March 2025| Final Environmental Impact Report
State Clearinghouse No. 2024071235

GREENBRIAR RESIDENTIAL DEVELOPMENT PROJECT

for City of Brea

Prepared for:

City of Brea
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PLACEWORKS

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1. Introduction

1.1 INTRODUCTION

This Final Environmental Impact Report (FEIR) has been prepared in accordance with the California Environmental Quality Act (CEQA) as amended (Public Resources Code §§ 21000 et seq.) and CEQA Guidelines (California Code of Regulations §§ 15000 et seq.).

According to the CEQA Guidelines, Section 15132, the FEIR shall consist of:

(a) The Draft Environmental Impact Report (DEIR) or a revision of the Draft;

(b) Comments and recommendations received on the DEIR either verbatim or in summary;

(c) A list of persons, organizations, and public agencies comments on the DEIR;

(d) The responses of the Lead Agency to significant environmental points raised in the review and consultation process; and

(e) Any other information added by the Lead Agency.

This document contains responses to comments received on the DEIR for the Greenbriar Residential Development Project during the public review period, which began December 13, 2024, and closed January 28, 2025. This document has been prepared in accordance with CEQA and the CEQA Guidelines and represents the independent judgment of the Lead Agency. This document and the circulated DEIR comprise the FEIR, in accordance with CEQA Guidelines, Section 15132.

1.2 FORMAT OF THE FEIR

This document is organized as follows:

Section 1, Introduction. This section describes CEQA requirements and content of this FEIR.

Section 2, Response to Comments. This section provides a list of agencies and interested persons commenting on the DEIR; copies of comment letters received during the public review period, and individual responses to written comments. To facilitate review of the responses, each comment letter has been reproduced and assigned a number (A-1 through A-3 for letters received from agencies and organizations, and R-1 for letters received from residents). Individual comments have been numbered for each letter and the letter is followed by responses with references to the corresponding comment number.

Section 3. Revisions to the Draft EIR. This section contains revisions to the DEIR text and figures as a result of the comments received by agencies and interested persons as described in Section 2, and/or errors and omissions discovered subsequent to release of the DEIR for public review.

The responses to comments contain material and revisions that will be added to the text of the FEIR. The City of Brea staff has reviewed this material and determined that none of this material constitutes the type of significant new information that requires recirculation of the DEIR for further public comment under CEQA Guidelines Section 15088.5. None of this new material indicates that the proposed Project will result in a significant new environmental impact not previously disclosed in the DEIR. Additionally, none of this material indicates that there would be a substantial increase in the severity of a previously identified environmental impact that will not be mitigated, or that there would be any of the other circumstances requiring recirculation described in Section 15088.5.

1.3 CEQA REQUIREMENTS REGARDING COMMENTS AND RESPONSES

CEQA Guidelines Section 15204 (a) outlines parameters for submitting comments, and reminds persons and public agencies that the focus of review and comment of DEIRs should be "on the sufficiency of the document in identifying and analyzing possible impacts on the environment and ways in which significant effects of the project might be avoided or mitigated. Comments are most helpful when they suggest additional specific alternatives or mitigation measures that would provide better ways to avoid or mitigate the significant environmental effects. At the same time, reviewers should be aware that the adequacy of an EIR is determined in terms of what is reasonably feasible. …CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters. When responding to comments, lead agencies need only respond to significant environmental issues and do not need to provide all information requested by reviewers, as long as a good faith effort at full disclosure is made in the EIR."

CEQA Guidelines Section 15204 (c) further advises, "Reviewers should explain the basis for their comments, and should submit data or references offering facts, reasonable assumptions based on facts, or expert opinion supported by facts in support of the comments. Pursuant to Section 15064, an effect shall not be considered significant in the absence of substantial evidence." Section 15204 (d) also states, "Each responsible agency and trustee agency shall focus its comments on environmental information germane to that agency's statutory responsibility." Section 15204 (e) states, "This section shall not be used to restrict the ability of reviewers to comment on the general adequacy of a document or of the lead agency to reject comments not focused as recommended by this section."

Written responses are prepared consistent with Section 15088 of Title 14 of the California Code of Regulations. Pursuant to this section, the level of detail contained in the response may correspond to the level of detail provided in the comment (i.e., responses to general comments may be general). In accordance with CEQA, Public Resources Code Section 21092.5, copies of the written responses to public agencies will be forwarded to those agencies at least 10 days prior to certifying the environmental impact report. The responses will be forwarded with copies of this FEIR, as permitted by CEQA, and will conform to the legal standards established for response to comments on DEIRs.

2. Response to Comments

Section 15088 of the CEQA Guidelines requires the Lead Agency (City of Brea) to evaluate comments on environmental issues received from public agencies and interested parties who reviewed the DEIR and prepare written responses.

This section provides all written responses received on the DEIR and the City of Brea's responses to each comment.

Comment letters and specific comments are given letters and numbers for reference purposes. Where sections of the DEIR are excerpted in this document, the sections are shown indented. Changes to the DEIR text are shown in underlined text for additions and ~~strikeout~~ for deletions.

2.1 LIST OF COMMENTERS

The following is a list of agencies and persons that submitted comments on the DEIR during the public review period.

Number Reference	Commenting Person/Agency	Date of Comment	Page No.
Agencies			
A1	Juaneño Band of Mission Indians, Acjachemen Nation-Belardes	January 14, 2025	2-3
A2	California Department of Transportation (Caltrans)	January 28, 2025	2-7
A3	California Department of Transportation (Caltrans)	February 24, 2025	2-15
Residents & Organizations			
R1	Miller Starr Regalia/BOSC	January 28, 2025	2-21

2.2 COMMENT LETTERS AND RESPONSES

2. Response to Comments

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LETTER A1 – Juaneño Band of Mission Indians, Acjachemen Nation-Belardes (1 page)

A1

From: Joyce Perry <kaamalam@gmail.com>
Sent: Tuesday, January 14, 2025 2:22 PM
To: Angel Castro <acastro@placeworks.com>
Cc: Pennington, Rebecca <rebeccap@ci.brea.ca.us>
Subject: Re: Greenbriar Residential Development Project Draft Environmental Impact Report (DEIR) - Notice of Availability (NOA)

Good Afternoon,

I am responding on behalf of the Juaneno Band of Mission Indians, Acjachemen Nation-Belardes to Notice of Availability of a DEIR for the Greenbar Residential Development Project. This project is located within our territory, and we wish to consult on this project as it moves forward. A1-1

Due to the sensitivity of the area we are in agreement with the mitigation measures requiring native monitoring. We ask that the language of TCR-1 is updated as follows, to include a requirement that all interested and culturally affiliated tribes are given the opportunity to monitor.

"Prior to the commencement of any ground disturbing activity at the Project site, the Project Applicant shall retain a total of three Native American Monitors, each approved by the tribes that consulted on this Project (the "Tribe" or the "Consulting Tribe"), and in concurrence with the City of Brea as the CEQA lead agency. The Applicant shall coordinate with each of the Consulting Tribes to develop an executed contract to pay for tribal monitors to be present during ground-disturbing activities. Prior to the issuance of any permit necessary to commence a grounddisturbing activity, a copy of the executed contract shall be submitted to the City of Brea Community Development Department.and an inadvertent discovery plan are put in place to minimize the potential impacts on buried cultural resources." A1-2

Thank you and we look forward to hearing from you.

Joyce Stanfield Perry
Húu'uni 'óomaqati yáamaqati- Teach peace

PAYOMKAWICHUM KAAMALAM

Payomkawichum Kaamalam - President
kaamalam.com

Juaneño Band of Mission Indians, Acjachemen Nation
Cultural Resource Director

2. Response to Comments

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A1. Response to Comments from Joyce Stanfield Perry, of the Juaneño Band of Mission Indians, Acjachemen Nation-Belardes, dated January 14, 2025.

A1-1 In accordance with Senate Bill (SB) 18 and Assembly Bill (AB) 52, the City reached out to Tribes identified by the Native American Heritage Commission (NAHC), including the Juaneño Band of Mission Indians, Acjachemen Nation (JBMIAN), on June 27, 2024, asking if they wished to consult with the City on this Project. Because no response was identified within the consultation time period for SB 18 (90 days – September 25, 2024) or AB 52 (30 days – July 27, 2024), consultation was determined to be concluded. This comment does not address the adequacy of the DEIR. This comment is noted for the record and no further response is required.

A1-2 The comment expresses agreement with the requirement for a Native American Monitor outlined in Mitigation Measure TCR-1. Mitigation Measure TCR-1 requires that the Project Applicant shall retain a total of two Native American Monitors, each approved by the tribes that consulted on this Project. The presence of two Native American Monitors ensures that impacts to Tribal Cultural Resources will be mitigated to less than significant levels. Additionally, nothing precludes the JBMIAN from coordinating with the applicant to send a Native American Monitor on a volunteer basis during ground disturbing activities. However, additional Native American Monitors are not warranted per CEQA.

2. Response to Comments

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LETTER A2 – California Department of Transportation (4 pages)

A2

CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, GOVERNOR

California Department of Transportation

DISTRICT 12
1750 East 4th Street, Suite 100 | SANTA ANA, CA 92705
(657) 328-6000 | FAX (657) 328-6522 TTY 711
https://dot.ca.gov/caltrans-near-me/district-12

January 28, 2025

Ms. Rebecca Pennington
Senior Planner
City of Brea
1 Civic Center Circle
Brea, CA. 92821

File: LDR/CEQA
SCH: 2024071235
12-ORA-2024-02703
SR 90, PM: 5.652
SR 57, PM: 20.08

Dear Ms. Pennington,

Thank you for including the California Department of Transportation (Caltrans) in the review of the Draft Environmental Impact Report (DEIR) for the Greenbrier Residential Development Project. The proposed Project would require demolition of the existing office building, parking structure, and parking lot, and subsequent construction and operation of 180 attached residential units on the 9.7acre site. Vehicular access to the residential property would be solely via Greenbriar Lane. No vehicular access would be provided to the Brea Plaza Shopping Center or directly to South Associated Road. Vehicular access to the Project site would require minor reconfiguration of Greenbriar Lane. The proposed Project would require a General Plan Amendment from General Commercial to Mixed-Use II and a Zone Change from C-G Zone to MU-II Zone. A2-1

The approximately 9.7-acre Project site (Assessor's Parcel Number 319-102-34) is located at the southwest corner of South Associated Road and Greenbriar Lane, at 1698 through 1700 Greenbriar Lane in Brea. The Project site is generally bounded by Greenbriar Lane to the north, the Fullerton Creek drainage channel and South Associated Road to the east, State Route 57 (SR-57) to the west, and the Brea Plaza Shopping Center and State Route 90 (SR-90) to the south.

State Route 90 and State Route 57 are both owned and operated by Caltrans. Therefore, Caltrans is a responsible agency on this project, and has the following comments:

A2-2

1. Please encourage the use of transit among future residents, visitors, and workers of the development. Increasing multimodal transportation will lead to a reduction to congestion, Vehicle Miles Traveled, and improve air quality.

2. Provide adequate wayfinding signage and related amenities for transit stops where needed within the project vicinity. A2-3

"Provide a safe and reliable transportation network that serves all people and respects the environment"

2. Response to Comments

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3. During construction, please ensure that appropriate detours and safety measures are in place that prioritize the mobility, access, and safety of bicyclists, pedestrians, and transit users. If adjacent sidewalks or bike lanes need to be closed during construction, please ensure that closures and detours are clearly signed. A2-4

4. As part of state goals to increase active transportation, Caltrans recommends the inclusion of secure and functional short- and long-term bike parking. Short-term bike parking at public/commercial locations should be placed in visible areas that are close to main entrances and should be installed at least 24" away from walls and other objects (e.g. trash cans, plants, etc.). Long-term bike storage for residential units should be provided indoors and on the ground floor. Both short- and long-term bike parking should be designed to accommodate different types of bikes (e.g. cargo bike, bike with trailer). For additional guidance on providing functional bike parking, see the attached "Essentials of Bike Parking" guidance created by the Association of Pedestrian and Bicycle Professionals (link to online PDF: https://www.apbp.org/Publications). A2-5

5. Consider adding pedestrian scale lighting along Greenbriar Ln to accommodate the larger number of pedestrians from the new residential buildings. A2-6

6. Consider adding raised crosswalks at the entrances of the project site and at the Recreation Center Connection to ensure safety for all road users. A2-7

7. Caltrans encourages the design of Complete Streets that include high-quality pedestrian, bicycle, and transit facilities that are safe and comfortable for users of all ages and abilities. Improvements may include providing comfortable connections to nearby active transportation and/or transit facilities. Complete Streets improvements also promote regional connectivity, improve air quality, reduce congestion, promote improved first-/last-mile connections, and increase safety for all modes of transportation. A2-8
   a. Potential Complete Streets improvements that would improve public safety include, but are not limited to, pedestrian-oriented LED lighting, high visibility crosswalks, curb extensions and bulb outs, and other improvements.

8. The project is close to an existing Class II bikeway on Associated Road. With that in mind, Caltrans recommends the inclusion of secure and functional short-term bike parking. Short-term bike parking at public locations should be placed in visible areas that are close to main destinations and should be installed at least 24" away from walls and other objects (e.g. trash cans, plants, etc.). With the increasing popularity of electric bikes and cargo/utility bikes, bike parking should also be designed to accommodate different styles, sizes, and weights of bikes (e.g. cargo bike, bike with trailer, adult tricycle, etc.). A2-9

"Provide a safe and reliable transportation network that serves all people and respects the environment"

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a. For additional guidance on bicycle parking best practices, see the "Essentials of Bike Parking" guidance created by the Association of Pedestrian and Bicycle Professionals (link to online PDF: https://www.apbp.org/Publications). A2-9 cont'd

9. Utilizing alley space or similar areas, if available, can reduce the need for on street parking which may conflict with highway/street flows. A2-10

10. Delivery areas need to be clearly marked so delivery drivers are easily seen by either on-street traffic or delivery employees. A2-11

11. Creation of emergency plans, that include emergency routes and paths, can alleviate congestion in the event of an emergency and allow EMS to easily access the site. A2-12

12. Consider offering pick-up point services or automated parcel systems (e.g. Amazon Lockers) so that deliveries can be made with one truck stop instead of multiple stops to individual residences. A2-13

13. Providing electric charging for personal vehicle use encourages adoption of electric or hybrid vehicles. Install or implement air pollution reductions strategies. A2-14

14. Please provide Appendix F2: Traffic Impact Study for review. It is not included in the DEIR nor the Appendices. A2-15

15. Any work performed within Caltrans right-of-way (R/W) will require discretionary review and approval by Caltrans and an encroachment permit will be required for any work within the Caltrans R/W prior to construction. Prior to submitting to Caltrans Permit's branch, applicant should fill out Applicant's Checklist to Determine Applicable Review Process (QMAP List) Form TR-0416 to determine if project oversight/coordination with Caltrans Project Manager is needed. Applicant must submit a signed Standard Encroachment Permit application form TR-0100 along with a deposit payable to Caltrans. Deposit amount will be dependent on when the application is submitted. Public corporations are legally exempt from encroachment permit fees. However, contractors working for public corporations are not exempt from fees. Please note that all utility work should be disclosed prior to permit submittal, and utility companies are to apply for separate permits for their corresponding work. A2-16

16. Project plans and traffic control plans must be stamped and signed by a licensed engineer. For all plans, including traffic control plans, Caltrans R/W lines should be clearly labeled, which includes existing and proposed (if there are any changes to Caltrans R/W), the north arrow, the edge of pavement, and edge of the sidewalk, if applicable. When submitting the application, please include final Environmental Clearance Documentation, relevant design details including design exception A2-17

"Provide a safe and reliable transportation network that serves all people and respects the environment"

2. Response to Comments

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approvals and construction and drainage plans, traffic control plans, traffic management plan and traffic impact study if proposed traffic delay of 30 minutes above normal recurring traffic delay is anticipated, any Caltrans R/W certifications if needed, maintenance agreement as needed, shoring plans for any excavation 5-feet or more, ADA certification, and any letter of authorizations. A2-17 cont'd

17. Please submit all applications and associated documents/plans via email to D12.Permits@dot.ca.gov until further notice. Caltrans Encroachment Permits will be transitioning to an online web portal base for all applications in Fall 2023. Further details to be announced on the Caltrans Encroachment Permits homepage. Additional information regarding encroachment permits may be obtained by contacting the Caltrans Permits Office at (657) 328-6246. For specific details on Caltrans Encroachment Permits procedure and any future updates regarding the application process and permit rates, please visit the Caltrans Encroachment Permits homepage at https://dot.ca.gov/programs/traffic-operations/ep. A2-18

Caltrans' mission is to provide a safe and reliable transportation network that serves all people and respects the environment. Please continue to coordinate with Caltrans for any future developments that could potentially impact State transportation facilities. If you have any questions, please do not hesitate to contact Julie Lugaro at Julie.lugaro@dot.ca.gov.

Sincerely, A2-19

Scott Shelley (Jan 28, 2025 12:55 PST)

Scott Shelley
Branch Chief,
Local Development Review-Climate Change-Transit Grants
Caltrans, District 12

"Provide a safe and reliable transportation network that serves all people and respects the environment"

A2. Response to Comments from Scott Shelley, Branch Chief, of the California Department of Transportation, dated January 28, 2025.

A2-1 Responses to comments provided by the California Department of Transportation (Caltrans) are provided in response to Comments A2-2 through A2-18 below. This is an introductory comment, which provides a summary of the proposed Project as set forth in the DEIR but does not address the adequacy of the DEIR. This comment is noted for the record and no further response is required.

A2-2 State Route (SR) 90 and SR-57 are owned and operated by Caltrans. The comment also states that the Project applicant should encourage multimodal transportation. This comment is noted for the record and no further response is required.

A2-3 The proposed Project would install wayfinding as necessary, which includes but is not limited to monument signs (i.e., stop signs) as identified by PPP TRAF-2, *Right-of-Way-Improvements*, and PPP TRAF-3, *Sight Distance Improvements*, in Section 5.12 of the DEIR. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. No further response is required.

A2-4 The proposed Project's circulation modification would be subject to approval by the City of Brea, including appropriate safety measures, as identified in PPP TRAF-2. The proposed Project would adhere to the prescribed safety measures and signage. This comment is noted for the record and no further response is required.

A2-5 Caltrans recommends increasing active transportation, including the installation of short- and long-term bike parking infrastructure. By virtue of being a mixed-use Project, the proposed Project encourages active transportation through walking and bicycling to adjacent commercial uses. Furthermore, each residential unit includes an enclosed garage, which could be used to safely store bicycles. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-6 This comment requests that the proposed Project consider adding pedestrian-scale lighting along Greenbriar Lane. Street lights already exist along Greenbriar Lane, providing pedestrian lighting for pedestrians using the existing sidewalk. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-7 This comment requests that the proposed Project consider raised crosswalks at the entrance to the proposed Project site and the recreation center connection. The proposed Project includes changes in pavement color and/or texture at important pedestrian crossings. Furthermore, the Project does not include a relationship to the

Recreation Center located on the north side of Greenbriar Lane. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-8 The comment suggests implementing Complete Street design, which would apply to surrounding arterial roadways, not internal neighborhood roads. The Project does not make any changes to surrounding arterial roadways and has not authority to make Complete Street improvements. Furthermore, as discussed in response to Comments A2-6 and A2-7, street lights exist along Greenbriar Lane and pedestrian crossings will be enhanced as necessary. The proposed Project would include painted curbs and high-visibility crosswalks, subject to approval by the City of Brea, as identified in PPP TRAF-2 in the DEIR. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-9 This comment continues to express the recommendation for short-term bike parking (refer to response A2-5). No further response is required.

A2-10 The proposed Project would include pedestrian pathways throughout the Project site that would connect to the public spaces on-site and the sidewalks along Greenbriar Lane and Associated Road; see Figure 3.5, *Conceptual Site Plan*, of the DEIR. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-11 The proposed Project is a residential project, and the Project site would not expect deliveries from heavy duty commercial trucks. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-12 The DEIR concluded that proposed Project construction and operation would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; see Section 5.6, *Hazards*. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-13 This comment states that the proposed Project should consider pick-up point services or an automated parcel system for a single stop. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A2-14 The proposed Project would provide six exterior electronic parking stalls; refer to Section 3.4.4, *Site Access and Parking*, of the DIER. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required

A2-15 Appendix F2, *Traffic Impact Analysis*, provides an analysis of level of service (LOS) impacts of the proposed Project. The full DEIR and all appendices have been accessible on the State's Office of Land Use and Climate Innovation (LCI), CEQAnet website, including Appendix F2. The City updated the link on the City website on January 28, 2025, to include Appendix F2.

It should be noted that Senate Bill (SB) 743 eliminated auto delay, vehicular capacity, or traffic congestion as the sole basis for determining significant impacts under CEQA. Therefore, the transportation analysis in the EIR relies on the vehicle miles traveled (VMT) analysis included in Appendix F1, *VMT Memorandum*, for transportation impacts under CEQA and does not rely on the automobile delay included in Appendix F2. Furthermore, the information in Appendix F2 was incorporated into the DEIR, specifically Section 5.12, *Transportation*. Lastly, the Commenter was provided Appendix F2 as soon as the City was notified of the absence of Appendix F2 on the City's website. As noted above, the website link on the City's website now includes Appendix F2.

As identified in CEQA Guidelines Section 15088.5, *Recirculation of an EIR prior to Certification*, none of the conditions that would trigger recirculation have been met. No changes to the analysis in the DEIR are affected. The delay in posting Appendix F2 on the City's website does not interfere with the public having meaningful consultation in reviewing the DEIR and providing feedback on the environmental impacts of the proposed Project. The CEQA Guidelines only require recirculation of an EIR if there is a new significant environmental impact, a substantial increase in severity of an environmental impact, or a feasible new project alternative or mitigation measure, or the DEIR was so fundamentally inadequate that meaningful public review and comment were precluded. None of these circumstances apply to the proposed Project.

A2-16 The Project would not encroach into Caltrans right-of-way; and therefore, not require any discretionary approvals or an encroachment permit by Caltrans. Refer to Table 3-2, *Actions Required*, of the DEIR, for all discretionary approvals. No further response is required.

A2-17 The proposed Project would not include any improvements within Caltrans right-of-way or the need to submit improvement plans to Caltrans for review; refer to response A2-16. This comment is noted for the record and no further response is required.

2. Response to Comments

A2-18 The Project would not require any discretionary approvals or an encroachment permit by Caltrans; refer to Table 3-2, *Actions Required*, of the DEIR, for all discretionary approvals. No further response is required.

A2-19 This comment serves as a conclusion to the comment letter, and requests continued coordination with Caltrans. This comment is noted for the record and no further response is required.

LETTER A3 – California Department of Transportation (3 pages)

A3

CALIFORNIA STATE TRANSPORTATION AGENCY

GAVIN NEWSOM, GOVERNOR

California Department of Transportation

DISTRICT 12
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(657) 328-6000 | FAX (657) 328-6522 TTY 711
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February 24, 2025

Ms. Rebecca Pennington
Senior Planner
City of Brea
1 Civic Center Circle
Brea, CA. 92821

File: LDR/CEQA
SCH: 2024071235
12-ORA-2024-02703
SR 90, PM: 5.652
SR 57, PM: 20.08

Dear Ms. Pennington,

Thank you for including the California Department of Transportation (Caltrans) in the review of Traffic Impact Study (TIS) for the Greenbrier Residential Development Project. The proposed Project would require demolition of the existing office building, parking structure, and parking lot, and subsequent construction and operation of 180 attached residential units on the 9.7acre site. Vehicular access to the residential property would be solely via Greenbriar Lane. No vehicular access would be provided to the Brea Plaza Shopping Center or directly to South Associated Road. Vehicular access to the Project site would require minor reconfiguration of Greenbriar Lane. The proposed Project would require a General Plan Amendment from General Commercial to Mixed-Use II and a Zone Change from C-G Zone to MU-II Zone. A3-1

The approximately 9.7-acre Project site (Assessor's Parcel Number 319-102-34) is located at the southwest corner of South Associated Road and Greenbriar Lane, at 1698 through 1700 Greenbriar Lane in Brea. The Project site is generally bounded by Greenbriar Lane to the north, the Fullerton Creek drainage channel and South Associated Road to the east, State Route 57 (SR-57) to the west, and the Brea Plaza Shopping Center and State Route 90 (SR-90) to the south.

State Route 90 and State Route 57 are both owned and operated by Caltrans. Therefore, Caltrans is a responsible agency on this project, and has the following comments:

1. Please update Intersection #5 & #6 LOS analysis with current Caltrans local timing and signal coordination timing plans (Ex: Yellow, All Red, Walk, FDW, cycle lengths, split times ….) for all peak hours. A3-2

2. Response to Comments

A3

2. HCM Analysis signal timing parameters should be conformed with city of Brea Transportation Impact Analysis guidelines. Note that the speed limit on EB & WB Imperial Hwy is 40 mph. A3-3

3. Update Section 7.0 Caltrans Queuing Analysis with the updated LOS analysis. A3-4

4. Any work performed within Caltrans right-of-way (R/W) will require discretionary review and approval by Caltrans and an encroachment permit will be required for any work within the Caltrans R/W prior to construction. Prior to submitting to Caltrans Permit's branch, applicant should fill out Applicant's Checklist to Determine Applicable Review Process (QMAP List) Form TR-0416 to determine if project oversight/coordination with Caltrans Project Manager is needed. Applicant must submit a signed Standard Encroachment Permit application form TR-0100 along with a deposit payable to Caltrans. Deposit amount will be dependent on when the application is submitted. Public corporations are legally exempt from encroachment permit fees. However, contractors working for public corporations are not exempt from fees. Please note that all utility work should be disclosed prior to permit submittal, and utility companies are to apply for separate permits for their corresponding work. A3-5

5. Project plans and traffic control plans must be stamped and signed by a licensed engineer. For all plans, including traffic control plans, Caltrans R/W lines should be clearly labeled, which includes existing and proposed (if there are any changes to Caltrans R/W), the north arrow, the edge of pavement, and edge of the sidewalk, if applicable. When submitting the application, please include final Environmental Clearance Documentation, relevant design details including design exception approvals and construction and drainage plans, traffic control plans, traffic management plan and traffic impact study if proposed traffic delay of 30 minutes above normal recurring traffic delay is anticipated, any Caltrans R/W certifications if needed, maintenance agreement as needed, shoring plans for any excavation 5-feet or more, ADA certification, and any letter of authorizations. A3-6

6. Please submit all applications and associated documents/plans via email to D12.Permits@dot.ca.gov until further notice. Caltrans Encroachment Permits will be transitioning to an online web portal base for all applications in Fall 2023. Further details to be announced on the Caltrans Encroachment Permits homepage. Additional information regarding encroachment permits may be obtained by contacting the Caltrans Permits Office at (657) 328-6246. For specific details on Caltrans Encroachment Permits procedure and any future updates regarding the application process and permit rates, please visit the A3-7

A3

Caltrans Encroachment Permits homepage at https://dot.ca.gov/programs/traffic-operations/ep. A3-7 cont'd

Caltrans' mission is to provide a safe and reliable transportation network that serves all people and respects the environment. Please continue to coordinate with Caltrans for any future developments that could potentially impact State transportation facilities. If you have any questions, please do not hesitate to contact Julie Lugaro at Julie.lugaro@dot.ca.gov.

Sincerely, A3-8

Scott Shelley (Feb 24, 2025 12:47 PST)

Scott Shelley
Branch Chief,
Local Development Review-Climate Change-Transit Grants
Caltrans, District 12

2. Response to Comments

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A3. Response to Comments from Scott Shelley, Branch Chief, of the California Department of Transportation, dated February 24, 2025.

A3-1 Responses to comments provided by the California Department of Transportation (Caltrans) are provided in response to Comments A3-2 through A3-8 below. This is an introductory comment, which provides a summary of the proposed Project as set forth in the DEIR but does not address the adequacy of the DEIR. This comment is noted for the record and no further response is required.

A3-2 State Route (SR) 90 and SR-57 are owned and operated by Caltrans. Pursuant to Senate Bill (SB) 743, level of service (LOS) metrics may no longer constitute the sole basis for determining transportation impacts under CEQA. The local timing and signal coordination timing for Intersections #5 and #6 in the LOS analysis are based on the Highway Capacity Manual (HCM) defaults. The purpose of the analysis is to compare with and without Project conditions to determine the effects of the proposed Project. Therefore, whether the analysis uses HCM defaults or Caltrans signal timing is irrelevant because the purpose of the study is to determine the effects of the proposed Project. The City and Caltrans can adjust signal timing to optimize the operation of the roadway network, which is outside of the scope and purpose of the LOS analysis. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required.

A3-3 See response to Comments A3-1 and A3-2. As indicated in Appendix F2, of the DEIR, conforms with the City of Brea Transportation Impact Analysis guidelines, which relies on the HCM analysis signal timing parameters. Based on HCM methodology, the imputed speed does not affect the delay/LOS calculations (i.e., it is an informational input for HCM calculations). As explained in response to Comment A3-2, the LOS analysis compares with and without Project conditions to understand the effect of the proposed Project. The changes in signal timing can help optimize the operation of the circulation network, however, the LOS analysis shows no proposed Project-related impacts to intersection operation, therefore, signal optimization is not necessary to accommodate the proposed Project. The comment identifies neither a deficiency in the DEIR's analysis nor a new or exacerbated potential significant environmental impact. This comment is noted for the record and no further response is required

A3-4 Pursuant to SB 743, LOS metrics may no longer constitute the sole basis for determining transportation impacts under CEQA. This comment requests that section 7.0, *Caltrans Queuing Analysis*, of Appendix F2 of the DEIR be updated with an updated LOS analysis. However, based on Comments A3-2 and A3-3 no changes to the LOS analysis are warranted. This comment is noted for the record and no further response is required.

2. Response to Comments

A3-5 The proposed Project would not include any improvements within Caltrans right-of-way or need to submit improvement plans to Caltrans for review (refer to response to Comment A2-16). This comment is noted for the record and no further response is required.

A3-6 The proposed Project would not include any improvements within Caltrans right-of-way or the need to submit improvement plans to Caltrans for review (refer to response to Comment A2-16). This comment is noted for the record and no further response is required.

A3-7 The proposed Project would not require any discretionary approvals or an encroachment permit by Caltrans (refer to refer to response to Comment A2-16). No further response is required.

A3-8 This comment serves as a conclusion to the comment letter, and requests continued coordination with Caltrans. This comment is noted for the record and no further response is required.

LETTER R1 – Miller Starr Regalia/BOSC (5 pages)

R1

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January 28, 2025

VIA EMAIL

Rebecca Pennington
Senior Planner, Planning Division
City of Brea
Brea City Hall – 3rd Floor,1 Civic Center Circle
Brea, CA 92821
Email: rebeccap@cityofbrea.net

Re: CEQA Greenbriar Residential Development Project

Dear Ms. Pennington:

Thank you for the opportunity to comment on the Draft Environmental Impact Report ("DEIR") prepared for the proposed Greenbriar Residential Development Project (the "Greenbriar Project") (State Clearinghouse No. 2024071235). We write on behalf of our client, BOSC, owner of the Brea Plaza Shopping Center, located at 1639 E. Imperial Highway, adjacent to the Greenbriar Project ("Brea Plaza"). As you know, BOSC has proposed a residential project on a portion of Brea Plaza ("Brea Plaza Living"). Applications for the Brea Plaza Living project were submitted before the Notice of Preparation of a DEIR for the Greenbriar Project was published on July 31, 2024. Given that the City previously certified a Final Environmental Impact Report for a smaller version of the pending Brea Plaza Living project, we anticipate that the project will be considered by the City early this year, with construction commencing in October and occupancy in early 2027.

R1-1

We believe that the DEIR is currently an inadequate informational document, as it fails to properly analyze and disclose the environmental impacts of the Greenbriar project as required by law. Most importantly, the Traffic Impact Study underpinning the Transportation, Greenhouse Gas, and Energy analysis, was not appended to the circulated DEIR. The DEIR should be revised and recirculated, including the Traffic Impact Study, before the City considers adopting approvals for the Greenbriar Project. Our other overarching concerns include, generally: 1) a lack of specificity in the Project Description resulting in inadequate evaluation of the project's environmental impacts, 2) the determination that Biological Resource impacts did not require analysis, (3) inconsistent and incorrect identification of the nearest sensitive receptor, and 4) an incomplete circulation analysis, with the potential for undisclosed and unmitigated transportation impacts. Detailed comments are attached as **Exhibit A**

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Offices: Walnut Creek / San Francisco / Newport Beach / Reno

2. Response to Comments

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hereto. We reserve the right to supplement these comments, including at public hearings, as the Greenbriar Project proceeds.

R1-1 cont'd

Again, we appreciate the opportunity to participate in review of the DEIR and thank you for taking the above comments into consideration. Should you have any questions regarding this letter, please contact the undersigned at (949) 688-2980 or ken.stahl@msrlegal.com.

Very truly yours,

MILLER STARR REGALIA

Kenneth A. Stahl

Kenneth A. Stahl

KAS:kli

Attachment: Exhibit A

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R1

EXHIBIT A

Detailed Comments on the DEIR for the Greenbriar Project

1. **Project Description Deficiencies**:

(a) Phasing. FN 2 on page 1-11 states: "The residential units would be released in phases as the market demands." It is not clear from the DEIR whether all units would be constructed in a single phase or over multiple phrases. If multiple phases, it may be possible for the project to locate residents on-site who would then become sensitive receptors themselves and should be identified and analyzed as such in the noise and AQ/GHG studies. R1-2

(b) Construction Staging. The DEIR does not disclose where construction staging will occur or whether any roads or sidewalks will close during construction. Without this information, transportation impacts during construction cannot be adequately analyzed or understood. R1-3

(c) USTs. Remediation of existing underground storage tanks (USTs) is not adequately described. It is not clear what the remediation will entail, which government agency will be the overseeing or permitting body. Please address how remediation will be accomplished without access from Brea Plaza, as the same has not been granted. R1-4

(d) Stationary Sources. The DEIR should address whether any generators will be located on-site and identify the proposed location of HVAC equipment. R1-5

(e) Utility Connections. Section 3.4.5 states that "off-site utility connections would occur within Greenbriar Lane and the Brea Plaza Shopping Center, which are located within existing streets and developed areas." Please note that the applicant for the Greenbriar Project does not have the property rights necessary to locate utility connections within the Brea Plaza Shopping Center, and utility connections should not be assumed to occur in that location. R1-6

(f) Parking. We understand that the Greenbriar Project will have 413 parking spaces in garages and stalls. Please describe the number of on-street parking spaces and parking spaces in driveways. Without a figure attached to on-street and driveway parking, the full circulation pattern cannot be understood. R1-7

(g) Development Agreement. The Project Description does not provide any details of the anticipated development agreement. For example, it is not clear whether the development agreement would require any applicant-constructed off-site improvements or other community benefits that should be analyzed in the DEIR. Will the development agreement allow for vesting for a number of years? If so, it is all the more likely that Brea Plaza Living will have residents on-site for the entire duration of the Greenbriar Project's construction and residents of Brea Plaza Living should be analyzed as the nearest sensitive receptor, as noted below. R1-8

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2. Response to Comments

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(h) Discretionary Approvals. The DEIR should explain whether Caltrans will issue any discretionary approvals for work in/on SR 57. Are any discretionary approvals required in connection with removing the USTs and remediating the PCE (DTSC, Water Board, etc.?) and locating residential uses on the project site? Does the Greenbriar Project require any discretionary approvals from the Orange County Board of Supervisors or the Orange County Flood Control District? R1-9

(i) Sustainability. Does the Greenbriar Project propose any sustainability features? Solar? EV? Bike parking, carshare, LEED certification, etc.? R1-10

(j) Indoor Air Quality. Despite the site's proximity to the freeway, the Project Description does not indicate whether or how air circulating indoors at the completed Greenbriar Project will be filtered of pollutants. R1-11

2. **Biological Resources**: It was determined without analysis that biological resources would not be significantly affected by the Project, despite its adjacency to the Fullerton Creek drainage channel. We believe this was an error, as we understand species of special status have been identified in and near the drainage channel. The project's impact on biological resources must be analyzed and disclosed. R1-12

3. **Nearest Sensitive Receptor:** Page 5.2-17 identifies the nearest off-site receptor for air quality purposes as the residences located 50 feet north of the project site on Greenbriar and south of the project site on South Associated Road. The Brea Plaza Living project was already in the development pipeline when the Greenbriar NOP was published; Brea Plaza Living residents should be analyzed as the nearest sensitive receptor. Also, as noted above, if project construction is phased, Greenbriar Project residents may themselves become sensitive receptors for later phases of construction. R1-13

- Cumulative Noise Analysis. In the Noise section on page 5.8-24, the analysis notes that construction at Greenbriar and Brea Plaza Living may occur at the same time but says that the nearest sensitive noise receptor would be located over 500 feet away so there is no significant cumulative impact. Why would the nearest sensitive receptor be located over 500 feet away in that circumstance but only 50 feet away for all other circumstances? R1-14

4. **Circulation**: How would traffic be metered onto Greenbriar from the two access points to avoid conflicts with existing traffic? The site plan in Figure 3-5 suggests that traffic hazards are possible, particularly because access points occur at a bend in the road. As flagged above, it remains unclear how many cars would be accommodated within the Greenbriar Project site, as on-street parking is not addressed in the project description. R1-15

- Figure 3-10 shows elimination of an ingress point to the project site (acknowledged on 5.10-8.) How will this affect traffic circulation into and around the site? R1-16

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- VMT counts on 5.12-12 subtract trips from Mercury building based on ITE code 710 (General Office), although building has been vacant for five years. The DEIR should explain whether and why this was appropriate. R1-17

- Figure 5.12-1 acknowledges creation of new driveway/intersection providing access through existing residential neighborhood to the north. Safety/traffic impacts are not analyzed. R1-18

- There is a danger of stacking and hazards with cars from Aurora to Redbay and Birch, as all traffic into the residential neighborhood will come through those access points. R1-19

5. **Traffic Impact Study**: The DEIR indicates several times that a Traffic Impact Study is attached as Appendix F2, but no such study is included in the Appendices circulated with the DEIR, and there is no "Appendix F2."[i] Please recirculate the DEIR with the Traffic Impact Study included with the materials. The Traffic Impact Study is so central to the analysis in the DEIR that the document's conclusions cannot be meaningfully understood – and the impacts of the Greenbriar Project cannot be adequately disclosed – without proper circulation of the Traffic Impact Study together with the DEIR. R1-20

6. **Alternatives**:

- The DEIR states that the Single-Family Detached Land Use Alternative was "rejected because it would not meet all of the Project objectives." Which objectives would this alternative fail to meet? Analyzed alternatives frequently do not meet every single project objective, so this is an inadequate reason to reject this alternative without analysis. Note also that it is not clear that the record does not demonstrate that the analyzed alternatives would "provide a comparable level of mitigation" to the Single-Family Detached Land Use Alternative, which was not analyzed. Reliance on Section 21159.26 is therefore inappropriate. R1-21

[i] References to the Traffic Impact Study as Appendix F2 appear on pages vi, 1-3, 4-8, 5.2-24, 5.2-31, 5.2-37, 5.4-11, 5.5-19, 5.8-17, 5.8-20, 5.8-21, 5.8-24, 5.12-1, 5.12-6, 5.12-7, 5.12-11, 5.12-16, 5.12-17, 5.12-19, and 13-8 of the DEIR.

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2. Response to Comments

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R1. Response to Comments from Kenneth A. Stahl, of Miller Starr Regalia on behalf of BOSC (owner of the Brea Plazza Shopping Center) dated January 28, 2025.

R1-1 The "Brea Plaza Living" project is adjacent to the Project site. Responses to comments written on behalf of BOSC in Exhibit A are provided in responses R2-1 through R2-21, below. City staff has reviewed the EIR and determined that none of this material constitutes significant new information requiring recirculation of the DEIR under CEQA Guidelines Section 15088.5. None of the comments contain substantial evidence that the proposed Project will result in a significant new environmental impact not previously disclosed in the DEIR, a significant increase in the severity of a previously identified environmental impact that will not be mitigated, or any of the other circumstances requiring recirculation described in Section 15088.5 of the CEQA Guidelines. Specifically, Chapter 3, *Project Description*, provides a complete, clear and consistent description of the proposed Project (see Responses R1-2 through R1-11). Section 8.2, *Biological Resources*, adequately describes the biological resources impacts (see response R1-12). Section 5.12, *Transportation*, provides a comprehensive analysis of the proposed Project's transportation impacts (see responses R1-13 through R1-20).

R1-2 As outlined by Section 3.4.7, *Construction Phase*, the Project description outlines that equipment-intensive construction subphases, such as demolition, grading and off-site improvements, would occur before construction of residential buildings. Construction of the proposed Project would not occur in multiple construction "phases." However, similar to other residential construction projects, residential units would be released per market demand. It should be noted that impacts of Project construction on the proposed Project are not impacts under CEQA. As identified in Section 5.2, *Air Quality*, the DEIR identifies the significant effects of the proposed Project on the environment, not the significant effects of the environment on the proposed Project (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369 [Case No. S213478]). The court stated the following:

> In light of CEQA's text, statutory structure, and purpose, we conclude that agencies generally subject to CEQA are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users. In those specific instances, it is the project's impact on the environment—and not the environment's impact on the project—that compels an evaluation of how future residents or users could be affected by exacerbated conditions.

The DEIR determined that the proposed Project would not risk exacerbating existing environmental hazards or conditions, and there is no special circumstance that requires evaluation of the existing environment's impact on the proposed Project. The court

further stated that "ordinary CEQA analysis is concerned with a project's impact on the environment, rather than with the environment's impact on a project and its users or residents." Furthermore, Section 21060.5 defines "environment" as "the physical conditions which exist within the area which will be affected by a proposed project, including land, air, water, minerals, flora, fauna, noise, objects of historic or aesthetic significance."

As a result, an analysis of health risk of Project construction on future residents at the Project site is not warranted. Additionally, vertical building construction and painting phases do not warrant use of heavy construction equipment that would have the potential to generate substantial pollutant concentrations.

As part of the DEIR, a health risk assessment (HRA) regarding the Project's impact on the environment concluded that the proposed Project would not exceed the South Coast Air Quality Management District's significance thresholds (see DEIR Appendix C2). The comment identifies neither a deficiency in the EIR's analysis nor a new or exacerbated potentially significant environmental impact. The comment also does not provide evidence that contradicts the technical analysis provided in the DEIR.

R1-3 Project construction and staging would occur on the Project site and as identified by PPP TRAF-2 of the DEIR (see Section 5.12 of the DEIR). However, the exact location of the staging area within the Project site is not known at this time. Refer to Section 5.12, *Transportation*, of the DEIR for emergency access during construction (see DEIR page 5.12-17). Construction vehicles would access the site via Greenbriar Lane and Associated Road. The location of the staging area onsite would not alter the access route for construction vehicles. No access would be taken through the Brea Plaza site. The comment identifies neither a deficiency in the EIR's analysis nor a new or exacerbated potentially significant environmental impact. The comment also does not provide evidence that contradicts the technical analysis provided in the DEIR.

R1-4 Refer to Section 5.6, *Hazards*, which outlines potential environmental impacts from removal of the underground storage tanks (UST) on the Project site. As identified in the DEIR (see pages 5.6-11 through 5.6-12), there is no indication that any leakage or potential threat to groundwater has occurred, and no "remediation" is anticipated on-site associated with removal of the USTs. The removal of the USTs would be completed with oversight from the regulatory agencies, as necessary. Further, because the entire site would be disturbed during construction, removal of the USTs would not require access from Brea Plaza. Construction access would be via Greenbriar Lane and Associated Road. The comment identifies neither a deficiency in the EIR's analysis nor a new or exacerbated potentially significant environmental impact. The comment also does not provide evidence that contradicts the technical analysis provided in the DEIR. No further response is required.

R1-5 Operation of the proposed Project would not require generators. Underground electrical service will be provided to each dwelling unit. While residential units would be equipped with heating, ventilation, and air conditioning (HVAC) units, the location of these units is not known at this time. Nonetheless, the DEIR evaluated potential noise impacts of the HVAC equipment in Section 5.8, *Noise*, and energy impacts from use of HVAC equipment are also accounted for in the air quality, energy, and greenhouse gas (GHG) emissions analyses in the DEIR. The location of HVAC equipment does not present new or unknown information that would exacerbate a potentially significant environmental impact. As such, this comment does not identify a deficiency in the EIR's analysis or provide evidence that contradicts the technical analysis provided in the DEIR, and no further response is required.

R1-6 The City of Brea maintains an easement within the Brea Plaza Shopping Center for water utilities. Additionally, an easement for electrical utilities to serve the Project site also crosses the Brea Plaza Shopping Center. Therefore, the proposed Project includes utility connections within the existing easements in the Brea Plaza Shopping Center. The off-site utility connections at the Brea Plaza Shopping Center would occur solely within the existing easements. Further, this comment is not a CEQA issue and does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-7 The proposed Project provides 342 garage parking spaces and 55 exterior parking stalls for a total of 397 parking spaces on the Project site. Refer to Figure 3-5, *Conceptual Site Plan*, for a visual representation of the proposed Project's parking spaces, which include on-street parking within the Project site. No further response is required.

R1-8 The proposed Development Agreement does not have any requirements for improvements that would have a physical impact on the environment that are not addressed in the DEIR.

The DEIR did evaluate the Brea Plaza Living project as a cumulative project (see Table 4-1, *Cumulative Projects in the City*). As such, residents in the Brea Living Plaza site were considered potential sensitive receptors; refer to Section 5.2, *Air Quality* (pages 5.2-32 through 5.2-33), and Section 5.8, *Noise* (pages 5.8-23 through 5.8-14).

R1-9 Refer to Table 3-2, *Actions Required*, for discretionary approvals associated with the proposed Project. The Project would not require discretionary approval from Caltrans, the Orange County Board of Supervisors, the Department of Toxic Substances Control (DTSC), or the Orange County Flood Control District. Refer to comment R1-4 for additional information on the USTs. Though the proposed Project requires removal of the USTs, remediation that would require discretionary approval from DTSC is not anticipated. No improvements or encroachment permits are required from Caltrans for the proposed Project. No improvements are proposed within the flood control channel that would require discretionary approvals from the Orange County Board of

Supervisors or the Orange County Flood Control District. This comment does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-10 This comment does not identify a deficiency in the EIR's analysis, and no further response is required. The proposed Project would be required to be constructed to achieve the latest requirements identified in the California Green Building Standards Code (CALGreen). This includes garages with outlets for electric vehicle charging, enhanced energy efficiency upgrades and solar panels to offset the proposed Project's energy use. In addition, Mitigation Measure GHG-1 requires that the residential buildings' primary energy systems are electric and adhere to existing regulations regarding renewable energy and energy efficiency. Refer to Table 5.4-1, *State Energy Regulations*, which summarizes the mandatory requirements of CALGreen and California's Building Energy Efficiency Standards.

R1-11 See response to Comment R1-2. The DEIR identifies the significant effects of the proposed Project on the environment, not the significant effects of the environment on the proposed Project (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369 [Case No. S213478]).

The proposed Project is required to adhere to the minimum efficiency report value requirements for HVACs in the California Building Code. The California Building Code (Title 24), Part 6 (California Building and Energy Efficiency Standards) and Part 11 (CALGreen), have standards for enhanced filtration for non-residential buildings. Under Title 24, Part 6, Section 120.1(b)(1)(C) and Part 11 (Section 5.504.4.5.3), nonresidential buildings are required to use Minimum Efficiency Reporting Value (MERV)-13 filters. As a result, compliance with existing regulations is sufficient to ensure a healthy indoor air quality environment. This comment does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-12 Biological resources impacts, including potential impacts to Fullerton Creek, were evaluated in the DEIR (refer to Section 8.2, *Biological Resources*). The proposed Project does not include any improvements or alterations to the Fullerton Creek drainage channel. While the proposed Project would discharge stormwater flows into the existing flood control channel via the existing connection, the proposed Project would reduce peak discharge rates in the developed condition compared to the existing condition and install a modular wetland system to treat runoff prior to discharge to receiving waters (refer to Section 8.5, *Hydrology and Water Quality,* of the DEIR for additional information). No direct or indirect impacts to sensitive species would occur since the proposed Project does not involve improvements or alternatives to the Fullerton Creek drainage channel. The comment identifies neither a deficiency in the EIR's analysis nor a new or exacerbated potentially significant environmental impact. The comment also does not provide evidence that contradicts the technical analysis provided in the DEIR.

R1-13 See response to Comment R1-2 regarding impacts of Project construction on the future residents of the proposed Project, which are not impacts under CEQA.

See response to Comment R1-8; the Brea Plaza Living project is identified as a sensitive receptor in the DEIR. Section 5.2, *Air Quality*, identified that the Project would not result in a cumulatively considerable health risk impact to off-site receptors during construction after mitigation (including Brea Plaza Living project) and does not generate toxic air containments (TACs) during operation that would impact off-site receptors.

R1-14 The Brea Plaza Living project is included as a sensitive receptor for noise impacts. Distances applied to project construction noise are not measured from the Project boundary to nearest noise sensitive receptor property line. Rather, construction noise is typically evaluated by applying distances from the acoustical center of the construction area to account for construction equipment that moves throughout the site, such as during grading or site preparation, or from the type of construction activity with a discrete location, such as building construction or paving to the nearest sensitive receptor property line. Additionally, construction noise impacts are based on an 8-hour average of construction noise impacts generated on the Project site. Revisions have been made to the cumulative impacts within Section 5.8, *Noise*, to better clarify the identified misconception (refer to Chapter 3, *DEIR Revisions in Response to Written Comments,* of this FEIR).

R1-15 The proposed Project has two access driveways on Greenbriar Lane. These access points are the sole access to the proposed Project site at buildout. The intersection of Associated Road and Greenbriar Lane is stop controlled and would remain stop controlled with implementation of the proposed Project. However, as described in Chapter 3, *Project Description*, Greenbriar Lane would be reconfigured, and the two new internal access roads would connect at "t-intersections" to accommodate the proposed Project per the City's roadway standards. The proposed Project would also add a stop sign at the Project Driveway No. 2 and Greenbriar Lane. In addition, the proposed Project would adhere to the requirements set by PPP TRAF-3, *Sight Distance Improvements*, to avoid conflicts with existing traffic. As discussed in Impact 5.12-1, the Project would not result in traffic hazards. The DEIR concluded that no hazards were related to site design or vehicle queuing (see pages 5.12-16 through 5.12-18), and PPP TRAF-3, *Sight Distance Improvements*, would further assist in avoiding conflicts with traffic hazards.

The comment on the number of cars accommodated within the Project site and on-street parking is not a comment on the physical impacts of the Project on the environment. Section 5.12, *Transportation*, evaluates potential transportation impacts of the proposed Project based on vehicle miles traveled (VMT) in accordance with Senate Bill 743. As identified on page 3-22 of the DEIR, the proposed Project includes a total of 413 parking spaces (342 garage spaces and 51 exterior parking stalls). However, it is the residential units that attract vehicle trips. The presence or absence of on-street

parking does not affect the number of vehicle trips the proposed Project generates. This comment does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-16 A level of service (LOS) analysis was conducted to show how traffic circulation into and out of the Project site would occur with implementation of the proposed Project (see Appendix F2). However, SB 743 eliminated auto delay, vehicular capacity, or traffic congestion as the sole basis for determining significant impacts under CEQA. Therefore, the analysis in the DEIR is based on the City's transportation thresholds adopted in accordance with SB 743. This comment does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-17 The VMT analysis for the proposed Project was conducted in accordance with the City's significance thresholds and methodology to comply with SB 743. The City's Traffic Engineer reviewed and approved the traffic scoping agreement to ensure that the VMT analysis was consistent with City of Brea's VMT guidelines. As outlined on page 5.12-8, the City's VMT thresholds are based on the Brea General Plan buildout, which includes operation of the Project site as an office use; therefore, the difference between the existing land use and the proposed land use is used for the SB 743 VMT threshold determination (see Appendix F1).

R1-18 See response to Comments R1-15 though R-17. Safety hazards associated with the creation of the new driveways were evaluated under Impact 5.12-3 on pages 5.12-16 through 5.12-18 of the DEIR. As identified in the DEIR, no significant safety hazards were identified with the creation of the new driveways. The comment also does not provide evidence that contradicts the technical analysis provided in the DEIR.

R1-19 The commenter's statement is incorrect. As identified in Section 5.12, *Transportation*, and in Appendix F2, Associated Road would also be utilized to convey vehicles. Exhibit 4-1, Project Trip Distribution, of DEIR Appendix F2 provides an overview of the distribution of vehicle tripes from the Project site; which would include 10 percent of trips on Associated Road, 25 percent of trips westbound on Birch, 10 percent eastbound on Beach, 10 percent west- and eastbound each on Imperial Highway, 5 percent on Placentia Avenue, and overall 30 percent on State Route 57. Additionally, as concluded in the DEIR Section 5.12, *Transportation*, "the proposed Project would not worsen queuing or stacking at the nine study intersections." For additional information, refer to Section 5.12, *Transportation*, and Appendix F2 of the DEIR. This comment does not identify a deficiency in the EIR's analysis, and no further response is required.

R1-20 Appendix F2, *Traffic Impact Analysis*, provides an analysis of level of service (LOS) impacts of the proposed Project. The full DEIR and all appendices have been accessible on the State's Office of Land Use and Climate Innovation (LCI), CEQAnet website,

including Appendix F2. The City has updated the link on the City website on January 28, 2025, to include Appendix F2.

As identified in response to Comment R1-16, SB 743 eliminated auto delay, vehicular capacity, or traffic congestion as the sole basis for determining significant impacts under CEQA. Therefore, the transportation analysis in the EIR relies on the VMT analysis in Appendix F1, *VMT Memorandum*, for transportation impacts under CEQA and does not rely on the automobile delay analysis in Appendix F2. Furthermore, the information in Appendix F2 was incorporated into the DEIR, specifically Section 5.12, *Transportation*. Lastly, the Commenter was provided with Appendix F2 as soon as the City was notified of the absence of Appendix F2 on the City's website. As noted above, the website link on the City's website now includes Appendix F2.

As identified in CEQA Guidelines Section 15088.5, Recirculation of an EIR prior to Certification, none of the conditions that would trigger recirculation have been met. No changes to the analysis in the DEIR are affected. The delay in posting Appendix F2 on the City's website does not interfere with the public having meaningful consultation in reviewing the DEIR and providing feedback on the environmental impacts of the proposed Project. The CEQA Guidelines only require recirculation of an EIR if there is a new significant environmental impact, a substantial increase in severity of an environmental impact, or a feasible project alternative or mitigation measure or if the DEIR was so fundamentally inadequate that meaningful public review and comment were precluded. None of these circumstances apply to the proposed Project.

R1-21 See Section 7.2, *Alternatives Considered and Rejected During the Scoping/Project Planning Process*. While the Single-Family Detached Land Use alternative would create land uses that are more aligned with the residential neighborhoods surrounding the Project site to the north and east, this alternative is rejected and considered infeasible because it would result in a substantial reduction in housing units compared to the proposed Project. Per Section 21159.26, Reductions in Housing Units as Mitigation Discouraged, of the CEQA Statues, "A public agency may not reduce the proposed number of housing units as a mitigation measure or project alternative for a particular significant effect on the environment if it determines that there is another feasible specific mitigation measure or project alternative that would provide a comparable level of mitigation." Additionally, the single-family detached product would result in fewer housing units, and therefore would not meet the objectives to the extent that the proposed Project does. Therefore, this alternative was rejected.

The DEIR includes a reasonable range of alternatives that have the potential to feasibly attain most of the basic objectives of the proposed Project but may avoid or substantially lessen any of the significant effects of the Project. As discussed in Chapter 7, *Alternatives*, and above, further analysis of the Single-Family Detached Land Use alternative is not required because it would result in fewer housing units than the proposed Project.

3. Revisions to the Draft EIR

3.1 INTRODUCTION

This section contains revisions to the DEIR based upon (1) additional or revised information required to prepare a response to a specific comment; (2) applicable updated information that was not available at the time of DEIR publication; and/or (3) typographical errors. This section also includes additional mitigation measures to fully respond to commenter concerns as well as provide additional clarification to mitigation requirements included in the DEIR. The provision of these additional mitigation measures does not alter any impact significance conclusions as disclosed in the DEIR. Changes made to the DEIR are identified here in ~~strikeout text~~ to indicate deletions and in <u>underlined text</u> to signify additions.

None of the revisions to the DEIR require recirculation of the document. Recirculation is only required when significant new information is added. Information is not significant unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect or a feasible way to mitigate or avoid such an effect. Recirculation is not required where the new information merely clarifies, amplifies, or makes insignificant modifications. (CEQA Guidelines Section 15088.5.) As explained below, none of the changes adds any new significant information and recirculation is not required.

3.2 DEIR REVISIONS IN RESPONSE TO WRITTEN COMMENTS

The following text has been revised in response to comments received on the DEIR.

The following Figures have been updated as part of the FEIR as a result of minor changes to the site plan. The updated figures can be found in Appendix A of the FEIR.

Page 1-13, Chapter 1, *Executive Summary*, Figure ES-4, *Conceptual Site Plan***.**

Page 3-23, Chapter 3, *Project Description*, Figure 3-5, *Conceptual Site Plan.*

Page 3-39, Chapter 3, *Project Description*, Figure 3-10, *Fencing and Walls.*

Page 3-39, Chapter 3, *Project Description*, Figure 3-11, *Pedestrian Connectivity.*

Page 5.14-25, Section 5.14, *Utilities and Service Systems*, Figure 5.14-2, *Proposed Hydrology.*

Page 8-13, Chapter 8, *Impacts Found Not to Be Significant*, Figure 8-1, *Water Quality Management Plan: BMP Site Plan.*

3. Revisions to the Draft EIR

The following technical studies have been updated and can be found as Appendices to the FEIR:

Appendix C. Updated Preliminary Sewer System Hydraulic Analysis (Appendix G1 of the DEIR)

Appendix D. Updated Preliminary Hydrology Analysis for Greenbriar Residential Development Project (Appendix G2 of the DEIR)

Appendix E. Updated Preliminary/Conceptual Water Quality Management Plan (Appendix G3 of the DEIR)

Appendix F. Updated Preliminary Water System Hydraulic Analysis (Appendix J of the DEIR)

Page 3.22, Chapter 3, *Project Description*. The following text has been updated to provide greater clarity on landscaping and open space

The proposed Project would include ornamental landscaping throughout the site, as shown on Figure 3-5. The proposed landscaping includes 104,785 square feet of ornamental landscaping, 39,995 square feet of common open landscape area ~~(planting improvements)~~ and 7,569 square feet of private open space landscape area. The Project also includes 35,423 square feet of common hardscape area.

Page 3.22, Chapter 3, *Project Description*. The following text has been updated in response to changes to the site plan and proposed Project's parking space count.

A total of ~~413~~ 397 parking spaces would be provided for the Project site, in which 342 spaces are provided as garage spaces and 55 ~~51~~ spaces are provided as exterior parking stalls. Electric vehicle parking would be provided at ~~6~~ 5 exterior parking stalls onsite.

Page 5.7-6, Section 5.7, *Land Use*. The following text has been updated to provide greater clarity on landscaping and open space

- **Open Space Requirements.** Development in the MU-II zone is required to provide a minimum of 75 square feet per dwelling unit of common residential open space and a minimum of 50 square feet per dwelling unit of private open space. The proposed Project would include 104,785 square feet of ornamental landscaping, 39,995 square feet of common open space landscape area and 35,423 square feet of common hardscape area. Therefore, the proposed Project would meet the open space requirements of the MU-II zone.

Page 5.8-24, Section 5.8, *Noise*. The following text has been in response to Comment R1-14.

…Potential overlap of construction of the proposed P~~p~~roject and the Brea Plaza Living project would not expose noise sensitive uses to cumulative construction noise impacts due to the distance to the nearest noise sensitive receptor ~~(over 500 feet)~~ and intervening building facades providing acoustical shielding and reducing direct line of sight to construction activities. Therefore, the Project would not contribute to a significant cumulative construction noise impact.

Pages 5.13-7 and 5.13-8, Section 5.13, *Tribal Cultural Resources*. Mitigation Measure TCR-1 has been modified to include language requested by the Consulting Tribes.

TCR-1 Prior to the commencement of any ground disturbing activity at the Project site, the Project Applicant shall retain a total of two Native American Monitors, each approved by the tribes that consulted on this Project pursuant to Assembly Bill AB52 (the "Tribe" or the "Consulting Tribe"), and in concurrence with the City of Brea as the CEQA lead agency. The Applicant shall coordinate with each of the Consulting Tribes to develop an executed contract to pay for tribal monitors to be present during ground-disturbing activities. Prior to the issuance of any permit necessary to commence a ground-disturbing activity, a copy of the executed contract shall be submitted to the City of Brea Community Development Department.

- The Tribal monitors will only be present during on-site and off-site portions of the area included as part of the Project grading or improvement permits during the construction phases that involve ground-disturbing activities. Ground disturbing activities are defined by the Tribes as activities that may include, but are not limited to, pavement removal, potholing or auguring, grubbing, tree removals, boring, grading, excavation, drilling, and trenching, within the Project area. The Tribal Monitors will complete daily monitoring logs that will provide descriptions of the day's activities, including construction activities, locations, soil, and any cultural materials identified. The on-site monitoring shall end when all ground-disturbing activities on the Project Site are completed, or when the Tribal Representatives and Tribal Monitors have indicated that all upcoming ground-disturbing activities at the Project Site have little to no potential for impacting Tribal Cultural Resources.
- Upon discovery of any Tribal Cultural Resources, construction activities shall cease in the immediate vicinity of the find (not less than the surrounding 100 feet) until the find can be assessed. All Tribal Cultural Resources unearthed by Project activities shall be evaluated by the qualified archaeologist and Tribal monitors approved by the Consulting Tribes. If the resources are Native American in origin, the Consulting Tribes will have the on-site archeologist perform data recovery and secure the item(s) in their lab until the Project is completed on which consulting tribes will determine the best course of

action ~~retain it/them in the form and/or manner the Tribes deems appropriate, for educational, cultural and/or historic purposes~~.

- If human remains and/or grave goods are discovered or recognized at the Project Site, all ground disturbance shall immediately cease within 100 feet of discovery, and the county coroner shall be notified per Public Resources Code Section 5097.98, and Health & Safety Code Section 7050.5. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2).
- Work may continue on other parts of the Project Site while evaluation and, if necessary, mitigation takes place (CEQA Guidelines Section 15064.5[f]).
- If a non-Native American resource is determined by the qualified archaeologist to constitute a "historical resource" or "unique archaeological resource," time allotment and funding sufficient to allow for implementation of avoidance measures, or appropriate mitigation, must be available. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and PRC Sections 21083.2(b) for unique archaeological resources.
- Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any qualifying historic archaeological resource deemed significant by a qualified archaeologist as a "historical resource" or "unique archaeological resource", shall be curated at a public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, it shall be offered to a local school or historical society in the area for educational purposes.

Page 5.14-1, Section 5.14, *Utilities and Service Systems*. The following text has been as a result of updates to technical studies identified as Appendices G1, G2, and G3, respectively, in the DEIR.

... The analysis in this section is based in part on the following technical studies:

- *Preliminary Sewer System Hydraulic Analysis,* Hunsaker & Associates Irvine, January 2025 ~~July 2024~~
- *Preliminary Hydrology Analysis for Greenbriar Residential Development Project*, Hunsaker & Associates Irvine, January 9, 2025 ~~July 2024~~
- *Preliminary/Conceptual Water Quality Management Plan*, Hunsaker & Associates Irvine, March 3, 2025 ~~July 2024~~

Pages 5.14-6 to 5.14-8, Section 5.14, *Utilities and Service Systems*. The following text has been in response to updated Appendices G1, G2, and G3, respectively.

Sewer Infrastructure

No wastewater is currently being produced at the Project site because the existing office building is currently vacant. The proposed Project would increase wastewater flows compared to current conditions. However, historically the Project site did produce wastewater flows associated with its former use as an office building. The total estimated average dry weather sewer flow at the Project site with implementation of the proposed Project would be 0.041 ~~0.038~~ mgd, as shown in Table 5.14-3, *Greenbriar Site Sewer Flow*. The estimated peak wet weather flow is 0.1185 ~~0.109~~ mgd. The existing sewer lines would be used to convey flows from the proposed buildings.

~~Table 5.14-3 Greenbriar Site Sewer Flow~~

~~Units (Du)~~	~~Duty Factor (Gpd/Du)~~	~~Average Dry Weather Flow (Mgd)~~	~~Peak Wet Weather Flow (Mgd)~~
~~Proposed Residential Development Type~~			
~~179~~	~~210~~	~~0.038~~	~~0.109~~

~~Source: Hunsaker and Associates 2024c (see Appendix G1).~~
~~Notes: mgd: million gallons per day~~

Table 5.14-3 Greenbriar Site Sewer Flow

Proposed Residential Development Type	Units (Du)	Duty Factor (Gpd/Du)	Average Dry Weather Flow (Mgd)	Peak Wet Weather Flow (Mgd)
Multi-Family Residential	99	248	0.0246	N/a
High Density Residential	88	210	0.0168	N/a
Totals:	179	N/a	0.0414	0.1185

Source: Hunsaker and Associates 2024c (see Appendix G1).
Notes: mgd: million gallons per day

The existing 8-inch sewer main at Greenbriar Lane would be used to convey flows from the proposed uses on-site. From there the sewer would connect to the existing 12-inch sewer main on Associated Road to combine with flows from the surrounding area.

~~The Preliminary Sewer System Hydraulic Analysis analyzed the sewer flow from the Mercury Insurance Complex when it was still operational and found that the proposed Project would contribute less sewer flow to the existing sewer mains than flows associated with the former Mercury Insurance Complex. Additionally, t~~ The existing sewer system~~'s~~ has the capacity and ability to accept additional flows from the proposed Project, which were calculated using the existing flows in the existing sewer system without accounting for the loss of flows from the removal of the Mercury Insurance Complex.

The flow under peak wet weather conditions, including flows from the proposed Project, resulted in a depth-to-pipe-diameter ratio of 0.68 ~~066~~ in the existing 8-inch sewer main in Greenbriar Lane, which is below the 0.75 design limit (see Appendix G1). Additionally, the flow during peak wet weather conditions to the 12-inch sewer main on Associated Road resulted in a maximum depth-to-pipe-diameter ratio of 0.45, which is below the 0.75 design limit (see Appendix G1). Therefore, all the existing sewer lines have adequate capacity to convey the proposed Project's wastewater flows in addition to existing flow, and impacts are less than significant.

The additional sewer flows from the proposed Project would be treated at OCSD's treatment plants, which treat a total of 180 mgd (OCSD 2023a). OCSD had previously treated flows from the former Mercury Insurance building and the projected flows for the proposed P~~p~~roject are less than the Mercury Insurance building flows. The proposed Project's sewer flows would be less than 1 percent of the city's total average dry weather flow of 4.8845 ~~8.082~~ mgd as calculated in Table 5.14-1, and would represent less than 0.1 percent of the total daily flows of 180 mgd treated at OCSD's treatment plants. Therefore, there is adequate residual wastewater treatment capacity in the region for the wastewater generated by the proposed Project…

Page 5.14-8, Section 5.14, *Utilities and Service Systems*. The following text has been in response to updated Appendices G1, G2, and G3, respectively.

Wastewater Treatment Capacity Impacts

The area considered for cumulative impacts to sewage services is OCSD, which serves 2.6 million people. The proposed Project would be less than one percent of the City's total average dry weather flow of 4.8845 ~~8.082~~ mgd as calculated in Table 5.14-1, and it is expected that with both treatment plants OCSD would have adequate wastewater treatment capacity for wastewater generation by cumulative developments in its service area. No significant cumulative impact is anticipated, and buildout of the proposed Project would not contribute to a significant cumulative impact.

Page 5.14-8, Section 5.14, *Utilities and Service Systems*. The following text has been in response to updated Appendices G1, G2, and G3.

Table 5.14-6, *Existing and Proposed Water Use,* shows the existing and proposed indoor and outdoor water use for the Project site. As identified above, despite the fact that the Project site operated as the Mercury Insurance office building, existing water demand is zero. Therefore, the proposed Project would result in a net increase of approximately 53 ~~50~~ afy. This estimate is also conservative because it is based on sewer generation rates, which are used for infrastructure sizing and do not account for reductions in water use from new construction with low-flow plumbing fixtures and water conservation efforts. Additionally, the proposed Project would not generate a water demand equivalent to 500 residential units; and therefore, a Water Supply Assessment pursuant to SB 610 is not required.

Table 5.14-6 Existing and Proposed Water Use

	Existing Conditions		Proposed Conditions		Net Change	
	Gallons per day (gpd)	Acre-feet per year (afy)	Gallons per day (gpd)	AFY	Gallons per day (gpd)	Acre-feet per day ~~year~~ (afd ~~y~~)
Indoor Water Use[1]	0	0	45,540 ~~42,214~~	51.0 ~~47.3~~	45,540 ~~42,214~~	51.0 ~~47.3~~
Outdoor Water Use[2]	0	0	2,626	2.9	2,626	2.9
Total Water Use	0	0	48,166 ~~44,840~~	52.9 ~~50~~	48,166 ~~44,840~~	52.9 ~~50~~

[1] Interior water use is based on the Preliminary Sewer System Hydraulic Analysis (see Appendix G1), The proposed interior water use was calculated by multiplying the wastewater generated by 1.10, which assumes that 10 percent of indoor water use discharged to the sewer system is lost through inflow and infiltration before reaching the wastewater treatment plant (King County 2014).
[2] Outdoor water use is based on the Water Efficient Landscape Worksheet (Appendix G4)

As shown in Table 5.14-5, the City of Brea's UWMP forecasts an increase of 152 afy between 2025 and 2030 during a normal year. The year 2030 was chosen as a comparison due to the proposed Project's anticipated buildout in 2028. The increase of 53 ~~50~~ afy would represent 35 ~~33~~ percent of the anticipated increase in water demand forecasts for the City. As stated in the 2020 UWMP, the City is projected to meet all water demands through 2045 during normal, single dry, and multiple dry years, due to the diversified supply and conservation measures. (Brea 2021c). It should be noted that the 2020 UWMP assumes the Mercury Insurance building would remain in operation up until the year 2045. With this building out of operation the demand needs projected in the UWMP are conservative and do not account for a supply surplus associated with the Mercury Insurance building going out of operation. Therefore, the City would be able to meet the water demands of the proposed Project in addition to existing and cumulative demands. Impacts would be less than significant.

Page 5.14-28, Section 5.14, *Utilities and Service Systems,* Table 5.14-7, *Existing and Proposed Storm Drain Flows.* The following text has been in response to updated Appendices G1, G2, and G3, respectively.

Table 5.14-7 Existing and Proposed Storm Drain Flows

	2-Year cfs	25-Year cfs	100-Year cfs
Drainage Area A			
Existing	9.6	21.7	28.2
Proposed	16.6	37.5 ~~37.4~~	48.7 ~~48.5~~
Difference	7.0	15.8 ~~15.7~~	20.5 ~~20.3~~
Drainage Area B			
Existing	8.8	20.3 ~~20.2~~	26.2 ~~26.1~~
Proposed	8.3	19.2 ~~19.1~~	24.8 ~~24.7~~
Difference	-0.5	-1.1	-1.4
Drainage Area C			
Existing	0.9	2.0	2.6
Proposed	0.4	0.9	1.2
Difference	-0.5	-1.1	-1.4
Drainage Area D[1]			

3. Revisions to the Draft EIR

Table 5.14-7 Existing and Proposed Storm Drain Flows

	2-Year cfs	25-Year cfs	100-Year cfs
Existing	6.5	14.4	18.6
Proposed	-	-	-
Difference	-6.5	-14.4	-18.6
Overall	-0.50	-0.80 ~~0.90~~	-0.90 ~~1.10~~

Source: Hunsaker and Associates 2024a (see Appendix G2).
Notes: cfs: cubic feet per second
1 = Existing Drainage Area "D" was combined into the Project site drainage areas

Page 8-9, Chapter 8, *Impacts Found Not to Be Significant*. The following text has been as a result of updates to technical study identified as Appendices G2 and G3 in the DEIR.

The analysis in this section is based in part on the following technical studies:

- *Preliminary Hydrology Analysis for Greenbriar Residential Development Project,* Hunsaker and Associates Irvine, January 28, 2025 ~~July 2024~~
- *Preliminary/Conceptual Water Quality Management Plan,* Hunsaker and Associates Irvine, March 3, 2025 ~~July 2024~~.

Complete copies of these studies are included in this DEIR as Appendices G2 and G3, respectively.

Pages 8-9 through 8-18, Chapter 8, *Impacts Found Not to be Significant*. The following text has been revised to fix a typographical error.

b) ~~a)~~ Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

c) ~~b)~~ Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

d) ~~c)~~ In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

e) ~~d)~~ Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Pages 8-11, Chapter 8, *Impacts Found Not to be Significant*. The following text has been in response to updated Appendix G3, and a footnote has been included.

Proposed Hydrology

As shown on Figure 5.14-1, *Existing Hydrology*, of Chapter 5.14, *Utilities and Services Systems*, the existing Project site includes Drainage Management Area A (DMA A). DMAs B, C, and D are off-site and include Chevy Chase Drive, Hill Haven Drive, and Greenbriar Lane. As shown on Figure 5.14-2, *Proposed Hydrology*, the proposed Project would reorganize the DMAs so that DMA D would be removed and redistributed between DMA A, B, and C. The WQMP calculated a required design flow rate of 1.560 ~~0.22~~ cubic feet per sec (cfs) for on-site runoff, which would only be from DMA A; all other DMAs are off-site. The maximum flow rate for the proposed LID BMPs is approximately 2.076 cfs[1], which exceeds the required design flow rate of 1.560 ~~0.22~~ cfs (Appendix G3).

Hydromodification Requirements

The WQMP calculated the onsite runoff volume and peak discharge for the three DMAs the two-year storm event and identified that with implementation of the proposed Project, runoff volume and peak discharge would be less than the existing conditions at the Project site…

Page 8-12, Chapter 8, *Impacts Found Not to be Significant*. The following text has been in response to updated Appendix G2.

Operation

As stated in the preliminary WQMP, the drainage of the proposed Project would generally follow the existing flows, and the proposed storm drain system would discharge into the existing flood control channel to the east of the Project site. The on-site flows would be collected via a series of catch basins and conveyed to three modular wetlands systems for treatment before flowing into the existing 18-inch pipe and discharging into the existing flood control channel. The design flow rate for this system is 1.560 ~~0.22~~ cfs, and the MWS systems for the proposed Project would have a design flow rate of ~~of~~ 0.692 cfs per unit, since there would be three MWS's the design flow rate in total would be 2.076 cfs, which exceeds the required storage volume (see Appendix G3).

[1] In the WQMP it was identified that the modular wetland systems are able to treat 0.692 cfs per unit, since there are three units that would be installed, the MWS system as a whole would be able to treat 2.076 cfs.

3. Revisions to the Draft EIR

Pages 8-16 to 8-17, Chapter 8, *Impacts Found Not to be Significant*. The following text has been in response to updated Appendix G2.

- **DMA C** would contain the off-site areas tributary along the south side of Greenbriar Lane Lance, and flows would go to the existing 21-foot catch basin, which is south of Greenbriar Lane and on top of the existing triple reinforced concrete box culvert to the east of the Project site.

  As part of the proposed Project there would be no detention pipes or detention areas. To satisfy the WQMP requirements, a water quality diversion structure would be installed at the 18-inch pipe that would connect to three MWSs for treatment before flowing into the 18-inch pipe and discharging into Loftus Channel.

- **Loftus Channel.** The Preliminary Hydrology Analysis concluded that the Loftus Channel reach along the Project site will have no negative impacts resulting from the additional peak flow rate from the proposed Project.

- **Greenbriar Lane.** The proposed flows to the existing 10-foot and 21-foot catch basins on top of the Loftus Channel box culvert are less than the existing levels. Currently, the existing flow rates for the 10-foot and 21-foot catch basins are 26.2 26.1 cfs and 2.6 cfs, respectively. Under the proposed Project, the 10-foot and 21-foot catch basins would have a flow rate of 24.8 24.7 cfs and 1.2 cfs respectively.

- **18-inch RCP.** The proposed flows from the Project and off-site areas will be collected via area drains, inlets and catch basins and discharge to Loftus Channel via existing 18-inch storm drain. The proposed Project will comply with the Orange County Local Drainage Manual's specified flood protection criteria. As described in the Preliminary Hydrology Analysis, preliminary capacity calculations indicated that the existing 18-inch RCP can convey about 33.2 cfs with free flow condition without pressure, and a 25-year storm is about 37.4 cfs. Due to the 18-inch RCP being exceeded, the proposed Project would install a secondary overflow path to Loftus Channel to be in compliance with the Orange County Local Drainage manual's specified flood protection criteria. Due to the Hydrology Analysis being a preliminary report, a detailed pressured flow hydraulic calculation was not performed. However, this calculation will be performed during the final engineering phase when the detailed designs are available (see Appendix G2).

  For projects in north Orange County, hydrologic conditions of concerns are considered to exist if streams downstream from the project are determined to be potentially susceptible to hydromodification impact. While the Project site is within a hydrologic conditions of concern area, because the proposed Project would reduce the amount of impervious area in the site and the proposed Project's storm drain flows would be less than the existing conditions, the proposed Project does not have hydromodification impacts to downstream receiving waters (see Appendix G3 ~~G2~~).

Pages 8-16 to 8-17, Chapter 8, *Impacts Found Not to be Significant*. The following text has been in response to updated Appendix G.

Less Than Significant Impact. Site design BMPs would minimize the impacts associated with impervious surfaces. Additionally, the overall combined proposed runoffs are less than the overall combined existing condition. Currently, the overall 2-year peak flow is approximately 25.8 cfs, 25-year peak flow is approximately 58.4 ~~58.3~~ cfs, and 100-year flow rate is approximately 75.6 ~~75.5~~ cfs. For the proposed Project, the total 2-year peak flow is approximately 25.3 cfs, 25-year peak flow is approximately 57.6 ~~57.4~~ cfs, and 100-year flow rate is approximately 74.7 ~~74.4~~ cfs with the same tributary area as existing conditions (see Appendix G2). Because the proposed Project has a lower peak flow than the existing peak flow conditions at the site, the proposed Project would not exceed the capacity of existing or planned stormwater drainage systems. Impacts would be less than significant.

3. Revisions to the Draft EIR

Pages 1-26 to 1-28, Chapter 1, *Executive Summary*, Table ES-2, *Summary of Environmental Impacts, Mitigation Measures and Levels of Significance After Mitigation*. Mitigation Measure TCR-1 has been modified to include language requested by the Consulting Tribes.

Table ES-2 Summary of Environmental Impacts, Mitigation Measures and Levels of Significance After Mitigation

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures		Level of Significance After Mitigation
5.13 TRIBAL CULTURAL RESOURCES				
Impact 5.13-2: The proposed Project could impact undiscovered tribal cultural resources.	Potentially Significant	TCR-1	Prior to the commencement of any ground disturbing activity at the Project site, the Project Applicant shall retain a total of two Native American Monitors, each approved by the tribes that consulted on this Project pursuant to Assembly Bill AB52 (the "Tribe" or the "Consulting Tribe"), and in concurrence with the City of Brea as the CEQA lead agency. The Applicant shall coordinate with each of the Consulting Tribes to develop an executed contract to pay for tribal monitors to be present during ground-disturbing activities. Prior to the issuance of any permit necessary to commence a ground-disturbing activity, a copy of the executed contract shall be submitted to the City of Brea Community Development Department. • The Tribal monitors will only be present during on-site and off-site portions of the area included as part of the Project grading or improvement permits during the construction phases that involve ground-disturbing activities. Ground disturbing activities are defined by the Tribes as activities that may include, but are not limited to, pavement removal, potholing or auguring, grubbing, tree removals, boring, grading, excavation, drilling, and trenching, within the Project area. The Tribal Monitors will complete daily monitoring logs that will provide descriptions of the day's activities, including construction activities, locations, soil, and any cultural materials identified. The on-site monitoring shall end when all ground-disturbing activities on the Project Site are completed, or when the Tribal Representatives and Tribal Monitors have indicated that all upcoming ground-disturbing activities at the Project Site have little to no potential for impacting Tribal Cultural Resources. • Upon discovery of any Tribal Cultural Resources, construction activities shall cease in the immediate vicinity of the find (not less than the surrounding 100 feet) until the find can be assessed. All Tribal Cultural Resources unearthed by Project activities shall be evaluated by the		Less Than Significant With Mitigation

Table ES-2 Summary of Environmental Impacts, Mitigation Measures and Levels of Significance After Mitigation

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		qualified archaeologist and Tribal monitors approved by the Consulting Tribes. If the resources are Native American in origin, the Consulting Tribes will have the on-site archeologist perform data recovery and secure the item(s) in their lab until the Project is completed on which consulting tribes will determine the best course of action ~~retain it/them in the form and/or manner the Tribes deems appropriate, for educational, cultural and/or historic purposes~~. • If human remains and/or grave goods are discovered or recognized at the Project Site, all ground disturbance shall immediately cease within 100 feet of discovery, and the county coroner shall be notified per Public Resources Code Section 5097.98, and Health & Safety Code Section 7050.5. Human remains and grave/burial goods shall be treated alike per California Public Resources Code section 5097.98(d)(1) and (2). • Work may continue on other parts of the Project Site while evaluation and, if necessary, mitigation takes place (CEQA Guidelines Section 15064.5[f]). • If a non-Native American resource is determined by the qualified archaeologist to constitute a “historical resource” or “unique archaeological resource,” time allotment and funding sufficient to allow for implementation of avoidance measures, or appropriate mitigation, must be available. The treatment plan established for the resources shall be in accordance with CEQA Guidelines Section 15064.5(f) for historical resources and PRC Sections 21083.2(b) for unique archaeological resources. • Preservation in place (i.e., avoidance) is the preferred manner of treatment. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. Any qualifying historic archaeological resource deemed significant by a qualified archaeologist as a “historical resource” or “unique archaeological resource”, shall be curated at a public, non-profit	

3. Revisions to the Draft EIR

Table ES-2 Summary of Environmental Impacts, Mitigation Measures and Levels of Significance After Mitigation

Environmental Impact	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		institution with a research interest in the materials, such as the Natural History Museum of Los Angeles County or the Fowler Museum, if such an institution agrees to accept the material. If no institution accepts the archaeological material, it shall be offered to a local school or historical society in the area for educational purposes.	

Appendix A. Revised Figures

Appendix

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Figure ES-4 - Conceptual Site Plan

Project Boundary

Proposed Park

0 120
Scale (Feet)

Source: RVI 2025.

Figure 3-5 - Conceptual Site Plan

Project Boundary

Proposed Park

0 120
Scale (Feet)

Source: RVI 2025.

Figure 3-10 - Fencing and Walls

LEGEND	
SYMBOL	**DESCRIPTION**
	PATIO WALLS - A PATIO WALLS - B 42" H. X 6" PRECISION BLOCK W/ STUCCO FINISH
	PRIVACY WALL - 6' H. X 8" PRECISION BLOCK W/ STUCCO FINISH
	ACCENT WALLS - 8" PRECISION BLOCK W/ STACKED STONE VENEER
	PERIMETER WALL - 8' H. X 8" W. MASONRY BLOCK
	SOUND WALL - 10' H X 12" MASONRY WALL

Project Boundary

0 100
Scale (Feet)

Source: RVI 2025.

Figure 3-11 - Pedestrian Connectivity

Project Boundary

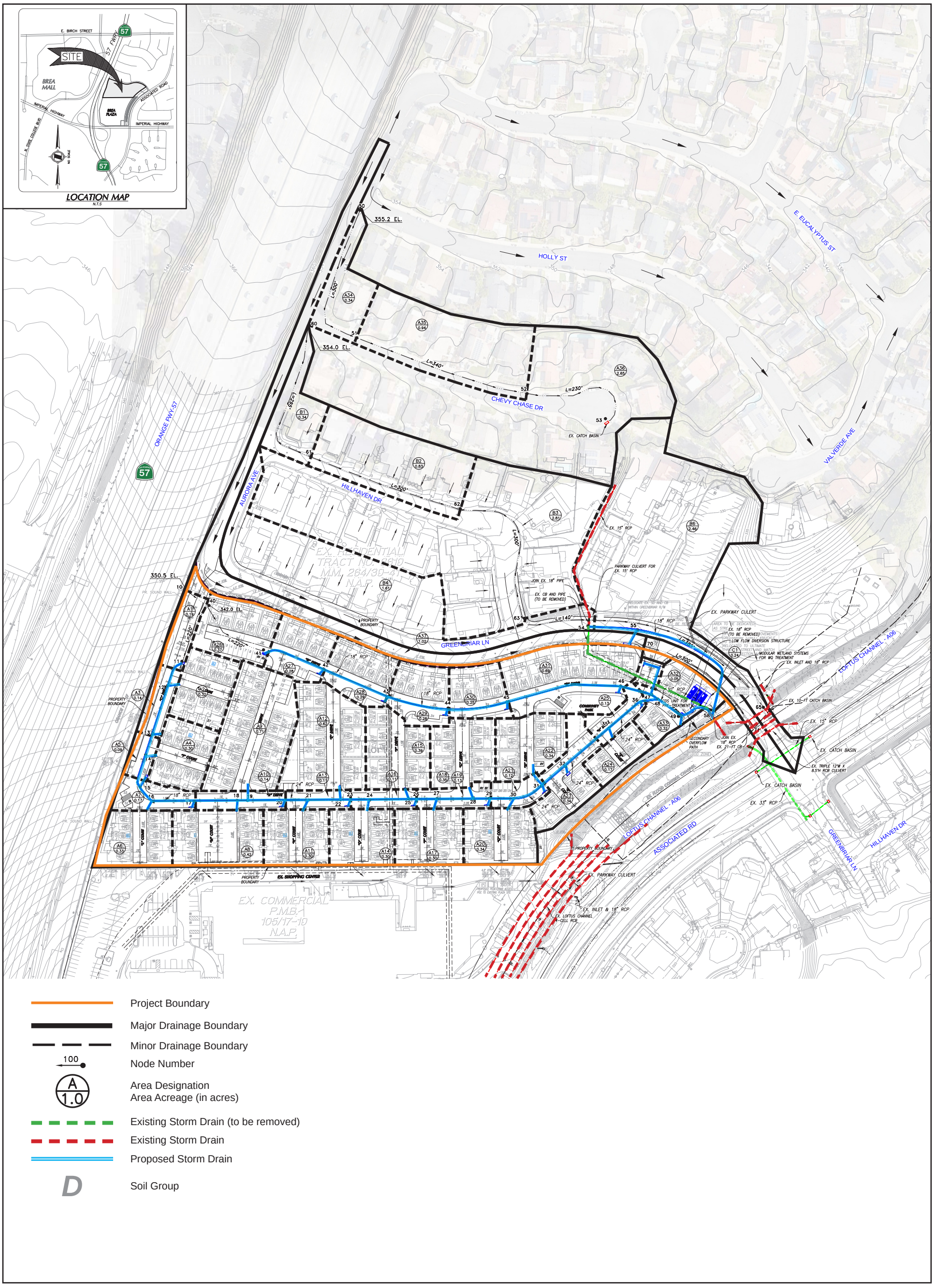
Primary Pedestrian Path (5' Min.)

Pedestrian Crossing

0 120
Scale (Feet)

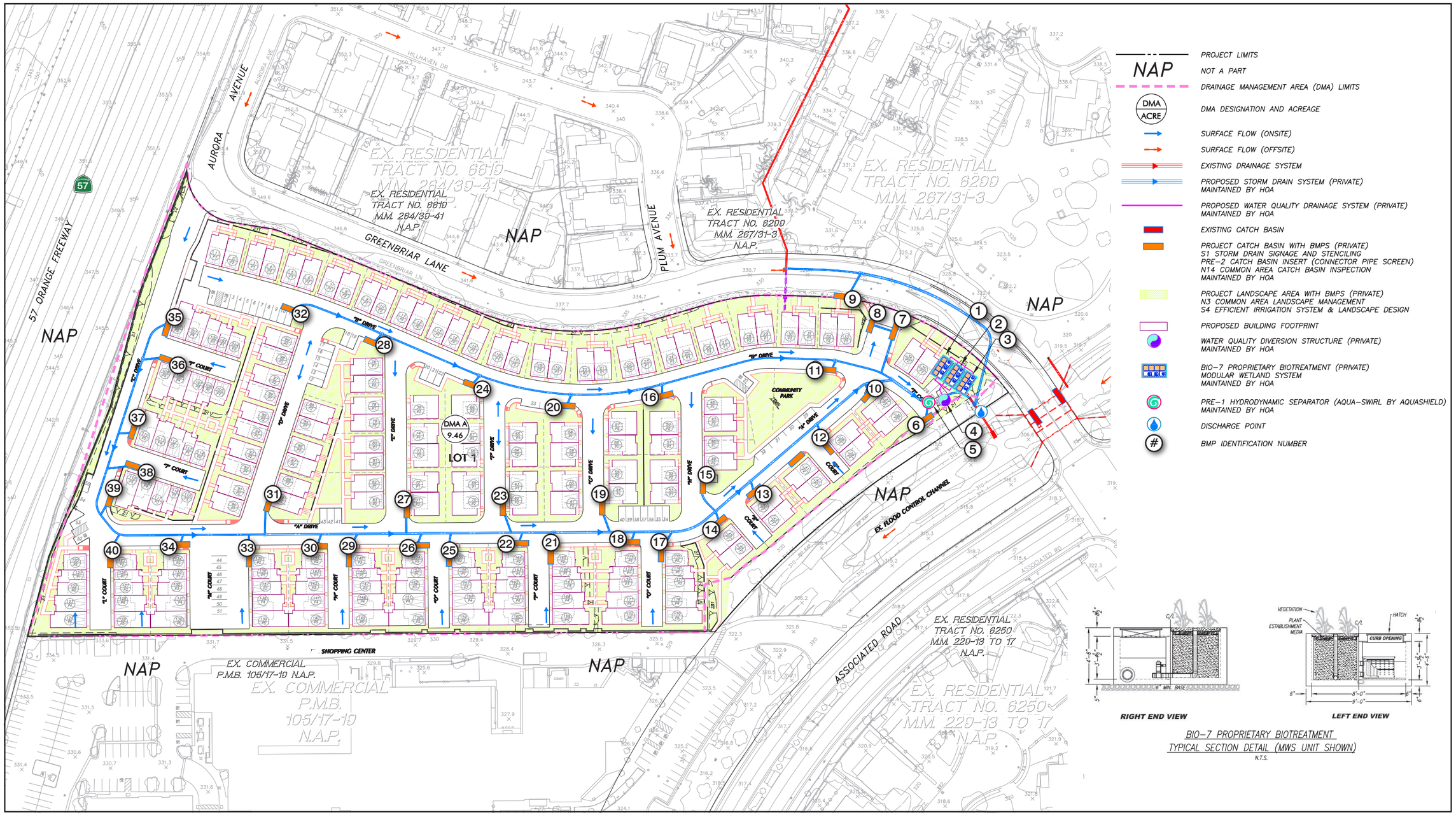
Source: RVI 2025.

Figure 5.14-2 - Proposed Hydrology



Source: Hunsaker & Associates 2025.

Figure 8-1 - Water Quality Management Plan BMP Site Plan



Source: Hunsaker and Associates 2025.

Appendix B. Appendix F2: Traffic Impact Study

Appendix

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GREENBRIAR MULTIFAMILY RESIDENTIAL PROJECT
REVISED TRAFFIC IMPACT STUDY
City of Brea, California

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December 4, 2024
(Revision to the November 19, 2024 Study)

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1.0 Introduction

1.1 Purpose of Report & Study Objectives

The purpose of this traffic impact study is to evaluate the Greenbriar Multifamily Residential Project (hereinafter referred to as "project") from a traffic and circulation standpoint. Furthermore, this analysis will determine whether the proposed project will significantly impact the environment.

This traffic study has been conducted pursuant to the *City of Brea Transportation Impact Analysis (TIA) Guidelines,* dated September 2020, the *2023 Orange County Congestion Management Program Report*, dated November 2023, and the California Environmental Quality Act (CEQA) requirements.

This study has been prepared in accordance with the scope of work that has been submitted to the City of Brea, which is contained in **Appendix A**.

1.2 Site Location & Project Description

The project site is bound between Greenbriar Lane to the north, Associated Road to the east, the SR-57 Freeway to the west, and Brea Plaza to the south, in the City of Brea. The approximately 9.73-acre project site is currently occupied by 164,908 square feet (SF) of vacant office space (formerly occupied by Mercury Insurance).

The project consists of razing the existing office building, as well as the onsite parking structure to construct 180 townhome/condominium dwelling units. Access to the project is proposed to be provided via two (2) full-access unsignalized driveways located along Greenbriar Lane. The easternmost driveway is proposed to be located opposite the existing Brea Glenbrook Club driveway.

The project is planned to open in 2026 and will be evaluated in one (1) single phase.

Exhibit 1-1 shows the aerial location of the proposed project. **Exhibit 1-2** shows the preliminary site plan for the project.

Exhibit 1-1
Location Map

Legend:

= Project Site Boundary

N

Exhibit 1-2
Site Plan

N

1.3 Traffic Study Area & Analysis Scenarios

Per the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, a Non-CEQA Transportation Assessment, which includes LOS analysis, shall be required for proposed projects when either the AM or PM peak hour trip generation on a weekday or weekend is expected to exceed 50 net new vehicle trips from the proposed development. The proposed project trip generation is discussed in detail in Section 4.1 of this report. Pursuant to those guidelines and as directed by City of Brea staff, the study area consists of the following nine (9) study intersections listed in Table 1-1 below. The jurisdiction(s) of each study intersection is also identified.

Table 1-1

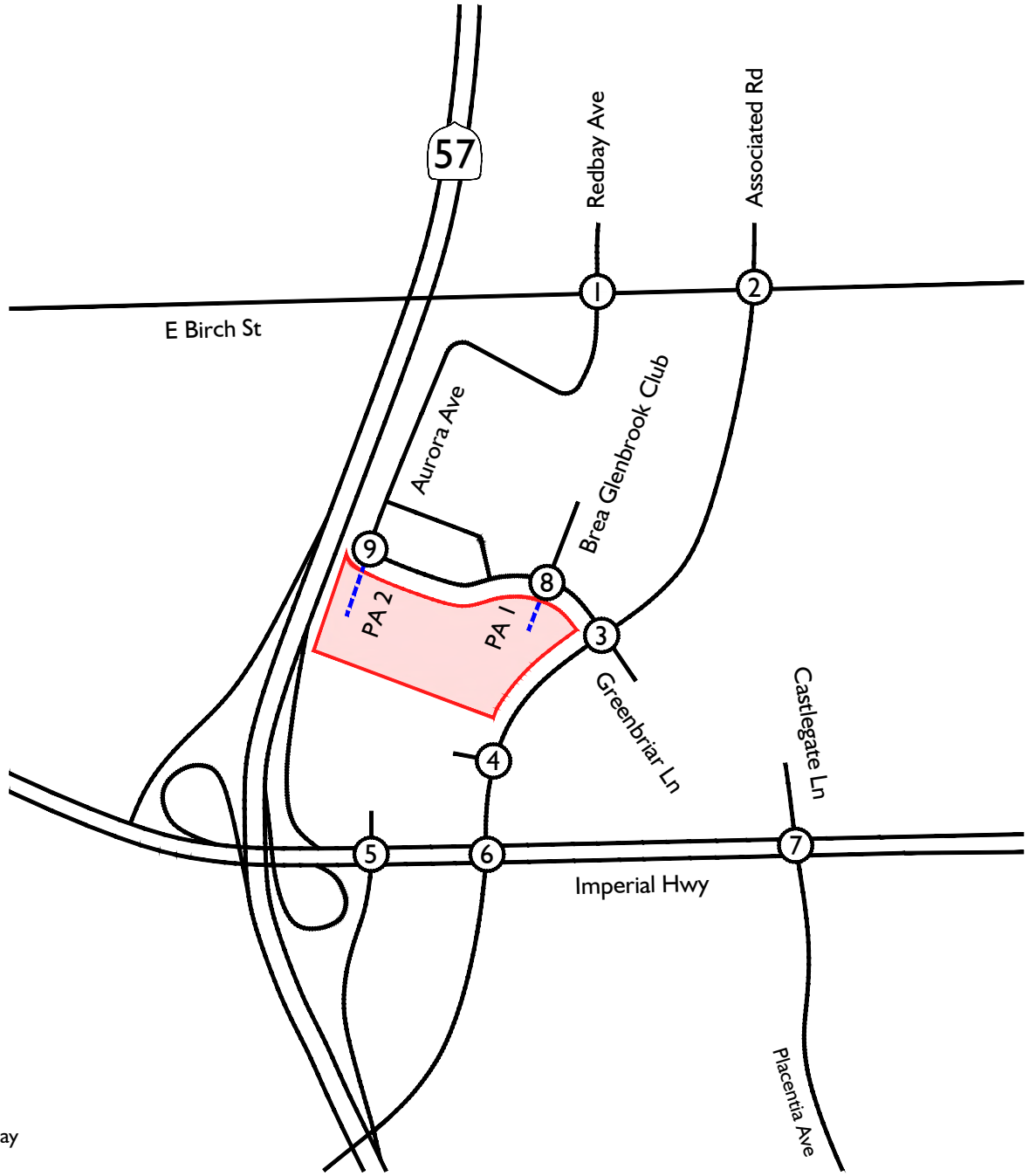
Study Area Intersections

	Study Intersection	Jurisdiction[1]
1.	Redbay Avenue (N/S) at Birch Street (E/W)	City of Brea
2.	Associated Road (N/S) at Birch Street (E/W)	City of Brea
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	City of Brea
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	City of Brea
5.	SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Highway (E/W)	City of Brea; OC CMP; Caltrans
6.	Associated Road (N/S) at Imperial Highway (E/W)	City of Brea; Caltrans
7.	Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)	City of Brea; Caltrans
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	City of Brea
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)	City of Brea

[1] OC CMP = Orange County Congestion Management Program Intersection

Exhibit 1-3 illustrates the general location of the project site and depicts the study locations and surrounding street system.

Exhibit 1-3
Study Area



Legend:

1 = Study Intersection

= Project Access Driveway

= Project Site Boundary

N

The analysis will evaluate traffic conditions for the following scenarios during the weekday AM, weekday PM, and Saturday midday peak hours:

- Existing Conditions;
- Project Opening Year (2026) Without Project Conditions; and
- Project Opening Year (2026) With Project Conditions.

According to the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, General Plan Development scenarios are required for any project that contributes traffic to an intersection projected to have unacceptable LOS, any project that requires a General Plan Amendment, or otherwise proposes development that exceeds the land use intensity assumed for the General Plan. However, the analysis does not include General Plan Development Scenarios despite the project proposing a General Plan Amendment from General Commercial to Mixed-Use II and a Zone Change from C-G Zone to MU-II Zone. General Plan Development Scenarios are not included since the project is proposing the construction of 180 condominium/townhome dwelling units which is a less intense land use as it generates fewer trips than currently existing under the General Commercial land use designated in the General Plan.

2.0 Analysis Methodologies & Performance Criteria

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report in accordance with the City of Brea and Orange County Congestion Management Program. This section also discusses the agency-established applicable performance criteria and thresholds of significance for the study facilities.

2.1 Study Intersection Peak Hour Level of Service Analysis Methodology

The Highway Capacity Manual (HCM) and the Intersection Capacity Utilization (ICU) methodologies are two accepted methods of determining intersection level of service. The study area intersections are governed by varying jurisdictional bodies which includes the City of Brea, the Orange County Congestion Management Program, and Caltrans. Each of these jurisdictions has adopted either one or both level of service methodologies as technical guides in the evaluation of traffic operations.

The study intersections will be assessed based on the methodologies and parameters adopted by their respective jurisdictions (previously identified in Table 1-1). Performance criteria for each jurisdiction are elaborated in Section 2.2.

Int #1. Redbay Avenue (N/S) at Birch Street (E/W) – [HCM]
Int #2. Associated Road (N/S) at Birch Street (E/W) – [HCM]
Int #3. Associated Road (N/S) at Greenbriar Lane (E/W) – [HCM]
Int #4. Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W) – [HCM]
Int #5. SR-57 NB Ramps/Shopping Center Dwy 2 (N/S) at Imperial Hwy (E/W) – [HCM & ICU]
Int #6. Associated Road (N/S) at Imperial Highway (E/W) – [HCM]
Int #7. Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W) – [HCM]
Int #8. Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W) – [HCM]
Int #9. Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W) – [HCM]

2.1.1 HCM (7th Edition) Methodology

The HCM defines level of service as a qualitative measure which describes operational conditions within a traffic stream, generally in terms of factors such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate LOS (Level of Service) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted.

The definitions of level of service for interrupted flow (flow regulated by the existence of traffic control devices) are:

- **LOS A** (Free Flow / Insignificant Delays) describes traffic operations in which progression is exceptionally favorable or the cycle length is extremely short. Generally, LOS A operations for signalized intersections tend to result in most vehicles arriving during the green phase and traveling through the intersection without stopping.
- **LOS B** (Stable Operation / Minimal Delays) describes traffic operations in which progression slightly diminishes but is still considered highly favorable and the cycle length is short. Vehicles stop more often causing a marginal increase in average delay.
- **LOS C** (Stable Operation / Acceptable Delays) describes traffic operations in which progression is favorable and the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear. Many vehicles still past through the intersection but a significant number of vehicles are stopping. Average delay is fair.
- **LOS D** (Approaching Unstable / Tolerable Delays) describes traffic operations in which progression is ineffective and/or cycle length is long. Considerable amount of vehicles stop and individual cycle failures are noticeable. Average delay is adequate.
- **LOS E** (Unstable Operation / Significant Delays) describes traffic operations in which progression is unfavorable and the cycle length is exceedingly long. Individual cycle failures are frequent. Average delay is high.
- **LOS F** (Forced Flow / Excessive Delays) describes traffic operations in which progression is extremely poor and the cycle length is extremely long. Most cycles fail to clear the queue. Average delay is vast.

Level of service is typically dependent on the quality of traffic flow at the intersection along a roadway. The Highway Capacity Manual 7th Edition (HCM 7) expresses the level of service at an intersection in terms of delay time for various intersection approaches. The HCM 7 uses different procedures depending on the type of intersection control. The levels of service determined in this study are calculated using the HCM 7 methodology.

For signalized intersections, average control delay per vehicle is used to determine the LOS.

For all-way stop-controlled intersections, average control delay per vehicle is also used to determine the LOS.

For intersections with stop control on the minor approach only, the calculation of LOS is dependent on the occurrence of gaps in the free-flow traffic movement of the major street, and the LOS is determined based on the worst stop-controlled approach from the minor street or an individual movement from the major street, whichever is worse.

Table 2-1 shows the level of service criteria based on the HCM 7 methodology.

Table 2-1
HCM Intersection LOS & Delay Ranges

LOS	Average Control Delay Per Vehicle (Seconds)	
	Signalized	Unsignalized
A	0.00 - 10.00	0.00 - 10.00
B	10.01 - 20.00	10.01 - 15.00
C	20.01 - 35.00	15.01 - 25.00
D	35.01 - 55.00	25.01 - 35.00
E	55.01 - 80.00	35.01 - 50.00
F	>80.00	>50.00

2.1.2 ICU Analysis Parameters

To calculate the ICU, the volume of traffic using the intersection is compared with the capacity of the intersection. ICU is usually expressed as a ratio. This ratio represents the portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity.

Table 2-2 shows the level of service criteria based on the ICU methodology.

Table 2-2
ICU Intersection LOS and V/C Ranges

LOS	Signalized Intersection LOS Criteria
	(V/C)
A	≤ 0.600
B	> 0.600 and ≤ 0.700
C	> 0.700 and ≤ 0.800
D	> 0.800 and ≤ 0.900
E	> 0.900 and ≤ 1.000
F	> 1.000

All intersections that are located under the jurisdiction of the Orange County Congestion Management Plan (CMP) are required to perform an LOS analysis with the ICU methodology. As such, Intersection No. 5 is the only study intersection that requires the use of the ICU methodology.

2.2 LOS Performance Criteria & Thresholds for Requiring LOS Improvements

The following criteria has been utilized for each respective jurisdiction:

2.2.1 City of Brea

As per the *City of Brea Transportation Impact Analysis (TIA) Guidelines,* dated September 2020, the HCM methodology is utilized in evaluating traffic operations for both signalized and unsignalized intersections.

The acceptable level of service for signalized and unsignalized intersections within the City of Brea is LOS D or better. An intersection shall be considered unacceptable and cause an effect on traffic operations if:

- the project causes a study intersection that currently operates at LOS D or better to degrade to LOS E or F;
- a study intersection that is already operating at LOS E and the project causes an increase in control delay of 4 or more seconds; and
- a study intersection that is already operating at LOS F and the project causes an increase in control delay of 2 or more seconds.

If a project causes an effect on traffic operations, improvements to study intersections may be required to bring back the intersection to an acceptable LOS or make other improvements to the intersection comparable to the operational deficiency. If a feasible identified improvement(s) cannot be provided as determined by the City Traffic Engineer, then contribution of fair share towards an improvement will be considered. Unsignalized intersections operating at a deficient LOS with or without project conditions shall be evaluated for the installation of a traffic signal using the traffic signal peak hour warrant and crash experience warrant per the latest version of the California Manual on Uniform Traffic Control Devices (CA MUTCD).

2.2.2 Orange County Congestion Management Program (CMP)

As per the *2023 Orange County Congestion Management Program Report*, dated November 2023, all Congestion Management Program Highway System (CMPHS) segments or intersections are evaluated by the ICU methodology.

For CMP intersections, the LOS standard must maintain a LOS "E" or better, unless the level of service from the baseline CMP dataset were lower. If a CMPHS segment or intersection does not meet the minimum LOS standard outside an infill opportunity zone, a deficiency plan must be adopted (subject to exclusions).

2.2.3 Caltrans

The *Caltrans Guide for The Preparation of Traffic Impact Studies*, dated December 2002, previously defined Caltrans' methodology and significance thresholds for evaluating traffic operations on state highway facilities. These guidelines were subsequently replaced by the *Caltrans Vehicle Miles Traveled-Focused Transportation Impact Study Guide*, dated May 2020, in response to automobile delay no longer considered as a significant impact under the California Environmental Quality Act (CEQA) and Senate Bill (SB-743). Consequently, Caltrans now primarily focuses on vehicle miles traveled (VMT) when reviewing the impact of a land use project. Additionally, the *Caltrans Local Development Review (LDR) Safety Review Practitioner's Guidance*, dated February 2024, indicates that a local agency partner must alert Caltrans about a development review, in which Caltrans will determine if a safety review is required based on the screening criteria defined in the guidelines.

Although Caltrans no longer requires an LOS analysis for review of development projects, the City of Brea still requires an LOS analysis to understand the possible influences the proposed project will have on the State Highway. As such, for the purpose of this analysis, the minimum acceptable level of service for state-controlled intersections is assumed to match the City of Brea's minimum standards (i.e., LOS D or better).

3.0 Circulation System & Existing Conditions

This section provides a discussion of existing study area conditions and traffic volumes.

3.1 Existing Traffic Controls & Intersection Geometrics

Exhibit 3-1 identifies the existing roadway conditions, number of through traffic lanes, and intersection controls for the study area roadways. The type of traffic control and number of lanes at an intersection are key inputs for the calculation of level of service.

3.2 Existing Traffic Volumes & Observations

Existing conditions intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts taken on Tuesday, February 13, 2024 during typical weekday conditions and on Saturday, February 10, 2024 during typical Saturday conditions. The weekday AM and PM peak hour traffic volumes were determined by counting the two-hour peak period from 7:00 AM to 9:00 AM, and from 4:00 PM to 6:00 PM, respectively, and using the highest hour within each two-hour peak period. The Saturday midday peak period was determined by collecting 24-hour roadway volumes along four (4) roadway segments located along Associated Road, Birch Street, and Imperial Highway (within the vicinity of the project site) and determining which peak period generally produced the highest volumes. The Saturday midday peak period was determined to be between 12:00 PM and 3:00 PM and the highest hour within the three-hour period was utilized.

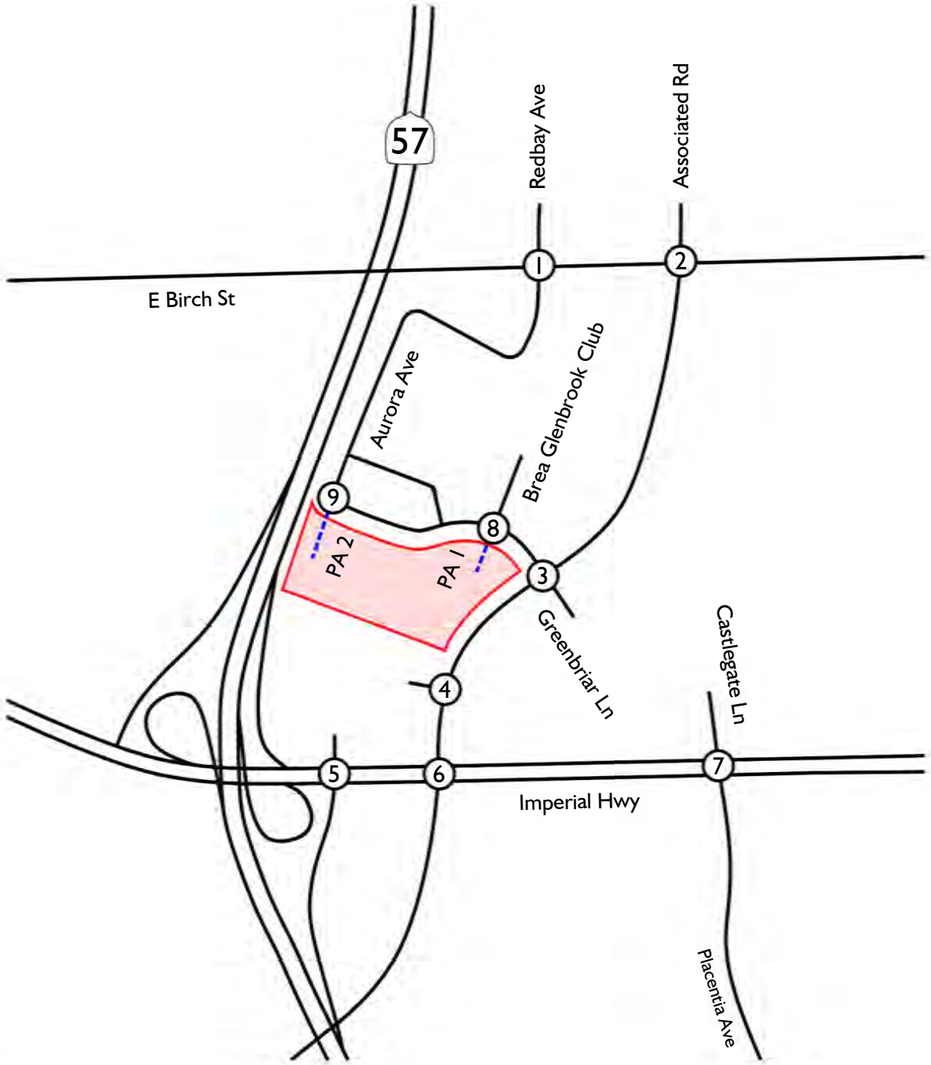
Existing traffic volumes for the Weekday Peak Hours and Saturday Midday Peak Hour are provided in **Exhibit 3-2** and **Exhibit 3-3**, respectively.

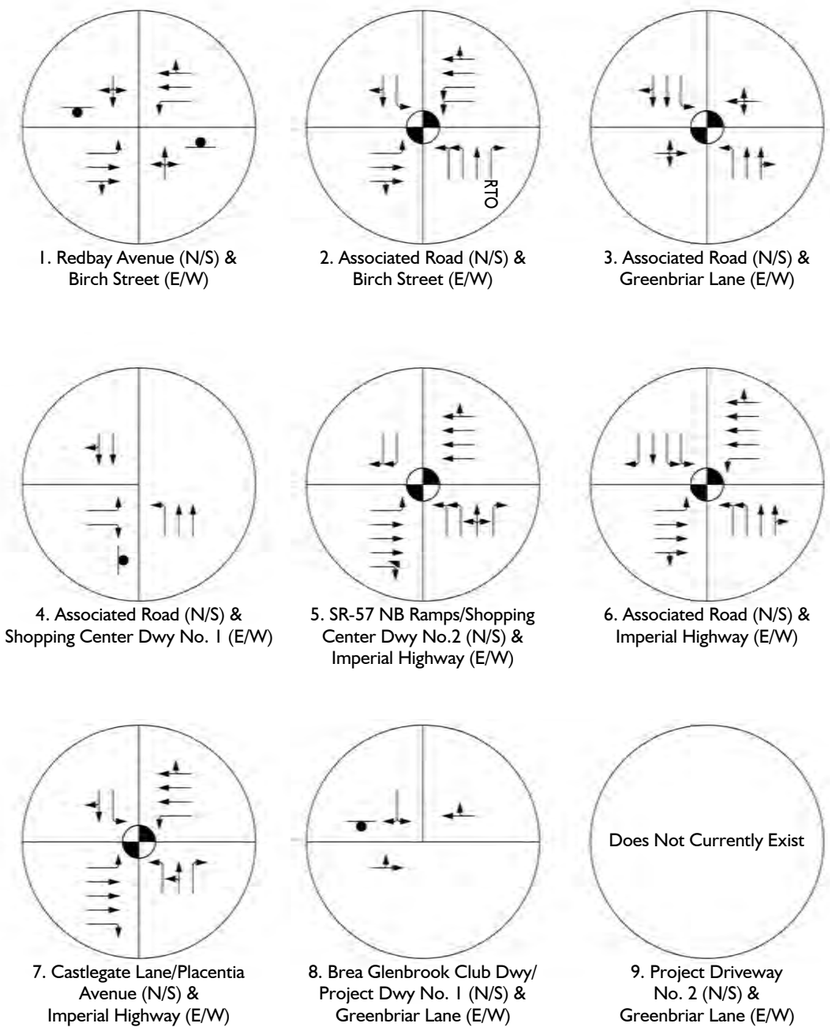
Additionally, with the construction of the project, the shared access points between both the Brea Shopping Plaza and the project site will be eliminated. Due to this elimination of the shared access between the two sites, the "With Project" traffic scenarios need to account for rerouting of any vehicles currently either cutting through the project site to/from the commercial center, or parking within the project site and walking to the commercial center. Observations were collected at the three (3) existing access points serving the prior Mercury Insurance parking lot during the same timeframes identified above.

Exhibit 3-4 summarizes these existing parking lot cut-through & poaching traffic volumes at the three (3) existing access points serving the prior Mercury Insurance parking lot for weekday AM, weekday PM, and Saturday midday peak periods.

Exhibit 3-1

Existing Lane Geometry & Traffic Controls





1. Redbay Avenue (N/S) & Birch Street (E/W)
2. Associated Road (N/S) & Birch Street (E/W)
3. Associated Road (N/S) & Greenbriar Lane (E/W)
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)
6. Associated Road (N/S) & Imperial Highway (E/W)
7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)
8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)
9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

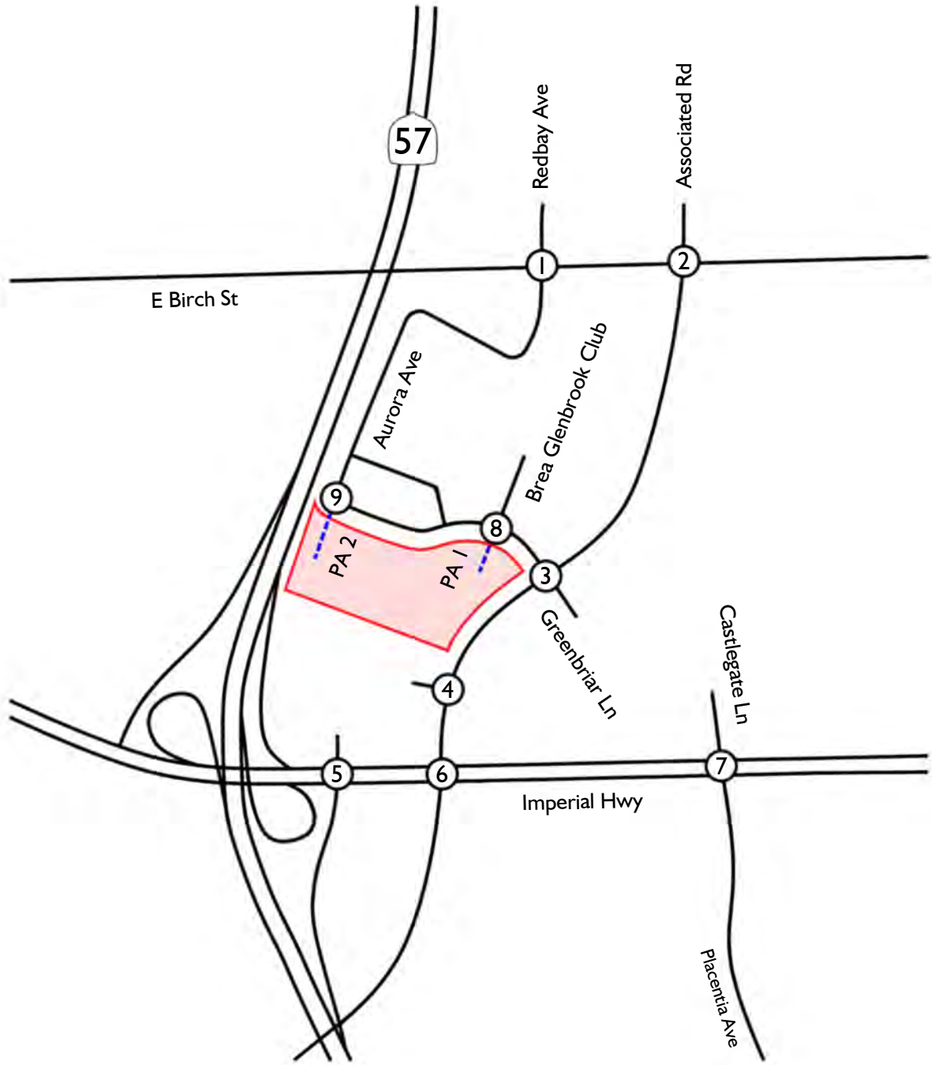
Legend:

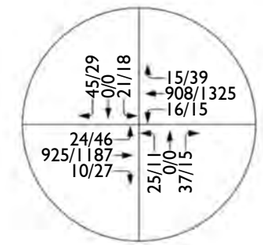
- = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- = Traffic Signal
- = All Way Stop
- = Stop Sign
- RTO = Right Turn Overlap
- = Free Right Turn

N

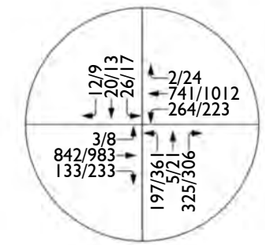
Exhibit 3-2

Existing Weekday Peak Hour Traffic Volumes





1. Redbay Avenue (N/S) & Birch Street (E/W)



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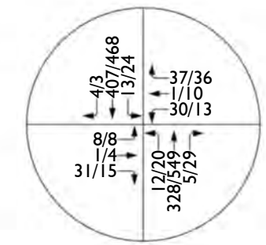
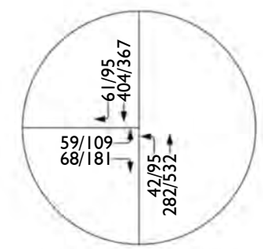
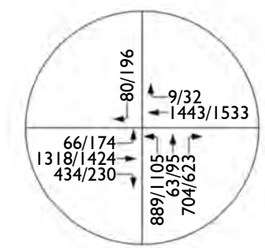


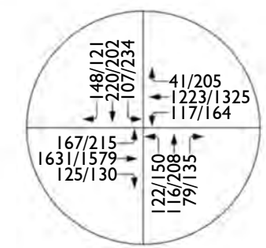
3. Associated Road (N/S) & Greenbriar Lane (E/W)



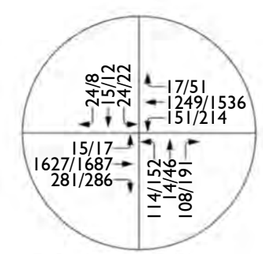
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)



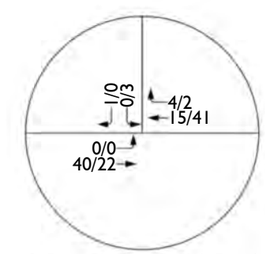
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)



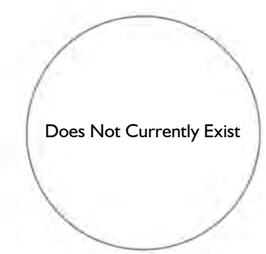
6. Associated Road (N/S) & Imperial Highway (E/W)



7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)



8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)



9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

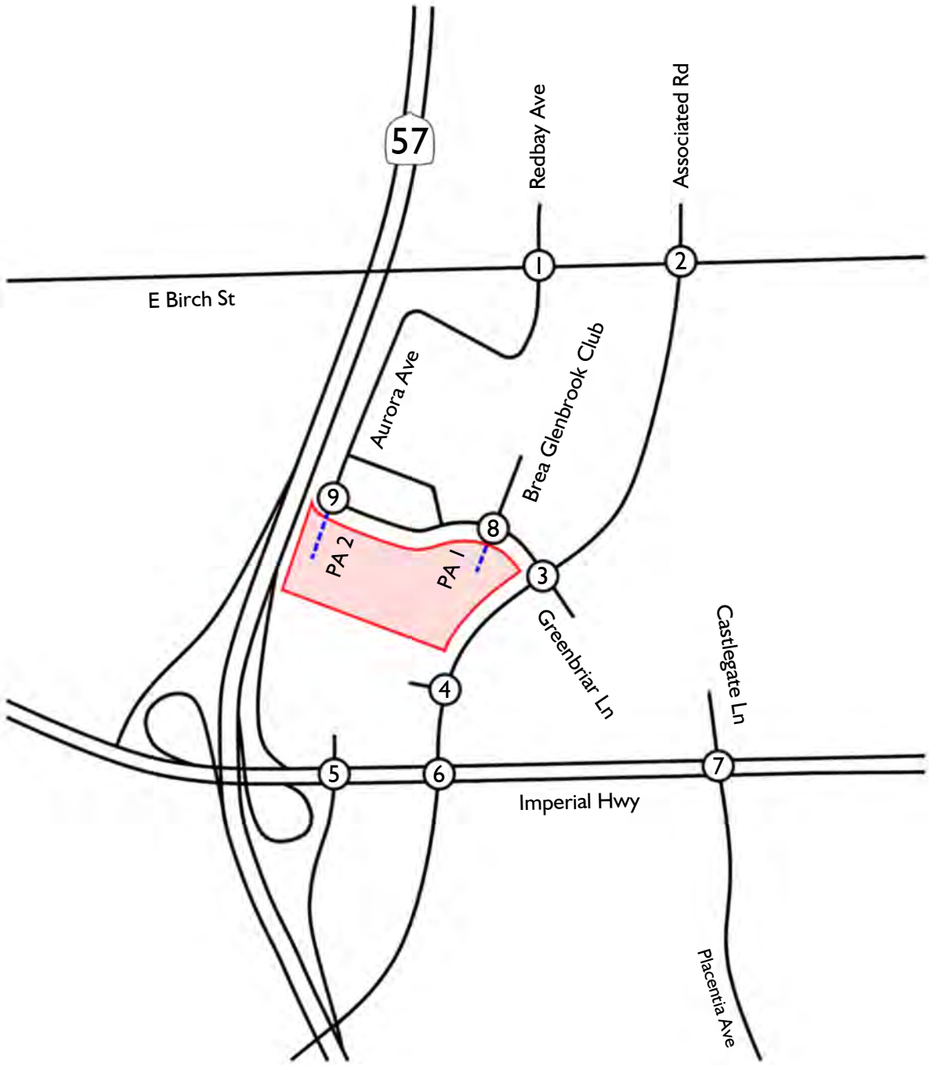
Legend:

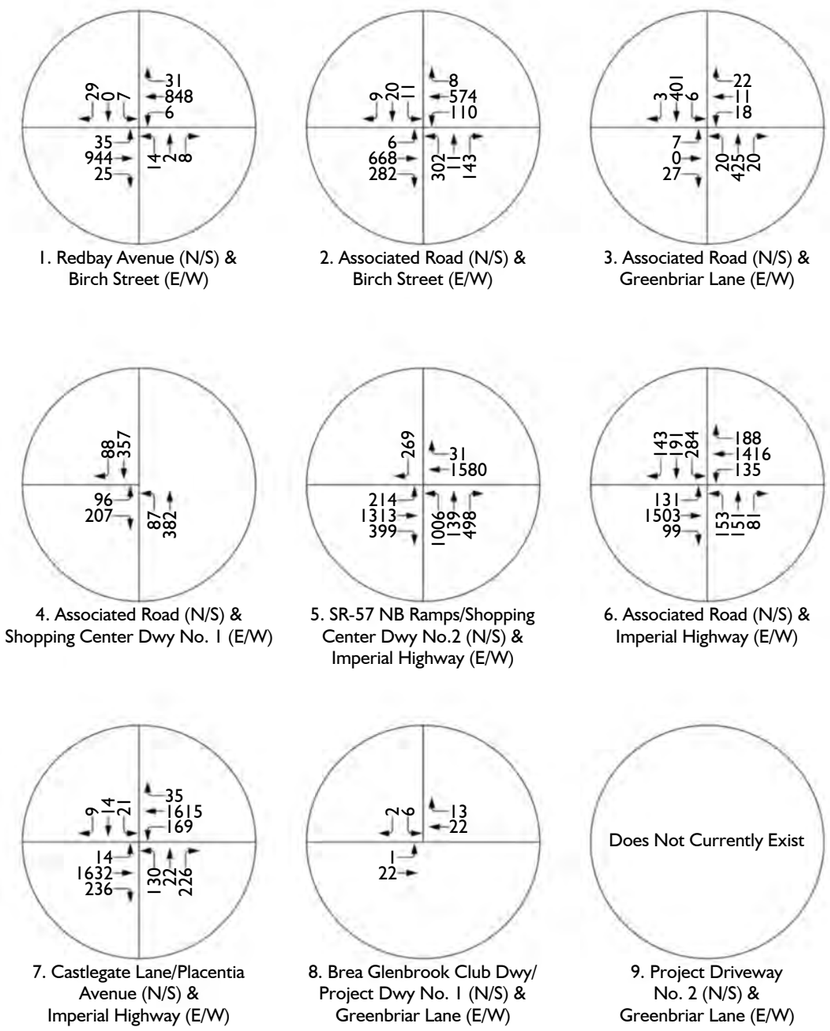
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10/20 = AM/PM Peak Hour Volumes

N

Exhibit 3-3

Existing Saturday Midday Peak Hour Traffic Volumes





1. Redbay Avenue (N/S) & Birch Street (E/W)
2. Associated Road (N/S) & Birch Street (E/W)
3. Associated Road (N/S) & Greenbriar Lane (E/W)
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)
6. Associated Road (N/S) & Imperial Highway (E/W)
7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)
8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)
9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

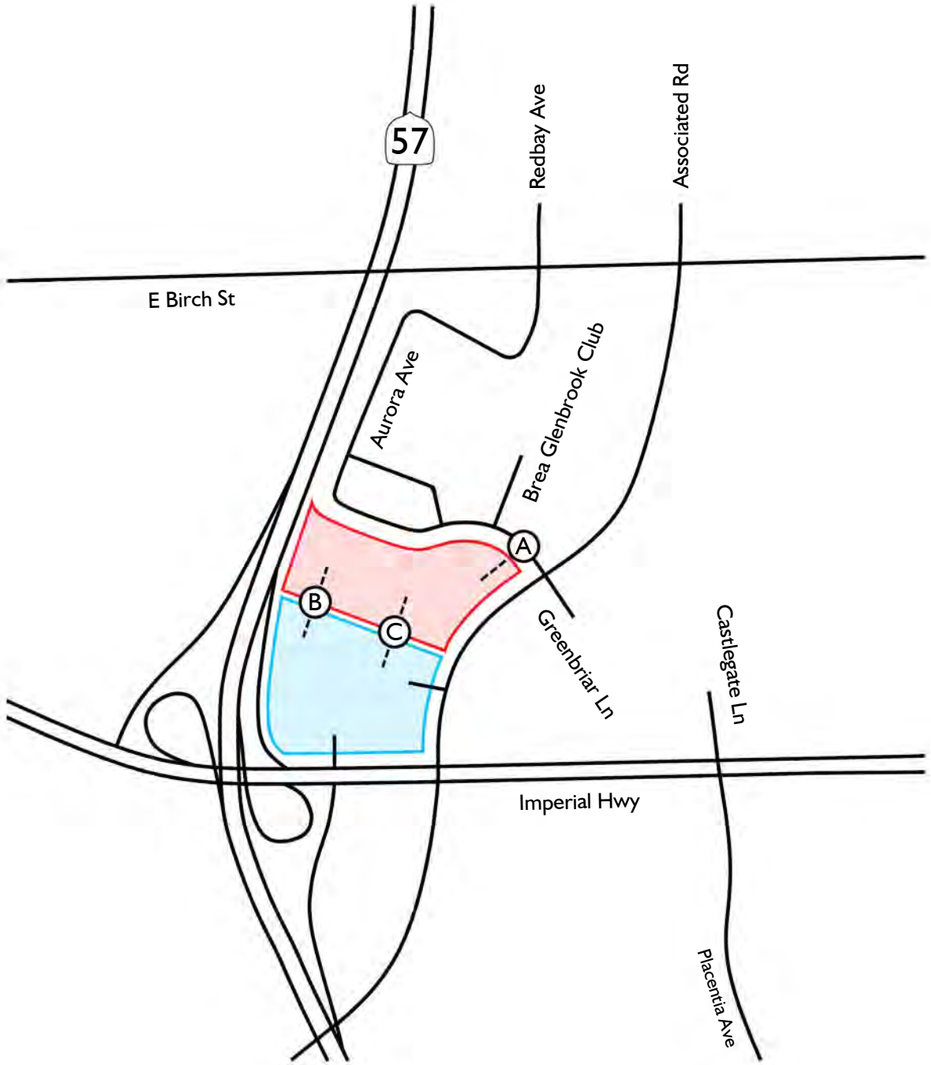
Legend:

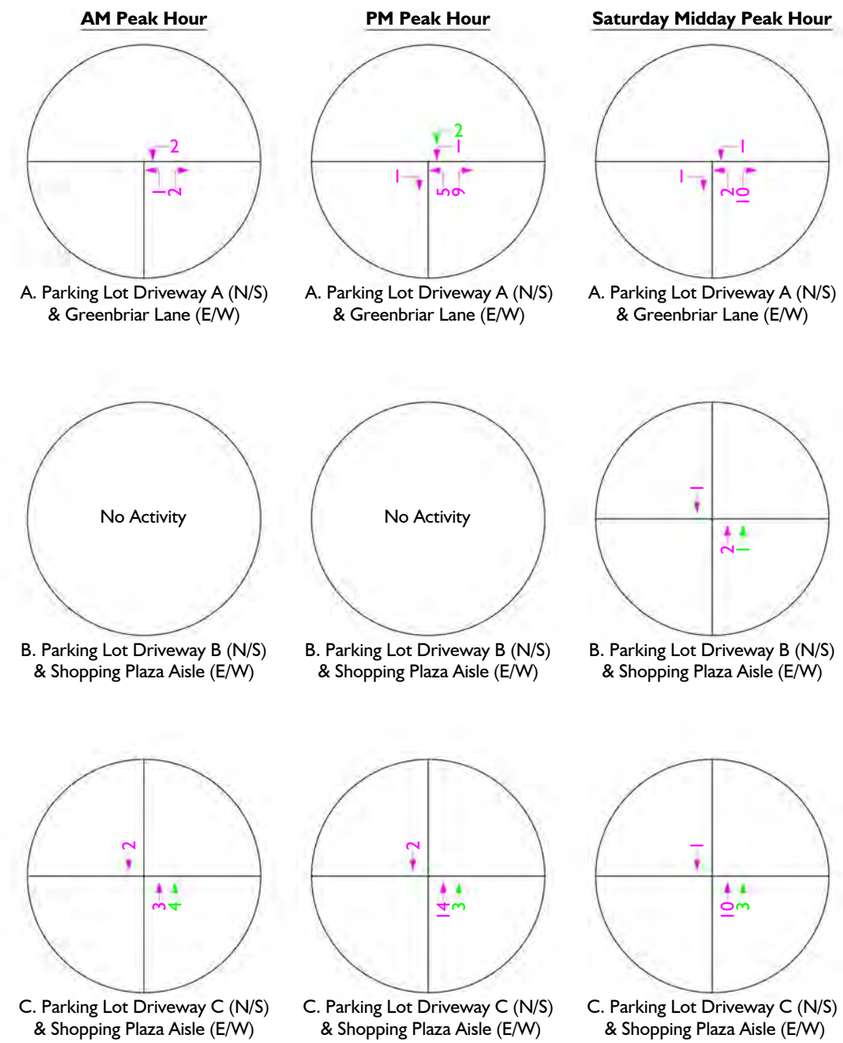
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10 = Saturday Midday Peak Hour Volumes

N

Exhibit 3-4

Existing Parking Lot Cut-Through Traffic Volumes





Legend:

- (A) = Existing Parking Lot Driveway Intersection (To Be Removed)
- = Existing Parking Lot Driveway (To be Removed)
- = Brea Shopping Plaza Boundary
- = Project Site Boundary
- = Vehicles Parked After Entrance (Do Not Leave During Peak Hour)
- = Cut-Through Vehicles

N

Lastly, additional count data was collected at study intersections #1 & #4 (Redbay Avenue at Birch Street and Associated Road at Shopping Center Driveway No. 1) to sufficiently complete the signal warrant analyses which is later discussed in Section 6 of this report.

All traffic count worksheets are included in **Appendix B**, including the peak period intersection turning movement counts, the Saturday daily roadway segment counts utilized to determine the Saturday peak period, the existing Mercury Insurance parking lot cut-through & poaching counts, and the signal warrant counts.

3.3 City of Brea General Plan Circulation Element

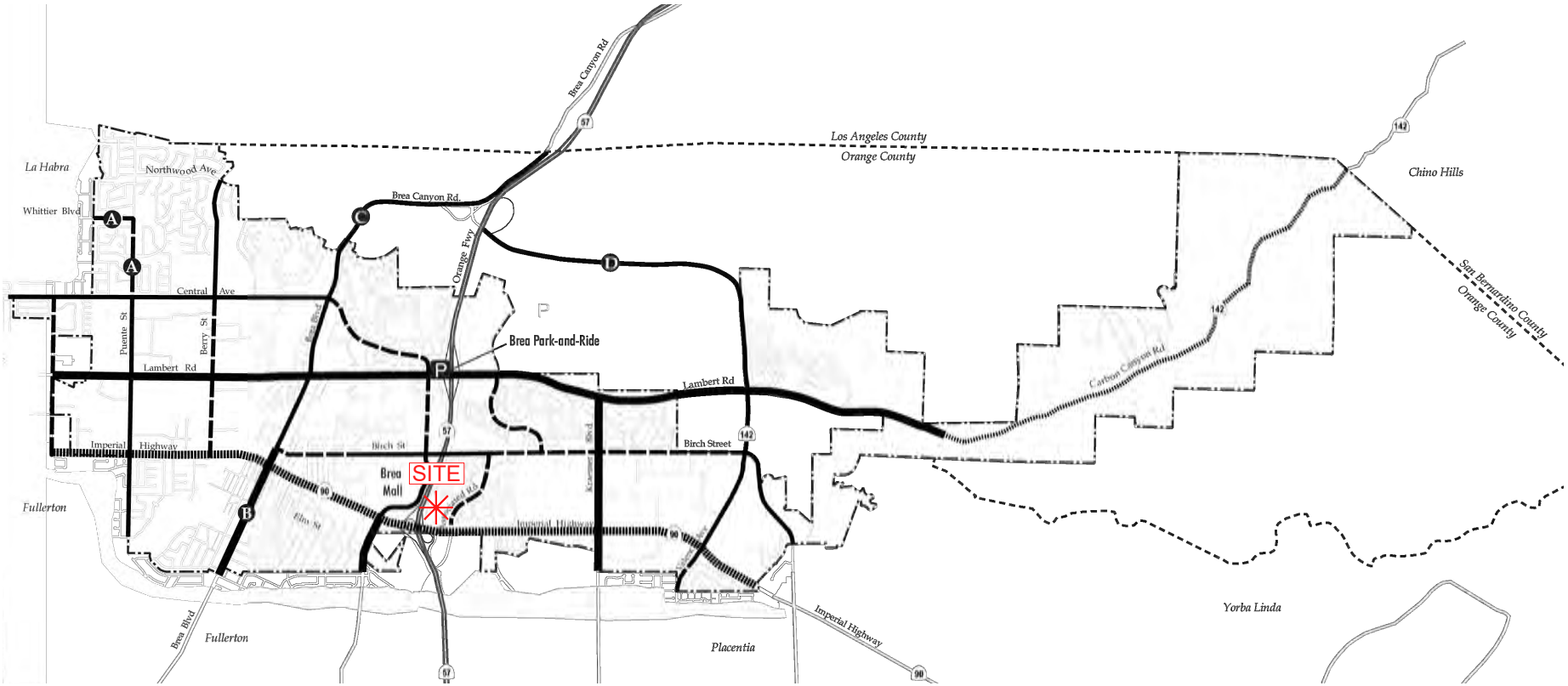
The City of Brea General Plan Master Plan of Roadways is shown on **Exhibit 3-5**. The City of Brea General Plan Typical Roadway Cross-Sections are shown on **Exhibit 3-6**.

The ultimate buildout General Plan classifications and the curb-to-curb roadway distances for the roadway segments of the study intersections that appear as a major route or is part of a highway system that serves as principal network for through traffic are as follows:

- Birch Street – Primary Arterial (Divided 4 lanes, 84 feet)
- Associated Road – Secondary Arterial (Divided 4 lanes, 64 feet)
- Imperial Highway – Smart Street (Divided 6 lanes, 84 feet)

Exhibit 3-5

City of Brea General Plan
Master Plan of Roadways



Legend:

- City Boundary
- Sphere of Influence
- ✳ = Project Site

Arterial Highways

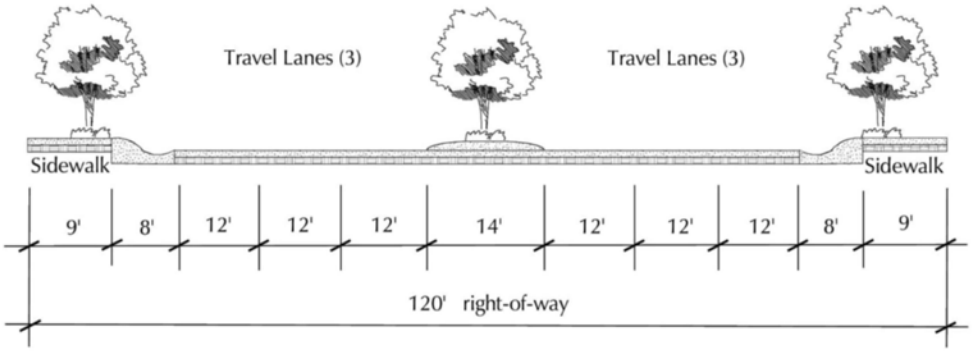
- Major Arterial
- Smart Street
- Primary Arterial
- Secondary Arterial
- Modified Secondary Arterial
- Collector/Commuter Roadway

N

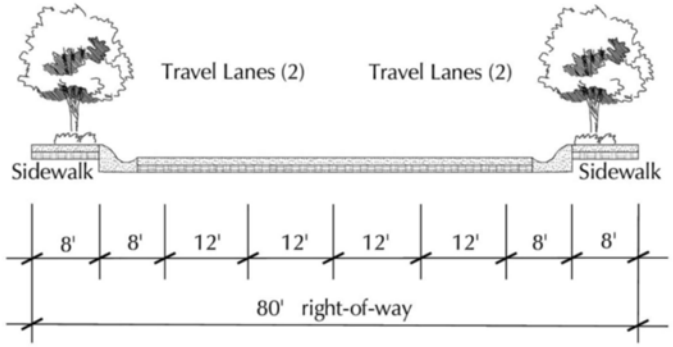
Exhibit 3-6

City of Brea General Plan
Typical Roadway Cross Sections

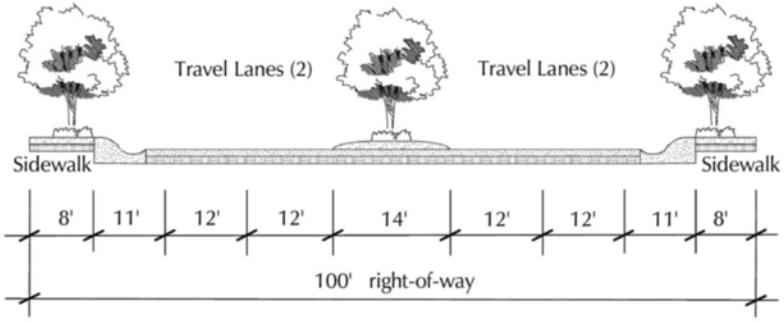
Major Arterial



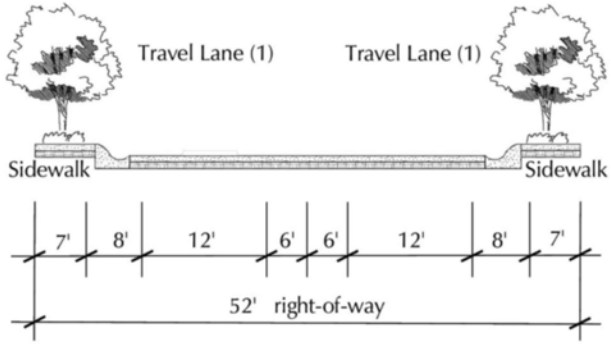
Secondary Arterial



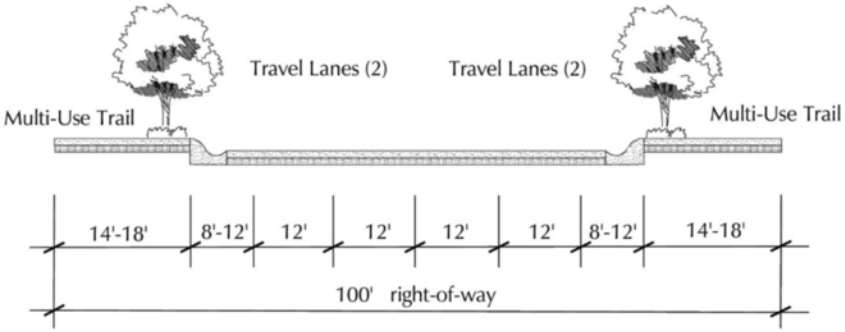
Primary Arterial



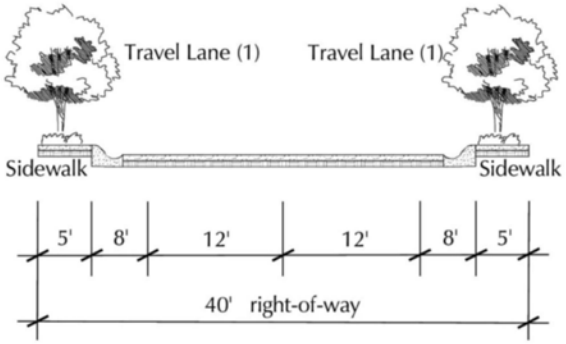
Collector Roadway (with Median Turn Lane)



Modified Secondary Arterial



Collector Roadway



4.0 Project Traffic Volumes

This section provides a discussion on methodologies utilized to derive project traffic volumes for the study area.

4.1 Project Traffic Conditions

4.1.1 Project Trip Generation

Trip generation represents the amount of traffic that is attracted and produced by a development. Typically, trip generation rates from the latest Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021) are used when calculating a proposed project's trip generation forecast. This publication provides a comprehensive evaluation of trip generation rates for a variety of land uses.

The proposed project consists of razing the existing vacant office building as well as the onsite parking garage to construct 180 single-family attached residential dwelling units. As such, ITE Land Use Code 215: Single-Family Attached Housing trip rates accurately reflect the proposed land use.

As directed by City of Brea staff, existing trip credits for the existing entitled (yet vacant) office buildings are not permitted for the Non-CEQA Transportation Assessment since the existing office site has not been fully occupied for several years. As such, the traffic study will assess the potential impact of the gross trips added by the project.

Table 4-1 shows the project trip generation rates and forecast for the Non-CEQA Transportation Assessment without trip credits. Utilizing the trip generation rates from the upper portion of Table 1, the lower portion of Table 1 shows the forecasted trip generation for the proposed land use.

As shown at the bottom of Table 1, the project is forecast to generate approximately 1,296 weekday daily trips which include approximately 86 weekday AM peak hour trips and approximately 103 weekday PM peak hour trips. Additionally, the project is forecast to generate approximately 1,577 Saturday daily trips which includes approximately 103 Saturday midday peak hour trips.

Table 4-1

Project Trip Generation Rates & Forecast[1]

For Non-CEQA Transportation Assessment (Without Trip Credit)

Land Use (ITE Code)	Quantity	Units[2]	Weekday						Daily	Saturday			Daily
			AM Peak Hour			PM Peak Hour				Midday Peak Hour			
			In	Out	Total	In	Out	Total		In	Out	Total	
Trip Generation Rates													
Single-Family Attached Housing (215)	--	DU	25%	75%	0.48	59%	41%	0.57	7.20	48%	52%	0.57	8.76
Trip Generation Forecast													
Single-Family Attached Housing (215)	180	DU	22	64	86	62	41	103	1,296	49	54	103	1,577

[1] Source: ITE Trip Generation Manual (11th Edition, 2021).
[2] DU = Dwelling Units.

4.1.2 Project Trip Distribution & Assignment

Trip distribution represents the directional orientation of traffic to and from the project site. Trip distribution is heavily influenced by the geographical location of the site, the location of residential, employment and recreational opportunities, and the proximity to the regional freeway system. The directional orientation of traffic was determined by evaluating existing and proposed land uses, highways within the community, and existing traffic volumes.

The assignment of traffic from the project site to the adjoining roadway system has been based upon the site's trip generation, trip distribution, existing and proposed arterial highways, and local street systems, which would be in place by the time of initial occupancy of the site.

Exhibit 4-1 shows the forecast project trip distribution.

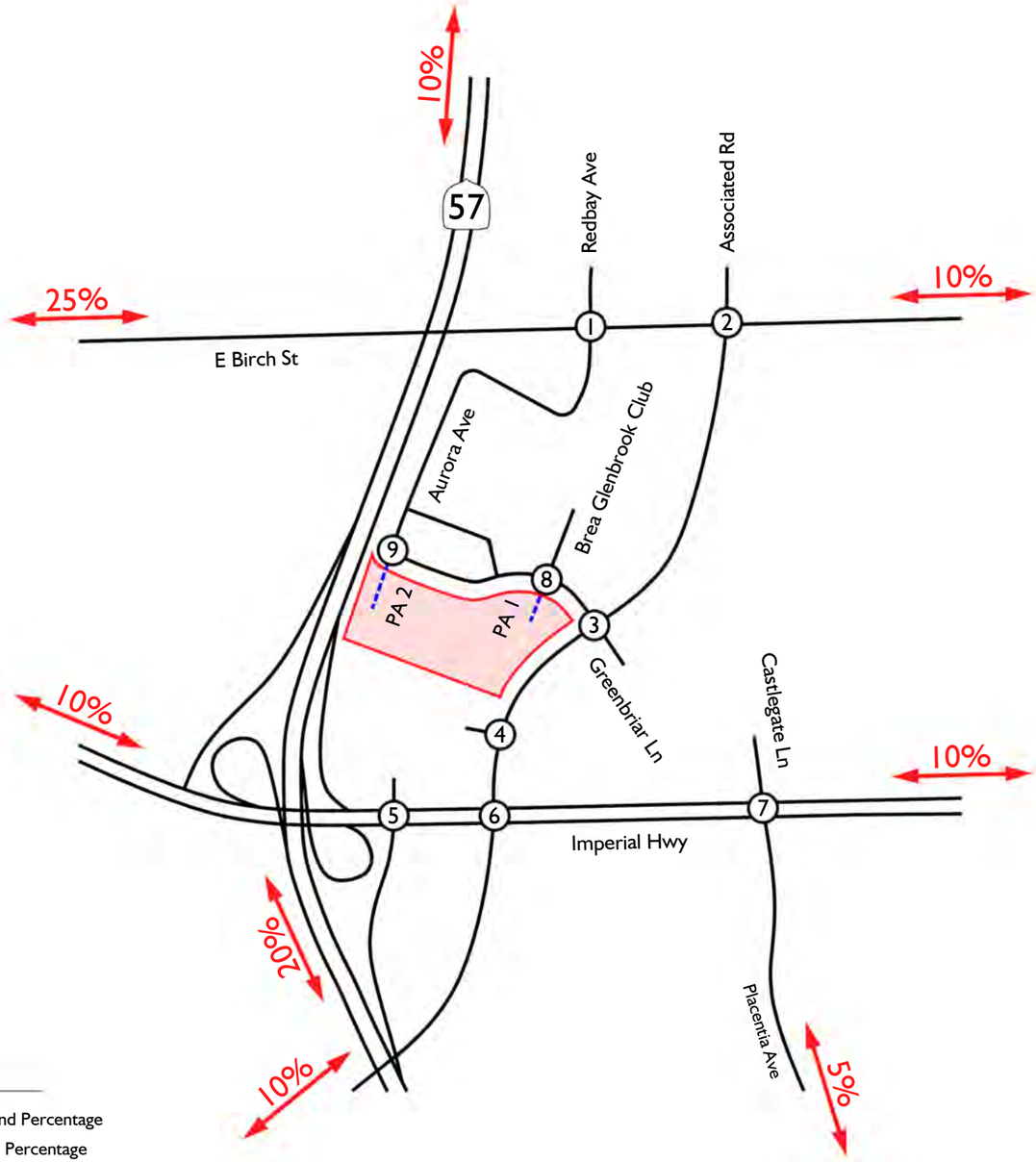
4.1.3 Project Peak Hour Traffic Volumes

With the construction of the project, the shared access points between both the Brea Shopping Plaza and the project site will be eliminated. Due to this elimination of the shared access between the two sites, the "With Project" traffic scenarios account for rerouting of any vehicles currently either cutting through the project site to/from the commercial center, or parking within the project site and walking to the commercial center.

As previously mentioned, Exhibit 3-4 (See Section 3.2 above) summarizes these existing parking lot cut-through traffic volumes at the three (3) existing access points serving the prior Mercury Insurance parking lot for weekday AM, weekday PM, and Saturday midday peak hours. **Exhibit 4-2** presents the necessary reroutes of the existing cut-through traffic volumes presented in Exhibit 3-4 after construction of the project and the elimination of the shared access points between both the Brea Shopping Plaza and the project site.

Exhibit 4-3 and **Exhibit 4-4** show the total adjusted weekday AM and PM peak hour and Saturday midday peak hour intersection turning movement volumes, respectively, which accounts for both the gross project traffic and the appropriate rerouted volumes shown in Exhibit 4-2.

Project Trip Distribution



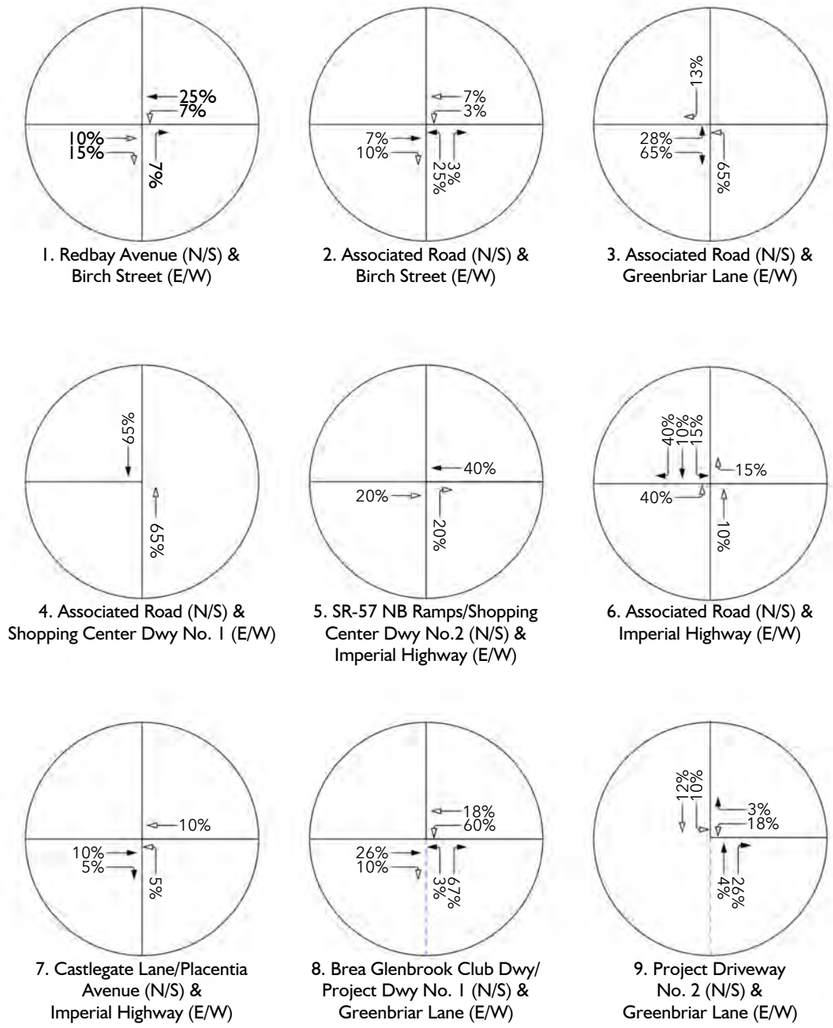
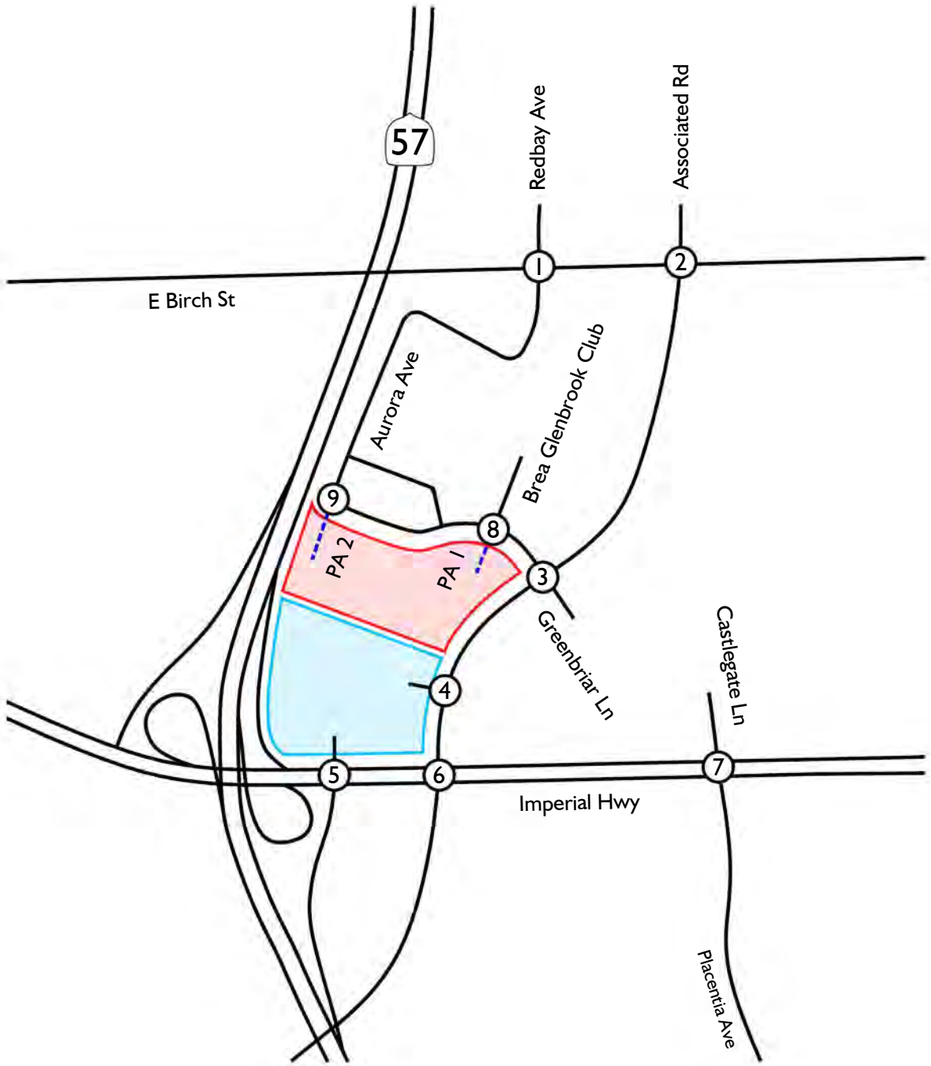
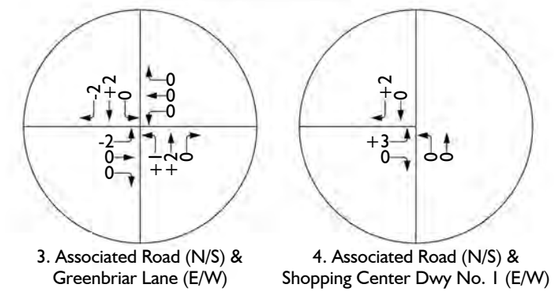


Exhibit 4-2

Project Volume Adjustments for Rerouted Traffic



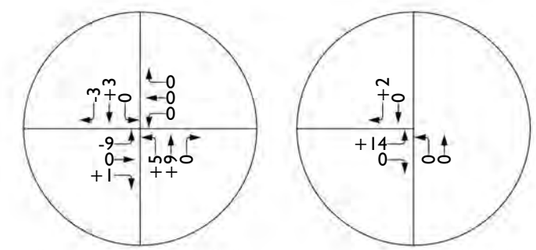
AM Peak Hour



3. Associated Road (N/S) & Greenbriar Lane (E/W)

4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)

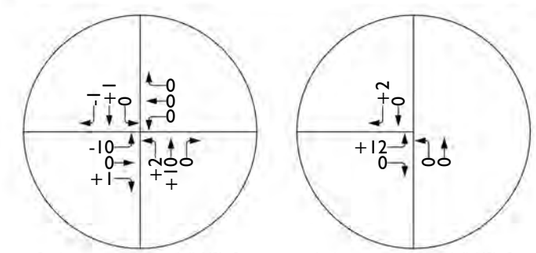
PM Peak Hour



3. Associated Road (N/S) & Greenbriar Lane (E/W)

4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)

Saturday Midday Peak Hour



3. Associated Road (N/S) & Greenbriar Lane (E/W)

4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)

Legend:

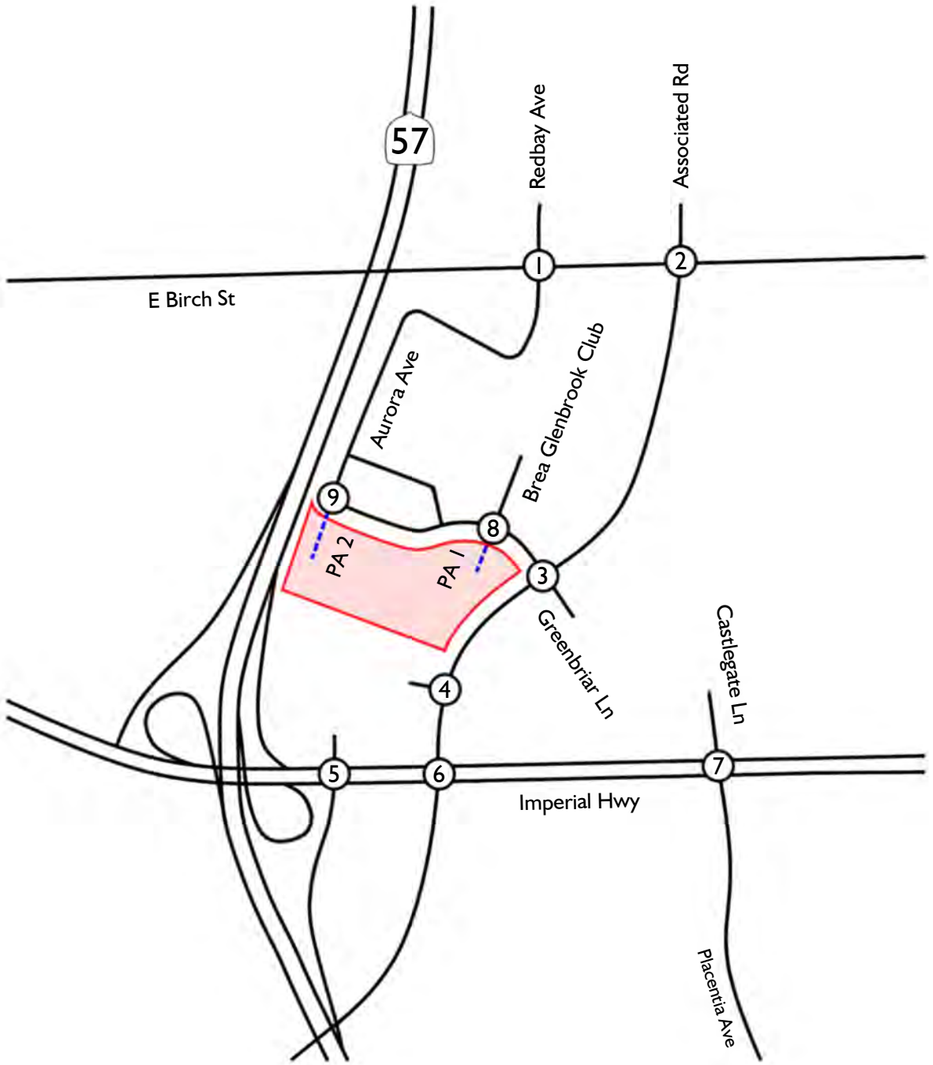
- (1) = Study Intersection
- = Project Access Driveway
- = Brea Shopping Plaza Boundary
- = Project Site Boundary
- +/-1 = Project Volume Adjustments

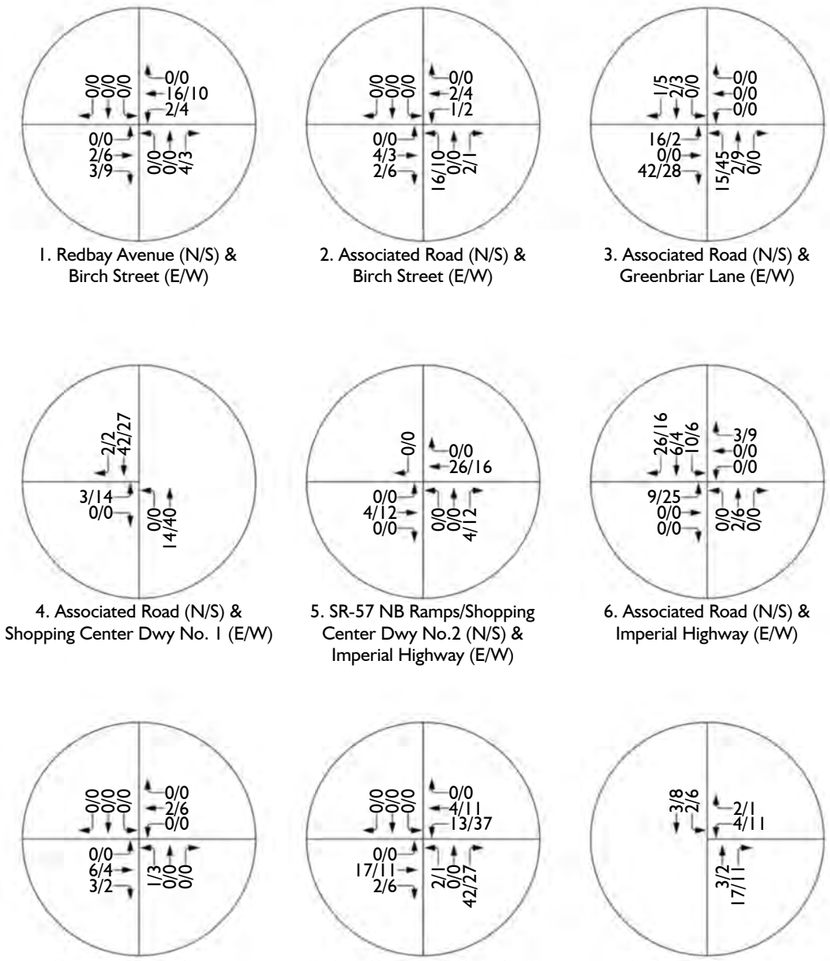
N

Note: Intersections not included do not have any adjustments to the project volumes.

Exhibit 4-3

Weekday Peak Hour Project Traffic Volumes With Rerouted Traffic





1. Redbay Avenue (N/S) & Birch Street (E/W)
2. Associated Road (N/S) & Birch Street (E/W)
3. Associated Road (N/S) & Greenbriar Lane (E/W)
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)
6. Associated Road (N/S) & Imperial Highway (E/W)
7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)
8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)
9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

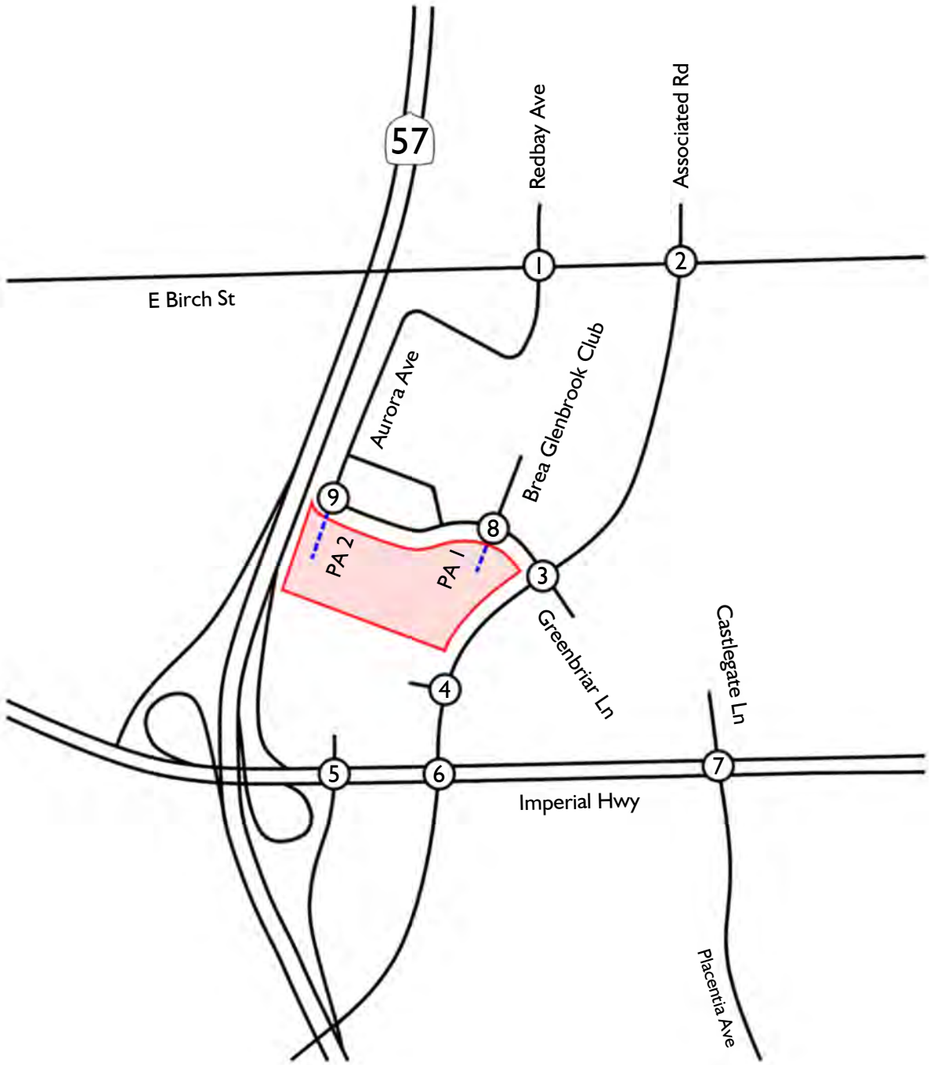
Legend:

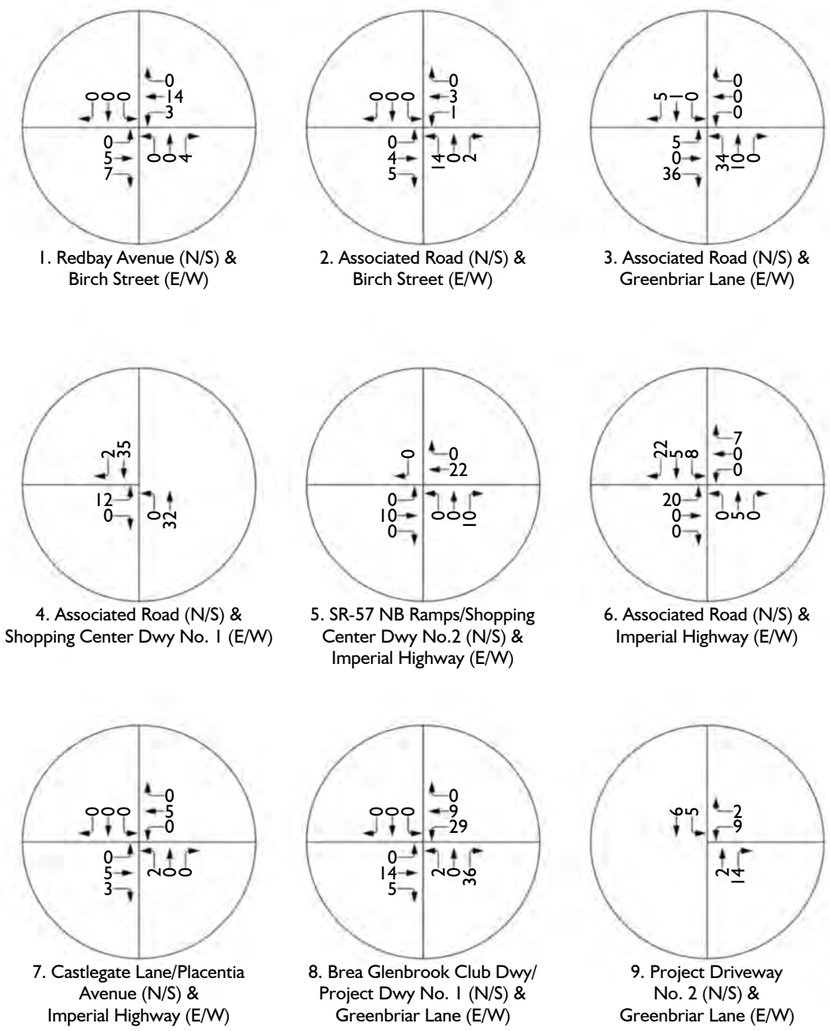
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10/20 = AM/PM Peak Hour Volumes

N

Exhibit 4-4

Saturday Midday Peak Hour Project Traffic Volumes With Rerouted Traffic





Legend:

- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10 = Saturday Midday Peak Hour Volumes

N

4.2 Background Traffic

4.2.1 Method of Projection

To assess future traffic conditions, project traffic is combined with existing traffic and area-wide growth. As directed by City staff, to account for area-wide/ambient growth in the study area, a linear annual growth rate of one percent (1%) per year has been applied to the existing (2024) traffic volumes over a two-year period for project opening year 2026 conditions (2% total growth).

4.2.2 Cumulative Projects Traffic Volumes

Information on future projects in the vicinity of the study area has been provided by City of Brea staff for inclusion in this analysis and is shown in **Table 4-2**. Table 4-2 shows the land uses, and daily and peak hour trip generation for the nearby cumulative projects provided by the public agencies.

A location map of the cumulative projects is shown on **Exhibit 4-5**. Cumulative projects traffic volumes for a typical weekday and Saturday are shown on **Exhibit 4-6** and **Exhibit 4-7**, respectively.

In reality, some of the cumulative projects may be downsized or may not be developed by the project opening year (2026). In addition, many of the cumulative projects have been or will be subject to a variety of mitigation measures that will reduce the potential environmental impacts associated with those projects. However, those mitigation measures have not been taken into account in projecting the environmental impact of the related projects. Therefore, the cumulative analyses set forth below are conservative and could result in greater impacts than actually anticipated.

4.3 Project Opening Year (2026) Without Project Conditions Traffic Volumes

Project Opening Year 2026 Without Project Conditions traffic volumes consists of two (2) years of annual growth on top of existing (2024) traffic volumes at one percent (1%) per year (i.e. 2% total growth) plus traffic volumes generated by cumulative projects without rerouted traffic volumes.

Project Opening Year 2026 Without Project Conditions traffic volumes during a typical weekday and Saturday are shown in **Exhibit 4-8** and **Exhibit 4-9**, respectively.

Table 4-2

Cumulative Projects Trip Generation[1]

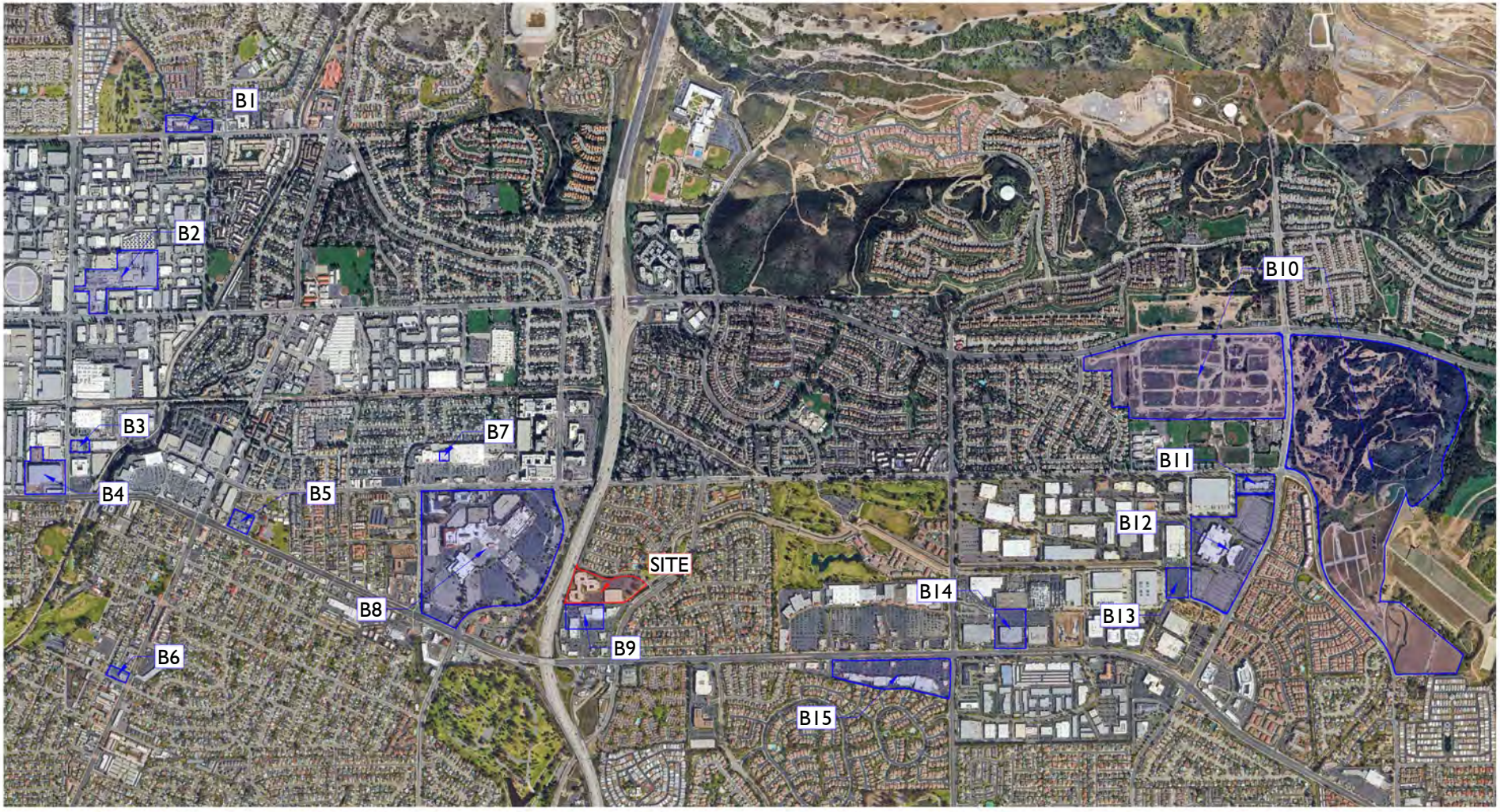
ID No.	Jurisdiction	Project Name / Case Number	Land Use (ITE Code[2])	Quantity	Units[3]	Weekday							Weekend			
						AM Peak Hour			PM Peak Hour			Daily	Midday Peak Hour			Daily
						In	Out	Total	In	Out	Total		In	Out	Total	
TAZ 1																
1	**City of Brea**	The Phoenix Club	High-Turnover (Sit-Down) Restaurant (932)	8.35	TSF	40	32	72	26	17	43	805	43	41	84	920
					TAZ 1 Total	**40**	**32**	**72**	**26**	**17**	**43**	**805**	**43**	**41**	**84**	**920**
TAZ 2																
2	**City of Brea**	New Industrial Building	Warehousing (150)	147.5	TSF	22	8	30	10	23	33	388	7	2	9	35
					TAZ 2 Total	**22**	**8**	**30**	**10**	**23**	**33**	**388**	**7**	**2**	**9**	**35**
TAZ 3																
3	**City of Brea**	Mercury Lane Apartments[4]	--	--	--	-2	30	28	30	9	39	545	23	22	45	533
					TAZ 3 Total	**-2**	**30**	**28**	**30**	**9**	**39**	**545**	**23**	**22**	**45**	**533**
TAZ 4																
4	**City of Brea**	Transwestern	Warehousing (150)	126.797	TSF	19	8	27	10	19	29	334	6	2	8	31
					TAZ 4 Total	**19**	**8**	**27**	**10**	**19**	**29**	**334**	**6**	**2**	**8**	**31**
TAZ 5																
5	**City of Brea**	Brea Gaslight Square Redevelopment[5]	--	--	--	64	55	119	39	34	73	872	60	57	117	1,330
					TAZ 5 Total	**64**	**55**	**119**	**39**	**34**	**73**	**872**	**60**	**57**	**117**	**1,330**
TAZ 6																
6	**City of Brea**	South Brea Townhomes	Multi-Family Housing (Low-Rise) (220)	32	DU	3	10	13	10	6	16	216	7	7	14	146
					TAZ 6 Total	**3**	**10**	**13**	**10**	**6**	**16**	**216**	**7**	**7**	**14**	**146**
TAZ 7																
7	**City of Brea**	Smart Parke Pet Daycare[6]	Day Care Center (565)	6.715	TSF	39	35	74	35	40	75	320	0	1	1	3
					TAZ 7 Total	**39**	**35**	**74**	**35**	**40**	**75**	**320**	**0**	**1**	**1**	**3**
TAZ 8																
8	**City of Brea**	Brea Mall Mixed Use Project[7]	--	--	--	165	150	315	281	143	424	4,140	172	269	441	4,031
					TAZ 8 Total	**165**	**150**	**315**	**281**	**143**	**424**	**4,140**	**172**	**269**	**441**	**4,031**
TAZ 9																
9	**City of Brea**	Brea Plaza Remodel (Buildings E-G)[8]	--	--	--	39	61	100	21	18	39	256	7	10	17	182
					TAZ 9 Total	**39**	**61**	**100**	**21**	**18**	**39**	**256**	**7**	**10**	**17**	**182**
TAZ 10																
10	**City of Brea**	Brea 265 Specific Plan[9]	--	--	--	182	452	634	542	351	893	9,351	488	470	958	11,021
					TAZ 10 Total	**182**	**452**	**634**	**542**	**351**	**893**	**9,351**	**488**	**470**	**958**	**11,021**
TAZ 11																
11	**City of Brea**	New warehouse building (Preliminary Plan Review)	Warehousing (150)	86.145	TSF	13	6	19	6	15	21	227	3	3	6	21
12	**City of Brea**	Amazon Parcel Delivery Facility[10]	High-Cube Parcel Hub Warehouse (156)	181.5	GFA	77	75	152	87	46	133	1,001	119	41	160	673
13	**City of Brea**	Light Industrial Building	General Light Industrial (110)	56	TSF	36	7	43	5	33	38	295	3	3	6	43
14	**City of Brea**	Industrial Building	Warehousing (150)	113.7	TSF	17	6	23	10	15	25	300	4	4	8	27
					TAZ 11 Total	**143**	**94**	**237**	**108**	**109**	**217**	**1,823**	**129**	**51**	**180**	**764**
TAZ 12																
15	**City of Brea**	Brea Regional Animal Hospital[11]	Animal Hospital/Veterinary Clinic (640)	5.925	TSF	14	8	22	8	13	21	127	14	8	22	91
					TAZ 12 Total	**14**	**8**	**22**	**8**	**13**	**21**	**127**	**14**	**8**	**22**	**91**
					Total Cumulative Project Developments Trip Generation	***728***	***943***	***1,671***	***1,120***	***782***	***1,902***	***19,177***	***956***	***940***	***1,896***	***19,087***

[1] Cumulative project information provided by the City of Brea staff.
[2] Source: *ITE Trip Generation Manual (11th Edition, 2021).*
[3] TSF = Thousand Square Feet; DU = Dwelling Units; GFA = Gross Floor Area.
[4] Source: *Mercury Apartments Revised Traffic Impact Analysis Report*, prepared by Linscott, Law, & Greenspan, Engineers, dated July 16, 2019.
[5] Source: *Brea Gaslight Square (PLN2022-00011) Traffic Analysis*, prepared by Urban Crossroads, dated April 5, 2023.
[6] Smart Parke Pet Daycare does not have an appropriate land use listed in the ITE Trip Generation Manual; therefore, the land use of Day Care Center is used in substitution and the quantity of pets is dvivided by three to account for less trips than a typical day care center.
[7] Source: *Brea Mall Mixed-Use Project Traffic Impact Analysis Report*, prepared by Linscott, Law, & Greenspan, Engineers, dated January 9, 2020.
[8] Source: *Brea Plaza Expansion Revised Traffic Circulation Analysis*, prepared by Linscott, Law, & Greenspan, Engineers, dated July 29, 2021.
[9] Source: *Brea 265 Specific Plan Traffic Circulation Analysis*, prepared by Linscott, Law, & Greenspan, Engineers, dated February 8, 2022.
[10] The identified land use of High-Cube Parcel Warehouse from the ITE Trip Generation Manual does not provide rates for the weekend. The Amazon Parcel Delivery Facility will be in operation on the weekends; therefore, weekend rates are proportioned to a smilar land use, High-Cube Transload and Short-Term Storage Warehouse (ITE Code: 154) in substitution.
[11] The identified land use of Animal Hospital/Veterinary Clinic from the ITE Trip Generation Manual does not provide rates for the weekend. The Brea Regional Animal Hospital will be in operation on the weekends; therefore, weekend rates matched to the highest rates for the weekday in substitution.

RK19753.2TB.xlsx
JN:2827-2023-05

Exhibit 4-5

Cumulative Projects Location Map



Legend:

= Project Site

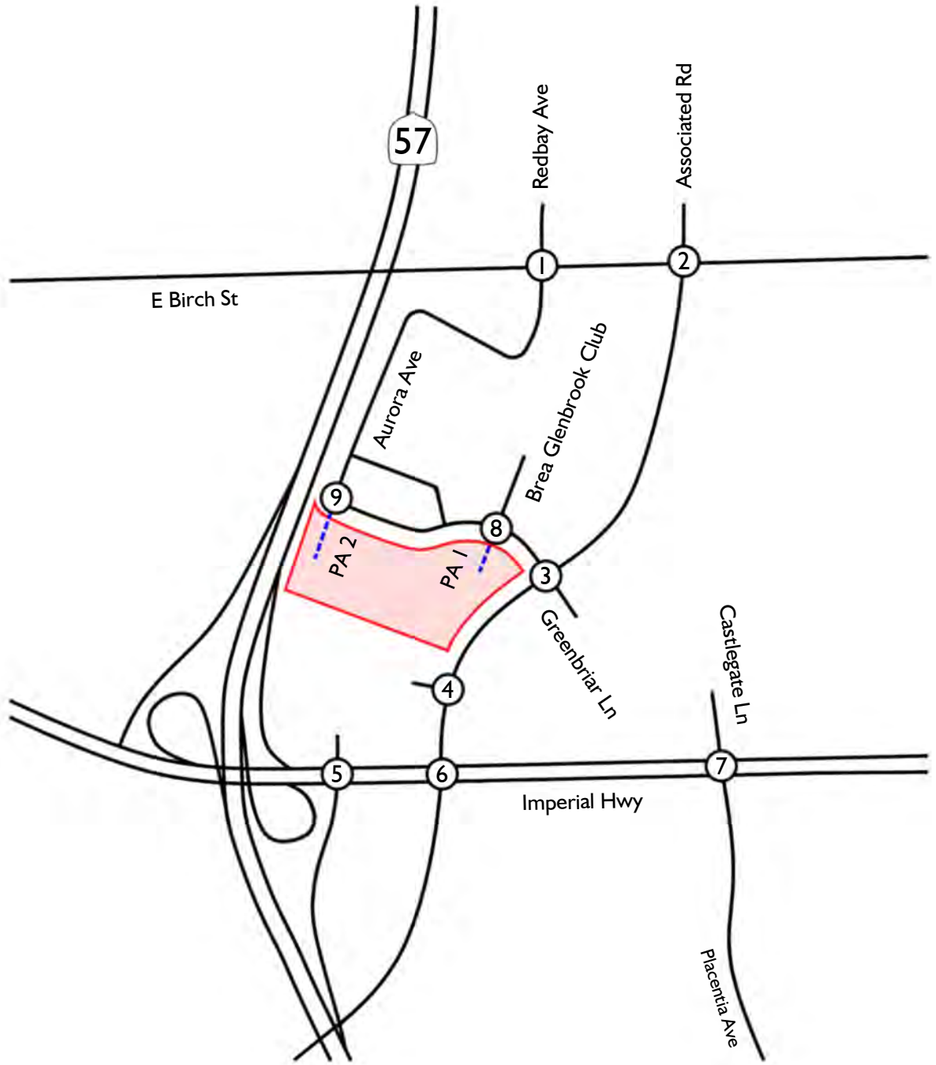
= City of Brea Cumulative Projects

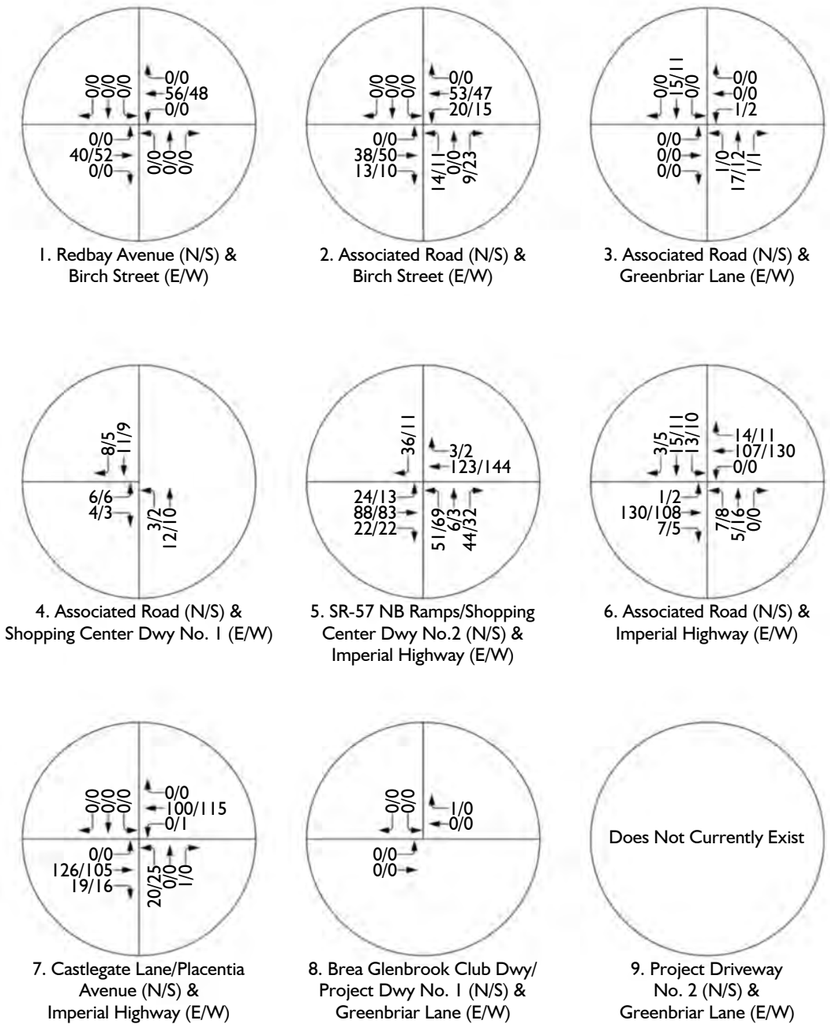
N

RK engineering group, inc.

Exhibit 4-6

Weekday Peak Hour Cumulative Projects Traffic Volumes





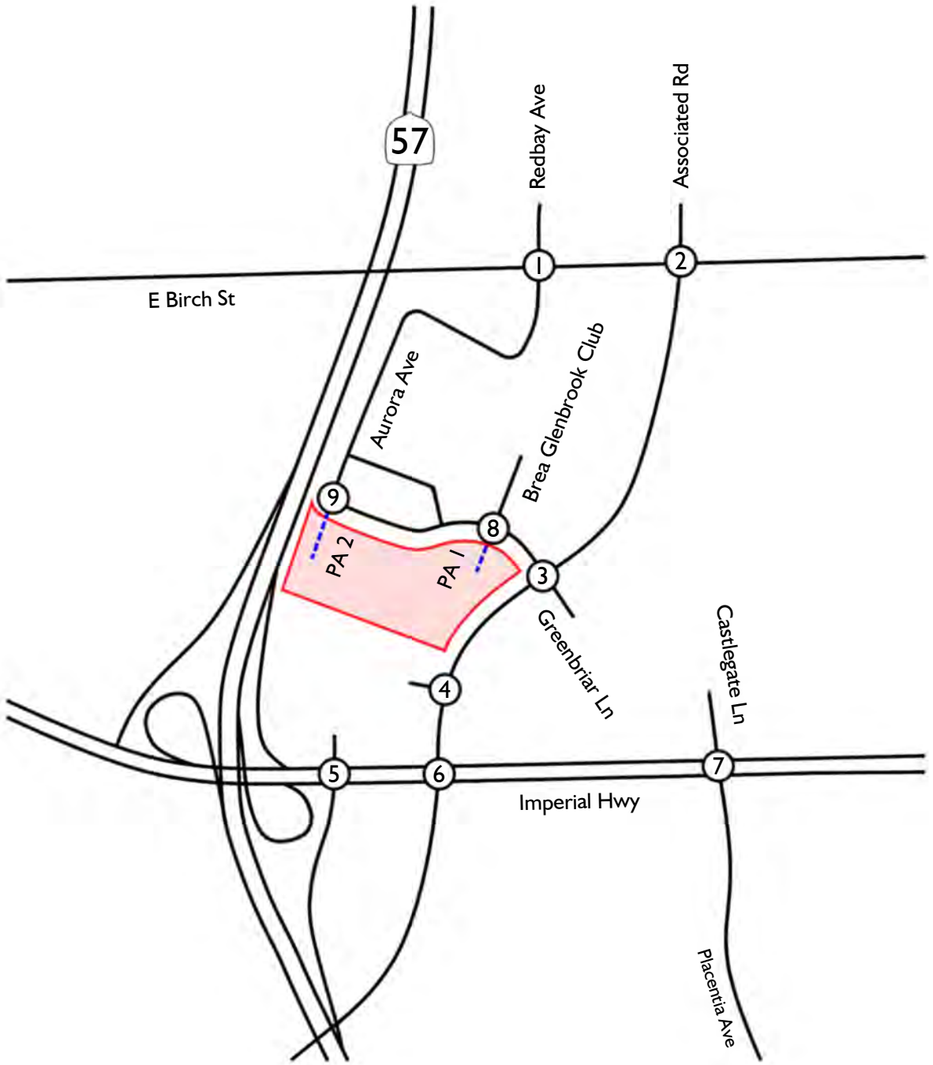
Legend:

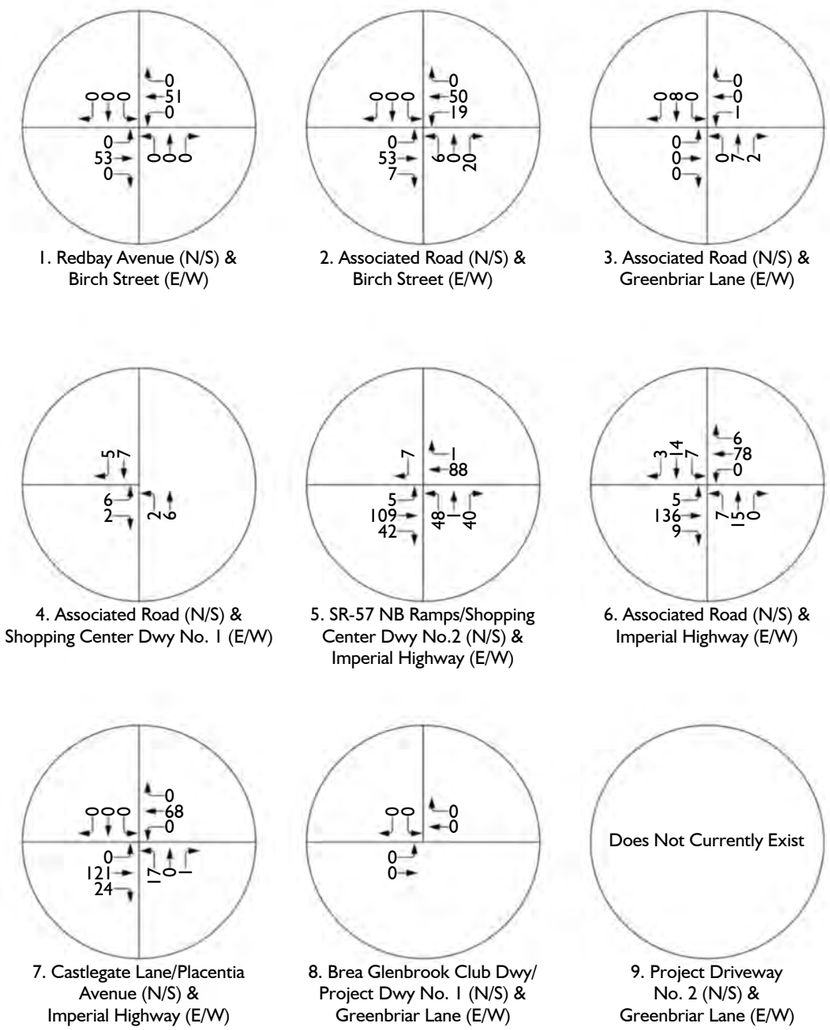
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10/20 = AM/PM Peak Hour Volumes

N

Exhibit 4-7

Saturday Midday Peak Hour Cumulative Projects Traffic Volumes





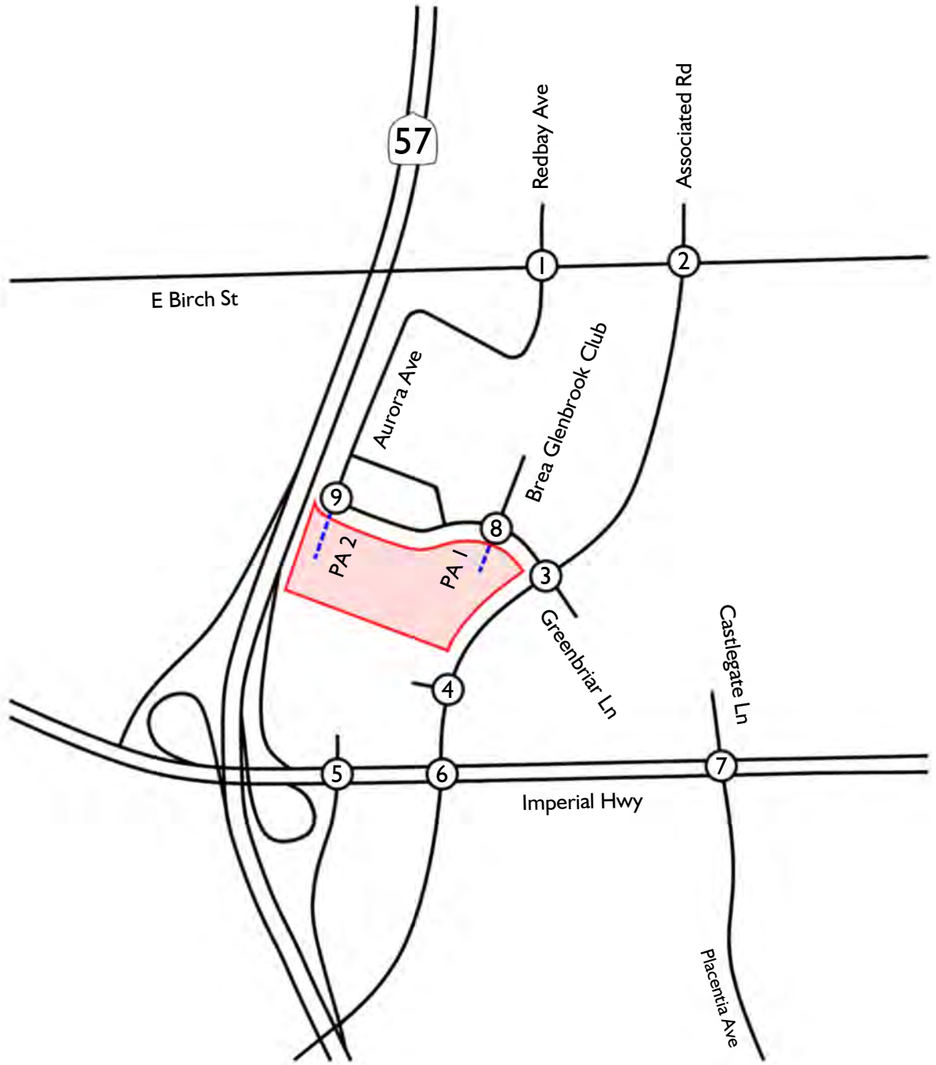
Legend:

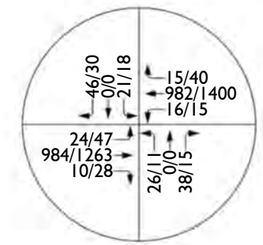
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10 = Saturday Midday Peak Hour Volumes

N

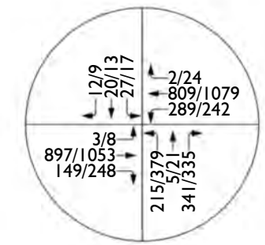
Exhibit 4-8

Project Opening Year (2026) With 2% Ambient Growth, Cumulative Projects, & No Rerouted Traffic
Without Project Conditions Traffic Volumes
Weekday Peak Hours

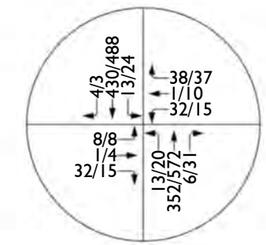




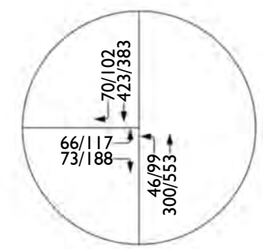
1. Redbay Avenue (N/S) & Birch Street (E/W)



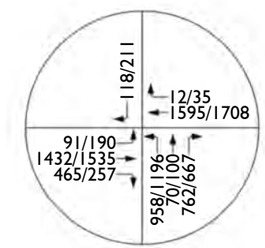
2. Associated Road (N/S) & Birch Street (E/W)



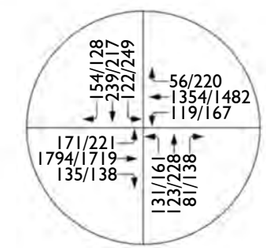
3. Associated Road (N/S) & Greenbriar Lane (E/W)



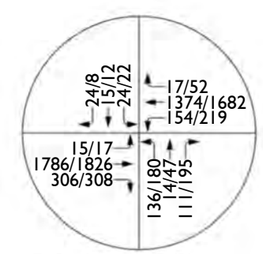
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)



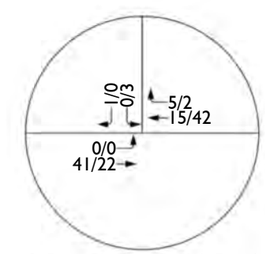
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)



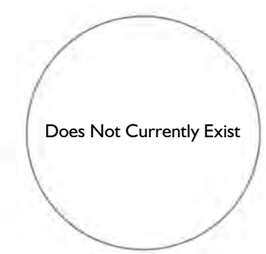
6. Associated Road (N/S) & Imperial Highway (E/W)



7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)



8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)



9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

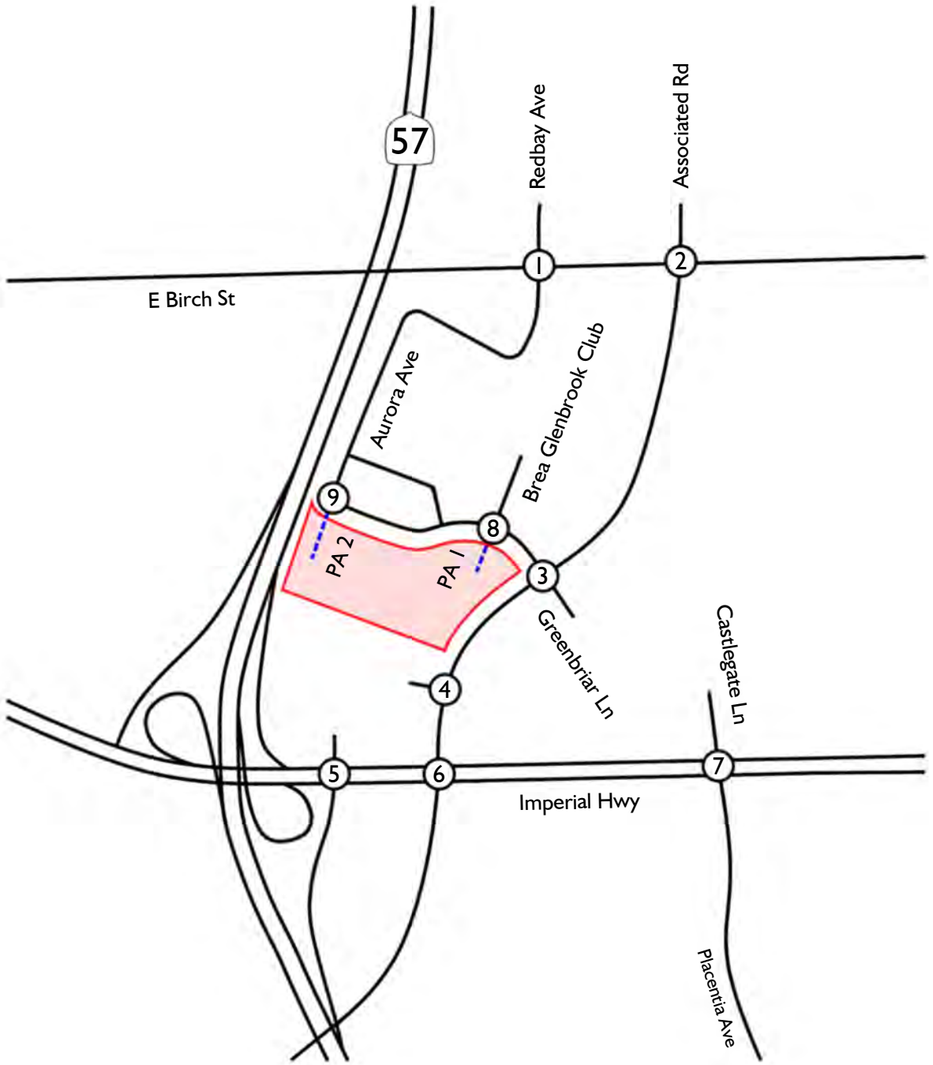
Legend:

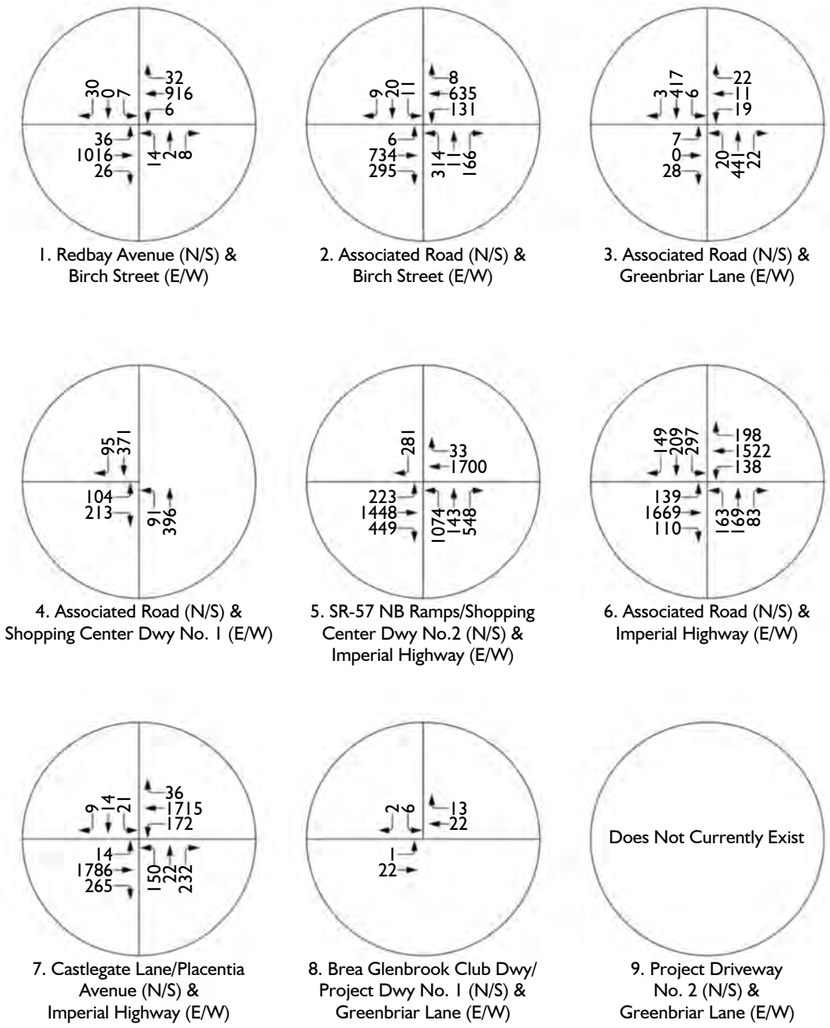
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10/20 = AM/PM Peak Hour Volumes

N

Exhibit 4-9

Project Opening Year (2026) With 2% Ambient Growth, Cumulative Projects, & No Rerouted Traffic
Without Project Conditions Traffic Volumes
Saturday Midday Peak Hour





Legend:

- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10 = Saturday Midday Peak Hour Volumes

N

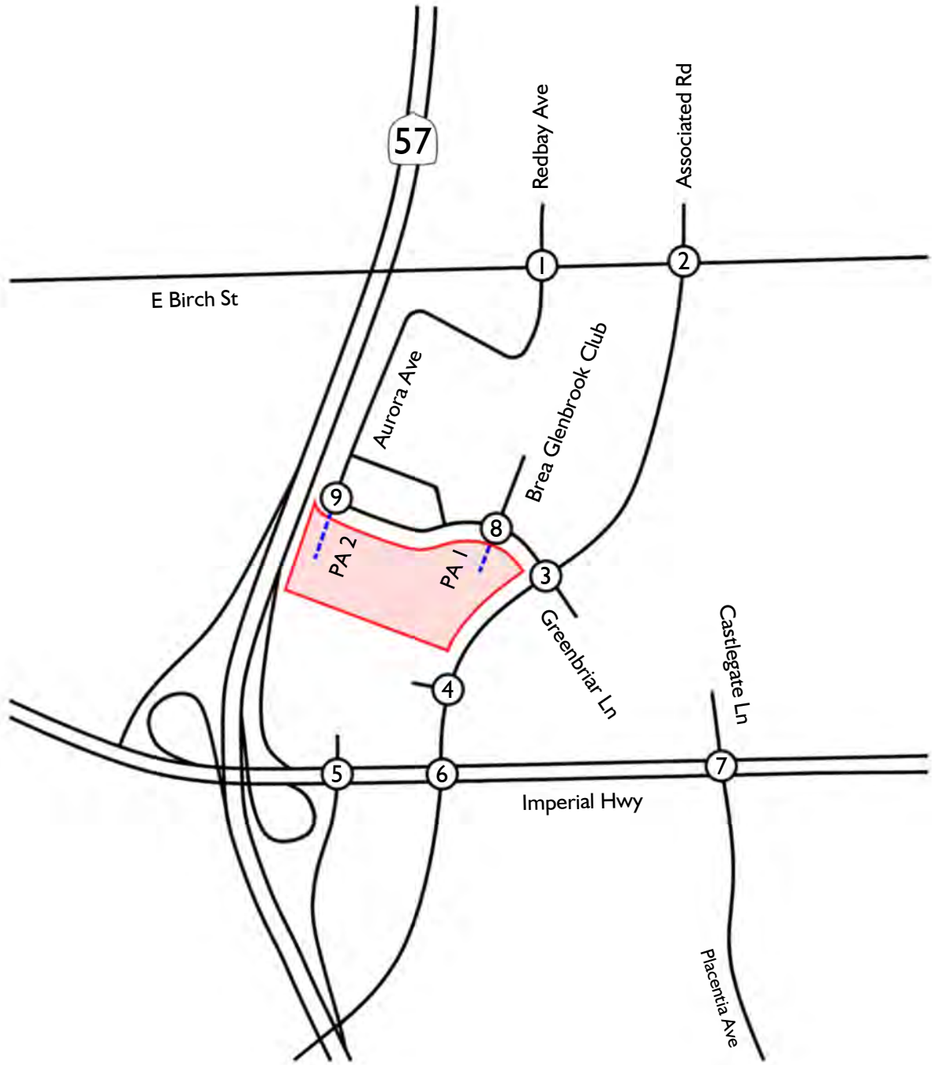
4.4 Project Opening Year (2026) With Project Conditions Traffic Volumes

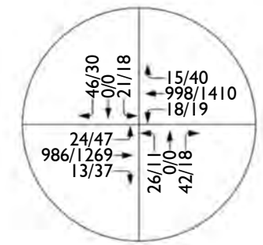
Project Opening Year 2026 With Project Conditions traffic volumes consists of two (2) years of annual growth on top of existing (2024) traffic volumes at one percent (1%) per year (i.e. 2% total growth) plus traffic volumes generated by the proposed project, the rerouted traffic volumes, and cumulative projects.

Project Opening Year 2026 With Project Conditions traffic volumes during a typical weekday and Saturday are shown in **Exhibit 4-10** and **Exhibit 4-11**, respectively.

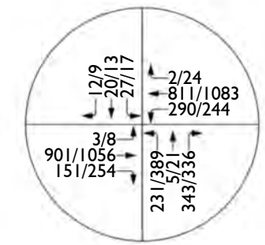
Exhibit 4-10

Project Opening Year (2026) With 2% Ambient Growth, Cumulative Projects, & Rerouted Traffic With Project Conditions Traffic Volumes Weekday Peak Hours

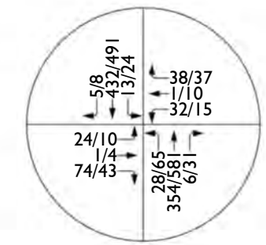




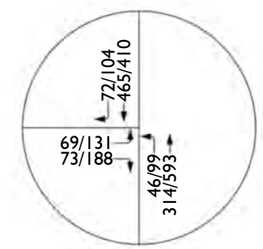
1. Redbay Avenue (N/S) & Birch Street (E/W)



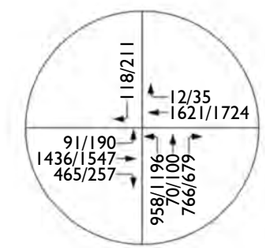
2. Associated Road (N/S) & Birch Street (E/W)



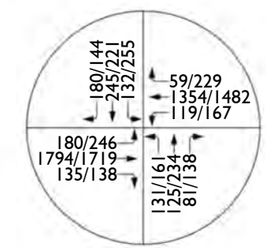
3. Associated Road (N/S) & Greenbriar Lane (E/W)



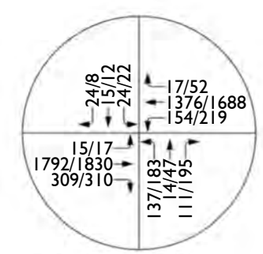
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)



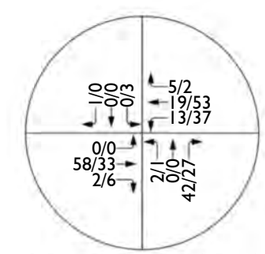
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)



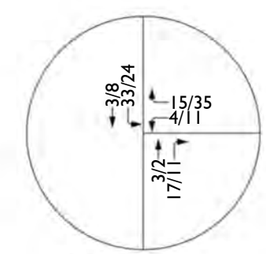
6. Associated Road (N/S) & Imperial Highway (E/W)



7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)



8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)



9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

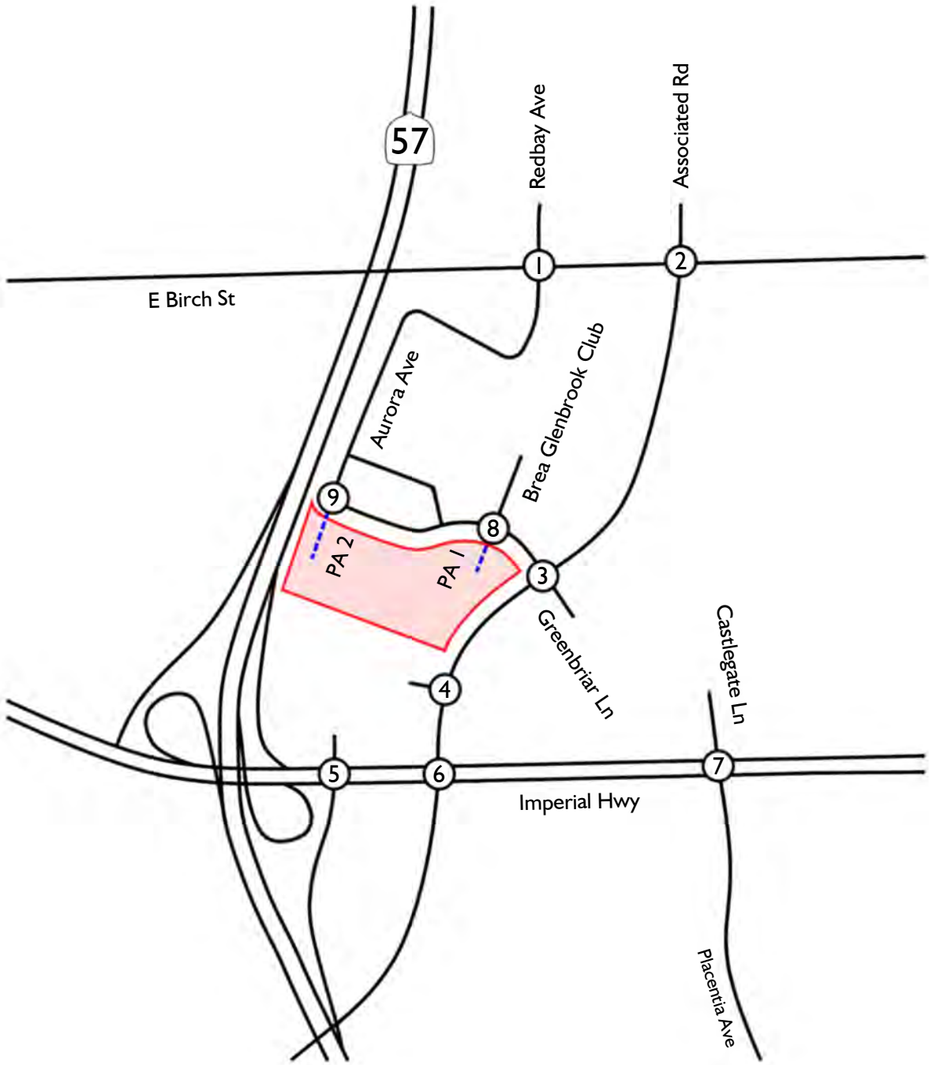
Legend:

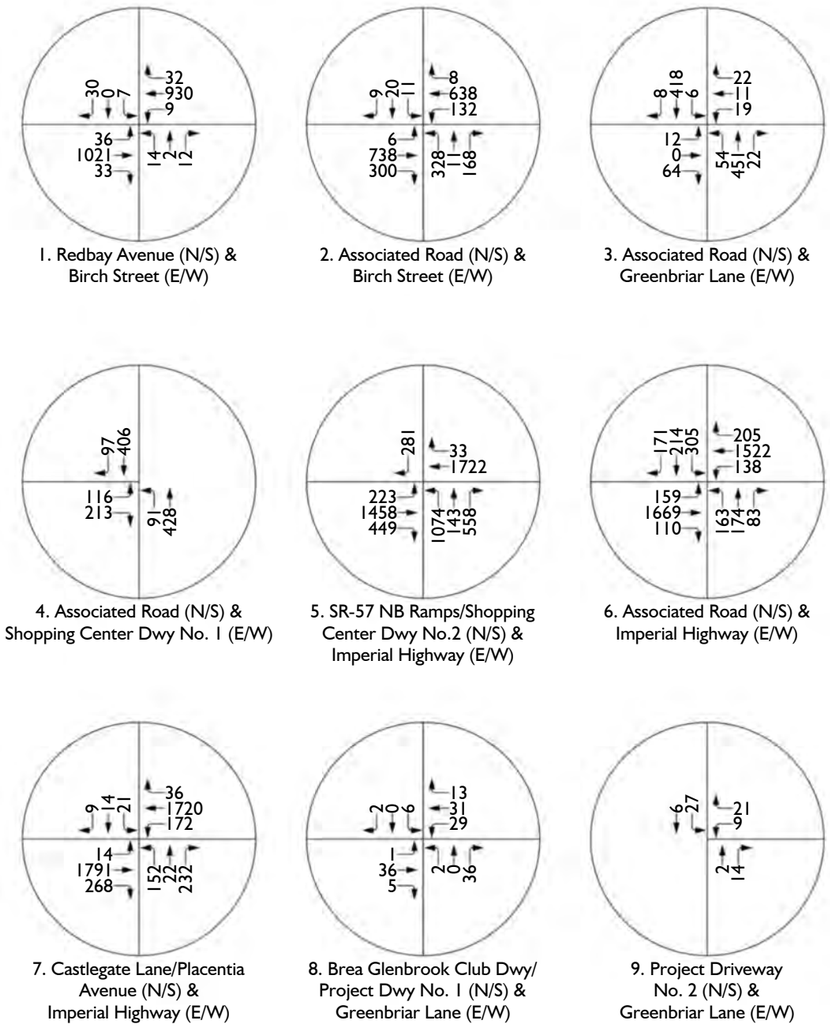
- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10/20 = AM/PM Peak Hour Volumes

N

Exhibit 4-11

Project Opening Year (2026) With Ambient Growth, Cumulative Projects, & Rerouted Traffic With Project Conditions Traffic Volumes Saturday Midday Peak Hour





1. Redbay Avenue (N/S) & Birch Street (E/W)
2. Associated Road (N/S) & Birch Street (E/W)
3. Associated Road (N/S) & Greenbriar Lane (E/W)
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)
5. SR-57 NB Ramps/Shopping Center Dwy No.2 (N/S) & Imperial Highway (E/W)
6. Associated Road (N/S) & Imperial Highway (E/W)
7. Castlegate Lane/Placentia Avenue (N/S) & Imperial Highway (E/W)
8. Brea Glenbrook Club Dwy/ Project Dwy No. 1 (N/S) & Greenbriar Lane (E/W)
9. Project Driveway No. 2 (N/S) & Greenbriar Lane (E/W)

Legend:

- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- 10 = Saturday Midday Peak Hour Volumes

N

5.0 Study Intersection Peak Hour LOS Analysis

This section of the report provides a discussion on the study intersection peak hour level of service (LOS) analysis and findings.

The minimum acceptable LOS thresholds for each study intersection are detailed in Section 2.2 of this report. If the LOS performance criteria outlined in Section 2.2 are met, operational improvements will be identified for the study area intersections to restore acceptable conditions.

5.1 Existing Conditions Level of Service

Existing Conditions LOS calculations for the nine (9) study intersections are reported in **Table 5-1** and are based on the weekday AM and PM and Saturday Midday peak hour existing traffic volumes shown in Exhibit 3-2 and the existing traffic controls & intersection geometrics shown in Exhibit 3-1.

As shown in Table 5-1, all nine (9) study intersections are currently operating at an acceptable LOS during the peak hours under Existing Conditions except for the following one (1) study intersection:

Deficient Intersection:

1. Redbay Avenue (N/S) at Birch Street (E/W)
    - AM Peak Hour – LOS F (124.4 seconds per vehicle)
    - PM Peak Hour – LOS F (275.2 seconds per vehicle)
    - Saturday Midday Peak Hour – LOS F (57.0 seconds per vehicle)

Detailed LOS Analysis worksheets for Existing Conditions are included in **Appendix C**.

5.2 Project Opening Year (2026) Without Project Conditions Level of Service

Project Opening Year (2026) Without Project Conditions LOS calculations for the nine (9) study intersections are reported in **Table 5-2** and are based on the Project Opening Year (2026) Without Project Conditions traffic volumes shown in Exhibit 4-8 and Exhibit 4-9 and the existing traffic controls & intersection geometrics shown in Exhibit 3-1.

As shown in Table 5-2, all nine (9) study intersections are forecasted to operate at an acceptable LOS during the peak hours under Project Opening Year (2026) Without Project Conditions except for the following one (1) study intersection:

Table 5-1
Study Intersection LOS Analysis Summary
Existing Conditions

	Study Intersection	Jurisdictions	Traffic Control[1]	Methodology	Acceptable LOS[2]	Acceptable LOS (CMP)[3]	ICU Ratio (V/C)[4,5]			Level of Service			Delay (sec/veh)[4,5]			Level of Service		
							AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Redbay Avenue (N/S) at Birch Street (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	**124.4**	**275.2**	**57.0**	**F**	**F**	**F**
2.	Associated Road (N/S) at Birch Street (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	38.2	41.0	37.3	D	D	D
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	6.3	4.3	4.8	A	A	A
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	13.7	18.4	15.3	B	C	C
5.	SR-57 NB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Brea OC CMP Caltrans	TS	ICU HCM 7	D	E	0.552	0.651	0.654	A	B	B	21.5	24.5	25.7	C	C	C
6.	Associated Road (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	38.8	42.5	41.4	D	D	D
7.	Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	14.5	18.2	17.9	B	B	B
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	8.42	8.95	8.79	*A*	*A*	*A*
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)	Brea	--	--	--	--	*Does Not Currently Exist.*											

[1] TS = Traffic Signal
AWS = All-Way Stop
CSS = Cross-Street Stop

[2] The minimum acceptable level of service for the City of Brea and the City of Fullerton is D.

[3] The minimum acceptable level of service for the Orange County Congestion Management Program and Caltrans is E.

[4] Deficient operation shown in **Bold**.

[5] HCM Analysis Software: PTV Vistro, Version 2024.
ICU Analysis Software: PTV Vistro, Version 2024.

Table 5-2
Study Intersection LOS Analysis Summary
Project Opening Year (2026) Conditions Without Project Conditions

	Study Intersection	Jurisdictions	Traffic Control[1]	Methodology	Acceptable LOS[2]	Acceptable LOS (CMP)[3]	ICU Ratio (V/C)[4,5]			Level of Service			Delay (sec/veh)[4,5]			Level of Service		
							AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Redbay Avenue (N/S) at Birch Street (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	**212.0**	**406.7**	**73.4**	**F**	**F**	**F**
2.	Associated Road (N/S) at Birch Street (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	38.6	41.4	38.4	D	D	D
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	6.2	4.4	4.8	A	A	A
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	14.5	20.5	16.5	B	C	C
	With Improvements[6]		TS	HCM 7	D	--	--	--	--	--	--	--	10.9	15.8	17.9	B	B	B
5.	SR-57 NB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Brea OC CMP Caltrans	TS	ICU HCM 7	D	E	0.603	0.707	0.696	A	C	B	24.0	24.0	24.7	C	C	C
6.	Associated Road (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	37.9	42.8	41.0	D	D	D
7.	Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	14.8	18.8	18.5	B	B	B
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	8.4	9.0	8.8	A	A	A
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)	Brea	AWS	HCM 7	D	--	*Does Not Currently Exist.*											

[1] TS = Traffic Signal
AWS = All-Way Stop
CSS = Cross-Street Stop

[2] The minimum acceptable level of service for the City of Brea and the City of Fullerton is D.

[3] The minimum acceptable level of service for the Orange County Congestion Management Program and Caltrans is E.

[4] Deficient operation shown in **Bold**.

[5] HCM Analysis Software: PTV Vistro, Version 2024.
ICU Analysis Software: PTV Vistro, Version 2024.

[6] Although the LOS is acceptable for this scenario, it does meet multiple signal warrants under existing conditions. As such, the project is only responsible for the payment of fair-share fees towards a future traffic signal which is further discussed in Section 6 of this study.

Deficient Intersection:

1. Redbay Avenue (N/S) at Birch Street (E/W)
    - AM Peak Hour – LOS F (212.0 seconds per vehicle)
    - PM Peak Hour – LOS F (406.7 seconds per vehicle)
    - Saturday Midday Peak Hour – LOS F (73.4 seconds per vehicle)

Detailed LOS Analysis worksheets for Project Opening Year (2026) Without Project Conditions are included in **Appendix D**.

5.3 Project Opening Year (2026) With Project Conditions Level of Service

Project Opening Year (2026) With Project Conditions LOS calculations for the nine (9) study intersections are reported in **Table 5-3** and are based on the Project Opening Year (2026) Without Project Conditions traffic volumes shown in Exhibit 4-10 and Exhibit 4-11.

As shown in Table 5-3, all nine (9) study intersections are forecasted to operate at an acceptable LOS during the peak hours under Project Opening Year (2026) With Project Conditions except for the following one (1) study intersection:

Deficient Intersection:

1. Redbay Avenue (N/S) at Birch Street (E/W)
    - AM Peak Hour – LOS F (228.0 seconds per vehicle)
    - PM Peak Hour – LOS F (445.9 seconds per vehicle)
    - Saturday Midday Peak Hour – LOS F (75.6 seconds per vehicle)

Detailed LOS Analysis worksheets for Project Opening Year (2026) With Project Conditions are included in **Appendix E**.

Although Intersection No. 1 (Redbay Avenue at Birch Street) is forecast to operate at an unacceptable LOS during the AM, PM, and Saturday Midday Peak Hours under Project Opening Year (2026) With Project Conditions, it should be noted that it is common for local streets that have direct access to primary arterials, such as Birch Street, to experience longer delay due to the limited gaps in traffic and the heavy volumes on the major street, especially during peak periods. Furthermore, Intersection No. 1 is currently operating at an unacceptable LOS under Existing Conditions and Project Opening Year (2026) Without Project Conditions. As such, the recommendation of improvements would only be made to offset the project's effect and since Birch Street and Redbay Avenue are built to the maximum right-of-way, there are no appropriate recommendations for the intersection (other than installing a traffic signal).

Table 5-3
Study Intersection LOS Analysis Summary
Project Opening Year (2026) Conditions With Project Conditions

	Study Intersection	Jurisdictions	Traffic Control[1]	Methodology	Acceptable LOS[2]	Acceptable LOS (CMP)[3]	ICU Ratio (V/C)[4,5]			Level of Service			Delay (sec/veh)[4,5]			Level of Service			Requires LOS Improvement?		
							AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
1.	Redbay Avenue (N/S) at Birch Street (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	**228.0**	**445.9**	**75.6**	**F**	**F**	**F**	YES	YES	YES
2.	Associated Road (N/S) at Birch Street (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	39.7	41.7	38.7	D	D	D	NO	NO	NO
	With Improvements [6]		TS	HCM 7	D	--	--	--	--	--	--	--	36.2	37.8	33.9	D	D	C	NO	NO	NO
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	Brea	TS	HCM 7	D	--	--	--	--	--	--	--	8.4	5.1	6.2	A	A	A	NO	NO	NO
	With Improvements [6]		TS	HCM 7	D	--	--	--	--	--	--	--	8.4	5.1	6.2	A	A	A	NO	NO	NO
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	15.6	25.1	18.9	C	D	C	NO	NO	NO
	With Improvements [7]		TS	HCM 7	D	--	--	--	--	--	--	--	10.7	15.5	16.9	B	B	B	NO	NO	NO
5.	SR-57 NB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Brea OC CMP Caltrans	TS	ICU HCM 7	D	E	0.608	0.711	0.700	A	C	B	24.0	24.0	24.7	C	C	C	NO	NO	NO
6.	Associated Road (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	38.2	43.8	41.6	D	D	D	NO	NO	NO
7.	Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)	Brea Caltrans	TS	HCM 7	D	E	--	--	--	--	--	--	14.9	18.8	18.6	B	B	B	NO	NO	NO
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	Brea	CSS	HCM 7	D	--	--	--	--	--	--	--	8.87	10.08	9.56	A	B	A	NO	NO	NO
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)	Brea	AWS	HCM 7	D	--	--	--	--	--	--	--	8.67	8.64	8.62	A	A	A	NO	NO	NO

[1] TS = Traffic Signal
AWS = All-Way Stop
CSS = Cross-Street Stop

[2] The minimum acceptable level of service for the City of Brea and the City of Fullerton is D.

[3] The minimum acceptable level of service for the Orange County Congestion Management Program and Caltrans is E.

[4] Deficient operation shown in **Bold**.

[5] HCM Analysis Software: PTV Vistro, Version 2024.
ICU Analysis Software: PTV Vistro, Version 2024.

[6] Although the LOS is acceptable for this scenario, the improvement being recommended is to improve delay for Intersection No. 1 and minimize cut-through traffic which is further discussed in Section 11 of this study.

[7] Although the LOS is acceptable for this scenario, it does meet multiple signal warrants under existing conditions. As such, the project is only responsible for the payment of fair-share fees towards a future traffic signal which is further discussed in Section 6 of this study.

However, a Signal Warrant Analysis, discussed in further detail in Section 6, was performed for Intersection No. 1 and the intersection does not satisfy the requirements under any scenario to warrant a traffic signal. Therefore, installation of a traffic signal is not being recommended for the existing deficient Intersection No. 1 as the project does not have a significant effect on the LOS of the intersection. Moreover, the signalization of the intersection may actually have a negative effect on traffic safety as it could introduce new types of crashes such as rear-ends. However, recommendations are being made to Intersection No. 2 which will have a direct benefit to the operations and safety of Intersection No. 1. This is discussed in further detail in Section 11.2 of this study.

6.0 CA MUTCD Traffic Signal Warrant Analysis

This evaluation has been conducted based on the traffic signal warrants and procedures contained in the California Manual on Uniform Traffic Control Devices (CA MUTCD), 2014 Edition, Revision 4 (March 29, 2019). A copy of the CA MUTCD traffic signal warrants criteria is provided in **Appendix F**.

The purpose of this traffic signal warrant analysis is to determine whether the following unsignalized study intersections meet the minimum requirements to warrant the recommendation of a traffic signal installation.

- **Intersection No. 1** – Redbay Avenue (N/S) at Birch Street (E/W)
- **Intersection No. 4** – Associated Road (N/S) at Shopping Center Dwy No. 1 (E/W)

Detailed MUTCD traffic signal warrant analysis worksheets are included in **Appendix G**.

6.1 Existing Conditions Traffic Signal Warrant Analysis

The following traffic signal warrant analyses were conducted under Existing (2024) Conditions for the two (2) study intersections identified above:

- Warrant 1 – Eight Hour Vehicular Volumes;
- Warrant 2 – Four Hour Vehicular Volumes;
- Warrant 3 – Peak Hour Warrant;
- Warrant 4 – Pedestrian Volumes;
- Warrant 5 – School Crossing;
- Warrant 6 – Coordinated Signal System;
- Warrant 7 – Crash Experience, and;
- Warrant 8 – Roadway Network.

The existing vehicle, pedestrian, and bicycle counts were conducted during the same timeframe identified in Section 3.2 and were previously provided in Appendix B. A summary of the weekday hourly traffic counts for Intersections No. 1 and 4 are provided in **Table 6-1** and **Table 6-2**, respectively. **Table 6-3** and **Table 6-4** show a summary of the Saturday hourly traffic counts for Intersections No. 1 and 4, respectively. The collision data shown in **Table 6-5** was sourced from the Statewide Integration Traffic Record System (SWITRS).

Table 6-1
Existing Hourly Traffic Counts
Redbay Avenue at Birch Street
Tuesday, February 13,2024

END TIME	Redbay Avenue			Birch Street			Grand Total
	NB	SB	Subtotal NB+SB	EB	WB	Subtotal EB+WB	
1:00 AM	0	1	1	38	14	52	53
2:00 AM	1	2	3	16	13	29	32
3:00 AM	0	1	1	9	8	17	18
4:00 AM	3	3	6	11	14	25	31
5:00 AM	2	5	7	46	46	92	99
6:00 AM	11	23	34	102	101	203	237
7:00 AM	22	35	57	298	225	523	580
8:00 AM	44	70	114	803	754	1,557	1,671
9:00 AM	67	58	125	913	931	1,844	1,969
10:00 AM	22	34	56	489	544	1,033	1,089
11:00 AM	23	34	57	517	524	1,041	1,098
12:00 PM	24	36	60	609	674	1,283	1,343
1:00 PM	30	30	60	786	712	1,498	1,558
2:00 PM	28	38	66	783	698	1,481	1,547
3:00 PM	35	29	64	857	823	1,680	1,744
4:00 PM	29	42	71	994	1,048	2,042	2,113
5:00 PM	29	39	68	1,104	1,151	2,255	2,323
6:00 PM	43	46	89	1,029	1,142	2,171	2,260
7:00 PM	34	31	65	852	804	1,656	1,721
8:00 PM	13	40	53	587	505	1,092	1,145
9:00 PM	17	23	40	451	304	755	795
10:00 PM	5	18	23	255	236	491	514
11:00 PM	2	10	12	139	92	231	243
12:00 AM	0	3	3	60	43	103	106
Total	***484***	***651***	***1,135***	***11,748***	***11,406***	***23,154***	***24,289***

Table 6-2
Existing Hourly Traffic Counts
Associated Road at Shopping Center Driveway No. 1
Tuesday, February 13, 2024

END TIME	Associated Road			Shopping Center Driveway No. 1			Grand Total
	NB	SB	Subtotal NB+SB	EB	WB	Subtotal EB+WB	
1:00 AM	33	21	54	3	0	3	57
2:00 AM	12	11	23	1	0	1	24
3:00 AM	8	14	22	1	0	1	23
4:00 AM	16	27	43	0	0	0	43
5:00 AM	57	67	124	2	0	2	126
6:00 AM	89	105	194	6	0	6	200
7:00 AM	205	231	436	61	0	61	497
8:00 AM	300	464	764	103	0	103	867
9:00 AM	323	450	773	135	0	135	908
10:00 AM	265	329	594	148	0	148	742
11:00 AM	269	280	549	162	0	162	711
12:00 PM	306	369	675	280	0	280	955
1:00 PM	364	429	793	354	0	354	1,147
2:00 PM	385	384	769	289	0	289	1,058
3:00 PM	469	445	914	303	0	303	1,217
4:00 PM	508	517	1,025	307	0	307	1,332
5:00 PM	566	484	1,050	265	0	265	1,315
6:00 PM	631	463	1,094	294	0	294	1,388
7:00 PM	481	407	888	298	0	298	1,186
8:00 PM	378	305	683	267	0	267	950
9:00 PM	272	216	488	180	0	180	668
10:00 PM	189	141	330	134	0	134	464
11:00 PM	95	99	194	48	0	48	242
12:00 AM	41	40	81	13	0	13	94
Total	***6,262***	***6,298***	***12,560***	***3,654***	***0***	***3,654***	***16,214***

Table 6-3
Existing Hourly Traffic Counts
Redbay Avenue at Birch Street
Saturday, February 10,2024

END TIME	Redbay Avenue			Birch Street			Grand Total
	NB	SB	Subtotal NB+SB	EB	WB	Subtotal EB+WB	
1:00 AM	5	3	8	69	40	109	117
2:00 AM	1	8	9	31	22	53	62
3:00 AM	0	4	4	22	15	37	41
4:00 AM	1	1	2	15	14	29	31
5:00 AM	0	3	3	18	26	44	47
6:00 AM	7	12	19	23	39	62	81
7:00 AM	11	16	27	79	85	164	191
8:00 AM	21	25	46	202	192	394	440
9:00 AM	30	54	84	351	327	678	762
10:00 AM	31	43	74	487	492	979	1,053
11:00 AM	27	48	75	597	792	1,389	1,464
12:00 PM	37	49	86	854	899	1,753	1,839
1:00 PM	41	43	84	852	880	1,732	1,816
2:00 PM	32	47	79	945	943	1,888	1,967
3:00 PM	22	32	54	963	814	1,777	1,831
4:00 PM	32	41	73	937	798	1,735	1,808
5:00 PM	37	47	84	822	746	1,568	1,652
6:00 PM	23	46	69	782	827	1,609	1,678
7:00 PM	24	44	68	676	624	1,300	1,368
8:00 PM	18	38	56	550	434	984	1,040
9:00 PM	15	25	40	423	306	729	769
10:00 PM	9	19	28	309	210	519	547
11:00 PM	3	12	15	203	135	338	353
12:00 AM	6	13	19	102	79	181	200
Total	***433***	***673***	***1,106***	***10,312***	***9,739***	***20,051***	***21,157***

Table 6-4
Existing Hourly Traffic Counts
Associated Road at Shopping Center Driveway No. 1
Saturday, February 10, 2024

END TIME	Associated Road			Shopping Center Driveway No. 1			Grand Total
	NB	SB	Subtotal NB+SB	EB	WB	Subtotal EB+WB	
1:00 AM	33	21	54	3	0	3	57
2:00 AM	12	11	23	1	0	1	24
3:00 AM	8	14	22	1	0	1	23
4:00 AM	16	27	43	0	0	0	43
5:00 AM	57	67	124	2	0	2	126
6:00 AM	89	105	194	6	0	6	200
7:00 AM	205	231	436	61	0	61	497
8:00 AM	300	464	764	103	0	103	867
9:00 AM	323	450	773	135	0	135	908
10:00 AM	265	329	594	148	0	148	742
11:00 AM	269	280	549	162	0	162	711
12:00 PM	306	369	675	280	0	280	955
1:00 PM	364	429	793	354	0	354	1,147
2:00 PM	385	384	769	289	0	289	1,058
3:00 PM	469	445	914	303	0	303	1,217
4:00 PM	508	517	1,025	307	0	307	1,332
5:00 PM	566	484	1,050	265	0	265	1,315
6:00 PM	631	463	1,094	294	0	294	1,388
7:00 PM	481	407	888	298	0	298	1,186
8:00 PM	378	305	683	267	0	267	950
9:00 PM	272	216	488	180	0	180	668
10:00 PM	189	141	330	134	0	134	464
11:00 PM	95	99	194	48	0	48	242
12:00 AM	41	40	81	13	0	13	94
Total	***6,262***	***6,298***	***12,560***	***3,654***	***0***	***3,654***	***16,214***

Table 6-5

Study Intersection Collision Summary[1]

2019 — 2023

Year[2]	Collision Type	Primary Collision Factor	Lighting	Roadway Surface	Control Device	Alcohol Involved?	Pedestrian or Bicycle Involved?	Total Collisions Per Year
Intersection No. 1 — Redbay Avenue (N/S) at Birch Street (E/W)								
2019	Rear End	Unsafe Speed	Daylight	Dry	Not Related	No	No	1
2021	Sideswipe	Improper Turn	Dark	Dry	Functioning	No	No	1
2022	Rear End	Unsafe Speed	Daylight	Dry	Not Related	No	No	1
2023	Hit Object	Unsafe Speed	Dark	Dry	Not Related	No	No	1
Total Reported Collisions at Intersection No. 1 Over 5 Years								**4**
Intersection No. 4 — Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)								
2019	Sideswipe	Automobile Right of Way	Daylight	Dry	Functioning	No	No	2
	Broadside	Automobile Right of Way	Daylight	Dry	Not Related	No	No	
2020	Broadside	Automobile Right of Way	Daylight	Dry	Functioning	No	No	2
	Broadside	Automobile Right of Way	Daylight	Dry	Functioning	No	No	
2021	Broadside	Automobile Right of Way	Daylight	Dry	Functioning	No	No	1
Total Reported Collisions at Intersection No. 4 Over 5 Years								**5**

[1] *Source:* Data from SWITRS & TIMS attached in Appendix H.

[2] There were zero collisions reported based on the data from SWITRS & TIMS in the year of 2020 for Intersection No. 1 and in the years 2022 and 2023 for Intersection No. 4.

As shown in **Table 6-6**, the following study intersection is expected to satisfy the following signal warrants under Existing Weekday Conditions:

Intersection No. 4:

- Warrant 1 – Eight Hour Vehicular Volumes;
- Warrant 2 – Four Hour Vehicular Volumes;
- Warrant 3 – Peak Hour Warrant.

As shown in **Table 6-7**, the following study intersection is expected to satisfy the following signal warrants under Existing Saturday Conditions:

Intersection No. 4:

- Warrant 1 – Eight Hour Vehicular Volumes;
- Warrant 2 – Four Hour Vehicular Volumes;

Intersection No.1 does not satisfy any of the signal warrants under Existing Conditions.

6.2 Project Opening Year (2026) Conditions Traffic Signal Warrant Analysis

The following traffic signal warrant analysis was conducted for Opening Year (2026) scenarios:

- Warrant 3 – Peak Hour Warrant

As shown in **Table 6-8**, Intersection No. 1 does not satisfy the peak hour signal warrant under any Opening Year (2026) scenarios. However, the following study intersection is expected to meet the peak hour signal warrant for the following scenarios:

Intersection No. 4:

- Opening Year (2026) Without Project Conditions - PM Peak Hour & Sat. Midday Peak Hour
- Opening Year (2026) With Project Conditions - PM Peak Hour & Sat. Midday Peak Hour

As shown in Table 5-2, Intersection No. 4 is currently operating and is forecasted to operate at an acceptable level of service. However, it is recommended that the city consider the installation of a traffic signal for Intersection No. 4, and the project shall only be responsible for payment of fair-share fees towards a future traffic signal since the intersection meets multiple signal warrants under existing conditions. **Exhibit 6-1** summarizes these recommendations for improvements.

Additionally, as shown in Tables 5-2 and 5-3, the signalization of Intersection No. 4 is forecasted to further improve the LOS under Project Opening Year (2026) scenarios. Detailed LOS Analysis worksheets for Project Opening Year (2026) Without Project Conditions With Improvements and Project Opening Year (2026) With Project Conditions With Improvements are included in **Appendices H** and **I**, respectively**.**

Table 6-6
CA MUTCD Traffic Signal Warrant Analysis Summary
Existing (2024) Weekday Conditions[1]

Warrants	Description	Study Intersection	
		1. Redbay Avenue at Birch Street	4. Associated Road at Shopping Center Dwy No. 1
1	8-Hour Vehicular Volume	Does Not Satisfy	**Satisfied**
2	4-Hour Vehicular Volume	Does Not Satisfy	**Satisfied**
3	Peak Hour Volume	Does Not Satisfy	**Satisfied**
4	Pedestrian Volume	Does Not Satisfy	Does Not Satisfy
5	School Crossing	Does Not Satisfy	Does Not Satisfy
6	Coordinated Signal System	Does Not Satisfy	Does Not Satisfy
7	Crash Warrant	Does Not Satisfy	Does Not Satisfy
8	Roadway Network	Does Not Satisfy	Does Not Satisfy
9	Intersection Near a Grade Crossing	Not Applicable	Not Applicable

[1] Study intersections that meet a MUTCD Traffic Signal Warrant under existing conditions are shown in **Bold**.

Table 6-7
CA MUTCD Traffic Signal Warrant Analysis Summary
Existing (2024) Saturday Conditions[1]

Warrants	Description	Study Intersection	
		1. Redbay Avenue at Birch Street	4. Associated Road at Shopping Center Dwy No. 1
1	8-Hour Vehicular Volume	Does Not Satisfy	**Satisfied**
2	4-Hour Vehicular Volume	Does Not Satisfy	**Satisfied**
3	Peak Hour Volume	Does Not Satisfy	Does Not Satisfy
4	Pedestrian Volume	Does Not Satisfy	Does Not Satisfy
5	School Crossing	Does Not Satisfy	Does Not Satisfy
6	Coordinated Signal System	Does Not Satisfy	Does Not Satisfy
7	Crash Warrant	Does Not Satisfy	Does Not Satisfy
8	Roadway Network	Does Not Satisfy	Does Not Satisfy
9	Intersection Near a Grade Crossing	Not Applicable	Not Applicable

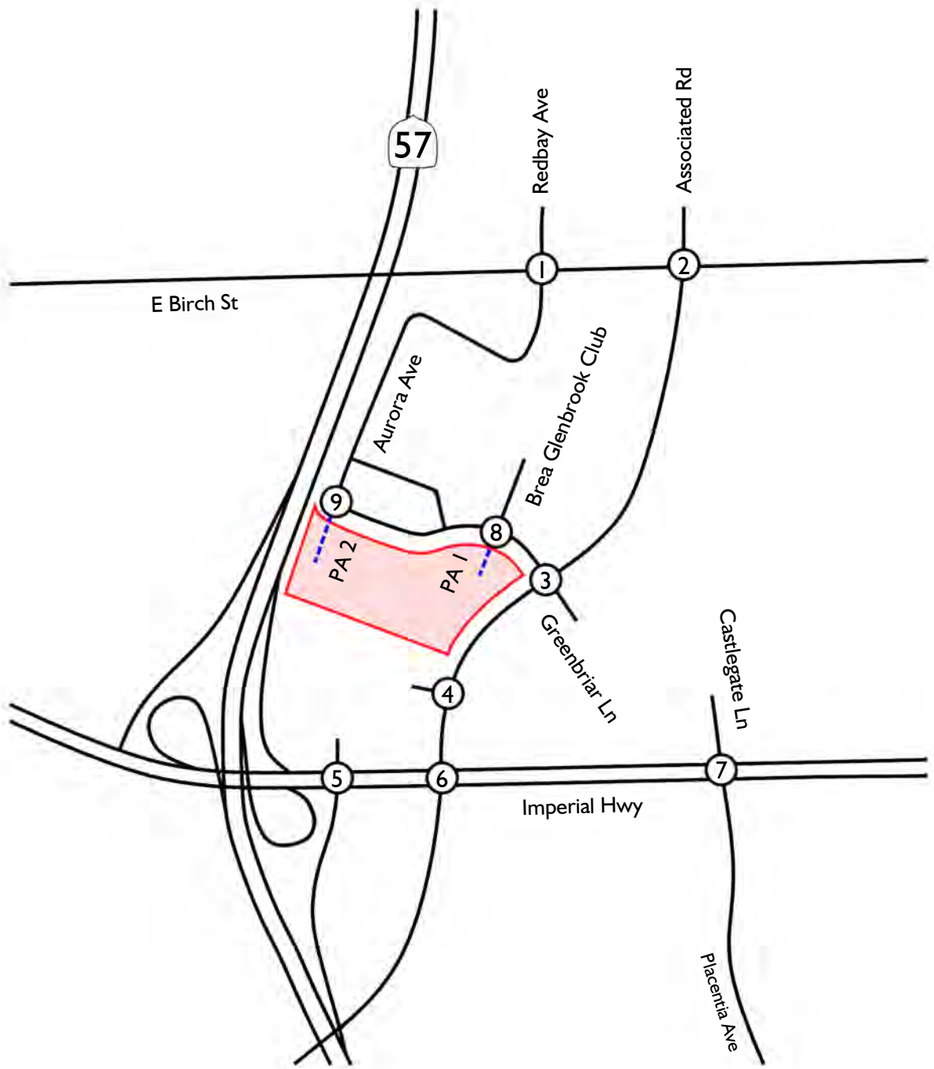
[1] Study intersections that meet a MUTCD Traffic Signal Warrant under existing conditions are shown in **Bold**.

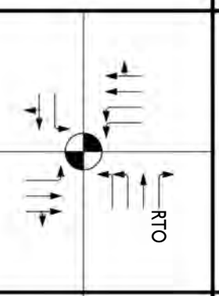
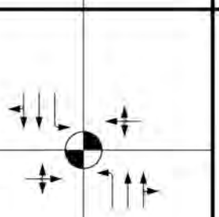
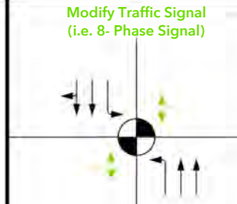
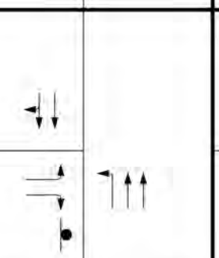
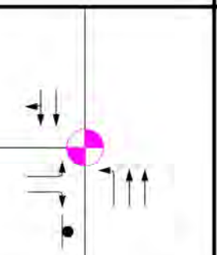
Table 6-8
CA MUTCD Peak Hour Traffic Signal Warrant Analysis Summary
Project Opening Year (2026) Analysis Scenarios[1]

Analysis Scenario	Study Intersection					
	1. Redbay Avenue at Birch Street			4. Associated Road at Shopping Center Dwy No. 1		
	AM	PM	SAT	AM	PM	SAT
Opening Year (2026) Without Project Conditions	Does Not Satisfy	Does Not Satisfy	Does Not Satisfy	Does Not Satisfy	**Satisfied**	**Satisfied**
Opening Year (2026) With Project Conditions	Does Not Satisfy	Does Not Satisfy	Does Not Satisfy	Does Not Satisfy	**Satisfied**	**Satisfied**

[1] Study intersections that meet the MUTCD peak hour traffic signal warrant (i.e. Warrant 3) are shown in **Bold**.

Recommended Improvements



	Existing Conditions	Project Opening Year (2026) Without Project Conditions	Project Opening Year (2026) With Project Conditions
2. Associated Road (N/S) & Birch Street (E/W)		See next scenario improvements.	
3. Associated Road (N/S) & Greenbriar Lane (E/W)		See next scenario improvements.	Modify Traffic Signal (i.e. 8- Phase Signal) 
4. Associated Road (N/S) & Shopping Center Dwy No. 1 (E/W)			See previous scenario improvements. No additional improvements required.

Legend:

- (1) = Study Intersection
- = Project Access Driveway
- = Project Site Boundary
- = Traffic Signal
- RTO = Right-Turn Overlap
- = Recommended Improvements for Project Opening Year (2026) Without Project Conditions
- = Recommended Improvements for Project Opening Year (2026) With Project Conditions

N

7.0 Caltrans Queuing Analysis

A queuing analysis has been conducted to evaluate the queue lengths for all freeway ramp study intersections and Intersection No. 6, per the direction of City staff. The queue analysis has been performed utilizing the HCM 7 95th percentile queue evaluation methodology. Queue lengths have been reported for the following turning movements:

Intersection No. 5 – SR-57 NB Ramps/Shopping Center Dwy No. 2 at Imperial Highway

- Northbound Left-Turn
- Northbound Shared Left/Through/Right-Turn
- Northbound Right-Turn

Intersection No. 6 – Associated Road at Imperial Highway

- Southbound Dual Left-Turns
- Southbound Right-Turn
- Eastbound Left-Turn

7.1 Existing Conditions Queuing Analysis

The queuing analysis results for the analyzed turning movements under Existing Conditions are summarized in **Table 7-1**.

As shown in Table 7-1, adequate storage is provided for all reported turning movements under Existing Conditions.

7.2 Project Opening Year (2026) Without Project Conditions Queuing Analysis

The queuing analysis results for the analyzed turning movements under Project Opening Year (2026) Without Project Conditions are summarized in **Table 7-2**.

As shown in Table 7-2, adequate storage is provided for all reported turning movements under Project Opening Year (2026) Without Project Conditions.

7.3 Project Opening Year (2026) With Project Conditions Queuing Analysis

The queuing analysis results for the analyzed turning movements under Project Opening Year (2026) With Project Conditions are summarized in **Table 7-3**.

As shown in Table 7-3, adequate storage is provided for all reported turning movements under Project Opening Year (2026) With Project Conditions.

Table 7-1
Study Intersection HCM 95th Percentile Vehicular Queue Analysis Summary[1]
Existing Conditions

Intersection		Movement	Storage Length (Feet)	HCM 95th Percentile Queue Length (Feet)			Adequate Storage Provided?		
				AM	PM	SAT	AM	PM	SAT
5.	SR-57 SB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Northbound Left-Turn	610	227	285	297	YES	YES	YES
		Northbound Shared Left/Through/Right-Turn	610	235	296	308	YES	YES	YES
		Northbound Right Turn	350	235	296	308	YES	YES	YES
6.	Associated Road (N/S) & Imperial Highway (E/W)	Southbound Dual Left-Turns	210	77	165	198	YES	YES	YES
		Southbound Right-Turn	210	137	111	126	YES	YES	YES
		Eastbound Left-Turn	340	233	296	192	YES	YES	YES

[1] HCM Analysis Software: Vistro, Version 2024.

Table 7-2

Study Intersection HCM 95th Percentile Vehicular Queue Analysis Summary[1]

Project Opening Year (2026) Without Project Conditions

Intersection		Movement	Storage Length (Feet)	HCM 95th Percentile Queue Length (Feet)			Adequate Storage Provided?		
				AM	PM	SAT	AM	PM	SAT
5.	SR-57 SB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Northbound Left-Turn	610	294	323	335	YES	YES	YES
		Northbound Shared Left-Through-Right Turn	610	303	336	349	YES	YES	YES
		Northbound Right Turn	350	303	336	349	YES	YES	YES
6.	Associated Road (N/S) & Imperial Highway (E/W)	Southbound Dual Left-Turns	210	88	179	205	YES	YES	YES
		Southbound Right-Turn	210	152	122	140	YES	YES	YES
		Eastbound Left-Turn	340	237	318	201	YES	YES	YES

[1] HCM Analysis Software: Vistro, Version 2024.

Table 7-3

Study Intersection HCM 95th Percentile Vehicular Queue Analysis Summary[1]

Project Opening Year (2026) With Project Conditions

Intersection		Movement	Storage Length (Feet)	HCM 95th Percentile Queue Length (Feet)			Adequate Storage Provided?		
				AM	PM	SAT	AM	PM	SAT
5.	SR-57 SB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)	Northbound Left-Turn	610	298	327	340	YES	YES	YES
		Northbound Shared Left-Through-Right Turn	610	308	340	355	YES	YES	YES
		Northbound Right Turn	350	308	340	355	YES	YES	YES[2]
6.	Associated Road (N/S) & Imperial Highway (E/W)	Southbound Dual Left-Turns	210	97	185	212	YES	YES	YES[3]
		Southbound Right-Turn	210	181	139	162	YES	YES	YES
		Eastbound Left-Turn	340	249	362	222	YES	YES[4]	YES

[1] HCM Analysis Software: Vistro, Version 2024.

[2] Although the queue exceeds the storage provided, the excess can be accommodated within the remainder of the storage provided for the northbound shared left-through-right turn (i.e., 260 feet). As such, no spill over onto the mainline is expected.

[3] The forecasted queue generated by the project (i.e., less than one vehicle) is considered a nominal increase. Adequate storage is provided under without project conditions and therefore the deficiency is not attributable to the project.

[4] Although the queue exceeds the storage provided, the excess can be accommodated within the existing 90-foot transition. As such, no spill over onto the eastbound through lanes is expected.

8.0 Site Access Analysis

This section of the report provides a qualitative analysis of various site access aspects relevant to the proposed project, including the following:

- Number of access points proposed for the project site;
- Spacing between driveways and intersections;
- Potential signalization of driveways;
- Shared access;
- Turn conflicts/restrictions;
- Sight distance;
- Driveway widths;
- Service Vehicle Access and Circulation;
- Turning Movements.

8.1 Proposed Access Points, Driveway Widths, & Turning Movements

As shown in Exhibit 1-2, access to the project is proposed to be provided via two (2) full-access unsignalized driveways located along Greenbriar Lane. Project Access Driveway No. 1, otherwise known as "A" Drive, will be the future fourth (south) leg of the existing Brea Glenbrook Club Driveway/Greenbriar Lane intersection. Project Access Driveway No. 2, otherwise known as "C" Drive, will be the future third (south) leg of the existing knuckle at Aurora Avenue and Greenbriar Lane.

Project Access Driveway No. 1 and No. 2 will have the same driveway widths and lane geometry. The driveway widths, as shown in Exhibit 1-2, will be 32' (i.e., two 16' wide lanes with a 6" curb and gutter on both sides of the driveway).

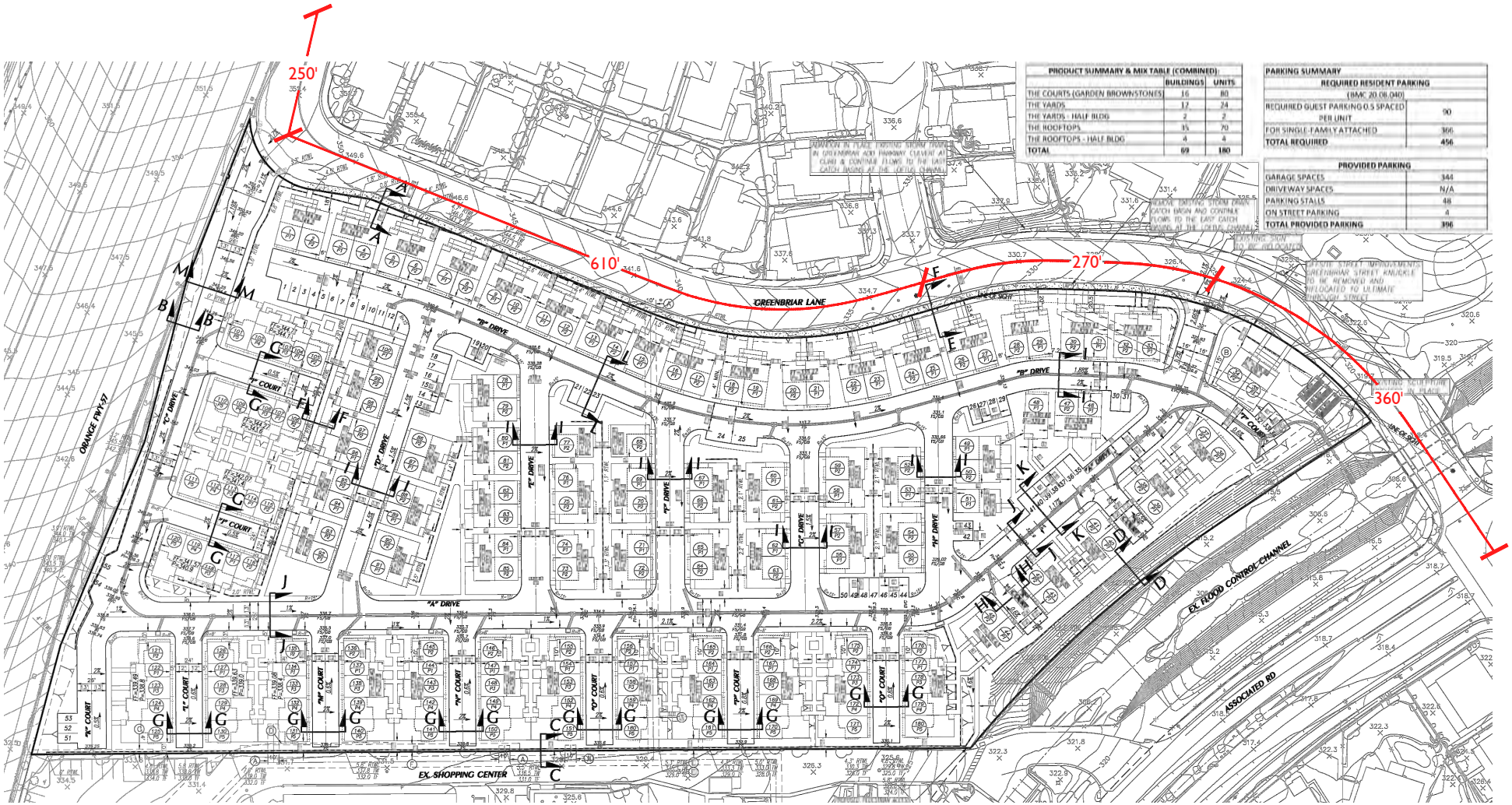
Project Access Driveway No. 1 will be considered and signed as the primary entry and exit to the project in an attempt to minimize traffic using Intersection No. 1 (Redbay Avenue and Birch Street).

8.2 Spacing between Driveways and Intersections

Exhibit 8-1 shows the distances between the two project access points (i.e., Study Intersections #8 & #9) and with adjacent intersections (e.g., Plum Avenue, Hillhaven Drive, and Associated Road).

Exhibit 8-1

Spacing Between Driveways and Intersections



N

The forecasted queues for the turning movements at the two project access points (i.e., Study Intersections #8 & #9) are previously presented in Appendix E (Project Opening Year (2026) With Project Conditions). As shown, there are no queuing deficiencies along Greenbriar Lane along the project frontage. As such, there will be adequate spacing between the driveways and adjacent intersections.

8.3 Potential Signalization of Driveways

As shown in Table 5-3, both proposed driveway intersections are operating at an acceptable LOS under Project Opening Year (2026) With Project Conditions. Intersection No. 9 is also a three-legged intersection that is planned to only have one stop control allowing for efficient circulation on the public roadway. Therefore, signalization would not be recommended since the LOS will be satisfactory with project conditions.

8.4 Shared Access

With the construction of the project, the shared access points between both the Brea Shopping Plaza and the project site will be eliminated. Due to this elimination of the shared access between the two sites, the "With Project" traffic scenarios account for the rerouting of any vehicles currently either cutting through the project site to/from the commercial center, or parking within the project site and walking to the commercial center. See Sections 3.2 and 4.1.4 for additional information.

8.5 Turn Conflicts/Restrictions

As part of the project, Greenbriar Lane will be realigned from the Brea Glenbrook Club Driveway to Associated Road. This realignment of Greenbriar Lane will eliminate an unnecessary intersection (previously serving the Mercury Insurance lot) and allow for more efficient travel along Greenbriar Lane.

Project Access Driveway No. 1, otherwise known as "A" Drive, will be the future fourth (south) leg of the existing Brea Glenbrook Club Driveway/Greenbriar Lane intersection. As such, there are no turning conflicts and neither driveway is recommended to have any access restrictions.

Additionally, based on RK's review of the site plan from an on-site circulation standpoint, there appears to be no significant conflicts between vehicles with or pedestrian/bicycles. Vehicles can navigate the site safely and efficiently.

8.6 Sight Distance

An intersection sight distance analysis has been conducted for both driveways located along Greenbriar Lane. As part of this analysis, a sight line is developed and a "limited use area" is created which designates an area between the edge of pavement and the driver's line of sight. This area prohibits obstructions to maintain adequate sight distance at the intersection.

The line of sight has been created utilizing the methodology for stopping sight distance to provide a more accurate representation of the sight distance. As such, according to the Orange County Highway Design Manual, the minimum stopping sight distance for a roadway classified as a local street is 150 feet for both horizontal and vertical curves. Additionally, per the Caltrans Highway Design Manual, the minimum stopping sight distance is based on the design speed of the major road. In which, the speed limit for Greenbriar lane is 25 mph.

Pursuant to the Caltrans Highway Design Manual, the decision point of the triangle, or driver position on the minor road, is located a minimum of 10 feet plus the shoulder width of the major but not less 15 feet back from the nearest edge of the major road traveled way. The decision point, or driver position, is located at a setback distance that drivers are assumed to be located at waiting on the minor road.

The resulting clear sight triangles and established limited use areas are shown in **Exhibit 8-2**, **Exhibit 8-3**, and **Exhibit 8-4**. The following recommendations are provided to maintain clear line of sight for driver's:

1. Trim and maintain foliage continuously within the corner sight distance limited use area up to 2.5 feet in height to remain consistent with Caltrans Highway Design Manual.

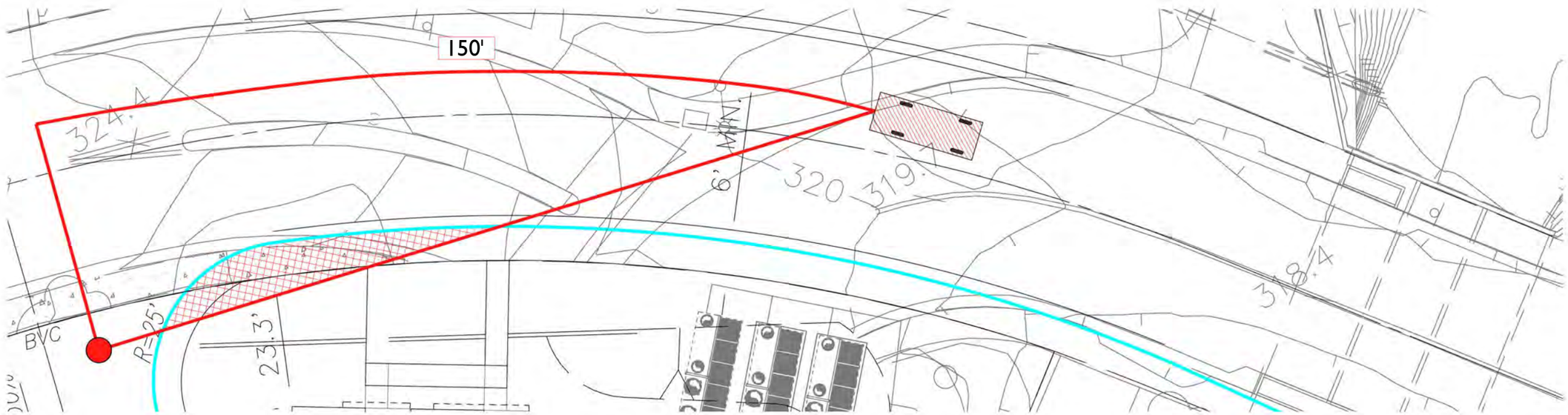
2. Any future landscaping and/or hardscapes (i.e. monument signs) should be designed such that a driver's clear line of sight is not obstructed.

8.7 Service Vehicle Access and Circulation

Service vehicles will be able to access the site via either project driveway. Adequate radii is provided at both Project Driveways No. 1 & No. 2 to facilitate waste management vehicle turning movements. Waste management vehicles can enter the site, and navigate internally, without any significant conflicts.

Exhibit 8-2

Intersection 8 Sight Distance Analysis
Left-Turn Maneuver Exiting Driveway



Legend:

= Driver's Eye

= Oncoming Vehicle

= Limited Use Area

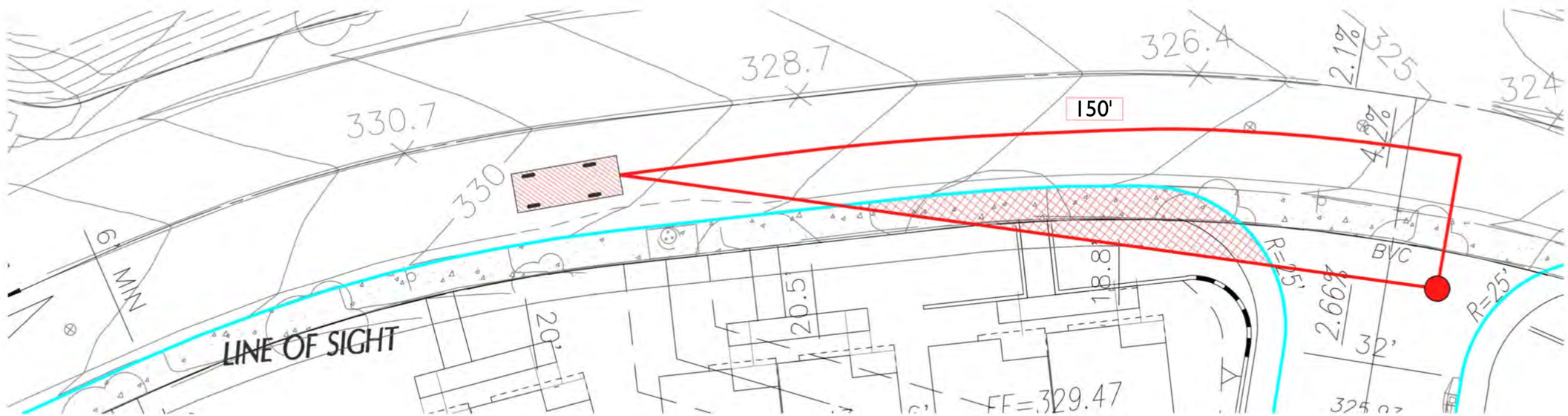
SCALE: 1" = 20'

20 10 0 20 40

N

Exhibit 8-3

Intersection 8 Sight Distance Analysis
Right-Turn Maneuver Exiting Driveway



Legend:

= Driver's Eye

= Oncoming Vehicle

= Limited Use Area

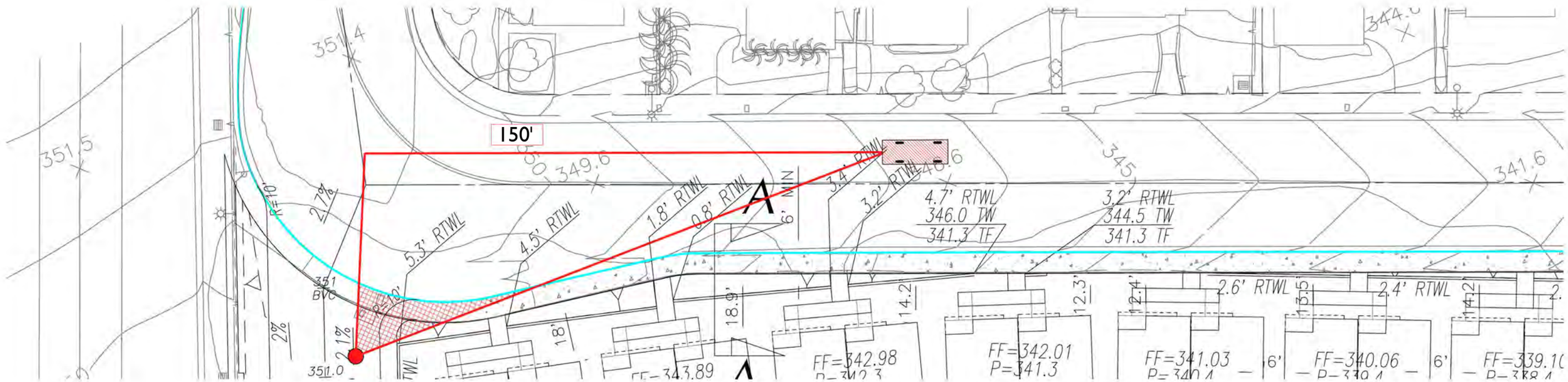
SCALE: 1" = 20'

20 10 0 20 40

N

Exhibit 8-4

Intersection 9 Sight Distance Analysis
Through Movement Exiting Driveway



Legend:

- = Driver's Eye
- = Oncoming Vehicle
- = Limited Use Area

SCALE: 1" = 30'

30 15 0 30 60

N

8.8 Pedestrian & Bicyclists On-Site Circulation & Off-Site Connectivity

The project will provide adequate pedestrian connections from within the site to the existing sidewalks located along the Greenbriar Lane project frontage. These existing sidewalks connect to the signalized intersection of Associate Road at Greenbriar Lane which currently provides protected pedestrian crossings on all legs. These pedestrian facilities provide safe and efficient connectivity for pedestrians to nearby adjacent land uses (most notably commercial uses to the south and residential uses to the north and east) as well as other multi-modal facilities (e.g. bus stops along Birch Street).

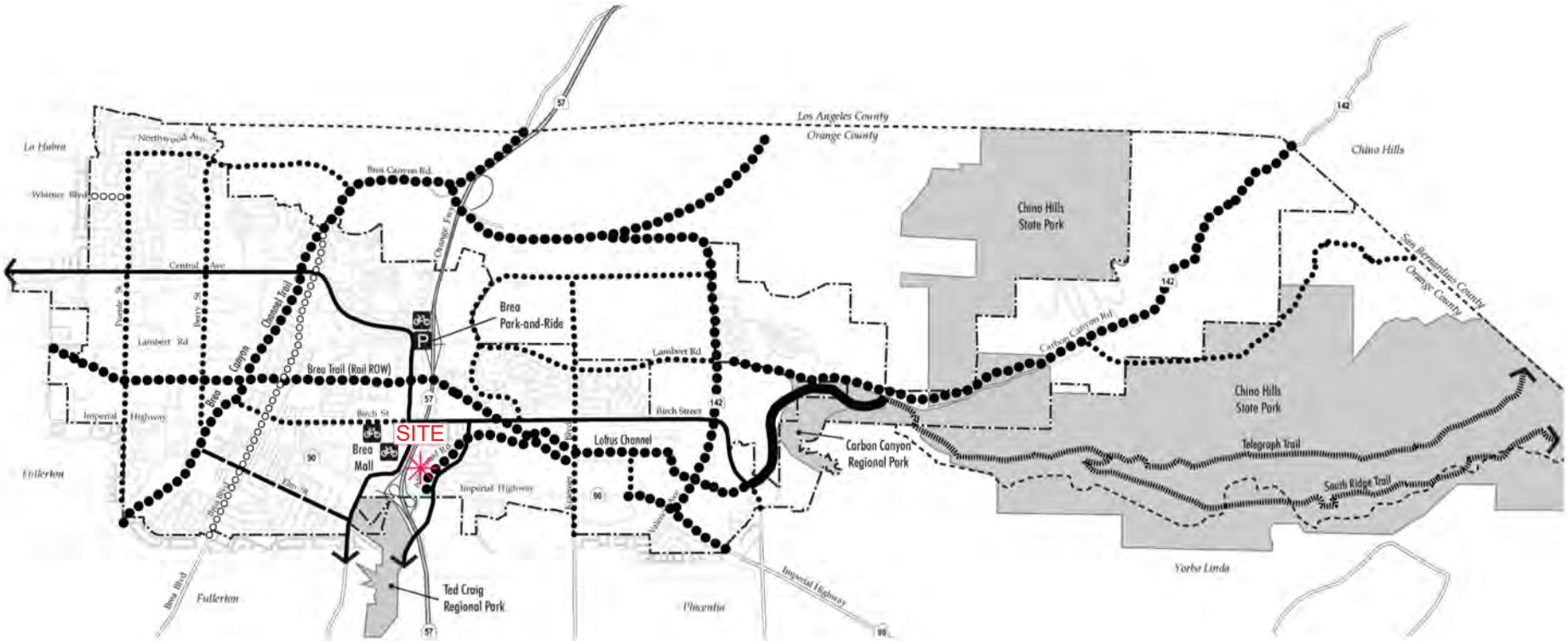
Furthermore, the project also proposes a pedestrian access point located at the southeast corner of the site which will provide direct pedestrian access to the Brea Shopping Plaza.

In addition, **Exhibit 8-6** shows the City of Brea General Plan Bike Plan. As shown, within the vicinity of the project, Associated Road and Birch Street are both identified as Class II – Bike Lanes. Project residents will be able to easily connect to these existing bicycle facilities via Greenbriar Lane or Aurora Avenue/Redbay Avenue. Lastly, the development is located within a mile of the Tracks which is identified as an east/west corridor within the City of Brea General Plan. As such, biking will be an attractive and easily accessible alternative mode of transportation for residents.

Moreover, as part of the recommendations for Intersection No. 2, the eastbound bike lane will be restriped in between the No. 2 through lane and the exclusive right-turn lane, which is further discussed in Section 11.2 of this study. This improvement will enhance safety for bicyclists at this intersection.

Exhibit 8-6

City of Brea General Plan
Bike Plan



Legend:

- City Boundary
- Sphere of Influence
- ✳ = Project Site

Bike Ways

- Bike Path (Class I)
- Bike Path (Class II)
- Bike Route (Class III)
- Off Road (Unpaved)

Bike Ways (Proposed)

- Bike Path (Class I)
- Bike Path (Class II)
- Bike Route (Class III)

N

9.0 Safety Review

This section provides a safety evaluation on the proposed project's site access provided for vehicles, emergency vehicles, bikes, and pedestrians. According to the *City of Brea Transportation Impact Analysis (TIA) Guidelines*, dated September 2020, the evaluation should consider the history and pattern of collision types to identify if any improvements could compliment or improve the safety at the study intersections.

9.1 Site Access

As discussed in Section 8, the project proposes two (2) unsignalized driveways along Greenbriar Lane. The proposed project access has been reviewed and is considered to be adequate. Service vehicles and emergency vehicles entering and exiting the project site will be able to do so comfortably, safely, and without undue congestion.

9.2 Collision History

As shown in **Table 9-1**, collision data has been reviewed for all study intersections over the course of the previous five years. The following intersections have experienced more than five collisions in the span of one year that were not due to driver impairment:

- **Intersection No. 5 –** SR-57 NB Ramps/Shopping Center Dwy No. 2 at Imperial Highway
- **Intersection No. 6** – Associated Road at Imperial Highway

Table 9-2 through **Table 9-8** show the number and type of collisions for each intersection per year.

Exhibit 9-1 through **Exhibit 9-9** show the pattern and type of collisions per year for each intersection that includes more than five collisions in a year (i.e., Intersections No. 5 & No. 6).

As a result, Intersections No. 5 and No. 6 have experienced a significant number of collisions throughout the last five (5) years. Intersection No. 5 experiences a maximum of 11 collisions in 2022 that are dispersed throughout the intersection and at most there are only two repeat collisions of the same type/movement. Intersection No. 6 experiences a maximum of 13 collisions in 2020; however, similar to Intersection No. 5, these collisions are also dispersed throughout the intersection and at most there are only two repeat collisions of the same type/movement. The most common type of collision at both Intersections No. 5 & No. 6 are rear-end collisions.

Table 9-1
Study Intersection Collision Data[1]
2019 - 2024

	Intersection	All Reported Collisions						All Non-Driver Impairment Collisions					
		Year					Total	Year					Total
		2019	2020	2021	2022	2023		2019	2020	2021	2022	2023	
1.	Redbay Avenue (N/S) at Birch Street (E/W)	1	0	1	1	1	4	1	0	0	1	1	3
2.	Associated Road (N/S) at Birch Street (E/W)	7	1	4	1	2	15	5	1	3	1	2	12
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	1	1	1	0	0	3	1	0	1	0	0	2
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	2	2	1	0	0	5	2	2	1	0	0	5
5.	SR-57 NB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)[2]	5	1	12	12	16	46	4	0	9	11	13	37
6.	Associated Road (N/S) at Imperial Highway (E/W)	7	14	8	6	4	39	7	13	8	6	4	38
7.	Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)	5	3	1	3	4	16	5	2	1	3	4	15
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	0	0	0	0	0	0	0	0	0	0	0	0
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)	*Does Not Currently Exist.*						*Does Not Currently Exist.*					

[1] Source: Statewide Integrated Traffic Records System (SWITRS)

[2] TransportationIntegrated Mapping System (TIMS) has been sourced solely for study Intersection No. 5 between 2019 and 2020 due to the ambiguity from the SWITRS data for this intersection and time period.

Table 9-2
Intersection No. 1 Collision History (Excluding Driver Impairment Collisions)
Redbay Avenue (N/S) at Birch Street (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	1	0	0	1	0	2
Hit Object	0	0	0	0	1	1
Total Collisions Per Year	**1**	**0**	**0**	**1**	**1**	**3**

Table 9-3
Intersection No. 2 Collision History (Excluding Driver Impairment Collisions)
Associated Road (N/S) at Birch Street (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	2	0	2	0	1	5
Broadside	0	0	1	0	0	1
Sideswipe	1	0	0	0	1	2
Hit Object	1	1	0	1	0	3
Other	1	0	0	0	0	1
Total Collisions Per Year	**5**	**1**	**3**	**1**	**2**	**12**

Table 9-4
Intersection No. 3 Collision History (Excluding Driver Impairment Collisions)
Associated Road (N/S) at Greenbriar Lane (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	1	0	0	0	0	1
Broadside	0	0	1	0	0	1
Total Collisions Per Year	**1**	**0**	**1**	**0**	**0**	**2**

Table 9-5
Intersection No. 4 Collision History (Excluding Driver Impairment Collisions)
Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Broadside	1	2	1	0	0	4
Sideswipe	1	0	0	0	0	1
Total Collisions Per Year	**2**	**2**	**1**	**0**	**0**	**5**

Table 9-6
Intersection No. 5 Collision History (Excluding Driver Impairment Collisions)
SR-57 NB Ramps/Shopping Center Driveway No. 2 (N/S) at Imperial Hwy (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	3	0	5	2	5	15
Sideswipe	0	0	4	3	2	9
Broadside	1	0	0	4	4	9
Hit Object	0	0	0	1	2	3
Auto/Ped	0	0	0	1	0	1
Total Collisions Per Year	**4**	**0**	**9**	**11**	**13**	**37**

Table 9-7
Intersection No. 6 Collision History (Excluding Driver Impairment Collisions)
Associated Road (N/S) at Imperial Highway (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	4	5	5	1	1	16
Sideswipe	3	5	2	2	2	14
Broadside	0	3	1	1	1	6
Auto/Ped	0	0	0	1	0	1
Head-On	0	0	0	1	0	1
Total Collisions Per Year	**7**	**13**	**8**	**6**	**4**	**38**

Table 9-8
Intersection No. 7 Collision History (Excluding Driver Impairment Collisions)
Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)
2019-2023

Collision Type	Year					Total
	2019	2020	2021	2022	2023	
Rear End	3	1	0	3	4	11
Sideswipe	1	0	1	0	0	2
Other	1	1	0	0	0	2
Total Collisions Per Year	**5**	**2**	**1**	**3**	**4**	**15**

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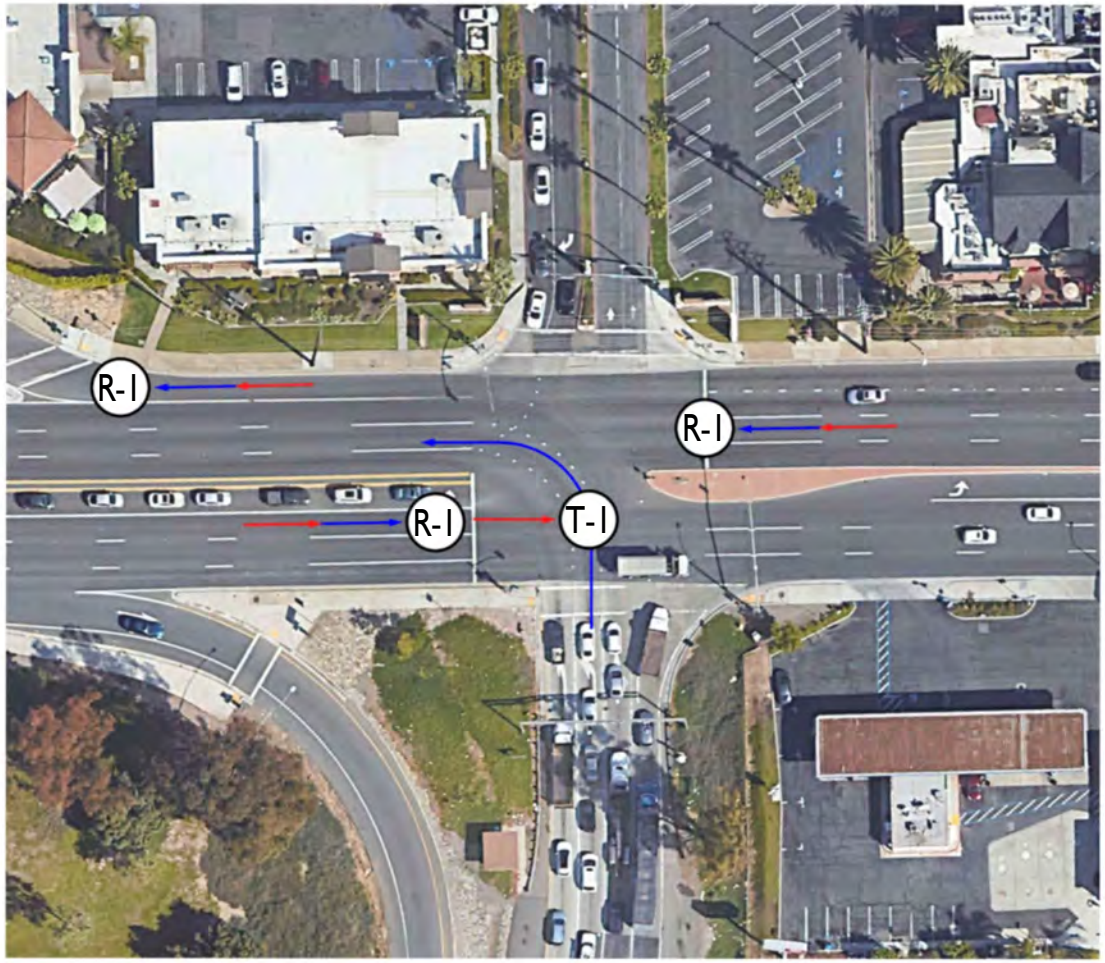
JN:2827-2023-05

Exhibit 9-1

2019-2020 Intersection No. 5 Collision History
SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)

Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe

N

Exhibit 9-2

2021-2022 Intersection No. 5 Collision History
SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Highway (E/W)

Legend:

(X-1) = Collision Type - Number of Incidents

→ = Driver's Movement Preceding Collison

→ = Driver's Movement Preceding Collision (At Fault)

Collision Type:

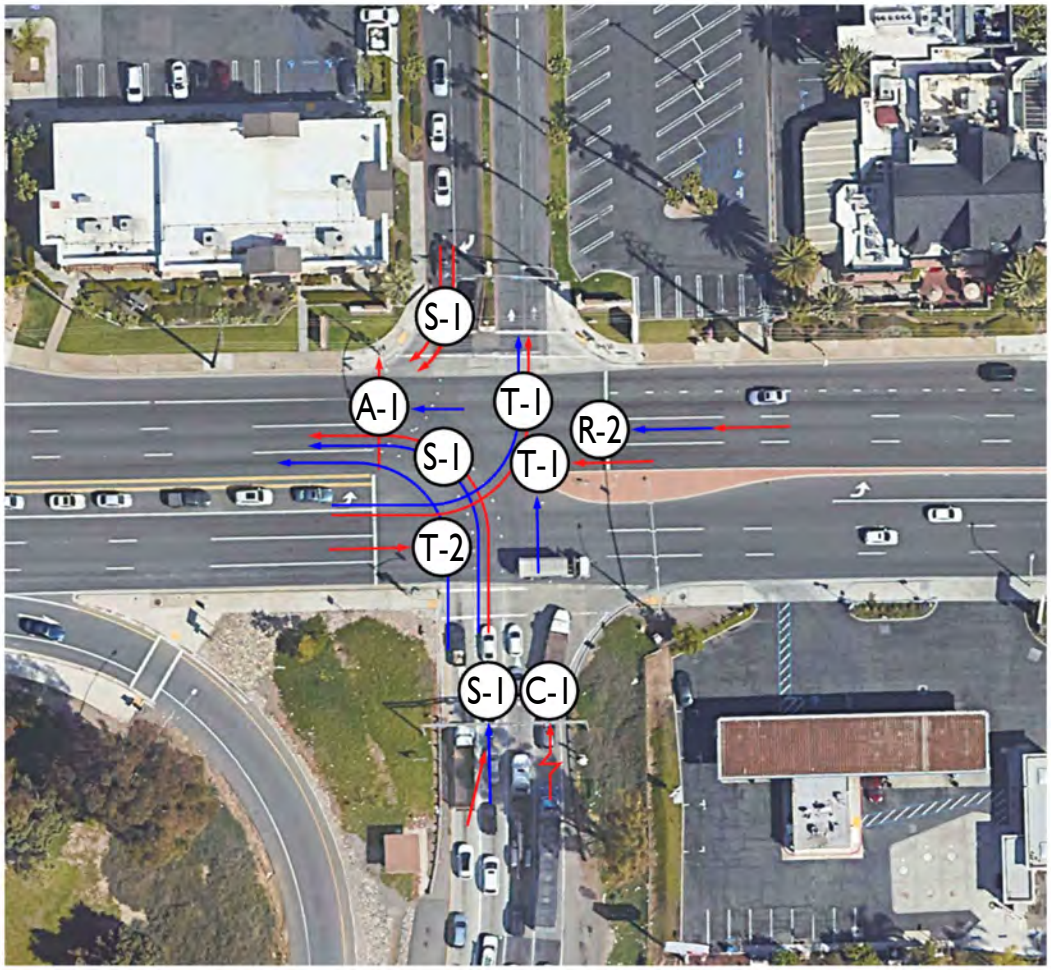
R = Rear End

S = Sideswipe

N

Exhibit 9-3

2022-2023 Intersection No. 5 Collision History
SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)
- = Driver Ran Off Road (At Fault)
- --- = Pedestrian Crossing (At Fault)

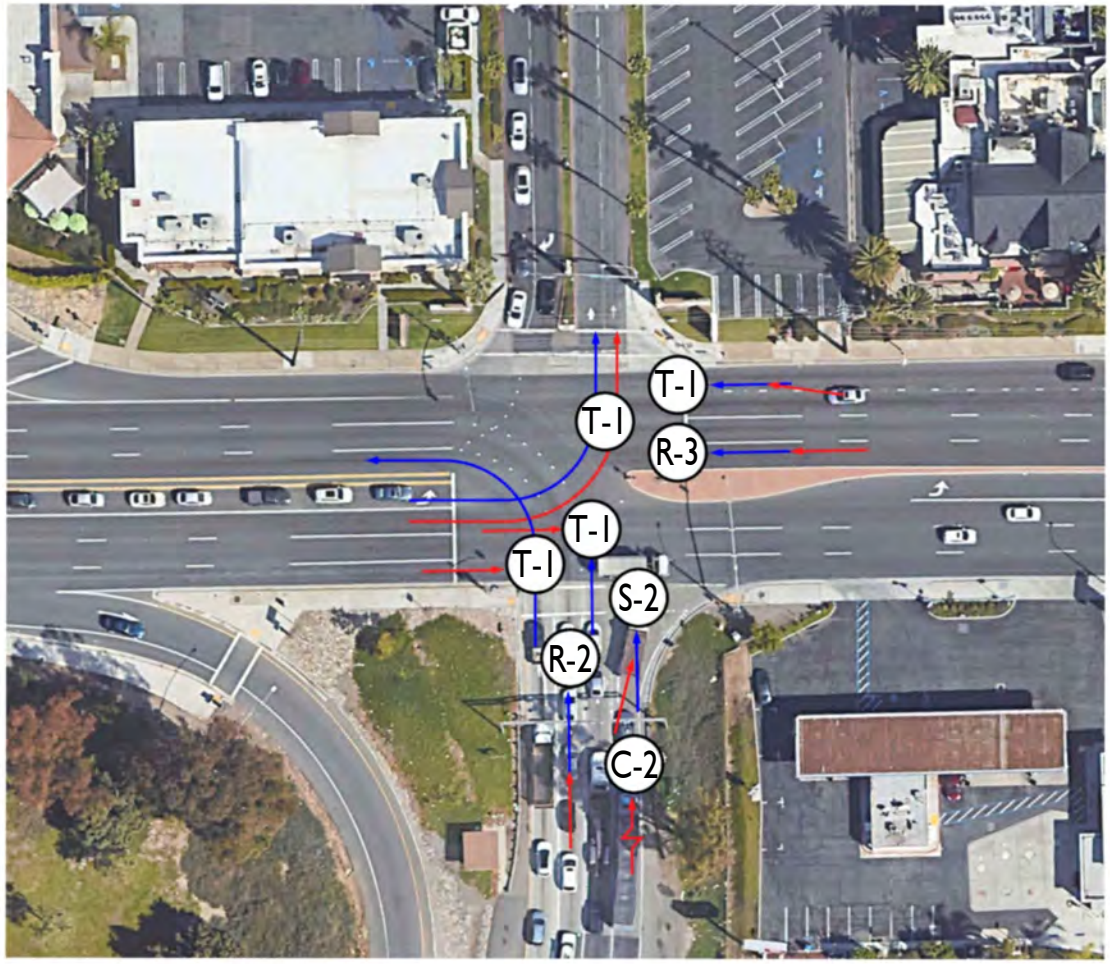
Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe
- C = Hit-Object
- A = Auto-Pedestrian

N

Exhibit 9-4

2023-2024 Intersection No. 5 Collision History
SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)

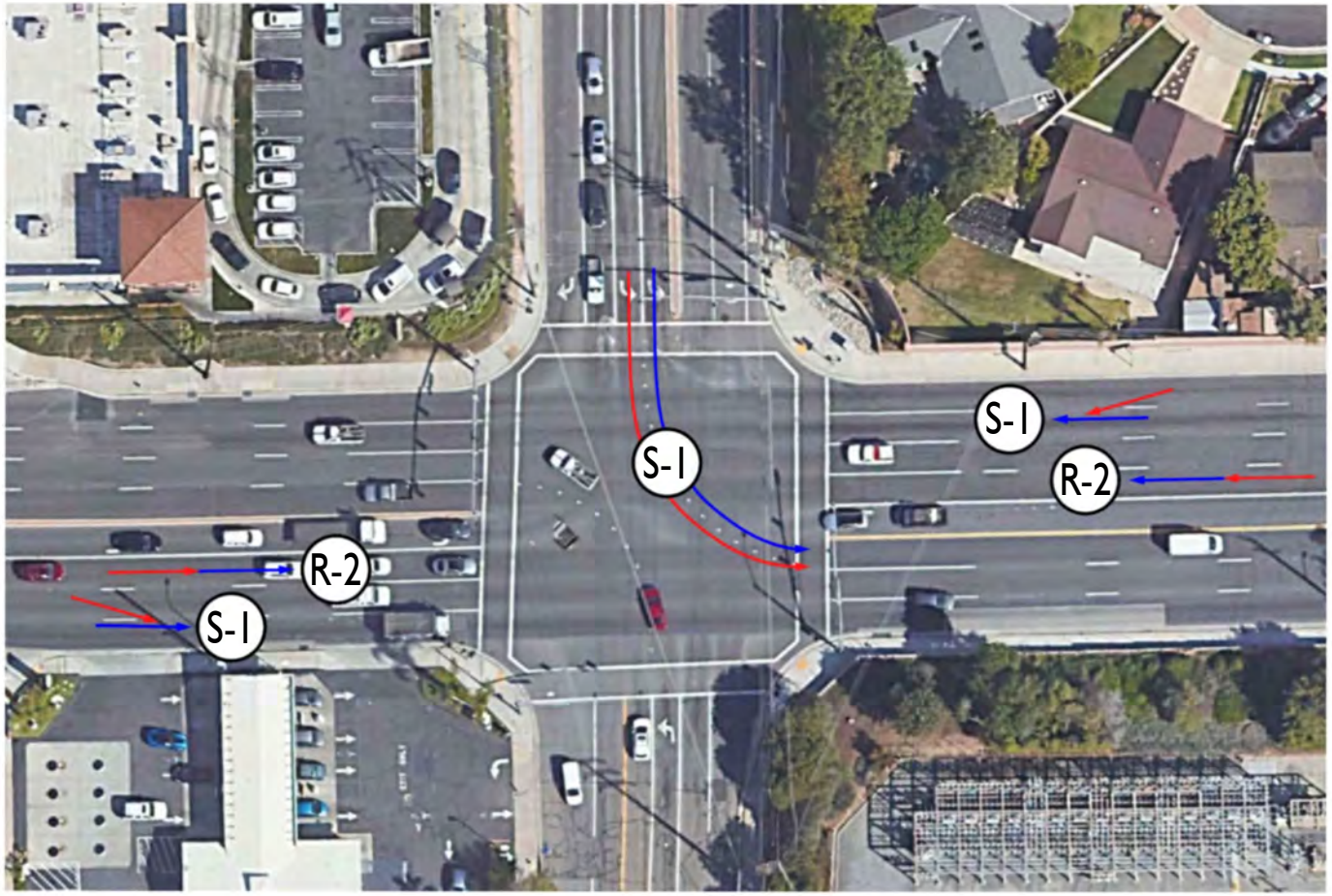
Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe
- C = Hit Object

N

Exhibit 9-5

2019-2020 Intersection No. 6 Collision History
Associated Road (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)

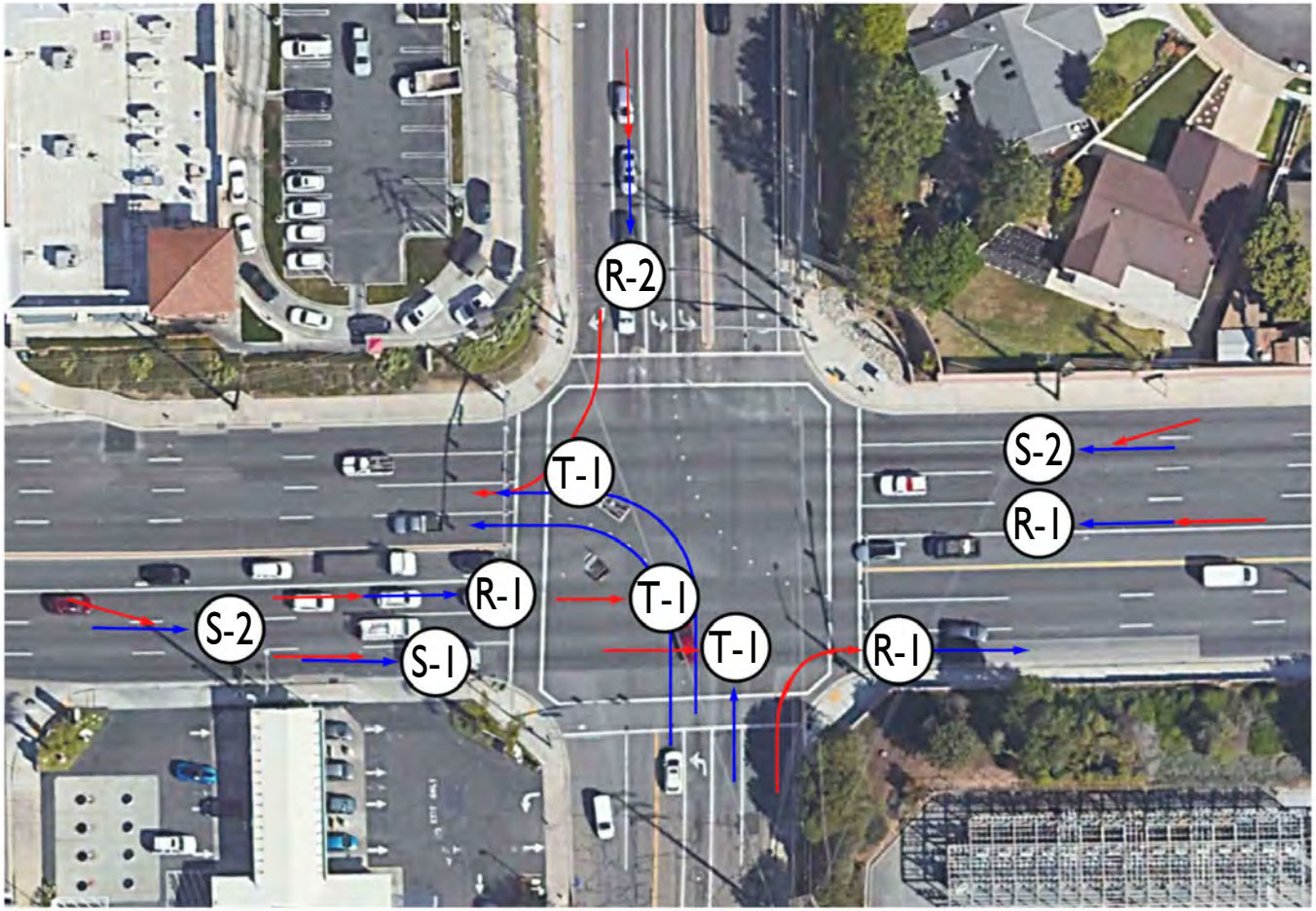
Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe

N

Exhibit 9-6

2020-2021 Intersection No. 6 Collision History
Associated Road (N/S) at Imperial Highway (E/W)



Legend:

(X-1) = Collision Type - Number of Incidents

→ = Driver's Movement Preceding Collison

→ = Driver's Movement Preceding Collision (At Fault)

Collision Type:

R = Rear End

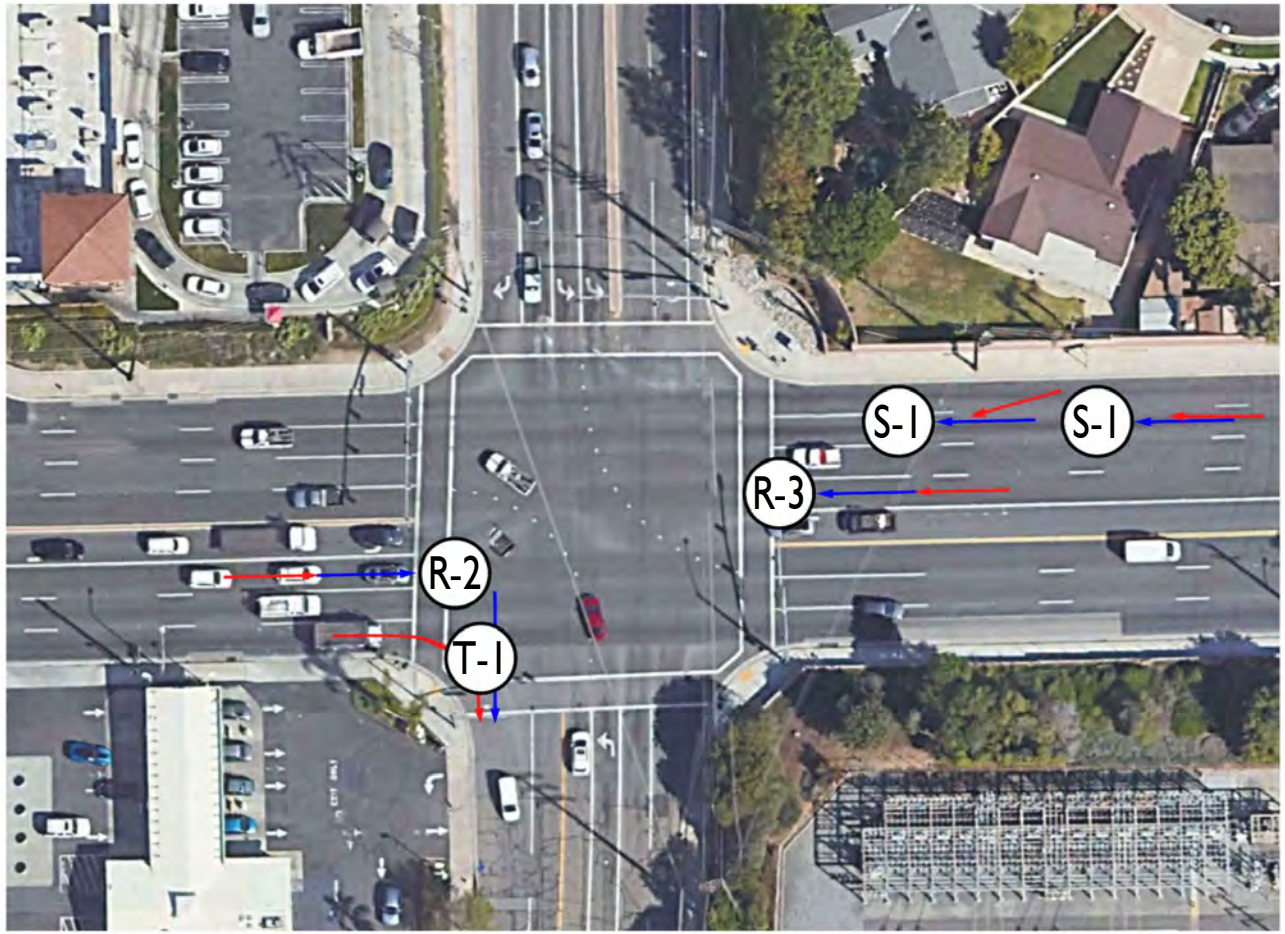
T = Broadside

S = Sideswipe

N

Exhibit 9-7

2021-2022 Intersection No. 6 Collision History
Associated Road (N/S) at Imperial Highway (E/W)



Legend:

(X-1) = Collision Type - Number of Incidents

→ = Driver's Movement Preceding Collison

→ = Driver's Movement Preceding Collision (At Fault)

Collision Type:

R = Rear End

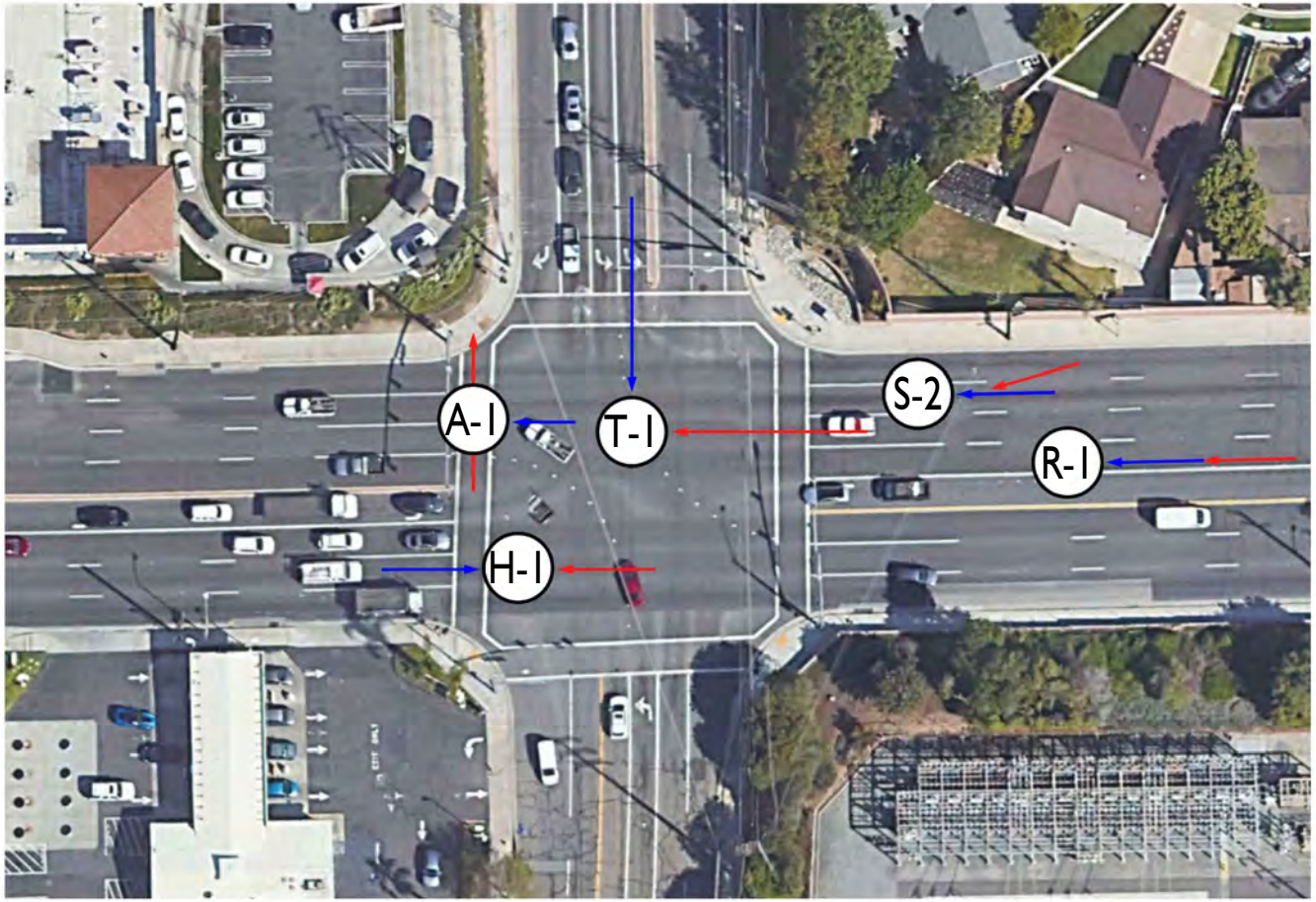
T = Broadside

S = Sideswipe

N

Exhibit 9-8

2022-2023 Intersection No. 6 Collision History
Associated Road (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)
- --- = Pedestrian Crossing (At Fault)

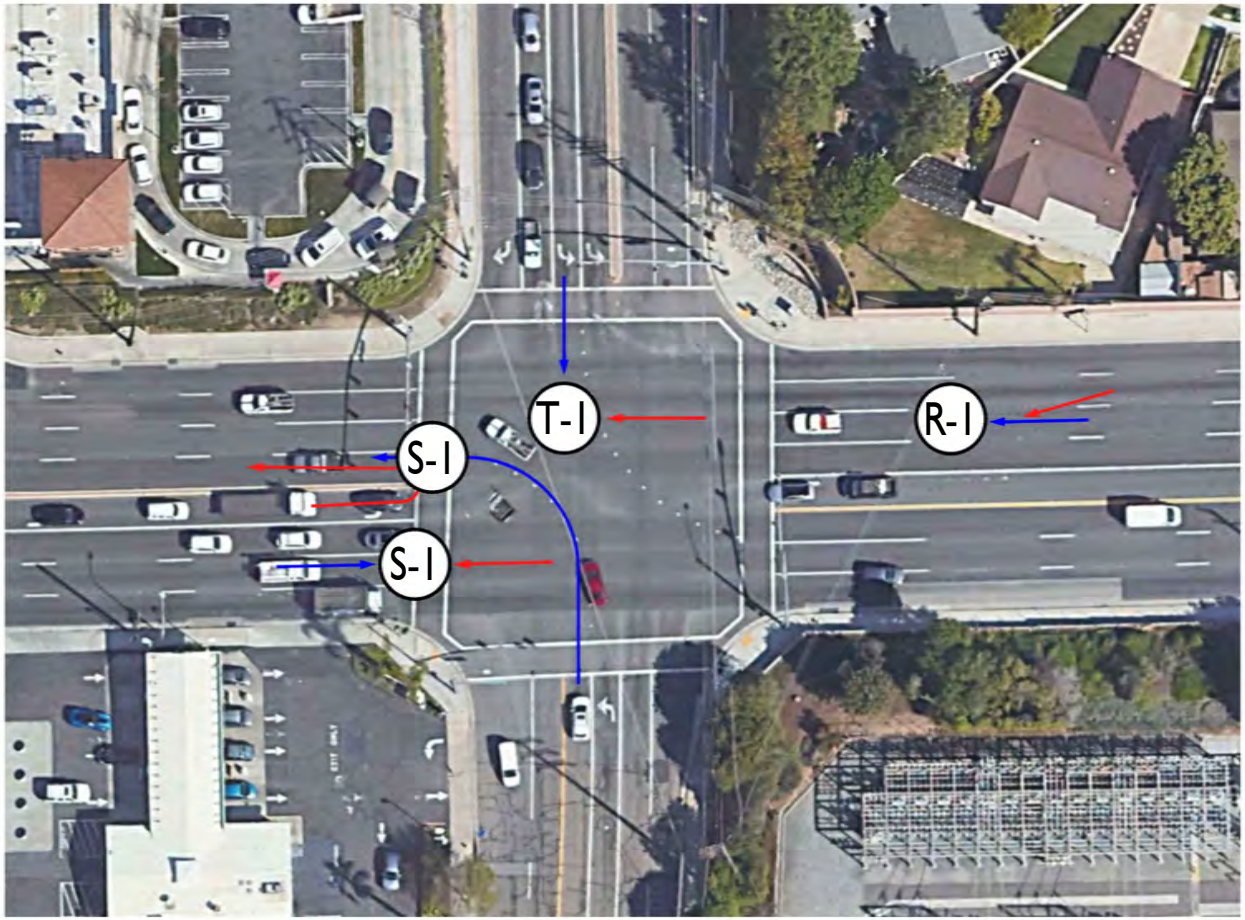
Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe
- H = Head On
- A = Auto-Pedestrian

N

Exhibit 9-9

2023-2024 Intersection No. 6 Collision History
Associated Road (N/S) at Imperial Highway (E/W)



Legend:

- (X-1) = Collision Type - Number of Incidents
- → = Driver's Movement Preceding Collison
- → = Driver's Movement Preceding Collision (At Fault)

Collision Type:

- R = Rear End
- T = Broadside
- S = Sideswipe
- H = Head On
- A = Auto-Pedestrian

N

It is important to note that Caltrans is in the process of implementing traffic safety improvements along the SR-90 corridor (Imperial Highway) which include installing/modifying new traffic signals, constructing additional safety lighting, bringing existing curb ramps to ADA standards, installing loop detectors and traffic count stations where needed, and restripe to pre-existing configuration. As such, the elevated crash rates at Intersection No. 5 may be due to construction activities at or near the intersection which could be reduced with the safety improvements along the corridor. Additionally, it has been found that the crash rates at Intersection No. 6 have steadily decreased in recent years. Therefore, no improvements are being recommended at these intersections to address the collision history.

Collison data sourced from Statewide Integrated Traffic Records System (SWITRS) and Transportation Integrated Mapping System (TIMS) are included in **Appendix J.**

10.0 Active Transportation and Public Transit Analysis

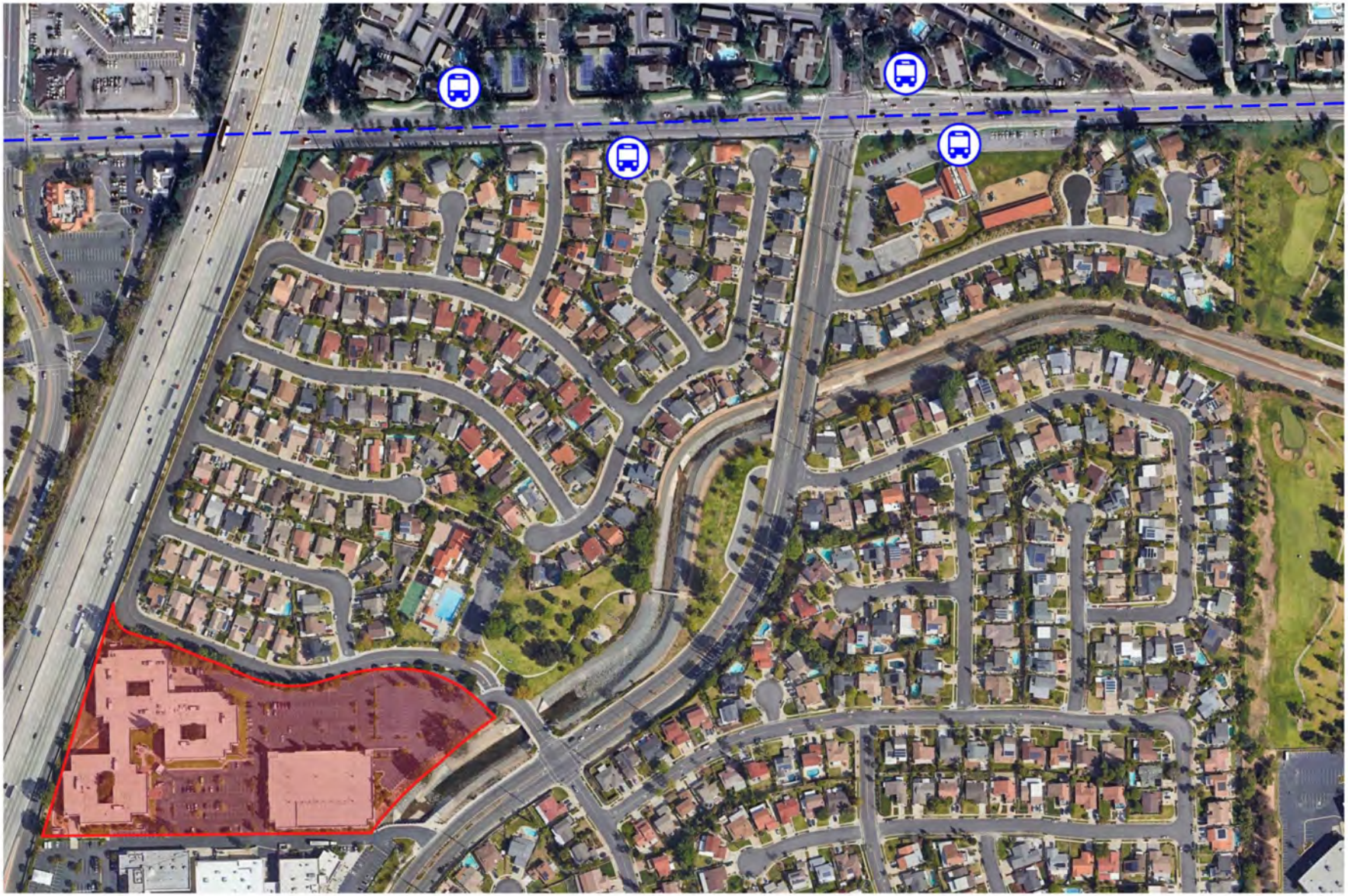
This section provides an evaluation on the proposed project's potential impacts on pedestrian facilities and travel, bicycle facilities and travel, and public transit. According to the *City of Brea Transportation Impact Analysis (TIA) Guidelines*, dated September 2020, "A significant impact occurs if the project conflicts with the adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities."

As discussed in Section 8.8, the project site is currently surrounded by local neighborhoods and a shopping center that implements pedestrian and bicyclist facilities. There is an existing sidewalk along Associated Road and Greenbriar Lane which are adjacent to the project site. The project proposes to leave the existing sidewalk as it remains. Furthermore, the project does not propose any construction of sidewalks along public roads as there are no missing sidewalks along the perimeter of the project site. Additionally, bicyclists are currently being served through bike lanes as shown in Exhibit 8-4. Greenbriar Lane is identified as a local roadway according to the City of Brea General Plan and will not implement any bike lanes. However, Greenbriar Lane may be utilized to access Class II – Bike Lanes on Associated Road and Birch Street.

Additionally, **Exhibit 10-1** shows the existing transit stops within the study area. As shown, there are four (4) bus stops within the study area that are all served by Orange County Transportation Authority (OCTA) Route 129 which runs from La Habra Circle via La Habra Blvd and Brea Blvd through the Brea Mall Area via Birch Street and Kramer Blvd to Anaheim. The two bus stops located on Birch Street, west of Associated Road are within approximately a half mile from the project site. The two bus stops located on Birch Street, east of Associated Road are approximately just over a half mile from the project site. The project will provide adequate pedestrian connections from within the site to the existing sidewalks located along the Greenbriar Lane project frontage, as previously discussed in Section 8.8. As such, residents can safely walk to/from the project site to the existing bus stops along Birch Street via Associated Road or Aurora Avenue/Redbay Avenue.

Temporary obstructions to the connectivity from Greenbriar Lane to Associated Road may occur during the construction of the realignment of Greenbriar Lane. However, these improvements are temporary and will improve overall multi-modal connectivity once Greenbriar Lane is realigned. Therefore, the project will not have a significant impact on existing or proposed public transit.

Exhibit 10-1
Transit Stops



Legend:

= Project Site Boundary

= OCTA Bus Stop (Route:129)

= Route 129

N

11.0 Residential Cut-Through Analysis

To address City staff concerns, a residential cut-through analysis was completed for two (2) neighborhoods located within close proximity of the project site. **Exhibit 11-1** shows the locations of these two neighborhoods.

Neighborhood 1 is bound between Birch Street to the north, Associated Road to the east, the SR-57 Freeway to the west, and Greenbriar Lane to the south. Primary access to Neighborhood 1 is provided via study Intersections #1 & #3. Neighborhood 2 is generally bound between Birch Street to the north, Associated Road to the west, a golf course and commercial shopping center to the east, and Imperial Highway to the south. Primary access to Neighborhood 2 is provided via study Intersections #3 & #7.

A cut-through trip is identified as a vehicle passing through each intersection (through the neighborhood) within a 5-minute span. Existing license plate surveys were collected during the same timeframes as identified in Section 3.3. The license plate surveys matched vehicles entering and exiting the neighborhoods at the following locations:

- Neighborhood 1: Between the Redbay Avenue at Birch Street intersection (i.e., Intersection No. 1) & the Associated Road at Greenbriar Lane intersection (i.e., Intersection No. 3);
- Neighborhood 2: Between the Castlegate Lane/Placentia Avenue at Imperial Highway intersection (i.e., Intersection No. 7) & the Associated Road at Greenbriar Lane intersection (i.e., Intersection No. 3).

Exhibit 11-1 shows the cut-through routes for each neighborhood.

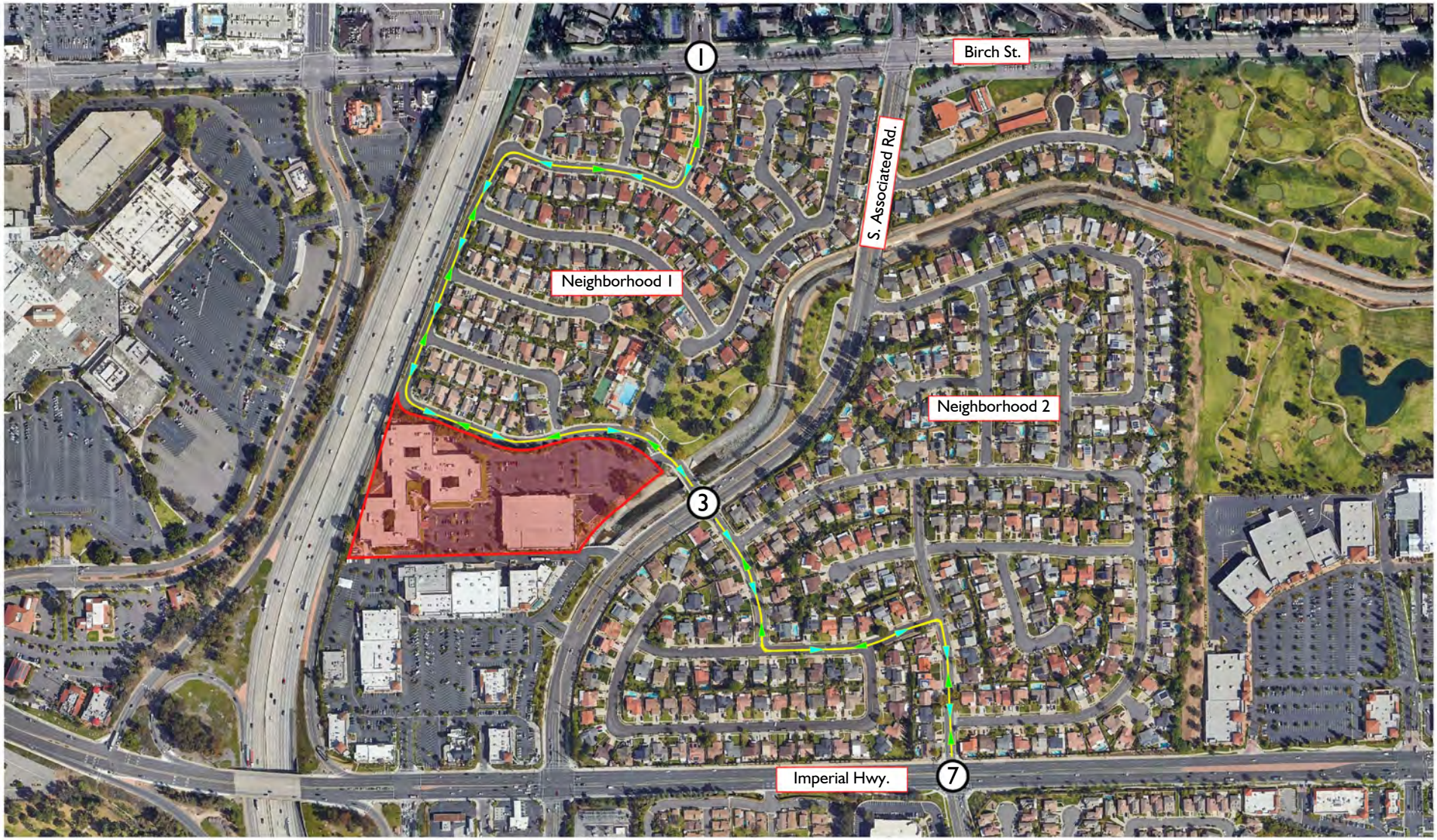
11.1 Cut-Through Analysis Results

The highest peak hour results of the residential cut-through analysis are as follows:

- Neighborhood 1:
    - AM Peak Hour: 6 total vehicles (4 northbound/2 southbound)
    - PM Peak Hour: 6 total vehicles (0 northbound/6 southbound)
    - Saturday Midday Peak Hour: 2 total vehicles (1 northbound/1 southbound)
- Neighborhood 2:
    - AM Peak Hour: 30 total vehicles (24 northbound/6 southbound)
    - PM Peak Hour: 76 total vehicles (60 northbound/16 southbound)
    - Saturday Midday Peak Hour: 71 total vehicles (53 northbound/18 southbound)

Exhibit 11-1

Cut-Through Routes



Legend:

1 = Study Intersection

= Project Site Boundary

= Cut-Through Routes (Northbound)

= Cut-Through Routes (Southbound)

N

Under existing traffic conditions, Neighborhood 1 experiences a total of 245 inbound/outbound total trips during the AM peak hour, 260 inbound/outbound total trips during the PM peak hour, and 273 inbound/outbound trips during the Saturday Midday peak hour, calculated as the sum of inbound/outbound trips at both access points. As such, based on the peak hour cut-through volumes identified above, the total amount of cut-through traffic for Neighborhoods 1 is calculated to be approximately 2%, 2%, and 0.7% for the AM, PM, and Saturday Midday peak hours, respectively.

Neighborhood 2 experiences a total of 357 inbound/outbound total trips during the AM peak hour, 469 inbound/outbound total trips during the PM peak hour, and 549 inbound/outbound trips during the Saturday Midday peak hour calculated as the sum of inbound/outbound trips at both access points. As such, based on the peak hour cut-through volumes identified above, the total amount of cut-through traffic for Neighborhood 2 is calculated to be approximately 8%, 16%, and 13% for the AM, PM, and Saturday Midday peak hours, respectively.

The neighborhood cut-through counts are contained in **Appendix K**.

11.2 Neighborhood 1 Cut-Through Recommendations

For Neighborhood 1, and as shown in Exhibit 4-1, a small portion of project traffic is anticipated to utilize Aurora Avenue/Redbay Avenue to/from Birch Street to the north (through Neighborhood 1). This equates to 9 trips in the weekday AM peak hour, 17 trips in the weekday PM peak hour, and 15 trips in the Saturday midday peak hour. However, since the project is located along Greenbriar Lane, Aurora Avenue/Redbay Avenue provides the most direct access to Birch Street. As such, these aren't actually considered cut-through trips.

Although, as an operational and safety improvement, the following recommendations are being made to encourage drivers to utilize Intersection No. 2 since Intersection No. 1 is an existing deficient intersection (i.e. LOS F) and will experience increased delay with project conditions.

<u>Recommended Improvements:</u>

2. Associated Road (N/S) at Birch Street (E/W)
    - Restripe the eastbound approach to provide an exclusive right-tun lane and through bike lane.
    - Modify the existing traffic signal to provide a right-turn overlap phase in the eastbound direction.

Exhibit 6-1 shows the recommended improvements for Intersection No. 2. Additionally, as shown in Table 5-3, the recommended improvements identified above reduce the delay for Intersection No. 2 under Project Opening Year (2026) With Project Conditions.

Detailed LOS Analysis worksheets for Project Opening Year (2026) With Project Conditions With Improvements are included in Appendix I.

11.3 Neighborhood 2 Cut-Through Recommendations

For Neighborhood 2, and as shown in Exhibits 4-3 and 4-4, project traffic is not anticipated to utilize Greenbriar Lane/Castlegate Lane to/from Imperial Highway. The 15% of project traffic anticipated to travel east on Imperial Highway will likely do so by traveling south on Associated Road before making a southbound left-turn onto eastbound Imperial Highway. This 15% of traffic for the outbound and inbound trips equates to 13 trips in the weekday AM peak hour, 15 trips in the weekday PM peak hour, and 15 trips in the Saturday midday peak hour. To ensure drivers from the project site will not make a cut-through trip via Neighborhood 2, the following recommendations are being made to Intersection No. 3.

Recommended Improvements:

3. Associated Road (N/S) at Greenbriar Lane (E/W)
    - Restripe the eastbound and westbound shared left/through/right-turn lane to an eastbound shared left/right-turn lane and westbound shared left/right-turn lane.
    - Modify the existing signal to a split phasing for the eastbound and westbound movements.
    - Install signage at the intersection to discourage eastbound & westbound through traffic.

Exhibit 6-1 shows the recommended improvements for Intersection No. 3. Additionally, as shown in Table 5-3, the recommended improvements identified above reduce the delay for Intersection No. 3 under Project Opening Year (2026) With Project Conditions.

Detailed LOS Analysis worksheets for Project Opening Year (2026) With Project Conditions With Improvements are included in Appendix I.

12.0 Summary of Recommendations & Fair Share Contributions

This section of the report provides a summary of all the recommendations made throughout this study and the associated fair-share contribution if applicable.

12.1 Summary of Recommendations

The following improvements have been recommended at seven (7) of the study intersections:

Recommended Improvements Based on Cut-Through Analysis:

The following improvements for Intersection No. 2 (Associated Road at Birch Street) are being recommended to minimize cut-through traffic through the neighborhood located north of the project as well as improve the operations and safety of Intersection No. 1.

- Restripe the eastbound approach to provide an exclusive right-tun lane and through bike lane.
- Modify the existing traffic signal to provide a right-turn overlap phase in the eastbound direction.

The following improvements for Intersection No. 3 (Associated Road at Greenbriar Lane) are being recommended to minimize cut-through traffic from the project to the neighborhood located east of the project.

- Restripe the eastbound and westbound shared left/through/right-turn lane to an eastbound shared left/right-turn lane and westbound shared left/right-turn lane.
- Modify the existing signal to a split phasing for the eastbound and westbound movements.
- Install signage at the intersection to discourage eastbound & westbound through traffic.

Recommendations Based on Signal Warrant Analysis:

The City should consider the installation of a traffic signal for Intersection No. 4 (Associated Road at Shopping Center Driveway No. 1) since the intersection meets multiple signal warrants under existing conditions. The project shall only be responsible to pay it's fair-share contribution toward the installation of a future traffic signal.

Recommended Improvements Based on Sight Distance Analysis:

The following improvements for Intersection No. 8 (Brea Glenbrook Club Dwy/Project Dwy No. 1 at Greenbriar Lane) and Intersection No. 9 (Project Driveway No. 2 and Greenbriar Lane) are being recommended to maintain clear line of sight for driver's exiting the project site:

- Trim and maintain foliage continuously within the corner sight distance limited use area up to 2.5 feet in height to remain consistent with Caltrans Highway Design Manual.
- Any future landscaping and/or hardscapes (i.e. monument signs) should be designed such that a driver's clear line of sight is not obstructed.

12.2 Funding Mechanisms

The project is responsible for its fair share contribution of the cost required to implement the identified improvements for Intersection No. 4. Fair-share contribution is based on project trip contribution relative to the amount of overall growth from existing traffic conditions at each impacted study area intersection.

Fair-share contribution percentages for the proposed project for Project Opening Year (2026) are provided in **Table 12-1**.

As shown in Table 12-1, the project-fair share contribution percentages for Project Opening Year (2026) With Project Conditions are as follows:

4. Associated Road (N/S) at Shopping Center Dwy No. 1(E/W)
    - 6.0% (Saturday Midday Peak Hour)

For Intersection No. 2, No. 3, No. 8, and No. 9, the project shall be 100% responsible for the costs of the improvements.

Table 12-2 summarizes the recommendations of improvements at each intersection and the respective fair-share contribution to the improvement, if applicable.

Table 12-1
Project Fair-Share Contribution Summary[1]
Project Opening Year (2026)

Intersection		Existing Conditions Traffic			Porject Opening Year (2026) With Project Conditions			Growth in Traffic			Project Traffic			Project Fair-Share[2,3]		
		AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT	AM	PM	SAT
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	916	1,379	1,217	1,039	1,525	1,351	123	146	134	61	83	81	5.9%	5.4%	**6.0%**

[1] Project Fair-Share Contribution represents the project's traffic contribution at each impacted study area intersection as a percentage of the overall growth in traffic for Project Opening Year (2026) With Project scenario. This table is for informational purposes only and is not tied to any mitigation.

[2] The Project's Fair-Share Contribution is shown in **Bold**.

[3] Based on the LOS analysis, Intersection No. 4 is operating at an acceptable LOS under Existing Conditions; however, the intersection meets multiple signal warrants under existing conditions and project opening year conditions. As such, the project shall only be responsible for the project traffic volumes over the total traffic volumes in the project opening year since the intersection will meet the signal warrants without the addition of the project traffic volumes.

Table 12-2

Recommended Improvements & Project Fair-Share Contribution Summary

Study Intersection		Recommended Improvement	When is Improvement Required?	Responsibility of the Project	Project Fair-Share
2.	Associated Road (N/S) at Birch Street (E/W)	Restripe the eastbound approach to provide an exclusive right-turn lane and through bike-lane. Modify the existing signal to provide a right-turn overlap in the eastbound direction.	Project Opening Year (2026)	Construct	100%
3.	Associated Road (N/S) at Greenbriar Lane (E/W)	Restripe the eastbound and westbound shared left/through/right-turn lane to an eastbound shared left/right-turn lane and westbound shared left/right-turn lane. Modify the existing signal to a split phasing for the eastbound and westbound movements. Install signage at the intersection to discourage eastbound & westbound through traffic.	Project Opening Year (2026)	Construct	100%
4.	Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)	Install a traffic signal.	Exisiting (2024) Conditions	Fair-Share	6%
8.	Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)	Trim and maintain foliage continuously within the corner sight distance limited use area up to 2.5 feet in height to remain consistent with Caltrans Highway Design Manual. Any future landscaping and/or hardscapes (i.e. monument signs) should be designed such that a driver's clear line of sight is not obstructed.	Project Opening Year (2026)	Construct	100%
9.	Project Driveway No. 2 (N/S) and Greenbriar Lane (E/W)				

[1] For improvements where the project's responsibility has been identified as "Construct," the project is responsible for the entirety (i.e. 100%) of the identified improvement.

[2] Fair-share contribution is based on project trip contribution relative to the amount of overall growth from existing traffic conditions at each impacted study area intersection. Calculations for project fair-share contribution are provided in Table 12-1. Please note that these tables are for informational purposes only and are not tied to any mitigation.

13.0 Findings and Conclusions

13.1 Project Summary

The project site is bound between Greenbriar Lane to the north, Associated Road to the east, the SR-57 Freeway to the west, and Brea Plaza to the south, in the City of Brea. The approximately 9.73-acre project site is currently occupied by 164,908 square feet (SF) of vacant office space (formerly occupied by Mercury Insurance).

The project consists of razing the existing office building and parking structure to construct 180 townhome/condominium dwelling units. Access to the project is proposed to be provided via two (2) full-access unsignalized driveways located along Greenbriar Lane. The easternmost driveway is proposed to be located opposite of the existing Brea Glenbrook Club driveway.

The proposed project is forecast to generate approximately 1,296 gross weekday daily trips which include approximately 86 gross weekday AM peak hour trips and approximately 103 gross weekday PM peak hour trips. Additionally, the project is forecast to generate approximately 1,577 gross Saturday daily trips which includes approximately 103 gross Saturday midday peak hour trips.

13.2 Traffic Study Area & Analysis Scenarios

The study area included in this analysis has been determined based on existing and future transportation facilities within the vicinity of the site where the project may contribute a significant amount of traffic.

Per the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, a Non-CEQA Transportation Assessment, which includes LOS analysis, shall be required for proposed projects when either the AM or PM peak hour trip generation on a weekday or weekend is expected to exceed 50 net new vehicle trips from the proposed development. As such, the study area consists of nine (9) intersections.

The analysis evaluates traffic conditions of the study area under the following scenarios during the weekday AM (7:00 AM to 9:00 AM), weekday PM (4:00 PM to 6:00 PM), and Saturday midday (12:00 PM to 3:00 PM) peak periods:

- Existing Conditions;
- Project Opening Year (2026) Without Project Conditions; and
- Project Opening Year (2026) With Project Conditions.

According to the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, General Plan Development scenarios are required for any project that contributes traffic to an intersection projected to have unacceptable LOS, any project that requires a General Plan Amendment, or otherwise proposes development that exceeds the land use intensity assumed for the General Plan. However, the analysis does not include General Plan Development Scenarios despite the project proposing a General Plan Amendment from General Commercial to Mixed-Use II and a Zone Change from C-G Zone to MU-II Zone. General Plan Development Scenarios are not included since the project is proposing the construction of 180 condominium/townhome dwelling units which is a less intense land use as it generates fewer trips than currently existing under the General Commercial land use designated in the General Plan.

13.3 Study Intersection LOS Summary

The intersection level of service analysis has been performed at the nine (9) study intersections within the vicinity of the site where the project may contribute a significant amount of traffic. Project deficiencies have been evaluated within the study area based on peak hour level of service performance criteria and threshold of significance.

The following study intersection has been determined to operate deficiently under all analysis scenarios:

- Intersection No. 1 – Redbay Avenue (N/S) at Birch Street (E/W)

Although Intersection No. 1 (Redbay Avenue at Birch Street) is forecast to operate at an unacceptable LOS during the AM, PM, and Saturday Midday Peak Hours under Project Opening Year (2026) With Project Conditions, it should be noted that it is common for local streets that have direct access to primary arterials, such as Birch Street, to experience longer delay due to the limited gaps in traffic and the heavy volumes on the major street, especially during peak periods. Furthermore, Intersection No. 1 is currently operating at an unacceptable LOS under Existing Conditions and Project Opening Year (2026) Without Project Conditions. Additionally, a Signal Warrant Analysis, discussed in further detail in Section 6, was performed for Intersection No. 1 and the intersection does not satisfy the requirements under any scenario to warrant a traffic signal. Therefore, installation of a traffic signal is not being recommended for the existing deficient Intersection No. 1 as the project does not have a significant effect on the LOS of the intersection. Moreover, the signalization of the intersection may actually have a negative effect on traffic safety as it could introduce new types of crashes such as rear-ends. However, recommendations are being made to Intersection No. 2 which will have a direct benefit to the operations and safety of Intersection No. 1. This is discussed in further detail in Section 11.2 of this study.

13.4 CA MUTCD Warrant Analysis Summary

The following intersections have been evaluated for signalization based on all signal warrants and procedures contained in the CA MUTCD under Existing Conditions:

- **Intersection No. 1** – Redbay Avenue (N/S) at Birch Street (E/W)
- **Intersection No. 4** – Associated Road (N/S) at Shopping Center Dwy No. 1 (E/W)

Intersection No. 4 is the only intersection expected to satisfy the following warrants under Existing Conditions:

- Warrant 1 – Eight Hour Vehicular Volumes (Weekday and Saturday);
- Warrant 2 – Four Hour Vehicular Volumes (Weekday and Saturday);
- Warrant 3 – Peak Hour Warrant (Weekday).

Additional peak hour warrant analyses were conducted under project opening year scenarios for the same identified intersections. Intersection No. 4 meets the peak hour signal warrant under Opening Year (2026) Without Project Conditions for the PM and Saturday Midday peak hours and Opening Year (2026) With Project Conditions PM and Saturday Midday peak hours. Intersection No. 1 does not meet the peak hour signal warrant under any project scenarios.

As a result, signalization is being recommended for Intersection No. 4 and is subject to a fair-share contribution of approximately 6%.

13.5 Intersection Queuing Analysis Summary

A queuing analysis has been conducted to evaluate the queue lengths of turn pockets serving the SR-57 NB off ramp (i.e. Intersection No. 5) along Imperial Highway and turn pockets of Intersection No. 6 directly affected from project traffic. This analysis aims to determine the potential for traffic overflow from turn pockets, considering its impact on the freeway facility, through lanes, and adjacent intersections. As such, adequate storage is provided for all reported turning movements under all scenarios.

13.6 Site Access Analysis

The following summarizes the qualitative analysis conducted on several site access aspects:

Proposed Access Points

Access to the project is proposed to be provided via two (2) full-access unsignalized driveways located along Greenbriar Lane. Project Access Driveway No. 1, otherwise known as "A" Drive, will be the future fourth (south) leg of the existing Brea Glenbrook Club Driveway/Greenbriar Lane intersection. Project Access Driveway No. 2, otherwise known as "C" Drive, will be the future third (south) leg of the existing knuckle at Aurora Avenue and Greenbriar Lane.

Spacing between driveways and intersections

The project access driveway locations are located along Greenbriar Lane have been reviewed for adequate spacing. As such, there are no queuing deficiencies along Greenbriar Lane along the project frontage. Therefore, there will be adequate spacing between the driveways and adjacent intersections.

Potential signalization of driveways

Signalization is not recommended for the proposed driveway as the LOS will remain satisfactory with project conditions.

Shared Access

With the construction of the project, the shared access points between both the Brea Shopping Plaza and the project site will be eliminated. Due to this elimination of the shared access between the two sites, the "With Project" traffic scenarios account for the rerouting of any vehicles currently either cutting through the project site to/from the commercial center, or parking within the project site and walking to the commercial center.

Turn Conflicts/Restrictions

As part of the project, Greenbriar Lane will be realigned from the Brea Glenbrook Club Driveway to Associated Road to allow for more efficient travel along Greenbriar Lane. Additionally, there appears to be no significant conflicts between vehicles or pedestrian/bicycles for on site circulation.

Adequate sight distance

An intersection sight distance analysis has been conducted for both driveways located along Greenbriar Lane. As part of this analysis, a sight line is developed and a "limited use area" is created which designates an area between the edge of pavement and the driver's line of sight. This area prohibits obstructions to maintain adequate sight distance at the intersection.

The following recommendations are provided to maintain clear line of sight for driver's:

- Trim and maintain foliage continuously within the corner sight distance limited use area up to 2.5 feet in height to remain consistent with Caltrans Highway Design Manual.
- Any future landscaping and/or hardscapes (i.e., monument signs) should be designed such that a driver's clear line of sight is not obstructed.

The project shall be 100% responsible for the costs of these improvements at Intersections No. 8 and No. 9.

Service Vehicle Access and Circulation

The radius for both proposed project driveways has been reviewed and service vehicles will be able to access the site via either project driveway with adequate distance for turning movements throughout the project site.

Pedestrian & Bicyclists On-Site Circulation & Off-Site Connectivity

The project will provide adequate pedestrian connections from within the site to the existing sidewalks located along the Greenbriar Lane frontage. These existing sidewalks connect to the signalized intersection of Associated Road and Greenbriar Lane which currently provides protected pedestrian crossings on all legs. These pedestrian facilities provide safe and efficient connectivity for pedestrians to nearby adjacent land uses (e.g., commercial, residential, office uses) as well as other multi-modal facilities (e.g. bus stops along Birch Street). Furthermore, the project also proposes a pedestrian access point located at the southeast corner of the site which will provide direct pedestrian access to the Brea Shopping Plaza. In addition, there are Class II – Bike Lanes along Associated Road and Birch Street and the development is located within a mile of The Tracks which is identified as an east/west corridor. Project residents will be able to easily connect to these existing bicycle facilities via Greenbriar Lane or Aurora Avenue/Redbay Avenue. As such, biking will be an attractive easily accessible alternative mode of transportation for residents. Moreover, as part of the recommendations for Intersection No. 2, the eastbound bike lane will be restriped in between the No. 2 through lane and the exclusive right-turn lane, which will enhance safety for bicyclists at this intersection.

13.7 Safety Review

The proposed project access has been reviewed and is considered to be adequate. Service vehicles and emergency vehicles entering and exiting the project site will be able to do so comfortably, safely, and without undue congestion.

Furthermore, collision data has been reviewed for all study intersections over the course of the previous five years. The following intersections have experienced more than five correctable collisions in the span of one year that were not due to driver impairment:

- **Intersection No. 5 –** SR-57 NB Ramps/Shopping Center Dwy No. 2 at Imperial Highway
- **Intersection No. 6** – Associated Road at Imperial Highway

Although Intersection No. 5 experiences a maximum of 11 collisions in 2022, these collisions are dispersed throughout the intersection and at most there are only two repeat collisions of the same type/movement. Intersection No. 6 experiences a maximum of 13 collisions in 2020; however, similar to Intersection No. 5, these collisions are also dispersed throughout the intersection and at most there are only two repeat collisions of the same type/movement. The most common type of collision at both Intersections No. 5 & No. 6 are rear-end collisions.

13.8 Active Transportation and Public Transit Analysis

The project site is currently surrounded by local neighborhoods and a shopping center that implements pedestrian and bicyclist facilities. The project proposes to leave the existing sidewalk as it remains. Additionally, bicyclists are currently being served through bike lanes and Greenbriar Lane may be utilized to access Class II – Bike Lanes on Associated Road and Birch Street.

Furthermore, there are four (4) bus stops within the study area that are all served by Orange County Transportation Authority (OCTA) Route 129 which runs from La Habra Circle via La Habra Blvd and Brea Blvd through the Brea Mall Area via Birch Street and Kramer Blvd to Anaheim. The two bus stops located on Birch Street, west of Associated Road are within approximately a half-mile from the project site. The two bus stops located on Birch Street, east of Associated Road are approximately just over a half-mile from the project site. The project will provide adequate pedestrian connections from within the site to the existing sidewalks located along the Greenbriar Lane project frontage. As such, residents can safely walk to/from the project site to the existing bus stops along Birch Street via Associated Road or Aurora Avenue/Redbay Avenue.

Temporary obstructions to the connectivity from Greenbriar Lane to Associated Road may occur during the construction of the realignment of Greenbriar Lane. However, these improvements are

temporary and will improve overall multi-modal connectivity once Greenbriar Lane is realigned. Therefore, the project will not have a significant impact on existing or proposed public transit.

13.9 Residential Cut-Through Analysis

To address City staff concerns, a residential cut-through analysis was completed for two (2) neighborhoods located within close proximity of the project site. Neighborhood 1 is bound between Birch Street to the north, Associated Road to the east, the SR-57 Freeway to the west, and Greenbriar Lane to the south. Primary access to Neighborhood 1 is provided via study Intersections #1 & #3. Neighborhood 2 is generally bound between Birch Street to the north, Associated Road to the west, a golf course and commercial shopping center to the east, and Imperial Highway to the south. Primary access to Neighborhood 2 is provided via study Intersections #3 & #7.

Neighborhood 1 experiences a total of 245 inbound/outbound total trips during the AM peak hour, 260 inbound/outbound total trips during the PM peak hour, and 273 inbound/outbound trips during the Saturday Midday peak hour, calculated as the sum of inbound/outbound trips at both access points. As such, based on the peak hour cut-through volumes identified above, the maximum amount of cut-through traffic for Neighborhoods 1 is calculated to be approximately 2% for the AM and PM peak hours.

Neighborhood 2 experiences a total of 357 inbound/outbound total trips during the AM peak hour, 469 inbound/outbound total trips during the PM peak hour, and 549 inbound/outbound trips during the Saturday Midday peak hour calculated as the sum of inbound/outbound trips at both access points. As such, based on the peak hour cut-through volumes identified above, the maximum amount of cut-through traffic for Neighborhood 2 is calculated to be approximately 16% for the PM peak hour.

For Neighborhood 1, a small portion of project traffic is anticipated to utilize Aurora Avenue/Redbay Avenue to/from Birch Street to the north (through Neighborhood 1). However, since the project is located along Greenbriar Lane, Aurora Avenue/Redbay Avenue provides the most direct access to Birch Street. As such, these aren't actually considered cut-through trips.

Although, as previously discussed, Intersection No. 1 is an existing deficient intersection (i.e. LOS F) and will experience increased delay with project conditions. As such, the following recommendations are being made to encourage drivers to utilize Intersection No. 2:

Recommended Improvements:

2. Associated Road (N/S) at Birch Street (E/W)
    - Restripe the eastbound approach to provide an exclusive right-tun lane and through bike lane.
    - Modify the existing traffic signal to provide a right-turn overlap phase in the eastbound direction.

For Neighborhood 2, project traffic is not anticipated to utilize Greenbriar Lane/Castlegate Lane to/from Imperial Highway. The 15% of project anticipated to travel east on Imperial Highway will do so by traveling south on Associated Road before making a southbound left-turn onto eastbound Imperial Highway. To ensure drivers will not make a cut-through trip, the following recommendations are being made to Intersection No. 3.

Recommended Improvements:

3. Associated Road (N/S) at Greenbriar Lane (E/W)
    - Restripe the eastbound and westbound shared left/through/right-turn lane to an eastbound shared left/right-turn lane and westbound shared left/right-turn lane.
    - Modify the existing signal to a split phasing for the eastbound and westbound movements.
    - Install signage at the intersection to discourage eastbound & westbound through traffic.

The project shall be 100% responsible for the costs of these improvements at Intersection No. 3 (i.e. Associated Road at Greenbriar Lane) since the purpose is to restrict project traffic from cut-through movements.

Appendices

Appendix A

Scope of Work

RK19750.1
JN: 2827-2023-05

MERCURY SITE RESIDENTIAL PROJECT
Traffic Impact Study
Revised Scope of Work

August 15, 2024

The following Revised Scope of Work provides information on the proposed project, summarizes the analysis scope, parameters, and assumptions for review and approval, and also includes a request for information on items related to the study.

A. Project Description: The proposed Mercury Site Residential Project (hereinafter referred to as project) is bound between Greenbriar Lane to the north, Associated Road to the east, the SR-57 Freeway to the west, and Brea Plaza to the south, in the City of Brea. The approximately 9.73-acre project site is currently occupied by 164,908 square feet (SF) of vacant office space.

The project consists of razing the existing office buildings, as well as the onsite parking garage, and constructing 180 townhome/condominium dwelling units. Access to the project is proposed to be provided via two (2) full-access unsignalized driveways located along Greenbriar Lane.

The project is planned to open in 2026 and will be evaluated in one (1) single phase.

Exhibit A shows the aerial location of the proposed project. **Exhibit B** shows the preliminary site plan for the project.

B. Project Trip Generation: Trip generation represents the amount of traffic that is attracted and produced by a development.

Trip generation is typically estimated based on the trip generation rates from the latest *Institute of Transportation Engineers (ITE) Trip Generation Manual*. The latest and most recent version (11th Edition, 2021) of the ITE Manual has been utilized for this trip generation analysis. This publication provides a comprehensive evaluation of trip generation rates for a variety of land uses.

The proposed project consists of razing the existing vacant office building as well as the onsite parking garage and constructing 180 single-family attached residential dwelling units.

As directed by City of Brea staff, existing trip credits for the existing entitled (yet vacant) office buildings are not permitted for the Non-CEQA Transportation Assessment since the existing office site has not been fully occupied for several years. As such, the traffic study will assess the potential impact of the gross trips added by the project.

Table 1 shows the project trip generation rates and forecast for the Non-CEQA Transportation Assessment without trip credits. Utilizing the trip generation rates from the upper portion of Table 1, the lower portion of Table 1 shows the forecasted trip generation for the proposed land use.

As shown at the bottom of Table 1, the project is forecast to generate approximately 1,296 weekday daily trips which include approximately 86 weekday AM peak hour trips and approximately 103 weekday PM peak hour trips. Additionally, the project is forecast to generate approximately 1,577 Saturday daily trips which includes approximately 103 Saturday midday peak hour trips.

C. Study Intersections: Per the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, a Non-CEQA Transportation Assessment, which includes LOS analysis, shall be required for proposed projects when either the AM or PM peak hour trip generation on a weekday or weekend is expected to exceed 50 net new vehicle trips from the proposed development. However, as directed by City of Brea staff, the analysis will evaluate the following nine (9) study intersections:

1. Redbay Avenue at Birch Street [Brea];
2. Associated Road at Birch Street [Brea];
3. Associated Road at Greenbriar Lane [Brea];
4. Associated Road at Shopping Center Driveway No. 1 [Brea];
5. SR-57 NB Ramps/Shopping Center Dwy No. 2 at Imperial Hwy [OC CMP/Caltrans];
6. Associated Road at Imperial Highway [Brea/Fullerton];
7. Castlegate Lane/Placentia Avenue at Imperial Highway [Brea];

Table 1

Project Trip Generation Rates & Forecast[1]

For Non-CEQA Transportation Assessment (Without Trip Credit)

Land Use (ITE Code)	Quantity	Units[2]	Weekday						Daily	Saturday			Daily
			AM Peak Hour			PM Peak Hour				Midday Peak Hour			
			In	Out	Total	In	Out	Total		In	Out	Total	
Trip Generation Rates													
Single-Family Attached Housing (215)	--	DU	25%	75%	0.48	59%	41%	0.57	7.20	48%	52%	0.57	8.76
Trip Generation Forecast													
Single-Family Attached Housing (215)	180	DU	22	64	86	62	41	103	1,296	49	54	103	1,577

[1] Source: ITE Trip Generation Manual (11th Edition, 2021).
[2] DU = Dwelling Units.

8. Brea Glenbrook Club Dwy/Project Dwy No. 1 at Greenbriar Lane [Brea]; and
9. Project Driveway No. 2 at Greenbriar Lane [Brea].

Exhibit C illustrates the project's study area.

D. Project Trip Distribution: Exhibit D-1 and **Exhibit D-2** show the outbound and inbound trip distribution pattern for the proposed project, respectively.

E. Analysis Scenarios: The analysis will evaluate traffic conditions for the following scenarios during the weekday AM, weekday PM, and Saturday midday peak hours:

- Existing Conditions;
- Project Opening Year (2026) Without Project Conditions; and
- Project Opening Year (2026) With Project Conditions.

According to the *City of Brea Transportation Impact Analysis Guidelines*, dated September 2020, General Plan Development scenarios are required for any project that contributes traffic to an intersection projected to have unacceptable LOS, any project that requires a General Plan Amendment, or otherwise proposes development that exceeds the land use intensity assumed for the General Plan. However, the analysis does not include General Plan Development Scenarios despite the project proposing a General Plan Amendment from General Commercial to Mixed-Use II and a Zone Change from C-G Zone to MU-II Zone. General Plan Development Scenarios are not included since the project is proposing the construction of 180 condominium/townhome dwelling units which is a less intense land use as it generates fewer trips than currently existing under the General Commercial land use designated in the General Plan.

F. Traffic Analysis Parameters: The analysis will utilize the following parameters:

- Vistro analysis software and the latest edition of the Highway Capacity methodology. The intersection Capacity Utilization (ICU) methodology will also be utilized for any study intersections that are CMP-designated locations.
- Optimized signal timing (i.e., splits). Existing cycle length and pedestrian timing parameters will be utilized.

- Analysis parameters as detailed in the *City of Brea Transportation Impact Analysis Guidelines, dated September 2020*.

G. Existing Traffic Counts: The analysis will utilize new traffic counts to be collected in February 2024. The counts will not be collected by vehicle classification.

- Weekday AM peak period counts will be collected during one typical weekday from 7:00 AM to 9:00 AM.
- Weekday PM peak period counts will be collected during one typical weekday from 4:00 PM to 6:00 PM.
- Saturday midday peak period counts will be collected during one typical Saturday during a 2-3 hour timeframe. The 2-3 hour timeframe will be determined based on a review of Saturday 24-hour roadway counts that are being collected at select locations within the confines of the study area.

In addition to the intersection counts, RK will also collect existing counts at the current Mercury Insurance parking lot entrances. Currently, the Mercury Insurance complex and the shopping center are interconnected and share parking and access driveways. The proposed project will eliminate that shared access between the two properties, forcing a reroute of a portion of the exiting shopping center traffic. The "With Project" traffic scenarios will account for this partial shift of existing traffic due to the elimination of the interconnection. These counts will be collected for the same timeframes identified above for the intersection counts.

H. Forecast Opening Year (2026) Conditions Traffic Volumes: Opening Year (2026) background traffic volumes will be derived by applying an annual growth rate of one percent (1%) per year to existing traffic volumes (i.e., 2% total growth) and adding traffic from any cumulative developments located within one mile of the project site.

I. Performance Criteria: Per the City's General Plan Circulation Element and Growth Management Element requirements, a volume/capacity ratio of 0.90 (Level of Service D) shall be the lowest acceptable LOS at intersections.

J. Threshold for Requiring LOS Improvements: An intersection shall be considered unacceptable and cause an effect on traffic operations if:

- the project causes a study intersection that currently operates at LOS D or better to degrade to LOS E or F;
- a study intersection that is already operating at LOS E and the project causes an increase in control delay of 4 or more seconds; and
- a study intersection that is already operating at LOS F and the project causes an increase in control delay of 2 or more seconds.

If a project causes an effect on traffic operations, improvements to study intersections may be required to bring back the intersection to an acceptable LOS or make other improvements to the intersection comparable to the operational deficiency. If a feasible identified improvement(s) cannot be provided as determined by the City Traffic Engineer, then contribution of fair share towards an improvement will be considered. Unsignalized intersections operating at a deficient LOS with or without project conditions shall be evaluated for the installation of a traffic signal using the traffic signal peak hour warrant and crash experience warrant per the latest version of the California Manual on Uniform Traffic Control Devices (CA MUTCD).

K. Site Access Analysis: The traffic impact study will include a site access analysis which will consist of the following:

- Number of access points proposed for the project site.
- Spacing between driveways and intersections.
- Potential signalization of driveways.
- Shared access.
- Turn conflicts/restrictions.
- Sight distance.
- Driveway widths.
- Any other operational characteristics as directed by the City Traffic Engineer.
- Service Vehicle Access and Circulation.
- Turning Movements.

L. Signal Warrant Analysis: RK will prepare a signal warrant analysis for the intersections of Associated Road at Shopping Center Driveway No. 1 (i.e., Intersection No. 4) and Redbay Avenue at Birch Street (i.e., Intersection No. 1).

M. Cut-Through Analysis/License Plate Survey: RK will collect license plate surveys for the same timeframes identified above in Section G and conduct a cut-through analysis for the following areas:

- Between the Castlegate Lane/Placentia Avenue at Imperial Highway intersection (i.e., Intersection No. 7) & the Associated Road at Greenbriar Lane intersection (i.e., Intersection No. 3). A cut-through trip is identified as a vehicle passing through each intersection (through the neighborhood) within a 5-minute span.
- Between the Redbay Avenue at Birch Street intersection (i.e., Intersection No. 1) & the Associated Road at Greenbriar Lane intersection (i.e., Intersection No. 3). A cut-through trip is identified as a vehicle passing through each intersection (through the neighborhood) within a 5-minute span.

N. Safety Review: RK will prepare a Safety Review, consistent with page 15 of the *City of Brea Transportation Impact Analysis Guidelines,* dated September 2020.

O. Active Transportation and Public Transit Analysis: RK will prepare a Active Transportation and Public Transit Analysis, consistent with page 24 of the *City of Brea Transportation Impact Analysis Guidelines,* dated September 2020.

P. Caltrans Off-Ramp Queuing Analysis: RK will calculate the 95th percentile off-ramp queues for Study Intersection #5 (i.e., SR-57 Northbound Off-Ramp) and Study Intersection #6 to assess if they extend back from the intersection to the mainline.

Q. VMT Analysis: RK will prepare a VMT screening assessment consistent with the *City of Brea Transportation Impact Analysis Guidelines,* dated September 2020, <u>under a standalone report from the Non-CEQA Transportation Assessment</u>.

R. Request for Information: Please provide information on the following for use in the traffic study:

- Information on cumulative projects within one-mile of the project site that need to be included in the traffic analysis (location, land use type(s), and land use quantities);
- Existing signal timing plans for all signalized study intersections; and
- Information on future roadway and circulation system modifications/improvements that are planned within the study area and would potentially affect the analysis; and
- Collision statistics for all study intersections, as specified on page 15 of the City's TIA Guidelines.

If you have any questions, or would like further review, please call us at (949) 474-0809.

Sincerely,

RK ENGINEERING GROUP, INC.

Justin Tucker, P.E., T.E.
Associate Principal

Attachments

Attachments

Exhibit A

Location Map

Legend:

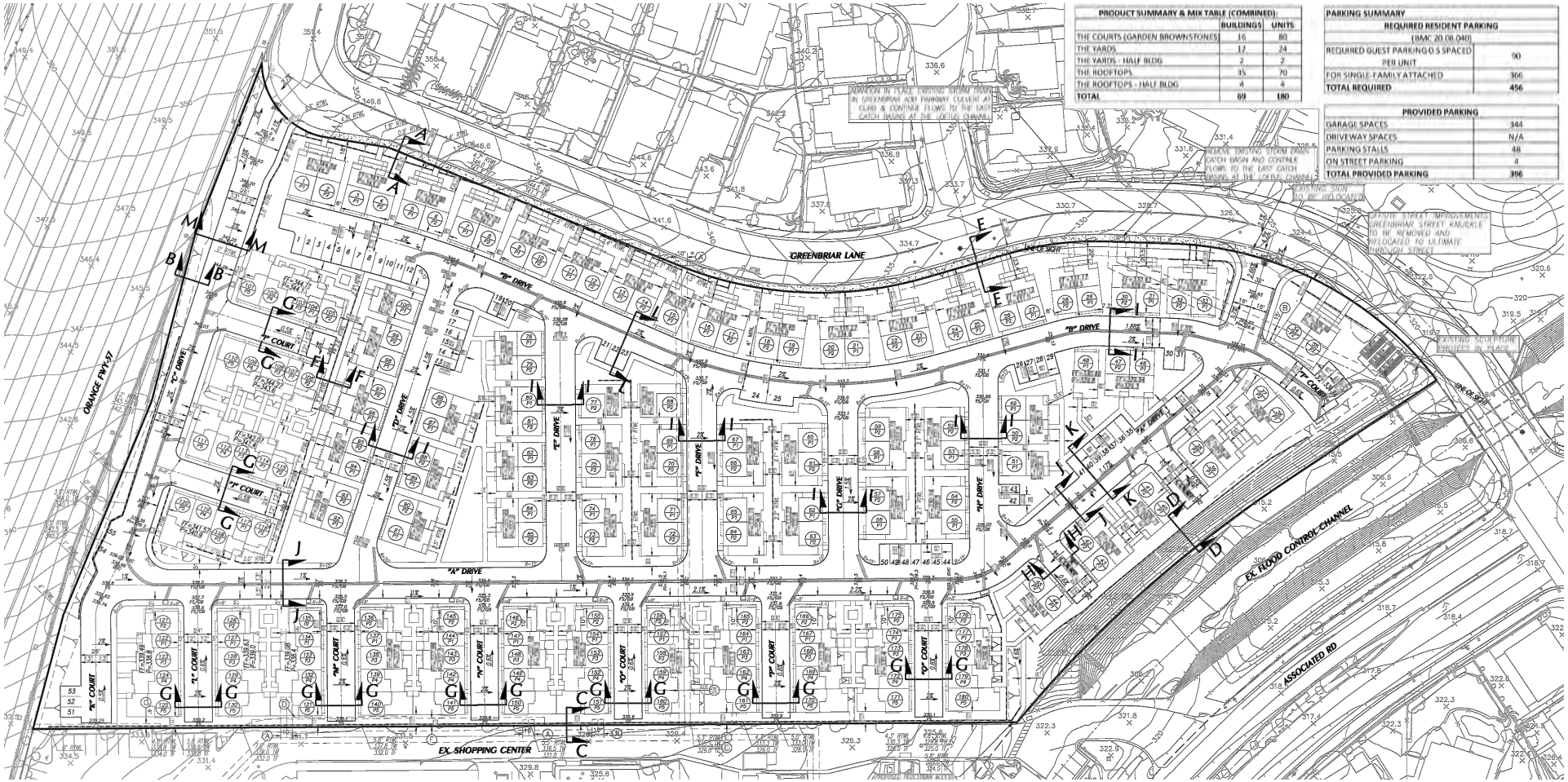
= Project Site Boundary

N

RK engineering group, inc.

Exhibit B

Site Plan



PRODUCT SUMMARY & MIX TABLE (COMBINED):		
	BUILDINGS	UNITS
THE COURTS (GARDEN BROWNSTONES)	16	80
THE YARDS	17	34
THE YARDS - HALF BLDG	2	2
THE ROOFTOPS	35	70
THE ROOFTOPS - HALF BLDG	4	4
TOTAL	69	180

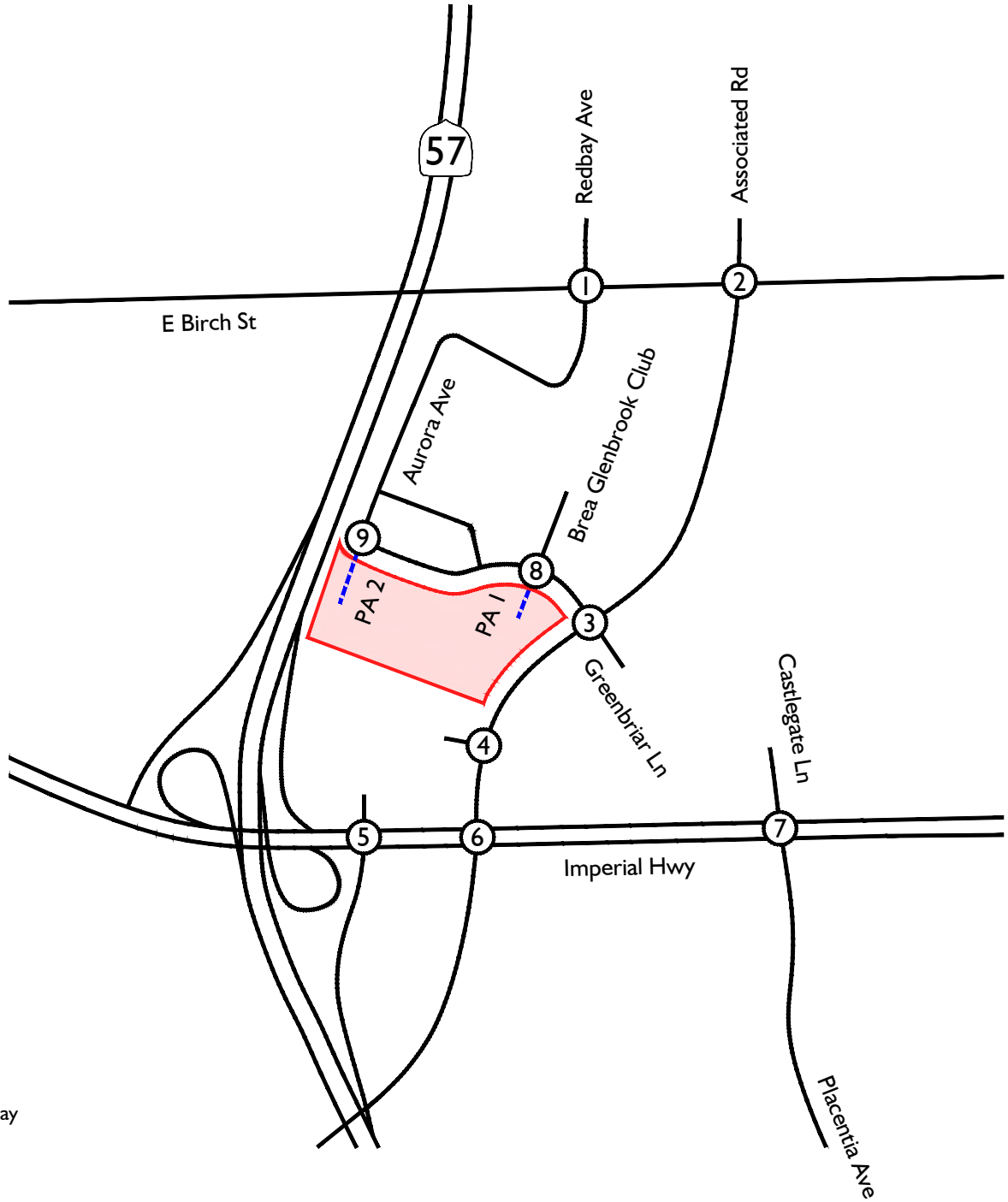
PARKING SUMMARY	
REQUIRED RESIDENT PARKING (BMC 20.08.040)	
REQUIRED GUEST PARKING 0.5 SPACED PER UNIT	90
FOR SINGLE-FAMILY ATTACHED	366
TOTAL REQUIRED	456

PROVIDED PARKING	
GARAGE SPACES	344
DRIVEWAY SPACES	N/A
PARKING STALLS	48
ON STREET PARKING	4
TOTAL PROVIDED PARKING	396

N

Exhibit C

Study Area



Legend:

1 = Study Intersection

= Project Access Driveway

= Project Site Boundary

N

Exhibit D-1

Outbound Project Trip Distribution

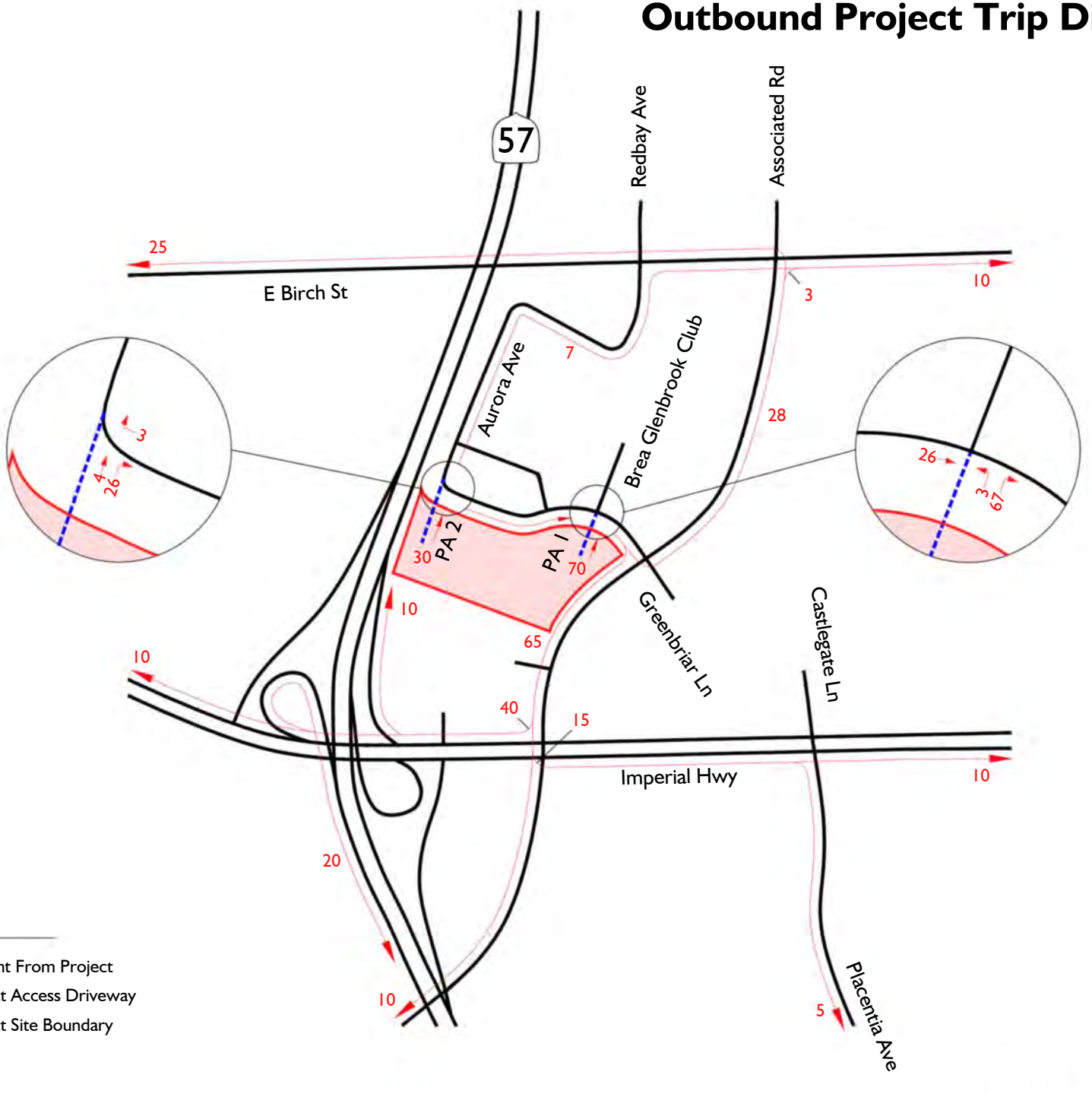


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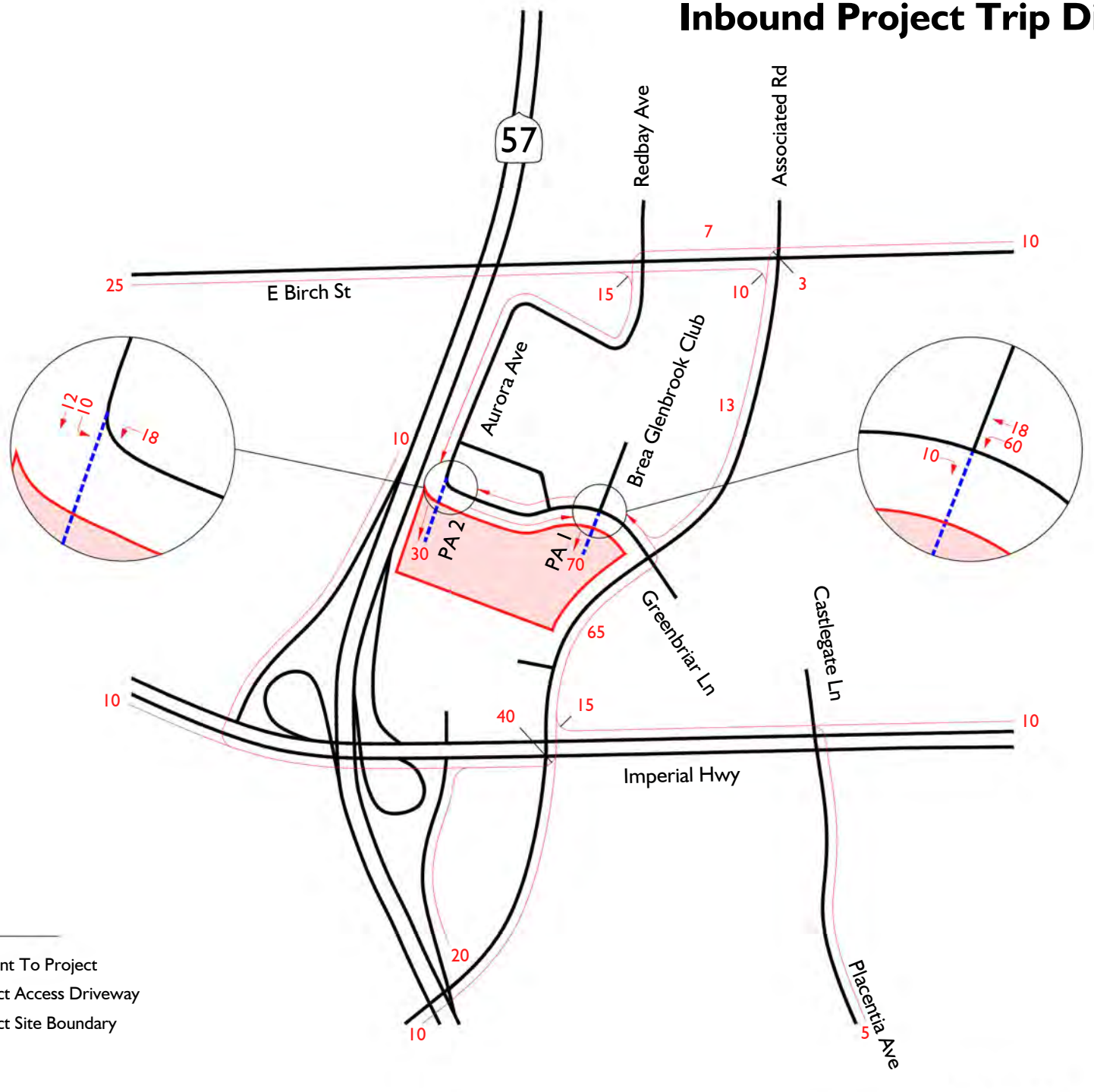
Exhibit D-2

Inbound Project Trip Distribution



RK engineering group, inc.

Appendix B

Existing Count Data

RK19750.1
JN: 2827-2023-05

Appendix B-I

Existing Traffic Count Worksheets

RK19750.1
JN: 2827-2023-05

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Brea
N/S: Redbay Avenue
E/W: Birch Street
Weather: Clear

File Name : 01_BRE_Red_Birch AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	6	0	16	22	1	94	2	97	1	0	5	6	2	175	1	178	303
07:15 AM	5	0	10	15	0	155	5	160	3	0	8	11	4	164	2	170	356
07:30 AM	7	0	13	20	1	214	3	218	7	0	5	12	6	206	3	215	465
07:45 AM	4	0	11	15	3	242	3	248	9	0	3	12	7	220	2	229	504
Total	22	0	50	72	5	705	13	723	20	0	21	41	19	765	8	792	1628
08:00 AM	7	0	12	19	5	251	5	261	6	0	15	21	6	306	2	314	615
08:15 AM	3	0	9	12	7	201	4	212	3	0	14	17	5	193	3	201	442
08:30 AM	6	0	12	18	6	204	10	220	7	0	16	23	5	175	3	183	444
08:45 AM	3	0	12	15	5	183	5	193	4	0	3	7	2	171	5	178	393
Total	19	0	45	64	23	839	24	886	20	0	48	68	18	845	13	876	1894
Grand Total	41	0	95	136	28	1544	37	1609	40	0	69	109	37	1610	21	1668	3522
Apprch %	30.1	0	69.9		1.7	96	2.3		36.7	0	63.3		2.2	96.5	1.3		
Total %	1.2	0	2.7	3.9	0.8	43.8	1.1	45.7	1.1	0	2	3.1	1.1	45.7	0.6	47.4	

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**7**	0	**13**	**20**	1	214	3	218	7	0	5	12	6	206	**3**	215	465
07:45 AM	4	0	11	15	3	242	3	248	**9**	0	3	12	**7**	220	2	229	504
08:00 AM	7	0	12	19	5	**251**	**5**	**261**	6	0	**15**	**21**	6	**306**	2	**314**	**615**
08:15 AM	3	0	9	12	**7**	201	4	212	3	0	14	17	5	193	3	201	442
Total Volume	21	0	45	66	16	908	15	939	25	0	37	62	24	925	10	959	2026
% App. Total	31.8	0	68.2		1.7	96.7	1.6		40.3	0	59.7		2.5	96.5	1		
PHF	.750	.000	.865	.825	.571	.904	.750	.899	.694	.000	.617	.738	.857	.756	.833	.764	.824

Counts Unlimited, Inc.
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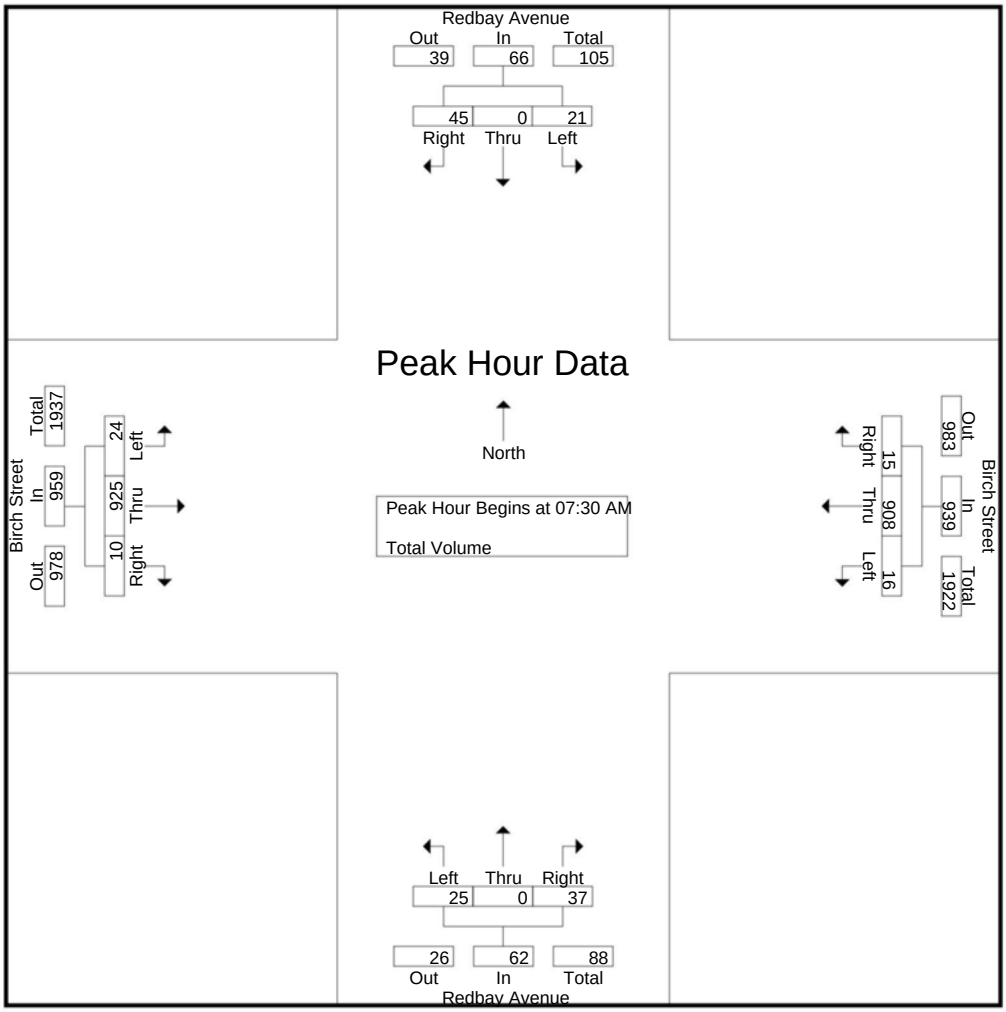
City of Brea
N/S: Redbay Avenue
E/W: Birch Street
Weather: Clear

File Name : 01_BRE_Red_Birch AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:45 AM				07:45 AM				07:30 AM			
+0 mins.	6	0	**16**	**22**	3	242	3	248	**9**	0	3	12	6	206	**3**	215
+15 mins.	5	0	10	15	5	**251**	5	**261**	6	0	15	21	**7**	220	2	229
+30 mins.	**7**	0	13	20	**7**	201	4	212	3	0	14	17	6	**306**	2	**314**
+45 mins.	4	0	11	15	6	204	**10**	220	7	0	**16**	**23**	5	193	3	201
Total Volume	22	0	50	72	21	898	22	941	25	0	48	73	24	925	10	959
% App. Total	30.6	0	69.4		2.2	95.4	2.3		34.2	0	65.8		2.5	96.5	1	
PHF	.786	.000	.781	.818	.750	.894	.550	.901	.694	.000	.750	.793	.857	.756	.833	.764

Counts Unlimited, Inc.
PO Box 1178
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City of Brea
N/S: Redbay Avenue
E/W: Birch Street
Weather: Clear

File Name : 01_BRE_Red_Birch PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	0	7	11	7	283	10	300	5	0	6	11	5	265	6	276	598
04:15 PM	1	0	5	6	6	294	7	307	6	0	4	10	6	325	6	337	660
04:30 PM	2	0	8	10	7	300	8	315	1	0	8	9	8	298	8	314	648
04:45 PM	4	0	7	11	1	315	11	327	3	0	2	5	11	272	6	289	632
Total	11	0	27	38	21	1192	36	1249	15	0	20	35	30	1160	26	1216	2538
05:00 PM	5	0	8	13	2	329	8	339	1	0	5	6	8	301	10	319	677
05:15 PM	2	0	7	9	6	359	11	376	5	0	4	9	18	310	8	336	730
05:30 PM	7	0	7	14	6	322	9	337	2	0	4	6	9	304	3	316	673
05:45 PM	3	0	2	5	1	256	10	267	1	0	8	9	11	279	8	298	579
Total	17	0	24	41	15	1266	38	1319	9	0	21	30	46	1194	29	1269	2659
Grand Total	28	0	51	79	36	2458	74	2568	24	0	41	65	76	2354	55	2485	5197
Apprch %	35.4	0	64.6		1.4	95.7	2.9		36.9	0	63.1		3.1	94.7	2.2		
Total %	0.5	0	1	1.5	0.7	47.3	1.4	49.4	0.5	0	0.8	1.3	1.5	45.3	1.1	47.8	

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	4	0	7	11	1	315	**11**	327	3	0	2	5	11	272	6	289	632
05:00 PM	5	0	**8**	13	2	329	8	339	1	0	**5**	6	8	301	**10**	319	677
05:15 PM	2	0	7	9	**6**	**359**	11	**376**	**5**	0	4	**9**	**18**	**310**	8	**336**	**730**
05:30 PM	**7**	0	7	**14**	6	322	9	337	2	0	4	6	9	304	3	316	673
Total Volume	18	0	29	47	15	1325	39	1379	11	0	15	26	46	1187	27	1260	2712
% App. Total	38.3	0	61.7		1.1	96.1	2.8		42.3	0	57.7		3.7	94.2	2.1		
PHF	.643	.000	.906	.839	.625	.923	.886	.917	.550	.000	.750	.722	.639	.957	.675	.938	.929

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City of Brea
N/S: Redbay Avenue
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Weather: Clear

File Name : 01_BRE_Red_Birch PM
Site Code : 10524132
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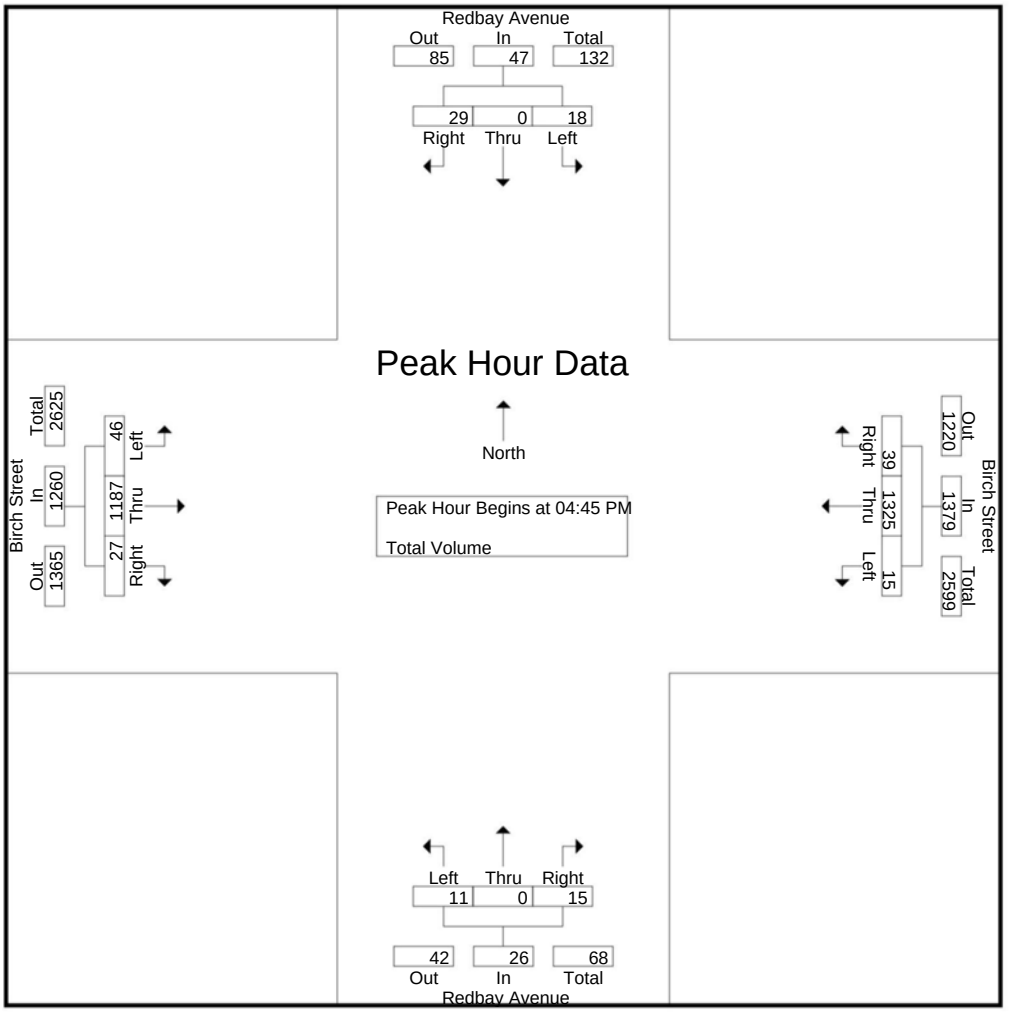

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:00 PM				05:00 PM			
+0 mins.	4	0	7	11	1	315	**11**	327	5	0	6	**11**	8	301	**10**	319
+15 mins.	5	0	**8**	13	2	329	8	339	**6**	0	4	10	**18**	**310**	8	**336**
+30 mins.	2	0	7	9	**6**	**359**	11	**376**	1	0	**8**	9	9	304	3	316
+45 mins.	**7**	0	7	**14**	6	322	9	337	3	0	2	5	11	279	8	298
Total Volume	18	0	29	47	15	1325	39	1379	15	0	20	35	46	1194	29	1269
% App. Total	38.3	0	61.7		1.1	96.1	2.8		42.9	0	57.1		3.6	94.1	2.3	
PHF	.643	.000	.906	.839	.625	.923	.886	.917	.625	.000	.625	.795	.639	.963	.725	.944

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City of Brea
N/S: Redbay Avenue
E/W: Birch Street
Weather: Clear

File Name : 01_BRE_Red_Birch SAT
Site Code : 10524132
Start Date : 2/10/2024
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Groups Printed- Total Volume

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	7	0	5	12	1	214	4	219	7	0	3	10	13	226	8	247	488
12:15 PM	2	0	8	10	4	207	7	218	7	0	1	8	7	225	3	235	471
12:30 PM	3	0	5	8	4	192	8	204	5	0	1	6	4	193	6	203	421
12:45 PM	5	0	6	11	1	236	8	245	4	1	1	6	3	233	2	238	500
Total	17	0	24	41	10	849	27	886	23	1	6	30	27	877	19	923	1880
01:00 PM	0	0	12	12	2	219	6	227	2	0	3	5	6	249	7	262	506
01:15 PM	4	0	11	15	1	209	7	217	7	0	2	9	7	230	3	240	481
01:30 PM	0	0	5	5	1	201	8	210	2	0	3	5	3	231	1	235	455
01:45 PM	5	0	7	12	3	207	6	216	3	0	3	6	10	237	9	256	490
Total	9	0	35	44	7	836	27	870	14	0	11	25	26	947	20	993	1932
02:00 PM	1	0	12	13	1	224	6	231	4	2	1	7	10	248	4	262	513
02:15 PM	1	0	5	6	1	216	11	228	5	0	1	6	12	228	11	251	491
02:30 PM	4	0	9	13	2	199	6	207	2	0	2	4	13	203	5	221	445
02:45 PM	3	0	9	12	0	193	7	200	5	0	3	8	5	235	4	244	464
Total	9	0	35	44	4	832	30	866	16	2	7	25	40	914	24	978	1913
Grand Total	35	0	94	129	21	2517	84	2622	53	3	24	80	93	2738	63	2894	5725
Apprch %	27.1	0	72.9		0.8	96	3.2		66.2	3.8	30		3.2	94.6	2.2		
Total %	0.6	0	1.6	2.3	0.4	44	1.5	45.8	0.9	0.1	0.4	1.4	1.6	47.8	1.1	50.6	

	Redbay Avenue Southbound				Birch Street Westbound				Redbay Avenue Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	0	5	5	1	201	8	210	2	0	**3**	5	3	231	1	235	455
01:45 PM	**5**	0	7	12	**3**	207	6	216	3	0	3	6	10	237	9	256	490
02:00 PM	1	0	**12**	**13**	1	**224**	6	**231**	4	**2**	1	**7**	10	**248**	4	**262**	**513**
02:15 PM	1	0	5	6	1	216	**11**	228	**5**	0	1	6	**12**	228	**11**	251	491
Total Volume	7	0	29	36	6	848	31	885	14	2	8	24	35	944	25	1004	1949
% App. Total	19.4	0	80.6		0.7	95.8	3.5		58.3	8.3	33.3		3.5	94	2.5		
PHF	.350	.000	.604	.692	.500	.946	.705	.958	.700	.250	.667	.857	.729	.952	.568	.958	.950

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Site Code : 10524132
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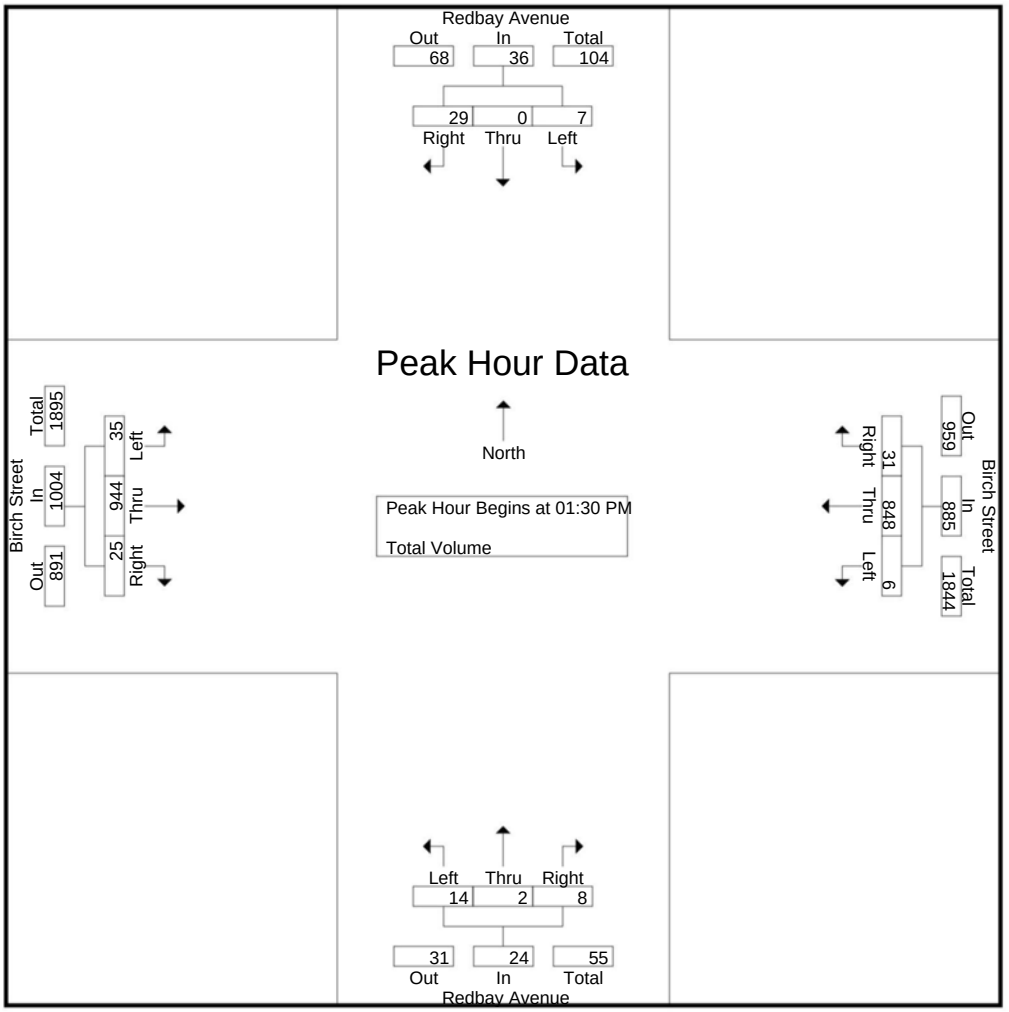

Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:30 PM				12:45 PM				12:00 PM				01:30 PM			
+0 mins.	3	0	5	8	1	**236**	**8**	**245**	**7**	0	**3**	**10**	3	231	1	235
+15 mins.	**5**	0	6	11	**2**	219	6	227	7	0	1	8	10	237	9	256
+30 mins.	0	0	**12**	12	1	209	7	217	5	0	1	6	10	**248**	4	**262**
+45 mins.	4	0	11	**15**	1	201	8	210	4	**1**	1	6	**12**	228	**11**	251
Total Volume	12	0	34	46	5	865	29	899	23	1	6	30	35	944	25	1004
% App. Total	26.1	0	73.9		0.6	96.2	3.2		76.7	3.3	20		3.5	94	2.5	
PHF	.600	.000	.708	.767	.625	.916	.906	.917	.821	.250	.500	.750	.729	.952	.568	.958

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File Name : 01_BRE_Red_Birch SAT
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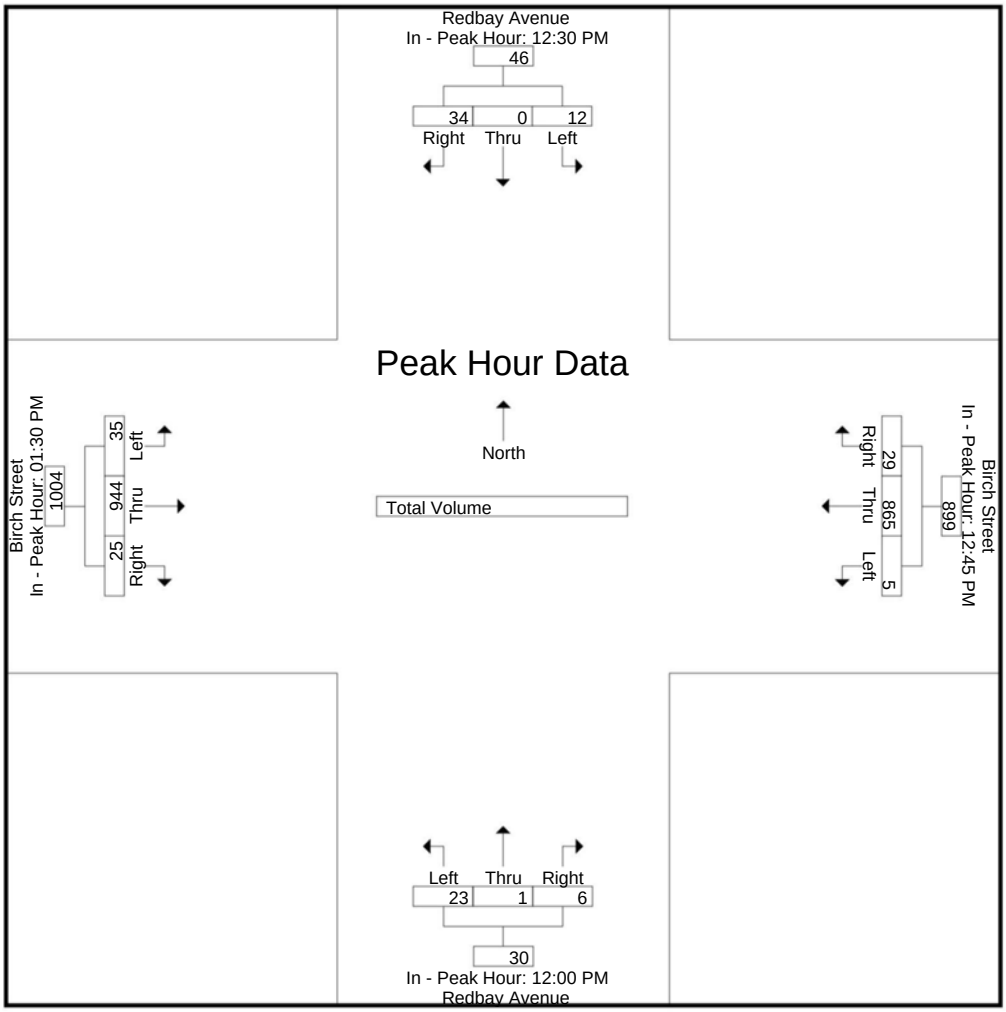

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City of Brea
N/S: Associated Road
E/W: Birch Street
Weather: Clear

File Name : 02_BRE_Asd_Birch AM
Site Code : 10524132
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Groups Printed- Total Volume

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	9	13	4	26	75	82	1	158	25	1	58	84	1	154	28	183	451
07:15 AM	7	5	4	16	52	131	1	184	25	1	65	91	0	169	11	180	471
07:30 AM	5	3	3	11	86	194	2	282	26	0	60	86	1	168	33	202	581
07:45 AM	7	6	5	18	72	201	0	273	55	1	77	133	0	202	25	227	651
Total	28	27	16	71	285	608	4	897	131	3	260	394	2	693	97	792	2154
08:00 AM	5	5	2	12	60	177	0	237	62	1	112	175	2	273	48	323	747
08:15 AM	9	6	2	17	46	169	0	215	54	3	76	133	0	199	27	226	591
08:30 AM	10	2	2	14	79	185	4	268	26	1	58	85	2	156	30	188	555
08:45 AM	4	6	0	10	62	140	0	202	49	1	63	113	0	129	47	176	501
Total	28	19	6	53	247	671	4	922	191	6	309	506	4	757	152	913	2394
Grand Total	56	46	22	124	532	1279	8	1819	322	9	569	900	6	1450	249	1705	4548
Apprch %	45.2	37.1	17.7		29.2	70.3	0.4		35.8	1	63.2		0.4	85	14.6		
Total %	1.2	1	0.5	2.7	11.7	28.1	0.2	40	7.1	0.2	12.5	19.8	0.1	31.9	5.5	37.5	

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	5	3	3	11	**86**	194	**2**	**282**	26	0	60	86	1	168	33	202	581
07:45 AM	7	**6**	**5**	**18**	72	**201**	0	273	55	1	77	133	0	202	25	227	651
08:00 AM	5	5	2	12	60	177	0	237	**62**	1	**112**	**175**	**2**	**273**	**48**	**323**	**747**
08:15 AM	**9**	6	2	17	46	169	0	215	54	**3**	76	133	0	199	27	226	591
Total Volume	26	20	12	58	264	741	2	1007	197	5	325	527	3	842	133	978	2570
% App. Total	44.8	34.5	20.7		26.2	73.6	0.2		37.4	0.9	61.7		0.3	86.1	13.6		
PHF	.722	.833	.600	.806	.767	.922	.250	.893	.794	.417	.725	.753	.375	.771	.693	.757	.860

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City of Brea
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Site Code : 10524132
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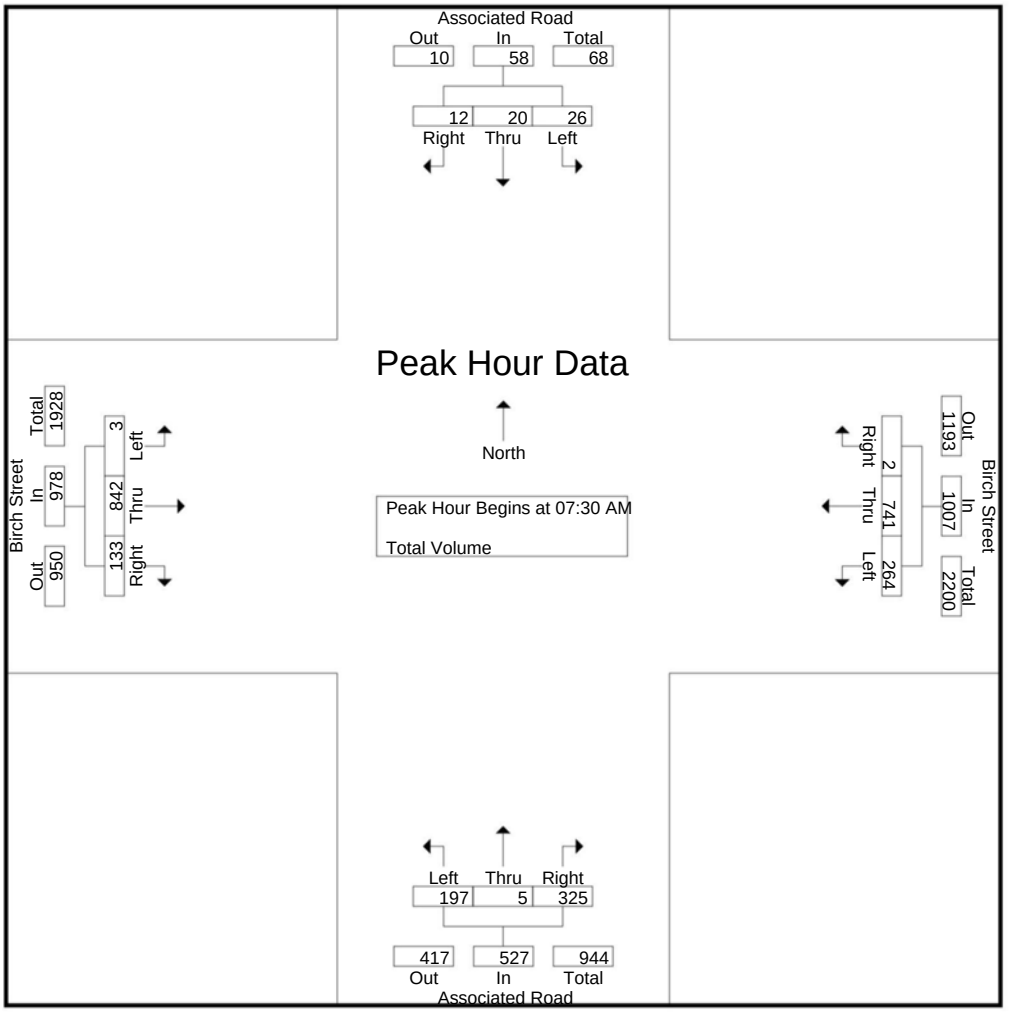

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:30 AM				07:30 AM			
+0 mins.	**9**	**13**	4	**26**	**86**	194	**2**	**282**	26	0	60	86	1	168	33	202
+15 mins.	7	5	4	16	72	**201**	0	273	55	1	77	133	0	202	25	227
+30 mins.	5	3	3	11	60	177	0	237	**62**	1	**112**	**175**	**2**	**273**	**48**	**323**
+45 mins.	7	6	**5**	18	46	169	0	215	54	**3**	76	133	0	199	27	226
Total Volume	28	27	16	71	264	741	2	1007	197	5	325	527	3	842	133	978
% App. Total	39.4	38	22.5		26.2	73.6	0.2		37.4	0.9	61.7		0.3	86.1	13.6	
PHF	.778	.519	.800	.683	.767	.922	.250	.893	.794	.417	.725	.753	.375	.771	.693	.757

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File Name : 02_BRE_Asd_Birch PM
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Groups Printed- Total Volume

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	3	1	1	5	56	208	4	268	91	5	70	166	2	238	55	295	734
04:15 PM	4	3	2	9	41	199	5	245	104	6	62	172	3	236	76	315	741
04:30 PM	4	1	1	6	72	245	4	321	78	6	56	140	3	237	73	313	780
04:45 PM	3	2	1	6	57	243	5	305	89	7	75	171	1	220	51	272	754
Total	14	7	5	26	226	895	18	1139	362	24	263	649	9	931	255	1195	3009
05:00 PM	6	3	4	13	57	254	5	316	89	6	76	171	3	260	64	327	827
05:15 PM	3	4	0	7	62	269	6	337	99	4	83	186	3	238	60	301	831
05:30 PM	5	4	4	13	47	246	8	301	84	4	72	160	1	265	58	324	798
05:45 PM	0	1	4	5	62	167	2	231	100	5	71	176	2	224	50	276	688
Total	14	12	12	38	228	936	21	1185	372	19	302	693	9	987	232	1228	3144
Grand Total	28	19	17	64	454	1831	39	2324	734	43	565	1342	18	1918	487	2423	6153
Apprch %	43.8	29.7	26.6		19.5	78.8	1.7		54.7	3.2	42.1		0.7	79.2	20.1		
Total %	0.5	0.3	0.3	1	7.4	29.8	0.6	37.8	11.9	0.7	9.2	21.8	0.3	31.2	7.9	39.4	

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	2	1	6	57	243	5	305	89	**7**	75	171	1	220	51	272	754
05:00 PM	**6**	3	**4**	**13**	57	254	5	316	89	6	76	171	**3**	260	**64**	**327**	827
05:15 PM	3	**4**	0	7	**62**	**269**	6	**337**	**99**	4	**83**	**186**	3	238	60	301	**831**
05:30 PM	5	4	4	13	47	246	**8**	301	84	4	72	160	1	**265**	58	324	798
Total Volume	17	13	9	39	223	1012	24	1259	361	21	306	688	8	983	233	1224	3210
% App. Total	43.6	33.3	23.1		17.7	80.4	1.9		52.5	3.1	44.5		0.7	80.3	19		
PHF	.708	.813	.563	.750	.899	.941	.750	.934	.912	.750	.922	.925	.667	.927	.910	.936	.966

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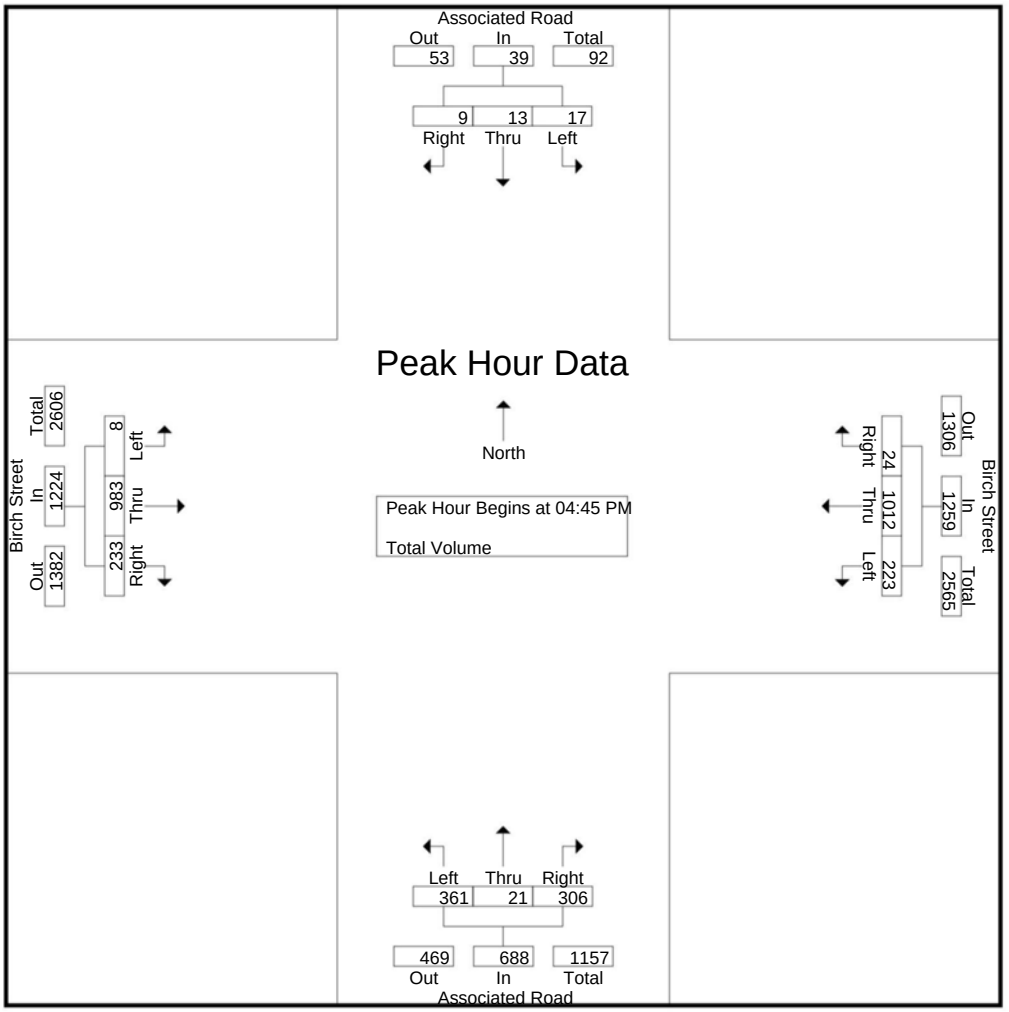

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:30 PM				05:00 PM				05:00 PM			
+0 mins.	3	2	1	6	**72**	245	4	321	89	**6**	76	171	**3**	260	**64**	**327**
+15 mins.	**6**	3	**4**	**13**	57	243	5	305	99	4	**83**	**186**	3	238	60	301
+30 mins.	3	**4**	0	7	57	254	5	316	84	4	72	160	1	**265**	58	324
+45 mins.	5	4	4	13	62	**269**	**6**	**337**	**100**	5	71	176	2	224	50	276
Total Volume	17	13	9	39	248	1011	20	1279	372	19	302	693	9	987	232	1228
% App. Total	43.6	33.3	23.1		19.4	79	1.6		53.7	2.7	43.6		0.7	80.4	18.9	
PHF	.708	.813	.563	.750	.861	.940	.833	.949	.930	.792	.910	.931	.750	.931	.906	.939

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Groups Printed- Total Volume

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	2	6	1	9	35	146	3	184	63	1	23	87	3	171	64	238	518
12:15 PM	4	4	5	13	29	153	1	183	61	1	31	93	0	157	70	227	516
12:30 PM	5	4	4	13	30	135	0	165	70	5	25	100	1	134	60	195	473
12:45 PM	4	5	1	10	36	170	3	209	65	1	30	96	1	152	84	237	552
Total	15	19	11	45	130	604	7	741	259	8	109	376	5	614	278	897	2059
01:00 PM	6	4	2	12	32	154	1	187	65	3	25	93	1	183	68	252	544
01:15 PM	1	2	1	4	25	140	2	167	74	5	37	116	1	167	67	235	522
01:30 PM	4	3	1	8	29	135	2	166	76	3	33	112	2	167	62	231	517
01:45 PM	3	7	2	12	29	140	1	170	75	1	36	112	1	169	74	244	538
Total	14	16	6	36	115	569	6	690	290	12	131	433	5	686	271	962	2121
02:00 PM	3	5	4	12	26	150	4	180	78	3	26	107	1	179	73	253	552
02:15 PM	1	5	2	8	26	149	1	176	73	4	48	125	2	153	73	228	537
02:30 PM	7	2	4	13	24	131	2	157	72	8	25	105	2	139	65	206	481
02:45 PM	5	3	6	14	27	133	2	162	59	2	31	92	3	179	60	242	510
Total	16	15	16	47	103	563	9	675	282	17	130	429	8	650	271	929	2080
Grand Total	45	50	33	128	348	1736	22	2106	831	37	370	1238	18	1950	820	2788	6260
Apprch %	35.2	39.1	25.8		16.5	82.4	1		67.1	3	29.9		0.6	69.9	29.4		
Total %	0.7	0.8	0.5	2	5.6	27.7	0.4	33.6	13.3	0.6	5.9	19.8	0.3	31.2	13.1	44.5	

	Associated Road Southbound				Birch Street Westbound				Associated Road Northbound				Birch Street Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	**4**	3	1	8	**29**	135	2	166	76	3	33	112	**2**	167	62	231	517
01:45 PM	3	**7**	2	**12**	29	140	1	170	75	1	36	112	1	169	**74**	244	538
02:00 PM	3	5	**4**	12	26	**150**	**4**	**180**	**78**	3	26	107	1	**179**	73	**253**	**552**
02:15 PM	1	5	2	8	26	149	1	176	73	**4**	**48**	**125**	2	153	73	228	537
Total Volume	11	20	9	40	110	574	8	692	302	11	143	456	6	668	282	956	2144
% App. Total	27.5	50	22.5		15.9	82.9	1.2		66.2	2.4	31.4		0.6	69.9	29.5		
PHF	.688	.714	.563	.833	.948	.957	.500	.961	.968	.688	.745	.912	.750	.933	.953	.945	.971

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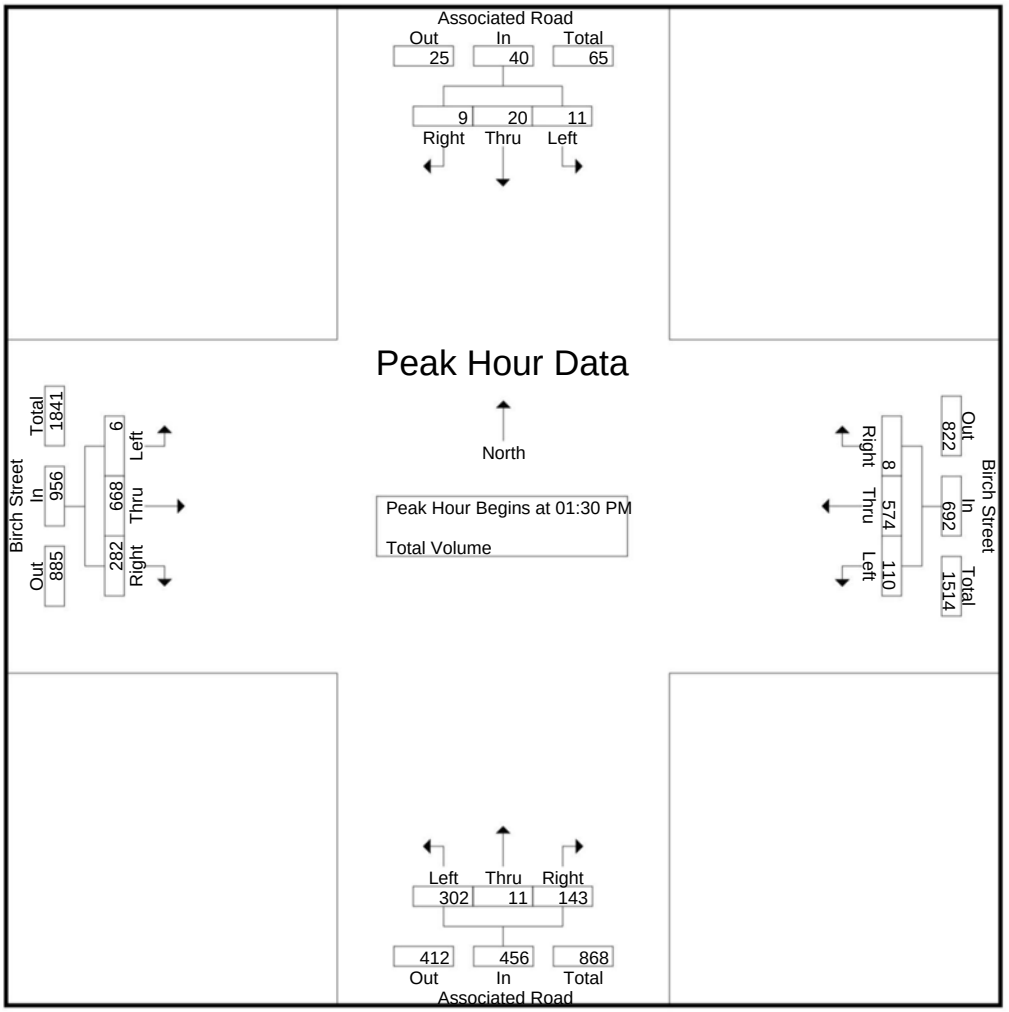
City of Brea
N/S: Associated Road
E/W: Birch Street
Weather: Clear

File Name : 02_BRE_Asd_Birch SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 2



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:15 PM				12:15 PM				01:30 PM				01:15 PM			
+0 mins.	4	4	**5**	**13**	29	153	1	183	76	3	33	112	1	167	67	235
+15 mins.	5	4	4	13	30	135	0	165	75	1	36	112	**2**	167	62	231
+30 mins.	4	**5**	1	10	**36**	**170**	**3**	**209**	**78**	3	26	107	1	169	**74**	244
+45 mins.	**6**	4	2	12	32	154	1	187	73	**4**	**48**	**125**	1	**179**	73	**253**
Total Volume	19	17	12	48	127	612	5	744	302	11	143	456	5	682	276	963
% App. Total	39.6	35.4	25		17.1	82.3	0.7		66.2	2.4	31.4		0.5	70.8	28.7	
PHF	.792	.850	.600	.923	.882	.900	.417	.890	.968	.688	.745	.912	.625	.953	.932	.952

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City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	119	0	120	13	0	4	17	3	65	2	70	1	0	10	11	218
07:15 AM	1	68	2	71	8	1	2	11	1	73	2	76	3	0	4	7	165
07:30 AM	4	117	1	122	10	0	8	18	6	67	2	75	2	1	12	15	230
07:45 AM	2	100	2	104	10	1	11	22	2	85	1	88	2	0	6	8	222
Total	8	404	5	417	41	2	25	68	12	290	7	309	8	1	32	41	835
08:00 AM	3	105	1	109	4	0	11	15	3	98	1	102	2	0	8	10	236
08:15 AM	4	85	0	89	6	0	7	13	1	78	1	80	2	0	5	7	189
08:30 AM	6	107	1	114	8	1	12	21	2	55	1	58	0	1	4	5	198
08:45 AM	7	110	0	117	6	0	9	15	7	76	5	88	3	1	9	13	233
Total	20	407	2	429	24	1	39	64	13	307	8	328	7	2	26	35	856
Grand Total	28	811	7	846	65	3	64	132	25	597	15	637	15	3	58	76	1691
Apprch %	3.3	95.9	0.8		49.2	2.3	48.5		3.9	93.7	2.4		19.7	3.9	76.3		
Total %	1.7	48	0.4	50	3.8	0.2	3.8	7.8	1.5	35.3	0.9	37.7	0.9	0.2	3.4	4.5	

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**4**	**117**	1	**122**	**10**	0	8	18	**6**	67	**2**	75	**2**	**1**	**12**	**15**	230
07:45 AM	2	100	**2**	104	10	**1**	**11**	**22**	2	85	1	88	2	0	6	8	222
08:00 AM	3	105	1	109	4	0	11	15	3	**98**	1	**102**	2	0	8	10	**236**
08:15 AM	4	85	0	89	6	0	7	13	1	78	1	80	2	0	5	7	189
Total Volume	13	407	4	424	30	1	37	68	12	328	5	345	8	1	31	40	877
% App. Total	3.1	96	0.9		44.1	1.5	54.4		3.5	95.1	1.4		20	2.5	77.5		
PHF	.813	.870	.500	.869	.750	.250	.841	.773	.500	.837	.625	.846	1.00	.250	.646	.667	.929

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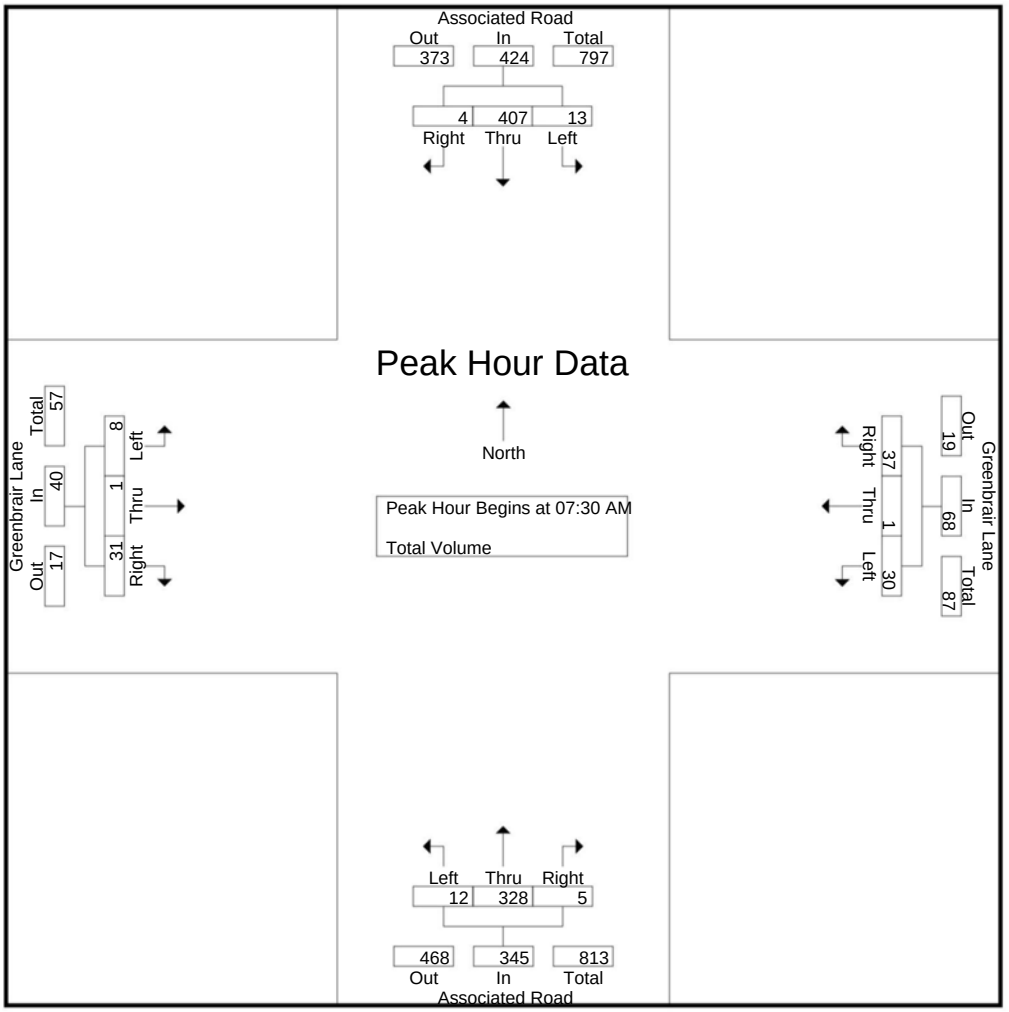
City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:45 AM				07:30 AM				07:00 AM			
+0 mins.	3	105	**1**	109	**10**	**1**	11	**22**	**6**	67	**2**	75	1	0	10	11
+15 mins.	4	85	0	89	4	0	11	15	2	85	1	88	**3**	0	4	7
+30 mins.	6	107	1	114	6	0	7	13	3	**98**	1	**102**	2	**1**	**12**	**15**
+45 mins.	**7**	**110**	0	**117**	8	1	**12**	21	1	78	1	80	2	0	6	8
Total Volume	20	407	2	429	28	2	41	71	12	328	5	345	8	1	32	41
% App. Total	4.7	94.9	0.5		39.4	2.8	57.7		3.5	95.1	1.4		19.5	2.4	78	
PHF	.714	.925	.500	.917	.700	.500	.854	.807	.500	.837	.625	.846	.667	.250	.667	.683

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City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	4	102	2	108	3	2	12	17	6	122	1	129	3	1	5	9	263
04:15 PM	1	107	0	108	6	0	8	14	9	130	6	145	3	0	3	6	273
04:30 PM	6	134	0	140	8	8	8	24	10	125	5	140	2	2	6	10	314
04:45 PM	5	104	1	110	1	0	7	8	7	130	7	144	3	1	4	8	270
Total	16	447	3	466	18	10	35	63	32	507	19	558	11	4	18	33	1120
05:00 PM	6	118	1	125	3	0	14	17	1	144	9	154	3	1	4	8	304
05:15 PM	7	112	1	120	1	2	7	10	2	150	8	160	0	0	1	1	291
05:30 PM	4	107	0	111	2	3	9	14	7	152	6	165	2	0	3	5	295
05:45 PM	2	105	1	108	5	3	8	16	6	151	5	162	1	0	2	3	289
Total	19	442	3	464	11	8	38	57	16	597	28	641	6	1	10	17	1179
Grand Total	35	889	6	930	29	18	73	120	48	1104	47	1199	17	5	28	50	2299
Apprch %	3.8	95.6	0.6		24.2	15	60.8		4	92.1	3.9		34	10	56		
Total %	1.5	38.7	0.3	40.5	1.3	0.8	3.2	5.2	2.1	48	2	52.2	0.7	0.2	1.2	2.2	

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	6	**134**	0	**140**	**8**	**8**	8	**24**	**10**	125	5	140	2	**2**	**6**	**10**	**314**
04:45 PM	5	104	**1**	110	1	0	7	8	7	130	7	144	**3**	1	4	8	270
05:00 PM	6	118	1	125	3	0	**14**	17	1	144	**9**	154	3	1	4	8	304
05:15 PM	**7**	112	1	120	1	2	7	10	2	**150**	8	**160**	0	0	1	1	291
Total Volume	24	468	3	495	13	10	36	59	20	549	29	598	8	4	15	27	1179
% App. Total	4.8	94.5	0.6		22	16.9	61		3.3	91.8	4.8		29.6	14.8	55.6		
PHF	.857	.873	.750	.884	.406	.313	.643	.615	.500	.915	.806	.934	.667	.500	.625	.675	.939

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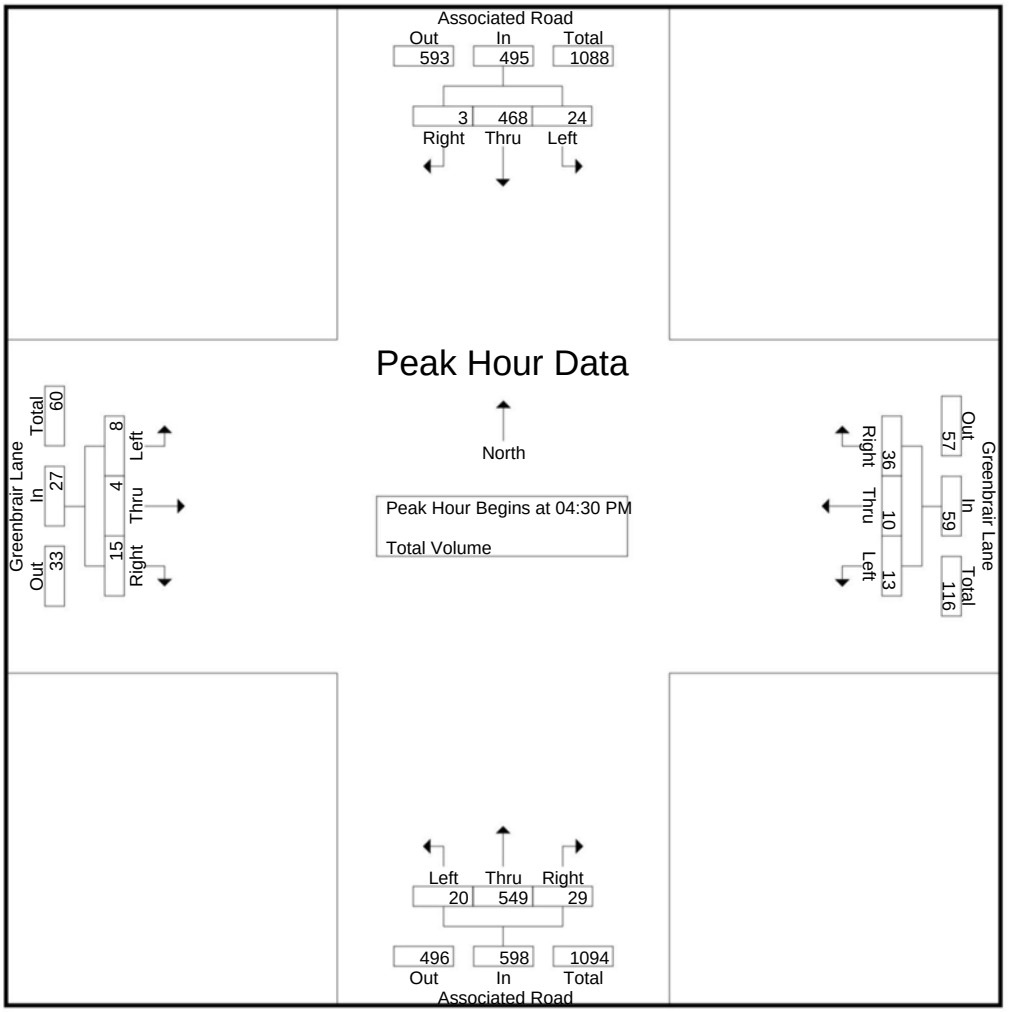
City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:00 PM				05:00 PM				04:00 PM			
+0 mins.	6	**134**	0	**140**	3	2	**12**	17	1	144	**9**	154	**3**	1	5	9
+15 mins.	5	104	**1**	110	6	0	8	14	2	150	8	160	3	0	3	6
+30 mins.	6	118	1	125	**8**	**8**	8	**24**	**7**	**152**	6	**165**	2	**2**	**6**	**10**
+45 mins.	**7**	112	1	120	1	0	7	8	6	151	5	162	3	1	4	8
Total Volume	24	468	3	495	18	10	35	63	16	597	28	641	11	4	18	33
% App. Total	4.8	94.5	0.6		28.6	15.9	55.6		2.5	93.1	4.4		33.3	12.1	54.5	
PHF	.857	.873	.750	.884	.563	.313	.729	.656	.571	.982	.778	.971	.917	.500	.750	.825

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City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	4	104	0	108	10	1	5	16	1	80	4	85	0	0	4	4	213
12:15 PM	3	93	0	96	5	5	4	14	2	91	8	101	0	0	6	6	217
12:30 PM	4	89	4	97	8	0	8	16	9	93	3	105	3	0	2	5	223
12:45 PM	7	109	2	118	4	1	4	9	7	92	3	102	2	1	4	7	236
Total	18	395	6	419	27	7	21	55	19	356	18	393	5	1	16	22	889
01:00 PM	2	99	1	102	9	1	6	16	1	91	4	96	4	1	7	12	226
01:15 PM	2	87	1	90	7	0	6	13	2	104	6	112	2	2	4	8	223
01:30 PM	0	98	0	98	4	2	6	12	6	105	4	115	2	0	7	9	234
01:45 PM	0	111	1	112	2	4	5	11	2	103	4	109	2	0	7	9	241
Total	4	395	3	402	22	7	23	52	11	403	18	432	10	3	25	38	924
02:00 PM	2	98	2	102	6	4	7	17	7	104	7	118	2	0	4	6	243
02:15 PM	4	94	0	98	6	1	4	11	5	113	5	123	1	0	9	10	242
02:30 PM	4	93	1	98	1	0	4	5	3	92	7	102	0	0	3	3	208
02:45 PM	1	85	1	87	3	0	4	7	3	84	5	92	0	0	2	2	188
Total	11	370	4	385	16	5	19	40	18	393	24	435	3	0	18	21	881
Grand Total	33	1160	13	1206	65	19	63	147	48	1152	60	1260	18	4	59	81	2694
Apprch %	2.7	96.2	1.1		44.2	12.9	42.9		3.8	91.4	4.8		22.2	4.9	72.8		
Total %	1.2	43.1	0.5	44.8	2.4	0.7	2.3	5.5	1.8	42.8	2.2	46.8	0.7	0.1	2.2	3	

	Associated Road Southbound				Greenbrair Lane Westbound				Associated Road Northbound				Greenbrair Lane Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:30 PM																	
01:30 PM	0	98	0	98	4	2	6	12	6	105	4	115	**2**	0	7	9	234
01:45 PM	0	**111**	1	**112**	2	**4**	5	11	2	103	4	109	2	0	7	9	241
02:00 PM	2	98	**2**	102	**6**	4	**7**	**17**	**7**	104	**7**	118	2	0	4	6	**243**
02:15 PM	**4**	94	0	98	6	1	4	11	5	**113**	5	**123**	1	0	**9**	**10**	242
Total Volume	6	401	3	410	18	11	22	51	20	425	20	465	7	0	27	34	960
% App. Total	1.5	97.8	0.7		35.3	21.6	43.1		4.3	91.4	4.3		20.6	0	79.4		
PHF	.375	.903	.375	.915	.750	.688	.786	.750	.714	.940	.714	.945	.875	.000	.750	.850	.988

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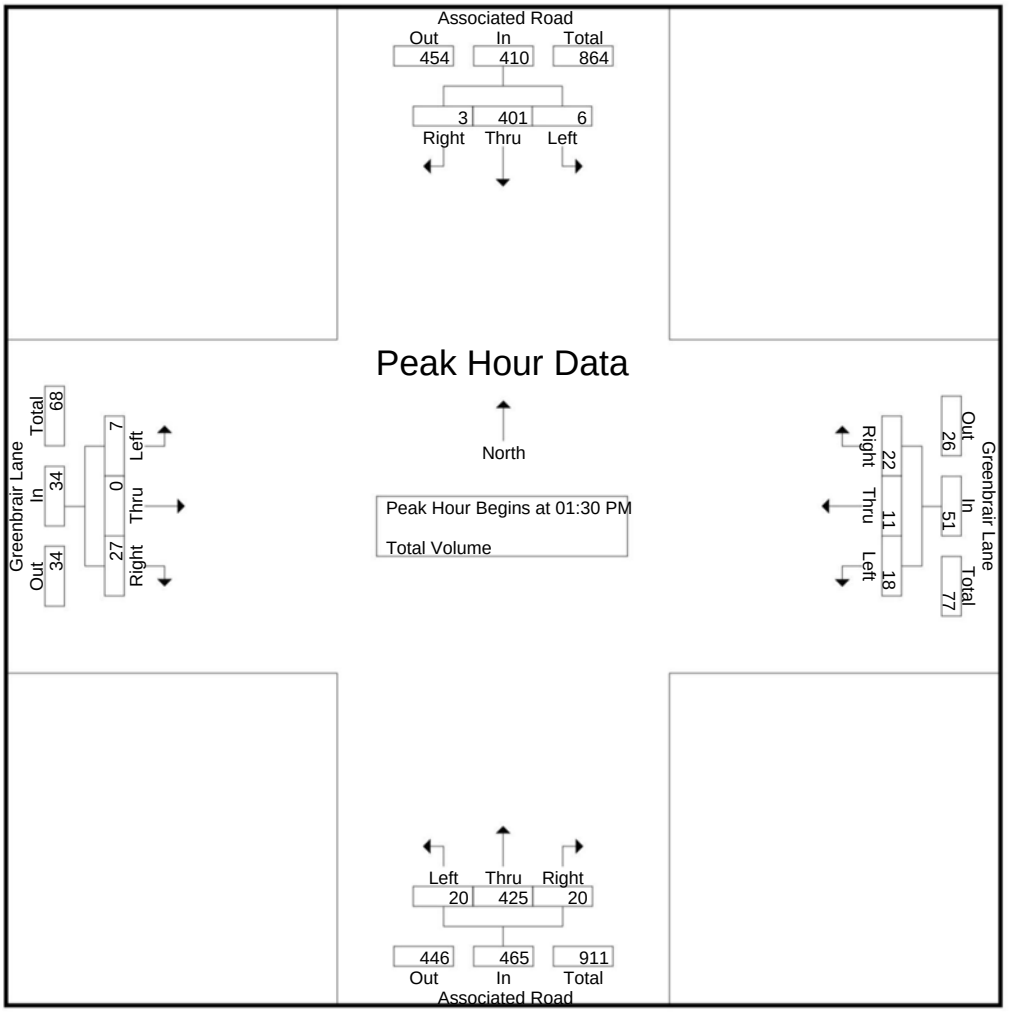
City of Brea
N/S: Associated Road
E/W: Greenbrair Lane
Weather: Clear

File Name : 03_BRE_Asd_Green SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 2



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM				12:00 PM				01:30 PM				01:00 PM			
+0 mins.	4	104	0	108	**10**	1	5	**16**	6	105	4	115	**4**	1	**7**	**12**
+15 mins.	3	93	0	96	5	**5**	4	14	2	103	4	109	2	**2**	4	8
+30 mins.	4	89	**4**	97	8	0	**8**	16	**7**	104	**7**	118	2	0	7	9
+45 mins.	**7**	**109**	2	**118**	4	1	4	9	5	**113**	5	**123**	2	0	7	9
Total Volume	18	395	6	419	27	7	21	55	20	425	20	465	10	3	25	38
% App. Total	4.3	94.3	1.4		49.1	12.7	38.2		4.3	91.4	4.3		26.3	7.9	65.8	
PHF	.643	.906	.375	.888	.675	.350	.656	.859	.714	.940	.714	.945	.625	.375	.893	.792

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City of Brea
N/S: Associated Road
E/W: Driveway
Weather: Clear

File Name : 04_BRE_Asd_DW AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
07:00 AM	122	18	140	11	59	70	9	15	24	234
07:15 AM	69	9	78	8	70	78	10	8	18	174
07:30 AM	116	19	135	5	60	65	12	17	29	229
07:45 AM	105	12	117	12	73	85	15	17	32	234
Total	412	58	470	36	262	298	46	57	103	871
08:00 AM	102	16	118	10	84	94	17	18	35	247
08:15 AM	81	14	95	15	65	80	15	16	31	206
08:30 AM	96	16	112	12	46	58	13	20	33	203
08:45 AM	104	21	125	12	77	89	10	28	38	252
Total	383	67	450	49	272	321	55	82	137	908
Grand Total	795	125	920	85	534	619	101	139	240	1779
Apprch %	86.4	13.6		13.7	86.3		42.1	57.9		
Total %	44.7	7	51.7	4.8	30	34.8	5.7	7.8	13.5	

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	**116**	**19**	**135**	5	60	65	12	17	29	229
07:45 AM	105	12	117	12	73	85	15	17	32	234
08:00 AM	102	16	118	10	**84**	**94**	**17**	**18**	**35**	**247**
08:15 AM	81	14	95	**15**	65	80	15	16	31	206
Total Volume	404	61	465	42	282	324	59	68	127	916
% App. Total	86.9	13.1		13	87		46.5	53.5		
PHF	.871	.803	.861	.700	.839	.862	.868	.944	.907	.927

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City of Brea
N/S: Associated Road
E/W: Driveway
Weather: Clear

File Name : 04_BRE_Asd_DW AM
Site Code : 10524132
Start Date : 2/13/2024
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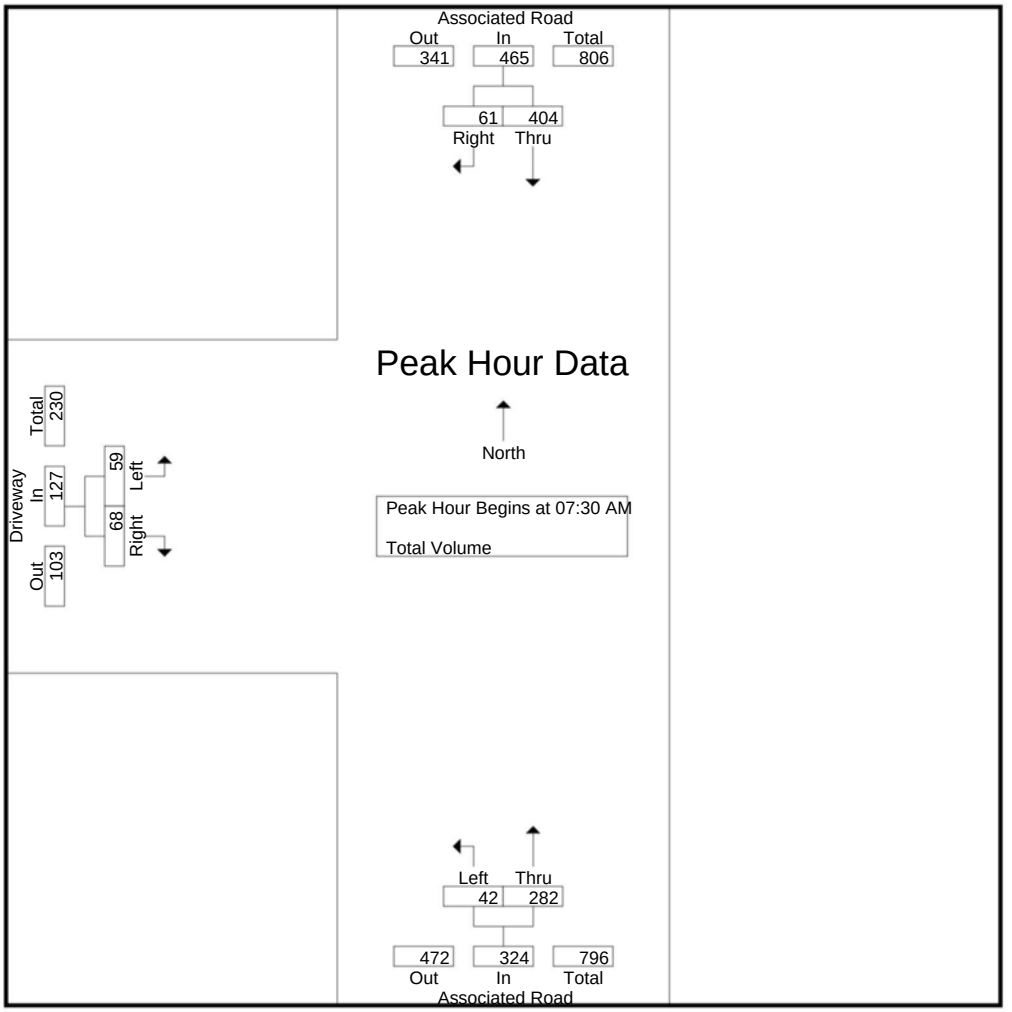

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:30 AM			08:00 AM		
+0 mins.	**122**	18	**140**	5	60	65	**17**	18	35
+15 mins.	69	9	78	12	73	85	15	16	31
+30 mins.	116	**19**	135	10	**84**	**94**	13	20	33
+45 mins.	105	12	117	**15**	65	80	10	**28**	**38**
Total Volume	412	58	470	42	282	324	55	82	137
% App. Total	87.7	12.3		13	87		40.1	59.9	
PHF	.844	.763	.839	.700	.839	.862	.809	.732	.901

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File Name : 04_BRE_Asd_DW PM
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Groups Printed- Total Volume

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
04:00 PM	96	11	107	33	109	142	20	50	70	319
04:15 PM	97	24	121	15	128	143	20	42	62	326
04:30 PM	120	18	138	24	116	140	23	40	63	341
04:45 PM	89	26	115	24	118	142	27	46	73	330
Total	402	79	481	96	471	567	90	178	268	1316
05:00 PM	109	17	126	25	131	156	25	49	74	356
05:15 PM	88	23	111	27	129	156	29	46	75	342
05:30 PM	93	21	114	19	138	157	32	44	76	347
05:45 PM	77	34	111	24	134	158	23	42	65	334
Total	367	95	462	95	532	627	109	181	290	1379
Grand Total	769	174	943	191	1003	1194	199	359	558	2695
Apprch %	81.5	18.5		16	84		35.7	64.3		
Total %	28.5	6.5	35	7.1	37.2	44.3	7.4	13.3	20.7	

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	**109**	17	**126**	25	131	156	25	**49**	74	**356**
05:15 PM	88	23	111	**27**	129	156	29	46	75	342
05:30 PM	93	21	114	19	**138**	157	**32**	44	**76**	347
05:45 PM	77	**34**	111	24	134	**158**	23	42	65	334
Total Volume	367	95	462	95	532	627	109	181	290	1379
% App. Total	79.4	20.6		15.2	84.8		37.6	62.4		
PHF	.842	.699	.917	.880	.964	.992	.852	.923	.954	.968

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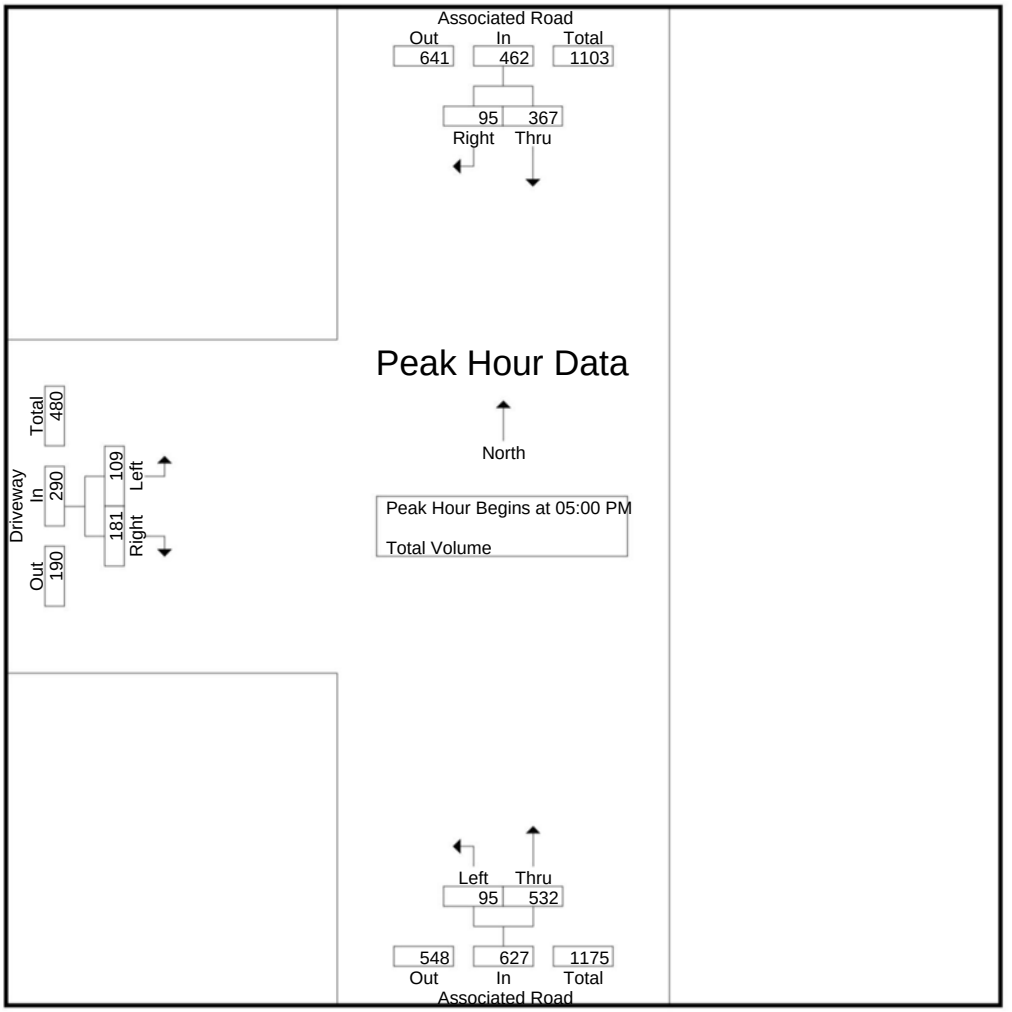

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM			05:00 PM			04:45 PM		
+0 mins.	97	24	121	25	131	156	27	46	73
+15 mins.	**120**	18	**138**	**27**	129	156	25	**49**	74
+30 mins.	89	**26**	115	19	**138**	157	29	46	75
+45 mins.	109	17	126	24	134	**158**	**32**	44	**76**
Total Volume	415	85	500	95	532	627	113	185	298
% App. Total	83	17		15.2	84.8		37.9	62.1	
PHF	.865	.817	.906	.880	.964	.992	.883	.944	.980

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Site Code : 10524132
Start Date : 2/10/2024
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Groups Printed- Total Volume

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
12:00 PM	71	38	109	30	68	98	34	39	73	280
12:15 PM	74	35	109	21	64	85	43	61	104	298
12:30 PM	77	33	110	20	77	97	34	43	77	284
12:45 PM	75	26	101	18	66	84	46	54	100	285
Total	297	132	429	89	275	364	157	197	354	1147
01:00 PM	69	25	94	24	61	85	23	40	63	242
01:15 PM	72	27	99	24	84	108	25	52	77	284
01:30 PM	84	21	105	20	67	87	27	51	78	270
01:45 PM	64	22	86	24	81	105	24	47	71	262
Total	289	95	384	92	293	385	99	190	289	1058
02:00 PM	89	25	114	19	76	95	16	60	76	285
02:15 PM	107	25	132	19	83	102	21	49	70	304
02:30 PM	87	23	110	23	118	141	28	41	69	320
02:45 PM	74	15	89	26	105	131	31	57	88	308
Total	357	88	445	87	382	469	96	207	303	1217
Grand Total	943	315	1258	268	950	1218	352	594	946	3422
Apprch %	75	25		22	78		37.2	62.8		
Total %	27.6	9.2	36.8	7.8	27.8	35.6	10.3	17.4	27.6	

	Associated Road Southbound			Associated Road Northbound			Driveway Eastbound			
Start Time	Thru	Right	App. Total	Left	Thru	App. Total	Left	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 02:00 PM										
02:00 PM	89	**25**	114	19	76	95	16	**60**	76	285
02:15 PM	**107**	25	**132**	19	83	102	21	49	70	304
02:30 PM	87	23	110	23	**118**	**141**	28	41	69	**320**
02:45 PM	74	15	89	**26**	105	131	**31**	57	**88**	308
Total Volume	357	88	445	87	382	469	96	207	303	1217
% App. Total	80.2	19.8		18.6	81.4		31.7	68.3		
PHF	.834	.880	.843	.837	.809	.832	.774	.863	.861	.951

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File Name : 04_BRE_Asd_DW SAT
Site Code : 10524132
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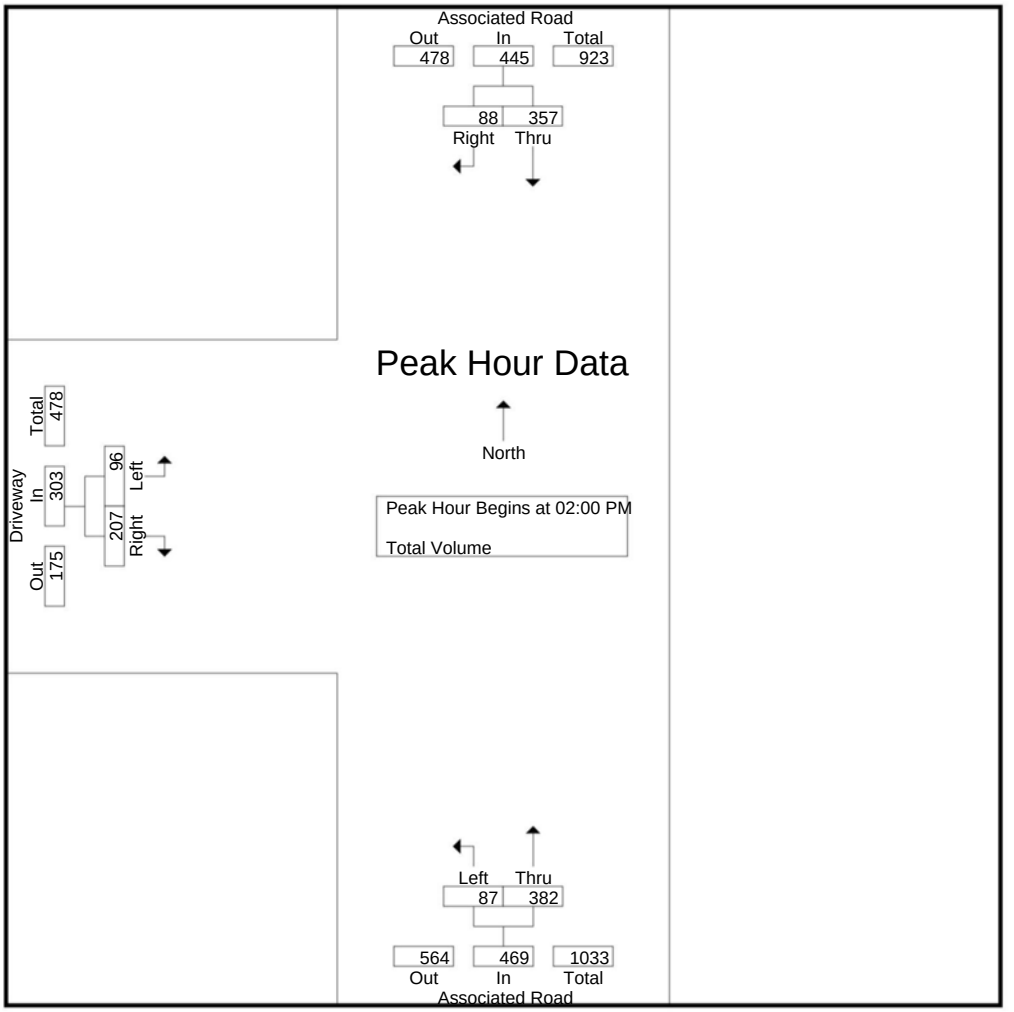

Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	02:00 PM			02:00 PM			12:00 PM		
+0 mins.	89	**25**	114	19	76	95	34	39	73
+15 mins.	**107**	25	**132**	19	83	102	43	**61**	**104**
+30 mins.	87	23	110	23	**118**	**141**	34	43	77
+45 mins.	74	15	89	**26**	105	131	**46**	54	100
Total Volume	357	88	445	87	382	469	157	197	354
% App. Total	80.2	19.8		18.6	81.4		44.4	55.6	
PHF	.834	.880	.843	.837	.809	.832	.853	.807	.851

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City of Brea
N/S: SR-57 Northbound Off Ramp
E/W: Imperial Highway
Weather: Clear

File Name : 05_BRE_57N Off_Imp AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	17	17	0	261	1	262	159	7	163	329	12	249	120	381	989
07:15 AM	0	0	21	21	0	288	3	291	184	13	148	345	15	329	144	488	1145
07:30 AM	0	0	19	19	0	367	1	368	228	12	176	416	14	332	109	455	1258
07:45 AM	0	0	13	13	0	372	2	374	282	21	183	486	18	358	99	475	1348
Total	0	0	70	70	0	1288	7	1295	853	53	670	1576	59	1268	472	1799	4740
08:00 AM	0	0	29	29	0	325	5	330	201	20	172	393	11	319	104	434	1186
08:15 AM	0	0	19	19	0	379	1	380	178	10	173	361	23	309	122	454	1214
08:30 AM	1	0	26	27	0	325	3	328	217	13	193	423	18	304	102	424	1202
08:45 AM	0	0	19	19	0	353	5	358	239	21	210	470	23	275	116	414	1261
Total	1	0	93	94	0	1382	14	1396	835	64	748	1647	75	1207	444	1726	4863
Grand Total	1	0	163	164	0	2670	21	2691	1688	117	1418	3223	134	2475	916	3525	9603
Apprch %	0.6	0	99.4		0	99.2	0.8		52.4	3.6	44		3.8	70.2	26		
Total %	0	0	1.7	1.7	0	27.8	0.2	28	17.6	1.2	14.8	33.6	1.4	25.8	9.5	36.7	

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	19	19	0	367	1	368	228	12	176	416	14	332	109	455	1258
07:45 AM	0	0	13	13	0	372	2	374	**282**	**21**	**183**	**486**	18	**358**	99	**475**	**1348**
08:00 AM	0	0	**29**	**29**	0	325	**5**	330	201	20	172	393	11	319	104	434	1186
08:15 AM	0	0	19	19	0	**379**	1	**380**	178	10	173	361	**23**	309	**122**	454	1214
Total Volume	0	0	80	80	0	1443	9	1452	889	63	704	1656	66	1318	434	1818	5006
% App. Total	0	0	100		0	99.4	0.6		53.7	3.8	42.5		3.6	72.5	23.9		
PHF	.000	.000	.690	.690	.000	.952	.450	.955	.788	.750	.962	.852	.717	.920	.889	.957	.928

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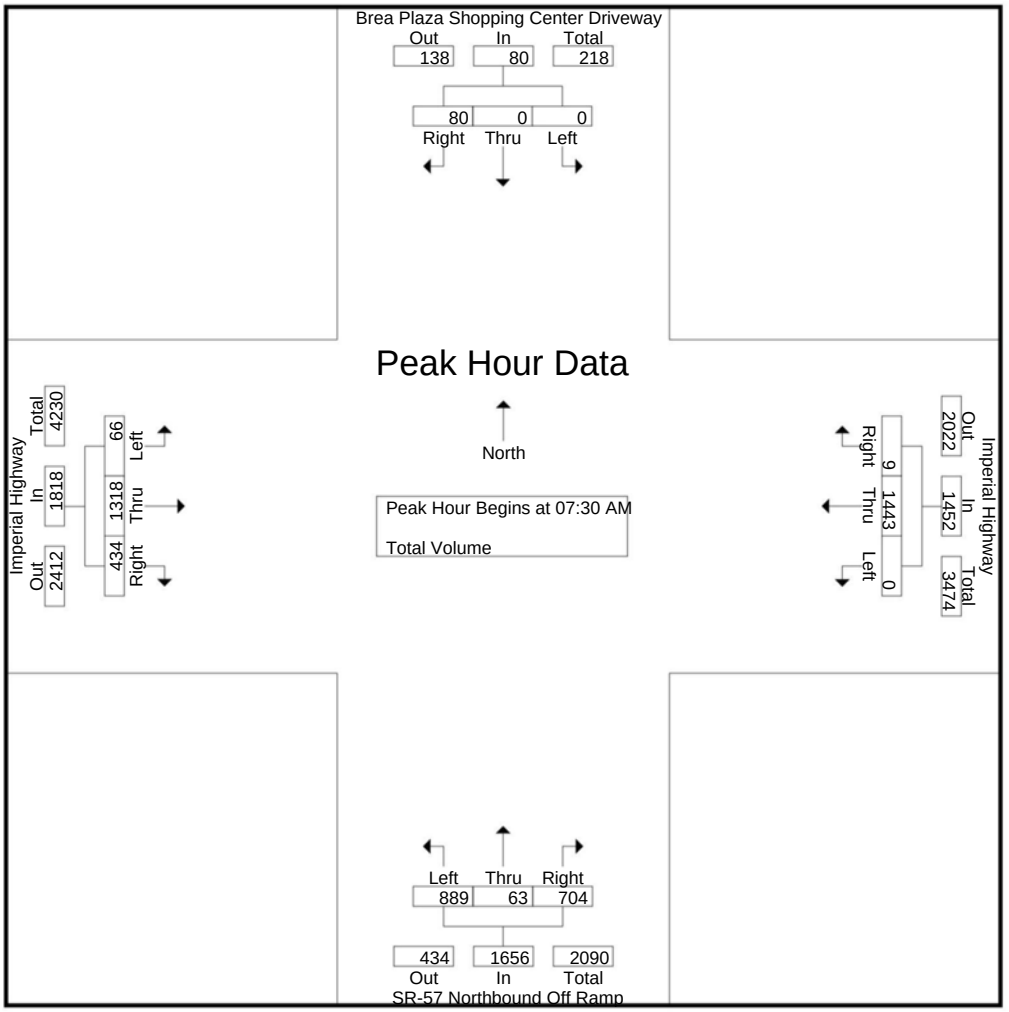

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM				07:30 AM				07:45 AM				07:15 AM			
+0 mins.	0	0	**29**	**29**	0	367	1	368	**282**	**21**	183	**486**	15	329	**144**	**488**
+15 mins.	0	0	19	19	0	372	2	374	201	20	172	393	14	332	109	455
+30 mins.	**1**	0	26	27	0	325	**5**	330	178	10	173	361	**18**	**358**	99	475
+45 mins.	0	0	19	19	0	**379**	1	**380**	217	13	**193**	423	11	319	104	434
Total Volume	1	0	93	94	0	1443	9	1452	878	64	721	1663	58	1338	456	1852
% App. Total	1.1	0	98.9		0	99.4	0.6		52.8	3.8	43.4		3.1	72.2	24.6	
PHF	.250	.000	.802	.810	.000	.952	.450	.955	.778	.762	.934	.855	.806	.934	.792	.949

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Weather: Clear

File Name : 05_BRE_57N Off_Imp PM
Site Code : 10524132
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Groups Printed- Total Volume

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	57	57	0	373	9	382	243	24	151	418	37	349	71	457	1314
04:15 PM	0	0	53	53	0	375	8	383	283	25	129	437	43	424	55	522	1395
04:30 PM	0	0	36	36	0	365	9	374	294	23	114	431	30	361	44	435	1276
04:45 PM	0	0	37	37	0	368	10	378	268	29	168	465	42	375	61	478	1358
Total	0	0	183	183	0	1481	36	1517	1088	101	562	1751	152	1509	231	1892	5343
05:00 PM	0	0	51	51	0	364	9	373	271	24	166	461	44	324	56	424	1309
05:15 PM	0	0	58	58	0	404	5	409	301	27	149	477	32	356	48	436	1380
05:30 PM	1	0	50	51	0	397	8	405	265	15	140	420	56	369	65	490	1366
05:45 PM	0	0	37	37	0	352	14	366	274	14	146	434	45	374	53	472	1309
Total	1	0	196	197	0	1517	36	1553	1111	80	601	1792	177	1423	222	1822	5364
Grand Total	1	0	379	380	0	2998	72	3070	2199	181	1163	3543	329	2932	453	3714	10707
Apprch %	0.3	0	99.7		0	97.7	2.3		62.1	5.1	32.8		8.9	78.9	12.2		
Total %	0	0	3.5	3.5	0	28	0.7	28.7	20.5	1.7	10.9	33.1	3.1	27.4	4.2	34.7	

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	37	37	0	368	**10**	378	268	**29**	**168**	465	42	**375**	61	478	1358
05:00 PM	0	0	51	51	0	364	9	373	271	24	166	461	44	324	56	424	1309
05:15 PM	0	0	**58**	**58**	0	**404**	5	**409**	**301**	27	149	**477**	32	356	48	436	**1380**
05:30 PM	**1**	0	50	51	0	397	8	405	265	15	140	420	**56**	369	**65**	**490**	1366
Total Volume	1	0	196	197	0	1533	32	1565	1105	95	623	1823	174	1424	230	1828	5413
% App. Total	0.5	0	99.5		0	98	2		60.6	5.2	34.2		9.5	77.9	12.6		
PHF	.250	.000	.845	.849	.000	.949	.800	.957	.918	.819	.927	.955	.777	.949	.885	.933	.981

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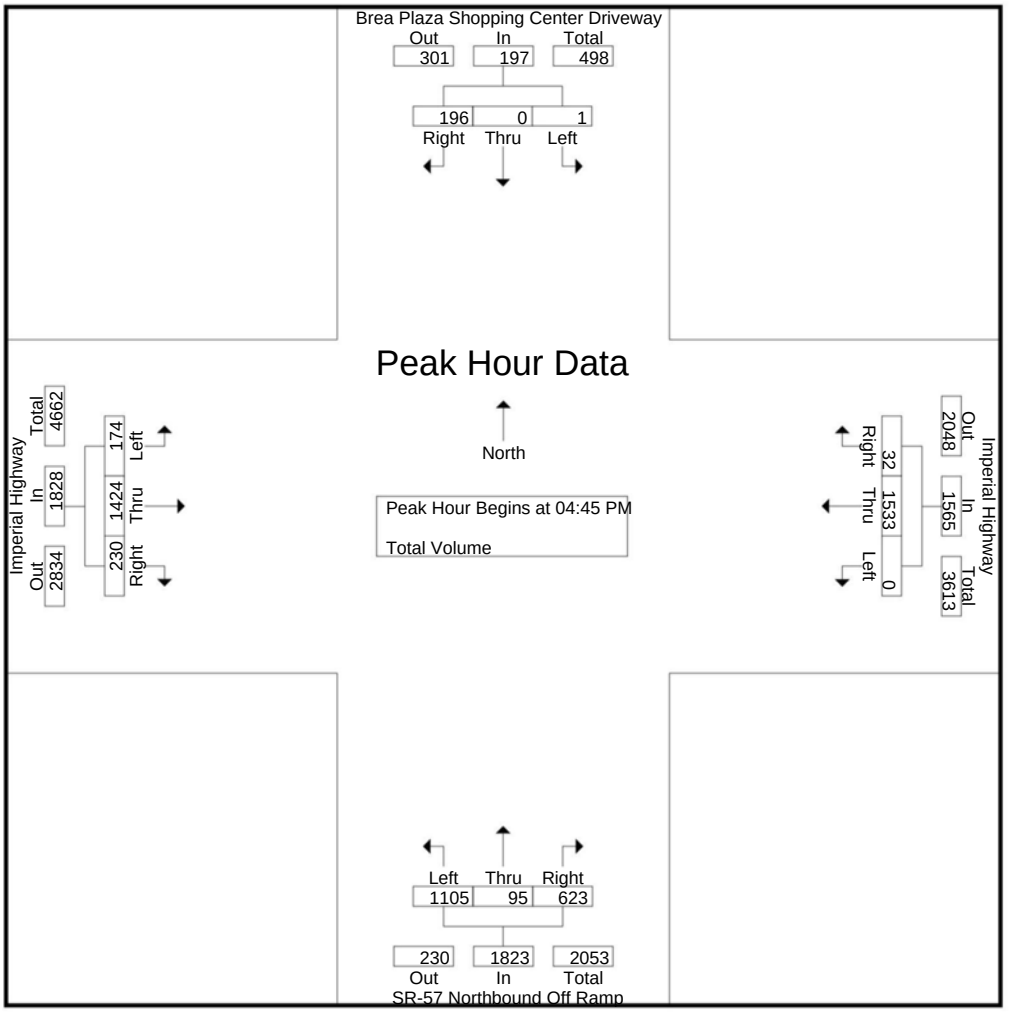

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM				04:45 PM				04:30 PM				04:00 PM			
+0 mins.	0	0	37	37	0	368	**10**	378	294	23	114	431	37	349	**71**	457
+15 mins.	0	0	51	51	0	364	9	373	268	**29**	**168**	465	**43**	**424**	55	**522**
+30 mins.	0	0	**58**	**58**	0	**404**	5	**409**	271	24	166	461	30	361	44	435
+45 mins.	**1**	0	50	51	0	397	8	405	**301**	27	149	**477**	42	375	61	478
Total Volume	1	0	196	197	0	1533	32	1565	1134	103	597	1834	152	1509	231	1892
% App. Total	0.5	0	99.5		0	98	2		61.8	5.6	32.6		8	79.8	12.2	
PHF	.250	.000	.845	.849	.000	.949	.800	.957	.942	.888	.888	.961	.884	.890	.813	.906

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File Name : 05_BRE_57N Off_Imp SAT
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Groups Printed- Total Volume

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	0	0	62	62	0	394	15	409	227	32	107	366	51	297	120	468	1305
12:15 PM	0	0	67	67	0	362	10	372	255	31	130	416	69	338	93	500	1355
12:30 PM	0	0	63	63	0	370	12	382	262	37	137	436	59	325	82	466	1347
12:45 PM	0	0	62	62	0	405	18	423	275	27	92	394	36	315	74	425	1304
Total	0	0	254	254	0	1531	55	1586	1019	127	466	1612	215	1275	369	1859	5311
01:00 PM	0	0	63	63	0	421	6	427	264	40	127	431	66	337	112	515	1436
01:15 PM	0	0	70	70	0	389	7	396	235	32	137	404	55	312	106	473	1343
01:30 PM	0	0	66	66	0	392	7	399	255	34	109	398	48	325	105	478	1341
01:45 PM	0	0	70	70	0	378	11	389	252	33	125	410	45	339	76	460	1329
Total	0	0	269	269	0	1580	31	1611	1006	139	498	1643	214	1313	399	1926	5449
02:00 PM	0	0	59	59	0	328	10	338	210	25	122	357	57	281	86	424	1178
02:15 PM	0	0	62	62	0	321	6	327	254	20	124	398	52	307	71	430	1217
02:30 PM	0	0	67	67	0	338	15	353	250	28	118	396	48	318	91	457	1273
02:45 PM	0	0	72	72	0	326	9	335	277	39	123	439	42	284	65	391	1237
Total	0	0	260	260	0	1313	40	1353	991	112	487	1590	199	1190	313	1702	4905
Grand Total	0	0	783	783	0	4424	126	4550	3016	378	1451	4845	628	3778	1081	5487	15665
Apprch %	0	0	100		0	97.2	2.8		62.2	7.8	29.9		11.4	68.9	19.7		
Total %	0	0	5	5	0	28.2	0.8	29	19.3	2.4	9.3	30.9	4	24.1	6.9	35	

	Brea Plaza Shopping Center Driveway Southbound				Imperial Highway Westbound				SR-57 Northbound Off Ramp Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	0	0	63	63	0	**421**	6	**427**	**264**	**40**	127	**431**	**66**	337	**112**	**515**	**1436**
01:15 PM	0	0	**70**	**70**	0	389	7	396	235	32	**137**	404	55	312	106	473	1343
01:30 PM	0	0	66	66	0	392	7	399	255	34	109	398	48	325	105	478	1341
01:45 PM	0	0	70	70	0	378	**11**	389	252	33	125	410	45	**339**	76	460	1329
Total Volume	0	0	269	269	0	1580	31	1611	1006	139	498	1643	214	1313	399	1926	5449
% App. Total	0	0	100		0	98.1	1.9		61.2	8.5	30.3		11.1	68.2	20.7		
PHF	.000	.000	.961	.961	.000	.938	.705	.943	.953	.869	.909	.953	.811	.968	.891	.935	.949

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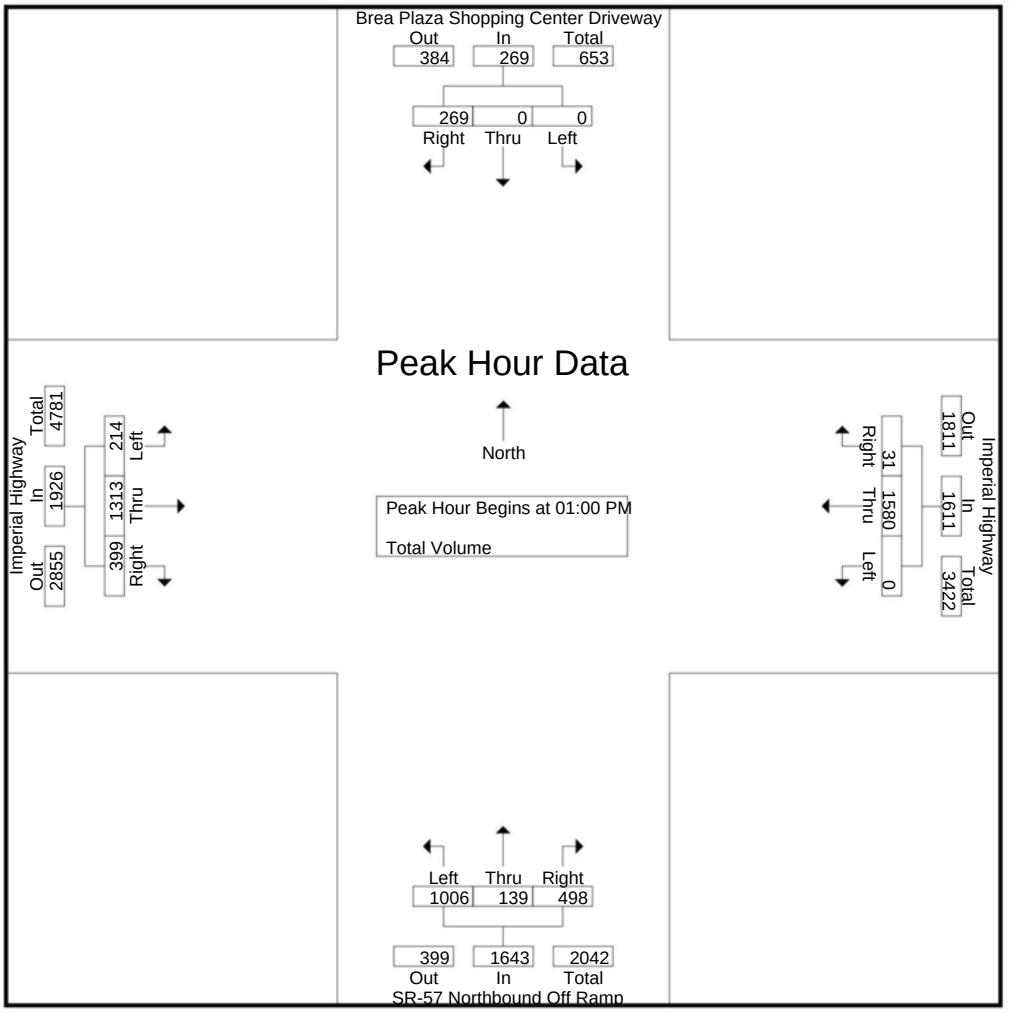
City of Brea
N/S: SR-57 Northbound Off Ramp
E/W: Imperial Highway
Weather: Clear

File Name : 05_BRE_57N Off_Imp SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 2



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:00 PM				12:45 PM				12:15 PM				01:00 PM			
+0 mins.	0	0	63	63	0	405	**18**	423	255	31	130	416	**66**	337	**112**	**515**
+15 mins.	0	0	**70**	**70**	0	**421**	6	**427**	262	37	**137**	**436**	55	312	106	473
+30 mins.	0	0	66	66	0	389	7	396	**275**	27	92	394	48	325	105	478
+45 mins.	0	0	70	70	0	392	7	399	264	**40**	127	431	45	**339**	76	460
Total Volume	0	0	269	269	0	1607	38	1645	1056	135	486	1677	214	1313	399	1926
% App. Total	0	0	100		0	97.7	2.3		63	8.1	29		11.1	68.2	20.7	
PHF	.000	.000	.961	.961	.000	.954	.528	.963	.960	.844	.887	.962	.811	.968	.891	.935

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City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	21	76	31	128	21	211	16	248	27	13	13	53	39	309	23	371	800
07:15 AM	16	53	15	84	18	263	8	289	25	29	18	72	42	378	32	452	897
07:30 AM	21	61	39	121	29	291	7	327	35	29	15	79	30	408	39	477	1004
07:45 AM	32	60	37	129	34	305	7	346	32	25	18	75	52	423	25	500	1050
Total	90	250	122	462	102	1070	38	1210	119	96	64	279	163	1518	119	1800	3751
08:00 AM	31	52	35	118	22	315	14	351	24	36	32	92	44	401	33	478	1039
08:15 AM	23	47	37	107	32	312	13	357	31	26	14	71	41	399	28	468	1003
08:30 AM	32	49	34	115	16	270	14	300	30	22	28	80	23	434	21	478	973
08:45 AM	42	62	28	132	12	295	20	327	21	21	20	62	53	397	15	465	986
Total	128	210	134	472	82	1192	61	1335	106	105	94	305	161	1631	97	1889	4001
Grand Total	218	460	256	934	184	2262	99	2545	225	201	158	584	324	3149	216	3689	7752
Apprch %	23.3	49.3	27.4		7.2	88.9	3.9		38.5	34.4	27.1		8.8	85.4	5.9		
Total %	2.8	5.9	3.3	12	2.4	29.2	1.3	32.8	2.9	2.6	2	7.5	4.2	40.6	2.8	47.6	

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	21	**61**	**39**	121	29	291	7	327	**35**	29	15	79	30	408	**39**	477	1004
07:45 AM	**32**	60	37	**129**	**34**	305	7	346	32	25	18	75	**52**	**423**	25	**500**	**1050**
08:00 AM	31	52	35	118	22	**315**	**14**	351	24	**36**	**32**	**92**	44	401	33	478	1039
08:15 AM	23	47	37	107	32	312	13	**357**	31	26	14	71	41	399	28	468	1003
Total Volume	107	220	148	475	117	1223	41	1381	122	116	79	317	167	1631	125	1923	4096
% App. Total	22.5	46.3	31.2		8.5	88.6	3		38.5	36.6	24.9		8.7	84.8	6.5		
PHF	.836	.902	.949	.921	.860	.971	.732	.967	.871	.806	.617	.861	.803	.964	.801	.962	.975

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City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp AM
Site Code : 10524132
Start Date : 2/13/2024
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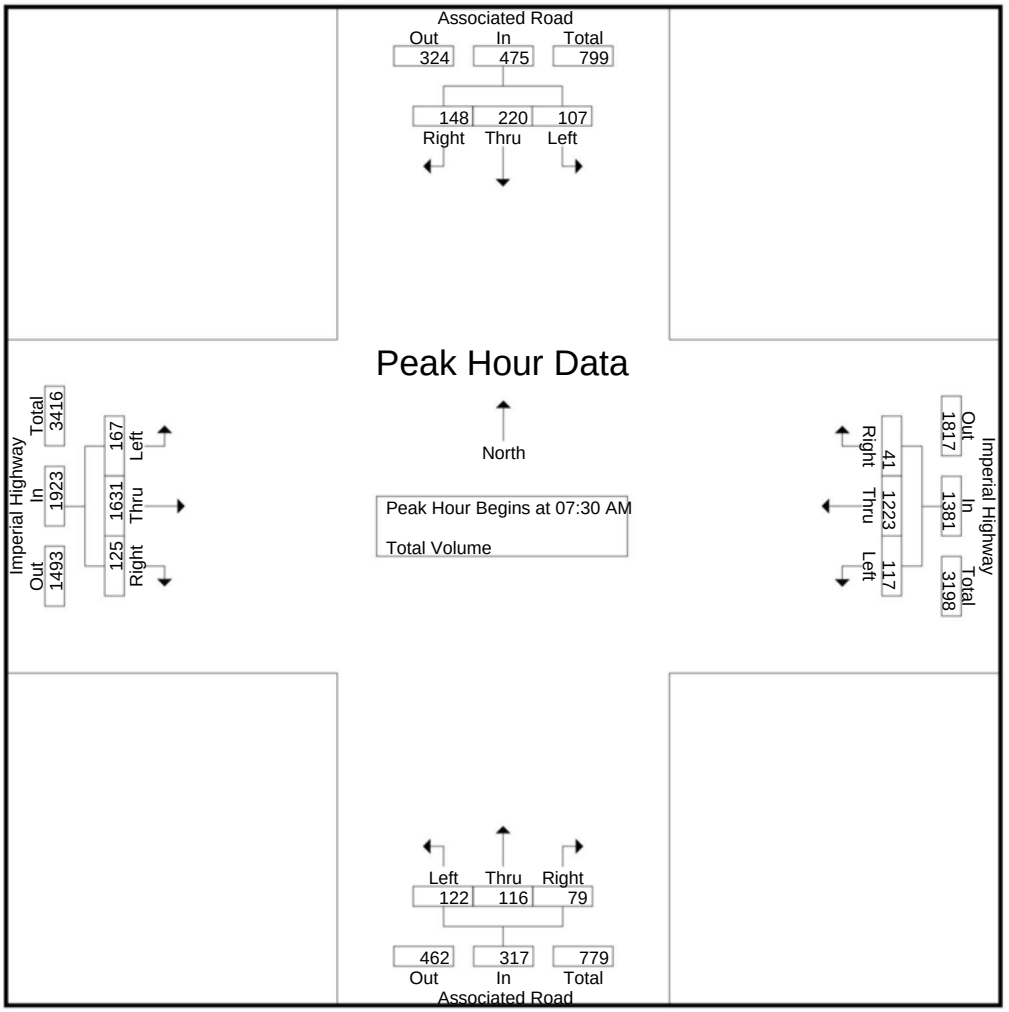

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				07:15 AM				07:45 AM			
+0 mins.	21	**61**	**39**	121	29	291	7	327	25	29	18	72	**52**	423	25	**500**
+15 mins.	**32**	60	37	**129**	**34**	305	7	346	**35**	29	15	79	44	401	**33**	478
+30 mins.	31	52	35	118	22	**315**	**14**	351	32	25	18	75	41	399	28	468
+45 mins.	23	47	37	107	32	312	13	**357**	24	**36**	**32**	**92**	23	**434**	21	478
Total Volume	107	220	148	475	117	1223	41	1381	116	119	83	318	160	1657	107	1924
% App. Total	22.5	46.3	31.2		8.5	88.6	3		36.5	37.4	26.1		8.3	86.1	5.6	
PHF	.836	.902	.949	.921	.860	.971	.732	.967	.829	.826	.648	.864	.769	.954	.811	.962

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City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	55	56	32	143	38	347	42	427	35	57	26	118	45	393	24	462	1150
04:15 PM	63	52	22	137	39	324	51	414	30	46	30	106	47	446	25	518	1175
04:30 PM	61	69	39	169	34	319	56	409	23	40	28	91	46	390	32	468	1137
04:45 PM	52	47	30	129	41	323	55	419	35	37	13	85	50	451	33	534	1167
Total	231	224	123	578	152	1313	204	1669	123	180	97	400	188	1680	114	1982	4629
05:00 PM	69	58	34	161	49	324	47	420	34	49	33	116	54	373	23	450	1147
05:15 PM	62	48	27	137	33	333	53	419	46	58	29	133	52	402	32	486	1175
05:30 PM	48	60	33	141	38	347	55	440	43	53	38	134	47	376	34	457	1172
05:45 PM	55	36	27	118	44	321	50	415	27	48	35	110	62	428	41	531	1174
Total	234	202	121	557	164	1325	205	1694	150	208	135	493	215	1579	130	1924	4668
Grand Total	465	426	244	1135	316	2638	409	3363	273	388	232	893	403	3259	244	3906	9297
Apprch %	41	37.5	21.5		9.4	78.4	12.2		30.6	43.4	26		10.3	83.4	6.2		
Total %	5	4.6	2.6	12.2	3.4	28.4	4.4	36.2	2.9	4.2	2.5	9.6	4.3	35.1	2.6	42	

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**69**	58	**34**	**161**	**49**	324	47	420	34	49	33	116	54	373	23	450	1147
05:15 PM	62	48	27	137	33	333	53	419	**46**	**58**	29	133	52	402	32	486	**1175**
05:30 PM	48	**60**	33	141	38	**347**	**55**	**440**	43	53	**38**	**134**	47	376	34	457	1172
05:45 PM	55	36	27	118	44	321	50	415	27	48	35	110	**62**	**428**	**41**	**531**	1174
Total Volume	234	202	121	557	164	1325	205	1694	150	208	135	493	215	1579	130	1924	4668
% App. Total	42	36.3	21.7		9.7	78.2	12.1		30.4	42.2	27.4		11.2	82.1	6.8		
PHF	.848	.842	.890	.865	.837	.955	.932	.963	.815	.897	.888	.920	.867	.922	.793	.906	.993

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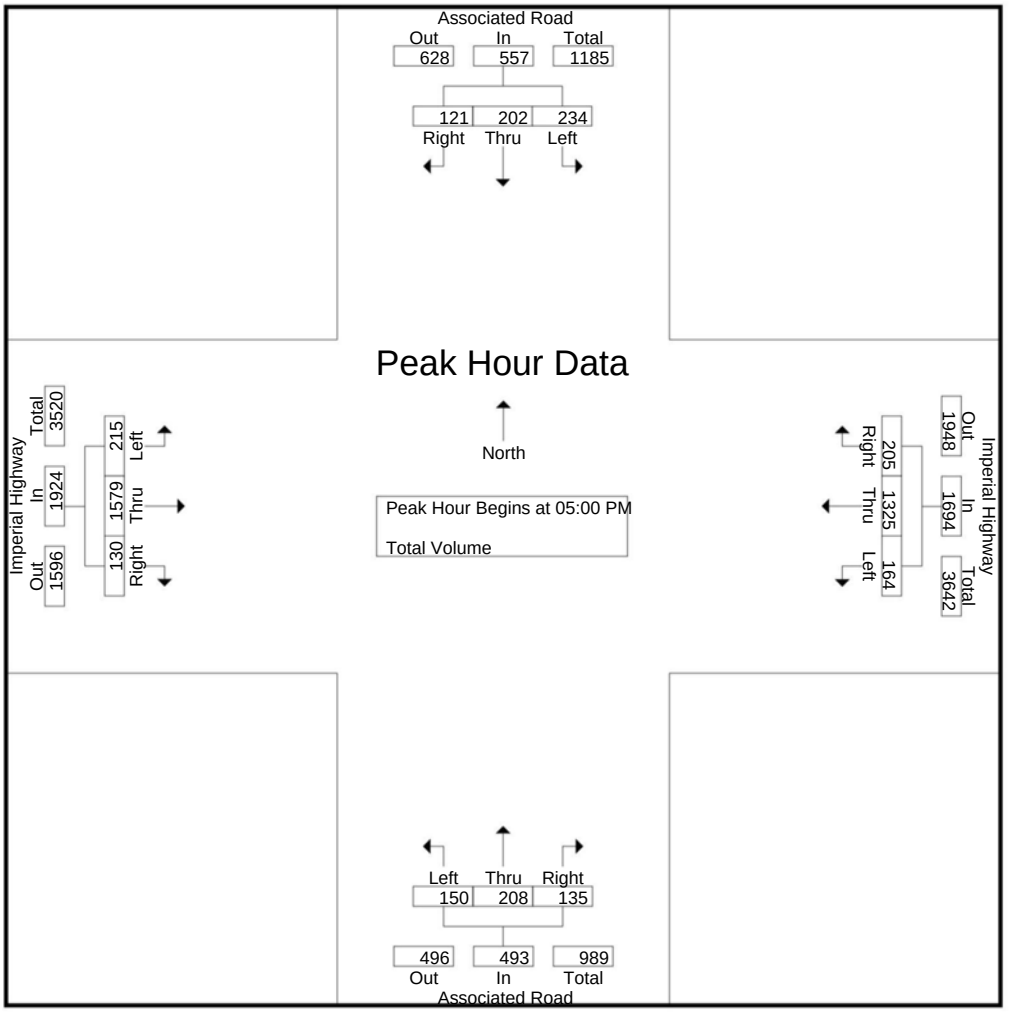
City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:15 PM				04:45 PM				05:00 PM				04:00 PM			
+0 mins.	63	52	22	137	41	323	**55**	419	34	49	33	116	45	393	24	462
+15 mins.	61	**69**	**39**	**169**	**49**	324	47	420	**46**	**58**	29	133	47	446	25	518
+30 mins.	52	47	30	129	33	333	53	419	43	53	**38**	**134**	46	390	32	468
+45 mins.	**69**	58	34	161	38	**347**	55	**440**	27	48	35	110	**50**	**451**	**33**	**534**
Total Volume	245	226	125	596	161	1327	210	1698	150	208	135	493	188	1680	114	1982
% App. Total	41.1	37.9	21		9.5	78.2	12.4		30.4	42.2	27.4		9.5	84.8	5.8	
PHF	.888	.819	.801	.882	.821	.956	.955	.965	.815	.897	.888	.920	.940	.931	.864	.928

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City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 1

Groups Printed- Total Volume

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	77	52	40	169	25	363	37	425	34	45	28	107	22	353	14	389	1090
12:15 PM	70	40	31	141	37	319	50	406	47	30	22	99	33	391	24	448	1094
12:30 PM	62	32	42	136	28	319	46	393	31	35	26	92	30	402	29	461	1082
12:45 PM	76	47	33	156	29	371	46	446	31	31	22	84	30	337	20	387	1073
Total	285	171	146	602	119	1372	179	1670	143	141	98	382	115	1483	87	1685	4339
01:00 PM	73	40	43	156	45	363	50	458	38	25	14	77	27	367	29	423	1114
01:15 PM	59	52	30	141	38	338	44	420	40	44	24	108	33	377	26	436	1105
01:30 PM	75	49	32	156	32	362	45	439	37	46	22	105	34	366	25	425	1125
01:45 PM	77	50	38	165	20	353	49	422	38	36	21	95	37	393	19	449	1131
Total	284	191	143	618	135	1416	188	1739	153	151	81	385	131	1503	99	1733	4475
02:00 PM	71	49	27	147	38	328	46	412	30	28	12	70	43	313	29	385	1014
02:15 PM	70	61	36	167	33	257	40	330	41	29	21	91	48	344	28	420	1008
02:30 PM	65	38	30	133	30	313	53	396	39	25	18	82	33	370	20	423	1034
02:45 PM	53	47	39	139	26	283	39	348	35	36	23	94	39	350	14	403	984
Total	259	195	132	586	127	1181	178	1486	145	118	74	337	163	1377	91	1631	4040
Grand Total	828	557	421	1806	381	3969	545	4895	441	410	253	1104	409	4363	277	5049	12854
Apprch %	45.8	30.8	23.3		7.8	81.1	11.1		39.9	37.1	22.9		8.1	86.4	5.5		
Total %	6.4	4.3	3.3	14.1	3	30.9	4.2	38.1	3.4	3.2	2	8.6	3.2	33.9	2.2	39.3	

	Associated Road Southbound				Imperial Highway Westbound				Associated Road Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	73	40	**43**	156	**45**	**363**	**50**	**458**	38	25	14	77	27	367	**29**	423	1114
01:15 PM	59	**52**	30	141	38	338	44	420	**40**	44	**24**	**108**	33	377	26	436	1105
01:30 PM	75	49	32	156	32	362	45	439	37	**46**	22	105	34	366	25	425	1125
01:45 PM	**77**	50	38	**165**	20	353	49	422	38	36	21	95	**37**	**393**	19	**449**	**1131**
Total Volume	284	191	143	618	135	1416	188	1739	153	151	81	385	131	1503	99	1733	4475
% App. Total	46	30.9	23.1		7.8	81.4	10.8		39.7	39.2	21		7.6	86.7	5.7		
PHF	.922	.918	.831	.936	.750	.975	.940	.949	.956	.821	.844	.891	.885	.956	.853	.965	.989

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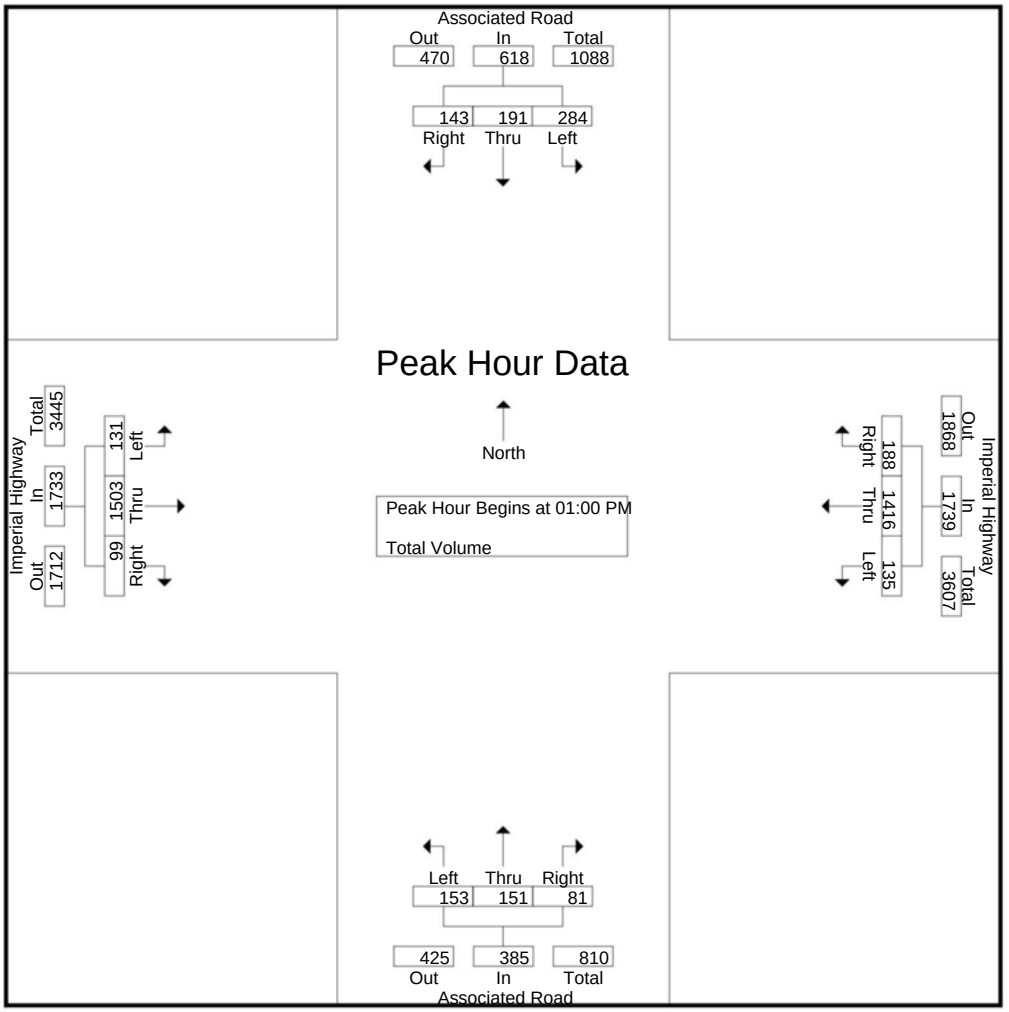
City of Brea
N/S: Associated Road
E/W: Imperial Highway
Weather: Clear

File Name : 06_BRE_Asd_Imp SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 2



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:30 PM				12:45 PM				01:00 PM				01:00 PM			
+0 mins.	75	49	32	156	29	**371**	46	446	38	25	14	77	27	367	**29**	423
+15 mins.	**77**	50	**38**	165	**45**	363	**50**	**458**	**40**	44	**24**	**108**	33	377	26	436
+30 mins.	71	49	27	147	38	338	44	420	37	**46**	22	105	34	366	25	425
+45 mins.	70	**61**	36	**167**	32	362	45	439	38	36	21	95	**37**	**393**	19	**449**
Total Volume	293	209	133	635	144	1434	185	1763	153	151	81	385	131	1503	99	1733
% App. Total	46.1	32.9	20.9		8.2	81.3	10.5		39.7	39.2	21		7.6	86.7	5.7	
PHF	.951	.857	.875	.951	.800	.966	.925	.962	.956	.821	.844	.891	.885	.956	.853	.965

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City of Brea
N/S: Castlegate Lane/Placentia Avenue
E/W: Imperial Highway
Weather: Clear

File Name : 07_BRE_Cast_Imp AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	5	5	11	17	219	3	239	27	3	20	50	1	324	41	366	666
07:15 AM	3	3	3	9	14	268	0	282	25	1	19	45	0	365	42	407	743
07:30 AM	7	4	5	16	23	299	1	323	25	1	34	60	4	385	51	440	839
07:45 AM	5	5	6	16	36	324	1	361	27	5	26	58	2	423	70	495	930
Total	16	17	19	52	90	1110	5	1205	104	10	99	213	7	1497	204	1708	3178
08:00 AM	6	5	7	18	33	329	3	365	20	6	33	59	4	397	78	479	921
08:15 AM	8	3	4	15	48	328	6	382	32	1	21	54	4	382	66	452	903
08:30 AM	5	2	7	14	34	268	7	309	35	2	28	65	5	425	67	497	885
08:45 AM	3	6	7	16	31	298	6	335	49	2	28	79	5	435	55	495	925
Total	22	16	25	63	146	1223	22	1391	136	11	110	257	18	1639	266	1923	3634
Grand Total	38	33	44	115	236	2333	27	2596	240	21	209	470	25	3136	470	3631	6812
Apprch %	33	28.7	38.3		9.1	89.9	1		51.1	4.5	44.5		0.7	86.4	12.9		
Total %	0.6	0.5	0.6	1.7	3.5	34.2	0.4	38.1	3.5	0.3	3.1	6.9	0.4	46	6.9	53.3	

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	5	**5**	6	16	36	324	1	361	27	5	26	58	2	423	70	495	**930**
08:00 AM	6	5	**7**	**18**	33	**329**	3	365	20	**6**	**33**	59	4	397	**78**	479	921
08:15 AM	**8**	3	4	15	**48**	328	6	**382**	32	1	21	54	4	382	66	452	903
08:30 AM	5	2	7	14	34	268	**7**	309	**35**	2	28	**65**	**5**	**425**	67	**497**	885
Total Volume	24	15	24	63	151	1249	17	1417	114	14	108	236	15	1627	281	1923	3639
% App. Total	38.1	23.8	38.1		10.7	88.1	1.2		48.3	5.9	45.8		0.8	84.6	14.6		
PHF	.750	.750	.857	.875	.786	.949	.607	.927	.814	.583	.818	.908	.750	.957	.901	.967	.978

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Corona, CA 92878
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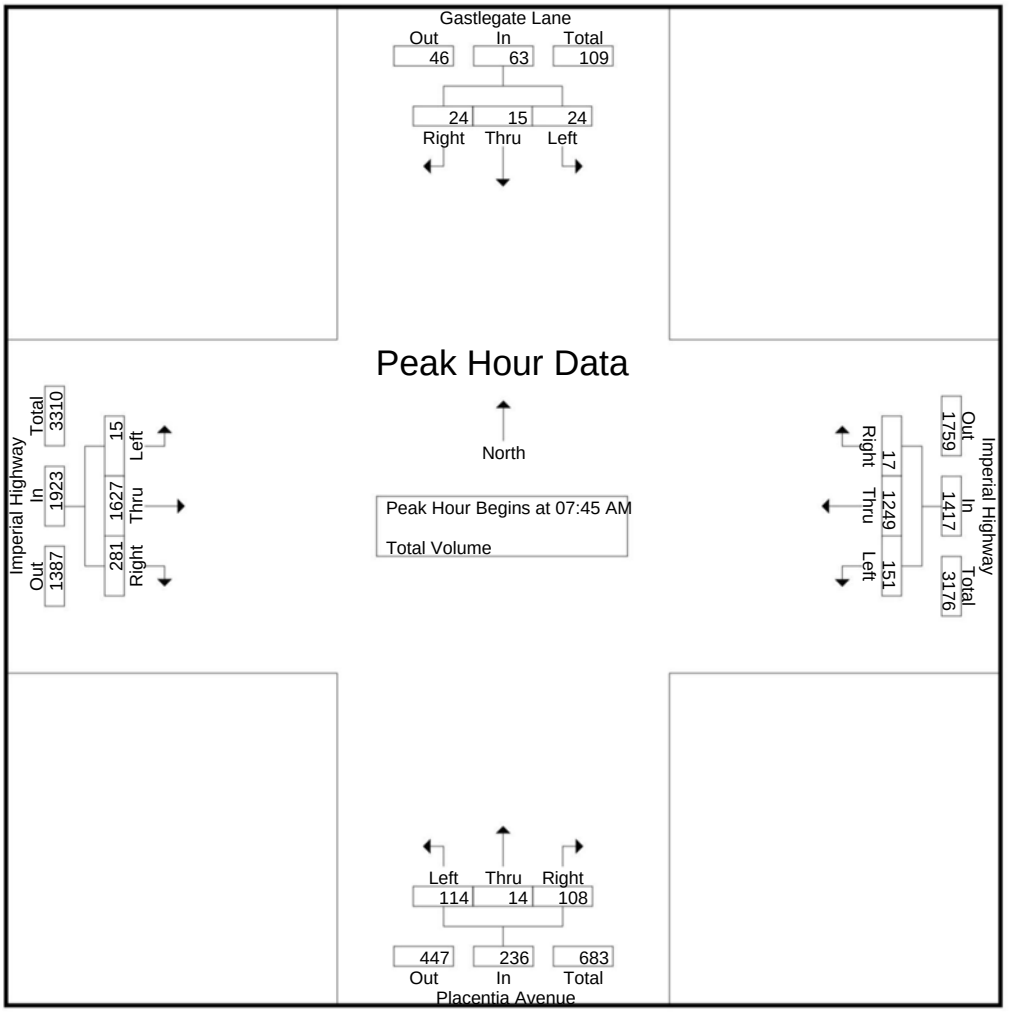
City of Brea
N/S: Castlegate Lane/Placentia Avenue
E/W: Imperial Highway
Weather: Clear

File Name : 07_BRE_Cast_Imp AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				08:00 AM				07:45 AM			
+0 mins.	7	4	5	16	23	299	1	323	20	**6**	**33**	59	2	423	70	495
+15 mins.	5	**5**	6	16	36	324	1	361	32	1	21	54	4	397	**78**	479
+30 mins.	6	5	**7**	**18**	33	**329**	3	365	35	2	28	65	4	382	66	452
+45 mins.	**8**	3	4	15	**48**	328	**6**	**382**	**49**	2	28	**79**	**5**	**425**	67	**497**
Total Volume	26	17	22	65	140	1280	11	1431	136	11	110	257	15	1627	281	1923
% App. Total	40	26.2	33.8		9.8	89.4	0.8		52.9	4.3	42.8		0.8	84.6	14.6	
PHF	.813	.850	.786	.903	.729	.973	.458	.937	.694	.458	.833	.813	.750	.957	.901	.967

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File Name : 07_BRE_Cast_Imp PM
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Page No : 1

Groups Printed- Total Volume

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	5	8	3	16	60	403	11	474	29	5	64	98	4	384	70	458	1046
04:15 PM	7	3	2	12	64	377	9	450	34	19	40	93	4	431	76	511	1066
04:30 PM	3	2	4	9	52	394	20	466	34	11	45	90	4	396	69	469	1034
04:45 PM	9	6	0	15	45	384	4	433	42	9	47	98	5	442	78	525	1071
Total	24	19	9	52	221	1558	44	1823	139	44	196	379	17	1653	293	1963	4217
05:00 PM	3	1	2	6	53	381	18	452	42	7	59	108	4	418	63	485	1051
05:15 PM	7	2	1	10	47	396	17	460	30	5	58	93	2	434	62	498	1061
05:30 PM	4	5	1	10	53	400	7	460	35	7	56	98	1	405	62	468	1036
05:45 PM	3	2	3	8	43	358	16	417	47	6	42	95	8	439	70	517	1037
Total	17	10	7	34	196	1535	58	1789	154	25	215	394	15	1696	257	1968	4185
Grand Total	41	29	16	86	417	3093	102	3612	293	69	411	773	32	3349	550	3931	8402
Apprch %	47.7	33.7	18.6		11.5	85.6	2.8		37.9	8.9	53.2		0.8	85.2	14		
Total %	0.5	0.3	0.2	1	5	36.8	1.2	43	3.5	0.8	4.9	9.2	0.4	39.9	6.5	46.8	

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	7	3	2	12	**64**	377	9	450	34	**19**	40	93	4	431	76	511	1066
04:30 PM	3	2	**4**	9	52	**394**	**20**	**466**	34	11	45	90	4	396	69	469	1034
04:45 PM	**9**	**6**	0	**15**	45	384	4	433	**42**	9	47	98	**5**	**442**	**78**	**525**	**1071**
05:00 PM	3	1	2	6	53	381	18	452	42	7	**59**	**108**	4	418	63	485	1051
Total Volume	22	12	8	42	214	1536	51	1801	152	46	191	389	17	1687	286	1990	4222
% App. Total	52.4	28.6	19		11.9	85.3	2.8		39.1	11.8	49.1		0.9	84.8	14.4		
PHF	.611	.500	.500	.700	.836	.975	.638	.966	.905	.605	.809	.900	.850	.954	.917	.948	.986

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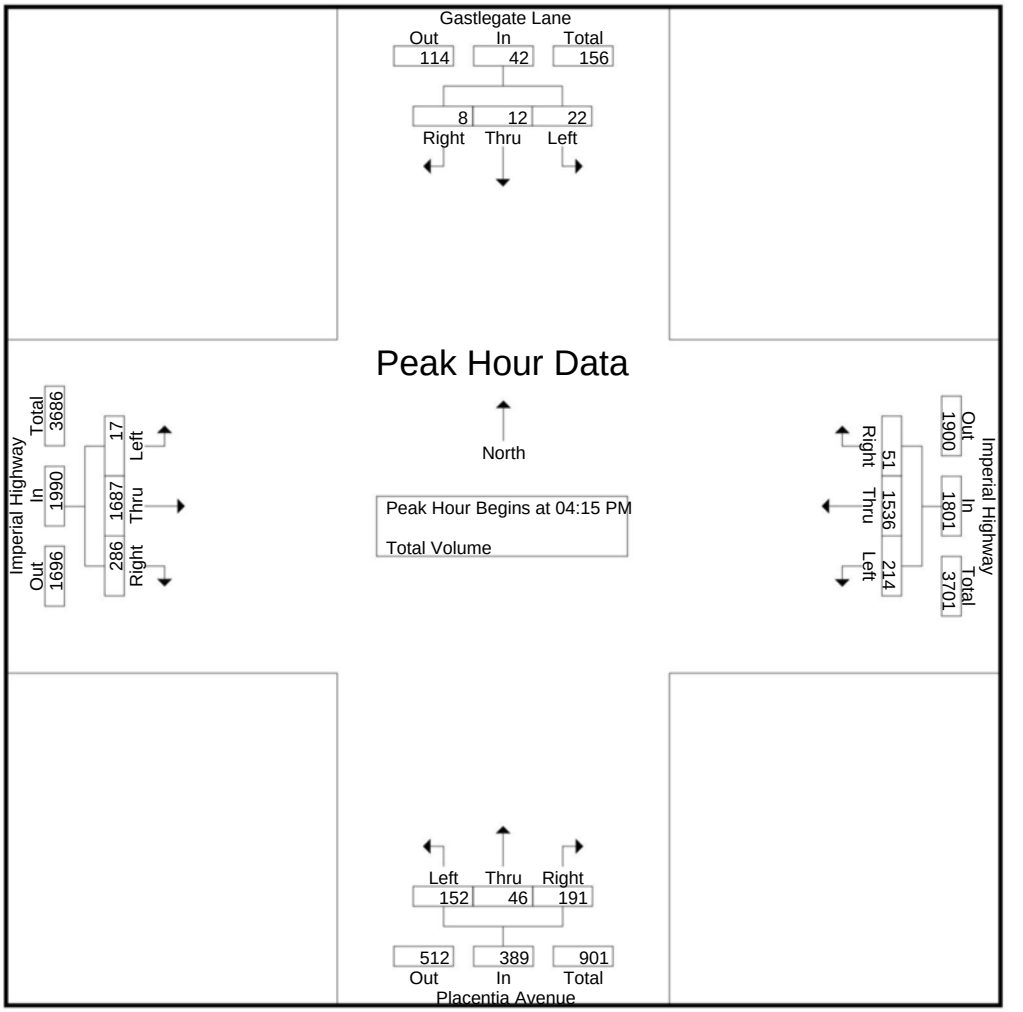

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:45 PM				04:15 PM			
+0 mins.	5	**8**	3	**16**	60	**403**	11	**474**	**42**	**9**	47	98	4	431	76	511
+15 mins.	7	3	2	12	**64**	377	9	450	42	7	**59**	**108**	4	396	69	469
+30 mins.	3	2	**4**	9	52	394	**20**	466	30	5	58	93	**5**	**442**	**78**	**525**
+45 mins.	**9**	6	0	15	45	384	4	433	35	7	56	98	4	418	63	485
Total Volume	24	19	9	52	221	1558	44	1823	149	28	220	397	17	1687	286	1990
% App. Total	46.2	36.5	17.3		12.1	85.5	2.4		37.5	7.1	55.4		0.9	84.8	14.4	
PHF	.667	.594	.563	.813	.863	.967	.550	.961	.887	.778	.932	.919	.850	.954	.917	.948

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City of Brea
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File Name : 07_BRE_Cast_Imp SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 1

Groups Printed- Total Volume

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
12:00 PM	3	5	1	9	51	409	9	469	32	1	50	83	1	428	58	487	1048
12:15 PM	10	4	3	17	41	381	10	432	40	6	38	84	3	417	65	485	1018
12:30 PM	3	4	3	10	45	372	10	427	33	8	60	101	8	416	73	497	1035
12:45 PM	3	3	4	10	42	413	8	463	33	6	51	90	2	391	57	450	1013
Total	19	16	11	46	179	1575	37	1791	138	21	199	358	14	1652	253	1919	4114
01:00 PM	4	2	1	7	37	425	10	472	26	3	52	81	2	403	56	461	1021
01:15 PM	11	5	1	17	45	405	7	457	38	5	63	106	2	422	50	474	1054
01:30 PM	3	3	0	6	49	397	7	453	28	4	51	83	5	400	46	451	993
01:45 PM	4	2	6	12	42	373	10	425	43	5	46	94	6	440	46	492	1023
Total	22	12	8	42	173	1600	34	1807	135	17	212	364	15	1665	198	1878	4091
02:00 PM	4	3	2	9	52	385	9	446	29	6	52	87	2	360	44	406	948
02:15 PM	7	8	1	16	42	311	5	358	35	2	56	93	6	382	51	439	906
02:30 PM	3	0	0	3	48	362	3	413	46	5	62	113	3	393	47	443	972
02:45 PM	4	5	6	15	54	350	14	418	27	7	45	79	7	397	40	444	956
Total	18	16	9	43	196	1408	31	1635	137	20	215	372	18	1532	182	1732	3782
Grand Total	59	44	28	131	548	4583	102	5233	410	58	626	1094	47	4849	633	5529	11987
Apprch %	45	33.6	21.4		10.5	87.6	1.9		37.5	5.3	57.2		0.9	87.7	11.4		
Total %	0.5	0.4	0.2	1.1	4.6	38.2	0.9	43.7	3.4	0.5	5.2	9.1	0.4	40.5	5.3	46.1	

	Gastlegate Lane Southbound				Imperial Highway Westbound				Placentia Avenue Northbound				Imperial Highway Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	3	4	3	10	**45**	372	**10**	427	33	**8**	60	101	**8**	416	**73**	**497**	1035
12:45 PM	3	3	**4**	10	42	413	8	463	33	6	51	90	2	391	57	450	1013
01:00 PM	4	2	1	7	37	**425**	10	**472**	26	3	52	81	2	403	56	461	1021
01:15 PM	**11**	**5**	1	**17**	45	405	7	457	**38**	5	**63**	**106**	2	**422**	50	474	**1054**
Total Volume	21	14	9	44	169	1615	35	1819	130	22	226	378	14	1632	236	1882	4123
% App. Total	47.7	31.8	20.5		9.3	88.8	1.9		34.4	5.8	59.8		0.7	86.7	12.5		
PHF	.477	.700	.563	.647	.939	.950	.875	.963	.855	.688	.897	.892	.438	.967	.808	.947	.978

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File Name : 07_BRE_Cast_Imp SAT
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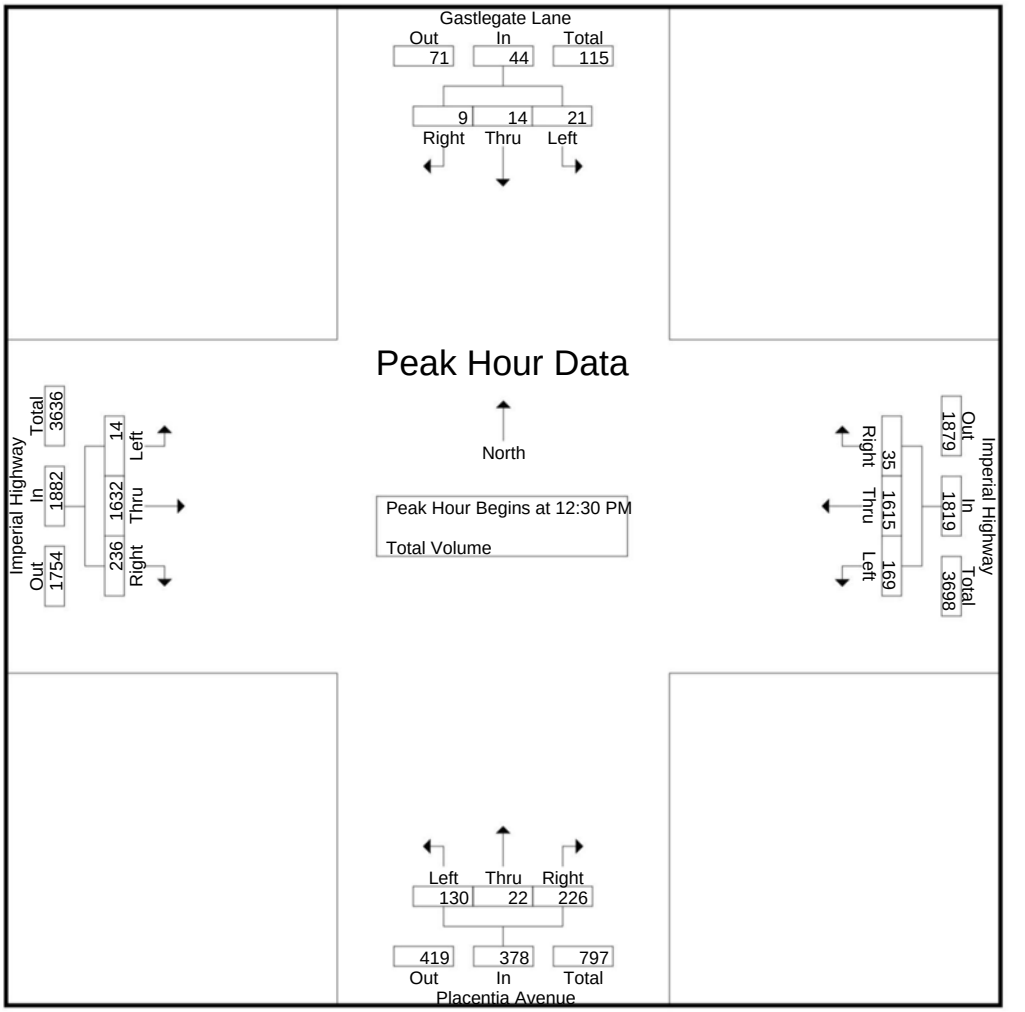

Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	12:00 PM				12:45 PM				01:45 PM				12:00 PM			
+0 mins.	3	**5**	1	9	42	413	8	463	43	5	46	94	1	**428**	58	487
+15 mins.	**10**	4	3	**17**	37	**425**	**10**	**472**	29	**6**	52	87	3	417	65	485
+30 mins.	3	4	3	10	45	405	7	457	35	2	56	93	**8**	416	**73**	**497**
+45 mins.	3	3	**4**	10	**49**	397	7	453	**46**	5	**62**	**113**	2	391	57	450
Total Volume	19	16	11	46	173	1640	32	1845	153	18	216	387	14	1652	253	1919
% App. Total	41.3	34.8	23.9		9.4	88.9	1.7		39.5	4.7	55.8		0.7	86.1	13.2	
PHF	.475	.800	.688	.676	.883	.965	.800	.977	.832	.750	.871	.856	.438	.965	.866	.965

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City of Brea
N/S: Driveway
E/W: Greenbrair Lane
Weather: Clear

File Name : 08_BRE_DW_Green AM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
07:00 AM	0	0	0	1	0	1	0	11	11	12
07:15 AM	0	0	0	4	1	5	0	8	8	13
07:30 AM	0	0	0	4	1	5	0	15	15	20
07:45 AM	0	1	1	3	1	4	0	7	7	12
Total	0	1	1	12	3	15	0	41	41	57
08:00 AM	0	0	0	4	1	5	0	10	10	15
08:15 AM	2	0	2	0	1	1	0	4	4	7
08:30 AM	0	0	0	3	1	4	0	4	4	8
08:45 AM	2	0	2	5	1	6	0	10	10	18
Total	4	0	4	12	4	16	0	28	28	48
Grand Total	4	1	5	24	7	31	0	69	69	105
Apprch %	80	20		77.4	22.6		0	100		
Total %	3.8	1	4.8	22.9	6.7	29.5	0	65.7	65.7	

	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	0	0	0	**4**	**1**	**5**	0	8	8	13
07:30 AM	0	0	0	4	1	5	0	**15**	**15**	**20**
07:45 AM	0	**1**	**1**	3	1	4	0	7	7	12
08:00 AM	0	0	0	4	1	5	0	10	10	15
Total Volume	0	1	1	15	4	19	0	40	40	60
% App. Total	0	100		78.9	21.1		0	100		
PHF	.000	.250	.250	.938	1.00	.950	.000	.667	.667	.750

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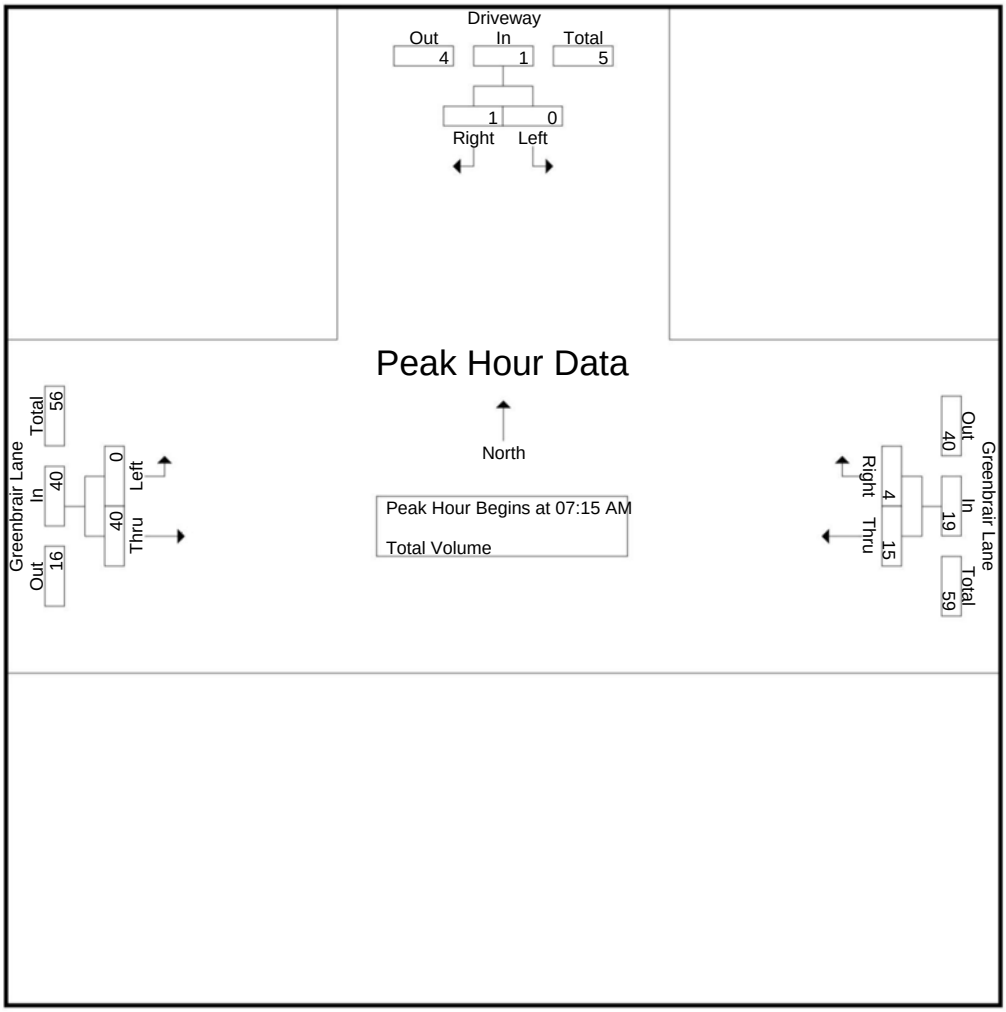

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	08:00 AM			07:15 AM			07:00 AM		
+0 mins.	0	0	0	**4**	**1**	**5**	0	11	11
+15 mins.	**2**	0	**2**	4	1	5	0	8	8
+30 mins.	0	0	0	3	1	4	0	**15**	**15**
+45 mins.	2	0	2	4	1	5	0	7	7
Total Volume	4	0	4	15	4	19	0	41	41
% App. Total	100	0		78.9	21.1		0	100	
PHF	.500	.000	.500	.938	1.000	.950	.000	.683	.683

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N/S: Driveway
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File Name : 08_BRE_DW_Green PM
Site Code : 10524132
Start Date : 2/13/2024
Page No : 1

Groups Printed- Total Volume

	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
04:00 PM	0	0	0	9	0	9	0	7	7	16
04:15 PM	0	0	0	8	0	8	0	4	4	12
04:30 PM	2	0	2	16	2	18	0	7	7	27
04:45 PM	1	0	1	8	0	8	0	4	4	13
Total	3	0	3	41	2	43	0	22	22	68
05:00 PM	0	0	0	1	0	1	0	5	5	6
05:15 PM	0	1	1	5	1	6	0	1	1	8
05:30 PM	0	0	0	8	0	8	0	4	4	12
05:45 PM	0	0	0	12	0	12	0	2	2	14
Total	0	1	1	26	1	27	0	12	12	40
Grand Total	3	1	4	67	3	70	0	34	34	108
Apprch %	75	25		95.7	4.3		0	100		
Total %	2.8	0.9	3.7	62	2.8	64.8	0	31.5	31.5	

	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	0	0	9	0	9	0	**7**	**7**	16
04:15 PM	0	0	0	8	0	8	0	4	4	12
04:30 PM	**2**	0	**2**	**16**	**2**	**18**	0	7	7	**27**
04:45 PM	1	0	1	8	0	8	0	4	4	13
Total Volume	3	0	3	41	2	43	0	22	22	68
% App. Total	100	0		95.3	4.7		0	100		
PHF	.375	.000	.375	.641	.250	.597	.000	.786	.786	.630

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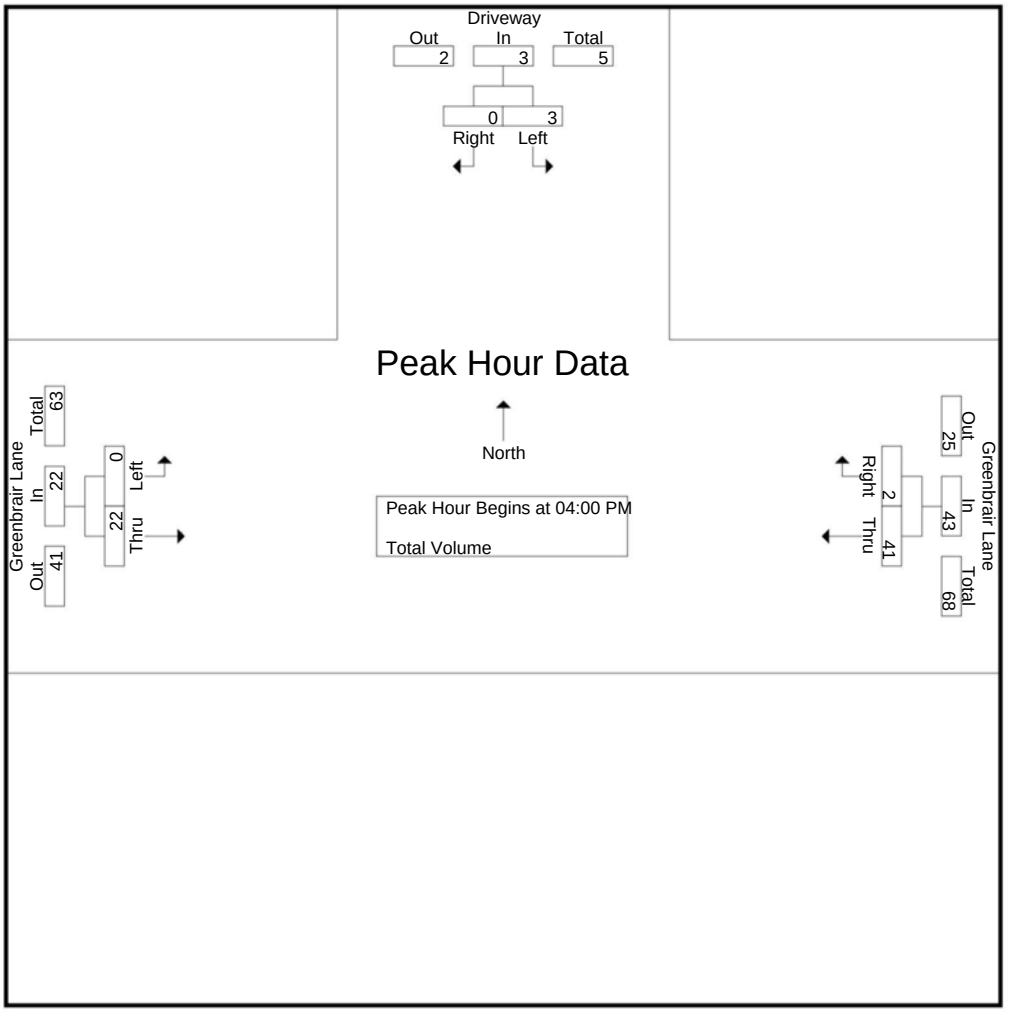

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:00 PM			04:00 PM		
+0 mins.	**2**	0	**2**	9	0	9	0	**7**	**7**
+15 mins.	1	0	1	8	0	8	0	4	4
+30 mins.	0	0	0	**16**	**2**	**18**	0	7	7
+45 mins.	0	**1**	1	8	0	8	0	4	4
Total Volume	3	1	4	41	2	43	0	22	22
% App. Total	75	25		95.3	4.7		0	100	
PHF	.375	.250	.500	.641	.250	.597	.000	.786	.786

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City of Brea
N/S: Driveway
E/W: Greenbrair Lane
Weather: Clear

File Name : 08_BRE_DW_Green SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 1

Groups Printed- Total Volume

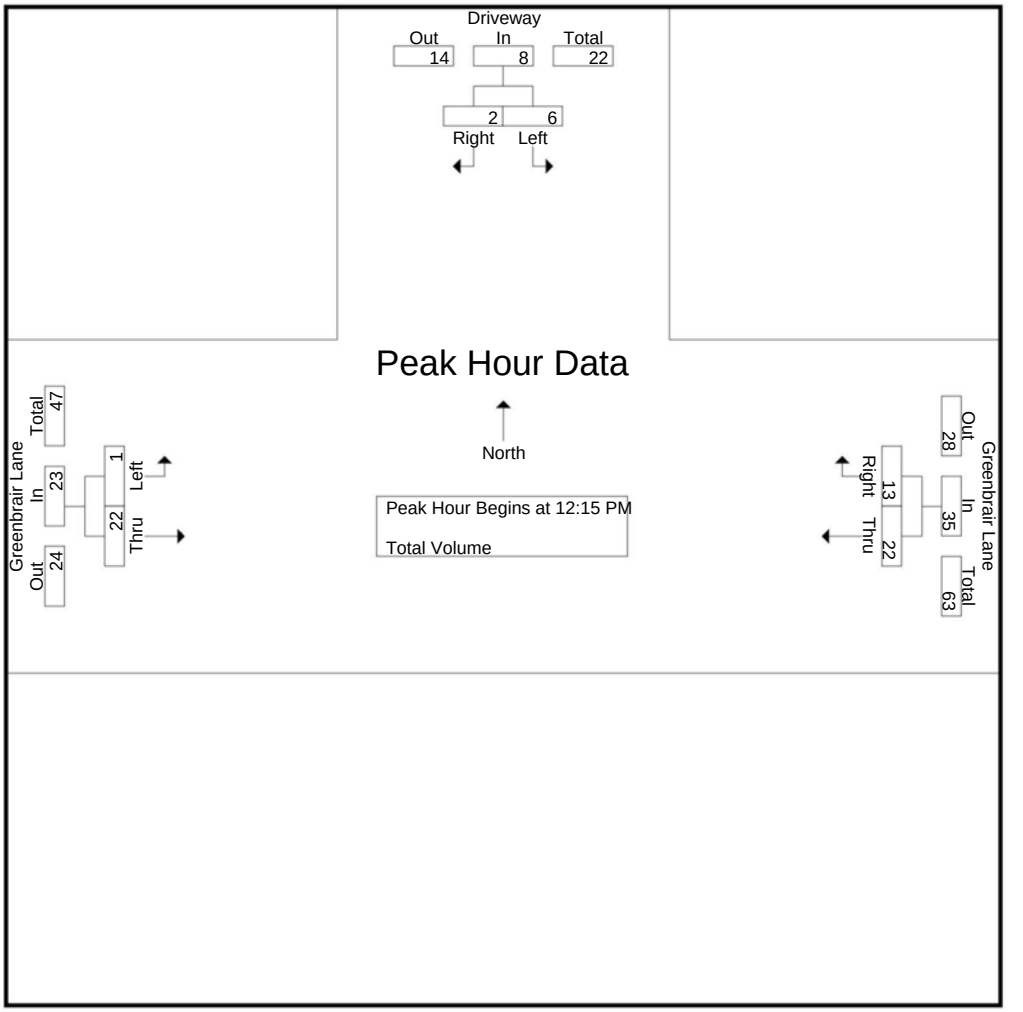
	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
12:00 PM	0	0	0	1	2	3	0	4	4	7
12:15 PM	0	0	0	6	1	7	0	6	6	13
12:30 PM	1	0	1	7	8	15	0	2	2	18
12:45 PM	4	1	5	7	3	10	0	4	4	19
Total	5	1	6	21	14	35	0	16	16	57
01:00 PM	1	1	2	2	1	3	1	10	11	16
01:15 PM	2	0	2	2	1	3	0	4	4	9
01:30 PM	0	0	0	7	1	8	0	6	6	14
01:45 PM	3	0	3	4	2	6	1	6	7	16
Total	6	1	7	15	5	20	2	26	28	55
02:00 PM	3	2	5	7	4	11	0	1	1	17
02:15 PM	5	0	5	8	0	8	0	5	5	18
02:30 PM	0	0	0	2	1	3	0	3	3	6
02:45 PM	1	0	1	3	1	4	0	1	1	6
Total	9	2	11	20	6	26	0	10	10	47
Grand Total	20	4	24	56	25	81	2	52	54	159
Apprch %	83.3	16.7		69.1	30.9		3.7	96.3		
Total %	12.6	2.5	15.1	35.2	15.7	50.9	1.3	32.7	34	

	Driveway Southbound			Greenbrair Lane Westbound			Greenbrair Lane Eastbound			
Start Time	Left	Right	App. Total	Thru	Right	App. Total	Left	Thru	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 12:15 PM										
12:15 PM	0	0	0	6	1	7	0	6	6	13
12:30 PM	1	0	1	**7**	**8**	**15**	0	2	2	18
12:45 PM	**4**	**1**	**5**	7	3	10	0	4	4	**19**
01:00 PM	1	1	2	2	1	3	**1**	**10**	**11**	16
Total Volume	6	2	8	22	13	35	1	22	23	66
% App. Total	75	25		62.9	37.1		4.3	95.7		
PHF	.375	.500	.400	.786	.406	.583	.250	.550	.523	.868

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

City of Brea
N/S: Driveway
E/W: Greenbrair Lane
Weather: Clear

File Name : 08_BRE_DW_Green SAT
Site Code : 10524132
Start Date : 2/10/2024
Page No : 2



Peak Hour Analysis From 12:00 PM to 02:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	01:30 PM			12:00 PM			01:00 PM		
+0 mins.	0	0	0	1	2	3	**1**	**10**	**11**
+15 mins.	3	0	3	6	1	7	0	4	4
+30 mins.	3	**2**	**5**	**7**	**8**	**15**	0	6	6
+45 mins.	**5**	0	5	7	3	10	1	6	7
Total Volume	11	2	13	21	14	35	2	26	28
% App. Total	84.6	15.4		60	40		7.1	92.9	
PHF	.550	.250	.650	.750	.438	.583	.500	.650	.636

Appendix B-II

Saturday Daily Roadway Segment Counts

RK19750.1
JN: 2827-2023-05

Counts Unlimited, Inc.

PO Box 1178
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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
N/S: Associated Road
E/W: Shopping Center Driveway
24 Hour Entering Volume Count

BRE006EWS
Site Code: 105-24132

Start Time	2/10/24 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon	Morning	Afternoon
12:00		3	95			0	0				
12:15		0	95			0	0				
12:30		0	99			0	0				
12:45		1	107	4	396	0	0	0	0	4	396
01:00		0	97			0	0				
01:15		1	105			0	0				
01:30		2	**115**			0	0				
01:45		0	**89**	3	406	0	0	0	0	3	406
02:00		0	**109**			0	0				
02:15		1	**114**			0	0				
02:30		0	80			0	0				
02:45		1	84	2	387	0	0	0	0	2	387
03:00		0	100			0	0				
03:15		0	80			0	0				
03:30		0	99			0	0				
03:45		2	112	2	391	0	0	0	0	2	391
04:00		1	90			0	0				
04:15		0	89			0	0				
04:30		0	88			0	0				
04:45		1	98	2	365	0	0	0	0	2	365
05:00		2	96			0	0				
05:15		1	92			0	0				
05:30		1	95			0	0				
05:45		3	85	7	368	0	0	0	0	7	368
06:00		7	91			0	0				
06:15		2	84			0	0				
06:30		6	87			0	0				
06:45		11	98	26	360	0	0	0	0	26	360
07:00		10	85			0	0				
07:15		10	79			0	0				
07:30		19	64			0	0				
07:45		29	55	68	283	0	0	0	0	68	283
08:00		20	46			0	0				
08:15		28	52			0	0				
08:30		29	46			0	0				
08:45		28	41	105	185	0	0	0	0	105	185
09:00		41	47			0	0				
09:15		50	35			0	0				
09:30		55	18			0	0				
09:45		53	28	199	128	0	0	0	0	199	128
10:00		54	21			0	0				
10:15		53	14			0	0				
10:30		**80**	13			0	0				
10:45		**80**	11	267	59	0	0	0	0	267	59
11:00		**59**	8			0	0				
11:15		**80**	6			0	0				
11:30		74	5			0	0				
11:45		73	2	286	21	0	0	0	0	286	21
Total		971	3349	971	3349	0	0	0	0	971	3349
Combined Total		4320		4320		0		0		4320	
AM Peak	-	10:30	-	-	-	-	-	-	-	-	-
Vol.	-	299	-	-	-	-	-	-	-	-	-
P.H.F.		0.934									
PM Peak	-	-	01:30	-	-	-	-	-	-	-	-
Vol.	-	-	427	-	-	-	-	-	-	-	-
P.H.F.			0.928								
Percentage		22.5%	77.5%			0.0%	0.0%				
ADT/AADT		ADT 4,320		AADT 4,320							

Counts Unlimited, Inc.

PO Box 1178
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City of Brea
N/S: Associated Road
E/W: Shopping Center Driveway
24 Hour Entering Volume Count

BRE006NSS
Site Code: 105-24132

Start Time	2/10/24 Sat	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		25	107			17	119				
12:15		13	109			5	110				
12:30		20	111			11	95				
12:45		16	103	74	430	5	113	38	437	112	867
01:00		11	112			6	118				
01:15		6	120			5	95				
01:30		8	122			6	**107**				
01:45		9	118	34	472	6	**120**	23	440	57	912
02:00		13	121			3	**108**				
02:15		9	115			2	**109**				
02:30		4	113			0	102				
02:45		5	113	31	462	8	88	13	407	44	869
03:00		7	81			5	103				
03:15		6	113			4	90				
03:30		5	113			4	97				
03:45		7	113	25	420	1	95	14	385	39	805
04:00		4	**125**			2	94				
04:15		3	**115**			4	105				
04:30		4	**135**			12	104				
04:45		5	**123**	16	498	9	104	27	407	43	905
05:00		5	119			7	96				
05:15		5	101			8	101				
05:30		7	126			15	84				
05:45		14	97	31	443	16	81	46	362	77	805
06:00		13	84			19	81				
06:15		9	85			14	106				
06:30		20	99			19	92				
06:45		24	66	66	334	21	70	73	349	139	683
07:00		18	78			30	65				
07:15		31	69			28	54				
07:30		29	46			42	64				
07:45		29	50	107	243	56	54	156	237	263	480
08:00		50	47			40	50				
08:15		48	43			48	57				
08:30		40	72			65	36				
08:45		54	46	192	208	73	30	226	173	418	381
09:00		45	45			77	38				
09:15		67	47			68	26				
09:30		54	38			81	26				
09:45		85	36	251	166	81	26	307	116	558	282
10:00		73	37			101	25				
10:15		80	28			83	22				
10:30		110	23			105	18				
10:45		107	28	370	116	83	18	372	83	742	199
11:00		**93**	27			**97**	9				
11:15		**95**	24			**96**	11				
11:30		**125**	16			**99**	10				
11:45		**112**	13	425	80	**123**	6	415	36	840	116
Total		1622	3872	1622	3872	1710	3432	1710	3432	3332	7304
Combined Total		5494		5494		5142		5142		10636	
AM Peak	-	11:00	-	-	-	11:00	-	-	-	-	-
Vol.	-	425	-	-	-	415	-	-	-	-	-
P.H.F.		0.850				0.843					
PM Peak	-	-	04:00	-	-	-	01:30	-	-	-	-
Vol.	-	-	498	-	-	-	444	-	-	-	-
P.H.F.			0.922				0.925				
Percentage		29.5%	70.5%			33.3%	66.7%				
ADT/AADT		ADT 10,636		AADT 10,636							

Counts Unlimited, Inc.

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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
Associated Road
N/ Imperial Highway
24 Hour Directional Volume Count

BRE003
Site Code: 105-24132

Start Time	2/10/24 Sat	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		25	107			21	168				
12:15		13	109			6	139				
12:30		20	111			11	137				
12:45		16	103	74	430	6	158	44	602	118	1032
01:00		11	112			6	160				
01:15		6	120			6	135				
01:30		8	122			8	**178**				
01:45		9	118	34	472	6	**157**	26	630	60	1102
02:00		13	121			4	**154**				
02:15		9	115			2	**151**				
02:30		4	113			0	137				
02:45		5	113	31	462	9	139	15	581	46	1043
03:00		7	81			5	156				
03:15		6	113			4	122				
03:30		5	113			4	137				
03:45		7	113	25	420	2	154	15	569	40	989
04:00		4	**125**			4	138				
04:15		3	**115**			2	145				
04:30		4	**135**			11	140				
04:45		5	**123**	16	498	8	141	25	564	41	1062
05:00		5	119			9	130				
05:15		5	101			8	130				
05:30		7	126			16	116				
05:45		14	97	31	443	11	116	44	492	75	935
06:00		13	84			20	115				
06:15		9	85			13	128				
06:30		20	99			21	119				
06:45		24	66	66	334	23	119	77	481	143	815
07:00		18	78			28	103				
07:15		31	69			29	99				
07:30		29	46			43	83				
07:45		29	50	107	243	63	80	163	365	270	608
08:00		50	47			49	66				
08:15		48	43			54	71				
08:30		40	72			67	63				
08:45		54	46	192	208	77	50	247	250	439	458
09:00		45	45			89	60				
09:15		67	47			77	43				
09:30		54	38			83	36				
09:45		85	36	251	166	94	43	343	182	594	348
10:00		73	37			122	31				
10:15		80	28			100	29				
10:30		110	23			137	26				
10:45		107	28	370	116	133	22	492	108	862	224
11:00		**93**	27			**114**	17				
11:15		**95**	24			**124**	16				
11:30		**125**	16			**131**	11				
11:45		**112**	13	425	80	**141**	9	510	53	935	133
Total		1622	3872	1622	3872	2001	4877	2001	4877	3623	8749
Combined Total		5494		5494		6878		6878		12372	
AM Peak	-	11:00	-	-	-	11:00	-	-	-	-	-
Vol.	-	425	-	-	-	510	-	-	-	-	-
P.H.F.		0.850				0.904					
PM Peak	-	-	04:00	-	-	-	01:30	-	-	-	-
Vol.	-	-	498	-	-	-	640	-	-	-	-
P.H.F.			0.922				0.899				
Percentage		29.5%	70.5%			29.1%	70.9%				
ADT/AADT		ADT 12,372		AADT 12,372							

Counts Unlimited, Inc.

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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
Associated Road
S/ Birch Street
24 Hour Directional Volume Count

BRE002
Site Code: 105-24132

Start Time	2/10/24 Sat	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		20	89			14	**105**				
12:15		8	93			5	**104**				
12:30		20	101			12	**95**				
12:45		14	96	62	379	4	**124**	35	428	97	807
01:00		9	94			5	103				
01:15		6	116			6	92				
01:30		6	111			7	94				
01:45		6	112	27	433	1	110	19	399	46	832
02:00		13	106			2	104				
02:15		7	124			3	103				
02:30		3	104			1	91				
02:45		5	90	28	424	9	90	15	388	43	812
03:00		6	80			4	99				
03:15		7	93			4	89				
03:30		3	123			4	90				
03:45		7	**108**	23	404	1	101	13	379	36	783
04:00		3	**124**			4	94				
04:15		3	**98**			3	97				
04:30		1	**144**			13	105				
04:45		5	93	12	459	5	91	25	387	37	846
05:00		1	134			4	96				
05:15		4	100			4	92				
05:30		5	119			11	79				
05:45		16	78	26	431	10	80	29	347	55	778
06:00		6	106			19	85				
06:15		7	91			9	93				
06:30		17	96			17	78				
06:45		24	79	54	372	21	67	66	323	120	695
07:00		21	70			25	60				
07:15		22	68			27	50				
07:30		27	50			30	66				
07:45		36	48	106	236	53	49	135	225	241	461
08:00		30	40			44	51				
08:15		46	44			39	57				
08:30		35	65			52	31				
08:45		51	48	162	197	62	25	197	164	359	361
09:00		39	53			69	33				
09:15		68	35			53	22				
09:30		68	34			78	25				
09:45		73	35	248	157	79	22	279	102	527	259
10:00		71	38			85	21				
10:15		81	31			86	26				
10:30		99	20			85	17				
10:45		**91**	27	342	116	89	17	345	81	687	197
11:00		**77**	21			**82**	11				
11:15		**90**	20			**104**	11				
11:30		**100**	17			**95**	9				
11:45		88	10	355	68	**122**	8	403	39	758	107
Total		1445	3676	1445	3676	1561	3262	1561	3262	3006	6938
Combined Total		5121		5121		4823		4823		9944	
AM Peak	-	10:45	-	-	-	11:00	-	-	-	-	-
Vol.	-	358	-	-	-	403	-	-	-	-	-
P.H.F.		0.895				0.826					
PM Peak	-	-	03:45	-	-	-	12:00	-	-	-	-
Vol.	-	-	474	-	-	-	428	-	-	-	-
P.H.F.			0.823				0.863				
Percentage		28.2%	71.8%			32.4%	67.6%				
ADT/AADT		ADT 9,944		AADT 9,944							

Counts Unlimited, Inc.

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City of Brea
Birch Street
W/ Associated Road
24 Hour Directional Volume Count

BRE001
Site Code: 105-24132

Start Time	2/10/24 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		17	237			19	212				
12:15		22	227			10	**217**				
12:30		10	197			14	**208**				
12:45		11	236	60	897	10	**236**	53	873	113	1770
01:00		10	250			5	**225**				
01:15		8	**234**			4	213				
01:30		9	**232**			4	209				
01:45		10	**244**	37	960	6	215	19	862	56	1822
02:00		1	**252**			12	233				
02:15		5	226			2	227				
02:30		1	208			4	202				
02:45		2	240	9	926	2	198	20	860	29	1786
03:00		4	235			2	187				
03:15		1	230			3	199				
03:30		4	223			6	211				
03:45		4	232	13	920	12	206	23	803	36	1723
04:00		4	201			3	211				
04:15		4	228			1	195				
04:30		6	209			6	241				
04:45		8	215	22	853	6	209	16	856	38	1709
05:00		4	198			7	225				
05:15		5	266			5	197				
05:30		6	200			5	237				
05:45		10	183	25	847	20	211	37	870	62	1717
06:00		19	177			12	187				
06:15		14	203			13	187				
06:30		26	153			18	173				
06:45		34	157	93	690	29	129	72	676	165	1366
07:00		37	138			28	130				
07:15		37	131			34	82				
07:30		43	117			35	82				
07:45		68	111	185	497	70	90	167	384	352	881
08:00		59	123			49	76				
08:15		74	116			83	81				
08:30		79	98			80	78				
08:45		106	94	318	431	110	69	322	304	640	735
09:00		90	81			108	58				
09:15		105	69			123	52				
09:30		125	67			138	48				
09:45		134	50	454	267	171	41	540	199	994	466
10:00		135	59			152	49				
10:15		140	60			177	40				
10:30		172	49			182	30				
10:45		174	47	621	215	219	25	730	144	1351	359
11:00		**180**	25			**219**	23				
11:15		**210**	26			**190**	19				
11:30		**183**	17			**218**	16				
11:45		**226**	19	799	87	**228**	16	855	74	1654	161
Total		2636	7590	2636	7590	2854	6905	2854	6905	5490	14495
Combined Total		10226		10226		9759		9759		19985	
AM Peak	-	11:00	-	-	-	11:00	-	-	-	-	-
Vol.	-	799	-	-	-	855	-	-	-	-	-
P.H.F.		0.884				0.938					
PM Peak	-	-	01:15	-	-	-	00:15	-	-	-	-
Vol.	-	-	962	-	-	-	886	-	-	-	-
P.H.F.			0.954				0.939				
Percentage		25.8%	74.2%			29.2%	70.8%				
ADT/AADT		ADT 19,985		AADT 19,985							

Counts Unlimited, Inc.

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City of Brea
Imperial Highway
Just E/ State Route 57 Northbound Off Ramp
24 Hour Directional Volume Count

BRE004
Site Code: 105-24132

Start Time	2/10/24 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		72	404			54	409				
12:15		54	468			41	372				
12:30		85	462			41	382				
12:45		59	407	270	1741	29	**423**	165	1586	435	3327
01:00		62	**464**			25	**427**				
01:15		34	**449**			29	**396**				
01:30		40	**434**			38	**399**				
01:45		49	**464**	185	1811	27	389	119	1611	304	3422
02:00		40	403			27	338				
02:15		35	431			26	327				
02:30		25	436			20	353				
02:45		19	407	119	1677	21	335	94	1353	213	3030
03:00		26	418			12	424				
03:15		23	446			16	377				
03:30		19	384			19	369				
03:45		39	443	107	1691	34	342	81	1512	188	3203
04:00		17	397			11	340				
04:15		31	418			23	331				
04:30		43	408			28	363				
04:45		63	405	154	1628	27	341	89	1375	243	3003
05:00		46	365			34	341				
05:15		44	412			35	371				
05:30		56	367			41	387				
05:45		114	367	260	1511	50	387	160	1486	420	2997
06:00		63	364			67	343				
06:15		68	378			66	376				
06:30		109	315			90	334				
06:45		154	337	394	1394	92	306	315	1359	709	2753
07:00		115	321			109	288				
07:15		152	319			142	273				
07:30		194	246			168	265				
07:45		249	263	710	1149	174	243	593	1069	1303	2218
08:00		203	248			177	273				
08:15		235	217			182	252				
08:30		249	241			247	220				
08:45		330	206	1017	912	270	217	876	962	1893	1874
09:00		275	210			269	189				
09:15		332	190			300	197				
09:30		311	182			308	145				
09:45		338	175	1256	757	327	157	1204	688	2460	1445
10:00		344	135			359	140				
10:15		378	139			393	133				
10:30		397	130			385	121				
10:45		407	120	1526	524	**386**	107	1523	501	3049	1025
11:00		**378**	120			**411**	95				
11:15		**376**	114			**408**	73				
11:30		**416**	74			**404**	65				
11:45		**463**	67	1633	375	381	42	1604	275	3237	650
Total		7631	15170	7631	15170	6823	13777	6823	13777	14454	28947
Combined Total		22801		22801		20600		20600		43401	
AM Peak	-	11:00	-	-	-	10:45	-	-	-	-	-
Vol.	-	1633	-	-	-	1609	-	-	-	-	-
P.H.F.		0.882				0.979					
PM Peak	-	-	01:00	-	-	-	00:45	-	-	-	-
Vol.	-	-	1811	-	-	-	1645	-	-	-	-
P.H.F.			0.976				0.963				
Percentage		33.5%	66.5%			33.1%	66.9%				
ADT/AADT		ADT 43,401		AADT 43,401							

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
N/S: Redbay Avenue
E/W: Birch Street
24 Hour Entering Volume Count

BRE005EWS
Site Code: 105-24132

Start Time	2/10/24 Sat	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		22	202			9	201				
12:15		11	233			8	223				
12:30		20	221			13	210				
12:45		16	196	69	852	10	246	40	880	109	1732
01:00		4	243			7	218				
01:15		11	239			5	**236**				
01:30		7	**224**			7	**241**				
01:45		9	**239**	31	945	3	**248**	22	943	53	1888
02:00		7	**247**			4	**222**				
02:15		5	**258**			4	210				
02:30		5	222			5	187				
02:45		5	236	22	963	2	195	15	814	37	1777
03:00		4	229			4	187				
03:15		2	247			3	209				
03:30		5	229			4	193				
03:45		4	232	15	937	3	209	14	798	29	1735
04:00		2	190			5	164				
04:15		1	214			6	168				
04:30		1	205			6	179				
04:45		14	213	18	822	9	235	26	746	44	1568
05:00		4	232			8	199				
05:15		4	197			6	221				
05:30		11	170			10	191				
05:45		4	183	23	782	15	216	39	827	62	1609
06:00		14	171			13	183				
06:15		9	180			23	173				
06:30		27	159			20	151				
06:45		29	166	79	676	29	117	85	624	164	1300
07:00		27	176			24	117				
07:15		46	132			31	126				
07:30		54	119			50	95				
07:45		75	123	202	550	87	96	192	434	394	984
08:00		82	133			63	83				
08:15		94	122			88	82				
08:30		75	97			83	68				
08:45		100	71	351	423	93	73	327	306	678	729
09:00		111	96			105	65				
09:15		99	93			111	53				
09:30		129	72			105	46				
09:45		148	48	487	309	171	46	492	210	979	519
10:00		144	46			174	36				
10:15		149	66			188	37				
10:30		141	46			214	34				
10:45		163	45	597	203	216	28	792	135	1389	338
11:00		**197**	31			**192**	25				
11:15		**197**	29			**222**	20				
11:30		**236**	29			**231**	22				
11:45		**224**	13	854	102	**254**	12	899	79	1753	181
Total		2748	7564	2748	7564	2943	6796	2943	6796	5691	14360
Combined Total		10312		10312		9739		9739		20051	
AM Peak	-	11:00	-	-	-	11:00	-	-	-	-	-
Vol.	-	854	-	-	-	899	-	-	-	-	-
P.H.F.		0.905				0.885					
PM Peak	-	-	01:30	-	-	-	01:15	-	-	-	-
Vol.	-	-	968	-	-	-	947	-	-	-	-
P.H.F.			0.938				0.955				
Percentage		26.6%	73.4%			30.2%	69.8%				
ADT/AADT		ADT 20,051		AADT 20,051							

Counts Unlimited, Inc.

PO Box 1178
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City of Brea
N/S: Redbay Avenue
E/W: Birch Street
24 Hour Entering Volume Count

BRE005NSS
Site Code: 105-24132

Start Time	2/10/24 Sat	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	**13**			2	17				
12:15		3	**9**			0	7				
12:30		2	**5**			1	14				
12:45		0	**14**	5	41	0	5	3	43	8	84
01:00		1	9			3	15				
01:15		0	9			1	11				
01:30		0	8			4	10				
01:45		0	6	1	32	0	11	8	47	9	79
02:00		0	8			1	6				
02:15		0	3			1	9				
02:30		0	6			0	8				
02:45		0	5	0	22	2	9	4	32	4	54
03:00		0	10			1	5				
03:15		0	5			0	10				
03:30		0	7			0	**12**				
03:45		1	10	1	32	0	**14**	1	41	2	73
04:00		0	6			0	**13**				
04:15		0	11			0	**12**				
04:30		0	7			1	11				
04:45		0	13	0	37	2	11	3	47	3	84
05:00		1	4			2	10				
05:15		1	6			1	8				
05:30		2	8			1	13				
05:45		3	5	7	23	8	15	12	46	19	69
06:00		4	7			3	10				
06:15		1	3			5	13				
06:30		3	7			5	9				
06:45		3	7	11	24	3	12	16	44	27	68
07:00		4	4			4	11				
07:15		3	4			10	8				
07:30		7	5			4	9				
07:45		7	5	21	18	7	10	25	38	46	56
08:00		12	3			13	3				
08:15		3	8			21	6				
08:30		4	1			7	6				
08:45		11	3	30	15	13	10	54	25	84	40
09:00		11	1			14	4				
09:15		8	5			6	7				
09:30		5	2			12	4				
09:45		7	1	31	9	11	4	43	19	74	28
10:00		7	1			8	2				
10:15		10	2			**14**	4				
10:30		8	0			**13**	4				
10:45		2	0	27	3	**13**	2	48	12	75	15
11:00		**9**	3			**18**	10				
11:15		**12**	1			13	2				
11:30		**8**	1			10	1				
11:45		**8**	1	37	6	8	0	49	13	86	19
Total		171	262	171	262	266	407	266	407	437	669
Combined Total		433		433		673		673		1106	
AM Peak	-	11:00	-	-	-	10:15	-	-	-	-	-
Vol.	-	37	-	-	-	58	-	-	-	-	-
P.H.F.		0.771				0.806					
PM Peak	-	-	12:00	-	-	-	03:30	-	-	-	-
Vol.	-	-	41	-	-	-	51	-	-	-	-
P.H.F.			0.732				0.911				
Percentage		39.5%	60.5%			39.5%	60.5%				
ADT/AADT		ADT 1,106		AADT 1,106							

Appendix B-III

Existing Mercury Insurance Parking Lot Cut-Through & Poaching Counts

RK19750.1
JN: 2827-2023-05

Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 1
Greenbriar / Associated
7:00 AM - 9:00 AM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 1 SB Entering	**Destination:**	**Notes**
7:04:59	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	Work Van
7:12:21	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	Box Truck
7:20:48	Enter MPL 1 - Greenbriar/Aurora	Exited Mercury Parking Lot 3	Cut-through
7:34:32	Enter MPL 1 - Greenbriar/Aurora	Exited Mercury Parking Lot 3	Cut-through
8:56:26	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	3-Axle Box Truck

Counts Unlimited, Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
951-485-7934

Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 1
Greenbriar / Associated
4:00 PM to 6:00 PM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 1 SB Entering	**Destination:**	**Notes**
16:13:06	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	
16:19:10	Enter MPL 1 - Greenbriar/Aurora	Exited Mercury Parking Lot 3	Cut-through
16:23:52	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	
16:43:42	Enter MPL 1 - Greenbriar/Associated	Parked North side of Mercury Building	3-Axle Box Truck
17:13:47	Enter MPL 1 - Greenbriar/Associated	Exited Mercury Parking Lot 3	Cut-through

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Moreno Valley, CA 92557
951-485-7934

Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/10/2023
Mercury Parking Lot - Entrance 1
Greenbriar / Associated
12:00 PM to 3:00 PM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 1 SB Entering	**Destination:**	**Notes**
12:50:34	Enter MPL 1 - Greenbriar/Associated	Exited Mercury Parking Lot 3	Cut-through
13:04:39	Enter MPL 1 - Greenbriar/Aurora	Exited Mercury Parking Lot 2	Cut-through
13:50:35	Enter MPL 1 - Greenbriar/Associated	Parked Main side of Mercury Building	Appeared to be security guard for Mercury building

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Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 2
West Internal Driveway
7:00 AM to 9:00 AM

Time	Enter at Origin: Mercury Parking Lot - Entrance 2	Destination:	Notes
7:13:40	Entered MPL 2	Parked Main side of Mercury Building	Went into Mercury building
7:20:14	Entered MPL 2	Parked Main side of Mercury Building	Went into Mercury building
7:27:43	Entered MPL 2	Parked Main side of Mercury Building	Went into Mercury building
8:12:28	Entered MPL 2	Parked Main side of Mercury Building	Went into Mercury building

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Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 2
West Internal Driveway
4:00 PM to 6:00 PM

Time	Enter at Origin: Mercury Parking Lot - Entrance 2	Destination:	Notes
	NO ACTIVITY		

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Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/10/2023
Mercury Parking Lot - Entrance 2
West Internal Driveway
12:00 PM to 3:00 PM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 2	**Destination:**	**Notes**
12:02:35	Entered MPL 2	Parked Main side of Mercury Building	Walked across the street to shopping center
13:27:44	Entered MPL 2	Exited MPL 1 - Greenbriar/Associated	Cut-through
13:30:55	Entered MPL 2	Parked Main side of Mercury Building	Sat in car for 30 mintues, did not exit
13:36:08	Entered MPL 2	Exited MPL 3	Turned around
13:42:59	Entered MPL 2	Parked Main side of Mercury Building	Went into Mercury building
14:00:26	Entered MPL 2	Exited MPL 1 - Greenbriar/Associated	Cut-through
14:27:23	Entered MPL 2	Parked Main side of Mercury Building	Construction crew for parking lot
14:33:33	Entered MPL 2	Exited MPL 3	Construction crew for parking lot

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Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 3
East Internal Driveway
7:00 AM to 9:00 AM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 3	**Destination:**	**Notes**
7:21:08	Entered MPL 3	Parked at parking structure in front of Mercury Building	
7:23:14	Entered MPL 3	Parked Main side of Mercury Building	Went into Mercury building
7:25:54	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	Cut-through
7:43:32	Entered MPL 3	Parked North side of Mercury Building	
7:51:21	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	Cut-through
7:55:15	Entered MPL 3	Parked North side of Mercury Building	
8:30:44	Entered MPL 3	Parked at parking structure in front of Mercury Building	
8:35:24	Entered MPL 3	Parked Main side of Mercury Building	Went into Mercury building
8:46:43	Entered MPL 3	Parked North side of Mercury Building	Box Truck
8:52:35	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	Cut-through

Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/13/2023
Mercury Parking Lot - Entrance 3
East Internal Driveway
4:00 PM to 6:00 PM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 3	**Destination:**	**Notes**
16:07:17	Entered MPL 3	Parked Main side of Mercury Building	
16:18:04	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
16:24:43	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
16:39:03	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
16:40:07	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
16:49:39	Entered MPL 3	Exited Mercury Parking Lot 2	
16:51:12	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:01:21	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:03:33	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:12:26	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:14:24	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
17:29:31	Entered MPL 3	Parked North side of Mercury Building	
17:32:37	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:42:31	Entered MPL 3	Parked North side of Mercury Building	
17:44:31	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
17:45:36	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
17:45:39	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
17:45:54	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	

Counts Unlimited, Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
951-485-7934

Brea - Vehicle Tracking Study
Location: City of Brea
Date: 2/10/2023
Mercury Parking Lot - Entrance 3
East Internal Driveway
12:00 PM to 3:00 PM

Time	**Enter at Origin:** Mercury Parking Lot - Entrance 3	**Destination:**	**Notes**
12:03:01	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
12:29:33	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
12:31:07	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
12:32:51	Entered MPL 3	Exited MPL 1 - Greenbriar/Aurora	
12:35:49	Entered MPL 3	Exited MPL 2	
12:39:33	Entered MPL 3	Parked Main side of Mercury Building	Walked to shopping center
12:55:05	Entered MPL 3	Parked Main side of Mercury Building	Walked to shopping center
12:55:31	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
12:58:10	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
13:10:41	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
13:35:29	Entered MPL 3	Parked Main side of Mercury Building	Construction on parking lot
13:36:41	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
13:41:50	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
14:12:41	Entered MPL 3	Exited MPL 1 - Greenbriar/Associated	
14:24:40	Entered MPL 3	Parked North side of Mercury Building	
14:29:42	Entered MPL 3	Exited MPL 2	
14:30:44	Entered MPL 3	Parked Main side of Mercury Building	Construction on parking lot
14:48:41	Entered MPL 3	Exited MPL 2	

Counts Unlimited, Inc.
25286 Jaclyn Avenue
Moreno Valley, CA 92557
951-485-7934

Appendix B-IV

Signal Warrant Counts

RK19750.1
JN: 2827-2023-05

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
N/S: Associated Road
E/W: Shopping Center Driveway
24 Hour Entering Volume Count

BRE006EW
Site Code: 105-24132

Start Time	2/13/24 Tue	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon	Morning	Afternoon
12:00		2	**73**			0	0				
12:15		1	**104**			0	0				
12:30		0	**77**			0	0				
12:45		0	**100**	3	354	0	0	0	0	3	354
01:00		0	63			0	0				
01:15		0	77			0	0				
01:30		0	78			0	0				
01:45		1	71	1	289	0	0	0	0	1	289
02:00		0	76			0	0				
02:15		0	70			0	0				
02:30		1	69			0	0				
02:45		0	88	1	303	0	0	0	0	1	303
03:00		0	64			0	0				
03:15		0	79			0	0				
03:30		0	81			0	0				
03:45		0	83	0	307	0	0	0	0	0	307
04:00		0	69			0	0				
04:15		0	62			0	0				
04:30		2	63			0	0				
04:45		0	71	2	265	0	0	0	0	2	265
05:00		1	76			0	0				
05:15		3	74			0	0				
05:30		1	77			0	0				
05:45		1	67	6	294	0	0	0	0	6	294
06:00		7	63			0	0				
06:15		14	80			0	0				
06:30		17	90			0	0				
06:45		23	65	61	298	0	0	0	0	61	298
07:00		25	72			0	0				
07:15		17	67			0	0				
07:30		28	68			0	0				
07:45		33	60	103	267	0	0	0	0	103	267
08:00		34	55			0	0				
08:15		31	46			0	0				
08:30		33	38			0	0				
08:45		37	41	135	180	0	0	0	0	135	180
09:00		28	43			0	0				
09:15		51	39			0	0				
09:30		40	26			0	0				
09:45		29	26	148	134	0	0	0	0	148	134
10:00		34	18			0	0				
10:15		47	17			0	0				
10:30		45	5			0	0				
10:45		36	8	162	48	0	0	0	0	162	48
11:00		**52**	4			0	0				
11:15		**58**	3			0	0				
11:30		**77**	4			0	0				
11:45		**93**	2	280	13	0	0	0	0	280	13
Total		902	2752	902	2752	0	0	0	0	902	2752
Combined Total		3654		3654		0		0		3654	
AM Peak	-	11:00	-	-	-	-	-	-	-	-	-
Vol.	-	280	-	-	-	-	-	-	-	-	-
P.H.F.		0.753									
PM Peak	-	-	12:00	-	-	-	-	-	-	-	-
Vol.	-	-	354	-	-	-	-	-	-	-	-
P.H.F.			0.851								
Percentage		24.7%	75.3%			0.0%	0.0%				
ADT/AADT		ADT 3,654		AADT 3,654							

Counts Unlimited, Inc.

PO Box 1178
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Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Brea
N/S: Associated Road
E/W: Shopping Center Driveway
24 Hour Entering Volume Count

BRE006NS
Site Code: 105-24132

Start Time	2/13/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		8	98			3	109				
12:15		9	85			6	109				
12:30		7	97			3	110				
12:45		9	84	33	364	9	101	21	429	54	793
01:00		3	85			2	94				
01:15		3	108			2	99				
01:30		2	87			3	105				
01:45		4	105	12	385	4	86	11	384	23	769
02:00		3	95			0	114				
02:15		2	102			2	132				
02:30		1	141			2	110				
02:45		2	131	8	469	10	89	14	445	22	914
03:00		2	130			4	**129**				
03:15		4	116			8	**126**				
03:30		5	126			6	**138**				
03:45		5	136	16	508	9	**124**	27	517	43	1025
04:00		6	142			8	108				
04:15		6	143			12	121				
04:30		17	139			26	140				
04:45		28	142	57	566	21	115	67	484	124	1050
05:00		15	**157**			17	126				
05:15		14	**158**			29	110				
05:30		19	**158**			23	115				
05:45		41	**158**	89	631	36	112	105	463	194	1094
06:00		36	130			43	114				
06:15		48	112			50	118				
06:30		55	134			62	87				
06:45		66	105	205	481	76	88	231	407	436	888
07:00		70	115			**140**	77				
07:15		78	111			**78**	90				
07:30		**67**	84			**133**	71				
07:45		**85**	68	300	378	**113**	67	464	305	764	683
08:00		**94**	62			118	76				
08:15		**80**	79			95	42				
08:30		60	63			111	53				
08:45		89	68	323	272	126	45	450	216	773	488
09:00		66	48			77	43				
09:15		67	49			78	35				
09:30		73	46			95	28				
09:45		59	46	265	189	79	35	329	141	594	330
10:00		66	24			65	35				
10:15		68	23			70	29				
10:30		64	32			71	25				
10:45		71	16	269	95	74	10	280	99	549	194
11:00		75	19			89	8				
11:15		66	2			74	11				
11:30		84	9			109	14				
11:45		81	11	306	41	97	7	369	40	675	81
Total		1883	4379	1883	4379	2368	3930	2368	3930	4251	8309
Combined Total		6262		6262		6298		6298		12560	
AM Peak	-	07:30	-	-	-	07:00	-	-	-	-	-
Vol.	-	326	-	-	-	464	-	-	-	-	-
P.H.F.		0.867				0.829					
PM Peak	-	-	05:00	-	-	-	03:00	-	-	-	-
Vol.	-	-	631	-	-	-	517	-	-	-	-
P.H.F.			0.998				0.937				
Percentage		30.1%	69.9%			37.6%	62.4%				
ADT/AADT		ADT 12,560		AADT 12,560							

Counts Unlimited, Inc.

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City of Brea
N/S: Redbay Avenue
E/W: Birch Street
24 Hour Entering Volume Count

BRE005EW
Site Code: 105-24132

Start Time	2/13/24 Tue	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		11	197			3	203				
12:15		13	184			6	164				
12:30		11	216			2	182				
12:45		3	189	38	786	3	163	14	712	52	1498
01:00		4	199			5	182				
01:15		5	183			4	180				
01:30		3	207			2	151				
01:45		4	194	16	783	2	185	13	698	29	1481
02:00		2	202			2	164				
02:15		4	203			1	219				
02:30		3	228			3	221				
02:45		0	224	9	857	2	219	8	823	17	1680
03:00		2	288			3	241				
03:15		0	226			2	268				
03:30		5	244			5	266				
03:45		4	236	11	994	4	273	14	1048	25	2042
04:00		6	**284**			9	293				
04:15		9	**280**			6	269				
04:30		12	**248**			12	**302**				
04:45		19	**292**	46	1104	19	**287**	46	1151	92	2255
05:00		14	258			17	**317**				
05:15		14	281			15	**317**				
05:30		32	262			33	257				
05:45		42	228	102	1029	36	251	101	1142	203	2171
06:00		50	232			42	229				
06:15		58	212			34	222				
06:30		71	211			53	182				
06:45		119	197	298	852	96	171	225	804	523	1656
07:00		184	161			130	178				
07:15		176	166			156	129				
07:30		**212**	144			194	92				
07:45		**231**	116	803	587	**274**	106	754	505	1557	1092
08:00		**295**	154			**247**	101				
08:15		**248**	118			**218**	75				
08:30		196	89			**251**	63				
08:45		174	90	913	451	215	65	931	304	1844	755
09:00		135	80			146	93				
09:15		115	72			145	57				
09:30		119	63			121	49				
09:45		120	40	489	255	132	37	544	236	1033	491
10:00		110	47			127	31				
10:15		120	32			122	29				
10:30		148	32			131	19				
10:45		139	28	517	139	144	13	524	92	1041	231
11:00		114	18			152	18				
11:15		140	8			166	9				
11:30		170	20			163	12				
11:45		185	14	609	60	193	4	674	43	1283	103
Total		3851	7897	3851	7897	3848	7558	3848	7558	7699	15455
Combined Total		11748		11748		11406		11406		23154	
AM Peak	-	07:30	-	-	-	07:45	-	-	-	-	-
Vol.	-	986	-	-	-	990	-	-	-	-	-
P.H.F.		0.836				0.903					
PM Peak	-	-	04:00	-	-	-	04:30	-	-	-	-
Vol.	-	-	1104	-	-	-	1223	-	-	-	-
P.H.F.			0.945				0.965				
Percentage		32.8%	67.2%			33.7%	66.3%				
ADT/AADT		ADT 23,154		AADT 23,154							

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City of Brea
N/S: Redbay Avenue
E/W: Birch Street
24 Hour Entering Volume Count

BRE005NS
Site Code: 105-24132

Start Time	2/13/24 Tue	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		0	8			1	4				
12:15		0	8			0	7				
12:30		0	5			0	12				
12:45		0	9	0	30	0	7	1	30	1	60
01:00		0	9			0	11				
01:15		0	7			0	9				
01:30		1	3			1	9				
01:45		0	9	1	28	1	9	2	38	3	66
02:00		0	10			1	9				
02:15		0	7			0	5				
02:30		0	13			0	6				
02:45		0	5	0	35	0	9	1	29	1	64
03:00		1	6			0	9				
03:15		1	3			1	10				
03:30		0	10			0	10				
03:45		1	10	3	29	2	13	3	42	6	71
04:00		0	6			0	12				
04:15		0	7			1	7				
04:30		1	9			1	9				
04:45		1	7	2	29	3	**11**	5	39	7	68
05:00		3	10			1	**12**				
05:15		1	7			7	**14**				
05:30		3	**11**			9	**10**				
05:45		4	**15**	11	43	6	10	23	46	34	89
06:00		5	**9**			7	4				
06:15		4	**10**			10	9				
06:30		7	8			9	9				
06:45		6	7	22	34	9	9	35	31	57	65
07:00		9	2			**19**	14				
07:15		9	5			**22**	12				
07:30		12	4			**14**	9				
07:45		**14**	2	44	13	**15**	5	70	40	114	53
08:00		**19**	3			15	6				
08:15		**15**	6			14	4				
08:30		**19**	2			15	3				
08:45		14	6	67	17	14	10	58	23	125	40
09:00		4	0			8	2				
09:15		6	1			10	7				
09:30		9	2			9	4				
09:45		3	2	22	5	7	5	34	18	56	23
10:00		7	2			14	3				
10:15		7	0			7	3				
10:30		6	0			5	4				
10:45		3	0	23	2	8	0	34	10	57	12
11:00		5	0			6	2				
11:15		4	0			15	1				
11:30		8	0			9	0				
11:45		7	0	24	0	6	0	36	3	60	3
Total		219	265	219	265	302	349	302	349	521	614
Combined Total		484		484		651		651		1135	
AM Peak	-	07:45	-	-	-	07:00	-	-	-	-	-
Vol.	-	67	-	-	-	70	-	-	-	-	-
P.H.F.		0.882				0.795					
PM Peak	-	-	05:30	-	-	-	04:45	-	-	-	-
Vol.	-	-	45	-	-	-	47	-	-	-	-
P.H.F.			0.750				0.839				
Percentage		45.2%	54.8%			46.4%	53.6%				
ADT/AADT		ADT 1,135		AADT 1,135							

Appendix C

Intersection Analysis Worksheets
Existing Conditions

RK19750.1
JN: 2827-2023-05

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	170.4
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	25	0	37	21	0	45	24	925	10	16	908	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	0	37	21	0	45	24	925	10	16	908	15
Peak Hour Factor	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	11	6	0	14	7	281	3	5	275	5
Total Analysis Volume [veh/h]	30	0	45	25	0	55	29	1123	12	19	1102	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.70	0.00	0.10	0.57	0.00	0.12	0.05	0.01	0.00	0.03	0.01	0.00
d_M, Delay for Movement [s/veh]	170.38	195.07	93.66	135.62	162.78	61.76	11.10	0.00	0.00	11.08	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	4.26	4.26	4.26	3.62	3.62	3.62	0.15	0.00	0.00	0.10	0.00	0.00
95th-Percentile Queue Length [ft/ln]	106.51	106.51	106.51	90.62	90.62	90.62	3.68	0.00	0.00	2.40	0.00	0.00
d_A, Approach Delay [s/veh]	124.35			84.84			0.28			0.18		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	6.77											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.2
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.662

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	197	5	325	26	20	12	3	842	133	264	741	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	197	5	325	26	20	12	3	842	133	264	741	2
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	1	94	8	6	3	1	245	39	77	215	1
Total Analysis Volume [veh/h]	229	6	378	30	23	14	3	979	155	307	862	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	13	48	48	0	35	0	10	52	0	15	57	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	54	69	41	41	1	38	38	11	49	49
g / C, Green / Cycle	0.08	0.47	0.60	0.35	0.35	0.01	0.33	0.33	0.10	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.07	0.00	0.20	0.02	0.02	0.00	0.31	0.29	0.09	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	274	887	1135	658	672	11	633	633	335	803	803
d1, Uniform Delay [s]	52.27	16.40	11.64	24.42	24.49	56.88	36.81	36.09	51.55	24.82	24.81
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.27	0.24	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.64	0.01	0.79	0.13	0.16	12.13	12.52	8.35	10.10	0.56	0.56
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.01	0.33	0.05	0.06	0.27	0.92	0.87	0.92	0.54	0.54
d, Delay for Lane Group [s/veh]	58.91	16.41	12.43	24.55	24.64	69.01	49.33	44.44	61.65	25.38	25.37
Lane Group LOS	E	B	B	C	C	E	D	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.45	0.09	4.74	0.57	0.71	0.12	17.02	15.33	4.73	8.44	8.43
50th-Percentile Queue Length [ft/ln]	86.28	2.15	118.57	14.31	17.69	3.07	425.57	383.32	118.27	210.98	210.77
95th-Percentile Queue Length [veh/ln]	6.21	0.15	8.31	1.03	1.27	0.22	23.79	21.75	8.30	13.20	13.19
95th-Percentile Queue Length [ft/ln]	155.30	3.86	207.86	25.76	31.84	5.52	594.73	543.86	207.44	330.09	329.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.91	16.41	12.43	24.55	24.64	24.64	69.01	47.34	44.44	61.65	25.38	25.37
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	29.84			24.60			47.00			34.89		
Approach LOS	C			C			D			C		
d_I, Intersection Delay [s/veh]	38.23											
Intersection LOS	D											
Intersection V/C	0.662											

Emissions

Vehicle Miles Traveled [mph]	14.96	0.39	24.69	1.17	1.45	0.16	30.26	28.87	25.79	36.30	36.27
Stops [stops/h]	216.07	2.69	148.47	17.92	22.15	3.84	532.89	479.98	296.18	264.19	263.92
Fuel consumption [US gal/h]	5.40	0.06	3.30	0.27	0.34	0.10	13.49	11.96	8.42	6.76	6.75
CO [g/h]	377.70	4.23	230.61	18.97	23.46	6.66	942.80	836.33	588.39	472.60	472.14
NOx [g/h]	73.49	0.82	44.87	3.69	4.57	1.30	183.43	162.72	114.48	91.95	91.86
VOC [g/h]	87.54	0.98	53.45	4.40	5.44	1.54	218.50	193.83	136.37	109.53	109.42

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersectio	2.702	1.973	3.011	3.131
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	765	539	835	922
d_b, Bicycle Delay [s]	21.92	30.68	19.52	16.71
l_b,int, Bicycle LOS Score for Intersection	2.571	1.670	2.498	2.526
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	6.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.170

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	12	328	5	13	407	4	8	1	31	30	1	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	328	5	13	407	4	8	1	31	30	1	37
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	88	1	3	110	1	2	0	8	8	0	10
Total Analysis Volume [veh/h]	13	353	5	14	438	4	9	1	33	32	1	40
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	26	0	0	26	0	0	56	0	0	56	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	0	60	0	0	60	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.01	0.09	0.09	0.01	0.12	0.12	0.02	0.04
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1520	1621	1621	1529	1621	1621	159	168
d1, Uniform Delay [s]	0.98	1.07	1.07	0.98	1.10	1.10	40.84	41.52
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.01	0.14	0.14	0.01	0.18	0.18	0.91	1.77
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.11	0.11	0.01	0.14	0.14	0.27	0.43
d, Delay for Lane Group [s/veh]	0.99	1.21	1.21	0.99	1.28	1.28	41.75	43.28
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.12	0.12	0.01	0.16	0.16	0.96	1.67
50th-Percentile Queue Length [ft/ln]	0.21	3.09	3.08	0.22	3.92	3.91	24.01	41.76
95th-Percentile Queue Length [veh/ln]	0.02	0.22	0.22	0.02	0.28	0.28	1.73	3.01
95th-Percentile Queue Length [ft/ln]	0.38	5.56	5.54	0.40	7.05	7.03	43.21	75.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.99	1.21	1.21	0.99	1.28	1.28	41.75	41.75	41.75	43.28	43.28	43.28
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.20			1.27			41.75			43.28		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	6.34											
Intersection LOS	A											
Intersection V/C	0.170											

Emissions

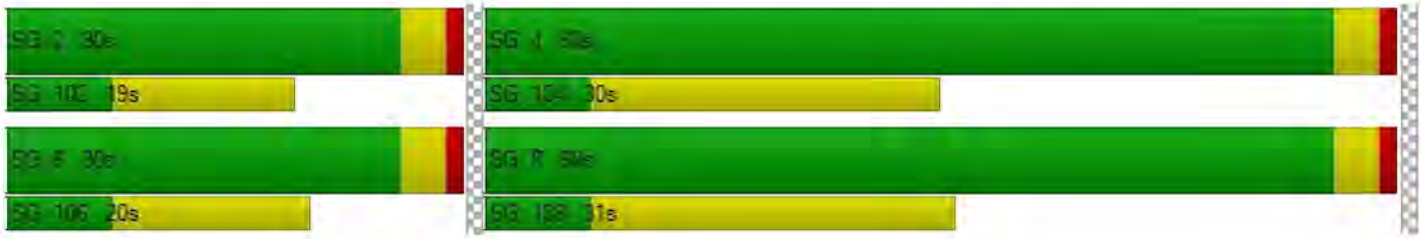
Vehicle Miles Traveled [mph]	0.45	6.15	6.14	0.45	7.09	7.07	0.82	1.72
Stops [stops/h]	0.33	4.94	4.93	0.36	6.27	6.25	38.41	66.81
Fuel consumption [US gal/h]	0.02	0.31	0.31	0.02	0.37	0.37	0.55	0.98
CO [g/h]	1.53	21.90	21.83	1.57	26.07	26.01	38.42	68.28
NOx [g/h]	0.30	4.26	4.25	0.31	5.07	5.06	7.48	13.28
VOC [g/h]	0.35	5.07	5.06	0.36	6.04	6.03	8.90	15.82

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.572	2.535	1.758	1.772
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	1.866	1.936	1.631	1.680
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	17.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.182

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	42	282	404	61	59	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	282	404	61	59	68
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	76	109	16	16	18
Total Analysis Volume [veh/h]	45	304	436	66	64	73
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.18	0.10
d_M, Delay for Movement [s/veh]	8.55	0.00	0.00	0.00	17.49	10.33
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.13	0.00	0.00	0.00	0.65	0.32
95th-Percentile Queue Length [ft/ln]	3.33	0.00	0.00	0.00	16.37	8.07
d_A, Approach Delay [s/veh]	1.10		0.00		13.67	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.29					
Intersection LOS	C					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	21.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.577

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	889	63	704	0	0	80	66	1318	434	0	1443	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	889	63	704	0	0	80	66	1318	434	0	1443	9
Peak Hour Factor	0.9280	0.9280	0.9280	1.0000	1.0000	0.9280	0.9280	0.9280	0.9280	1.0000	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	239	17	190	0	0	22	18	355	117	0	389	2
Total Analysis Volume [veh/h]	958	68	759	0	0	86	71	1420	468	0	1555	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	12	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	33	0	0	0	94	10	57	0	0	47	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	48	48	48	5	5	34	25	25
g / C, Green / Cycle	0.54	0.54	0.54	0.06	0.06	0.37	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.25	0.24	0.24	0.02	0.04	0.25	0.21	0.21
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1800	5700	5700	1900
c, Capacity [veh/h]	1880	1021	1021	195	100	2131	1560	520
d1, Uniform Delay [s]	12.87	12.65	12.65	41.14	41.77	23.49	29.89	29.89
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.84	1.40	1.40	1.56	8.81	0.36	0.75	2.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.47	0.44	0.44	0.44	0.71	0.67	0.75	0.75
d, Delay for Lane Group [s/veh]	13.71	14.05	14.05	42.70	50.58	23.86	30.64	32.12
Lane Group LOS	B	B	B	D	D	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.30	5.54	5.54	0.96	1.71	7.57	7.20	7.41
50th-Percentile Queue Length [ft/ln]	132.57	138.59	138.59	23.90	42.76	189.13	179.93	185.26
95th-Percentile Queue Length [veh/ln]	9.08	9.40	9.40	1.72	3.08	12.08	11.60	11.87
95th-Percentile Queue Length [ft/ln]	226.99	235.12	235.12	43.02	76.96	301.90	289.93	296.87

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.73	14.05	14.05	0.00	0.00	42.70	50.58	23.86	0.00	0.00	31.00	32.12
Movement LOS	B	B	B			D	D	C			C	C
d_A, Approach Delay [s/veh]	13.88			42.70			19.46			31.01		
Approach LOS	B			D			B			C		
d_I, Intersection Delay [s/veh]	21.52											
Intersection LOS	C											
Intersection V/C	0.577											

Emissions

Vehicle Miles Traveled [mph]	76.79	39.54	39.54	4.29	6.63	132.54	40.18	13.39
Stops [stops/h]	424.24	221.74	221.74	76.49	68.41	907.83	863.67	296.41
Fuel consumption [US gal/h]	7.96	4.15	4.15	1.35	2.00	25.27	21.92	7.56
CO [g/h]	556.30	289.93	289.93	94.12	140.00	1766.21	1532.39	528.14
NOx [g/h]	108.24	56.41	56.41	18.31	27.24	343.64	298.15	102.76
VOC [g/h]	128.93	67.19	67.19	21.81	32.45	409.34	355.15	122.40

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.647	2.188	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	644	133	1178	956
d_b, Bicycle Delay [s]	20.67	39.20	7.61	12.27
I_b,int, Bicycle LOS Score for Intersection	4.505	1.560	2.380	2.205
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.552

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	889	63	704	0	0	80	66	1318	434	0	1443	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	889	63	704	0	0	80	66	1318	434	0	1443	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	222	16	176	0	0	20	17	330	109	0	361	2
Total Analysis Volume [veh/h]	889	63	704	0	0	80	66	1318	434	0	1443	9
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.17	0.23	0.23	0.00	0.00	0.02	0.04	0.26	0.00	0.00	0.21	0.21
Intersection LOS	A											
Intersection V/C	0.552											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.8
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.624

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	122	116	79	107	220	148	167	1631	125	117	1223	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	122	116	79	107	220	148	167	1631	125	117	1223	41
Peak Hour Factor	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	30	20	27	56	38	43	418	32	30	314	11
Total Analysis Volume [veh/h]	125	119	81	110	226	152	171	1673	128	120	1254	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	10	39	0	10	39	0	25	57	0	14	46	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	45	45	6	45	45	13	44	44	10	40	40
g / C, Green / Cycle	0.05	0.37	0.37	0.05	0.37	0.37	0.11	0.36	0.36	0.08	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.05	0.03	0.12	0.08	0.10	0.31	0.32	0.07	0.17	0.18
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	175	710	710	171	708	708	202	1381	690	146	1891	630
d1, Uniform Delay [s]	56.16	24.90	24.79	56.05	26.82	25.69	52.22	35.46	35.74	54.31	32.17	32.69
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.26	0.24	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.33	0.43	0.40	4.03	1.19	0.69	9.23	1.75	8.54	21.71	0.21	0.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.15	0.14	0.64	0.32	0.21	0.84	0.86	0.88	0.82	0.50	0.54
d, Delay for Lane Group [s/veh]	61.49	25.34	25.19	60.08	28.01	26.38	61.46	37.21	44.28	76.01	32.38	33.43
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.97	2.01	1.85	1.71	4.74	3.04	5.48	15.90	17.60	4.39	7.25	8.05
50th-Percentile Queue Length [ft/ln]	49.14	50.36	46.29	42.66	118.56	76.01	137.06	397.58	440.03	109.70	181.33	201.18
95th-Percentile Queue Length [veh/ln]	3.54	3.63	3.33	3.07	8.31	5.47	9.32	22.44	24.48	7.82	11.67	12.70
95th-Percentile Queue Length [ft/ln]	88.46	90.65	83.32	76.80	207.84	136.82	233.06	561.09	612.03	195.58	291.76	317.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.49	25.32	25.19	60.08	28.01	26.38	61.46	39.23	44.28	76.01	32.63	33.43
Movement LOS	E	C	C	E	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	39.20			34.73			41.49			36.33		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	38.79											
Intersection LOS	D											
Intersection V/C	0.624											

Emissions

Vehicle Miles Traveled [mph]	9.73	8.09	7.47	7.14	14.67	9.87	10.17	71.03	36.13	7.36	58.46	21.04
Stops [stops/h]	117.95	60.43	55.54	102.39	142.27	91.22	164.47	954.20	528.03	131.64	652.80	241.42
Fuel consumption [US gal/h]	3.07	1.42	1.31	2.61	3.21	2.07	4.12	20.96	11.95	3.41	14.79	5.46
CO [g/h]	214.66	99.22	91.25	182.20	224.48	144.38	287.88	1464.84	835.50	238.56	1033.52	381.53
NOx [g/h]	41.77	19.31	17.75	35.45	43.68	28.09	56.01	285.01	162.56	46.41	201.09	74.23
VOC [g/h]	49.75	23.00	21.15	42.23	52.03	33.46	66.72	339.49	193.63	55.29	239.53	88.42

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.640	2.644	3.308	3.272
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	883	700
d_b, Bicycle Delay [s]	30.10	30.10	18.70	25.35
I_b,int, Bicycle LOS Score for Intersection	1.828	2.365	2.644	2.144
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	14.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	114	14	108	24	15	24	15	1627	281	151	1249	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	114	14	108	24	15	24	15	1627	281	151	1249	17
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	4	28	6	4	6	4	416	72	39	319	4
Total Analysis Volume [veh/h]	117	14	110	25	15	25	15	1664	287	154	1277	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	11	30	0	14	33	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	8	8	5	5	2	56	56	10	64	64
g / C, Green / Cycle	0.08	0.08	0.08	0.05	0.05	0.02	0.59	0.59	0.11	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.04	0.03	0.06	0.01	0.02	0.01	0.29	0.15	0.09	0.22	0.23
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	151	160	160	93	98	38	3359	1120	192	2564	1282
d1, Uniform Delay [s]	41.35	41.28	42.30	43.30	43.62	45.92	11.32	9.44	41.48	6.47	6.55
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.93	1.69	5.19	1.52	2.67	6.73	0.52	0.55	7.66	0.35	0.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.43	0.41	0.69	0.27	0.41	0.40	0.50	0.26	0.80	0.33	0.35
d, Delay for Lane Group [s/veh]	43.28	42.97	47.49	44.82	46.29	52.65	11.84	9.99	49.14	6.82	7.29
Lane Group LOS	D	D	D	D	D	D	B	A	D	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.54	1.54	2.74	0.59	0.96	0.41	6.03	2.70	3.82	2.99	3.29
50th-Percentile Queue Length [ft/ln]	38.46	38.52	68.58	14.73	23.98	10.26	150.78	67.61	95.42	74.72	82.27
95th-Percentile Queue Length [veh/ln]	2.77	2.77	4.94	1.06	1.73	0.74	10.06	4.87	6.87	5.38	5.92
95th-Percentile Queue Length [ft/ln]	69.23	69.34	123.45	26.51	43.16	18.47	251.47	121.70	171.76	134.50	148.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.14	42.97	47.49	44.82	46.29	46.29	52.65	11.84	9.99	49.14	6.98	7.29
Movement LOS	D	D	D	D	D	D	D	B	A	D	A	A
d_A, Approach Delay [s/veh]	45.12			45.73			11.88			11.47		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	14.47											
Intersection LOS	B											
Intersection V/C	0.549											

Emissions

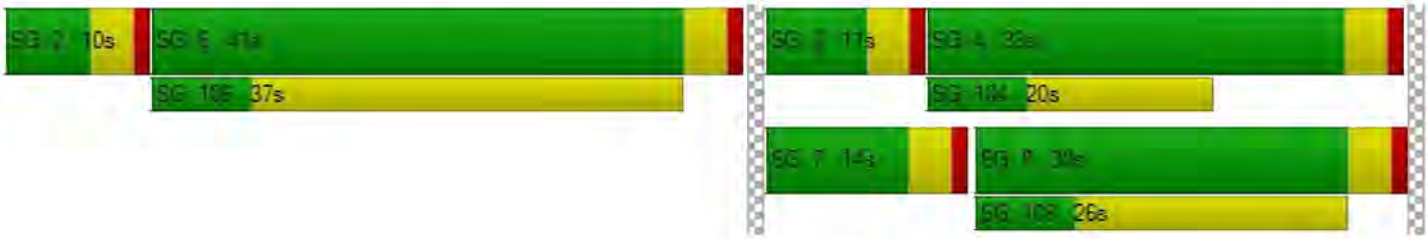
Vehicle Miles Traveled [mph]	3.73	3.76	6.29	1.22	1.95	0.80	88.35	15.24	11.58	63.96	33.37
Stops [stops/h]	58.30	58.39	103.96	22.32	36.35	15.56	685.64	102.48	144.64	226.52	124.71
Fuel consumption [US gal/h]	0.97	0.97	1.74	0.49	0.80	0.34	13.91	2.14	3.38	5.70	3.08
CO [g/h]	67.53	67.66	121.95	34.33	56.19	23.91	972.35	149.32	235.96	398.18	215.21
NOx [g/h]	13.14	13.16	23.73	6.68	10.93	4.65	189.18	29.05	45.91	77.47	41.87
VOC [g/h]	15.65	15.68	28.26	7.96	13.02	5.54	225.35	34.61	54.69	92.28	49.88

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.275	1.991	0.000	3.199
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	611
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.93
I_b,int, Bicycle LOS Score for Intersection	1.957	1.667	2.641	2.356
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	8.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	0	1	0	40	15	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	0	40	15	4
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	13	5	1
Total Analysis Volume [veh/h]	0	1	0	53	20	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.88	8.42	7.26	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.07	0.07	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.42		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.11					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	381.0
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.952

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	11	0	15	18	0	29	46	1187	27	15	1325	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	15	18	0	29	46	1187	27	15	1325	39
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	4	5	0	8	12	319	7	4	357	10
Total Analysis Volume [veh/h]	12	0	16	19	0	31	50	1278	29	16	1426	42
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.55	0.00	0.04	0.95	0.00	0.09	0.11	0.01	0.00	0.03	0.01	0.00
d_M, Delay for Movement [s/veh]	245.65	346.34	89.98	380.96	463.07	210.45	13.87	0.00	0.00	12.07	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	2.24	2.24	2.24	4.45	4.45	4.45	0.37	0.00	0.00	0.09	0.00	0.00
95th-Percentile Queue Length [ft/ln]	55.90	55.90	55.90	111.14	111.14	111.14	9.18	0.00	0.00	2.35	0.00	0.00
d_A, Approach Delay [s/veh]	156.69			275.24			0.51			0.13		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	6.52											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.0
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.645

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	361	21	306	17	13	9	8	983	233	223	1012	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	361	21	306	17	13	9	8	983	233	223	1012	24
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	93	5	79	4	3	2	2	254	60	58	262	6
Total Analysis Volume [veh/h]	374	22	317	18	13	9	8	1018	241	231	1048	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	18	53	53	0	35	0	19	54	0	13	48	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	55	68	37	37	1	44	44	9	52	52
g / C, Green / Cycle	0.12	0.46	0.57	0.31	0.31	0.01	0.37	0.37	0.08	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.11	0.01	0.17	0.01	0.01	0.00	0.34	0.32	0.07	0.28	0.28
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	408	871	1077	573	586	23	696	696	263	815	815
d1, Uniform Delay [s]	52.42	17.80	13.51	28.98	29.02	58.76	36.57	35.47	54.97	27.31	27.23
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.33	0.30	0.11	0.17	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.48	0.05	0.70	0.10	0.12	9.08	15.63	9.32	9.27	1.41	1.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.03	0.29	0.03	0.04	0.35	0.93	0.88	0.88	0.66	0.66
d, Delay for Lane Group [s/veh]	60.89	17.85	14.21	29.08	29.14	67.84	52.20	44.80	64.24	28.72	28.58
Lane Group LOS	E	B	B	C	C	E	D	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	5.95	0.34	4.43	0.39	0.47	0.29	20.32	17.58	3.71	11.93	11.80
50th-Percentile Queue Length [ft/ln]	148.67	8.51	110.78	9.67	11.83	7.33	507.94	439.50	92.75	298.33	295.09
95th-Percentile Queue Length [veh/ln]	9.95	0.61	7.88	0.70	0.85	0.53	27.71	24.46	6.68	17.60	17.44
95th-Percentile Queue Length [ft/ln]	248.65	15.32	197.09	17.41	21.30	13.19	692.75	611.41	166.95	439.97	435.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.89	17.85	14.21	29.08	29.14	29.14	67.84	49.52	44.80	64.24	28.65	28.58
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	38.81			29.11			48.73			34.95		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	40.96											
Intersection LOS	D											
Intersection V/C	0.645											

Emissions

Vehicle Miles Traveled [mph]	24.42	1.44	20.70	0.70	0.86	0.42	33.83	31.82	19.40	45.23	44.90
Stops [stops/h]	356.81	10.21	132.94	11.61	14.20	8.79	609.53	527.40	222.61	358.00	354.11
Fuel consumption [US gal/h]	9.01	0.23	2.96	0.18	0.22	0.23	15.63	13.21	6.45	9.15	9.05
CO [g/h]	630.08	16.20	207.18	12.77	15.63	16.36	1092.55	923.39	451.01	639.45	632.67
NOx [g/h]	122.59	3.15	40.31	2.49	3.04	3.18	212.57	179.66	87.75	124.41	123.09
VOC [g/h]	146.03	3.75	48.02	2.96	3.62	3.79	253.21	214.00	104.53	148.20	146.63

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
l_p,int, Pedestrian LOS Score for Intersectio	2.726	1.980	3.124	3.140
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	817	517	833	733
d_b, Bicycle Delay [s]	21.00	33.00	20.42	24.07
l_b,int, Bicycle LOS Score for Intersection	2.736	1.626	2.605	2.635
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	4.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.227

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	20	549	29	24	468	3	8	4	15	13	10	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	549	29	24	468	3	8	4	15	13	10	36
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	146	8	6	125	1	2	1	4	3	3	10
Total Analysis Volume [veh/h]	21	585	31	26	498	3	9	4	16	14	11	38
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	31	0	0	31	0	0	59	0	0	59	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.01	0.16	0.16	0.01	0.13	0.13	0.02	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1521	1627	1627	1509	1627	1627	157	153
d1, Uniform Delay [s]	0.94	1.11	1.11	0.95	1.07	1.07	40.80	41.56
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.26	0.26	0.02	0.20	0.20	0.56	1.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.19	0.19	0.02	0.15	0.15	0.18	0.41
d, Delay for Lane Group [s/veh]	0.96	1.38	1.37	0.97	1.28	1.27	41.37	43.31
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.20	0.20	0.01	0.16	0.16	0.64	1.44
50th-Percentile Queue Length [ft/ln]	0.30	5.11	5.01	0.37	3.96	3.95	16.07	36.07
95th-Percentile Queue Length [veh/ln]	0.02	0.37	0.36	0.03	0.29	0.28	1.16	2.60
95th-Percentile Queue Length [ft/ln]	0.54	9.20	9.03	0.67	7.13	7.12	28.92	64.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.96	1.37	1.37	0.97	1.28	1.27	41.37	41.37	41.37	43.31	43.31	43.31
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.36			1.26			41.37			43.31		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	4.34											
Intersection LOS	A											
Intersection V/C	0.227											

Emissions

Vehicle Miles Traveled [mph]	0.72	10.66	10.49	0.83	8.03	8.02	0.55	1.49
Stops [stops/h]	0.48	8.18	8.02	0.60	6.34	6.33	25.71	57.71
Fuel consumption [US gal/h]	0.03	0.55	0.54	0.04	0.42	0.41	0.37	0.84
CO [g/h]	2.42	38.37	37.72	2.85	29.02	28.97	25.70	58.96
NOx [g/h]	0.47	7.47	7.34	0.56	5.65	5.64	5.00	11.47
VOC [g/h]	0.56	8.89	8.74	0.66	6.73	6.71	5.96	13.67

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.622	2.613	1.770	1.802
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	1222	1222
d_b, Bicycle Delay [s]	22.05	22.05	6.81	6.81
I_b,int, Bicycle LOS Score for Intersection	2.085	1.994	1.607	1.664
Bicycle LOS	B	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	30.2
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.446

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	95	532	367	95	109	181
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	95	532	367	95	109	181
Peak Hour Factor	0.9680	0.9680	0.9680	0.9680	0.9680	0.9680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	137	95	25	28	47
Total Analysis Volume [veh/h]	98	550	379	98	113	187
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.01	0.00	0.00	0.45	0.25
d_M, Delay for Movement [s/veh]	8.66	0.00	0.00	0.00	30.17	11.25
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.30	0.00	0.00	0.00	2.15	0.96
95th-Percentile Queue Length [ft/ln]	7.46	0.00	0.00	0.00	53.80	24.04
d_A, Approach Delay [s/veh]	1.31		0.00		18.38	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.46					
Intersection LOS	D					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.5
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1105	95	623	0	0	196	174	1424	230	0	1533	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1105	95	623	0	0	196	174	1424	230	0	1533	32
Peak Hour Factor	0.9810	0.9810	0.9810	1.0000	1.0000	0.9810	0.9810	0.9810	0.9810	1.0000	0.9810	0.9810
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	282	24	159	0	0	50	44	363	59	0	391	8
Total Analysis Volume [veh/h]	1126	97	635	0	0	200	177	1452	234	0	1563	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	15	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	34	0	0	0	99	25	61	0	0	36	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	45	45	45	12	12	42	26	26
g / C, Green / Cycle	0.48	0.48	0.48	0.12	0.12	0.44	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.26	0.25	0.25	0.06	0.10	0.25	0.21	0.21
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1800	5700	5700	1900
c, Capacity [veh/h]	1668	906	906	436	224	2503	1554	518
d1, Uniform Delay [s]	17.62	17.30	17.30	38.62	40.38	20.05	31.82	31.82
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.30	2.14	2.14	0.76	6.13	0.21	0.83	2.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.55	0.52	0.52	0.46	0.79	0.58	0.77	0.77
d, Delay for Lane Group [s/veh]	18.92	19.44	19.44	39.37	46.51	20.26	32.65	34.28
Lane Group LOS	B	B	B	D	D	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	7.06	7.37	7.37	2.19	4.18	7.22	7.90	8.13
50th-Percentile Queue Length [ft/ln]	176.43	184.25	184.25	54.82	104.44	180.39	197.50	203.35
95th-Percentile Queue Length [veh/ln]	11.41	11.82	11.82	3.95	7.52	11.62	12.51	12.81
95th-Percentile Queue Length [ft/ln]	285.35	295.55	295.55	98.68	187.99	290.52	312.74	320.29

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.01	19.44	19.44	0.00	0.00	39.37	46.51	20.26	0.00	0.00	33.03	34.28
Movement LOS	B	B	B			D	D	C			C	C
d_A, Approach Delay [s/veh]	19.18			39.37			20.26			33.06		
Approach LOS	B			D			C			C		
d_I, Intersection Delay [s/veh]	24.47											
Intersection LOS	C											
Intersection V/C	0.652											

Emissions

Vehicle Miles Traveled [mph]	56.63	29.16	29.16	9.98	16.52	135.52	40.98	13.66
Stops [stops/h]	534.87	279.28	279.28	166.20	158.31	820.29	898.10	308.24
Fuel consumption [US gal/h]	8.81	4.61	4.61	2.93	4.66	23.12	23.11	7.97
CO [g/h]	615.87	322.09	322.09	204.91	325.63	1615.93	1615.50	557.27
NOx [g/h]	119.83	62.67	62.67	39.87	63.36	314.40	314.32	108.42
VOC [g/h]	142.73	74.65	74.65	47.49	75.47	374.51	374.41	129.15

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.664	2.257	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	632	442	1200	674
d_b, Bicycle Delay [s]	22.24	28.82	7.60	20.89
I_b,int, Bicycle LOS Score for Intersection	4.625	1.560	2.456	2.218
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1105	95	623	0	0	196	174	1424	230	0	1533	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1105	95	623	0	0	196	174	1424	230	0	1533	32
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	276	24	156	0	0	49	44	356	58	0	383	8
Total Analysis Volume [veh/h]	1105	95	623	0	0	196	174	1424	230	0	1533	32
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.22	0.25	0.25	0.00	0.00	0.06	0.10	0.28	0.12	0.00	0.22	0.22
Intersection LOS	B											
Intersection V/C	0.651											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	42.5
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.646

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	150	208	135	234	202	121	215	1579	130	164	1325	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	150	208	135	234	202	121	215	1579	130	164	1325	205
Peak Hour Factor	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	52	34	59	51	30	54	398	33	41	334	52
Total Analysis Volume [veh/h]	151	209	136	236	203	122	217	1590	131	165	1334	206
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	13	39	0	14	40	0	25	50	0	17	42	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	40	40	10	43	43	16	41	41	13	37	37
g / C, Green / Cycle	0.06	0.34	0.34	0.08	0.36	0.36	0.14	0.34	0.34	0.11	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.04	0.10	0.09	0.07	0.11	0.06	0.12	0.30	0.30	0.09	0.20	0.20
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	210	639	639	290	682	682	248	1296	648	192	1765	588
d1, Uniform Delay [s]	55.40	29.24	28.93	54.10	27.60	26.34	50.70	37.25	37.48	52.73	35.85	35.92
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.21	0.11	0.31	0.29	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.55	1.12	0.97	5.45	1.11	0.57	16.29	2.14	11.67	24.28	0.41	1.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.72	0.28	0.26	0.81	0.30	0.18	0.87	0.88	0.89	0.86	0.65	0.66
d, Delay for Lane Group [s/veh]	59.95	30.36	29.90	59.56	28.71	26.92	66.99	39.38	49.15	77.01	36.26	37.67
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.34	3.97	3.53	3.67	4.30	2.46	7.40	15.60	17.63	6.10	9.54	9.85
50th-Percentile Queue Length [ft/ln]	58.57	99.23	88.21	91.63	107.56	61.39	184.92	389.95	440.67	152.44	238.43	246.30
95th-Percentile Queue Length [veh/ln]	4.22	7.14	6.35	6.60	7.70	4.42	11.86	22.08	24.51	10.15	14.60	15.00
95th-Percentile Queue Length [ft/ln]	105.43	178.61	158.78	164.94	192.61	110.50	296.43	551.88	612.80	253.68	365.05	374.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.95	30.30	29.90	59.56	28.71	26.92	66.99	42.14	49.15	77.01	36.45	37.67
Movement LOS	E	C	C	E	C	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	39.22			41.30			45.39			40.53		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	42.49											
Intersection LOS	D											
Intersection V/C	0.646											

Emissions

Vehicle Miles Traveled [mph]	11.75	14.13	12.71	15.32	13.18	7.92	12.91	67.94	34.45	10.12	70.70	23.76
Stops [stops/h]	140.57	119.08	105.85	219.92	129.08	73.67	221.91	935.88	528.80	182.93	858.35	295.56
Fuel consumption [US gal/h]	3.64	2.80	2.49	5.57	2.93	1.68	5.60	20.78	12.22	4.75	19.47	6.72
CO [g/h]	254.70	195.56	174.00	389.29	204.54	117.13	391.46	1452.44	854.21	331.69	1360.97	469.99
NOx [g/h]	49.56	38.05	33.85	75.74	39.80	22.79	76.16	282.59	166.20	64.53	264.80	91.44
VOC [g/h]	59.03	45.32	40.33	90.22	47.41	27.15	90.72	336.62	197.97	76.87	315.42	108.93

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.682	2.725	3.315	3.335
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	600	767	633
d_b, Bicycle Delay [s]	30.10	29.40	22.82	28.02
I_b,int, Bicycle LOS Score for Intersection	1.969	2.485	2.626	2.263
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	18.2
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.643

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	152	46	191	22	12	8	17	1687	286	214	1536	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	46	191	22	12	8	17	1687	286	214	1536	51
Peak Hour Factor	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	12	48	6	3	2	4	428	73	54	389	13
Total Analysis Volume [veh/h]	154	47	194	22	12	8	17	1711	290	217	1558	52
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	12	12	4	4	2	49	49	14	60	60
g / C, Green / Cycle	0.13	0.13	0.13	0.04	0.04	0.02	0.52	0.52	0.14	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.06	0.05	0.10	0.01	0.01	0.01	0.30	0.15	0.12	0.28	0.29
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	236	249	249	76	81	42	2935	978	258	2412	1206
d1, Uniform Delay [s]	37.95	37.88	39.93	44.09	44.01	45.76	15.97	13.19	39.66	8.79	8.91
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.19	1.07	5.21	2.04	1.58	6.29	0.85	0.77	7.33	0.58	1.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.42	0.41	0.78	0.29	0.25	0.41	0.58	0.30	0.84	0.44	0.45
d, Delay for Lane Group [s/veh]	39.14	38.95	45.14	46.13	45.59	52.04	16.83	13.97	47.00	9.38	10.15
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.21	2.25	4.74	0.53	0.48	0.46	7.93	3.44	5.28	4.82	5.26
50th-Percentile Queue Length [ft/ln]	55.31	56.27	118.57	13.30	11.97	11.45	198.37	86.12	132.00	120.50	131.54
95th-Percentile Queue Length [veh/ln]	3.98	4.05	8.31	0.96	0.86	0.82	12.55	6.20	9.05	8.42	9.02
95th-Percentile Queue Length [ft/ln]	99.56	101.28	207.86	23.93	21.54	20.61	313.87	155.02	226.21	210.51	225.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.08	38.95	45.14	46.13	45.59	45.59	52.04	16.83	13.97	47.00	9.62	10.15
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	B
d_A, Approach Delay [s/veh]	42.04			45.88			16.71			14.08		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.21											
Intersection LOS	B											
Intersection V/C	0.643											

Emissions

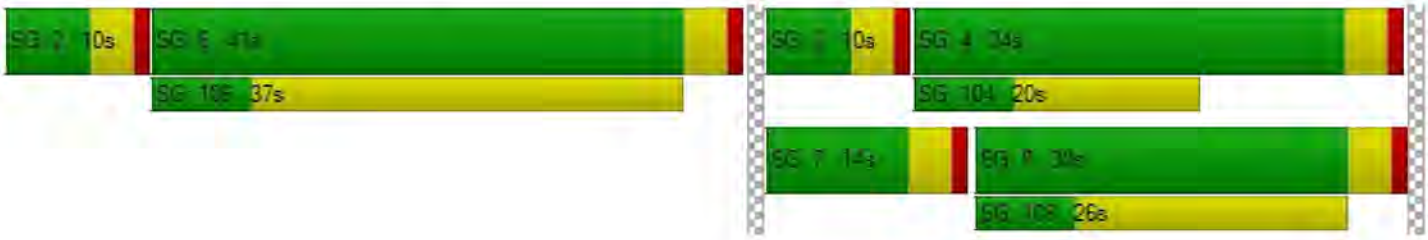
Vehicle Miles Traveled [mph]	5.69	5.81	11.09	1.08	0.98	0.90	90.84	15.40	16.32	79.82	41.27
Stops [stops/h]	83.84	85.29	179.73	20.15	18.14	17.35	902.08	130.55	200.09	365.30	199.39
Fuel consumption [US gal/h]	1.37	1.39	2.97	0.44	0.40	0.38	17.98	2.66	4.63	8.47	4.57
CO [g/h]	95.71	97.41	207.63	30.97	27.88	26.76	1256.46	185.81	323.31	592.22	319.49
NOx [g/h]	18.62	18.95	40.40	6.03	5.42	5.21	244.46	36.15	62.90	115.22	62.16
VOC [g/h]	22.18	22.58	48.12	7.18	6.46	6.20	291.20	43.06	74.93	137.25	74.04

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.319	2.011	0.000	3.293
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.211	1.629	2.670	2.564
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	3	0	0	22	41	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	0	0	22	41	2
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	7	14	1
Total Analysis Volume [veh/h]	4	0	0	29	55	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.95	8.58	7.33	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.33	0.33	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.95		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.39					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	84.9
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	8	7	0	29	35	944	25	6	848	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	8	7	0	29	35	944	25	6	848	31
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	2	2	0	8	9	248	7	2	223	8
Total Analysis Volume [veh/h]	15	2	8	7	0	31	37	994	26	6	893	33
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.21	0.04	0.02	0.09	0.00	0.06	0.05	0.01	0.00	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	70.02	84.91	25.57	54.70	73.53	14.04	10.17	0.00	0.00	10.37	0.00	0.00
Movement LOS	F	F	D	F	F	B	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	0.98	0.98	0.98	0.51	0.51	0.51	0.16	0.00	0.00	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	24.55	24.55	24.55	12.86	12.86	12.86	3.98	0.00	0.00	0.67	0.00	0.00
d_A, Approach Delay [s/veh]	56.98			21.53			0.36			0.07		
Approach LOS	F			C			A			A		
d_I, Intersection Delay [s/veh]	1.31											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	37.3
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.481

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	302	11	143	11	20	9	6	668	282	110	574	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	302	11	143	11	20	9	6	668	282	110	574	8
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	78	3	37	3	5	2	2	172	73	28	148	2
Total Analysis Volume [veh/h]	311	11	147	11	21	9	6	688	290	113	591	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	105
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	15	50	50	0	35	0	10	45	0	10	45	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	105	105	105	105	105	105	105	105	105	105	105
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	56	66	41	41	1	31	31	6	36	36
g / C, Green / Cycle	0.10	0.53	0.62	0.39	0.39	0.01	0.30	0.30	0.06	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.09	0.01	0.08	0.01	0.02	0.00	0.27	0.24	0.03	0.16	0.16
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	367	1008	1185	718	736	19	570	570	193	655	655
d1, Uniform Delay [s]	46.18	11.65	8.06	19.81	20.01	51.56	35.26	34.00	48.44	26.78	26.76
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.23	0.18	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.49	0.02	0.22	0.04	0.10	8.94	10.84	4.68	2.81	0.50	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.01	0.12	0.02	0.04	0.31	0.90	0.81	0.59	0.46	0.46
d, Delay for Lane Group [s/veh]	51.66	11.67	8.28	19.85	20.11	60.49	46.10	38.69	51.24	27.28	27.25
Lane Group LOS	D	B	A	B	C	E	D	D	D	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.17	0.12	1.29	0.18	0.48	0.20	13.61	11.07	1.48	5.63	5.60
50th-Percentile Queue Length [ft/ln]	104.15	3.00	32.18	4.40	12.11	5.00	340.25	276.76	36.90	140.72	139.99
95th-Percentile Queue Length [veh/ln]	7.50	0.22	2.32	0.32	0.87	0.36	19.66	16.53	2.66	9.52	9.48
95th-Percentile Queue Length [ft/ln]	187.47	5.40	57.92	7.92	21.80	9.00	491.50	413.18	66.43	238.00	237.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.66	11.67	8.28	19.85	20.11	20.11	60.49	44.23	38.69	51.24	27.27	27.25
Movement LOS	D	B	A	B	C	C	E	D	D	D	C	C
d_A, Approach Delay [s/veh]	37.13			20.04			42.70			31.07		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	37.34											
Intersection LOS	D											
Intersection V/C	0.481											

Emissions

Vehicle Miles Traveled [mph]	20.31	0.72	9.60	0.43	1.17	0.31	26.83	24.17	9.49	25.21	25.10
Stops [stops/h]	285.67	4.12	44.13	6.03	16.61	6.86	466.63	379.56	101.22	192.99	191.98
Fuel consumption [US gal/h]	6.80	0.09	1.03	0.09	0.24	0.17	11.55	9.20	2.76	4.93	4.90
CO [g/h]	475.55	6.45	71.65	6.08	16.73	11.87	807.25	642.78	193.07	344.60	342.85
NOx [g/h]	92.52	1.26	13.94	1.18	3.25	2.31	157.06	125.06	37.57	67.05	66.71
VOC [g/h]	110.21	1.49	16.61	1.41	3.88	2.75	187.09	148.97	44.75	79.87	79.46

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	42.08	42.08	42.08	42.08
I_p,int, Pedestrian LOS Score for Intersectio	2.654	1.965	2.922	2.856
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	876	590	781	781
d_b, Bicycle Delay [s]	16.58	26.08	19.50	19.50
I_b,int, Bicycle LOS Score for Intersection	2.333	1.627	2.371	2.147
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	4.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.168

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	20	425	20	6	401	3	7	0	27	18	11	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	425	20	6	401	3	7	0	27	18	11	22
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	108	5	2	101	1	2	0	7	5	3	6
Total Analysis Volume [veh/h]	20	430	20	6	406	3	7	0	27	18	11	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	31	0	0	31	0	0	59	0	0	59	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	78	78	78	78	78	78	4	4
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.01	0.12	0.12	0.00	0.11	0.11	0.02	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1540	1636	1636	1536	1636	1636	144	150
d1, Uniform Delay [s]	0.88	0.99	0.99	0.87	0.98	0.98	41.33	41.71
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.18	0.17	0.00	0.16	0.16	0.84	1.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.14	0.14	0.00	0.13	0.12	0.24	0.34
d, Delay for Lane Group [s/veh]	0.90	1.17	1.16	0.88	1.13	1.13	42.17	43.05
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.11	0.11	0.00	0.10	0.10	0.76	1.16
50th-Percentile Queue Length [ft/ln]	0.22	2.73	2.70	0.07	2.43	2.43	19.11	29.05
95th-Percentile Queue Length [veh/ln]	0.02	0.20	0.19	0.00	0.18	0.17	1.38	2.09
95th-Percentile Queue Length [ft/ln]	0.40	4.92	4.85	0.12	4.38	4.37	34.40	52.30

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.90	1.16	1.16	0.88	1.13	1.13	42.17	42.17	42.17	43.05	43.05	43.05
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.15			1.13			42.17			43.05		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	4.78											
Intersection LOS	A											
Intersection V/C	0.168											

Emissions

Vehicle Miles Traveled [mph]	0.69	7.77	7.68	0.19	6.56	6.55	0.65	1.20
Stops [stops/h]	0.35	4.37	4.31	0.11	3.90	3.89	30.57	46.49
Fuel consumption [US gal/h]	0.03	0.37	0.37	0.01	0.32	0.32	0.44	0.68
CO [g/h]	2.22	26.21	25.89	0.63	22.40	22.36	30.64	47.48
NOx [g/h]	0.43	5.10	5.04	0.12	4.36	4.35	5.96	9.24
VOC [g/h]	0.51	6.07	6.00	0.15	5.19	5.18	7.10	11.00

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.564	2.537	1.770	1.754
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	1222	1222
d_b, Bicycle Delay [s]	22.05	22.05	6.81	6.81
I_b,int, Bicycle LOS Score for Intersection	1.947	1.902	1.616	1.644
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	23.6
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.344

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	87	382	357	88	96	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	382	357	88	96	207
Peak Hour Factor	0.9510	0.9510	0.9510	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	100	94	23	25	54
Total Analysis Volume [veh/h]	91	402	375	93	101	218
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.00	0.00	0.34	0.28
d_M, Delay for Movement [s/veh]	8.60	0.00	0.00	0.00	23.56	11.54
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.27	0.00	0.00	0.00	1.48	1.17
95th-Percentile Queue Length [ft/ln]	6.82	0.00	0.00	0.00	37.05	29.24
d_A, Approach Delay [s/veh]	1.59		0.00		15.34	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.44					
Intersection LOS	C					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	25.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.673

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1006	139	498	0	0	269	214	1313	399	0	1580	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1006	139	498	0	0	269	214	1313	399	0	1580	31
Peak Hour Factor	0.9490	0.9490	0.9490	1.0000	1.0000	0.9490	0.9490	0.9490	0.9490	1.0000	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	265	37	131	0	0	71	56	346	105	0	416	8
Total Analysis Volume [veh/h]	1060	146	525	0	0	283	226	1384	420	0	1665	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	36	0	0	0	104	31	64	0	0	33	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	44	15	15	48	28	28
g / C, Green / Cycle	0.44	0.44	0.44	0.15	0.15	0.48	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.24	0.23	0.23	0.08	0.13	0.24	0.22	0.22
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1800	5700	5700	1900
c, Capacity [veh/h]	1547	840	840	539	277	2725	1619	540
d1, Uniform Delay [s]	20.59	20.25	20.25	38.93	40.92	17.99	33.00	33.00
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.13
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.42	2.32	2.32	0.79	5.79	0.15	0.88	3.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.55	0.52	0.52	0.53	0.82	0.51	0.79	0.79
d, Delay for Lane Group [s/veh]	22.01	22.58	22.58	39.73	46.71	18.14	33.88	36.08
Lane Group LOS	C	C	C	D	D	B	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	7.41	7.74	7.74	3.24	5.55	6.57	8.92	9.25
50th-Percentile Queue Length [ft/ln]	185.28	193.54	193.54	80.94	138.65	164.17	223.02	231.28
95th-Percentile Queue Length [veh/ln]	11.88	12.30	12.30	5.83	9.41	10.77	13.82	14.24
95th-Percentile Queue Length [ft/ln]	296.90	307.61	307.61	145.68	235.21	269.24	345.48	355.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.12	22.58	22.58	0.00	0.00	39.73	46.71	18.14	0.00	0.00	34.40	36.08
Movement LOS	C	C	C			D	D	B			C	D
d_A, Approach Delay [s/veh]	22.30			39.73			17.75			34.43		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	25.72											
Intersection LOS	C											
Intersection V/C	0.673											

Emissions

Vehicle Miles Traveled [mph]	52.76	27.17	27.17	14.12	21.09	129.18	43.60	14.53
Stops [stops/h]	533.62	278.69	278.69	233.09	199.66	709.22	963.44	333.05
Fuel consumption [US gal/h]	8.94	4.68	4.68	4.16	5.92	20.32	25.03	8.72
CO [g/h]	624.86	326.83	326.83	290.56	413.76	1420.41	1749.51	609.26
NOx [g/h]	121.57	63.59	63.59	56.53	80.50	276.36	340.39	118.54
VOC [g/h]	144.82	75.75	75.75	67.34	95.89	329.19	405.47	141.20

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.642	2.304	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	640	540	1200	580
d_b, Bicycle Delay [s]	23.12	26.65	8.00	25.21
I_b,int, Bicycle LOS Score for Intersection	4.416	1.560	2.445	2.260
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.654

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1006	139	498	0	0	269	214	1313	399	0	1580	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1006	139	498	0	0	269	214	1313	399	0	1580	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	252	35	125	0	0	67	54	328	100	0	395	8
Total Analysis Volume [veh/h]	1006	139	498	0	0	269	214	1313	399	0	1580	31
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.20	0.23	0.23	0.00	0.00	0.08	0.13	0.26	0.21	0.00	0.23	0.23
Intersection LOS	B											
Intersection V/C	0.654											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.4
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	153	151	81	284	191	143	131	1503	99	135	1416	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	153	151	81	284	191	143	131	1503	99	135	1416	188
Peak Hour Factor	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	38	20	72	48	36	33	380	25	34	358	48
Total Analysis Volume [veh/h]	155	153	82	287	193	145	132	1520	100	137	1432	190
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	39	0	16	39	0	20	50	0	15	45	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	42	42	12	47	47	11	39	39	11	39	39
g / C, Green / Cycle	0.06	0.35	0.35	0.10	0.39	0.39	0.09	0.32	0.32	0.09	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.06	0.08	0.10	0.08	0.07	0.28	0.29	0.08	0.21	0.22
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	217	672	672	342	740	740	161	1233	617	163	1856	619
d1, Uniform Delay [s]	55.23	26.76	26.63	53.23	24.89	24.21	53.67	38.15	38.44	53.70	34.65	34.82
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.28	0.27	0.11	0.14
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.32	0.59	0.54	5.56	0.86	0.59	9.76	2.05	10.56	23.29	0.39	1.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.18	0.17	0.84	0.26	0.20	0.82	0.87	0.89	0.84	0.65	0.66
d, Delay for Lane Group [s/veh]	59.55	27.36	27.17	58.79	25.75	24.80	63.43	40.20	49.00	77.00	35.04	36.41
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.40	2.49	2.28	4.44	3.83	2.79	4.29	14.70	16.53	5.06	9.87	10.31
50th-Percentile Queue Length [ft/ln]	59.91	62.13	57.09	111.11	95.65	69.72	107.17	367.43	413.36	126.39	246.75	257.84
95th-Percentile Queue Length [veh/ln]	4.31	4.47	4.11	7.90	6.89	5.02	7.68	20.98	23.20	8.74	15.02	15.58
95th-Percentile Queue Length [ft/ln]	107.84	111.84	102.76	197.54	172.17	125.50	192.06	524.61	580.07	218.58	375.56	389.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.55	27.32	27.17	58.79	25.75	24.80	63.43	42.78	49.00	77.00	35.25	36.41
Movement LOS	E	C	C	E	C	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	40.10			40.70			44.70			38.63		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	41.39											
Intersection LOS	D											
Intersection V/C	0.589											

Emissions

Vehicle Miles Traveled [mph]	12.06	9.50	8.78	18.63	12.53	9.41	7.85	63.85	32.53	8.40	74.27	25.23
Stops [stops/h]	143.78	74.56	68.51	266.66	114.78	83.67	128.61	881.82	496.03	151.67	888.31	309.41
Fuel consumption [US gal/h]	3.72	1.75	1.61	6.72	2.59	1.89	3.25	19.73	11.49	3.94	20.02	6.99
CO [g/h]	260.22	122.52	112.64	469.74	180.88	132.18	227.07	1379.08	803.07	275.22	1399.33	488.62
NOx [g/h]	50.63	23.84	21.91	91.39	35.19	25.72	44.18	268.32	156.25	53.55	272.26	95.07
VOC [g/h]	60.31	28.40	26.10	108.87	41.92	30.63	52.62	319.61	186.12	63.78	324.31	113.24

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.644	2.705	3.305	3.332
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	767	683
d_b, Bicycle Delay [s]	30.10	30.10	22.82	26.00
I_b,int, Bicycle LOS Score for Intersection	1.881	2.591	2.523	2.285
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.628

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	130	22	226	21	14	9	14	1632	236	169	1615	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	22	226	21	14	9	14	1632	236	169	1615	35
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	6	58	5	4	2	4	417	60	43	413	9
Total Analysis Volume [veh/h]	133	22	231	21	14	9	14	1669	241	173	1651	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	14	14	14	4	4	2	49	49	11	59	59
g / C, Green / Cycle	0.15	0.15	0.15	0.04	0.04	0.02	0.52	0.52	0.12	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.12	0.01	0.01	0.01	0.29	0.13	0.10	0.29	0.30
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	270	285	285	78	83	36	2967	989	212	2350	1175
d1, Uniform Delay [s]	35.87	35.80	39.09	43.97	43.99	45.99	15.44	12.50	40.91	9.77	9.93
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.58	0.52	5.53	1.81	1.80	6.84	0.78	0.59	7.50	0.68	1.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.29	0.27	0.81	0.27	0.28	0.39	0.56	0.24	0.82	0.47	0.49
d, Delay for Lane Group [s/veh]	36.44	36.32	44.61	45.77	45.79	52.83	16.22	13.09	48.41	10.45	11.40
Lane Group LOS	D	D	D	D	D	D	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.63	1.65	5.64	0.50	0.55	0.39	7.53	2.73	4.26	5.49	6.05
50th-Percentile Queue Length [ft/ln]	40.87	41.26	141.01	12.62	13.78	9.65	188.29	68.21	106.47	137.20	151.14
95th-Percentile Queue Length [veh/ln]	2.94	2.97	9.54	0.91	0.99	0.69	12.03	4.91	7.64	9.33	10.08
95th-Percentile Queue Length [ft/ln]	73.56	74.26	238.38	22.71	24.81	17.36	300.81	122.78	191.08	233.25	251.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.39	36.32	44.61	45.77	45.79	45.79	52.83	16.22	13.09	48.41	10.77	11.40
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.31			45.78			16.09			14.28		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	17.91											
Intersection LOS	B											
Intersection V/C	0.628											

Emissions

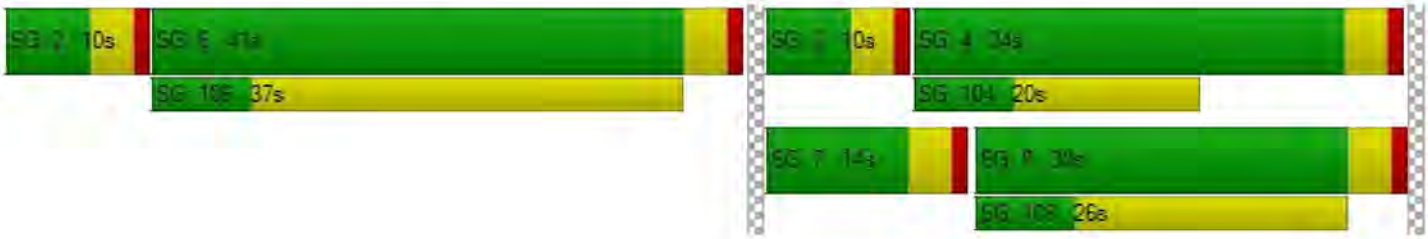
Vehicle Miles Traveled [mph]	4.40	4.46	13.21	1.03	1.12	0.74	88.61	12.80	13.01	83.48	43.40
Stops [stops/h]	61.95	62.54	213.74	19.13	20.89	14.62	856.23	103.39	161.39	415.94	229.10
Fuel consumption [US gal/h]	1.01	1.02	3.51	0.42	0.46	0.32	17.09	2.12	3.76	9.44	5.14
CO [g/h]	70.37	71.09	245.42	29.38	32.14	22.42	1194.81	147.91	262.52	659.71	359.61
NOx [g/h]	13.69	13.83	47.75	5.72	6.25	4.36	232.47	28.78	51.08	128.36	69.97
VOC [g/h]	16.31	16.48	56.88	6.81	7.45	5.20	276.91	34.28	60.84	152.89	83.34

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.299	1.993	0.000	3.298
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.197	1.632	2.618	2.583
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	6	2	1	22	22	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	2	1	22	22	13
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	0	7	7	4
Total Analysis Volume [veh/h]	8	3	1	29	29	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.89	8.52	7.31	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.87	0.87	0.04	0.04	0.00	0.00
d_A, Approach Delay [s/veh]	8.79		0.24		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.20					
Intersection LOS	A					

Appendix D

Intersection Analysis Worksheets
Project Opening Year (2026)
Without Project Conditions

RK19750.1
JN: 2827-2023-05

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	269.3
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.936

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	26	0	38	21	0	46	24	984	10	16	982	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	38	21	0	46	24	984	10	16	982	15
Peak Hour Factor	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	12	6	0	14	7	299	3	5	298	5
Total Analysis Volume [veh/h]	32	0	46	25	0	56	29	1194	12	19	1192	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.94	0.00	0.10	0.71	0.00	0.13	0.05	0.01	0.00	0.03	0.01	0.00
d_M, Delay for Movement [s/veh]	269.30	303.47	172.18	196.57	232.47	101.82	11.63	0.00	0.00	11.48	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	5.60	5.60	5.60	4.64	4.64	4.64	0.16	0.00	0.00	0.10	0.00	0.00
95th-Percentile Queue Length [ft/ln]	139.94	139.94	139.94	116.03	116.03	116.03	3.99	0.00	0.00	2.56	0.00	0.00
d_A, Approach Delay [s/veh]	212.02			131.06			0.27			0.18		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	10.56											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.6
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.705

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	215	5	341	27	20	12	3	897	149	289	809	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	215	5	341	27	20	12	3	897	149	289	809	2
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	63	1	99	8	6	3	1	261	43	84	235	1
Total Analysis Volume [veh/h]	250	6	397	31	23	14	3	1043	173	336	941	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	13	48	48	0	35	0	10	51	0	16	57	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	50	66	37	37	1	41	41	12	52	52
g / C, Green / Cycle	0.08	0.44	0.58	0.32	0.32	0.01	0.35	0.35	0.10	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.07	0.00	0.21	0.02	0.02	0.00	0.33	0.31	0.10	0.25	0.25
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	274	832	1096	608	617	11	672	672	365	858	858
d1, Uniform Delay [s]	52.61	18.24	13.02	26.69	26.75	56.88	35.72	34.94	51.02	22.99	22.99
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.32	0.29	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.49	0.02	0.93	0.16	0.19	12.13	14.81	9.95	9.66	0.55	0.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.01	0.36	0.05	0.06	0.27	0.93	0.88	0.92	0.55	0.55
d, Delay for Lane Group [s/veh]	64.10	18.26	13.95	26.85	26.94	69.01	50.53	44.89	60.68	23.54	23.54
Lane Group LOS	E	B	B	C	C	E	D	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	3.95	0.09	5.39	0.62	0.75	0.12	18.57	16.61	5.14	8.87	8.86
50th-Percentile Queue Length [ft/ln]	98.78	2.29	134.79	15.59	18.64	3.07	464.34	415.25	128.61	221.74	221.54
95th-Percentile Queue Length [veh/ln]	7.11	0.16	9.20	1.12	1.34	0.22	25.64	23.29	8.86	13.75	13.74
95th-Percentile Queue Length [ft/ln]	177.81	4.12	229.99	28.06	33.55	5.52	641.04	582.35	221.60	343.85	343.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.10	18.26	13.95	26.85	26.94	26.94	69.01	48.25	44.89	60.68	23.54	23.54
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	33.19			26.89			47.83			33.30		
Approach LOS	C			C			D			C		
d_I, Intersection Delay [s/veh]	38.64											
Intersection LOS	D											
Intersection V/C	0.705											

Emissions

Vehicle Miles Traveled [mph]	16.33	0.39	25.93	1.21	1.45	0.16	32.45	30.96	28.22	39.62	39.59
Stops [stops/h]	247.39	2.87	168.78	19.52	23.34	3.84	581.44	519.97	322.08	277.66	277.41
Fuel consumption [US gal/h]	6.28	0.06	3.71	0.30	0.36	0.10	14.74	12.95	9.12	7.07	7.06
CO [g/h]	438.66	4.51	259.59	20.89	24.99	6.66	1030.33	905.14	637.53	494.18	493.75
NOx [g/h]	85.35	0.88	50.51	4.06	4.86	1.30	200.46	176.11	124.04	96.15	96.07
VOC [g/h]	101.66	1.05	60.16	4.84	5.79	1.54	238.79	209.78	147.75	114.53	114.43

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
l_p,int, Pedestrian LOS Score for Intersectio	2.721	1.973	3.055	3.179
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	765	539	817	922
d_b, Bicycle Delay [s]	21.92	30.68	20.10	16.71
l_b,int, Bicycle LOS Score for Intersection	2.637	1.672	2.565	2.615
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	6.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.179

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	13	352	6	13	430	4	8	1	32	32	1	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	352	6	13	430	4	8	1	32	32	1	38
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	95	2	3	116	1	2	0	9	9	0	10
Total Analysis Volume [veh/h]	14	379	6	14	463	4	9	1	34	34	1	41
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	0	60	0	0	60	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.01	0.10	0.10	0.01	0.12	0.12	0.02	0.04
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1516	1619	1619	1524	1619	1619	160	170
d1, Uniform Delay [s]	0.99	1.09	1.09	0.99	1.12	1.12	40.80	41.52
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.01	0.15	0.15	0.01	0.19	0.19	0.92	1.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.12	0.12	0.01	0.14	0.14	0.27	0.45
d, Delay for Lane Group [s/veh]	1.00	1.24	1.24	1.00	1.31	1.31	41.72	43.36
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.14	0.14	0.01	0.17	0.17	0.98	1.74
50th-Percentile Queue Length [ft/ln]	0.23	3.46	3.44	0.23	4.30	4.29	24.55	43.53
95th-Percentile Queue Length [veh/ln]	0.02	0.25	0.25	0.02	0.31	0.31	1.77	3.13
95th-Percentile Queue Length [ft/ln]	0.42	6.22	6.20	0.42	7.75	7.73	44.19	78.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.00	1.24	1.24	1.00	1.31	1.31	41.72	41.72	41.72	43.36	43.36	43.36
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.24			1.30			41.72			43.36		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	6.25											
Intersection LOS	A											
Intersection V/C	0.179											

Emissions

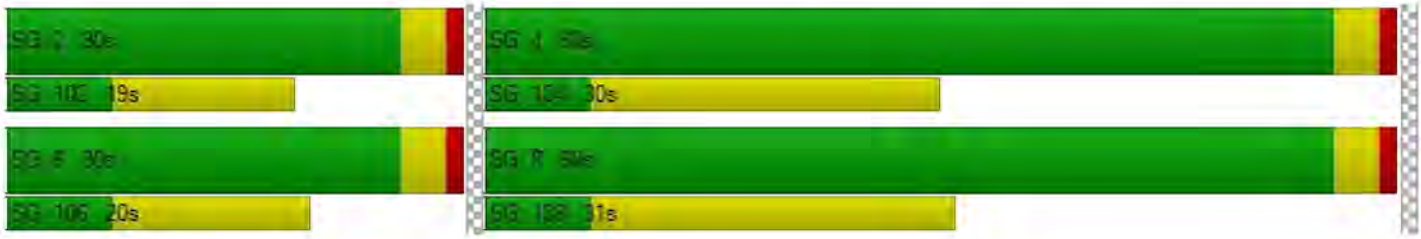
Vehicle Miles Traveled [mph]	0.48	6.62	6.60	0.45	7.49	7.47	0.84	1.80
Stops [stops/h]	0.37	5.53	5.51	0.37	6.89	6.87	39.28	69.65
Fuel consumption [US gal/h]	0.02	0.34	0.34	0.02	0.40	0.40	0.56	1.02
CO [g/h]	1.66	23.79	23.70	1.58	27.84	27.77	39.29	71.19
NOx [g/h]	0.32	4.63	4.61	0.31	5.42	5.40	7.64	13.85
VOC [g/h]	0.38	5.51	5.49	0.37	6.45	6.44	9.11	16.50

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.590	2.549	1.760	1.774
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	1.889	1.956	1.632	1.685
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	19.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.217

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	46	300	423	70	66	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	300	423	70	66	73
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	81	114	19	18	20
Total Analysis Volume [veh/h]	50	324	456	76	71	79
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.22	0.11
d_M, Delay for Movement [s/veh]	8.67	0.00	0.00	0.00	19.02	10.51
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.15	0.00	0.00	0.00	0.81	0.36
95th-Percentile Queue Length [ft/ln]	3.82	0.00	0.00	0.00	20.26	9.03
d_A, Approach Delay [s/veh]	1.16		0.00		14.54	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	2.48					
Intersection LOS	C					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.629

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	958	70	762	0	0	118	91	1432	465	0	1595	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	958	70	762	0	0	118	91	1432	465	0	1595	12
Peak Hour Factor	0.9280	0.9280	0.9280	1.0000	1.0000	0.9280	0.9280	0.9280	0.9280	1.0000	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	258	19	205	0	0	32	25	386	125	0	430	3
Total Analysis Volume [veh/h]	1032	75	821	0	0	127	98	1543	501	0	1719	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	10	0	0	0	104	18	90	0	0	72	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	51	51	51	7	7	41	30	30
g / C, Green / Cycle	0.51	0.51	0.51	0.07	0.07	0.41	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.27	0.26	0.26	0.04	0.05	0.27	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1776	964	964	259	130	2351	1713	571
d1, Uniform Delay [s]	16.65	16.33	16.33	44.63	45.54	23.66	31.68	31.68
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.16	1.91	1.91	1.43	8.62	0.31	0.71	2.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.51	0.51	0.49	0.76	0.66	0.76	0.76
d, Delay for Lane Group [s/veh]	17.81	18.24	18.24	46.06	54.15	23.98	32.39	33.78
Lane Group LOS	B	B	B	D	D	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	7.31	7.61	7.61	1.56	2.59	8.92	8.89	9.11
50th-Percentile Queue Length [ft/ln]	182.69	190.15	190.15	38.98	64.75	222.98	222.22	227.73
95th-Percentile Queue Length [veh/ln]	11.74	12.13	12.13	2.81	4.66	13.82	13.78	14.06
95th-Percentile Queue Length [ft/ln]	293.52	303.22	303.22	70.16	116.55	345.43	344.46	351.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	17.84	18.24	18.24	0.00	0.00	46.06	54.15	23.98	0.00	0.00	32.73	33.78
Movement LOS	B	B	B			D	D	C			C	C
d_A, Approach Delay [s/veh]	18.03			46.06			20.09			32.74		
Approach LOS	B			D			C			C		
d_I, Intersection Delay [s/veh]	24.00											
Intersection LOS	C											
Intersection V/C	0.629											

Emissions

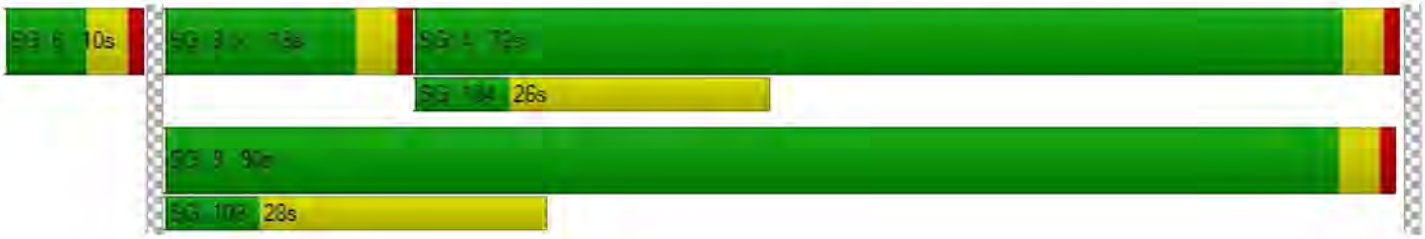
Vehicle Miles Traveled [mph]	58.76	30.26	30.26	6.34	9.15	144.02	44.47	14.82
Stops [stops/h]	526.15	273.81	273.81	112.26	93.24	963.29	960.01	327.93
Fuel consumption [US gal/h]	8.77	4.57	4.57	2.07	2.82	27.14	24.79	8.51
CO [g/h]	612.86	319.72	319.72	144.79	196.94	1896.94	1732.70	594.63
NOx [g/h]	119.24	62.21	62.21	28.17	38.32	369.08	337.12	115.69
VOC [g/h]	142.04	74.10	74.10	33.56	45.64	439.63	401.57	137.81

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.681	2.212	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	280	1720	1360
d_b, Bicycle Delay [s]	44.18	36.98	0.98	5.12
I_b,int, Bicycle LOS Score for Intersection	4.741	1.560	2.462	2.274
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.603

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	958	70	762	0	0	118	91	1432	465	0	1595	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	958	70	762	0	0	118	91	1432	465	0	1595	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	240	18	191	0	0	30	23	358	116	0	399	3
Total Analysis Volume [veh/h]	958	70	762	0	0	118	91	1432	465	0	1595	12
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.25	0.25	0.00	0.00	0.03	0.05	0.28	0.00	0.00	0.23	0.23
Intersection LOS	B											
Intersection V/C	0.603											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	37.9
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	131	123	81	122	239	154	171	1794	135	119	1354	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	123	81	122	239	154	171	1794	135	119	1354	56
Peak Hour Factor	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	32	21	31	61	39	44	460	35	31	347	14
Total Analysis Volume [veh/h]	134	126	83	125	245	158	175	1840	138	122	1389	57
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	10	39	0	10	39	0	26	56	0	15	45	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	41	41	6	41	41	14	47	47	10	43	43
g / C, Green / Cycle	0.05	0.34	0.34	0.05	0.34	0.34	0.11	0.39	0.39	0.08	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.05	0.04	0.13	0.08	0.10	0.34	0.35	0.07	0.19	0.20
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	175	646	646	175	646	646	207	1499	749	148	2062	687
d1, Uniform Delay [s]	56.31	27.73	27.59	56.16	30.01	28.51	52.06	33.58	33.96	54.20	30.05	30.57
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.32	0.21	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.82	0.56	0.51	5.33	1.69	0.90	9.13	1.74	10.42	18.86	0.20	0.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.17	0.16	0.71	0.38	0.24	0.85	0.87	0.89	0.82	0.52	0.55
d, Delay for Lane Group [s/veh]	63.13	28.29	28.11	61.49	31.70	29.41	61.19	35.32	44.38	73.06	30.26	31.28
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.14	2.25	2.07	1.97	5.55	3.38	5.60	17.19	19.56	4.34	7.86	8.68
50th-Percentile Queue Length [ft/ln]	53.49	56.34	51.66	49.14	138.80	84.43	140.02	429.78	488.95	108.58	196.46	216.96
95th-Percentile Queue Length [veh/ln]	3.85	4.06	3.72	3.54	9.42	6.08	9.48	23.99	26.81	7.76	12.46	13.51
95th-Percentile Queue Length [ft/ln]	96.27	101.41	92.99	88.46	235.41	151.97	237.05	599.77	670.27	194.03	311.40	337.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.13	28.26	28.11	61.49	31.70	29.41	61.19	37.93	44.38	73.06	30.49	31.28
Movement LOS	E	C	C	E	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	41.85			38.07			40.24			33.83		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	37.92											
Intersection LOS	D											
Intersection V/C	0.677											

Emissions

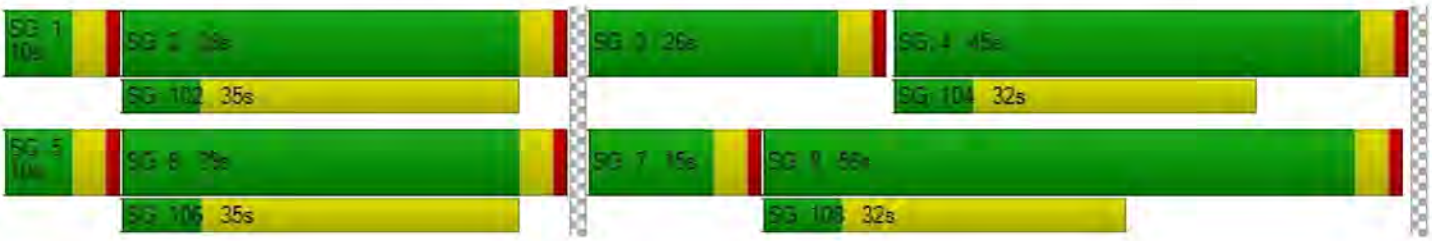
Vehicle Miles Traveled [mph]	10.43	8.46	7.80	8.12	15.91	10.26	10.41	77.89	39.79	7.48	65.31	23.38
Stops [stops/h]	128.36	67.61	62.00	117.95	166.56	101.31	168.03	1031.47	586.74	130.30	707.26	260.35
Fuel consumption [US gal/h]	3.36	1.59	1.46	3.01	3.79	2.31	4.20	22.33	13.23	3.36	15.84	5.82
CO [g/h]	234.56	111.37	102.17	210.63	264.67	161.35	293.75	1561.06	924.68	234.98	1107.42	406.92
NOx [g/h]	45.64	21.67	19.88	40.98	51.50	31.39	57.15	303.72	179.91	45.72	215.46	79.17
VOC [g/h]	54.36	25.81	23.68	48.82	61.34	37.39	68.08	361.79	214.30	54.46	256.66	94.31

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.650	2.659	3.362	3.327
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	867	683
d_b, Bicycle Delay [s]	30.10	30.10	19.27	26.00
I_b,int, Bicycle LOS Score for Intersection	1.843	2.431	2.744	2.206
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	14.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.587

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	136	14	111	24	15	24	15	1786	306	154	1374	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	136	14	111	24	15	24	15	1786	306	154	1374	17
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	4	28	6	4	6	4	457	78	39	351	4
Total Analysis Volume [veh/h]	139	14	113	25	15	25	15	1826	313	157	1405	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	12	30	0	14	32	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	8	8	5	5	2	56	56	10	64	64
g / C, Green / Cycle	0.09	0.09	0.09	0.05	0.05	0.02	0.59	0.59	0.11	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.06	0.01	0.02	0.01	0.32	0.16	0.09	0.25	0.26
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	155	164	164	93	98	38	3336	1112	195	2556	1278
d1, Uniform Delay [s]	41.41	41.33	42.17	43.30	43.62	45.92	12.02	9.78	41.39	6.75	6.85
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.39	2.07	5.08	1.52	2.67	6.70	0.65	0.63	7.63	0.41	0.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.47	0.69	0.27	0.41	0.40	0.55	0.28	0.81	0.37	0.38
d, Delay for Lane Group [s/veh]	43.80	43.40	47.25	44.82	46.29	52.61	12.67	10.41	49.02	7.16	7.72
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.81	1.81	2.81	0.59	0.96	0.41	7.00	3.04	3.89	3.42	3.78
50th-Percentile Queue Length [ft/ln]	45.29	45.29	70.26	14.73	23.98	10.26	175.09	76.05	97.16	85.50	94.44
95th-Percentile Queue Length [veh/ln]	3.26	3.26	5.06	1.06	1.73	0.74	11.34	5.48	7.00	6.16	6.80
95th-Percentile Queue Length [ft/ln]	81.53	81.52	126.46	26.51	43.16	18.46	283.60	136.89	174.90	153.89	170.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.62	43.40	47.25	44.82	46.29	46.29	52.61	12.67	10.41	49.02	7.34	7.72
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	45.15			45.73			12.62			11.49		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	14.84											
Intersection LOS	B											
Intersection V/C	0.587											

Emissions

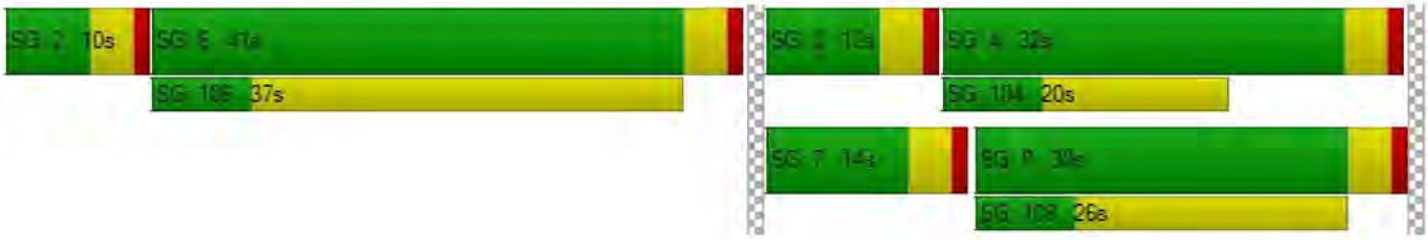
Vehicle Miles Traveled [mph]	4.36	4.39	6.46	1.22	1.95	0.80	96.95	16.62	11.81	70.27	36.68
Stops [stops/h]	68.66	68.65	106.49	22.32	36.35	15.55	796.22	115.28	147.28	259.19	143.16
Fuel consumption [US gal/h]	1.14	1.14	1.79	0.49	0.80	0.34	16.00	2.39	3.44	6.42	3.49
CO [g/h]	79.61	79.60	124.81	34.33	56.19	23.90	1118.64	167.14	240.16	449.05	243.69
NOx [g/h]	15.49	15.49	24.28	6.68	10.93	4.65	217.65	32.52	46.73	87.37	47.41
VOC [g/h]	18.45	18.45	28.93	7.96	13.02	5.54	259.26	38.74	55.66	104.07	56.48

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.286	1.991	0.000	3.254
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	589
d_b, Bicycle Delay [s]	17.71	41.69	25.06	23.63
I_b,int, Bicycle LOS Score for Intersection	1.999	1.667	2.744	2.428
Bicycle LOS	A	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	8.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	0	1	0	41	15	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1	0	41	15	5
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	5	2
Total Analysis Volume [veh/h]	0	1	0	55	20	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.90	8.42	7.27	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.07	0.07	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.42		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.10					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	543.7
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.208

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	11	0	15	18	0	30	47	1263	28	15	1400	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	15	18	0	30	47	1263	28	15	1400	40
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	4	5	0	8	13	340	8	4	377	11
Total Analysis Volume [veh/h]	12	0	16	19	0	32	51	1360	30	16	1507	43
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.70	0.00	0.04	1.21	0.00	0.09	0.12	0.01	0.00	0.03	0.02	0.00
d_M, Delay for Movement [s/veh]	344.65	481.19	143.93	543.68	657.97	325.34	14.66	0.00	0.00	12.62	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	2.69	2.69	2.69	5.17	5.17	5.17	0.41	0.00	0.00	0.10	0.00	0.00
95th-Percentile Queue Length [ft/ln]	67.20	67.20	67.20	129.37	129.37	129.37	10.18	0.00	0.00	2.54	0.00	0.00
d_A, Approach Delay [s/veh]	229.95			406.68			0.52			0.13		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	9.12											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.4
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.693

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	379	21	335	17	13	9	8	1053	248	242	1079	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	379	21	335	17	13	9	8	1053	248	242	1079	24
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	98	5	87	4	3	2	2	273	64	63	279	6
Total Analysis Volume [veh/h]	392	22	347	18	13	9	8	1090	257	251	1117	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	19	54	54	0	35	0	19	52	0	14	47	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	52	66	33	33	1	46	46	10	55	55
g / C, Green / Cycle	0.13	0.43	0.55	0.27	0.27	0.01	0.38	0.38	0.08	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.11	0.01	0.18	0.01	0.01	0.00	0.36	0.34	0.07	0.30	0.30
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	438	823	1045	512	522	23	729	729	292	863	863
d1, Uniform Delay [s]	51.73	19.50	14.87	31.87	31.92	58.76	35.90	34.79	54.31	25.59	25.52
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.40	0.36	0.11	0.20	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.70	0.06	0.85	0.13	0.15	9.08	20.11	12.47	7.37	1.64	1.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.03	0.33	0.04	0.04	0.35	0.95	0.90	0.86	0.66	0.66
d, Delay for Lane Group [s/veh]	58.43	19.56	15.73	31.99	32.07	67.84	56.01	47.26	61.68	27.23	27.11
Lane Group LOS	E	B	B	C	C	E	E	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.11	0.36	5.20	0.41	0.50	0.29	22.59	19.48	3.95	12.38	12.26
50th-Percentile Queue Length [ft/ln]	152.70	9.00	130.01	10.23	12.52	7.33	564.70	486.92	98.68	309.45	306.44
95th-Percentile Queue Length [veh/ln]	10.16	0.65	8.94	0.74	0.90	0.53	30.38	26.71	7.11	18.15	18.00
95th-Percentile Queue Length [ft/ln]	254.03	16.20	223.51	18.42	22.54	13.19	759.56	667.86	177.63	453.69	449.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.43	19.56	15.73	31.99	32.07	32.07	67.84	52.82	47.26	61.68	27.17	27.11
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	37.83			32.03			51.85			33.39		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	41.38											
Intersection LOS	D											
Intersection V/C	0.693											

Emissions

Vehicle Miles Traveled [mph]	25.60	1.44	22.66	0.70	0.86	0.42	36.12	34.12	21.08	48.11	47.81
Stops [stops/h]	366.48	10.80	156.01	12.28	15.02	8.79	677.64	584.30	236.84	371.34	367.73
Fuel consumption [US gal/h]	9.18	0.25	3.45	0.20	0.24	0.23	17.56	14.73	6.82	9.44	9.35
CO [g/h]	641.53	17.13	241.49	13.70	16.77	16.36	1227.29	1029.39	476.54	659.90	653.66
NOx [g/h]	124.82	3.33	46.99	2.67	3.26	3.18	238.79	200.28	92.72	128.39	127.18
VOC [g/h]	148.68	3.97	55.97	3.17	3.89	3.79	284.44	238.57	110.44	152.94	151.49

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.744	1.980	3.167	3.186
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	517	800	717
d_b, Bicycle Delay [s]	20.42	33.00	21.60	24.70
I_b,int, Bicycle LOS Score for Intersection	2.815	1.626	2.677	2.709
Bicycle LOS	C	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	4.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.237

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	20	572	31	24	488	3	8	4	15	15	10	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	572	31	24	488	3	8	4	15	15	10	37
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	152	8	6	130	1	2	1	4	4	3	10
Total Analysis Volume [veh/h]	21	609	33	26	520	3	9	4	16	16	11	39
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	0	60	0	0	60	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.01	0.17	0.17	0.01	0.14	0.14	0.02	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1516	1625	1625	1503	1625	1625	159	156
d1, Uniform Delay [s]	0.96	1.14	1.14	0.96	1.10	1.10	40.72	41.54
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.28	0.27	0.02	0.21	0.21	0.55	1.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.20	0.20	0.02	0.16	0.16	0.18	0.42
d, Delay for Lane Group [s/veh]	0.97	1.42	1.41	0.98	1.31	1.31	41.26	43.34
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.23	0.22	0.02	0.17	0.17	0.64	1.51
50th-Percentile Queue Length [ft/ln]	0.31	5.63	5.52	0.39	4.36	4.35	16.04	37.80
95th-Percentile Queue Length [veh/ln]	0.02	0.41	0.40	0.03	0.31	0.31	1.15	2.72
95th-Percentile Queue Length [ft/ln]	0.56	10.14	9.94	0.70	7.85	7.84	28.87	68.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.97	1.41	1.41	0.98	1.31	1.31	41.26	41.26	41.26	43.34	43.34	43.34
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.40			1.29			41.26			43.34		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	4.36											
Intersection LOS	A											
Intersection V/C	0.237											

Emissions

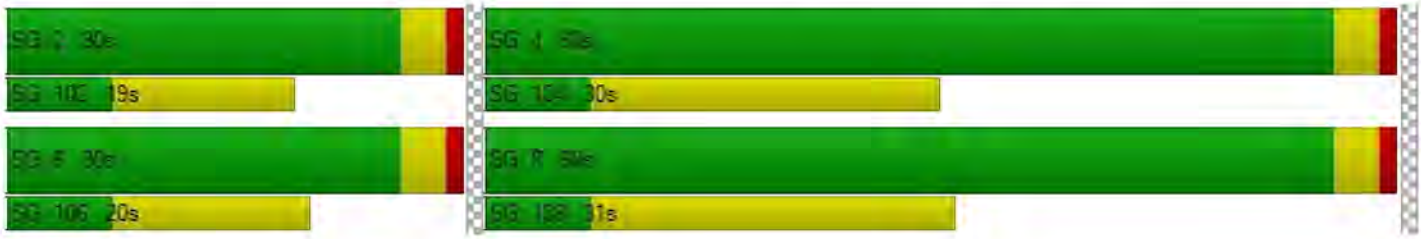
Vehicle Miles Traveled [mph]	0.72	11.11	10.93	0.83	8.39	8.37	0.55	1.56
Stops [stops/h]	0.50	9.01	8.83	0.63	6.98	6.97	25.66	60.48
Fuel consumption [US gal/h]	0.03	0.58	0.57	0.04	0.44	0.44	0.37	0.88
CO [g/h]	2.44	40.52	39.80	2.88	30.67	30.61	25.65	61.81
NOx [g/h]	0.47	7.88	7.74	0.56	5.97	5.96	4.99	12.03
VOC [g/h]	0.57	9.39	9.22	0.67	7.11	7.09	5.94	14.32

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.638	2.626	1.770	1.804
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	2.107	2.013	1.607	1.669
Bicycle LOS	B	B	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	34.9
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.509

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	99	553	383	102	117	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	553	383	102	117	188
Peak Hour Factor	0.9680	0.9680	0.9680	0.9680	0.9680	0.9680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	143	99	26	30	49
Total Analysis Volume [veh/h]	102	571	396	105	121	194
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.00	0.00	0.51	0.26
d_M, Delay for Movement [s/veh]	8.76	0.00	0.00	0.00	34.89	11.47
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.32	0.00	0.00	0.00	2.64	1.03
95th-Percentile Queue Length [ft/ln]	7.97	0.00	0.00	0.00	65.91	25.82
d_A, Approach Delay [s/veh]	1.33		0.00		20.47	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.93					
Intersection LOS	D					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.719

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1196	100	667	0	0	211	190	1535	257	0	1708	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1196	100	667	0	0	211	190	1535	257	0	1708	35
Peak Hour Factor	0.9810	0.9810	0.9810	1.0000	1.0000	0.9810	0.9810	0.9810	0.9810	1.0000	0.9810	0.9810
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	305	25	170	0	0	54	48	391	65	0	435	9
Total Analysis Volume [veh/h]	1219	102	680	0	0	215	194	1565	262	0	1741	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	34	0	0	0	94	20	56	0	0	36	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	39	39	39	12	12	43	27	27
g / C, Green / Cycle	0.43	0.43	0.43	0.13	0.13	0.48	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.28	0.27	0.27	0.06	0.11	0.27	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1512	821	821	479	240	2732	1719	573
d1, Uniform Delay [s]	20.22	19.82	19.82	35.96	37.90	16.82	28.65	28.65
k, delay calibration	0.50	0.50	0.50	0.11	0.14	0.11	0.11	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.20	3.49	3.49	0.66	8.07	0.19	0.77	3.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.62	0.62	0.45	0.81	0.57	0.78	0.78
d, Delay for Lane Group [s/veh]	22.42	23.31	23.31	36.62	45.96	17.01	29.42	31.85
Lane Group LOS	C	C	C	D	D	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.21	8.62	8.62	2.19	4.43	6.70	8.05	8.43
50th-Percentile Queue Length [ft/ln]	205.25	215.41	215.41	54.86	110.74	167.56	201.22	210.87
95th-Percentile Queue Length [veh/ln]	12.91	13.43	13.43	3.95	7.88	10.95	12.70	13.20
95th-Percentile Queue Length [ft/ln]	322.73	335.76	335.76	98.75	197.04	273.70	317.54	329.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.58	23.31	23.31	0.00	0.00	36.62	45.96	17.01	0.00	0.00	29.99	31.85
Movement LOS	C	C	C			D	D	B			C	C
d_A, Approach Delay [s/veh]	22.87			36.62			17.63			30.03		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	23.99											
Intersection LOS	C											
Intersection V/C	0.719											

Emissions

Vehicle Miles Traveled [mph]	60.99	31.40	31.40	10.73	18.11	146.07	45.63	15.21
Stops [stops/h]	656.81	344.66	344.66	175.56	177.19	804.28	965.85	337.40
Fuel consumption [US gal/h]	10.64	5.60	5.60	3.01	5.14	22.66	24.33	8.57
CO [g/h]	743.55	391.76	391.76	210.64	359.34	1583.67	1700.92	598.88
NOx [g/h]	144.67	76.22	76.22	40.98	69.91	308.12	330.94	116.52
VOC [g/h]	172.32	90.79	90.79	48.82	83.28	367.03	394.20	138.80

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.690	2.264	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	356	1156	711
d_b, Bicycle Delay [s]	20.00	30.42	8.02	18.69
I_b,int, Bicycle LOS Score for Intersection	4.861	1.560	2.527	2.293
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.707

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1196	100	667	0	0	211	190	1535	257	0	1708	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1196	100	667	0	0	211	190	1535	257	0	1708	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	299	25	167	0	0	53	48	384	64	0	427	9
Total Analysis Volume [veh/h]	1196	100	667	0	0	211	190	1535	257	0	1708	35
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.27	0.27	0.00	0.00	0.06	0.11	0.30	0.14	0.00	0.25	0.25
Intersection LOS	C											
Intersection V/C	0.707											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	42.8
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	161	228	138	249	217	128	221	1719	138	167	1482	220
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	228	138	249	217	128	221	1719	138	167	1482	220
Peak Hour Factor	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	57	35	63	55	32	56	433	35	42	373	55
Total Analysis Volume [veh/h]	162	230	139	251	219	129	223	1731	139	168	1492	222
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	39	0	14	42	0	22	50	0	17	45	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	37	37	10	40	40	17	44	44	13	40	40
g / C, Green / Cycle	0.06	0.31	0.31	0.08	0.34	0.34	0.14	0.36	0.36	0.11	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.05	0.10	0.09	0.07	0.12	0.07	0.12	0.33	0.33	0.09	0.22	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	204	593	593	292	640	640	252	1381	690	195	1890	630
d1, Uniform Delay [s]	55.79	31.64	31.29	54.31	29.82	28.30	50.67	36.09	36.41	52.64	34.59	34.69
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.30	0.11	0.37	0.30	0.11	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.82	1.47	1.27	7.37	1.46	0.71	22.93	2.35	14.70	25.04	0.43	2.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.33	0.29	0.86	0.34	0.20	0.89	0.90	0.91	0.86	0.68	0.69
d, Delay for Lane Group [s/veh]	62.60	33.12	32.55	61.68	31.28	29.01	73.59	38.43	51.11	77.68	35.02	37.14
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.58	4.48	3.98	3.98	4.90	2.72	8.06	16.91	19.73	6.24	10.53	11.01
50th-Percentile Queue Length [ft/ln]	64.39	111.96	99.42	99.45	122.47	68.01	201.39	422.74	493.25	156.09	263.13	275.28
95th-Percentile Queue Length [veh/ln]	4.64	7.95	7.16	7.16	8.53	4.90	12.71	23.65	27.01	10.34	15.85	16.45
95th-Percentile Queue Length [ft/ln]	115.91	198.73	178.95	179.01	213.22	122.41	317.76	591.34	675.36	258.54	396.14	411.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.60	33.03	32.55	61.68	31.28	29.01	73.59	42.04	51.11	77.68	35.32	37.14
Movement LOS	E	C	C	E	C	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	41.93			43.53			46.00			39.32		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	42.82											
Intersection LOS	D											
Intersection V/C	0.692											

Emissions

Vehicle Miles Traveled [mph]	12.60	15.11	13.60	16.30	14.22	8.38	13.27	73.72	37.54	10.31	78.66	26.48
Stops [stops/h]	154.55	134.36	119.30	238.69	146.97	81.61	241.67	1014.58	591.90	187.31	947.26	330.34
Fuel consumption [US gal/h]	4.03	3.17	2.82	6.08	3.35	1.86	6.19	22.30	13.72	4.86	21.26	7.46
CO [g/h]	281.93	221.59	196.89	424.89	233.94	130.25	432.59	1558.68	959.08	340.04	1486.20	521.15
NOx [g/h]	54.85	43.11	38.31	82.67	45.52	25.34	84.17	303.26	186.60	66.16	289.16	101.40
VOC [g/h]	65.34	51.36	45.63	98.47	54.22	30.19	100.26	361.24	222.28	78.81	344.44	120.78

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.696	2.743	3.369	3.390
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	633	767	683
d_b, Bicycle Delay [s]	30.10	28.02	22.82	26.00
I_b,int, Bicycle LOS Score for Intersection	1.998	2.548	2.711	2.336
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.679

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	180	47	195	22	12	8	17	1826	308	219	1682	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	180	47	195	22	12	8	17	1826	308	219	1682	52
Peak Hour Factor	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	12	49	6	3	2	4	463	78	56	426	13
Total Analysis Volume [veh/h]	183	48	198	22	12	8	17	1852	312	222	1706	53
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	13	13	4	4	2	48	48	14	60	60
g / C, Green / Cycle	0.13	0.13	0.13	0.04	0.04	0.02	0.51	0.51	0.15	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.10	0.01	0.01	0.01	0.32	0.16	0.12	0.30	0.32
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	241	255	255	76	81	42	2903	968	263	2401	1201
d1, Uniform Delay [s]	38.04	37.95	39.77	44.09	44.01	45.76	16.95	13.69	39.53	9.26	9.41
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.45	1.28	5.09	2.04	1.58	6.29	1.09	0.88	7.33	0.70	1.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.47	0.46	0.78	0.29	0.25	0.41	0.64	0.32	0.85	0.48	0.50
d, Delay for Lane Group [s/veh]	39.49	39.24	44.86	46.13	45.59	52.04	18.03	14.57	46.85	9.95	10.89
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.56	2.60	4.83	0.53	0.48	0.46	9.07	3.82	5.40	5.53	6.07
50th-Percentile Queue Length [ft/ln]	64.12	65.04	120.66	13.30	11.97	11.45	226.81	95.54	134.90	138.23	151.87
95th-Percentile Queue Length [veh/ln]	4.62	4.68	8.43	0.96	0.86	0.82	14.01	6.88	9.21	9.39	10.12
95th-Percentile Queue Length [ft/ln]	115.42	117.08	210.73	23.93	21.54	20.61	350.30	171.97	230.14	234.64	252.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.39	39.24	44.86	46.13	45.59	45.59	52.04	18.03	14.57	46.85	10.25	10.89
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.90			45.88			17.80			14.37		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.82											
Intersection LOS	B											
Intersection V/C	0.679											

Emissions

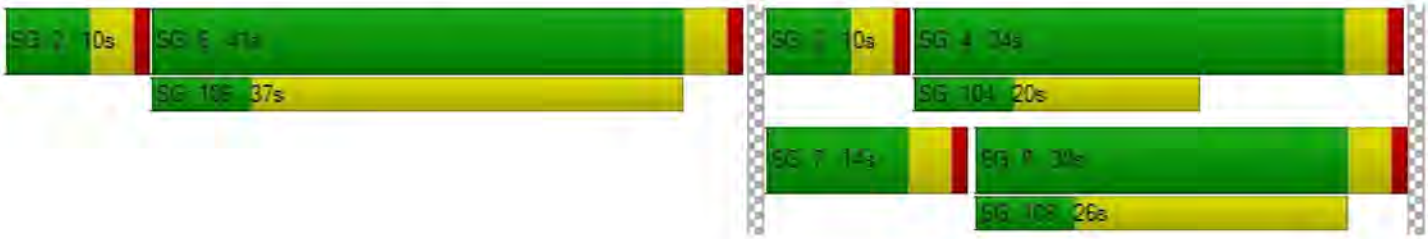
Vehicle Miles Traveled [mph]	6.54	6.67	11.32	1.08	0.98	0.90	98.33	16.56	16.70	87.14	45.15
Stops [stops/h]	97.19	98.59	182.89	20.15	18.14	17.35	1031.37	144.82	204.48	419.05	230.21
Fuel consumption [US gal/h]	1.59	1.61	3.02	0.44	0.40	0.38	20.45	2.94	4.72	9.58	5.21
CO [g/h]	110.86	112.49	210.96	30.97	27.88	26.76	1429.48	205.59	330.17	669.98	364.18
NOx [g/h]	21.57	21.89	41.04	6.03	5.42	5.21	278.13	40.00	64.24	130.35	70.86
VOC [g/h]	25.69	26.07	48.89	7.18	6.46	6.20	331.30	47.65	76.52	155.28	84.40

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.331	2.012	0.000	3.349
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.267	1.629	2.759	2.649
Bicycle LOS	B	A	C	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	3	0	0	22	42	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	0	0	22	42	2
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	0	7	14	1
Total Analysis Volume [veh/h]	4	0	0	29	56	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.95	8.59	7.33	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.33	0.33	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	8.95		0.00		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.39					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	109.4
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.046

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	8	7	0	30	36	1016	26	6	916	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	8	7	0	30	36	1016	26	6	916	32
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	2	2	0	8	9	267	7	2	241	8
Total Analysis Volume [veh/h]	15	2	8	7	0	32	38	1069	27	6	964	34
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.26	0.05	0.02	0.11	0.00	0.06	0.06	0.01	0.00	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	89.65	109.38	33.82	66.51	91.03	15.35	10.53	0.00	0.00	10.75	0.00	0.00
Movement LOS	F	F	D	F	F	C	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	1.22	1.22	1.22	0.62	0.62	0.62	0.17	0.00	0.00	0.03	0.00	0.00
95th-Percentile Queue Length [ft/ln]	30.58	30.58	30.58	15.48	15.48	15.48	4.37	0.00	0.00	0.72	0.00	0.00
d_A, Approach Delay [s/veh]	73.36			24.54			0.35			0.06		
Approach LOS	F			C			A			A		
d_I, Intersection Delay [s/veh]	1.48											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.4
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.514

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	314	11	166	11	20	9	6	734	295	131	635	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	314	11	166	11	20	9	6	734	295	131	635	8
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	81	3	43	3	5	2	2	189	76	34	163	2
Total Analysis Volume [veh/h]	323	11	171	11	21	9	6	756	304	135	654	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	51	51	0	35	0	10	49	0	10	49	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	57	67	41	41	1	35	35	6	40	40
g / C, Green / Cycle	0.11	0.51	0.61	0.37	0.37	0.01	0.32	0.32	0.05	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.09	0.01	0.09	0.01	0.02	0.00	0.29	0.26	0.04	0.17	0.17
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	381	978	1151	685	702	19	611	611	191	695	695
d1, Uniform Delay [s]	48.12	13.02	9.40	21.99	22.21	54.03	35.80	34.44	51.14	26.82	26.80
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.25	0.20	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.29	0.02	0.27	0.04	0.11	9.17	11.80	5.23	4.75	0.51	0.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.01	0.15	0.02	0.04	0.32	0.91	0.82	0.71	0.48	0.48
d, Delay for Lane Group [s/veh]	53.41	13.05	9.67	22.03	22.32	63.20	47.60	39.67	55.88	27.33	27.30
Lane Group LOS	D	B	A	C	C	E	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.53	0.13	1.72	0.19	0.53	0.21	15.52	12.65	1.90	6.45	6.42
50th-Percentile Queue Length [ft/ln]	113.27	3.32	43.08	4.80	13.21	5.23	387.95	316.17	47.60	161.22	160.41
95th-Percentile Queue Length [veh/ln]	8.02	0.24	3.10	0.35	0.95	0.38	21.98	18.48	3.43	10.61	10.57
95th-Percentile Queue Length [ft/ln]	200.54	5.97	77.54	8.63	23.77	9.41	549.46	461.97	85.67	265.34	264.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.41	13.05	9.67	22.03	22.32	22.32	63.20	45.51	39.67	55.88	27.32	27.30
Movement LOS	D	B	A	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	37.72			22.25			43.94			32.16		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	38.37											
Intersection LOS	D											
Intersection V/C	0.514											

Emissions

Vehicle Miles Traveled [mph]	21.09	0.72	11.17	0.43	1.17	0.31	29.02	26.25	11.34	27.86	27.74
Stops [stops/h]	296.56	4.34	56.39	6.28	17.29	6.84	507.86	413.89	124.61	211.05	209.99
Fuel consumption [US gal/h]	7.18	0.10	1.29	0.09	0.26	0.17	12.70	10.11	3.47	5.42	5.40
CO [g/h]	501.83	6.82	90.21	6.49	17.85	12.09	887.77	706.66	242.77	379.12	377.26
NOx [g/h]	97.64	1.33	17.55	1.26	3.47	2.35	172.73	137.49	47.24	73.76	73.40
VOC [g/h]	116.30	1.58	20.91	1.50	4.14	2.80	205.75	163.78	56.27	87.86	87.43

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersectio	2.672	1.968	2.963	2.901
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	564	818	818
d_b, Bicycle Delay [s]	18.04	28.37	19.20	19.20
I_b,int, Bicycle LOS Score for Intersection	2.393	1.627	2.439	2.217
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	4.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.175

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	20	441	22	6	417	3	7	0	28	19	11	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	20	441	22	6	417	3	7	0	28	19	11	22
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	112	6	2	106	1	2	0	7	5	3	6
Total Analysis Volume [veh/h]	20	446	22	6	422	3	7	0	28	19	11	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	31	0	0	31	0	0	59	0	0	59	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	78	78	78	78	78	78	4	4
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.01	0.12	0.12	0.00	0.11	0.11	0.02	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1537	1635	1635	1533	1635	1635	144	151
d1, Uniform Delay [s]	0.89	1.00	1.00	0.88	0.99	0.99	41.31	41.69
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	0.19	0.18	0.00	0.16	0.16	0.86	1.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.14	0.14	0.00	0.13	0.13	0.24	0.34
d, Delay for Lane Group [s/veh]	0.90	1.19	1.18	0.88	1.15	1.15	42.17	43.04
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.01	0.12	0.12	0.00	0.10	0.10	0.79	1.18
50th-Percentile Queue Length [ft/ln]	0.23	2.94	2.90	0.07	2.61	2.61	19.67	29.62
95th-Percentile Queue Length [veh/ln]	0.02	0.21	0.21	0.00	0.19	0.19	1.42	2.13
95th-Percentile Queue Length [ft/ln]	0.41	5.29	5.21	0.12	4.70	4.70	35.41	53.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.90	1.18	1.18	0.88	1.15	1.15	42.17	42.17	42.17	43.04	43.04	43.04
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.17			1.15			42.17			43.04		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	4.75											
Intersection LOS	A											
Intersection V/C	0.175											

Emissions

Vehicle Miles Traveled [mph]	0.69	8.08	7.98	0.19	6.82	6.80	0.67	1.23
Stops [stops/h]	0.36	4.70	4.63	0.11	4.18	4.17	31.48	47.39
Fuel consumption [US gal/h]	0.03	0.39	0.39	0.01	0.34	0.33	0.45	0.69
CO [g/h]	2.23	27.44	27.08	0.63	23.42	23.38	31.54	48.40
NOx [g/h]	0.43	5.34	5.27	0.12	4.56	4.55	6.14	9.42
VOC [g/h]	0.52	6.36	6.28	0.15	5.43	5.42	7.31	11.22

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.575	2.545	1.771	1.755
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	1222	1222
d_b, Bicycle Delay [s]	22.05	22.05	6.81	6.81
I_b,int, Bicycle LOS Score for Intersection	1.962	1.915	1.617	1.645
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	26.2
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.394

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	91	396	371	95	104	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	396	371	95	104	213
Peak Hour Factor	0.9510	0.9510	0.9510	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	104	98	25	27	56
Total Analysis Volume [veh/h]	96	416	390	100	109	224
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.39	0.30
d_M, Delay for Movement [s/veh]	8.70	0.00	0.00	0.00	26.22	11.76
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.30	0.00	0.00	0.00	1.80	1.24
95th-Percentile Queue Length [ft/ln]	7.38	0.00	0.00	0.00	44.90	31.03
d_A, Approach Delay [s/veh]	1.63		0.00		16.49	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	4.74					
Intersection LOS	D					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1074	143	548	0	0	281	223	1448	449	0	1700	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1074	143	548	0	0	281	223	1448	449	0	1700	33
Peak Hour Factor	0.9490	0.9490	0.9490	1.0000	1.0000	0.9490	0.9490	0.9490	0.9490	1.0000	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	283	38	144	0	0	74	59	381	118	0	448	9
Total Analysis Volume [veh/h]	1132	151	577	0	0	296	235	1526	473	0	1791	35
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	21	0	0	0	99	29	74	0	0	45	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	38	38	38	15	15	49	30	30
g / C, Green / Cycle	0.40	0.40	0.40	0.16	0.16	0.52	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.26	0.25	0.25	0.08	0.13	0.27	0.24	0.24
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1381	750	750	576	288	2970	1818	606
d1, Uniform Delay [s]	23.58	23.15	23.15	36.52	38.55	14.88	28.99	28.99
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.52	3.98	3.98	0.71	5.61	0.14	0.65	1.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.63	0.63	0.51	0.82	0.51	0.75	0.75
d, Delay for Lane Group [s/veh]	26.10	27.13	27.13	37.23	44.17	15.02	29.64	30.92
Lane Group LOS	C	C	C	D	D	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.59	9.03	9.03	3.17	5.42	6.20	8.63	8.85
50th-Percentile Queue Length [ft/ln]	214.77	225.69	225.69	79.26	135.54	155.03	215.77	221.14
95th-Percentile Queue Length [veh/ln]	13.40	13.96	13.96	5.71	9.24	10.29	13.45	13.72
95th-Percentile Queue Length [ft/ln]	334.95	348.88	348.88	142.66	231.01	257.13	336.23	343.08

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.29	27.13	27.13	0.00	0.00	37.23	44.17	15.02	0.00	0.00	29.94	30.92
Movement LOS	C	C	C			D	D	B			C	C
d_A, Approach Delay [s/veh]	26.62			37.23			15.06			29.96		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	24.69											
Intersection LOS	C											
Intersection V/C	0.724											

Emissions

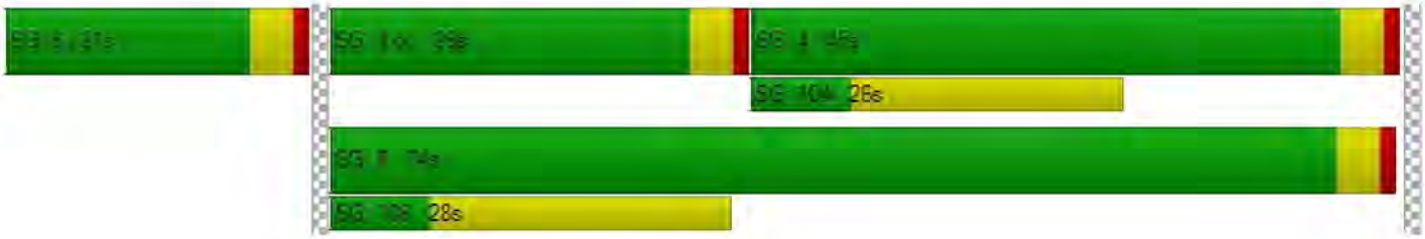
Vehicle Miles Traveled [mph]	56.69	29.19	29.19	14.77	21.93	142.43	46.89	15.63
Stops [stops/h]	651.10	342.10	342.10	240.27	205.45	704.99	981.21	335.21
Fuel consumption [US gal/h]	10.80	5.70	5.70	4.18	6.00	20.25	24.89	8.54
CO [g/h]	754.77	398.21	398.21	292.05	419.42	1415.81	1740.02	597.02
NOx [g/h]	146.85	77.48	77.48	56.82	81.60	275.47	338.55	116.16
VOC [g/h]	174.93	92.29	92.29	67.69	97.21	328.13	403.27	138.37

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.665	2.308	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	358	526	1474	863
d_b, Bicycle Delay [s]	32.02	25.79	3.29	15.35
I_b,int, Bicycle LOS Score for Intersection	4.629	1.560	2.528	2.313
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.696

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1074	143	548	0	0	281	223	1448	449	0	1700	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1074	143	548	0	0	281	223	1448	449	0	1700	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	269	36	137	0	0	70	56	362	112	0	425	8
Total Analysis Volume [veh/h]	1074	143	548	0	0	281	223	1448	449	0	1700	33
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.21	0.25	0.25	0.00	0.00	0.08	0.13	0.28	0.24	0.00	0.25	0.25
Intersection LOS	B											
Intersection V/C	0.696											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.0
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.642

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	169	83	297	209	149	139	1669	110	138	1522	198
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	169	83	297	209	149	139	1669	110	138	1522	198
Peak Hour Factor	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	43	21	75	53	38	35	422	28	35	385	50
Total Analysis Volume [veh/h]	165	171	84	300	211	151	141	1688	111	140	1539	200
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	39	0	16	39	0	29	50	0	15	36	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	39	39	12	43	43	11	42	42	11	42	42
g / C, Green / Cycle	0.06	0.32	0.32	0.10	0.36	0.36	0.10	0.35	0.35	0.09	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.06	0.09	0.11	0.08	0.08	0.31	0.32	0.08	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	225	612	612	350	679	679	172	1342	671	165	1990	663
d1, Uniform Delay [s]	55.12	29.65	29.48	53.16	27.86	26.90	53.24	36.58	36.93	53.68	32.92	33.11
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.34	0.28	0.11	0.18
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.54	0.81	0.74	6.09	1.19	0.76	9.18	2.20	13.52	24.95	0.37	1.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.22	0.20	0.86	0.31	0.22	0.82	0.89	0.91	0.85	0.65	0.67
d, Delay for Lane Group [s/veh]	59.65	30.46	30.22	59.25	29.05	27.66	62.42	38.78	50.45	78.63	33.29	35.00
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.55	2.88	2.65	4.67	4.51	3.11	4.54	16.22	18.82	5.23	10.34	10.89
50th-Percentile Queue Length [ft/ln]	63.85	72.05	66.17	116.76	112.83	77.66	113.58	405.48	470.47	130.83	258.55	272.19
95th-Percentile Queue Length [veh/ln]	4.60	5.19	4.76	8.21	8.00	5.59	8.04	22.82	25.93	8.98	15.62	16.30
95th-Percentile Queue Length [ft/ln]	114.92	129.69	119.11	205.36	199.93	139.80	200.97	570.60	648.33	224.62	390.40	407.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.65	30.41	30.22	59.25	29.05	27.66	62.42	42.21	50.45	78.63	33.55	35.00
Movement LOS	E	C	C	E	C	C	E	D	D	E	C	D
d_A, Approach Delay [s/veh]	41.86			42.42			44.15			37.07		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	41.00											
Intersection LOS	D											
Intersection V/C	0.642											

Emissions

Vehicle Miles Traveled [mph]	12.84	10.31	9.53	19.48	13.70	9.80	8.39	70.86	36.18	8.59	79.61	27.06
Stops [stops/h]	153.23	86.46	79.40	280.22	135.40	93.20	136.29	973.16	564.56	156.99	930.78	326.63
Fuel consumption [US gal/h]	3.97	2.04	1.87	7.07	3.07	2.12	3.43	21.50	13.08	4.09	20.79	7.32
CO [g/h]	277.35	142.60	131.03	493.99	214.46	147.95	239.78	1502.51	914.56	285.86	1452.91	511.69
NOx [g/h]	53.96	27.75	25.49	96.11	41.73	28.79	46.65	292.33	177.94	55.62	282.68	99.56
VOC [g/h]	64.28	33.05	30.37	114.49	49.70	34.29	55.57	348.22	211.96	66.25	336.73	118.59

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.658	2.721	3.356	3.381
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	767	533
d_b, Bicycle Delay [s]	30.10	30.10	22.82	32.27
I_b,int, Bicycle LOS Score for Intersection	1.906	2.652	2.627	2.335
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	18.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.667

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	150	22	232	21	14	9	14	1786	265	172	1715	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	150	22	232	21	14	9	14	1786	265	172	1715	36
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	6	59	5	4	2	4	457	68	44	438	9
Total Analysis Volume [veh/h]	153	22	237	21	14	9	14	1826	271	176	1754	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	15	15	4	4	2	49	49	11	58	58
g / C, Green / Cycle	0.15	0.15	0.15	0.04	0.04	0.02	0.52	0.52	0.12	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.05	0.05	0.12	0.01	0.01	0.01	0.32	0.14	0.10	0.31	0.32
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	276	292	292	78	83	36	2936	979	215	2336	1168
d1, Uniform Delay [s]	35.77	35.70	38.89	43.97	43.99	45.99	16.43	13.02	40.82	10.22	10.41
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.65	0.58	5.45	1.81	1.80	6.84	1.00	0.70	7.48	0.78	1.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.31	0.30	0.81	0.27	0.28	0.39	0.62	0.28	0.82	0.50	0.52
d, Delay for Lane Group [s/veh]	36.42	36.27	44.34	45.77	45.79	52.83	17.43	13.73	48.30	11.00	12.10
Lane Group LOS	D	D	D	D	D	D	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.85	1.86	5.77	0.50	0.55	0.39	8.73	3.18	4.33	6.07	6.71
50th-Percentile Queue Length [ft/ln]	46.24	46.60	144.32	12.62	13.78	9.65	218.29	79.42	108.21	151.72	167.81
95th-Percentile Queue Length [veh/ln]	3.33	3.35	9.71	0.91	0.99	0.69	13.58	5.72	7.74	10.11	10.96
95th-Percentile Queue Length [ft/ln]	83.22	83.87	242.83	22.71	24.81	17.36	339.44	142.95	193.51	252.73	274.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.35	36.27	44.34	45.77	45.79	45.79	52.83	17.43	13.73	48.30	11.36	12.10
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	40.94			45.78			17.19			14.68		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.54											
Intersection LOS	B											
Intersection V/C	0.667											

Emissions

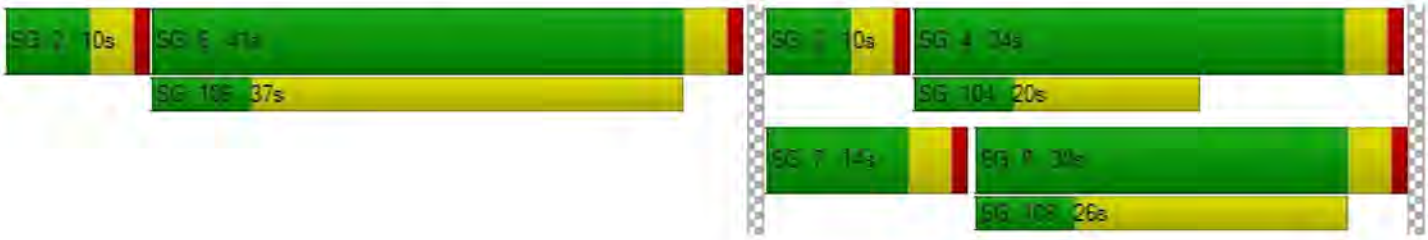
Vehicle Miles Traveled [mph]	4.97	5.03	13.55	1.03	1.12	0.74	96.95	14.39	13.24	88.60	46.10
Stops [stops/h]	70.08	70.63	218.76	19.13	20.89	14.62	992.64	120.38	164.03	459.96	254.37
Fuel consumption [US gal/h]	1.14	1.15	3.59	0.42	0.46	0.32	19.70	2.45	3.82	10.33	5.66
CO [g/h]	79.49	80.17	250.73	29.38	32.14	22.42	1377.11	171.60	266.70	721.99	395.57
NOx [g/h]	15.47	15.60	48.78	5.72	6.25	4.36	267.94	33.39	51.89	140.47	76.96
VOC [g/h]	18.42	18.58	58.11	6.81	7.45	5.20	319.16	39.77	61.81	167.33	91.68

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.311	1.993	0.000	3.348
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.239	1.632	2.721	2.641
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	8.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.009

Intersection Setup

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Brea Glenbrook Club Dwy		Greenbriar Lane		Greenbriar Lane	
Base Volume Input [veh/h]	6	2	1	22	22	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	2	1	22	22	13
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	1	0	7	7	4
Total Analysis Volume [veh/h]	8	3	1	29	29	17
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.89	8.52	7.31	0.00	0.00	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.87	0.87	0.04	0.04	0.00	0.00
d_A, Approach Delay [s/veh]	8.79		0.24		0.00	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.20					
Intersection LOS	A					

Appendix E

Intersection Analysis Worksheets
Project Opening Year (2026)
With Project Conditions

RK19750.1
JN: 2827-2023-05

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	290.6
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.978

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	26	0	42	21	0	46	24	986	13	18	998	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	42	21	0	46	24	986	13	18	998	15
Peak Hour Factor	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240	0.8240
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	13	6	0	14	7	299	4	5	303	5
Total Analysis Volume [veh/h]	32	0	51	25	0	56	29	1197	16	22	1211	18
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.98	0.00	0.12	0.76	0.00	0.13	0.05	0.01	0.00	0.04	0.01	0.00
d_M, Delay for Movement [s/veh]	290.59	327.31	188.72	219.33	255.92	117.65	11.74	0.00	0.00	11.56	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	6.04	6.04	6.04	4.94	4.94	4.94	0.16	0.00	0.00	0.12	0.00	0.00
95th-Percentile Queue Length [ft/ln]	151.09	151.09	151.09	123.39	123.39	123.39	4.06	0.00	0.00	3.00	0.00	0.00
d_A, Approach Delay [s/veh]	228.00			149.03			0.27			0.20		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	11.89											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	39.7
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.709

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	231	5	343	27	20	12	3	901	151	290	811	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	5	343	27	20	12	3	901	151	290	811	2
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	1	100	8	6	3	1	262	44	84	236	1
Total Analysis Volume [veh/h]	269	6	399	31	23	14	3	1048	176	337	943	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	115
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	13	48	48	0	35	0	10	51	0	16	57	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	115	115	115	115	115	115	115	115	115	115	115
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	50	66	37	37	1	41	41	12	52	52
g / C, Green / Cycle	0.08	0.44	0.57	0.32	0.32	0.01	0.36	0.36	0.10	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.21	0.02	0.02	0.00	0.33	0.31	0.10	0.25	0.25
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	274	828	1092	604	613	11	676	676	365	862	862
d1, Uniform Delay [s]	52.92	18.37	13.16	26.85	26.91	56.88	35.61	34.82	51.04	22.84	22.83
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.32	0.29	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.34	0.02	0.95	0.16	0.19	12.13	14.99	10.05	9.90	0.55	0.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.98	0.01	0.37	0.05	0.06	0.27	0.93	0.88	0.92	0.55	0.55
d, Delay for Lane Group [s/veh]	74.26	18.39	14.11	27.01	27.10	69.01	50.61	44.87	60.94	23.38	23.38
Lane Group LOS	E	B	B	C	C	E	D	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.62	0.09	5.46	0.63	0.75	0.12	18.72	16.72	5.17	8.85	8.84
50th-Percentile Queue Length [ft/ln]	115.39	2.30	136.52	15.64	18.71	3.07	468.05	418.04	129.30	221.32	221.12
95th-Percentile Queue Length [veh/ln]	8.14	0.17	9.29	1.13	1.35	0.22	25.82	23.43	8.90	13.73	13.72
95th-Percentile Queue Length [ft/ln]	203.47	4.14	232.33	28.16	33.67	5.52	645.45	585.70	222.54	343.31	343.05

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	74.26	18.39	14.11	27.01	27.10	27.10	69.01	48.30	44.87	60.94	23.38	23.38
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	38.15			27.06			47.86			33.25		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	39.65											
Intersection LOS	D											
Intersection V/C	0.709											

Emissions

Vehicle Miles Traveled [mph]	17.57	0.39	26.06	1.21	1.45	0.16	32.67	31.16	28.31	39.70	39.67
Stops [stops/h]	288.96	2.88	170.95	19.59	23.42	3.84	586.08	523.46	323.81	277.13	276.88
Fuel consumption [US gal/h]	7.53	0.06	3.76	0.30	0.36	0.10	14.86	13.03	9.18	7.06	7.05
CO [g/h]	526.51	4.53	262.70	20.98	25.10	6.66	1038.57	910.96	641.34	493.18	492.76
NOx [g/h]	102.44	0.88	51.11	4.08	4.88	1.30	202.07	177.24	124.78	95.96	95.87
VOC [g/h]	122.02	1.05	60.88	4.86	5.82	1.54	240.70	211.12	148.64	114.30	114.20

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	47.03	47.03	47.03	47.03
I_p,int, Pedestrian LOS Score for Intersectio	2.727	1.973	3.063	3.181
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	765	539	817	922
d_b, Bicycle Delay [s]	21.92	30.68	20.10	16.71
I_b,int, Bicycle LOS Score for Intersection	2.672	1.672	2.572	2.617
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	8.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.198

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	28	354	6	13	432	5	24	1	74	32	1	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	354	6	13	432	5	24	1	74	32	1	38
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	95	2	3	116	1	6	0	20	9	0	10
Total Analysis Volume [veh/h]	30	381	6	14	465	5	26	1	80	34	1	41
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	0	60	0	0	60	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	75	75	75	75	75	75	7	7
g / C, Green / Cycle	0.84	0.84	0.84	0.84	0.84	0.84	0.08	0.08
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.10	0.01	0.12	0.12	0.06	0.04
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1483	1587	1587	1492	1587	1587	194	202
d1, Uniform Delay [s]	1.24	1.36	1.36	1.23	1.40	1.40	40.71	40.02
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.03	0.16	0.16	0.01	0.20	0.20	2.43	1.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.12	0.12	0.01	0.15	0.15	0.55	0.38
d, Delay for Lane Group [s/veh]	1.27	1.52	1.52	1.25	1.59	1.59	43.14	41.17
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.03	0.24	0.23	0.02	0.29	0.29	2.45	1.68
50th-Percentile Queue Length [ft/ln]	0.84	5.88	5.85	0.39	7.32	7.30	61.27	42.11
95th-Percentile Queue Length [veh/ln]	0.06	0.42	0.42	0.03	0.53	0.53	4.41	3.03
95th-Percentile Queue Length [ft/ln]	1.52	10.58	10.54	0.70	13.18	13.14	110.29	75.80

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.27	1.52	1.52	1.25	1.59	1.59	43.14	43.14	43.14	41.17	41.17	41.17
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.50			1.58			43.14			41.17		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.43											
Intersection LOS	A											
Intersection V/C	0.198											

Emissions

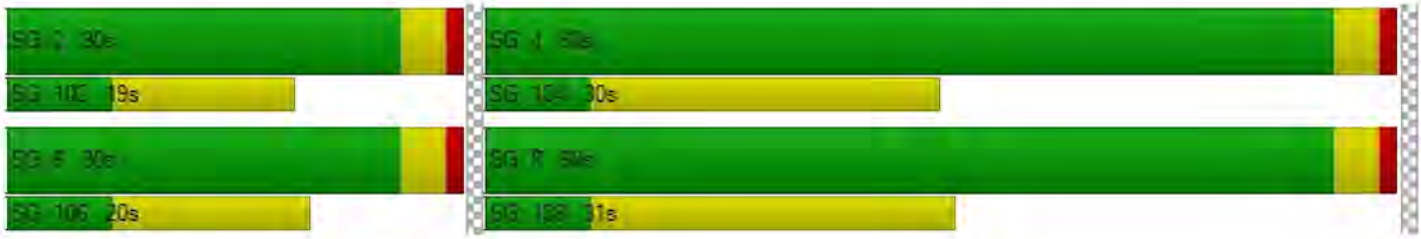
Vehicle Miles Traveled [mph]	1.03	6.66	6.63	0.45	7.54	7.52	2.05	1.80
Stops [stops/h]	1.35	9.40	9.37	0.62	11.72	11.68	98.03	67.38
Fuel consumption [US gal/h]	0.06	0.39	0.39	0.03	0.46	0.46	1.41	0.98
CO [g/h]	4.05	27.32	27.21	1.80	32.27	32.17	98.38	68.21
NOx [g/h]	0.79	5.31	5.29	0.35	6.28	6.26	19.14	13.27
VOC [g/h]	0.94	6.33	6.31	0.42	7.48	7.46	22.80	15.81

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.607	2.579	1.815	1.774
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	1.904	1.959	1.736	1.685
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	20.8
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.245

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	46	314	465	72	69	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	314	465	72	69	73
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	85	125	19	19	20
Total Analysis Volume [veh/h]	50	339	502	78	74	79
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.01	0.00	0.25	0.11
d_M, Delay for Movement [s/veh]	8.83	0.00	0.00	0.00	20.78	10.74
Movement LOS	A	A	A	A	C	B
95th-Percentile Queue Length [veh/ln]	0.16	0.00	0.00	0.00	0.94	0.38
95th-Percentile Queue Length [ft/ln]	3.98	0.00	0.00	0.00	23.61	9.40
d_A, Approach Delay [s/veh]	1.13		0.00		15.60	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	2.52					
Intersection LOS	C					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.634

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	958	70	766	0	0	118	91	1436	465	0	1621	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	958	70	766	0	0	118	91	1436	465	0	1621	12
Peak Hour Factor	0.9280	0.9280	0.9280	1.0000	1.0000	0.9280	0.9280	0.9280	0.9280	1.0000	0.9280	0.9280
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	258	19	206	0	0	32	25	387	125	0	437	3
Total Analysis Volume [veh/h]	1032	75	825	0	0	127	98	1547	501	0	1747	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	10	0	0	0	104	18	90	0	0	72	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	50	50	50	7	7	42	31	31
g / C, Green / Cycle	0.50	0.50	0.50	0.07	0.07	0.42	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.27	0.26	0.26	0.04	0.05	0.27	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1757	954	954	259	130	2383	1745	582
d1, Uniform Delay [s]	17.04	16.72	16.72	44.63	45.54	23.24	31.33	31.33
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.20	1.98	1.98	1.43	8.62	0.30	0.69	2.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.54	0.51	0.51	0.49	0.76	0.65	0.76	0.76
d, Delay for Lane Group [s/veh]	18.24	18.69	18.69	46.06	54.15	23.54	32.02	33.37
Lane Group LOS	B	B	B	D	D	C	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	7.44	7.74	7.74	1.56	2.59	8.84	8.98	9.20
50th-Percentile Queue Length [ft/ln]	185.92	193.54	193.54	38.98	64.75	220.98	224.60	230.06
95th-Percentile Queue Length [veh/ln]	11.91	12.30	12.30	2.81	4.66	13.72	13.90	14.18
95th-Percentile Queue Length [ft/ln]	297.73	307.61	307.61	70.16	116.55	342.88	347.49	354.44

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.27	18.69	18.69	0.00	0.00	46.06	54.15	23.54	0.00	0.00	32.35	33.37
Movement LOS	B	B	B			D	D	C			C	C
d_A, Approach Delay [s/veh]	18.47			46.06			19.77			32.36		
Approach LOS	B			D			B			C		
d_I, Intersection Delay [s/veh]	23.98											
Intersection LOS	C											
Intersection V/C	0.634											

Emissions

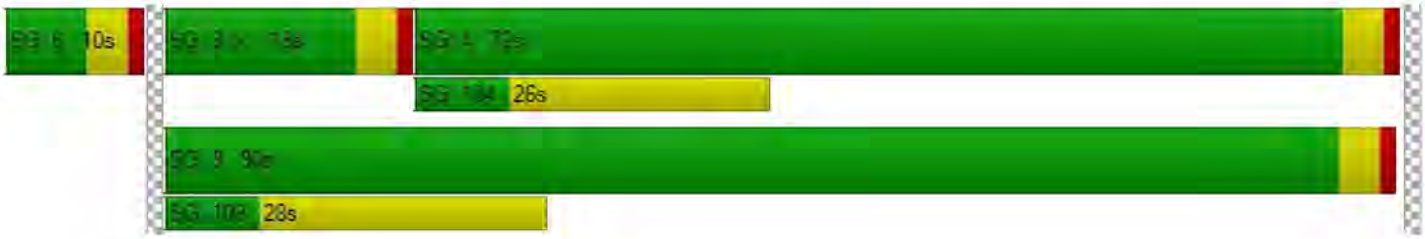
Vehicle Miles Traveled [mph]	58.88	30.32	30.32	6.34	9.15	144.39	45.19	15.06
Stops [stops/h]	535.45	278.69	278.69	112.26	93.24	954.64	970.27	331.29
Fuel consumption [US gal/h]	8.92	4.65	4.65	2.07	2.82	26.90	25.01	8.58
CO [g/h]	623.21	325.21	325.21	144.79	196.94	1880.32	1748.14	599.62
NOx [g/h]	121.25	63.27	63.27	28.17	38.32	365.84	340.12	116.66
VOC [g/h]	144.43	75.37	75.37	33.56	45.64	435.78	405.15	138.97

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.681	2.212	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	120	280	1720	1360
d_b, Bicycle Delay [s]	44.18	36.98	0.98	5.12
I_b,int, Bicycle LOS Score for Intersection	4.747	1.560	2.464	2.286
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.608

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	958	70	766	0	0	118	91	1436	465	0	1621	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	958	70	766	0	0	118	91	1436	465	0	1621	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	240	18	192	0	0	30	23	359	116	0	405	3
Total Analysis Volume [veh/h]	958	70	766	0	0	118	91	1436	465	0	1621	12
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.25	0.25	0.00	0.00	0.03	0.05	0.28	0.00	0.00	0.23	0.23
Intersection LOS	B											
Intersection V/C	0.608											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.2
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	131	125	81	132	245	180	180	1794	135	119	1354	59
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	131	125	81	132	245	180	180	1794	135	119	1354	59
Peak Hour Factor	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750	0.9750
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	32	21	34	63	46	46	460	35	31	347	15
Total Analysis Volume [veh/h]	134	128	83	135	251	185	185	1840	138	122	1389	61
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	10	39	0	10	39	0	26	56	0	15	45	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	41	41	6	41	41	14	47	47	10	43	43
g / C, Green / Cycle	0.05	0.34	0.34	0.05	0.34	0.34	0.12	0.39	0.39	0.08	0.36	0.36
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.05	0.04	0.13	0.10	0.10	0.34	0.35	0.07	0.19	0.20
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	175	646	646	175	646	646	217	1499	749	148	2031	677
d1, Uniform Delay [s]	56.31	27.74	27.61	56.32	30.12	28.96	51.75	33.57	33.96	54.20	30.59	31.10
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.12	0.11	0.32	0.21	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.82	0.57	0.52	7.02	1.76	1.11	10.03	1.74	10.42	18.86	0.21	0.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.17	0.16	0.77	0.39	0.29	0.85	0.87	0.89	0.82	0.53	0.56
d, Delay for Lane Group [s/veh]	63.13	28.31	28.13	63.34	31.88	30.08	61.77	35.31	44.38	73.06	30.80	31.84
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.14	2.28	2.09	2.16	5.71	4.02	5.97	17.19	19.56	4.34	7.97	8.79
50th-Percentile Queue Length [ft/ln]	53.49	56.91	52.20	53.99	142.82	100.62	149.13	429.68	489.06	108.58	199.27	219.67
95th-Percentile Queue Length [veh/ln]	3.85	4.10	3.76	3.89	9.63	7.24	9.97	23.99	26.82	7.76	12.60	13.65
95th-Percentile Queue Length [ft/ln]	96.27	102.43	93.97	97.18	240.81	181.11	249.27	599.66	670.40	194.03	315.02	341.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.13	28.29	28.13	63.34	31.88	30.08	61.77	37.93	44.38	73.06	31.04	31.84
Movement LOS	E	C	C	E	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	41.78			38.73			40.38			34.33		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	38.24											
Intersection LOS	D											
Intersection V/C	0.681											

Emissions

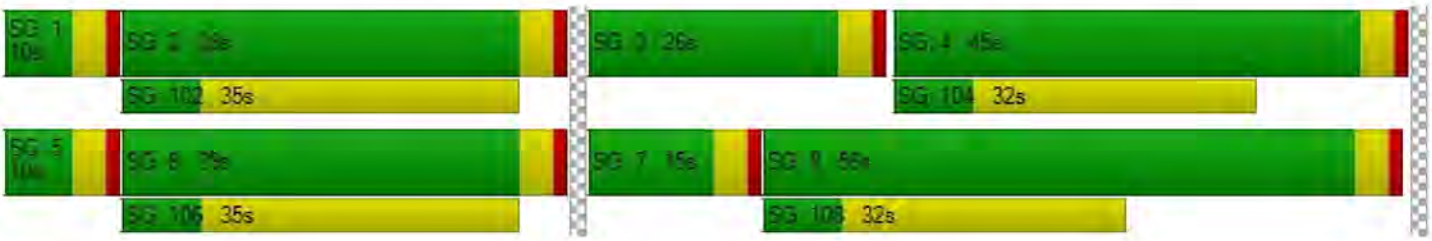
Vehicle Miles Traveled [mph]	10.43	8.54	7.88	8.77	16.30	12.01	11.01	77.89	39.80	7.48	65.52	23.42
Stops [stops/h]	128.36	68.29	62.64	129.57	171.38	120.74	178.96	1031.24	586.87	130.30	717.37	263.60
Fuel consumption [US gal/h]	3.36	1.61	1.48	3.33	3.90	2.75	4.48	22.33	13.23	3.36	16.09	5.90
CO [g/h]	234.56	112.49	103.24	232.55	272.31	192.13	312.98	1560.68	924.89	234.98	1124.63	412.57
NOx [g/h]	45.64	21.89	20.09	45.25	52.98	37.38	60.90	303.65	179.95	45.72	218.81	80.27
VOC [g/h]	54.36	26.07	23.93	53.90	63.11	44.53	72.54	361.70	214.35	54.46	260.64	95.62

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.652	2.671	3.368	3.329
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	867	683
d_b, Bicycle Delay [s]	30.10	30.10	19.27	26.00
I_b,int, Bicycle LOS Score for Intersection	1.844	2.502	2.749	2.208
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	14.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	137	14	111	24	15	24	15	1792	309	154	1376	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	137	14	111	24	15	24	15	1792	309	154	1376	17
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	4	28	6	4	6	4	458	79	39	352	4
Total Analysis Volume [veh/h]	140	14	113	25	15	25	15	1832	316	157	1407	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	12	30	0	14	32	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	8	8	5	5	2	56	56	10	64	64
g / C, Green / Cycle	0.09	0.09	0.09	0.05	0.05	0.02	0.59	0.59	0.11	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.04	0.04	0.06	0.01	0.02	0.01	0.32	0.17	0.09	0.25	0.26
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	155	164	164	93	98	38	3336	1112	195	2556	1278
d1, Uniform Delay [s]	41.42	41.34	42.16	43.30	43.62	45.92	12.04	9.80	41.39	6.76	6.85
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.42	2.10	5.08	1.52	2.67	6.70	0.66	0.64	7.63	0.41	0.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.49	0.47	0.69	0.27	0.41	0.40	0.55	0.28	0.81	0.37	0.38
d, Delay for Lane Group [s/veh]	43.84	43.43	47.24	44.82	46.29	52.61	12.70	10.44	49.02	7.16	7.72
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.82	1.82	2.81	0.59	0.96	0.41	7.04	3.08	3.89	3.43	3.79
50th-Percentile Queue Length [ft/ln]	45.62	45.61	70.25	14.73	23.98	10.26	175.97	76.94	97.16	85.67	94.64
95th-Percentile Queue Length [veh/ln]	3.28	3.28	5.06	1.06	1.73	0.74	11.39	5.54	7.00	6.17	6.81
95th-Percentile Queue Length [ft/ln]	82.11	82.09	126.45	26.51	43.16	18.46	284.75	138.49	174.90	154.20	170.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.66	43.43	47.24	44.82	46.29	46.29	52.61	12.70	10.44	49.02	7.35	7.72
Movement LOS	D	D	D	D	D	D	D	B	B	D	A	A
d_A, Approach Delay [s/veh]	45.16			45.73			12.64			11.49		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	14.85											
Intersection LOS	B											
Intersection V/C	0.588											

Emissions

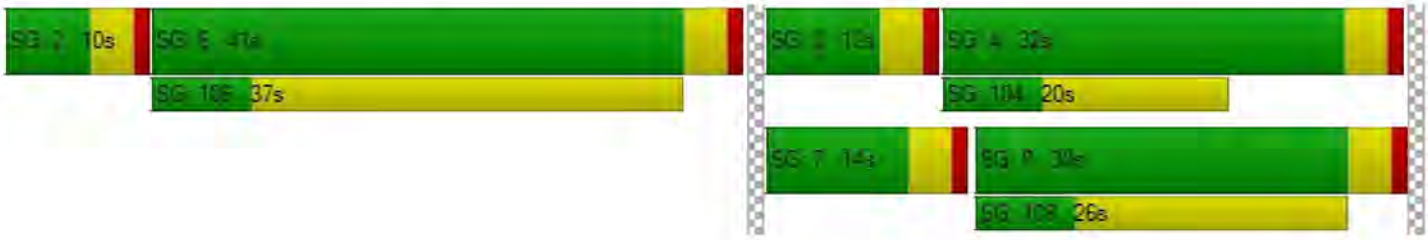
Vehicle Miles Traveled [mph]	4.39	4.42	6.46	1.22	1.95	0.80	97.27	16.78	11.81	70.37	36.73
Stops [stops/h]	69.14	69.13	106.48	22.32	36.35	15.55	800.20	116.63	147.28	259.71	143.45
Fuel consumption [US gal/h]	1.15	1.15	1.79	0.49	0.80	0.34	16.08	2.42	3.44	6.44	3.49
CO [g/h]	80.18	80.16	124.79	34.33	56.19	23.90	1123.90	169.04	240.16	449.86	244.14
NOx [g/h]	15.60	15.60	24.28	6.68	10.93	4.65	218.67	32.89	46.73	87.53	47.50
VOC [g/h]	18.58	18.58	28.92	7.96	13.02	5.54	260.47	39.18	55.66	104.26	56.58

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.287	1.991	0.000	3.256
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	589
d_b, Bicycle Delay [s]	17.71	41.69	25.06	23.63
I_b,int, Bicycle LOS Score for Intersection	2.000	1.667	2.749	2.429
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Project Driveway No. 1			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Project Driveway No. 1			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	2	0	42	0	0	1	0	58	2	13	19	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	42	0	0	1	0	58	2	13	19	5
Peak Hour Factor	1.0000	1.0000	1.0000	0.7500	1.0000	0.7500	0.7500	0.7500	1.0000	1.0000	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	11	0	0	0	0	19	1	3	6	2
Total Analysis Volume [veh/h]	2	0	42	0	0	1	0	77	2	13	25	7
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
d_M, Delay for Movement [s/veh]	9.51	9.99	8.84	9.67	9.80	8.44	7.28	0.00	0.00	7.39	0.00	0.00
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.14	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02
95th-Percentile Queue Length [ft/ln]	3.54	3.54	3.54	0.07	0.07	0.07	0.00	0.00	0.00	0.57	0.57	0.57
d_A, Approach Delay [s/veh]	8.87			8.44			0.00			2.13		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	2.93											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 9: Project Driveway No. 2 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Base Volume Input [veh/h]	3	17	33	3	4	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	17	33	3	4	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	8	1	1	4
Total Analysis Volume [veh/h]	3	17	33	3	4	15
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.38	8.54	0.00	0.00	7.29	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.06	0.06	0.00	0.00	0.01	0.01
95th-Percentile Queue Length [ft/ln]	1.53	1.53	0.00	0.00	0.20	0.20
d_A, Approach Delay [s/veh]	8.67		0.00		1.53	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.70					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	591.5
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.281

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	11	0	18	18	0	30	47	1269	37	19	1410	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	18	18	0	30	47	1269	37	19	1410	40
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	5	5	0	8	13	341	10	5	379	11
Total Analysis Volume [veh/h]	12	0	19	19	0	32	51	1366	40	20	1518	43
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.74	0.00	0.05	1.28	0.00	0.09	0.12	0.01	0.00	0.04	0.02	0.00
d_M, Delay for Movement [s/veh]	366.20	511.00	153.77	591.46	714.65	359.44	14.77	0.00	0.00	12.80	0.00	0.00
Movement LOS	F	F	F	F	F	F	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	2.93	2.93	2.93	5.33	5.33	5.33	0.41	0.00	0.00	0.13	0.00	0.00
95th-Percentile Queue Length [ft/ln]	73.31	73.31	73.31	133.23	133.23	133.23	10.29	0.00	0.00	3.24	0.00	0.00
d_A, Approach Delay [s/veh]	236.00			445.88			0.52			0.16		
Approach LOS	F			F			A			A		
d_I, Intersection Delay [s/veh]	9.96											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.7
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.697

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	389	21	336	17	13	9	8	1056	254	244	1083	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	389	21	336	17	13	9	8	1056	254	244	1083	24
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	101	5	87	4	3	2	2	273	66	63	280	6
Total Analysis Volume [veh/h]	403	22	348	18	13	9	8	1093	263	253	1121	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	19	54	54	0	35	0	19	52	0	14	47	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	52	66	33	33	1	46	46	10	55	55
g / C, Green / Cycle	0.13	0.43	0.55	0.27	0.27	0.01	0.39	0.39	0.08	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.12	0.01	0.18	0.01	0.01	0.00	0.37	0.35	0.07	0.30	0.30
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	438	820	1041	509	519	23	732	732	292	867	867
d1, Uniform Delay [s]	51.92	19.63	15.01	32.03	32.08	58.76	35.82	34.69	54.35	25.45	25.38
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.41	0.37	0.11	0.20	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.40	0.06	0.87	0.13	0.15	9.08	20.50	12.66	7.72	1.65	1.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.03	0.33	0.04	0.04	0.35	0.95	0.90	0.87	0.66	0.66
d, Delay for Lane Group [s/veh]	60.31	19.69	15.87	32.16	32.24	67.84	56.32	47.35	62.07	27.10	26.98
Lane Group LOS	E	B	B	C	C	E	E	D	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.39	0.36	5.25	0.41	0.50	0.29	22.82	19.63	3.99	12.39	12.27
50th-Percentile Queue Length [ft/ln]	159.80	9.04	131.18	10.26	12.56	7.33	570.49	490.79	99.83	309.70	306.72
95th-Percentile Queue Length [veh/ln]	10.54	0.65	9.00	0.74	0.90	0.53	30.65	26.90	7.19	18.16	18.01
95th-Percentile Queue Length [ft/ln]	263.46	16.26	225.09	18.48	22.61	13.19	766.35	672.45	179.70	454.00	450.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.31	19.69	15.87	32.16	32.24	32.24	67.84	53.08	47.35	62.07	27.04	26.98
Movement LOS	E	B	B	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	39.15			32.20			52.06			33.37		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	41.74											
Intersection LOS	D											
Intersection V/C	0.697											

Emissions

Vehicle Miles Traveled [mph]	26.32	1.44	22.73	0.70	0.86	0.42	36.37	34.34	21.25	48.28	47.98
Stops [stops/h]	383.52	10.84	157.41	12.32	15.07	8.79	684.59	588.95	239.59	371.64	368.06
Fuel consumption [US gal/h]	9.66	0.25	3.48	0.20	0.24	0.23	17.75	14.85	6.90	9.45	9.36
CO [g/h]	674.95	17.20	243.57	13.75	16.84	16.36	1240.83	1037.69	482.50	660.22	654.03
NOx [g/h]	131.32	3.35	47.39	2.68	3.28	3.18	241.42	201.90	93.88	128.45	127.25
VOC [g/h]	156.43	3.99	56.45	3.19	3.90	3.79	287.58	240.49	111.82	153.01	151.58

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.749	1.980	3.173	3.189
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	833	517	800	717
d_b, Bicycle Delay [s]	20.42	33.00	21.60	24.70
I_b,int, Bicycle LOS Score for Intersection	2.835	1.626	2.685	2.714
Bicycle LOS	C	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	5.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.240

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	65	581	31	24	491	8	10	4	43	15	10	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	65	581	31	24	491	8	10	4	43	15	10	37
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	155	8	6	131	2	3	1	11	4	3	10
Total Analysis Volume [veh/h]	69	619	33	26	523	9	11	4	46	16	11	39
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	0	60	0	0	60	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.17	0.17	0.01	0.14	0.14	0.03	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1515	1625	1625	1502	1625	1625	154	156
d1, Uniform Delay [s]	0.98	1.14	1.14	0.96	1.10	1.10	41.42	41.54
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.28	0.28	0.02	0.22	0.22	1.65	1.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.20	0.20	0.02	0.16	0.16	0.40	0.42
d, Delay for Lane Group [s/veh]	1.04	1.42	1.41	0.98	1.32	1.32	43.08	43.34
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.04	0.23	0.22	0.02	0.18	0.18	1.39	1.51
50th-Percentile Queue Length [ft/ln]	1.06	5.74	5.62	0.39	4.46	4.43	34.80	37.80
95th-Percentile Queue Length [veh/ln]	0.08	0.41	0.40	0.03	0.32	0.32	2.51	2.72
95th-Percentile Queue Length [ft/ln]	1.91	10.33	10.12	0.70	8.03	7.98	62.64	68.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.04	1.42	1.41	0.98	1.32	1.32	43.08	43.08	43.08	43.34	43.34	43.34
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.38			1.30			43.08			43.34		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	5.13											
Intersection LOS	A											
Intersection V/C	0.240											

Emissions

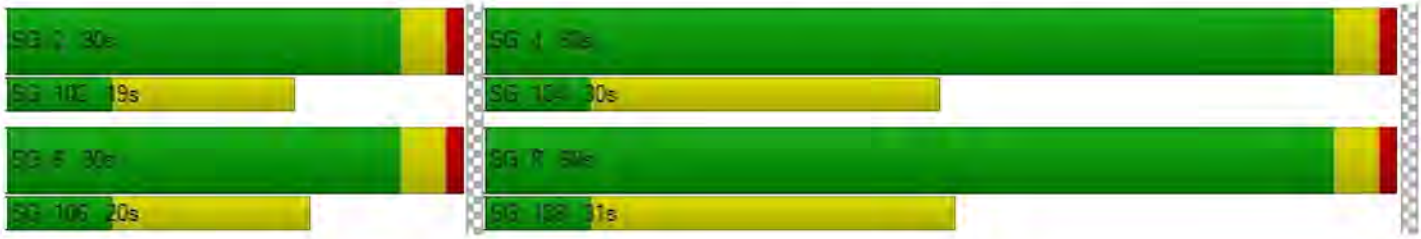
Vehicle Miles Traveled [mph]	2.37	11.29	11.10	0.83	8.54	8.50	1.17	1.56
Stops [stops/h]	1.70	9.18	9.00	0.63	7.14	7.10	55.68	60.48
Fuel consumption [US gal/h]	0.12	0.59	0.58	0.04	0.45	0.45	0.80	0.88
CO [g/h]	8.12	41.22	40.47	2.88	31.29	31.13	55.98	61.81
NOx [g/h]	1.58	8.02	7.87	0.56	6.09	6.06	10.89	12.03
VOC [g/h]	1.88	9.55	9.38	0.67	7.25	7.21	12.97	14.32

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.662	2.634	1.873	1.804
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	2.154	2.020	1.660	1.669
Bicycle LOS	B	B	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	44.3
Analysis Method:	HCM 7th Edition	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.614

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	99	593	410	104	131	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	593	410	104	131	188
Peak Hour Factor	0.9680	0.9680	0.9680	0.9680	0.9680	0.9680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	153	106	27	34	49
Total Analysis Volume [veh/h]	102	613	424	107	135	194
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.01	0.00	0.00	0.61	0.26
d_M, Delay for Movement [s/veh]	8.87	0.00	0.00	0.00	44.34	11.67
Movement LOS	A	A	A	A	E	B
95th-Percentile Queue Length [veh/ln]	0.33	0.00	0.00	0.00	3.57	1.06
95th-Percentile Queue Length [ft/ln]	8.20	0.00	0.00	0.00	89.20	26.59
d_A, Approach Delay [s/veh]	1.27		0.00		25.08	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	5.81					
Intersection LOS	E					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.724

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1196	100	679	0	0	211	190	1547	257	0	1724	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1196	100	679	0	0	211	190	1547	257	0	1724	35
Peak Hour Factor	0.9810	0.9810	0.9810	1.0000	1.0000	0.9810	0.9810	0.9810	0.9810	1.0000	0.9810	0.9810
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	305	25	173	0	0	54	48	394	65	0	439	9
Total Analysis Volume [veh/h]	1219	102	692	0	0	215	194	1577	262	0	1757	36
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	34	0	0	0	94	20	56	0	0	36	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	39	39	39	12	12	43	27	27
g / C, Green / Cycle	0.43	0.43	0.43	0.13	0.13	0.48	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.28	0.27	0.27	0.06	0.11	0.28	0.24	0.24
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1503	816	816	479	240	2745	1733	578
d1, Uniform Delay [s]	20.44	20.03	20.03	35.96	37.90	16.72	28.53	28.53
k, delay calibration	0.50	0.50	0.50	0.11	0.14	0.11	0.11	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.29	3.61	3.61	0.66	8.07	0.19	0.77	3.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.63	0.63	0.45	0.81	0.57	0.78	0.78
d, Delay for Lane Group [s/veh]	22.73	23.64	23.64	36.62	45.96	16.91	29.30	31.80
Lane Group LOS	C	C	C	D	D	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.33	8.75	8.75	2.19	4.43	6.73	8.11	8.51
50th-Percentile Queue Length [ft/ln]	208.32	218.68	218.68	54.86	110.74	168.22	202.67	212.69
95th-Percentile Queue Length [veh/ln]	13.07	13.60	13.60	3.95	7.88	10.98	12.78	13.29
95th-Percentile Queue Length [ft/ln]	326.67	339.94	339.94	98.75	197.04	274.57	319.41	332.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.89	23.64	23.64	0.00	0.00	36.62	45.96	16.91	0.00	0.00	29.89	31.80
Movement LOS	C	C	C			D	D	B			C	C
d_A, Approach Delay [s/veh]	23.19			36.62			17.54			29.93		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	24.05											
Intersection LOS	C											
Intersection V/C	0.724											

Emissions

Vehicle Miles Traveled [mph]	61.35	31.59	31.59	10.73	18.11	147.19	46.04	15.35
Stops [stops/h]	666.61	349.88	349.88	175.56	177.19	807.44	972.82	340.31
Fuel consumption [US gal/h]	10.79	5.69	5.69	3.01	5.14	22.75	24.49	8.64
CO [g/h]	754.56	397.76	397.76	210.64	359.34	1590.23	1712.09	603.83
NOx [g/h]	146.81	77.39	77.39	40.98	69.91	309.40	333.11	117.48
VOC [g/h]	174.88	92.18	92.18	48.82	83.28	368.55	396.79	139.94

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.692	2.264	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	667	356	1156	711
d_b, Bicycle Delay [s]	20.00	30.42	8.02	18.69
I_b,int, Bicycle LOS Score for Intersection	4.881	1.560	2.534	2.299
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.711

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1196	100	679	0	0	211	190	1547	257	0	1724	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1196	100	679	0	0	211	190	1547	257	0	1724	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	299	25	170	0	0	53	48	387	64	0	431	9
Total Analysis Volume [veh/h]	1196	100	679	0	0	211	190	1547	257	0	1724	35
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.27	0.27	0.00	0.00	0.06	0.11	0.30	0.14	0.00	0.25	0.25
Intersection LOS	C											
Intersection V/C	0.711											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	43.8
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.696

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	161	234	138	255	221	144	246	1719	138	167	1482	229
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	161	234	138	255	221	144	246	1719	138	167	1482	229
Peak Hour Factor	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930	0.9930
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	59	35	64	56	36	62	433	35	42	373	58
Total Analysis Volume [veh/h]	162	236	139	257	223	145	248	1731	139	168	1492	231
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	39	0	14	42	0	22	50	0	17	45	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	37	37	10	40	40	18	44	44	13	39	39
g / C, Green / Cycle	0.06	0.31	0.31	0.08	0.34	0.34	0.15	0.36	0.36	0.11	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.05	0.10	0.09	0.07	0.12	0.08	0.14	0.33	0.33	0.09	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	204	592	592	292	640	640	270	1381	690	195	1833	611
d1, Uniform Delay [s]	55.79	31.71	31.35	54.41	29.90	28.57	50.28	36.08	36.41	52.64	35.70	35.77
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.36	0.11	0.37	0.30	0.11	0.21
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.82	1.51	1.30	8.53	1.50	0.82	30.07	2.34	14.73	25.04	0.50	3.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.33	0.30	0.88	0.35	0.23	0.92	0.90	0.91	0.86	0.70	0.71
d, Delay for Lane Group [s/veh]	62.60	33.22	32.64	62.94	31.39	29.39	80.35	38.41	51.13	77.68	36.20	38.78
Lane Group LOS	E	C	C	E	C	C	F	D	D	E	D	D
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.58	4.56	4.05	4.12	5.00	3.09	9.44	16.90	19.74	6.24	10.81	11.33
50th-Percentile Queue Length [ft/ln]	64.39	113.99	101.30	103.00	125.07	77.23	236.12	422.52	493.56	156.09	270.31	283.22
95th-Percentile Queue Length [veh/ln]	4.64	8.06	7.29	7.42	8.67	5.56	14.48	23.64	27.03	10.34	16.20	16.85
95th-Percentile Queue Length [ft/ln]	115.91	201.54	182.34	185.40	216.78	139.02	362.12	591.08	675.73	258.54	405.12	421.21

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.60	33.12	32.64	62.94	31.39	29.39	80.35	42.03	51.13	77.68	36.55	38.78
Movement LOS	E	C	C	E	C	C	F	D	D	E	D	D
d_A, Approach Delay [s/veh]	41.89			43.90			47.11			40.48		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	43.76											
Intersection LOS	D											
Intersection V/C	0.696											

Emissions

Vehicle Miles Traveled [mph]	12.60	15.35	13.83	16.69	14.48	9.41	14.76	73.71	37.55	10.31	79.14	26.55
Stops [stops/h]	154.55	136.79	121.56	247.20	150.09	92.68	283.34	1014.05	592.27	187.31	973.11	339.86
Fuel consumption [US gal/h]	4.03	3.23	2.87	6.32	3.42	2.11	7.37	22.29	13.73	4.86	21.90	7.71
CO [g/h]	281.93	225.59	200.60	441.58	238.90	147.83	514.91	1557.77	959.74	340.04	1530.69	538.60
NOx [g/h]	54.85	43.89	39.03	85.92	46.48	28.76	100.18	303.09	186.73	66.16	297.82	104.79
VOC [g/h]	65.34	52.28	46.49	102.34	55.37	34.26	119.33	361.03	222.43	78.81	354.75	124.83

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.698	2.757	3.376	3.392
Crosswalk LOS	B	C	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	633	767	683
d_b, Bicycle Delay [s]	30.10	28.02	22.82	26.00
I_b,int, Bicycle LOS Score for Intersection	2.003	2.591	2.725	2.340
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	18.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.680

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	183	47	195	22	12	8	17	1830	310	219	1688	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	47	195	22	12	8	17	1830	310	219	1688	52
Peak Hour Factor	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860	0.9860
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	12	49	6	3	2	4	464	79	56	428	13
Total Analysis Volume [veh/h]	186	48	198	22	12	8	17	1856	314	222	1712	53
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	13	13	4	4	2	48	48	14	60	60
g / C, Green / Cycle	0.13	0.13	0.13	0.04	0.04	0.02	0.51	0.51	0.15	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.06	0.10	0.01	0.01	0.01	0.33	0.17	0.12	0.31	0.32
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	241	255	255	76	81	42	2902	967	263	2401	1201
d1, Uniform Delay [s]	38.07	37.98	39.76	44.09	44.01	45.76	16.97	13.71	39.53	9.27	9.42
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.48	1.31	5.07	2.04	1.58	6.29	1.09	0.89	7.33	0.70	1.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.46	0.78	0.29	0.25	0.41	0.64	0.32	0.85	0.48	0.50
d, Delay for Lane Group [s/veh]	39.55	39.29	44.84	46.13	45.59	52.04	18.06	14.60	46.85	9.97	10.92
Lane Group LOS	D	D	D	D	D	D	B	B	D	A	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.60	2.64	4.83	0.53	0.48	0.46	9.10	3.85	5.40	5.56	6.11
50th-Percentile Queue Length [ft/ln]	65.04	65.95	120.63	13.30	11.97	11.45	227.60	96.30	134.90	138.95	152.71
95th-Percentile Queue Length [veh/ln]	4.68	4.75	8.43	0.96	0.86	0.82	14.05	6.93	9.21	9.42	10.16
95th-Percentile Queue Length [ft/ln]	117.07	118.71	210.69	23.93	21.54	20.61	351.31	173.35	230.14	235.61	254.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.45	39.29	44.84	46.13	45.59	45.59	52.04	18.06	14.60	46.85	10.28	10.92
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	41.90			45.88			17.83			14.38		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.85											
Intersection LOS	B											
Intersection V/C	0.680											

Emissions

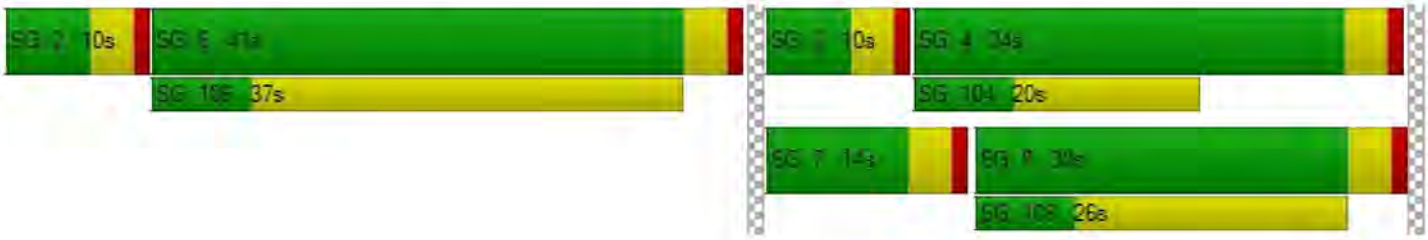
Vehicle Miles Traveled [mph]	6.63	6.76	11.32	1.08	0.98	0.90	98.54	16.67	16.70	87.44	45.31
Stops [stops/h]	98.58	99.97	182.84	20.15	18.14	17.35	1034.97	145.98	204.48	421.24	231.48
Fuel consumption [US gal/h]	1.61	1.63	3.02	0.44	0.40	0.38	20.52	2.96	4.72	9.63	5.24
CO [g/h]	112.44	114.06	210.89	30.97	27.88	26.76	1434.29	207.20	330.17	673.14	366.03
NOx [g/h]	21.88	22.19	41.03	6.03	5.42	5.21	279.06	40.31	64.24	130.97	71.22
VOC [g/h]	26.06	26.43	48.88	7.18	6.46	6.20	332.41	48.02	76.52	156.01	84.83

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.332	2.012	0.000	3.351
Crosswalk LOS	B	B	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.272	1.629	2.762	2.652
Bicycle LOS	B	A	C	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.006

Intersection Setup

Name	Project Driveway No. 2			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Project Driveway No. 2			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	1	0	27	3	0	0	0	33	6	37	53	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	27	3	0	0	0	33	6	37	53	2
Peak Hour Factor	1.0000	1.0000	1.0000	0.7500	1.0000	0.7500	0.7500	0.7500	1.0000	1.0000	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	7	1	0	0	0	11	2	9	18	1
Total Analysis Volume [veh/h]	1	0	27	4	0	0	0	44	6	37	71	3
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	9.92	10.37	8.62	10.08	10.31	8.67	7.36	0.00	0.00	7.36	0.00	0.00
Movement LOS	A	B	A	B	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.09	0.09	0.09	0.02	0.02	0.02	0.00	0.00	0.00	0.06	0.06	0.06
95th-Percentile Queue Length [ft/ln]	2.14	2.14	2.14	0.42	0.42	0.42	0.00	0.00	0.00	1.59	1.59	1.59
d_A, Approach Delay [s/veh]	8.67			10.08			0.00			2.45		
Approach LOS	A			B			A			A		
d_I, Intersection Delay [s/veh]	2.88											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 9: Project Driveway No. 2 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Base Volume Input [veh/h]	2	11	24	8	11	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	11	24	8	11	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	3	6	2	3	9
Total Analysis Volume [veh/h]	2	11	24	8	11	35
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	9.49	8.49	0.00	0.00	7.29	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.04	0.04	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.99	0.99	0.00	0.00	0.55	0.55
d_A, Approach Delay [s/veh]	8.64		0.00		1.74	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.12					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 1: Redbay Avenue (N/S) at Birch Street (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	161.1
Analysis Method:	HCM 7th Edition	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.073

Intersection Setup

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	100.00	155.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Redbay Avenue			Redbay Avenue			Birch Street			Birch Street		
Base Volume Input [veh/h]	14	2	12	7	0	30	36	1021	33	9	930	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	2	12	7	0	30	36	1021	33	9	930	32
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	1	3	2	0	8	9	269	9	2	245	8
Total Analysis Volume [veh/h]	15	2	13	7	0	32	38	1075	35	9	979	34
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.28	0.07	0.03	0.12	0.00	0.06	0.06	0.01	0.00	0.01	0.01	0.00
d_M, Delay for Movement [s/veh]	96.63	161.09	38.13	72.17	96.36	15.91	10.61	0.00	0.00	10.85	0.00	0.00
Movement LOS	F	F	E	F	F	C	B	A	A	B	A	A
95th-Percentile Queue Length [veh/ln]	1.47	1.47	1.47	0.66	0.66	0.66	0.18	0.00	0.00	0.04	0.00	0.00
95th-Percentile Queue Length [ft/ln]	36.78	36.78	36.78	16.59	16.59	16.59	4.43	0.00	0.00	1.10	0.00	0.00
d_A, Approach Delay [s/veh]	75.58			26.01			0.35			0.10		
Approach LOS	F			D			A			A		
d_I, Intersection Delay [s/veh]	1.69											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	38.7
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.523

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	0	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	328	11	168	11	20	9	6	738	300	132	638	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	328	11	168	11	20	9	6	738	300	132	638	8
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	84	3	43	3	5	2	2	190	77	34	164	2
Total Analysis Volume [veh/h]	338	11	173	11	21	9	6	760	309	136	657	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	110
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups			6,7									
Maximum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	51	51	0	35	0	10	49	0	10	49	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No		No	No	
Maximum Recall	No	No	No		No		No	No		No	No	
Pedestrian Recall	No	No	No		No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	C	L	C	C
C, Calculated Cycle Length [s]	110	110	110	110	110	110	110	110	110	110	110
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	56	66	40	40	1	36	36	6	41	41
g / C, Green / Cycle	0.11	0.51	0.60	0.37	0.37	0.01	0.32	0.32	0.05	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.10	0.01	0.09	0.01	0.02	0.00	0.30	0.27	0.04	0.18	0.17
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	1900	1900	3500	1900	1900
c, Capacity [veh/h]	382	973	1146	680	697	19	616	616	191	699	699
d1, Uniform Delay [s]	48.32	13.16	9.53	22.19	22.40	54.03	35.67	34.29	51.15	26.63	26.61
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.26	0.21	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.93	0.02	0.28	0.04	0.12	9.17	11.99	5.30	4.86	0.50	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.01	0.15	0.02	0.04	0.32	0.91	0.82	0.71	0.48	0.47
d, Delay for Lane Group [s/veh]	55.25	13.18	9.81	22.23	22.52	63.20	47.66	39.58	56.01	27.14	27.11
Lane Group LOS	E	B	A	C	C	E	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.84	0.13	1.76	0.19	0.53	0.21	15.67	12.74	1.92	6.45	6.42
50th-Percentile Queue Length [ft/ln]	120.88	3.34	44.01	4.82	13.28	5.23	391.82	318.58	48.01	161.31	160.50
95th-Percentile Queue Length [veh/ln]	8.44	0.24	3.17	0.35	0.96	0.38	22.17	18.60	3.46	10.62	10.58
95th-Percentile Queue Length [ft/ln]	211.04	6.01	79.22	8.68	23.90	9.41	554.14	464.93	86.43	265.45	264.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.25	13.18	9.81	22.23	22.52	22.52	63.20	45.55	39.58	56.01	27.12	27.11
Movement LOS	E	B	A	C	C	C	E	D	D	E	C	C
d_A, Approach Delay [s/veh]	39.30			22.44			43.93			32.03		
Approach LOS	D			C			D			C		
d_I, Intersection Delay [s/veh]	38.67											
Intersection LOS	D											
Intersection V/C	0.523											

Emissions

Vehicle Miles Traveled [mph]	22.07	0.72	11.30	0.43	1.17	0.31	29.28	26.47	11.42	27.99	27.87
Stops [stops/h]	316.49	4.37	57.61	6.31	17.38	6.84	512.93	417.04	125.71	211.16	210.10
Fuel consumption [US gal/h]	7.70	0.10	1.32	0.09	0.26	0.17	12.83	10.18	3.50	5.42	5.40
CO [g/h]	538.20	6.86	91.99	6.52	17.96	12.09	896.51	711.62	244.98	379.19	377.34
NOx [g/h]	104.71	1.34	17.90	1.27	3.49	2.35	174.43	138.45	47.66	73.78	73.42
VOC [g/h]	124.73	1.59	21.32	1.51	4.16	2.80	207.78	164.92	56.78	87.88	87.45

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	44.55	44.55	44.55	44.55
I_p,int, Pedestrian LOS Score for Intersectio	2.676	1.968	2.969	2.903
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	855	564	818	818
d_b, Bicycle Delay [s]	18.04	28.37	19.20	19.20
I_b,int, Bicycle LOS Score for Intersection	2.421	1.627	2.446	2.220
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	6.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.193

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	54	451	22	6	418	8	12	0	64	19	11	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	451	22	6	418	8	12	0	64	19	11	22
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	114	6	2	106	2	3	0	16	5	3	6
Total Analysis Volume [veh/h]	55	456	22	6	423	8	12	0	65	19	11	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	42	0	0	42	0	0	40	0	0	40	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	13	0	0	12	0	0	24	0	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	31	0	0	31	0	0	59	0	0	59	0
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.03	0.13	0.12	0.00	0.11	0.11	0.04	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1520	1619	1619	1515	1619	1619	159	167
d1, Uniform Delay [s]	1.02	1.13	1.13	0.99	1.11	1.11	41.52	40.96
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.19	0.19	0.00	0.17	0.17	2.29	1.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.15	0.15	0.00	0.13	0.13	0.49	0.31
d, Delay for Lane Group [s/veh]	1.06	1.32	1.32	0.99	1.28	1.28	43.81	42.01
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.04	0.18	0.18	0.00	0.16	0.16	1.78	1.17
50th-Percentile Queue Length [ft/ln]	0.94	4.49	4.42	0.10	3.97	3.94	44.44	29.14
95th-Percentile Queue Length [veh/ln]	0.07	0.32	0.32	0.01	0.29	0.28	3.20	2.10
95th-Percentile Queue Length [ft/ln]	1.70	8.08	7.96	0.18	7.14	7.10	79.99	52.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.06	1.32	1.32	0.99	1.28	1.28	43.81	43.81	43.81	42.01	42.01	42.01
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	1.29			1.28			43.81			42.01		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	6.19											
Intersection LOS	A											
Intersection V/C	0.193											

Emissions

Vehicle Miles Traveled [mph]	1.89	8.26	8.15	0.19	6.92	6.89	1.47	1.23
Stops [stops/h]	1.51	7.18	7.07	0.16	6.34	6.31	71.10	46.63
Fuel consumption [US gal/h]	0.09	0.43	0.43	0.01	0.37	0.36	1.03	0.68
CO [g/h]	6.60	30.13	29.72	0.68	25.63	25.51	71.68	47.43
NOx [g/h]	1.28	5.86	5.78	0.13	4.99	4.96	13.95	9.23
VOC [g/h]	1.53	6.98	6.89	0.16	5.94	5.91	16.61	10.99

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.597	2.557	1.854	1.755
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	600	600	1222	1222
d_b, Bicycle Delay [s]	22.05	22.05	6.81	6.81
I_b,int, Bicycle LOS Score for Intersection	1.999	1.920	1.687	1.645
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	31.6
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.480

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	91	428	406	97	116	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	428	406	97	116	213
Peak Hour Factor	0.9510	0.9510	0.9510	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	113	107	25	30	56
Total Analysis Volume [veh/h]	96	450	427	102	122	224
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.48	0.31
d_M, Delay for Movement [s/veh]	8.84	0.00	0.00	0.00	31.57	12.05
Movement LOS	A	A	A	A	D	B
95th-Percentile Queue Length [veh/ln]	0.31	0.00	0.00	0.00	2.42	1.29
95th-Percentile Queue Length [ft/ln]	7.65	0.00	0.00	0.00	60.38	32.30
d_A, Approach Delay [s/veh]	1.55		0.00		18.93	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	5.21					
Intersection LOS	D					

Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	24.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.729

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1074	143	558	0	0	281	223	1458	449	0	1722	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1074	143	558	0	0	281	223	1458	449	0	1722	33
Peak Hour Factor	0.9490	0.9490	0.9490	1.0000	1.0000	0.9490	0.9490	0.9490	0.9490	1.0000	0.9490	0.9490
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	283	38	147	0	0	74	59	384	118	0	454	9
Total Analysis Volume [veh/h]	1132	151	588	0	0	296	235	1536	473	0	1815	35
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Unsigna	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2,3						
Maximum Green [s]	0	26	0	0	0	8	14	44	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	21	0	0	19	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No				No		No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	0.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	21	0	0	0	99	29	74	0	0	45	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	0	0	6	6	6	0	0	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	0.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0
Minimum Recall		No				No	No	No			No	
Maximum Recall		No				No	No	No			No	
Pedestrian Recall		No				No	No	No			No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	R	L	C	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	15	15	50	31	31
g / C, Green / Cycle	0.39	0.39	0.39	0.16	0.16	0.52	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.26	0.25	0.25	0.08	0.13	0.27	0.24	0.24
s, saturation flow rate [veh/h]	3500	1900	1900	3600	1800	5700	5700	1900
c, Capacity [veh/h]	1365	741	741	576	288	2996	1845	615
d1, Uniform Delay [s]	23.99	23.55	23.55	36.52	38.55	14.63	28.72	28.72
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.69	4.21	4.21	0.71	5.61	0.14	0.64	1.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.64	0.64	0.51	0.82	0.51	0.75	0.75
d, Delay for Lane Group [s/veh]	26.68	27.77	27.77	37.23	44.17	14.76	29.36	30.61
Lane Group LOS	C	C	C	D	D	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	8.76	9.21	9.21	3.17	5.42	6.17	8.70	8.92
50th-Percentile Queue Length [ft/ln]	218.96	230.23	230.23	79.26	135.54	154.26	217.59	222.93
95th-Percentile Queue Length [veh/ln]	13.61	14.19	14.19	5.71	9.24	10.24	13.54	13.81
95th-Percentile Queue Length [ft/ln]	340.30	354.65	354.65	142.66	231.01	256.11	338.54	345.36

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.87	27.77	27.77	0.00	0.00	37.23	44.17	14.76	0.00	0.00	29.65	30.61
Movement LOS	C	C	C			D	D	B			C	C
d_A, Approach Delay [s/veh]	27.23			37.23			14.89			29.67		
Approach LOS	C			D			B			C		
d_I, Intersection Delay [s/veh]	24.75											
Intersection LOS	C											
Intersection V/C	0.729											

Emissions

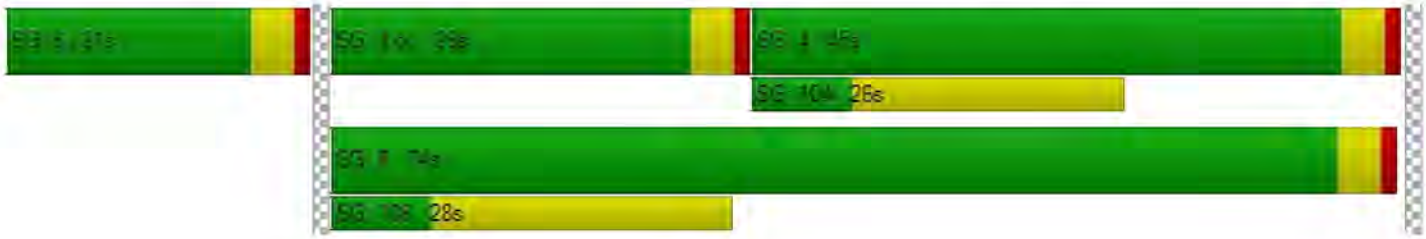
Vehicle Miles Traveled [mph]	57.02	29.36	29.36	14.77	21.93	143.36	47.50	15.83
Stops [stops/h]	663.80	348.97	348.97	240.27	205.45	701.48	989.45	337.92
Fuel consumption [US gal/h]	11.02	5.82	5.82	4.18	6.00	20.18	25.07	8.60
CO [g/h]	770.19	406.73	406.73	292.05	419.42	1410.88	1752.30	601.02
NOx [g/h]	149.85	79.14	79.14	56.82	81.60	274.51	340.93	116.94
VOC [g/h]	178.50	94.26	94.26	67.69	97.21	326.98	406.11	139.29

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	0.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	0.00
I_p,int, Pedestrian LOS Score for Intersectio	2.667	2.308	0.000	0.000
Crosswalk LOS	B	B	F	F
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	358	526	1474	863
d_b, Bicycle Delay [s]	32.02	25.79	3.29	15.35
I_b,int, Bicycle LOS Score for Intersection	4.647	1.560	2.534	2.323
Bicycle LOS	E	A	B	B

Sequence

Ring 1	-	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 5: SR-57 NB Ramps/Shopping Center Dwy No. 2 (N/S) at Imperial Hwy (E/W)

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	0	0	1	1	0	0	0	0	0
Entry Pocket Length [ft]	250.00	100.00	250.00	100.00	100.00	145.00	288.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name	SR-57 NB Ramp			Shopping Center Dwy No. 2			Imperial Hwy			Imperial Hwy		
Base Volume Input [veh/h]	1074	143	558	0	0	281	223	1458	449	0	1722	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1074	143	558	0	0	281	223	1458	449	0	1722	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	269	36	140	0	0	70	56	365	112	0	431	8
Total Analysis Volume [veh/h]	1074	143	558	0	0	281	223	1458	449	0	1722	33
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Overlap	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	0	0	2	3	8	0	0	4	0
Auxiliary Signal Groups						2						
Lead / Lag	-	-	-	-	-	-	Lead	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.21	0.25	0.25	0.00	0.00	0.08	0.13	0.29	0.24	0.00	0.25	0.25
Intersection LOS	C											
Intersection V/C	0.700											

Intersection Level Of Service Report
Intersection 6: Associated Road (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	41.6
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.645

Intersection Setup

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	2	0	0	1	0	1	1	0	0	1	0	0
Entry Pocket Length [ft]	270.00	100.00	100.00	210.00	100.00	210.00	340.00	100.00	100.00	195.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	163	174	83	305	214	171	159	1669	110	138	1522	205
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	174	83	305	214	171	159	1669	110	138	1522	205
Peak Hour Factor	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890	0.9890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	44	21	77	54	43	40	422	28	35	385	52
Total Analysis Volume [veh/h]	165	176	84	308	216	173	161	1688	111	140	1539	207
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	25	0	0	25	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	39	0	16	39	0	29	50	0	15	36	0
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	0	6	6	0	6	6	0	6	6	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	C	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	39	39	12	43	43	13	42	42	11	41	41
g / C, Green / Cycle	0.06	0.32	0.32	0.10	0.36	0.36	0.11	0.35	0.35	0.09	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.07	0.09	0.11	0.09	0.09	0.31	0.32	0.08	0.23	0.23
s, saturation flow rate [veh/h]	3500	1900	1900	3500	1900	1900	1800	3800	1900	1800	5700	1900
c, Capacity [veh/h]	225	612	612	350	679	679	193	1342	671	165	1925	642
d1, Uniform Delay [s]	55.12	29.70	29.53	53.29	27.95	27.25	52.55	36.57	36.93	53.68	34.11	34.29
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.34	0.28	0.11	0.19
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.54	0.83	0.75	7.19	1.23	0.90	9.18	2.19	13.53	24.95	0.42	2.34
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.73	0.22	0.20	0.88	0.32	0.25	0.84	0.89	0.91	0.85	0.68	0.69
d, Delay for Lane Group [s/veh]	59.65	30.53	30.28	60.48	29.18	28.15	61.73	38.76	50.46	78.63	34.54	36.63
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh/ln]	2.55	2.94	2.70	4.85	4.64	3.61	5.17	16.22	18.82	5.23	10.62	11.21
50th-Percentile Queue Length [ft/ln]	63.85	73.56	67.61	121.29	115.90	90.24	129.18	405.38	470.60	130.83	265.62	280.13
95th-Percentile Queue Length [veh/ln]	4.60	5.30	4.87	8.46	8.17	6.50	8.89	22.82	25.94	8.98	15.97	16.70
95th-Percentile Queue Length [ft/ln]	114.92	132.40	121.69	211.60	204.18	162.44	222.37	570.48	648.49	224.62	399.26	417.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.65	30.47	30.28	60.48	29.18	28.15	61.73	42.21	50.46	78.63	34.86	36.63
Movement LOS	E	C	C	E	C	C	E	D	D	E	C	D
d_A, Approach Delay [s/veh]	41.76			42.76			44.28			38.30		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	41.58											
Intersection LOS	D											
Intersection V/C	0.645											

Emissions

Vehicle Miles Traveled [mph]	12.84	10.51	9.72	20.00	14.02	11.23	9.58	70.85	36.18	8.59	79.98	27.12
Stops [stops/h]	153.23	88.27	81.13	291.10	139.08	108.29	155.01	972.91	564.73	156.99	956.24	336.16
Fuel consumption [US gal/h]	3.97	2.08	1.92	7.37	3.15	2.46	3.89	21.49	13.09	4.09	21.42	7.57
CO [g/h]	277.35	145.57	133.86	514.91	220.26	171.76	271.79	1502.07	914.84	285.86	1497.37	529.12
NOx [g/h]	53.96	28.32	26.04	100.18	42.85	33.42	52.88	292.25	177.99	55.62	291.33	102.95
VOC [g/h]	64.28	33.74	31.02	119.34	51.05	39.81	62.99	348.12	212.02	66.25	347.03	122.63

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.660	2.736	3.363	3.384
Crosswalk LOS	B	B	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	583	583	767	533
d_b, Bicycle Delay [s]	30.10	30.10	22.82	32.27
I_b,int, Bicycle LOS Score for Intersection	1.910	2.710	2.638	2.338
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 7: Castlegate Lane/Placentia Avenue (N/S) at Imperial Highway (E/W)

Control Type:	Signalized	Delay (sec / veh):	18.6
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.668

Intersection Setup

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	200.00	100.00	100.00	88.00	100.00	100.00	140.00	100.00	198.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			40.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			No			Yes		

Volumes

Name	Placentia Avenue			Castlegate Lane			Imperial Highway			Imperial Highway		
Base Volume Input [veh/h]	152	22	232	21	14	9	14	1791	268	172	1720	36
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	22	232	21	14	9	14	1791	268	172	1720	36
Peak Hour Factor	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780	0.9780
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	6	59	5	4	2	4	458	69	44	440	9
Total Analysis Volume [veh/h]	155	22	237	21	14	9	14	1831	274	176	1759	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	95
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	6	0	0	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Maximum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	19	0	0	13	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	41	0	0	10	0	10	30	0	14	34	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	6	0	6	6	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	95	95	95	95	95	95	95	95	95	95	95
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	15	15	4	4	2	49	49	11	58	58
g / C, Green / Cycle	0.15	0.15	0.15	0.04	0.04	0.02	0.52	0.52	0.12	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.05	0.05	0.12	0.01	0.01	0.01	0.32	0.14	0.10	0.31	0.32
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1800	5700	1900	1800	3800	1900
c, Capacity [veh/h]	276	292	292	78	83	36	2936	979	215	2336	1168
d1, Uniform Delay [s]	35.79	35.71	38.89	43.97	43.99	45.99	16.45	13.05	40.82	10.23	10.42
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.66	0.58	5.44	1.81	1.80	6.84	1.01	0.71	7.48	0.79	1.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.32	0.31	0.81	0.27	0.28	0.39	0.62	0.28	0.82	0.51	0.53
d, Delay for Lane Group [s/veh]	36.44	36.30	44.32	45.77	45.79	52.83	17.46	13.76	48.30	11.02	12.12
Lane Group LOS	D	D	D	D	D	D	B	B	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	1.87	1.89	5.77	0.50	0.55	0.39	8.77	3.22	4.33	6.09	6.74
50th-Percentile Queue Length [ft/ln]	46.80	47.15	144.30	12.62	13.78	9.65	219.22	80.46	108.21	152.37	168.57
95th-Percentile Queue Length [veh/ln]	3.37	3.40	9.71	0.91	0.99	0.69	13.63	5.79	7.74	10.14	11.00
95th-Percentile Queue Length [ft/ln]	84.23	84.88	242.80	22.71	24.81	17.36	340.63	144.84	193.51	253.59	275.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.38	36.30	44.32	45.77	45.79	45.79	52.83	17.46	13.76	48.30	11.38	12.12
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	40.92			45.78			17.22			14.69		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.56											
Intersection LOS	B											
Intersection V/C	0.668											

Emissions

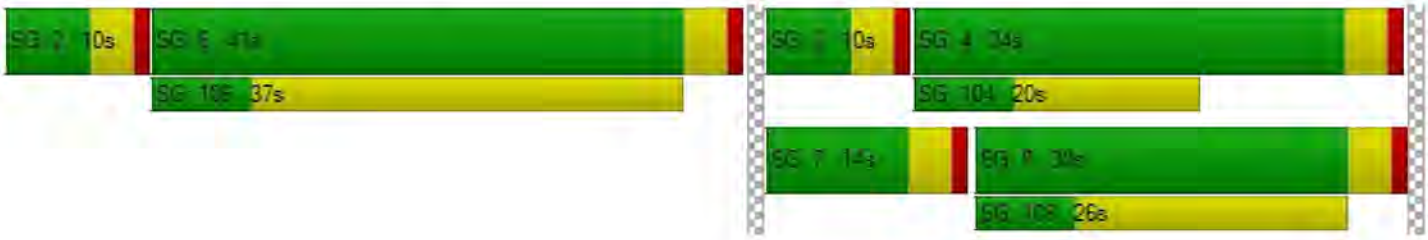
Vehicle Miles Traveled [mph]	5.03	5.09	13.55	1.03	1.12	0.74	97.21	14.55	13.24	88.85	46.23
Stops [stops/h]	70.93	71.48	218.72	19.13	20.89	14.62	996.87	121.97	164.03	461.92	255.51
Fuel consumption [US gal/h]	1.15	1.16	3.59	0.42	0.46	0.32	19.78	2.49	3.82	10.37	5.68
CO [g/h]	80.45	81.12	250.67	29.38	32.14	22.42	1382.75	173.82	266.70	724.80	397.22
NOx [g/h]	15.65	15.78	48.77	5.72	6.25	4.36	269.03	33.82	51.89	141.02	77.28
VOC [g/h]	18.64	18.80	58.10	6.81	7.45	5.20	320.47	40.28	61.81	167.98	92.06

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	37.14	37.14	0.00	37.14
I_p,int, Pedestrian LOS Score for Intersectio	2.312	1.993	0.000	3.350
Crosswalk LOS	B	A	F	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	779	126	547	632
d_b, Bicycle Delay [s]	17.71	41.69	25.06	22.24
I_b,int, Bicycle LOS Score for Intersection	2.243	1.632	2.725	2.644
Bicycle LOS	B	A	B	B

Sequence

Ring 1	2	6	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 8: Brea Glenbrook Club Dwy/Project Dwy No. 1 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.9
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.011

Intersection Setup

Name	Project Driveway No. 1			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	Project Driveway No. 1			Brea Glenbrook Club Dwy			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	2	0	36	6	0	2	1	36	5	29	31	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	36	6	0	2	1	36	5	29	31	13
Peak Hour Factor	1.0000	1.0000	1.0000	0.7500	1.0000	0.7500	0.7500	0.7500	1.0000	1.0000	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	9	2	0	1	0	12	1	7	10	4
Total Analysis Volume [veh/h]	2	0	36	8	0	3	1	48	5	29	41	17
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Stop	Free	Free
Flared Lane	No	No		
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No	No		
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
d_M, Delay for Movement [s/veh]	9.73	10.21	8.68	9.92	10.10	8.60	7.33	0.00	0.00	7.36	0.00	0.00
Movement LOS	A	B	A	A	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.12	0.04	0.04	0.04	0.00	0.00	0.00	0.05	0.05	0.05
95th-Percentile Queue Length [ft/ln]	2.95	2.95	2.95	1.04	1.04	1.04	0.04	0.04	0.04	1.30	1.30	1.30
d_A, Approach Delay [s/veh]	8.73			9.56			0.14			2.45		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	3.46											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 9: Project Driveway No. 2 (N/S) at Greenbriar Lane (E/W)

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	Project Driveway No. 2		Aurora Avenue		Greenbriar Lane	
Base Volume Input [veh/h]	2	14	27	6	9	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	14	27	6	9	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	7	2	2	5
Total Analysis Volume [veh/h]	2	14	27	6	9	21
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.01	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	9.42	8.50	0.00	0.00	7.29	0.00
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.05	0.05	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	1.21	1.21	0.00	0.00	0.45	0.45
d_A, Approach Delay [s/veh]	8.62		0.00		2.19	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	2.58					
Intersection LOS	A					

Appendix F

CA MUTCD Traffic Signal Warrants Criteria

RK19750.1
JN: 2827-2023-05

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

01 **An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.**

01a **On State highways, the engineering study shall include consideration of a roundabout (yield control). If a roundabout is determined to provide a viable and practical solution, it shall be studied in lieu of, or in addition to a traffic control signal.**

Guidance:

01b *On local streets and highways, the engineering study should include consideration of a roundabout (yield control). If a roundabout is determined to provide a viable and practical solution, it should be studied in lieu of, or in addition to a traffic control signal.*

Support:

01c Refer to Caltrans' website (http://www.dot.ca.gov/hq/traffops/liaisons/ice.html) for more information on the Traffic Operations Policy Directive 13-02, Intersection Control Evaluation (ICE), and other resources for the evaluation of intersection traffic control strategies.

02 **The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:**

Warrant 1, Eight-Hour Vehicular Volume
Warrant 2, Four-Hour Vehicular Volume
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network
Warrant 9, Intersection Near a Grade Crossing

03 **The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.**

Support:

04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/ or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*

06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*

07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*

08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*

09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The*

approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.

10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*

11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*

12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher ~~of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume~~ volume of the major-street left-turn volumes plus the higher volume minor-street approach as the "minor street" volume and both approaches of the major street minus the higher of the major-street left-turn volume as "major street" volume.

14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.

15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

17 Engineering study data may include the following:

A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.

B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.

C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.

D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.

E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.

F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions,

pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.

G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:

A. Vehicle-hours of stopped time delay determined separately for each approach.

B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.

C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.

D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.

E. Queue length on stop-controlled approaches.

Standard:

19 **Delay, congestion, approach conditions, driver confusion, future land use or other evidence of the need for right of way assignment beyond that which could be provided by stop sign shall be demonstrated.**

Support:

20 Figure 4C–101(CA) and 4C-103(CA) are examples of warrant sheets.

Guidance:

21 *Figure 4C-103(CA) should be used only for new intersections or other locations where it is not reasonable to count actual traffic volumes.*

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

04 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

Standard:

07 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**

03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Option:

04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

Section 4C.05 Warrant 4, Pedestrian Volume

Support:

01 The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

Standard:

02 **The need for a traffic control signal at an intersection or midblock crossing shall be considered if an engineering study finds that one of the following criteria is met:**

A. For each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) all fall above the curve in Figure 4C-5; or

B. For 1 hour (any four consecutive 15-minute periods) of an average day, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding pedestrians per hour crossing the major street (total of all crossings) falls above the curve in Figure 4C-7.

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 35 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-6 may be used in place of Figure 4C-5 to evaluate Criterion A in Paragraph 2, and Figure 4C-8 may be used in place of Figure 4C-7 to evaluate Criterion B in Paragraph 2.

Standard:

04 **The Pedestrian Volume signal warrant shall not be applied at locations where the distance to the nearest traffic control signal or STOP sign controlling the street that pedestrians desire to cross is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

05 **If this warrant is met and a traffic control signal is justified by an engineering study, the traffic control signal shall be equipped with pedestrian signal heads complying with the provisions set forth in Chapter 4E.**

Guidance:

06 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.

B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site

accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.

C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.

Option:

07 The criterion for the pedestrian volume crossing the major street may be reduced as much as 50 percent if the 15th-percentile crossing speed of pedestrians is less than 3.5 feet per second.

08 A traffic control signal may not be needed at the study location if adjacent coordinated traffic control signals consistently provide gaps of adequate length for pedestrians to cross the street.

Section 4C.06 Warrant 5, School Crossing

Support:

01 The School Crossing signal warrant is intended for application where the fact that schoolchildren cross the major street is the principal reason to consider installing a traffic control signal. For the purposes of this warrant, the word "schoolchildren" includes elementary through high school students.

Standard:

02 **The need for a traffic control signal shall be considered when an engineering study of the frequency and adequacy of gaps in the vehicular traffic stream as related to the number and size of groups of schoolchildren at an established school crossing across the major street shows that the number of adequate gaps in the traffic stream during the period when the schoolchildren are using the crossing is less than the number of minutes in the same period (see Section 7A.03) and there are a minimum of 20 schoolchildren during the highest crossing hour.**

03 **Before a decision is made to install a traffic control signal, consideration shall be given to the implementation of other remedial measures, such as warning signs and flashers, school speed zones, school crossing guards, or a grade-separated crossing.**

04 **The School Crossing signal warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet, unless the proposed traffic control signal will not restrict the progressive movement of traffic.**

Guidance:

05 *If this warrant is met and a traffic control signal is justified by an engineering study, then:*

A. If it is installed at an intersection or major driveway location, the traffic control signal should also control the minor-street or driveway traffic, should be traffic-actuated, and should include pedestrian detection.

B. If it is installed at a non-intersection crossing, the traffic control signal should be installed at least 100 feet from side streets or driveways that are controlled by STOP or YIELD signs, and should be pedestrian-actuated. If the traffic control signal is installed at a non-intersection crossing, at least one of the signal faces should be over the traveled way for each approach, parking and other sight obstructions should be prohibited for at least 100 feet in advance of and at least 20 feet beyond the crosswalk or site accommodations should be made through curb extensions or other techniques to provide adequate sight distance, and the installation should include suitable standard signs and pavement markings.

C. Furthermore, if it is installed within a signal system, the traffic control signal should be coordinated.

Section 4C.07 Warrant 6, Coordinated Signal System

Support:

01 Progressive movement in a coordinated signal system sometimes necessitates installing traffic control signals at intersections where they would not otherwise be needed in order to maintain proper platooning of vehicles.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following criteria is met:**

A. On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning.

B. On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.

Guidance:

03 *The Coordinated Signal System signal warrant should not be applied where the resultant spacing of traffic control signals would be less than 1,000 feet.*

Section 4C.08 Warrant 7, Crash Experience

Support:

01 The Crash Experience signal warrant conditions are intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that all of the following criteria are met:**

A. Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency; and

B. Five or more reported crashes, of types susceptible to correction by a traffic control signal, have occurred within a 12-month period, each crash involving personal injury or property damage apparently exceeding the applicable requirements for a reportable crash; and

C. For each of any 8 hours of an average day, the vehicles per hour (vph) given in both of the 80 percent columns of Condition A in Table 4C-1 (see Section 4C.02), or the vph in both of the 80 percent columns of Condition B in Table 4C-1 exists on the major-street and the higher-volume minor-street approach, respectively, to the intersection, or the volume of pedestrian traffic is not less than 80 percent of the requirements specified in the Pedestrian Volume warrant. These major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.09 Warrant 8, Roadway Network

Support:

01 Installing a traffic control signal at some intersections might be justified to encourage concentration and organization of traffic flow on a roadway network.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that the common intersection of two or more major routes meets one or both of the following criteria:**

A. The intersection has a total existing, or immediately projected, entering volume of at least 1,000 vehicles per hour during the peak hour of a typical weekday and has 5-year projected traffic volumes, based on an engineering study, that meet one or more of Warrants 1, 2, and 3 during an average weekday; or

B. The intersection has a total existing or immediately projected entering volume of at least 1,000 vehicles per hour for each of any 5 hours of a non-normal business day (Saturday or Sunday).

03 **A major route as used in this signal warrant shall have at least one of the following characteristics:**

A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow.

B. It includes rural or suburban highways outside, entering, or traversing a city.

C. It appears as a major route on an official plan, such as a major street plan in an urban area traffic and transportation study.

Section 4C.10 Warrant 9, Intersection Near a Grade Crossing

Support:

01 The Intersection Near a Grade Crossing signal warrant is intended for use at a location where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a

grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic control signal.

Guidance:

02 *This signal warrant should be applied only after adequate consideration has been given to other alternatives or after a trial of an alternative has failed to alleviate the safety concerns associated with the grade crossing. Among the alternatives that should be considered or tried are:*

A. Providing additional pavement that would enable vehicles to clear the track or that would provide space for an evasive maneuver, or

B. Reassigning the stop controls at the intersection to make the approach across the track a non-stopping approach.

Standard:

03 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following criteria are met:**

A. A grade crossing exists on an approach controlled by a STOP or YIELD sign and the center of the track nearest to the intersection is within 140 feet of the stop line or yield line on the approach; and

B. During the highest traffic volume hour during which rail traffic uses the crossing, the plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the minor-street approach that crosses the track (one direction only, approaching the intersection) falls above the applicable curve in Figure 4C-9 or 4C-10 for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance as defined in Section 1A.13.

Guidance:

04 *The following considerations apply when plotting the traffic volume data on Figure 4C-9 or 4C-10:*

A. Figure 4C-9 should be used if there is only one lane approaching the intersection at the track crossing location and Figure 4C-10 should be used if there are two or more lanes approaching the intersection at the track crossing location.

B. After determining the actual distance D, the curve for the distance D that is nearest to the actual distance D should be used. For example, if the actual distance D is 95 feet, the plotted point should be compared to the curve for D = 90 feet.

C. If the rail traffic arrival times are unknown, the highest traffic volume hour of the day should be used.

Option:

05 The minor-street approach volume may be multiplied by up to three adjustment factors as provided in Paragraphs 6 through 8.

06 Because the curves are based on an average of four occurrences of rail traffic per day, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-2 for the appropriate number of occurrences of rail traffic per day.

07 Because the curves are based on typical vehicle occupancy, if at least 2% of the vehicles crossing the track are buses carrying at least 20 people, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-3 for the appropriate percentage of high-occupancy buses.

08 Because the curves are based on tractor-trailer trucks comprising 10% of the vehicles crossing the track, the vehicles per hour on the minor-street approach may be multiplied by the adjustment factor shown in Table 4C-4 for the appropriate distance and percentage of tractor-trailer trucks.

Standard:

09 **If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, then:**

A. The traffic control signal shall have actuation on the minor street;

B. Preemption control shall be provided in accordance with Sections 4D.27, 8C.09, and 8C.10; and

C. The grade crossing shall have flashing-light signals (see Chapter 8C).

Guidance:

10 *If this warrant is met and a traffic control signal at the intersection is justified by an engineering study, the grade crossing should have automatic gates (see Chapter 8C).*

Section 4C.101(CA) Criterion for School Crossing Traffic Signals

01 **Standard:**

A. The signal shall be designed for full-time operation.

B. Pedestrian signal faces of the International Symbol type shall be installed at all marked crosswalks at signalized intersections along the "Suggested Route to School."

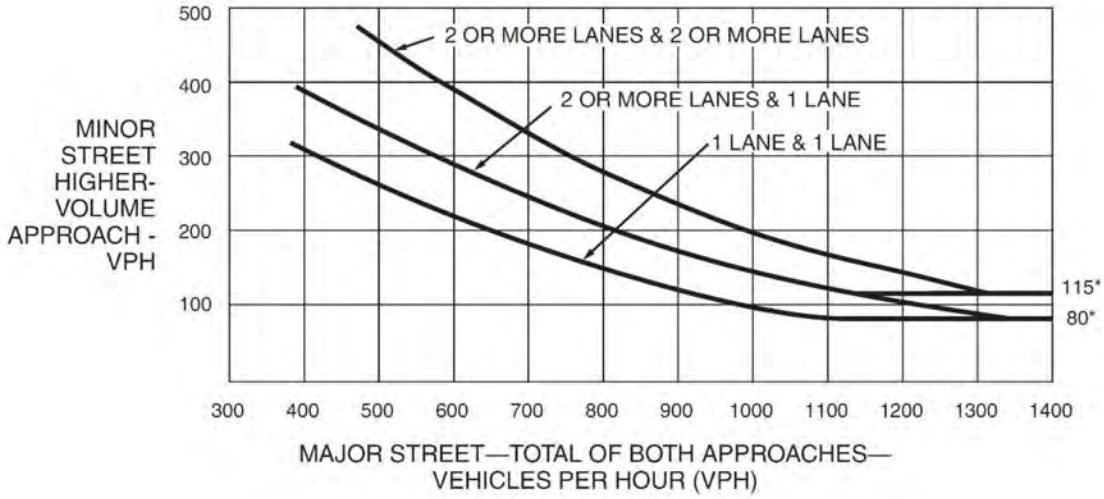
C. If an intersection is signalized under this guideline for school pedestrians, the entire intersection shall be signalized.

D. School area traffic signals shall be traffic actuated type with push buttons or other detectors for pedestrians.

Option:

02 Non-intersection school pedestrian crosswalk locations may be signalized when justified.

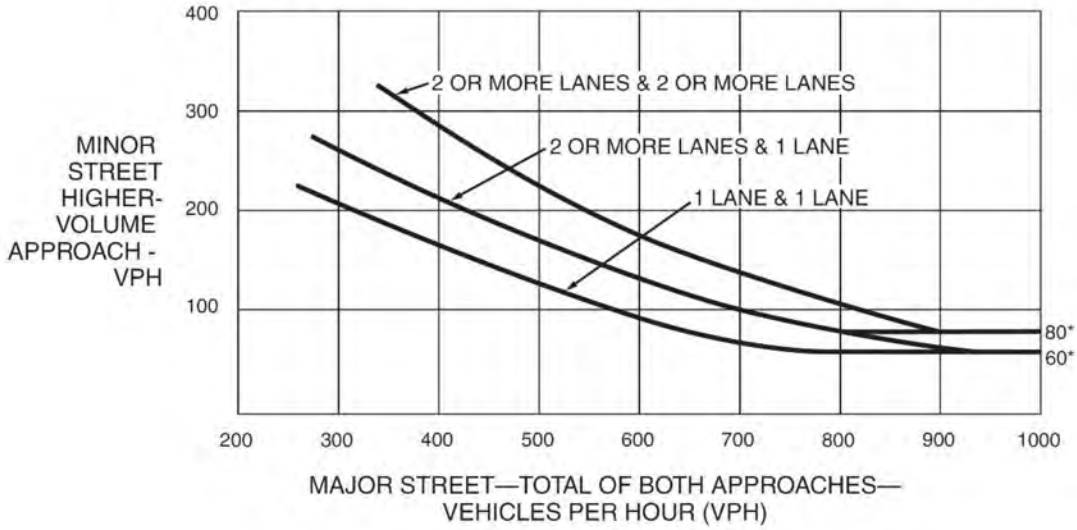
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

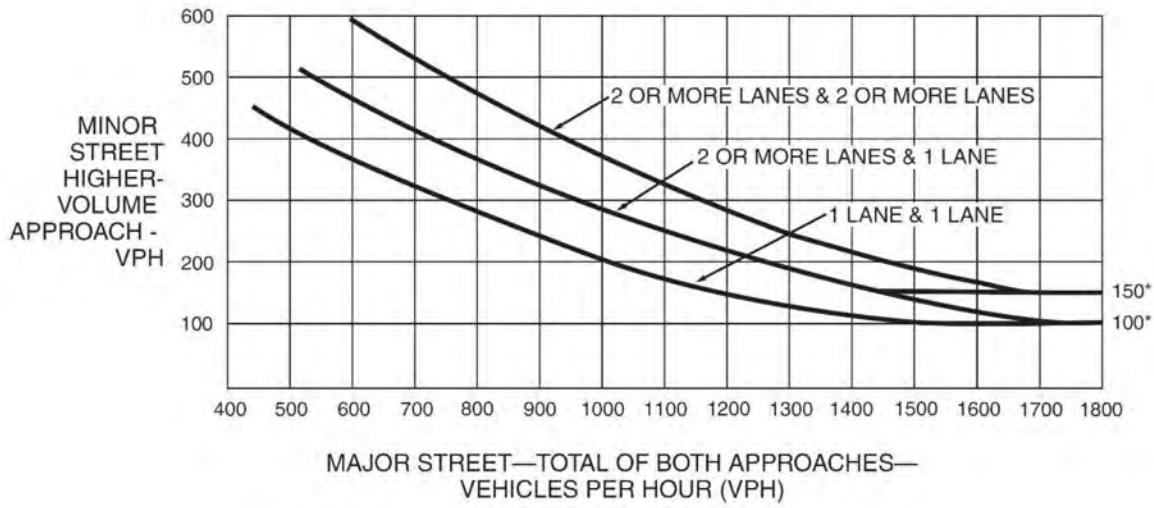
Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

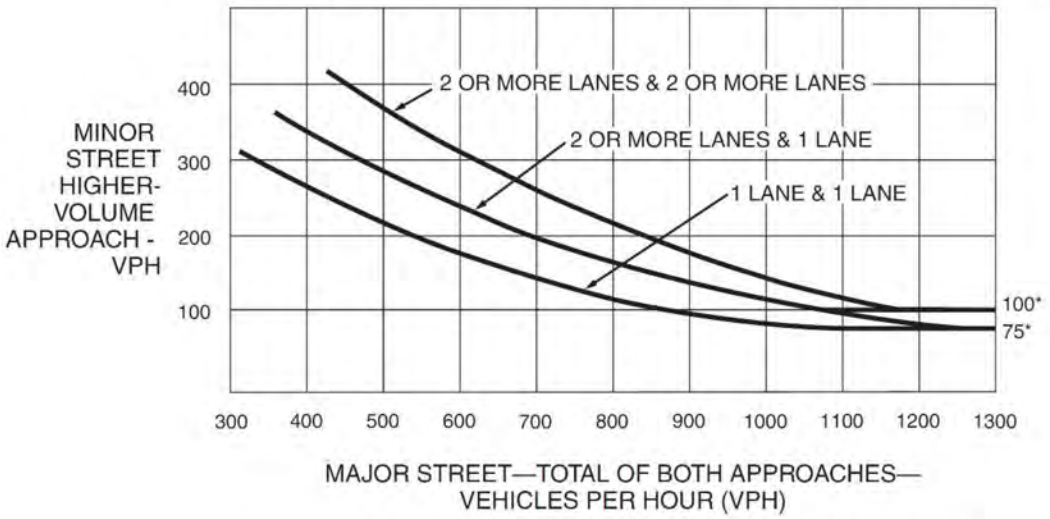
Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

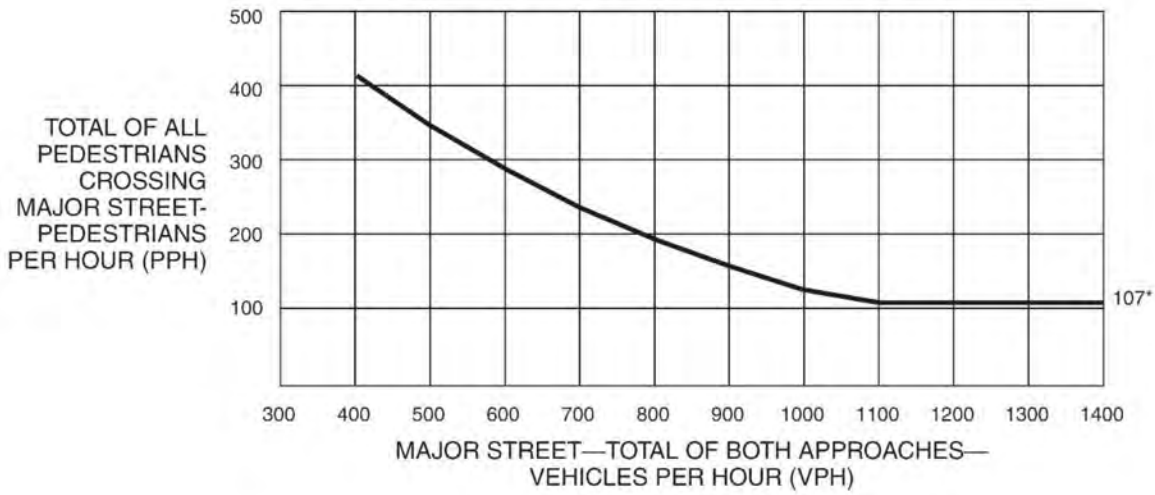
Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



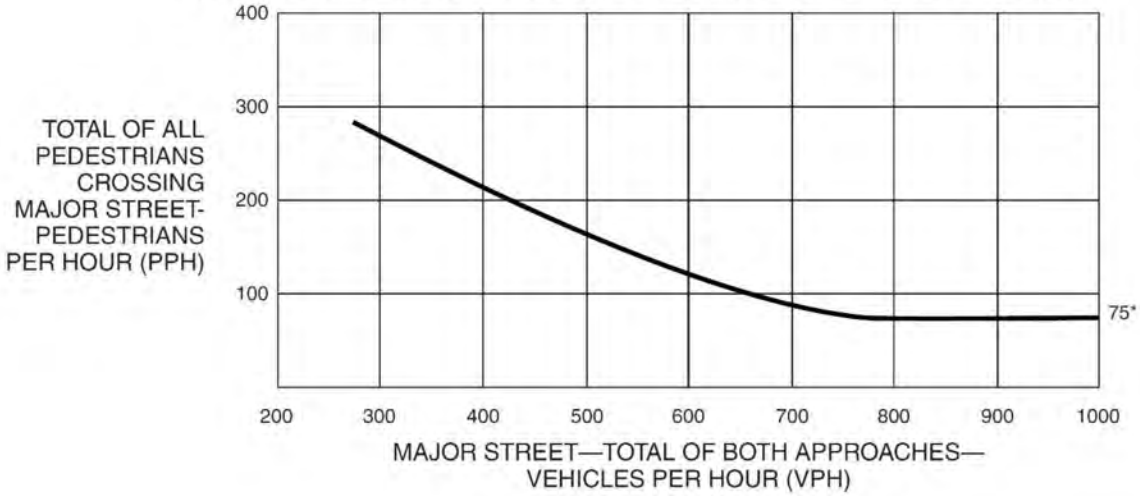
*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

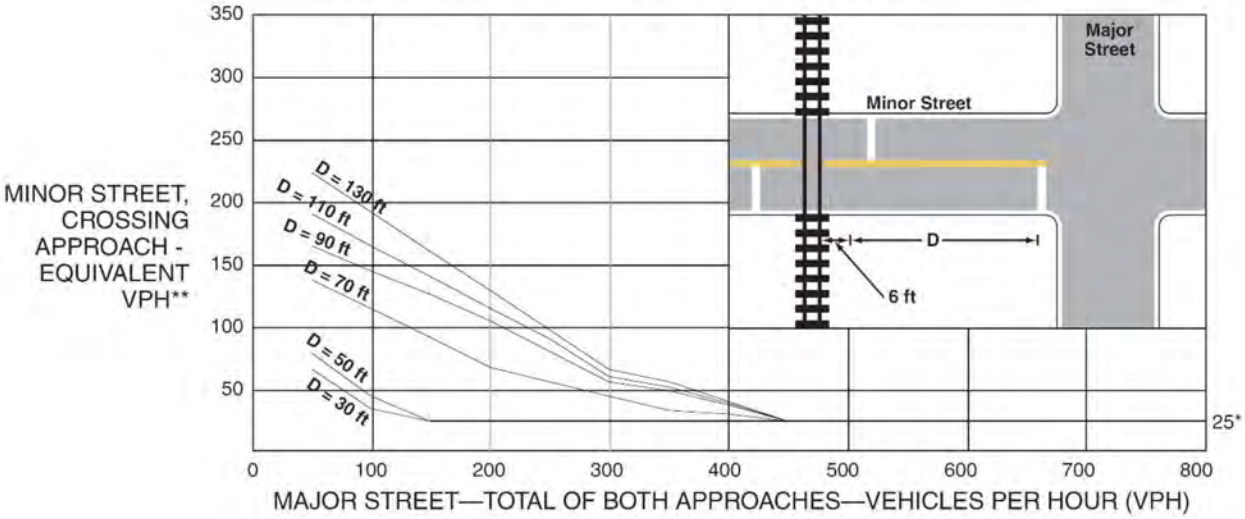
Figure 4C-7. Warrant 4, Pedestrian Peak Hour

*Note: 133 pph applies as the lower threshold volume.

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)

*Note: 93 pph applies as the lower threshold volume.

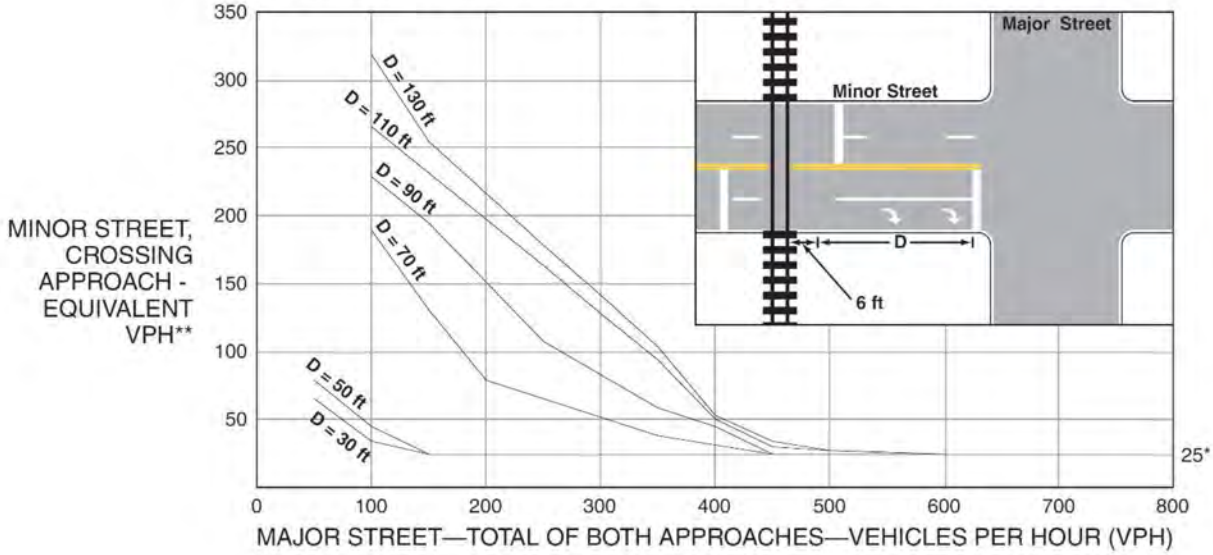
Figure 4C-9. Warrant 9, Intersection Near a Grade Crossing (One Approach Lane at the Track Crossing)



* 25 vph applies as the lower threshold volume

** VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

Figure 4C-10. Warrant 9, Intersection Near a Grade Crossing (Two or More Approach Lanes at the Track Crossing)



* 25 vph applies as the lower threshold volume

** VPH after applying the adjustment factors in Tables 4C-2, 4C-3, and/or 4C-4, if appropriate

Appendix G

Detailed Traffic Signal Warrant Analysis Worksheets

RK19750.1
JN: 2827-2023-05

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 1 - Eight Hour Vehicular Volume **Warrant Satisfied?** **N**
(Condition A or Condition B or Combination of A and B Must Be Satisfied)

Condition A Major Street Volume(70%):	**420**	Condition B Major Street Volume(70%):	**630**
Condition A Minor Street Volume(70%):	**105**	Condition B Minor Street Volume(70%):	**53**
Condition A Major Street Volume (56%):	**336**	Condition B Major Street Volume (56%):	**504**
Condition A Minor Street Volume (56%):	**84**	Condition B Minor Street Volume (56%):	**42**

Time Period		Major Street Volume (Both Approaches)	Minor Street Volumes (Higher Approach)	Condition A Met?	Condition B Met?	Combination of Conditions A & B Met?
Hour 1	**12-1**	52	1	N	N	N
Hour 2	**1-2**	29	2	N	N	N
Hour 3	**2-3**	17	1	N	N	N
Hour 4	**3-4**	25	3	N	N	N
Hour 5	**4-5**	92	5	N	N	N
Hour 6	**5-6**	203	23	N	N	N
Hour 7	**6-7**	523	35	N	N	N
Hour 8	**7-8**	1557	70	N	Y	N
Hour 9	**8-9**	1844	67	N	Y	N
Hour 10	**9-10**	1033	34	N	N	N
Hour 11	**10-11**	1041	34	N	N	N
Hour 12	**11-12**	1283	36	N	N	N
Hour 13	**12-1**	1498	30	N	N	N
Hour 14	**1-2**	1481	38	N	N	N
Hour 15	**2-3**	1680	35	N	N	N
Hour 16	**3-4**	2042	42	N	N	N
Hour 17	**4-5**	2255	39	N	N	N
Hour 18	**5-6**	2171	46	N	N	N
Hour 19	**6-7**	1656	34	N	N	N
Hour 20	**7-8**	1092	40	N	N	N
Hour 21	**8-9**	755	23	N	N	N
Hour 22	**9-10**	491	18	N	N	N
Hour 23	**10-11**	231	10	N	N	N
Hour 24	**11-12**	103	3	N	N	N
			Satisfied?	N	N	N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

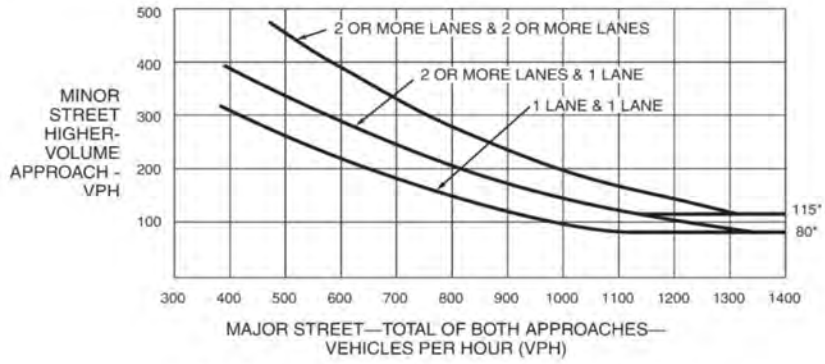
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 2 - Four Hour Vehicular Volume **Warrant Satisfied?** **N**

Record hourly vehicular volumes for any four hours of an average day.

	Time Period			
	Hour 8	Hour 9	Hour 16	Hour 18
Approach Lanes	7-8	8-9	3-4	5-6
Both Approaches - Major Street	1557	1844	2042	2171
Higher Approach - Minor Street	70	67	42	46

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

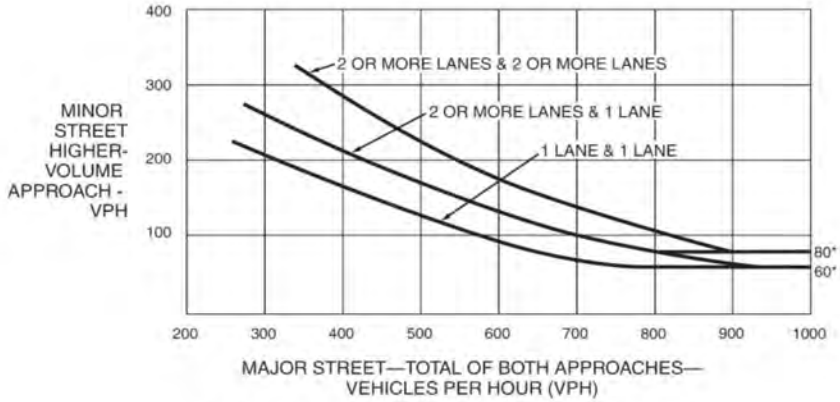


*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points falls above the applicable curve in Figure 4C-1 (Urban Areas)? **N**

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points fall above the applicable curve in Figure 4C-2 (Rural Areas? **N**

Warrant 3 - Peak Hour **Warrant Satisfied?** **N**
(Part A or Part B must be Satisfied)

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Part A **Part A Satisfied?** **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B **Part B Satisfied?** **N**

Approach Lanes	Time Period 4:45 - 5:45
Both Approaches - Major Street	1898
Higher Approach - Minor Street	66

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

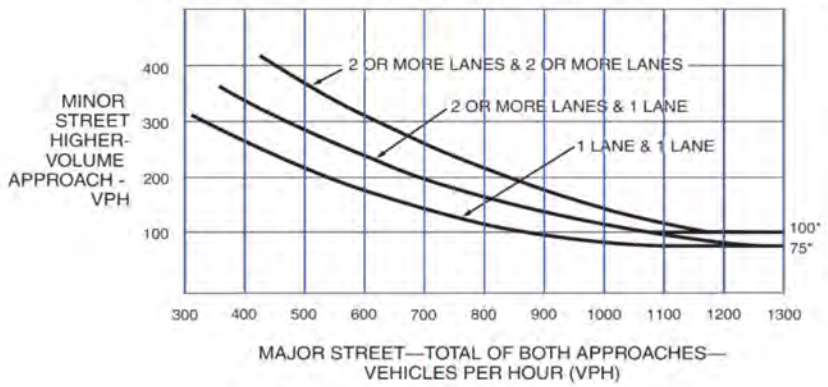
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Warrant 4 - Pedestrian Volume
(Parts 1 and 2 Must Be Satisified)

Warrant Satisfied? **N**

Part 1 (Part A or B Must Be Satisfied)

Part 1 Satisfied? **N**

Part A

Part A Satisfied? **N**

	Time Period			
	Hour 5	Hour 12	Hour 19	Hour 20
Approach Lanes	4-5	11-12	6-7	7-8
Vehicles Both Approaches - Major Street	92	1283	1656	1092
Pedestrians Crossing the Major Street	1	0	0	0

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume

The plotted points fall above the curve in Figure 4C-5 (Urban Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

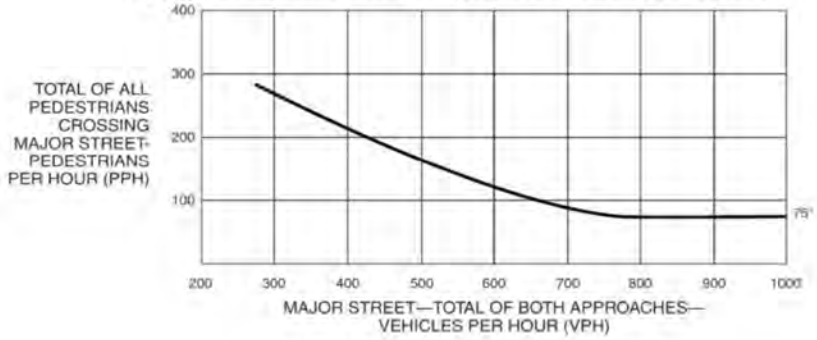
Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

VEHICLES PER HOUR (VPH)

*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-5 (Rural Areas)? **N**

Part B

Part B Satisfied? **N**

	Time Period
	Hour 19
Approach Lanes	6-7
Vehicles Both Approaches - Major Street	1656
Pedestrians Crossing the Major Street	0

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

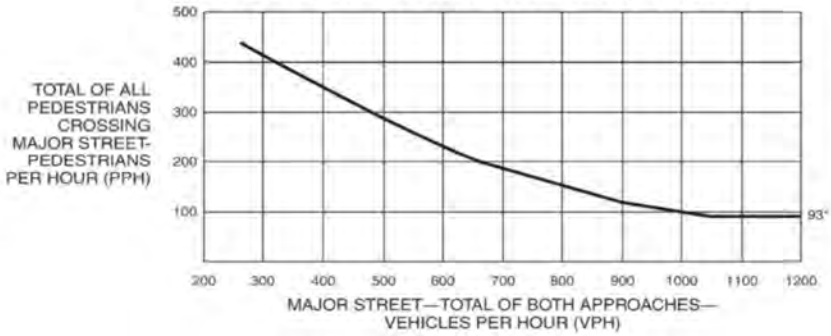
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-7. Warrant 4, Pedestrian Peak Hour

*Note: 133 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-7 (Urban Areas)? **N**

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-8 (Rural Areas)? **N**

Part 2 **Part 2 Satisfied?** **Y**

AND, The distance to the nearest traffic signal along the major street is greater than 300 feet?	**Y**
OR, The proposed traffic signal will not restrict progressive traffic flow along the major street?	**N**

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Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Birch Street	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Redbay Avenue	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Weekday Conditions				Rural

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 5 - School Crossing — **Warrant Satisfied?** **N**
(Parts A and B Must Be Satisfied)

Part A — **Part A Satisfied?** **N**
Gap/Minutes and # of Children

Gaps VS Minutes	Minutes Children Using Crossing	N/A
	Number of Adequate Gaps	N/A
School Age Pedestrian Crossing Street / Hr		N/A

Gaps < Minutes? **N**
AND Children >20/Hr? **N**

AND, Consideration has been given to less restrictive remedial measures? **N**

Part B — **Part B Satisfied?** **Y**

The distance to the nearest traffic signal along the major street is greater than 300 feet?	Y
OR, The proposed signal will not restrict the progressive movement of traffic?	N

Warrant 6 - Coordinated Signal System — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Minimum Requirements	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	North: - - ft, South: - - ft, East: 730 ft, West: 1420 ft.	N
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning?		N
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

Warrant 7 - Crash Experience Warrant — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency?			N
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash?		N
5 OR MORE			
REQUIREMENTS	CONDITIONS		
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	N	N
	OR, Warrant 1, Condition B - Interruption of Continous Traffic	N	
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8	N	

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Birch Street	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Redbay Avenue	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Weekday Conditions				Rural

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 8 - Roadway Network
(All Parts Must Be Satisfied)

Warrant Satisfied? **N**

Minimum Volume Requirements	Entering Volumes - All Approaches		Fulfilled
1000 Veh/Hr	During Typical Weekday Peak Hour (2639) Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.	Y	Y
	OR During Each of any 5Hrs. Of a Sat. or Sun (1889) Veh/Hr?	Y	

CHARACTERISTICS OF MAJOR ROUTES	Major Route A	Major Route B
Hwy. System Serving as Principal Network for Through Traffic?	Y	N
Rural or Suburban Highway Outside Of, Entering, or Traversing a City?	N	N
Appears as Major Route on an Official Plan?	Y	N
Any Major Route Characteristics Met, Both Streets?		N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 1 - Eight Hour Vehicular Volume **Warrant Satisfied? Y**
(Condition A or Condition B or Combination of A and B Must Be Satisfied)

Condition A Major Street Volume (100%):	**600**	Condition B Major Street Volume (100%):	**900**
Condition A Minor Street Volume (100%):	**150**	Condition B Minor Street Volume (100%):	**75**
Condition A Major Street Volume (80%):	**480**	Condition B Major Street Volume (80%):	**720**
Condition A Minor Street Volume (80%):	**120**	Condition B Minor Street Volume (80%):	**60**

Time Period		Major Street Volume (Both Approaches)	Minor Street Volumes (Higher Approach)	Condition A Met?	Condition B Met?	Combination of Conditions A & B Met?
Hour 1	12-1	54	3	N	N	N
Hour 2	1-2	23	1	N	N	N
Hour 3	2-3	22	1	N	N	N
Hour 4	3-4	43	0	N	N	N
Hour 5	4-5	124	2	N	N	N
Hour 6	5-6	194	6	N	N	N
Hour 7	6-7	436	61	N	N	N
Hour 8	7-8	764	103	N	N	N
Hour 9	8-9	773	135	N	N	Y
Hour 10	9-10	594	148	N	N	N
Hour 11	10-11	549	162	N	N	N
Hour 12	11-12	675	280	Y	N	N
Hour 13	12-1	793	354	Y	N	Y
Hour 14	1-2	769	289	Y	N	Y
Hour 15	2-3	914	303	Y	Y	Y
Hour 16	3-4	1025	307	Y	Y	Y
Hour 17	4-5	1050	265	Y	Y	Y
Hour 18	5-6	1094	294	Y	Y	Y
Hour 19	6-7	888	298	Y	N	Y
Hour 20	7-8	683	267	Y	N	N
Hour 21	8-9	488	180	N	N	N
Hour 22	9-10	330	134	N	N	N
Hour 23	10-11	194	48	N	N	N
Hour 24	11-12	81	13	N	N	N
			Satisfied?	Y	N	N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

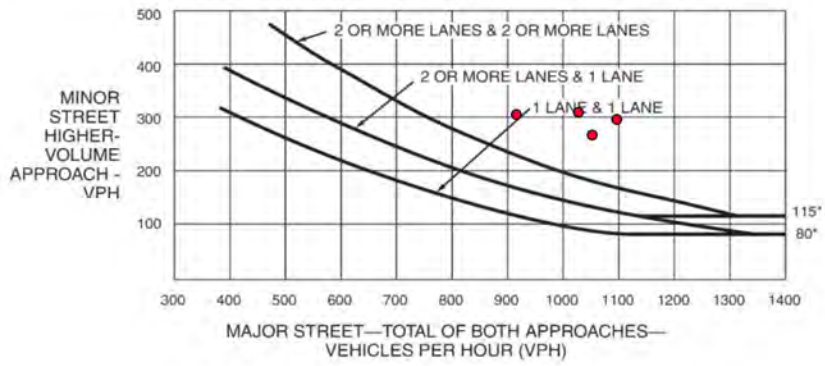
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 2 - Four Hour Vehicular Volume **Warrant Satisfied?** **Y**

Record hourly vehicular volumes for any four hours of an average day.

	Time Period			
	Hour 15	Hour 16	Hour 17	Hour 18
Approach Lanes	2-3	3-4	4-5	5-6
Both Approaches - Major Street	914	1025	1050	1094
Higher Approach - Minor Street	303	307	265	294

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

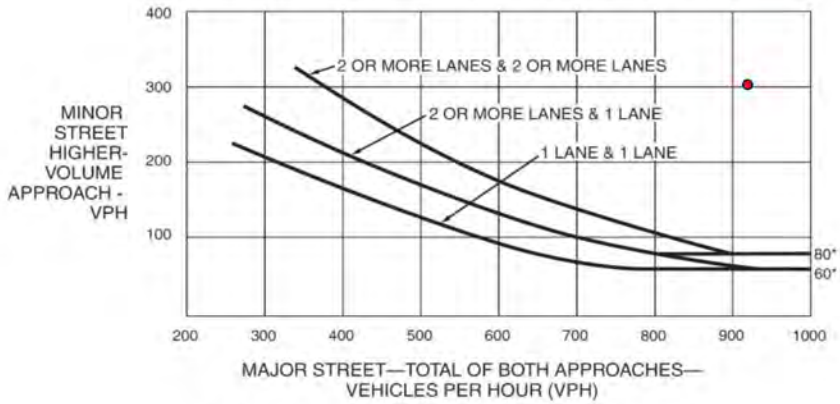


*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points falls above the applicable curve in Figure 4C-1 (Urban Areas)? **Y**

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points fall above the applicable curve in Figure 4C-2 (Rural Areas? **N**

Warrant 3 - Peak Hour **Warrant Satisfied?** **Y**
(Part A or Part B must be Satisfied)

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Part A **Part A Satisfied?** **N**

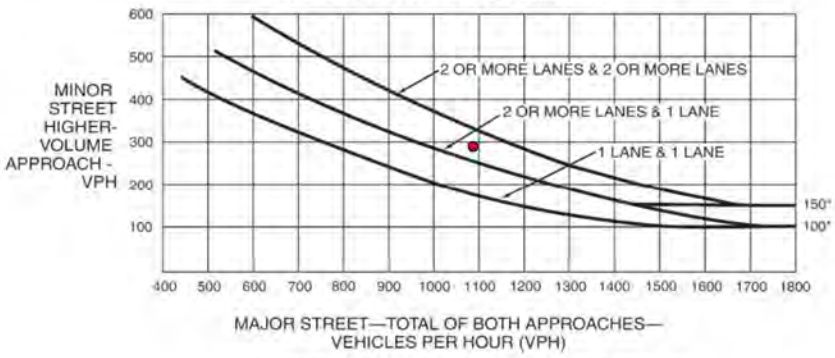
(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B **Part B Satisfied?** **Y**

Approach Lanes	Time Period 5-6
Both Approaches - Major Street	1089
Higher Approach - Minor Street	290

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

Y

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

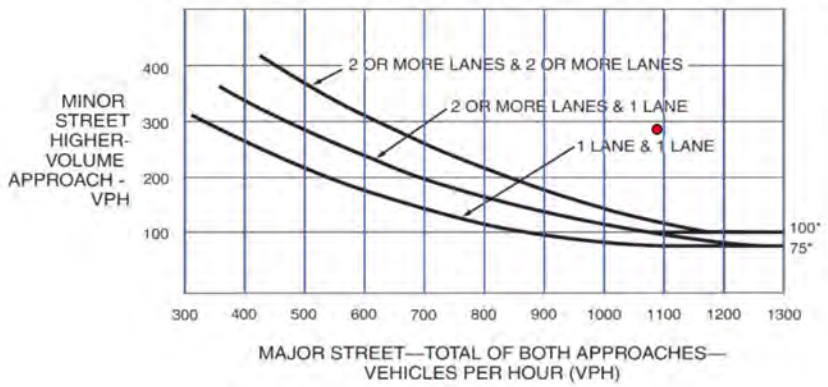
Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Warrant 4 - Pedestrian Volume
(Parts 1 and 2 Must Be Satisified)

Warrant Satisfied? **N**

Part 1 (Part A or B Must Be Satisfied)

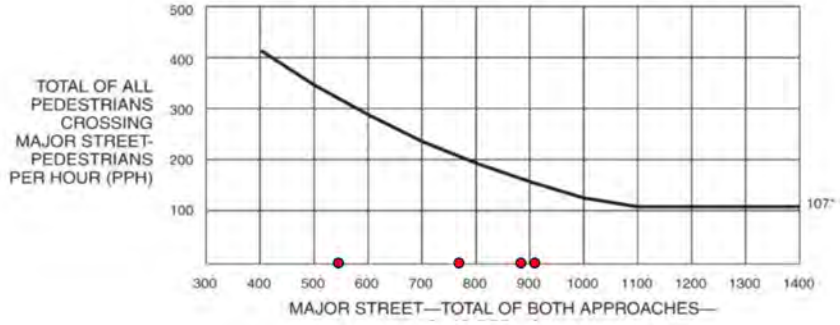
Part 1 Satisfied? **N**

Part A

Part A Satisfied? **N**

	Time Period			
	Hour 9	Hour 11	Hour 15	Hour 19
Approach Lanes	8-9	10-11	2-3	6-7
Vehicles Both Approaches - Major Street	773	549	914	888
Pedestrians Crossing the Major Street	0	0	0	0

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



The plotted points fall above the curve in Figure 4C-5 (Urban Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

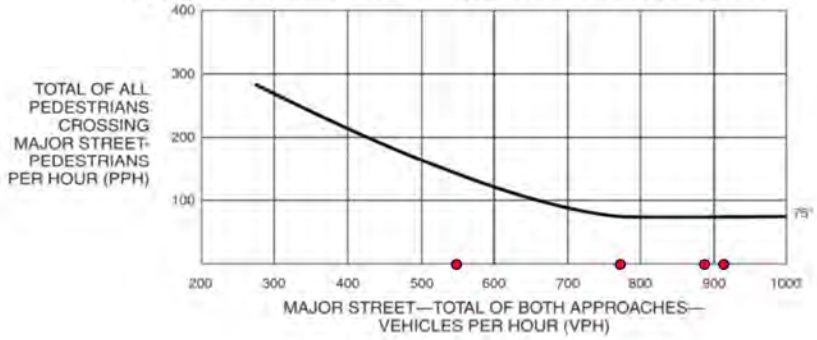
Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

VEHICLES PER HOUR (VPH)

*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-5 (Rural Areas)? **N**

Part B

Part B Satisfied? **N**

	Time Period
	Hour 18
Approach Lanes	5-6
Vehicles Both Approaches - Major Street	1094
Pedestrians Crossing the Major Street	0

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Weekday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

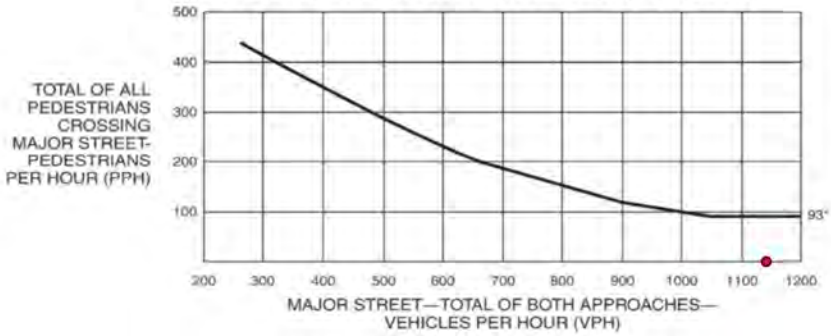
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Figure 4C-7. Warrant 4, Pedestrian Peak Hour

*Note: 133 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-7 (Urban Areas)? **N**

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-8 (Rural Areas)? **N**

Part 2 **Part 2 Satisfied?** **Y**

AND, The distance to the nearest traffic signal along the major street is greater than 300 feet?	**Y**
OR, The proposed traffic signal will not restrict progressive traffic flow along the major street?	**N**

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Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Associated Road	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Shopping Center Driveway No. 1	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Weekday Conditions				Urban

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 5 - School Crossing — **Warrant Satisfied?** **N**
(Parts A and B Must Be Satisfied)

Part A — **Part A Satisfied?** **N**
Gap/Minutes and # of Children

Gaps VS Minutes	Minutes Children Using Crossing	N/A
	Number of Adequate Gaps	N/A
School Age Pedestrian Crossing Street / Hr		N/A

Gaps < Minutes? **N**
AND Children >20/Hr? **N**

AND, Consideration has been given to less restrictive remedial measures? **N**

Part B — **Part B Satisfied?** **Y**

The distance to the nearest traffic signal along the major street is greater than 300 feet?	Y
OR, The proposed signal will not restrict the progressive movement of traffic?	N

Warrant 6 - Coordinated Signal System — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Minimum Requirements	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	North: 720 ft, South: 540 ft, East: - - ft, West: - - ft.	N
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning?		N
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

Warrant 7 - Crash Experience Warrant — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency?			N
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash?		N
5 OR MORE			
REQUIREMENTS	CONDITIONS		
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	Y	Y
	OR, Warrant 1, Condition B - Interruption of Continous Traffic	N	
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8	N	

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Associated Road	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Shopping Center Driveway No. 1	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Weekday Conditions				Urban

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 8 - Roadway Network
(All Parts Must Be Satisfied)

Warrant Satisfied? **N**

Minimum Volume Requirements	Entering Volumes - All Approaches		Fulfilled
1000 Veh/Hr	During Typical Weekday Peak Hour (1089) Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.	Y	Y
	OR During Each of any 5Hrs. Of a Sat. or Sun (914) Veh/Hr?	N	

CHARACTERISTICS OF MAJOR ROUTES	Major Route A	Major Route B
Hwy. System Serving as Principal Network for Through Traffic?	Y	N
Rural or Suburban Highway Outside Of, Entering, or Traversing a City?	N	N
Appears as Major Route on an Official Plan?	Y	N
Any Major Route Characteristics Met, Both Streets?		N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 1 - Eight Hour Vehicular Volume **Warrant Satisfied? Y**
(Condition A or Condition B or Combination of A and B Must Be Satisfied)

Condition A Major Street Volume (100%):	**600**	Condition B Major Street Volume (100%):	**900**
Condition A Minor Street Volume (100%):	**150**	Condition B Minor Street Volume (100%):	**75**
Condition A Major Street Volume (80%):	**480**	Condition B Major Street Volume (80%):	**720**
Condition A Minor Street Volume (80%):	**120**	Condition B Minor Street Volume (80%):	**60**

Time Period		Major Street Volume (Both Approaches)	Minor Street Volumes (Higher Approach)	Condition A Met?	Condition B Met?	Combination of Conditions A & B Met?
Hour 1	12-1	54	3	N	N	N
Hour 2	1-2	23	1	N	N	N
Hour 3	2-3	22	1	N	N	N
Hour 4	3-4	43	0	N	N	N
Hour 5	4-5	124	2	N	N	N
Hour 6	5-6	194	6	N	N	N
Hour 7	6-7	436	61	N	N	N
Hour 8	7-8	764	103	N	N	N
Hour 9	8-9	773	135	N	N	Y
Hour 10	9-10	594	148	N	N	N
Hour 11	10-11	549	162	N	N	N
Hour 12	11-12	675	280	Y	N	N
Hour 13	12-1	793	354	Y	N	Y
Hour 14	1-2	769	289	Y	N	Y
Hour 15	2-3	914	303	Y	Y	Y
Hour 16	3-4	1025	307	Y	Y	Y
Hour 17	4-5	1050	265	Y	Y	Y
Hour 18	5-6	1094	294	Y	Y	Y
Hour 19	6-7	888	298	Y	N	Y
Hour 20	7-8	683	267	Y	N	N
Hour 21	8-9	488	180	N	N	N
Hour 22	9-10	330	134	N	N	N
Hour 23	10-11	194	48	N	N	N
Hour 24	11-12	81	13	N	N	N
			Satisfied?	Y	N	N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

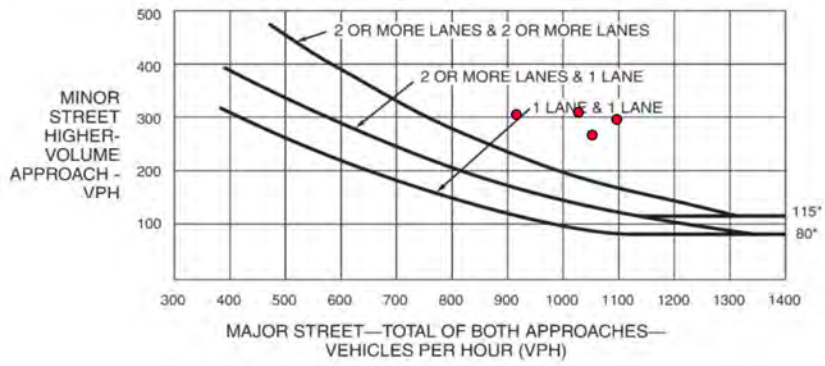
Volume Level Criteria:
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 2 - Four Hour Vehicular Volume **Warrant Satisfied?** **Y**

Record hourly vehicular volumes for any four hours of an average day.

	Time Period			
	Hour 15	Hour 16	Hour 17	Hour 18
Approach Lanes	2-3	3-4	4-5	5-6
Both Approaches - Major Street	914	1025	1050	1094
Higher Approach - Minor Street	303	307	265	294

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



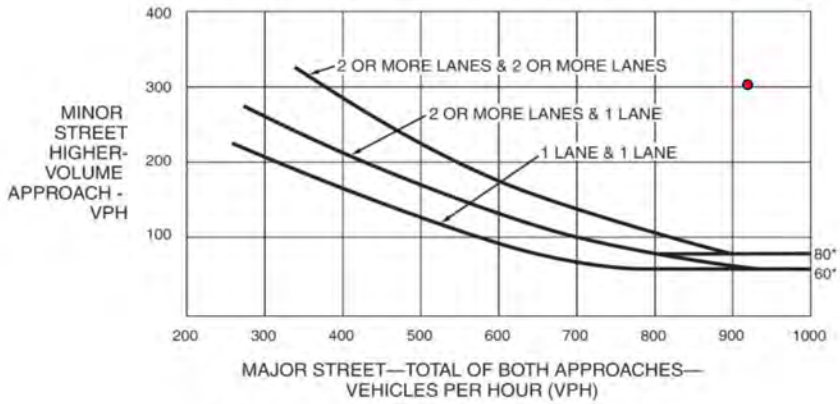
*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points falls above the applicable curve in Figure 4C-1 (Urban Areas)?

Y

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points fall above the applicable curve in Figure 4C-2 (Rural Areas?

N

Warrant 3 - Peak Hour **Warrant Satisfied?** **N**
(Part A or Part B must be Satisfied)

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Part A **Part A Satisfied?** **N**

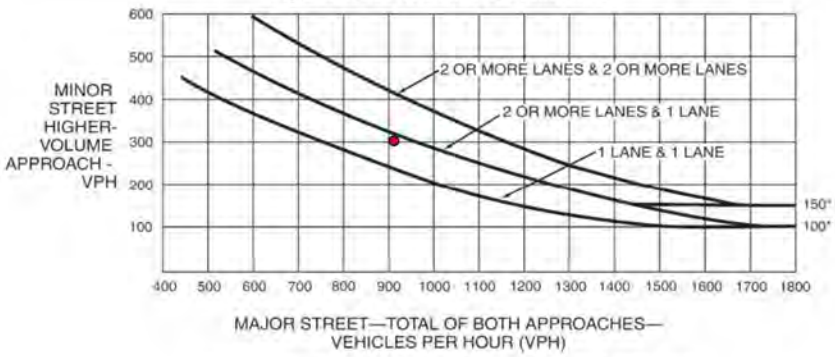
(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B **Part B Satisfied?** **N**

Approach Lanes	Time Period 2-3
Both Approaches - Major Street	914
Higher Approach - Minor Street	303

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

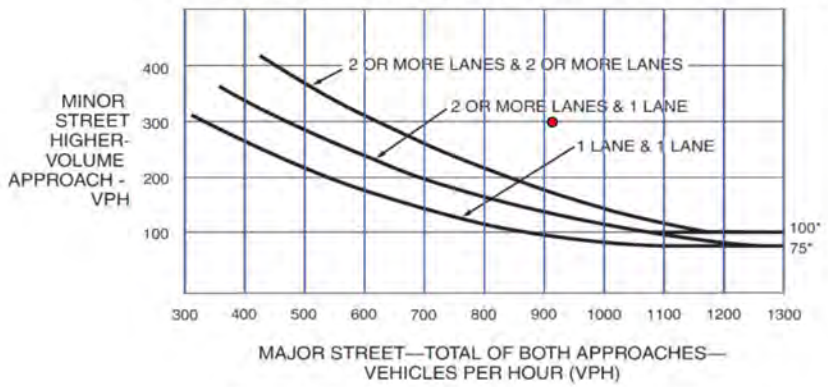
Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Warrant 4 - Pedestrian Volume
(Parts 1 and 2 Must Be Satisified)

Warrant Satisfied? **N**

Part 1 (Part A or B Must Be Satisfied)

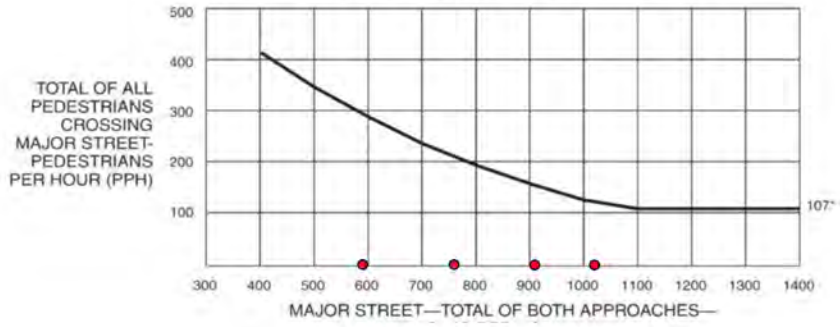
Part 1 Satisfied? **N**

Part A

Part A Satisfied? **N**

	Time Period			
	Hour 8	Hour 10	Hour 15	Hour 16
Approach Lanes	7-8	9-10	2-3	3-4
Vehicles Both Approaches - Major Street	764	594	914	1025
Pedestrians Crossing the Major Street	1	1	0	0

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



The plotted points fall above the curve in Figure 4C-5 (Urban Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

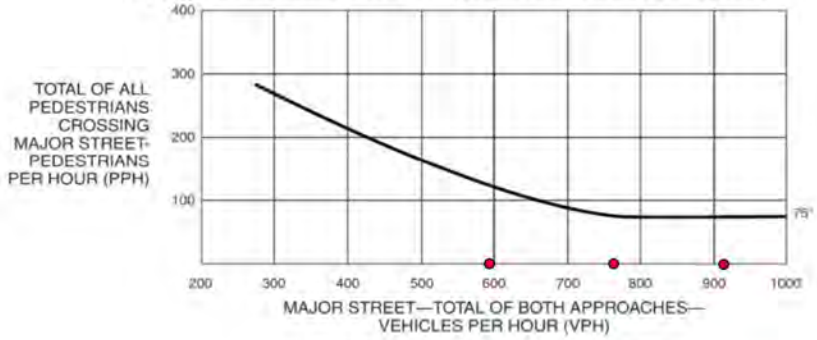
Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

VEHICLES PER HOUR (VPH)

*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-5 (Rural Areas)? **N**

Part B

Part B Satisfied? **N**

	Time Period
	Hour 15
Approach Lanes	2-3
Vehicles Both Approaches - Major Street	914
Pedestrians Crossing the Major Street	0

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

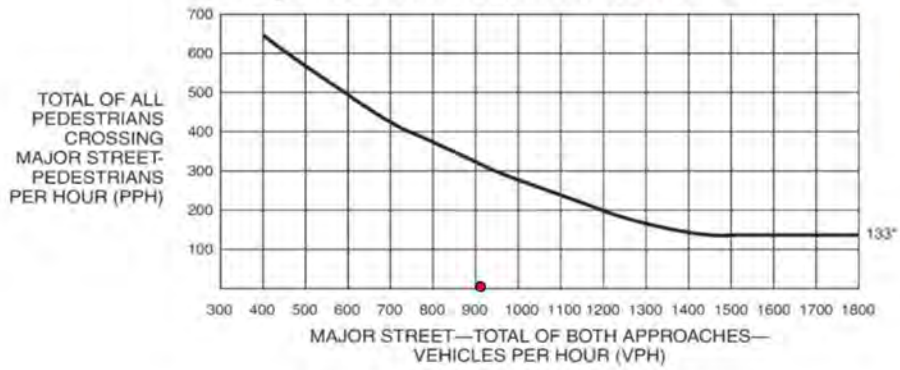
Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

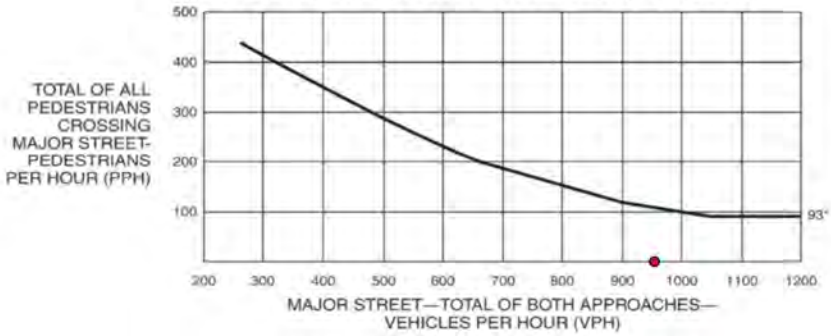
Figure 4C-7. Warrant 4, Pedestrian Peak Hour



*Note: 133 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-7 (Urban Areas)? **N**

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-8 (Rural Areas)? **N**

Part 2 **Part 2 Satisfied?** **Y**

AND, The distance to the nearest traffic signal along the major street is greater than 300 feet?	**Y**
OR, The proposed traffic signal will not restrict progressive traffic flow along the major street?	**N**

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Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Associated Road	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Shopping Center Driveway No. 1	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Saturday Conditions				Urban

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 5 - School Crossing — **Warrant Satisfied?** **N**
(Parts A and B Must Be Satisfied)

Part A — **Part A Satisfied?** **N**
Gap/Minutes and # of Children

Gaps VS Minutes	Minutes Children Using Crossing	N/A
	Number of Adequate Gaps	N/A
School Age Pedestrian Crossing Street / Hr		N/A

Gaps < Minutes? **N**
AND Children >20/Hr? **N**

AND, Consideration has been given to less restrictive remedial measures? **N**

Part B — **Part B Satisfied?** **Y**

The distance to the nearest traffic signal along the major street is greater than 300 feet?	Y
OR, The proposed signal will not restrict the progressive movement of traffic?	N

Warrant 6 - Coordinated Signal System — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Minimum Requirements	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	North: 720 ft, South: 540 ft, East: - - ft, West: - - ft.	N
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning?		N
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

Warrant 7 - Crash Experience Warrant — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency?			N
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash?		N
5 OR MORE			
REQUIREMENTS	CONDITIONS		
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	Y	Y
	OR, Warrant 1, Condition B - Interruption of Continous Traffic	N	
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8	N	

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Traffic Signal Warrant Worksheets

Jurisdiction:	**Brea**		Engineer: **SA**	Date:	3/25/2024
			Checked by: **JT**	Date:	3/25/2024
Major Street:	**Associated Road**	Number of Lanes:	**2 or more**	Roadway Classification	
Minor Street:	**Shopping Center Driveway No. 1**	Number of Lanes:	**1**		
Traffic Condition:	**Existing (2024) Saturday Conditions**			**Urban**	

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 8 - Roadway Network
(All Parts Must Be Satisfied)

Warrant Satisfied? **N**

Minimum Volume Requirements	Entering Volumes - All Approaches		Fulfilled
1000 Veh/Hr	During Typical Weekday Peak Hour (1089) Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.	Y	Y
	OR During Each of any 5Hrs. Of a Sat. or Sun (914) Veh/Hr?	N	

CHARACTERISTICS OF MAJOR ROUTES	Major Route A	Major Route B
Hwy. System Serving as Principal Network for Through Traffic?	Y	N
Rural or Suburban Highway Outside Of, Entering, or Traversing a City?	N	N
Appears as Major Route on an Official Plan?	Y	N
Any Major Route Characteristics Met, Both Streets?		N

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Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 1 - Eight Hour Vehicular Volume **Warrant Satisfied?** **N**
(Condition A or Condition B or Combination of A and B Must Be Satisfied)

Condition A Major Street Volume(70%):	**420**	Condition B Major Street Volume(70%):	**630**
Condition A Minor Street Volume(70%):	**105**	Condition B Minor Street Volume(70%):	**53**
Condition A Major Street Volume (56%):	**336**	Condition B Major Street Volume (56%):	**504**
Condition A Minor Street Volume (56%):	**84**	Condition B Minor Street Volume (56%):	**42**

Time Period		Major Street Volume (Both Approaches)	Minor Street Volumes (Higher Approach)	Condition A Met?	Condition B Met?	Combination of Conditions A & B Met?
Hour 1	**12-1**	109	5	N	N	N
Hour 2	**1-2**	53	8	N	N	N
Hour 3	**2-3**	37	4	N	N	N
Hour 4	**3-4**	29	1	N	N	N
Hour 5	**4-5**	44	3	N	N	N
Hour 6	**5-6**	62	12	N	N	N
Hour 7	**6-7**	164	16	N	N	N
Hour 8	**7-8**	394	25	N	N	N
Hour 9	**8-9**	678	54	N	Y	N
Hour 10	**9-10**	979	43	N	N	N
Hour 11	**10-11**	1389	48	N	N	N
Hour 12	**11-12**	1753	49	N	N	N
Hour 13	**12-1**	1732	43	N	N	N
Hour 14	**1-2**	1888	47	N	N	N
Hour 15	**2-3**	1777	32	N	N	N
Hour 16	**3-4**	1735	41	N	N	N
Hour 17	**4-5**	1568	47	N	N	N
Hour 18	**5-6**	1609	46	N	N	N
Hour 19	**6-7**	1300	44	N	N	N
Hour 20	**7-8**	984	38	N	N	N
Hour 21	**8-9**	729	25	N	N	N
Hour 22	**9-10**	519	19	N	N	N
Hour 23	**10-11**	338	12	N	N	N
Hour 24	**11-12**	181	13	N	N	N
			Satisfied?	N	N	N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

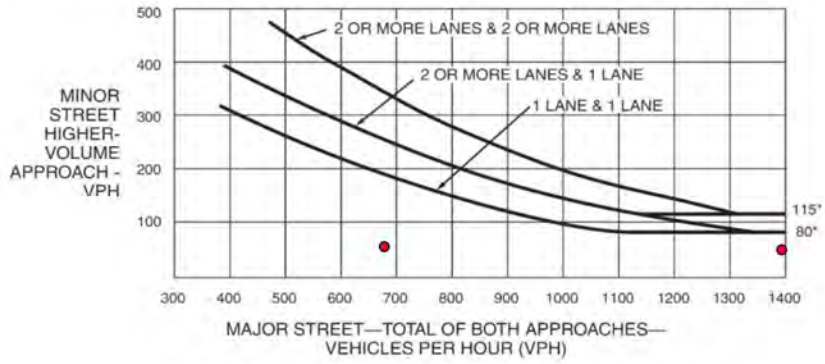
Volume Level Criteria:
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 2 - Four Hour Vehicular Volume **Warrant Satisfied?** **N**

Record hourly vehicular volumes for any four hours of an average day.

	Time Period			
	Hour 9	Hour 11	Hour 12	Hour 17
Approach Lanes	8-9	10-11	11-12	4-5
Both Approaches - Major Street	678	1389	1753	1568
Higher Approach - Minor Street	54	48	49	47

Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

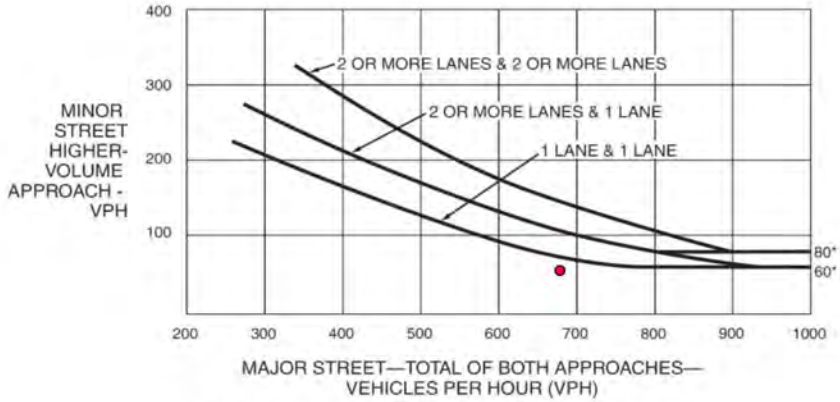


*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points falls above the applicable curve in Figure 4C-1 (Urban Areas)? **N**

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

All plotted points fall above the applicable curve in Figure 4C-2 (Rural Areas? **N**

Warrant 3 - Peak Hour **Warrant Satisfied?** **N**
(Part A or Part B must be Satisfied)

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Traffic Signal Warrant Worksheets

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Part A **Part A Satisfied?** **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B **Part B Satisfied?** **N**

Approach Lanes	Time Period 1:30-2:30
Both Approaches - Major Street	1889
Higher Approach - Minor Street	36

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

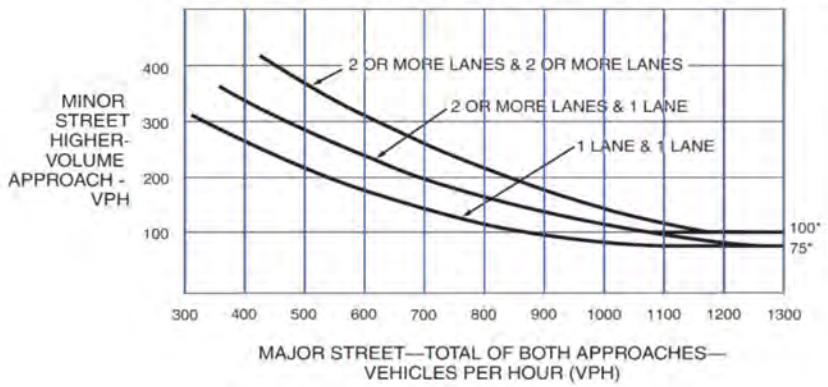
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Warrant 4 - Pedestrian Volume
(Parts 1 and 2 Must Be Satisified)

Warrant Satisfied? **N**

Part 1 (Part A or B Must Be Satisfied)

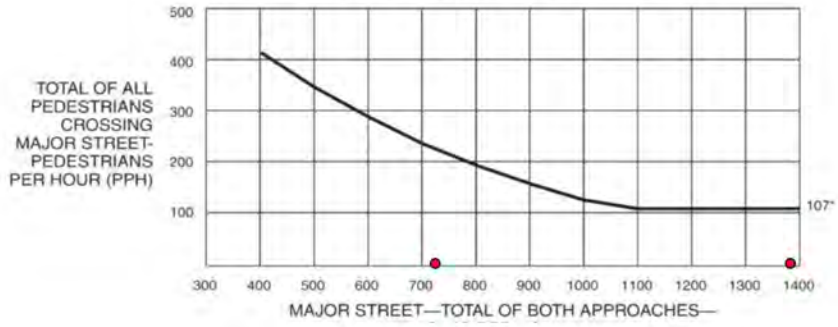
Part 1 Satisfied? **N**

Part A

Part A Satisfied? **N**

	Time Period			
	Hour 11	Hour 12	Hour 18	Hour 21
Approach Lanes	10-11	11-12	5-6	8-9
Vehicles Both Approaches - Major Street	1389	1753	1609	729
Pedestrians Crossing the Major Street	3	3	4	3

Figure 4C-5. Warrant 4, Pedestrian Four-Hour Volume



The plotted points fall above the curve in Figure 4C-5 (Urban Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

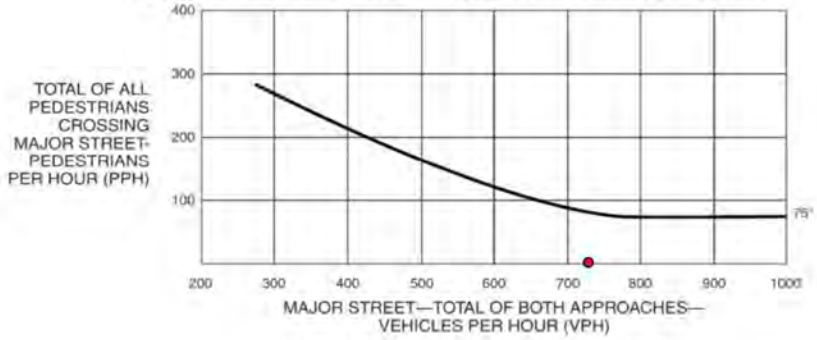
Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

VEHICLES PER HOUR (VPH)

*Note: 107 pph applies as the lower threshold volume.

Figure 4C-6. Warrant 4, Pedestrian Four-Hour Volume (70% Factor)



*Note: 75 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-5 (Rural Areas)? **N**

Part B

Part B Satisfied? **N**

	Time Period
	Hour 18
Approach Lanes	5-6
Vehicles Both Approaches - Major Street	1609
Pedestrians Crossing the Major Street	4

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:

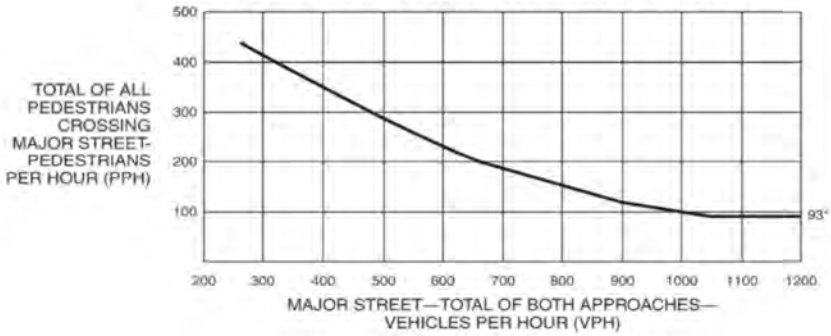
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-7. Warrant 4, Pedestrian Peak Hour

*Note: 133 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-7 (Urban Areas)? **N**

Figure 4C-8. Warrant 4, Pedestrian Peak Hour (70% Factor)



*Note: 93 pph applies as the lower threshold volume.

The plotted points fall above the curve in Figure 4C-8 (Rural Areas)? **N**

Part 2 **Part 2 Satisfied?** **Y**

AND, The distance to the nearest traffic signal along the major street is greater than 300 feet?	**Y**
OR, The proposed traffic signal will not restrict progressive traffic flow along the major street?	**N**

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction:	Brea	Engineer:	SA	Date:	3/25/2024
		Checked by:	JT	Date:	3/25/2024
Major Street:	Birch Street	Number of Lanes:	2 or more	Roadway Classification	
Minor Street:	Redbay Avenue	Number of Lanes:	1		
Traffic Condition:	Existing (2024) Saturday Conditions				Rural

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 5 - School Crossing — **Warrant Satisfied?** **N**
(Parts A and B Must Be Satisfied)

Part A — **Part A Satisfied?** **N**
Gap/Minutes and # of Children

Gaps VS Minutes	Minutes Children Using Crossing	N/A
	Number of Adequate Gaps	N/A
School Age Pedestrian Crossing Street / Hr		N/A

Gaps < Minutes? **N**
AND Children >20/Hr? **N**

AND, Consideration has been given to less restrictive remedial measures? **N**

Part B — **Part B Satisfied?** **Y**

The distance to the nearest traffic signal along the major street is greater than 300 feet?	Y
OR, The proposed signal will not restrict the progressive movement of traffic?	N

Warrant 6 - Coordinated Signal System — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Minimum Requirements	DISTANCE TO NEAREST SIGNAL	
≥ 1000 ft	North: -- ft, South: -- ft, East: 730 ft, West: 1420 ft.	N
On a one-way street or a street that has traffic predominantly in one direction, the adjacent traffic control signals are so far apart that they do not provide the necessary degree of vehicular platooning?		N
OR, On a two-way street, adjacent traffic control signals do not provide the necessary degree of platooning and the proposed and adjacent traffic control signals will collectively provide a progressive operation.		

Warrant 7 - Crash Experience Warrant — **Warrant Satisfied?** **N**
(All Parts Must Be Satisfied)

Adequate trial of alternatives with satisfactory observance and enforcement has failed to reduce the crash frequency?			N
REQUIREMENTS	Number of crashes reported within a 12 month period susceptible to correction by a traffic signal, and involving injury or damage exceeding the requirements for a reportable crash?		N
5 OR MORE			
REQUIREMENTS	CONDITIONS		
ONE CONDITION SATISFIED 80%	Warrant 1, Condition A - Minimum Vehicular Volume	N	N
	OR, Warrant 1, Condition B - Interruption of Continous Traffic	N	
	OR, Warrant 4, Pedestrian Volume Condition Ped Vol ≥ 80% of Figure 4C-5 through Figure 4C-8	N	

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Existing (2024) Saturday Conditions**

Roadway Classification: **Rural**

Volume Level Criteria:
1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 8 - Roadway Network
(All Parts Must Be Satisfied)

Warrant Satisfied? **N**

Minimum Volume Requirements	Entering Volumes - All Approaches		Fulfilled
1000 Veh/Hr	During Typical Weekday Peak Hour (2639) Veh/Hr and has 5-year projected traffic volumes that meet one or more of Warrants 1, 2, and 3 during an average weekday.	Y	Y
	OR During Each of any 5Hrs. Of a Sat. or Sun (1889) Veh/Hr?	Y	

CHARACTERISTICS OF MAJOR ROUTES	Major Route A	Major Route B
Hwy. System Serving as Principal Network for Through Traffic?	Y	N
Rural or Suburban Highway Outside Of, Entering, or Traversing a City?	N	N
Appears as Major Route on an Official Plan?	Y	N
Any Major Route Characteristics Met, Both Streets?		N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Weekday AM Peak Hour**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

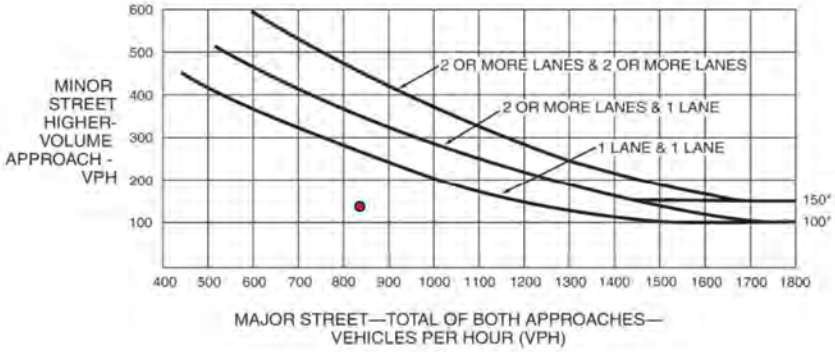
1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	839
Higher Approach - Minor Street	139

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Weekday AM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2031
Higher Approach - Minor Street	67

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

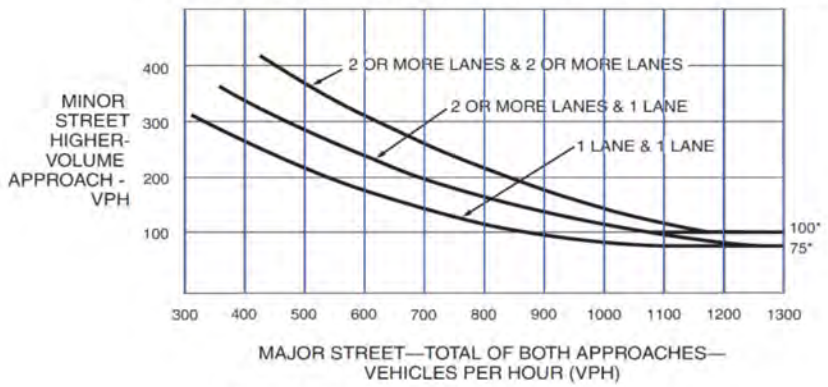
Jurisdiction:	**Brea**	Engineer:	**SA**	Date:	3/25/2024
		Checked by:	**JT**	Date:	3/25/2024
Major Street:	**Birch Street**	Number of Lanes:	**2 or more**	Roadway Classification	
Minor Street:	**Redbay Avenue**	Number of Lanes:	**1**		
Traffic Condition:	**Opening Year (2026) Without Project Conditions - Weekday AM Peak Hour**				**Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Weekday PM Peak Hour**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **Y**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **Y**

Approach Lanes	Volume
Both Approaches - Major Street	1137
Higher Approach - Minor Street	305

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

Y

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Weekday PM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **Y**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2793
Higher Approach - Minor Street	48

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

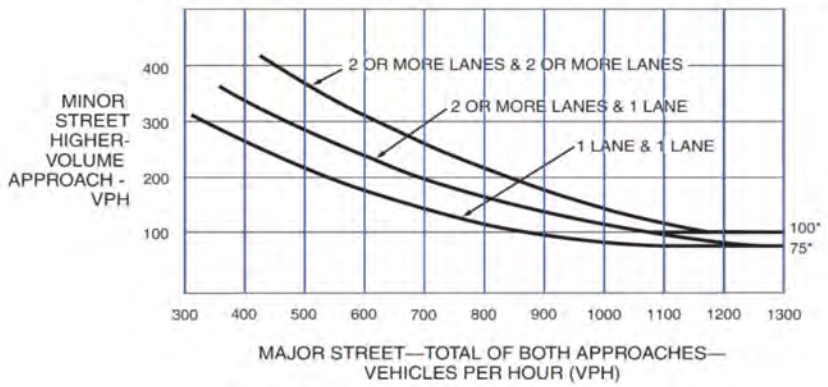
Jurisdiction:	**Brea**	Engineer:	**SA**	Date:	3/25/2024
		Checked by:	**JT**	Date:	3/25/2024
Major Street:	**Birch Street**	Number of Lanes:	**2 or more**	Roadway Classification	
Minor Street:	**Redbay Avenue**	Number of Lanes:	**1**		
Traffic Condition:	**Opening Year (2026) Without Project Conditions - Weekday PM Peak Hour**				**Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Saturday Midday Peak Hour**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **Y**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

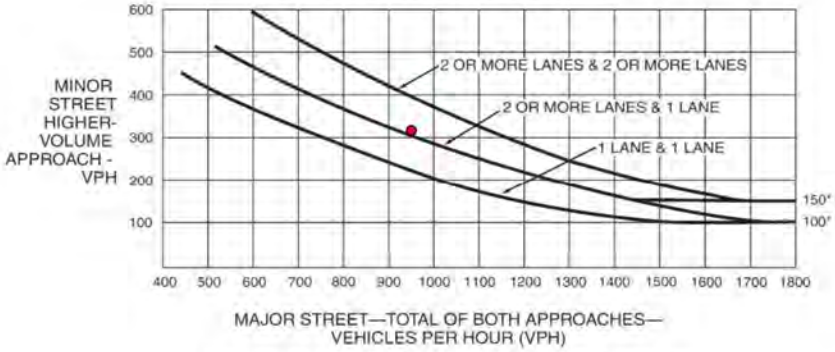
1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **Y**

Approach Lanes	Volume
Both Approaches - Major Street	953
Higher Approach - Minor Street	317

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

Y

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Saturday Midday Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2032
Higher Approach - Minor Street	37

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 3/25/2024
Checked by: **JT** Date: 3/25/2024

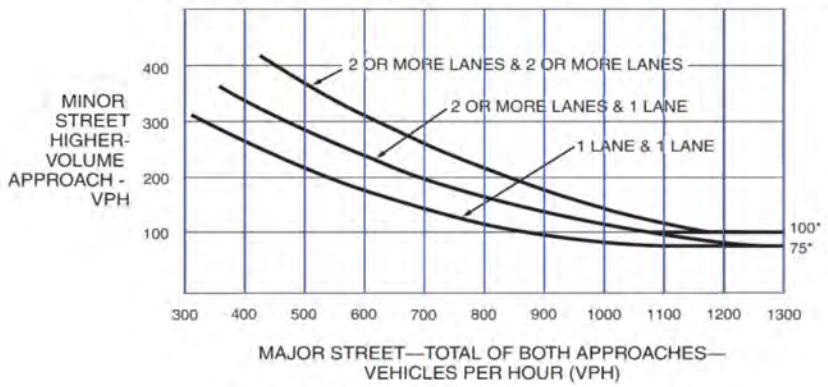
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) Without Project Conditions - Saturday Midday Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/5/2024
Checked by: **JT** Date: 4/5/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday AM Peak Hour**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

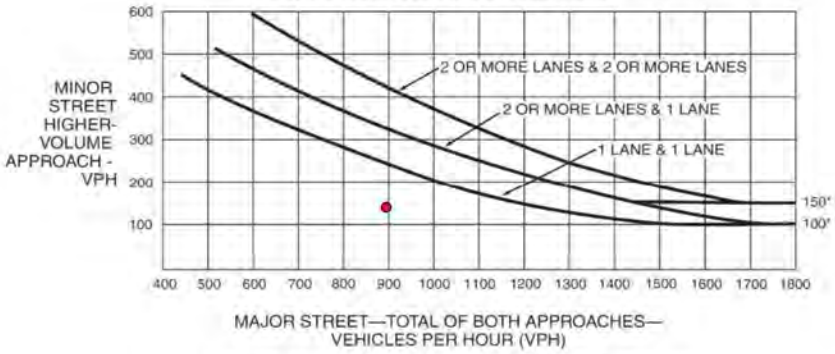
1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	897
Higher Approach - Minor Street	142

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday AM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **Y**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2054
Higher Approach - Minor Street	68

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

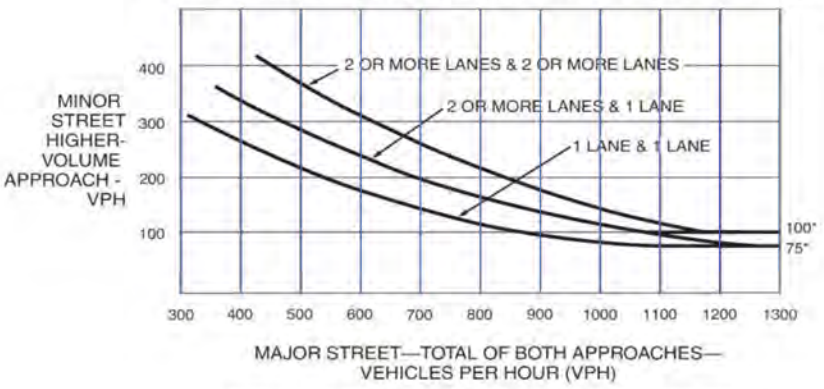
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday AM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/5/2024
Checked by: **JT** Date: 4/5/2024

Major Street: **Associated Road** Number of Lanes: **2 or more**
Minor Street: **Shopping Center Driveway No. 1** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday PM Peak Hour**

Roadway Classification: **Urban**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **Y**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **Y**

Approach Lanes	Volume
Both Approaches - Major Street	1206
Higher Approach - Minor Street	319

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

Y

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday PM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **Y**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2822
Higher Approach - Minor Street	48

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

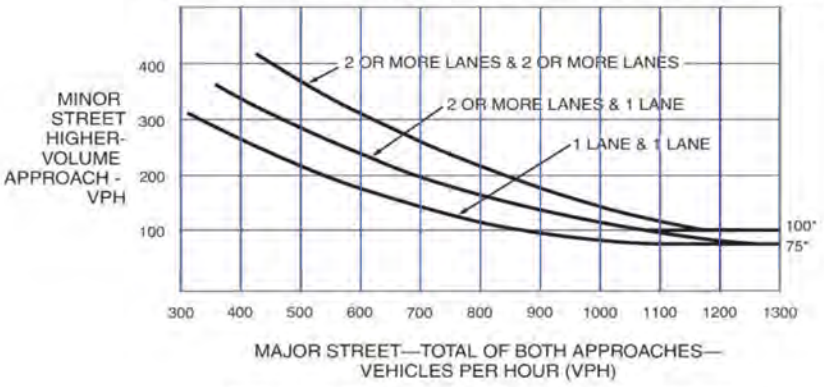
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Weekday PM Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

California MUTCD 2014 Edition
Traffic Signal Warrant Worksheets

Jurisdiction:	**Brea**	Engineer:	**SA**	Date:	4/5/2024
		Checked by:	**JT**	Date:	4/5/2024

Major Street:	**Associated Road**	Number of Lanes:	**2 or more**	Roadway Classification
Minor Street:	**Shopping Center Driveway No. 1**	Number of Lanes:	**1**	**Urban**
Traffic Condition:	**Opening Year (2026) With Project Conditions - Saturday Midday Peak Hour**			

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **N**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **N**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **Y**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

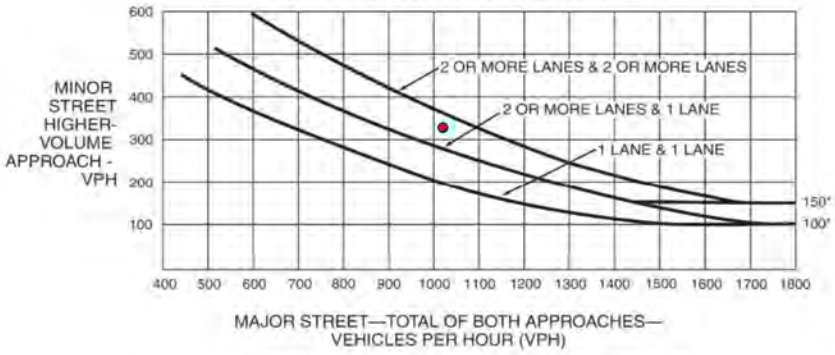
1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **Y**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **Y**

Approach Lanes	Volume
Both Approaches - Major Street	1022
Higher Approach - Minor Street	329

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

Y

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Saturday Midday Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Warrant 3 - Peak Hour
(Part A or Part B must be Satisfied)

Warrant Satisfied? **N**

Part A

Part A Satisfied? **N**

(All parts 1, 2, and 3 below must be satisfied the same one hour, for any four consecutive 15-minute periods)

1. The total delay experienced by traffic on one minor street-approach (one-direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach, or five vehicle-hours for a two lane approach; AND **N**
2. The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane or traffic of 150 vph for two moving lanes; AND **N**
3. The total entering volume serviced during the hour equals or exceeds 800vph for intersections with four or more approaches or 650 vph for intersections with three approaches. **Y**

Part B

Part B Satisfied? **N**

Approach Lanes	Volume
Both Approaches - Major Street	2061
Higher Approach - Minor Street	37

Figure 4C-3. Warrant 3, Peak Hour

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-3 (Urban Areas)?

N

Jurisdiction: **Brea**

Engineer: **SA** Date: 4/15/2024
Checked by: **JT** Date: 4/15/2024

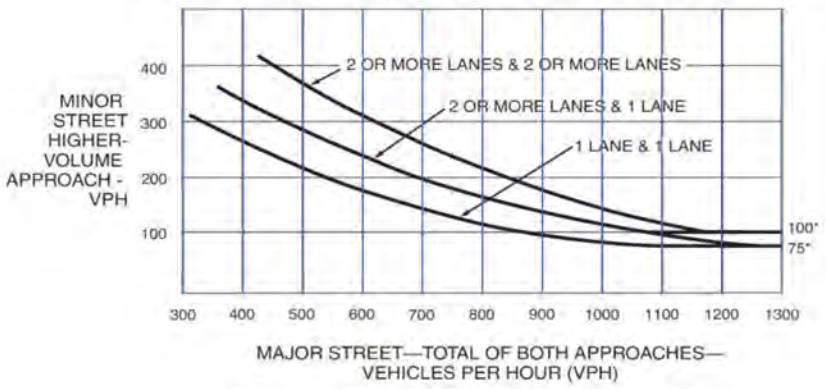
Major Street: **Birch Street** Number of Lanes: **2 or more**
Minor Street: **Redbay Avenue** Number of Lanes: **1**
Traffic Condition: **Opening Year (2026) With Project Conditions - Saturday Midday Peak Hour**

Roadway Classification: **Rural**

Volume Level Criteria:

1. Is the posted speed limit of 85th percentile speed on major road exceeds 40 mph? **Y**
2. Does the intersection lie within the built-area of an isolated community having a population of less than 10,000? **N**
3. Have adequate trials of other remedial measures been performed? **Y**

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

The plotted point falls above the appliable curve in Figure 4C-4 (Rural Areas)? **N**

Appendix H

Intersection Analysis Worksheets
Project Opening Year (2026)
Without Project Conditions With Improvements

RK19750.1
JN: 2827-2023-05

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	10.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.255

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	46	300	423	70	66	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	300	423	70	66	73
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	81	114	19	18	20
Total Analysis Volume [veh/h]	50	324	456	76	71	79
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	7	48	37	0	34	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	52	41	0	38	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	76	67	67	6	6
g / C, Green / Cycle	0.05	0.84	0.75	0.75	0.07	0.07
(v / s)_i Volume / Saturation Flow Rate	0.03	0.09	0.14	0.15	0.04	0.05
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	86	3195	1422	1347	127	123
d1, Uniform Delay [s]	41.97	1.25	3.31	3.34	40.49	40.73
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.07	0.06	0.29	0.33	3.85	5.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.10	0.19	0.20	0.56	0.64
d, Delay for Lane Group [s/veh]	48.04	1.31	3.60	3.67	44.35	46.22
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	1.20	0.14	1.02	1.03	1.66	1.89
50th-Percentile Queue Length [ft/ln]	29.95	3.44	25.46	25.87	41.47	47.31
95th-Percentile Queue Length [veh/ln]	2.16	0.25	1.83	1.86	2.99	3.41
95th-Percentile Queue Length [ft/ln]	53.91	6.19	45.83	46.56	74.64	85.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.04	1.31	3.63	3.67	44.35	46.22
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	7.56		3.63		45.33	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	10.95					
Intersection LOS	B					
Intersection V/C	0.255					

Emissions

Vehicle Miles Traveled [mph]	1.05	6.83	7.04	7.04	1.90	2.11
Stops [stops/h]	47.92	11.01	40.74	41.39	66.35	75.70
Fuel consumption [US gal/h]	1.00	0.44	0.85	0.86	0.98	1.13
CO [g/h]	69.71	30.70	59.22	59.92	68.54	78.87
NOx [g/h]	13.56	5.97	11.52	11.66	13.34	15.35
VOC [g/h]	16.16	7.11	13.72	13.89	15.89	18.28

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.187
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1067	822	756
d_b, Bicycle Delay [s]	9.80	15.61	17.42
I_b,int, Bicycle LOS Score for Intersection	1.868	1.999	1.560
Bicycle LOS	A	A	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	15.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.354

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	99	553	383	102	117	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	553	383	102	117	188
Peak Hour Factor	0.9680	0.9680	0.9680	0.9680	0.9680	0.9680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	143	99	26	30	49
Total Analysis Volume [veh/h]	102	571	396	105	121	194
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	7	37	26	0	45	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	41	30	0	49	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	69	59	59	13	13
g / C, Green / Cycle	0.07	0.77	0.66	0.66	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.06	0.15	0.13	0.14	0.07	0.11
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	129	2931	1245	1179	252	245
d1, Uniform Delay [s]	41.09	2.77	6.17	6.22	35.70	37.46
k, delay calibration	0.16	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.39	0.15	0.36	0.41	1.42	5.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.19	0.20	0.21	0.48	0.79
d, Delay for Lane Group [s/veh]	55.48	2.92	6.53	6.63	37.13	43.21
Lane Group LOS	E	A	A	A	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	2.67	0.85	1.65	1.67	2.55	4.51
50th-Percentile Queue Length [ft/ln]	66.64	21.35	41.17	41.71	63.67	112.67
95th-Percentile Queue Length [veh/ln]	4.80	1.54	2.96	3.00	4.58	7.99
95th-Percentile Queue Length [ft/ln]	119.95	38.43	74.10	75.08	114.60	199.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.48	2.92	6.57	6.63	37.13	43.21
Movement LOS	E	A	A	A	D	D
d_A, Approach Delay [s/veh]	10.88		6.58		40.87	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	15.78					
Intersection LOS	B					
Intersection V/C	0.354					

Emissions

Vehicle Miles Traveled [mph]	2.15	12.03	6.63	6.63	3.24	5.19
Stops [stops/h]	106.62	68.33	65.87	66.74	101.87	180.26
Fuel consumption [US gal/h]	2.28	1.44	1.22	1.23	1.45	2.63
CO [g/h]	159.09	100.74	85.11	86.06	101.38	183.87
NOx [g/h]	30.95	19.60	16.56	16.74	19.73	35.77
VOC [g/h]	36.87	23.35	19.72	19.95	23.50	42.61

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.237
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	822	578	1000
d_b, Bicycle Delay [s]	15.61	22.76	11.25
I_b,int, Bicycle LOS Score for Intersection	2.115	1.973	1.560
Bicycle LOS	B	A	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	17.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.366

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	91	396	371	95	104	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	396	371	95	104	213
Peak Hour Factor	0.9510	0.9510	0.9510	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	104	98	25	27	56
Total Analysis Volume [veh/h]	96	416	390	100	109	224
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	6	36	26	0	46	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	10	40	30	0	50	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	68	58	58	14	14
g / C, Green / Cycle	0.07	0.75	0.64	0.64	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.05	0.11	0.13	0.14	0.06	0.13
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	120	2867	1222	1158	282	274
d1, Uniform Delay [s]	41.41	3.05	6.57	6.63	34.06	36.70
k, delay calibration	0.19	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.55	0.11	0.37	0.42	0.87	5.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.15	0.20	0.21	0.39	0.82
d, Delay for Lane Group [s/veh]	59.96	3.16	6.94	7.05	34.93	42.59
Lane Group LOS	E	A	A	A	C	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	2.65	0.69	1.69	1.71	2.21	5.19
50th-Percentile Queue Length [ft/ln]	66.15	17.35	42.28	42.83	55.17	129.63
95th-Percentile Queue Length [veh/ln]	4.76	1.25	3.04	3.08	3.97	8.92
95th-Percentile Queue Length [ft/ln]	119.07	31.23	76.11	77.09	99.31	222.98

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.96	3.16	6.98	7.05	34.93	42.59
Movement LOS	E	A	A	A	C	D
d_A, Approach Delay [s/veh]	13.81		6.99		40.08	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	17.86					
Intersection LOS	B					
Intersection V/C	0.366					

Emissions

Vehicle Miles Traveled [mph]	2.02	8.77	6.48	6.48	2.91	5.99
Stops [stops/h]	105.84	55.53	67.65	68.52	88.28	207.40
Fuel consumption [US gal/h]	2.28	1.13	1.24	1.26	1.24	3.01
CO [g/h]	159.61	78.75	86.89	87.84	86.98	210.13
NOx [g/h]	31.05	15.32	16.91	17.09	16.92	40.88
VOC [g/h]	36.99	18.25	20.14	20.36	20.16	48.70

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.238
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	800	578	1022
d_b, Bicycle Delay [s]	16.20	22.76	10.76
I_b,int, Bicycle LOS Score for Intersection	1.982	1.964	1.560
Bicycle LOS	A	A	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix I

Intersection Analysis Worksheets
Project Opening Year (2026)
With Project Conditions With Improvements

RK19750.1
JN: 2827-2023-05

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	36.2
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.660

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	231	5	343	27	20	12	3	901	151	290	811	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	231	5	343	27	20	12	3	901	151	290	811	2
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	1	100	8	6	3	1	262	44	84	236	1
Total Analysis Volume [veh/h]	269	6	399	31	23	14	3	1048	176	337	943	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	8	7	4	0
Auxiliary Signal Groups			6,7						1,8			
Maximum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	26	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	15	50	50	0	35	0	10	53	53	17	60	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No	No	No	No	
Maximum Recall	No	No	No		No		No	No	No	No	No	
Pedestrian Recall	No	No	No		No		No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	58	75	43	43	1	37	52	13	49	49
g / C, Green / Cycle	0.09	0.48	0.62	0.36	0.36	0.01	0.31	0.43	0.11	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.08	0.00	0.23	0.02	0.02	0.00	0.28	0.10	0.10	0.25	0.25
s, saturation flow rate [veh/h]	3500	1900	1750	1800	1900	1800	3800	1750	3500	1900	1900
c, Capacity [veh/h]	321	916	1092	661	679	11	1176	760	379	782	782
d1, Uniform Delay [s]	53.63	16.13	10.99	25.22	25.28	59.36	39.51	21.34	52.79	27.65	27.65
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.11	0.44	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.82	0.01	0.95	0.13	0.15	12.48	2.58	0.63	7.17	0.76	0.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.84	0.01	0.37	0.05	0.05	0.27	0.89	0.23	0.89	0.60	0.60
d, Delay for Lane Group [s/veh]	59.45	16.15	11.94	25.36	25.43	71.84	42.09	21.97	59.96	28.41	28.40
Lane Group LOS	E	B	B	C	C	E	D	C	E	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.18	0.09	5.04	0.62	0.74	0.13	14.50	3.13	5.25	10.25	10.24
50th-Percentile Queue Length [ft/ln]	104.62	2.18	125.93	15.41	18.42	3.19	362.56	78.16	131.37	256.30	256.07
95th-Percentile Queue Length [veh/ln]	7.53	0.16	8.72	1.11	1.33	0.23	20.75	5.63	9.01	15.50	15.49
95th-Percentile Queue Length [ft/ln]	188.31	3.92	217.95	27.74	33.15	5.73	518.70	140.69	225.35	387.58	387.29

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.45	16.15	11.94	25.36	25.43	25.43	71.84	42.09	21.97	59.96	28.41	28.40
Movement LOS	E	B	B	C	C	C	E	D	C	E	C	C
d_A, Approach Delay [s/veh]	30.94			25.40			39.28			36.70		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	36.24											
Intersection LOS	D											
Intersection V/C	0.660											

Emissions

Vehicle Miles Traveled [mph]	17.57	0.39	26.06	1.21	1.45	0.16	54.65	9.18	28.31	39.70	39.67
Stops [stops/h]	251.08	2.61	151.11	18.49	22.10	3.82	870.15	93.79	315.28	307.56	307.28
Fuel consumption [US gal/h]	6.35	0.06	3.39	0.29	0.34	0.10	21.67	2.27	9.00	7.92	7.91
CO [g/h]	443.85	4.15	236.77	19.95	23.86	6.76	1514.57	158.51	629.21	553.43	552.95
NOx [g/h]	86.36	0.81	46.07	3.88	4.64	1.32	294.68	30.84	122.42	107.68	107.58
VOC [g/h]	102.87	0.96	54.87	4.62	5.53	1.57	351.02	36.74	145.83	128.26	128.15

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.729	1.975	3.120	3.183
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	767	517	817	933
d_b, Bicycle Delay [s]	22.82	33.00	21.00	17.07
I_b,int, Bicycle LOS Score for Intersection	2.672	1.672	2.572	2.617
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	8.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.198

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	28	354	6	13	432	5	24	1	75	32	1	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	354	6	13	432	5	24	1	75	32	1	39
Peak Hour Factor	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290	0.9290
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	95	2	3	116	1	6	0	20	9	0	10
Total Analysis Volume [veh/h]	30	381	6	14	465	5	26	1	81	34	1	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Permiss	Split
Signal Group	0	6	0	0	2	0	3	0	0	7	0	0
Auxiliary Signal Groups												
Maximum Green [s]	0	41	0	0	41	0	41	0	0	41	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	12	0	24	0	0	23	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No		No			No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	45	0	0	45	0	45	0	0	45	0	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	0	0	6	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
Minimum Recall		No			No		No			No		
Maximum Recall		No			No		No			No		
Pedestrian Recall		No			No		No			No		

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	75	75	75	75	75	75	7	7
g / C, Green / Cycle	0.84	0.84	0.84	0.84	0.84	0.84	0.08	0.08
(v / s)_i Volume / Saturation Flow Rate	0.02	0.10	0.10	0.01	0.12	0.12	0.06	0.04
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1478	1586	1586	1487	1586	1586	195	203
d1, Uniform Delay [s]	1.25	1.37	1.37	1.24	1.41	1.41	40.66	39.97
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.03	0.16	0.16	0.01	0.20	0.20	2.39	1.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.12	0.12	0.01	0.15	0.15	0.55	0.37
d, Delay for Lane Group [s/veh]	1.28	1.53	1.53	1.25	1.60	1.60	43.06	41.11
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.03	0.24	0.24	0.02	0.29	0.29	2.45	1.68
50th-Percentile Queue Length [ft/ln]	0.85	5.90	5.88	0.39	7.35	7.33	61.22	42.09
95th-Percentile Queue Length [veh/ln]	0.06	0.42	0.42	0.03	0.53	0.53	4.41	3.03
95th-Percentile Queue Length [ft/ln]	1.52	10.62	10.58	0.70	13.24	13.20	110.20	75.76

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.28	1.53	1.53	1.25	1.60	1.60	43.06	0.00	43.06	41.11	0.00	41.11
Movement LOS	A	A	A	A	A	A	D		D	D		D
d_A, Approach Delay [s/veh]	1.51			1.59			43.06			41.11		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.42											
Intersection LOS	A											
Intersection V/C	0.198											

Emissions

Vehicle Miles Traveled [mph]	1.03	6.66	6.63	0.45	7.54	7.52	2.05	1.80
Stops [stops/h]	1.36	9.44	9.40	0.63	11.77	11.73	97.96	67.34
Fuel consumption [US gal/h]	0.06	0.39	0.39	0.03	0.46	0.46	1.41	0.97
CO [g/h]	4.05	27.37	27.26	1.80	32.33	32.23	98.23	68.14
NOx [g/h]	0.79	5.32	5.30	0.35	6.29	6.27	19.11	13.26
VOC [g/h]	0.94	6.34	6.32	0.42	7.49	7.47	22.77	15.79

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.607	2.579	1.815	1.773
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	911	911	911	911
d_b, Bicycle Delay [s]	13.34	13.34	13.34	13.34
I_b,int, Bicycle LOS Score for Intersection	1.904	1.959	1.736	1.685
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	10.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.270

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	46	314	465	72	69	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	314	465	72	69	73
Peak Hour Factor	0.9270	0.9270	0.9270	0.9270	0.9270	0.9270
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	85	125	19	19	20
Total Analysis Volume [veh/h]	50	339	502	78	74	79
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	7	48	37	0	34	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	52	41	0	38	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	76	67	67	6	6
g / C, Green / Cycle	0.05	0.84	0.75	0.75	0.07	0.07
(v / s)_i Volume / Saturation Flow Rate	0.03	0.09	0.15	0.16	0.04	0.05
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	86	3194	1422	1347	127	123
d1, Uniform Delay [s]	41.97	1.26	3.36	3.40	40.55	40.72
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.07	0.07	0.32	0.37	4.20	5.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.58	0.11	0.20	0.22	0.58	0.64
d, Delay for Lane Group [s/veh]	48.04	1.32	3.69	3.76	44.74	46.15
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	1.20	0.15	1.13	1.15	1.74	1.89
50th-Percentile Queue Length [ft/ln]	29.95	3.64	28.23	28.71	43.45	47.27
95th-Percentile Queue Length [veh/ln]	2.16	0.26	2.03	2.07	3.13	3.40
95th-Percentile Queue Length [ft/ln]	53.91	6.55	50.82	51.68	78.21	85.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.04	1.32	3.72	3.76	44.74	46.15
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	7.33		3.72		45.47	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	10.67					
Intersection LOS	B					
Intersection V/C	0.270					

Emissions

Vehicle Miles Traveled [mph]	1.05	7.14	7.67	7.67	1.98	2.11
Stops [stops/h]	47.92	11.64	45.17	45.94	69.52	75.63
Fuel consumption [US gal/h]	1.00	0.46	0.94	0.95	1.03	1.13
CO [g/h]	69.71	32.26	65.44	66.28	71.95	78.78
NOx [g/h]	13.56	6.28	12.73	12.90	14.00	15.33
VOC [g/h]	16.16	7.48	15.17	15.36	16.68	18.26

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.188
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1067	822	756
d_b, Bicycle Delay [s]	9.80	15.61	17.42
I_b,int, Bicycle LOS Score for Intersection	1.881	2.038	1.560
Bicycle LOS	A	B	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	37.8
Analysis Method:	HCM 7th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.605

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	389	21	336	17	13	9	8	1056	254	244	1083	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	389	21	336	17	13	9	8	1056	254	244	1083	24
Peak Hour Factor	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660	0.9660
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	101	5	87	4	3	2	2	273	66	63	280	6
Total Analysis Volume [veh/h]	403	22	348	18	13	9	8	1093	263	253	1121	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	8	7	4	0
Auxiliary Signal Groups			6,7						1,8			
Maximum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	26	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	20	55	55	0	35	0	19	51	51	14	46	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No	No	No	No	
Maximum Recall	No	No	No		No		No	No	No	No	No	
Pedestrian Recall	No	No	No		No		No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	120	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	16	59	73	40	40	1	39	58	10	47	47
g / C, Green / Cycle	0.13	0.50	0.61	0.33	0.33	0.01	0.32	0.49	0.08	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.12	0.01	0.18	0.01	0.01	0.00	0.29	0.15	0.07	0.30	0.30
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	3800	1750	3500	1900	1900
c, Capacity [veh/h]	458	941	1163	613	629	23	1222	850	292	745	745
d1, Uniform Delay [s]	51.23	15.47	11.07	27.12	27.16	58.76	38.78	18.69	54.35	31.78	31.69
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.21	0.21
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.66	0.05	0.66	0.09	0.10	9.08	2.57	0.95	7.72	3.35	3.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.02	0.30	0.03	0.03	0.35	0.89	0.31	0.87	0.77	0.77
d, Delay for Lane Group [s/veh]	56.89	15.51	11.73	27.21	27.26	67.84	41.35	19.63	62.07	35.12	34.91
Lane Group LOS	E	B	B	C	C	E	D	B	E	D	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	6.20	0.31	4.30	0.37	0.46	0.29	15.05	4.43	3.99	14.44	14.29
50th-Percentile Queue Length [ft/ln]	154.94	7.80	107.57	9.30	11.38	7.33	376.31	110.69	99.83	360.97	357.24
95th-Percentile Queue Length [veh/ln]	10.28	0.56	7.70	0.67	0.82	0.53	21.42	7.88	7.19	20.67	20.49
95th-Percentile Queue Length [ft/ln]	257.01	14.05	192.62	16.75	20.48	13.19	535.38	196.96	179.70	516.76	512.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.89	15.51	11.73	27.21	27.26	27.26	67.84	41.35	19.63	62.07	35.02	34.91
Movement LOS	E	B	B	C	C	C	E	D	B	E	D	C
d_A, Approach Delay [s/veh]	35.38			27.24			37.31			39.91		
Approach LOS	D			C			D			D		
d_I, Intersection Delay [s/veh]	37.80											
Intersection LOS	D											
Intersection V/C	0.605											

Emissions

Vehicle Miles Traveled [mph]	26.32	1.44	22.73	0.70	0.86	0.42	57.00	13.71	21.25	48.28	47.98
Stops [stops/h]	371.86	9.37	129.08	11.17	13.66	8.79	903.15	132.83	239.59	433.16	428.69
Fuel consumption [US gal/h]	9.26	0.21	2.91	0.17	0.21	0.23	22.38	3.17	6.90	11.15	11.03
CO [g/h]	647.34	14.88	203.59	12.17	14.90	16.36	1564.29	221.75	482.50	779.29	771.16
NOx [g/h]	125.95	2.90	39.61	2.37	2.90	3.18	304.35	43.14	93.88	151.62	150.04
VOC [g/h]	150.03	3.45	47.18	2.82	3.45	3.79	362.54	51.39	111.82	180.61	178.72

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	49.50	49.50	49.50	49.50
I_p,int, Pedestrian LOS Score for Intersectio	2.749	1.980	3.213	3.189
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	850	517	783	700
d_b, Bicycle Delay [s]	19.84	33.00	22.20	25.35
I_b,int, Bicycle LOS Score for Intersection	2.835	1.626	2.685	2.714
Bicycle LOS	C	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	5.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.240

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	65	581	31	24	491	8	10	4	47	15	10	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	65	581	31	24	491	8	10	4	47	15	10	47
Peak Hour Factor	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390	0.9390
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	155	8	6	131	2	3	1	13	4	3	13
Total Analysis Volume [veh/h]	69	619	33	26	523	9	11	4	50	16	11	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Permiss	Split
Signal Group	0	6	0	0	2	0	3	0	0	7	0	0
Auxiliary Signal Groups												
Maximum Green [s]	0	26	0	0	26	0	56	0	0	56	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	12	0	24	0	0	23	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No		No			No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	60	0	0	60	0	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	0	0	6	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
Minimum Recall		No			No		No			No		
Maximum Recall		No			No		No			No		
Pedestrian Recall		No			No		No			No		

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.86	0.86	0.05	0.05
(v / s)_i Volume / Saturation Flow Rate	0.04	0.17	0.17	0.01	0.14	0.14	0.03	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1515	1625	1625	1502	1625	1625	154	156
d1, Uniform Delay [s]	0.98	1.14	1.14	0.96	1.10	1.10	41.42	41.54
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	0.28	0.28	0.02	0.22	0.22	1.65	1.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.20	0.20	0.02	0.16	0.16	0.40	0.42
d, Delay for Lane Group [s/veh]	1.04	1.42	1.41	0.98	1.32	1.32	43.08	43.34
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.04	0.23	0.22	0.02	0.18	0.18	1.39	1.51
50th-Percentile Queue Length [ft/ln]	1.06	5.74	5.62	0.39	4.46	4.43	34.80	37.80
95th-Percentile Queue Length [veh/ln]	0.08	0.41	0.40	0.03	0.32	0.32	2.51	2.72
95th-Percentile Queue Length [ft/ln]	1.91	10.33	10.12	0.70	8.03	7.98	62.64	68.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.04	1.42	1.41	0.98	1.32	1.32	43.08	0.00	43.08	43.34	0.00	43.34
Movement LOS	A	A	A	A	A	A	D		D	D		D
d_A, Approach Delay [s/veh]	1.38			1.30			43.08			43.34		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	5.13											
Intersection LOS	A											
Intersection V/C	0.240											

Emissions

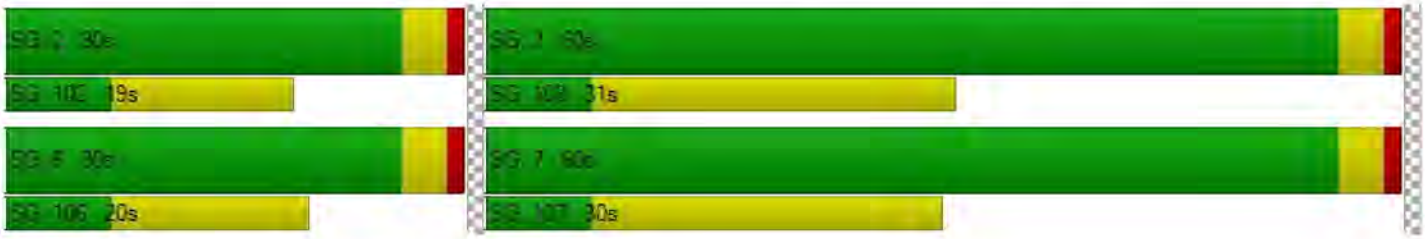
Vehicle Miles Traveled [mph]	2.37	11.29	11.10	0.83	8.54	8.50	1.17	1.56
Stops [stops/h]	1.70	9.18	9.00	0.63	7.14	7.10	55.68	60.48
Fuel consumption [US gal/h]	0.12	0.59	0.58	0.04	0.45	0.45	0.80	0.88
CO [g/h]	8.12	41.22	40.47	2.88	31.29	31.13	55.98	61.81
NOx [g/h]	1.58	8.02	7.87	0.56	6.09	6.06	10.89	12.03
VOC [g/h]	1.88	9.55	9.38	0.67	7.25	7.21	12.97	14.32

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.663	2.637	1.869	1.802
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	2.154	2.020	1.660	1.669
Bicycle LOS	B	B	A	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	15.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.363

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	99	593	410	104	131	188
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	593	410	104	131	188
Peak Hour Factor	0.9680	0.9680	0.9680	0.9680	0.9680	0.9680
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	153	106	27	34	49
Total Analysis Volume [veh/h]	102	613	424	107	135	194
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	7	37	26	0	45	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	11	41	30	0	49	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	69	59	59	13	13
g / C, Green / Cycle	0.07	0.77	0.66	0.66	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.06	0.16	0.14	0.15	0.08	0.11
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	129	2930	1244	1178	252	245
d1, Uniform Delay [s]	41.09	2.81	6.24	6.29	35.97	37.42
k, delay calibration	0.16	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.39	0.16	0.39	0.44	1.76	5.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.21	0.21	0.23	0.54	0.79
d, Delay for Lane Group [s/veh]	55.48	2.98	6.63	6.74	37.74	43.10
Lane Group LOS	E	A	A	A	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	2.67	0.93	1.76	1.79	2.88	4.50
50th-Percentile Queue Length [ft/ln]	66.64	23.31	44.12	44.74	71.88	112.51
95th-Percentile Queue Length [veh/ln]	4.80	1.68	3.18	3.22	5.18	7.98
95th-Percentile Queue Length [ft/ln]	119.95	41.97	79.42	80.53	129.39	199.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.48	2.98	6.67	6.74	37.74	43.10
Movement LOS	E	A	A	A	D	D
d_A, Approach Delay [s/veh]	10.47		6.68		40.90	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	15.55					
Intersection LOS	B					
Intersection V/C	0.363					

Emissions

Vehicle Miles Traveled [mph]	2.15	12.92	7.03	7.03	3.61	5.19
Stops [stops/h]	106.62	74.61	70.60	71.58	115.01	180.02
Fuel consumption [US gal/h]	2.28	1.57	1.30	1.32	1.64	2.63
CO [g/h]	159.09	109.53	91.11	92.20	114.65	183.50
NOx [g/h]	30.95	21.31	17.73	17.94	22.31	35.70
VOC [g/h]	36.87	25.38	21.12	21.37	26.57	42.53

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.240
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	822	578	1000
d_b, Bicycle Delay [s]	15.61	22.76	11.25
I_b,int, Bicycle LOS Score for Intersection	2.149	1.998	1.560
Bicycle LOS	B	A	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 2: Associated Road (N/S) at Birch Street (E/W)

Control Type:	Signalized	Delay (sec / veh):	33.9
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.418

Intersection Setup

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Entry Pocket Length [ft]	225.00	100.00	230.00	100.00	100.00	100.00	150.00	100.00	100.00	220.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			25.00			45.00			45.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Birch Street			Birch Street		
Base Volume Input [veh/h]	328	11	168	11	20	9	6	738	300	132	638	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	328	11	168	11	20	9	6	738	300	132	638	8
Peak Hour Factor	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710	0.9710
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	84	3	43	3	5	2	2	190	77	34	164	2
Total Analysis Volume [veh/h]	338	11	173	11	21	9	6	760	309	136	657	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing (Basic)

Control Type	Protecte	Permiss	Overlap	Permiss	Permiss	Permiss	Protecte	Permiss	Overlap	Protecte	Permiss	Permiss
Signal Group	1	6	6	0	2	0	3	8	8	7	4	0
Auxiliary Signal Groups			6,7						1,8			
Maximum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0
Walk [s]	0	7	7	0	7	0	0	7	7	0	7	0
Pedestrian Clearance [s]	0	24	24	0	24	0	0	26	26	0	23	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	16	51	51	0	35	0	10	39	39	10	39	0
Lead / Lag	Lead	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	6	6	6	0	6	0	6	6	6	6	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	0.0
Minimum Recall	No	No	No		No		No	No	No	No	No	
Maximum Recall	No	No	No		No		No	No	No	No	No	
Pedestrian Recall	No	No	No		No		No	No	No	No	No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
C, Calculated Cycle Length [s]	100	100	100	100	100	100	100	100	100	100	100
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	58	68	42	42	1	24	40	6	29	29
g / C, Green / Cycle	0.12	0.58	0.68	0.42	0.42	0.01	0.24	0.40	0.06	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.10	0.01	0.09	0.01	0.02	0.00	0.20	0.18	0.04	0.18	0.17
s, saturation flow rate [veh/h]	3500	1900	1900	1800	1900	1800	3800	1750	3500	1900	1900
c, Capacity [veh/h]	420	1109	1297	782	805	19	903	696	205	542	542
d1, Uniform Delay [s]	42.86	8.71	5.55	16.71	16.87	49.09	36.33	22.04	46.09	30.96	30.93
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.66	0.02	0.21	0.03	0.09	8.69	2.23	2.05	3.62	1.13	1.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.01	0.13	0.01	0.04	0.31	0.84	0.44	0.66	0.61	0.61
d, Delay for Lane Group [s/veh]	46.52	8.73	5.76	16.74	16.96	57.78	38.56	24.09	49.71	32.09	32.05
Lane Group LOS	D	A	A	B	B	E	D	C	D	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh/ln]	4.16	0.10	1.12	0.15	0.43	0.19	8.65	5.34	1.70	6.75	6.71
50th-Percentile Queue Length [ft/ln]	104.05	2.40	27.94	3.87	10.64	4.78	216.33	133.61	42.52	168.70	167.83
95th-Percentile Queue Length [veh/ln]	7.49	0.17	2.01	0.28	0.77	0.34	13.48	9.14	3.06	11.01	10.96
95th-Percentile Queue Length [ft/ln]	187.29	4.31	50.29	6.96	19.16	8.60	336.94	228.39	76.54	275.20	274.06

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	46.52	8.73	5.76	16.74	16.96	16.96	57.78	38.56	24.09	49.71	32.07	32.05
Movement LOS	D	A	A	B	B	B	E	D	C	D	C	C
d_A, Approach Delay [s/veh]	32.22			16.90			34.51			35.07		
Approach LOS	C			B			C			D		
d_I, Intersection Delay [s/veh]	33.91											
Intersection LOS	C											
Intersection V/C	0.418											

Emissions

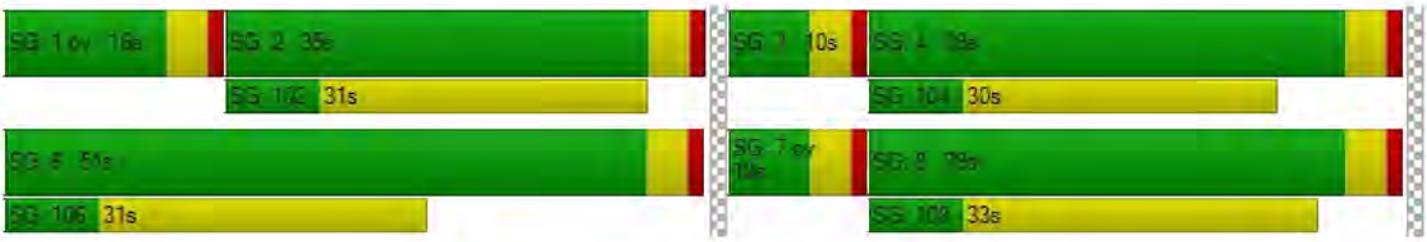
Vehicle Miles Traveled [mph]	22.07	0.72	11.30	0.43	1.17	0.31	39.63	16.11	11.42	27.99	27.87
Stops [stops/h]	299.67	3.45	40.23	5.57	15.33	6.88	623.03	192.39	122.47	242.92	241.68
Fuel consumption [US gal/h]	6.93	0.08	1.00	0.08	0.22	0.17	15.07	4.46	3.29	6.16	6.12
CO [g/h]	484.70	5.53	70.09	5.47	15.04	11.66	1053.27	311.70	229.97	430.27	428.11
NOx [g/h]	94.31	1.08	13.64	1.06	2.93	2.27	204.93	60.65	44.74	83.71	83.29
VOC [g/h]	112.33	1.28	16.24	1.27	3.49	2.70	244.10	72.24	53.30	99.72	99.22

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	39.61	39.61	39.61	39.61
I_p,int, Pedestrian LOS Score for Intersectio	2.672	1.963	3.033	2.899
Crosswalk LOS	B	A	C	C
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	940	620	700	700
d_b, Bicycle Delay [s]	14.05	23.81	21.13	21.13
I_b,int, Bicycle LOS Score for Intersection	2.421	1.627	2.446	2.220
Bicycle LOS	B	A	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Associated Road (N/S) at Greenbriar Lane (E/W)

Control Type:	Signalized	Delay (sec / veh):	6.2
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.193

Intersection Setup

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00			40.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Associated Road			Associated Road			Greenbriar Lane			Greenbriar Lane		
Base Volume Input [veh/h]	54	451	22	6	418	8	12	0	64	19	11	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	54	451	22	6	418	8	12	0	64	19	11	33
Peak Hour Factor	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880	0.9880
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	114	6	2	106	2	3	0	16	5	3	8
Total Analysis Volume [veh/h]	55	456	22	6	423	8	12	0	65	19	11	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Permiss	Split	Split	Permiss	Split
Signal Group	0	6	0	0	2	0	3	0	0	7	0	0
Auxiliary Signal Groups												
Maximum Green [s]	0	26	0	0	26	0	56	0	0	56	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Walk [s]	0	7	0	0	7	0	7	0	0	7	0	0
Pedestrian Clearance [s]	0	13	0	0	12	0	24	0	0	23	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No		No			No		
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	0	30	0	0	30	0	60	0	0	60	0	0
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	6	0	0	6	0	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0
Minimum Recall		No			No		No			No		
Maximum Recall		No			No		No			No		
Pedestrian Recall		No			No		No			No		

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
C, Calculated Cycle Length [s]	90	90	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	77	77	5	5
g / C, Green / Cycle	0.85	0.85	0.85	0.85	0.85	0.85	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.03	0.13	0.12	0.00	0.11	0.11	0.04	0.03
s, saturation flow rate [veh/h]	1800	1900	1900	1800	1900	1900	1900	1900
c, Capacity [veh/h]	1519	1619	1619	1514	1619	1619	159	167
d1, Uniform Delay [s]	1.02	1.13	1.13	0.99	1.11	1.11	41.52	40.95
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	0.19	0.19	0.00	0.17	0.17	2.29	1.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.15	0.15	0.00	0.13	0.13	0.49	0.31
d, Delay for Lane Group [s/veh]	1.06	1.32	1.32	0.99	1.28	1.28	43.81	42.00
Lane Group LOS	A	A	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.04	0.18	0.18	0.00	0.16	0.16	1.78	1.17
50th-Percentile Queue Length [ft/ln]	0.95	4.49	4.42	0.10	3.97	3.95	44.44	29.14
95th-Percentile Queue Length [veh/ln]	0.07	0.32	0.32	0.01	0.29	0.28	3.20	2.10
95th-Percentile Queue Length [ft/ln]	1.70	8.08	7.96	0.18	7.14	7.11	79.98	52.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.06	1.32	1.32	0.99	1.28	1.28	43.81	0.00	43.81	42.00	0.00	42.00
Movement LOS	A	A	A	A	A	A	D		D	D		D
d_A, Approach Delay [s/veh]	1.29			1.28			43.81			42.00		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	6.19											
Intersection LOS	A											
Intersection V/C	0.193											

Emissions

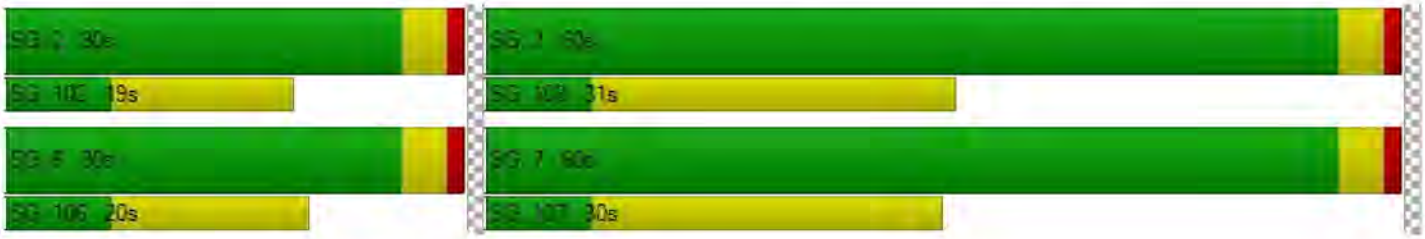
Vehicle Miles Traveled [mph]	1.89	8.26	8.15	0.19	6.92	6.89	1.47	1.23
Stops [stops/h]	1.51	7.19	7.08	0.16	6.35	6.32	71.10	46.62
Fuel consumption [US gal/h]	0.09	0.43	0.43	0.01	0.37	0.36	1.03	0.68
CO [g/h]	6.60	30.14	29.73	0.68	25.64	25.51	71.67	47.43
NOx [g/h]	1.28	5.86	5.78	0.13	4.99	4.96	13.95	9.23
VOC [g/h]	1.53	6.99	6.89	0.16	5.94	5.91	16.61	10.99

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	34.67	34.67	34.67	34.67
I_p,int, Pedestrian LOS Score for Intersectio	2.597	2.560	1.849	1.755
Crosswalk LOS	B	B	A	A
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	578	578	1244	1244
d_b, Bicycle Delay [s]	22.76	22.76	6.42	6.42
I_b,int, Bicycle LOS Score for Intersection	1.999	1.920	1.687	1.645
Bicycle LOS	A	A	A	A

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Associated Road (N/S) at Shopping Center Driveway No. 1 (E/W)

Control Type:	Signalized	Delay (sec / veh):	16.9
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.379

Intersection Setup

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	0	0	0
Entry Pocket Length [ft]	88.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	40.00		40.00		25.00	
Grade [%]	0.00		0.00		0.00	
Curb Present	No		No		No	
Crosswalk	No		No		Yes	

Volumes

Name	Associated Road		Associated Road		Shopping Center Driveway No. 1	
Base Volume Input [veh/h]	91	428	406	97	116	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00					
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	91	428	406	97	116	213
Peak Hour Factor	0.9510	0.9510	0.9510	0.9510	0.9510	0.9510
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	113	107	25	30	56
Total Analysis Volume [veh/h]	96	450	427	102	122	224
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0		0		0	
v_di, Inbound Pedestrian Volume crossing m	0		0		0	
v_co, Outbound Pedestrian Volume crossing	0		0		0	
v_ci, Inbound Pedestrian Volume crossing mi	0		0		0	
v_ab, Corner Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing (Basic)

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	1	6	2	0	3	0
Auxiliary Signal Groups						
Maximum Green [s]	13	52	35	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Walk [s]	0	0	7	0	0	0
Pedestrian Clearance [s]	0	0	19	0	0	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No	No		No	
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Advanced Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Phasing & Timing: Pattern 1

Split [s]	17	56	39	0	34	0
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	6	6	6	0	6	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Minimum Recall	No	No	No		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
C, Calculated Cycle Length [s]	90	90	90	90	90	90
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	68	58	58	14	14
g / C, Green / Cycle	0.07	0.76	0.64	0.64	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.05	0.12	0.14	0.15	0.07	0.13
s, saturation flow rate [veh/h]	1800	3800	1900	1800	1800	1750
c, Capacity [veh/h]	125	2868	1217	1153	281	274
d1, Uniform Delay [s]	41.15	3.07	6.75	6.81	34.36	36.73
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.38	0.12	0.41	0.46	1.05	5.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.16	0.22	0.23	0.43	0.82
d, Delay for Lane Group [s/veh]	50.54	3.19	7.16	7.27	35.41	42.70
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh/ln]	2.35	0.76	1.86	1.89	2.50	5.19
50th-Percentile Queue Length [ft/ln]	58.70	18.89	46.61	47.25	62.42	129.83
95th-Percentile Queue Length [veh/ln]	4.23	1.36	3.36	3.40	4.49	8.93
95th-Percentile Queue Length [ft/ln]	105.65	34.00	83.90	85.05	112.35	223.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	50.54	3.19	7.20	7.27	35.41	42.70
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	11.51		7.21		40.13	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	16.88					
Intersection LOS	B					
Intersection V/C	0.379					

Emissions

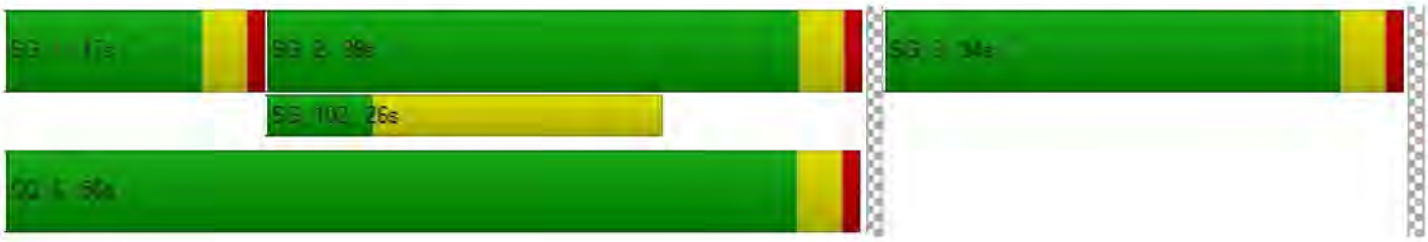
Vehicle Miles Traveled [mph]	2.02	9.48	7.00	7.00	3.26	5.99
Stops [stops/h]	93.91	60.45	74.58	75.60	99.86	207.73
Fuel consumption [US gal/h]	1.98	1.23	1.37	1.38	1.41	3.01
CO [g/h]	138.56	85.66	95.67	96.80	98.48	210.59
NOx [g/h]	26.96	16.67	18.61	18.83	19.16	40.97
VOC [g/h]	32.11	19.85	22.17	22.44	22.82	48.81

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0	0.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	0.00	0.00	0.00
M_CW, Crosswalk Circulation Area [ft²/ped]	0.00	0.00	0.00
d_p, Pedestrian Delay [s]	0.00	0.00	34.67
I_p,int, Pedestrian LOS Score for Intersectio	0.000	0.000	2.241
Crosswalk LOS	F	F	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	1156	778	667
d_b, Bicycle Delay [s]	8.02	16.81	20.00
I_b,int, Bicycle LOS Score for Intersection	2.010	1.996	1.560
Bicycle LOS	B	A	A

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Appendix J

SWITRS & TIMS Collision Data

RK19750.1
JN: 2827-2023-05

Primary Rd **BIRCH ST** *Distance (ft)* **110.** *Direction* **W** *Secondary Rd* **ORANGE AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200229** *Time* **1146** *Day* **SAT**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200526**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	32	F	W	HNBD		ENT TRAF	S	A	0700	JEEP	2015	-	3	E		- M G
2	DRVR	79	F	W	HNBD		PROC ST	W	A	0100	TOYOT	2019	-	3	N		- M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **200.** *Direction* **W** *Secondary Rd* **POPLAR AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20191016** *Time* **2215** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191113**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	17	M	W	HNBD		PROC ST	E	A	0100	FORD	2016	-	3	N		- M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RANDOLPH AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200320** *Time* **1830** *Day* **FRI**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200417**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	30	M	W	HBD-UI		PROC ST	-	D	2200	CHEVR	2005	-	3	N		- M G
2	DRVR	46	F	W	HNBD		CHANG LN	W	A	0700	LINCO	2010	-	3	A	21658	- M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **65.0** *Direction* **E** *Secondary Rd* **REDBAY AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1395** *Collision Date* **20190424** *Time* **1700** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190508**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	57	M	W	HNBD		PROC ST	E	A	0800	DODGE	2017	-	3	F		- L G
2	DRVR	26	F	W	HNBD		STOPPED	E	A	0700	JEEP	2018	-	3	N		- M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **17.0** *Direction* **E** *Secondary Rd* **STARFLOWER ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20190503** *Time* **0947** *Day* **FRI**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20190705**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	43	F	W	HNBD		PROC ST	W	A	0800	HONDA	2016	-	2	A	23123	- L G
2	DRVR	58	F	W	HNBD		LFT TURN	S	A	0100	BUICK	2010	-	3	N		- L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	POSSIBL	9	M	4	0	M	G
DRVR	POSSIBL	58	F	1	0	L	G
PASS	MINOR	97	F	2	0	L	G

This report is accepted subject to the Terms of Use. Due to collision records processing backlogs, SWITRS data is typically seven months behind. Data requested for dates seven months prior to the current date will be incomplete.

STATE OF CALIFORNIA
DEPARTMENT OF CALIFORNIA HIGHWAY PATROL

REPORT 8 - TOTAL COLLISIONS

03/21/2019 thru 03/20/2020 | *Total Count: 779* | Jurisdiction(s): ALL

Include State Highways cases | *Report Run On: 03/25/2024*

Primary Rd **ALDER ST** *Distance (ft)* **122.** *Direction* **W** *Secondary Rd* **POPLAR AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20190814** *Time* **0716** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191210**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	M	H	HNBD		PROC ST	E	A	0100	NISSA	2014	-	3	E	-	L	G
2	PRKD	998	-				PARKED	E	D	2200	NISSA	2006	-	-	N	-	-	-
3	PRKD	998	-				PARKED	E	A	0100	HONDA	2011	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		14	M	3	0	L	G

Primary Rd **ALWICK PL** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **MIDBURY ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20200204** *Time* **1420** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200320**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	A	0700	TOYOT		-	-	N	-	-	-
2	PRKD	998	-				PARKED	S	A	0100	HONDA	2004	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **23.0** *Direction* **S** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20190426** *Time* **1408** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20190508**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	68	M	W	HNBD		PROC ST	N	D	2200	FORD	2017	-	3	N	-	M	G
2	DRVR	38	F	H	HNBD		STOPPED	N	A	0100	TOYOT	2001	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	38	F	1	0	M	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **37.0** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1676** *Collision Date* **20190524** *Time* **1933** *Day* **FRI**
Primary Collision Factor **DRVR ALC\|DRG** *Violation* **23152A** *Collision Type* **HEAD-ON** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20190620**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	30	M	H	HBD-UI		RGT TURN	W	A	0100	TOYOT	2017	-	3	A	21650	-	L	C
2	DRVR	24	F	H	HNBD		STOPPED	S	A	0100	HONDA	2015	-	3	N		-	M	C

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **125.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20191029** *Time* **1258** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20191205**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	A	0700	-		-	-	N	-	-	-								

Primary Rd **ASSOCIATED RD** *Distance (ft)* **1000** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1395** *Collision Date* **20190920** *Time* **1604** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	40	F	W	HNBD		STOPPED	N	A	0700	JEEP	2015	-	3	N		-	M	G							
2	DRVR	23	M	H	HNBD		STOPPED	N	A	0800	FORD	2017	-	3	N		-	M	G							
3	DRVR	50	M	W	HNBD		SLOWING	N	D	2200	FORD	1992	-	3	N		-	M	G							
4	DRVR	61	M		HNBD		SLOWING	N	H	1800	OTHER	2008	-	3	A	22400	-	M	G							

Primary Rd **ASSOCIATED RD** *Distance (ft)* **322.** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20200122** *Time* **2002** *Day* **WED**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	22	M	A	HNBD		RAN OFF RD	S	A	0100	KIA	2020	-	1	F		-	L	G							

Primary Rd **ASSOCIATED RD** *Distance (ft)* **60.0** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1461** *Collision Date* **20200207** *Time* **1609** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200608**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	31	F	H	HNBD		PROC ST	S	A	0100	FORD	2014	-	3	E		-	M	G							
2	DRVR	64	M	W	HNBD		STOPPED	S	A	0100	VOLKS	2005	-	3	N		-	M	G							
3	DRVR	47	F	A	HNBD		STOPPED	S	A	0100	NISSA	2017	-	3	N		-	M	G							

Primary Rd **ASSOCIATED RD** *Distance (ft)* **420.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20190508** *Time* **0838** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190530**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	18	F	H	HNBD		LFT TURN	E	A	0100	FORD	2012	-	3	N		-	L	G	PASS		16	F	3	0	L	G
																				PASS		16	F	4	0	M	G
																				PASS		16	F	6	0	M	G
2	DRVR	66	F	W	HNBD		PROC ST	S	A	0700	GMC	2017	-	3	N		-	M	G							

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Primary Rd **BIRCH ST** *Distance (ft)* **300.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20191210** *Time* **1720** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200124**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	CHANG LN	W	A	0700	-		-	-	N	-	-	-
2	DRVR	23	F	W	HNBD		PROC ST	W	A	0100	HONDA	2002	-	3	N	-	M	G
3	DRVR	28	F	W	HNBD		PROC ST	W	A	0100	HYUND	2011	-	3	N	-	M	G
4	DRVR	43	F	W	HNBD		PROC ST	W	A	0700	FORD	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20200123** *Time* **1835** *Day* **THU**
Primary Collision Factor **STRTNG|BCKNG** *Violation* **22106** *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200516**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	BACKING	W	A	0100	BMW	2017	-	3	N	-	-	-
2	DRVR	39	M	H	HNBD		STOPPED	E	D	2200	CHEVR	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		39	F	3	0	M	G
PASS		14	F	5	0	M	G

Primary Rd **BIRCH ST** *Distance (ft)* **12.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD E** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20190419** *Time* **1758** *Day* **FRI**
Primary Collision Factor **IMPROP PASS** *Violation* **21755A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190510**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT FNCT** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PASSING	E	D	2200	FORD	2016	-	-	N	-	-	-
2	DRVR	62	M	W	HNBD		STOPPED	E	A	0700	BMW	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		59	F	3	0	M	G

Primary Rd **BIRCH ST** *Distance (ft)* **50.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD E** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1674** *Collision Date* **20190811** *Time* **1916** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **N** *Process Date* **20190925**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	D	2200	-		-	-	N	-	-	-
2	DRVR	55	F	W	HNBD		STOPPED	E	A	0100	TOYOT	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	55	F	1	0	M	G
PASS	COMP PN	37	F	3	0	M	G
PASS		12	F	6	0	M	G

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Primary Rd **BIRCH ST** *Distance (ft)* **50.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD E** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20191023** *Time* **1458** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20191219**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	-		HBD-UNK		PROC ST	W	A	0100	HONDA		-	-	N		-	-	-							
2	DRVR	36	F	H	HNBD		STOPPED	W	A	0100	NISSA	2011	-	3	N		-	M	G							

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH MALL ENT** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1490** *Collision Date* **20190322** *Time* **1936** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190506**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	26	F	H	HNBD		LFT TURN	E	A	0700	CHEVR	2017	-	3	N		-	M	G	PASS		27	M	3	0	M	G
																				PASS		1	F	4	0	M	Q
																				PASS		4	M	6	0	M	Q
																				PASS		3	F	7	0	M	Q
																				PASS		8	F	7	0	M	G
2	DRVR	24	M	B	HNBD		PROC ST	W	A	0700	GMC	2004	-	3	N		-	M	G							

Primary Rd **BIRCH ST** *Distance (ft)* **150.** *Direction* **W** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20190526** *Time* **1141** *Day* **SUN**
Primary Collision Factor **IMPROP TURN** *Violation* **22102** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190606**
Weather1 **CLOUDY** *Weather2* **RAINING** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	71	M	W	HNBD		U-TURN	W	A	0100	TOYOT	2009	-	3	N		-	M	G	PASS		64	F	3	0	M	G
2	DRVR	45	F	W	HNBD		PROC ST	W	A	0700	MAZDA	2015	-	3	N		-	M	G							

Primary Rd **BIRCH ST** *Distance (ft)* **50.0** *Direction* **E** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20190907** *Time* **2013** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* *Process Date* **20191017**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **FELONY** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	A	0100	BMW	2006	-	3	N		-	-	-							
2	DRVR	32	M	H	HNBD		STOPPED	W	A	0100	HONDA	2015	-	-	N		-	M	G	PASS	COMP PN	31	F	3	0	M	G

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **FLOWER AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20190608** *Time* **2138** *Day* **SAT**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190710**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	22	M	A	HNBD		LFT TURN	W	A	0100	MAZDA	2016	-	3	N		-	M	G	PASS		19	F	3	0	M	G

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **125.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20191029** *Time* **1258** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20191205**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	A	0700	-		-	N		-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **1000** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1395** *Collision Date* **20190920** *Time* **1604** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	40	F	W	HNBD		STOPPED	N	A	0700	JEEP	2015	- 3	N		-	M G
2	DRVR	23	M	H	HNBD		STOPPED	N	A	0800	FORD	2017	- 3	N		-	M G
3	DRVR	50	M	W	HNBD		SLOWING	N	D	2200	FORD	1992	- 3	N		-	M G
4	DRVR	61	M		HNBD		SLOWING	N	H	1800	OTHER	2008	- 3	A	22400	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **322.** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20200122** *Time* **2002** *Day* **WED**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	M	A	HNBD		RAN OFF RD	S	A	0100	KIA	2020	- 1	F		-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **60.0** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1461** *Collision Date* **20200207** *Time* **1609** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200608**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	31	F	H	HNBD		PROC ST	S	A	0100	FORD	2014	- 3	E		-	M G
2	DRVR	64	M	W	HNBD		STOPPED	S	A	0100	VOLKS	2005	- 3	N		-	M G
3	DRVR	47	F	A	HNBD		STOPPED	S	A	0100	NISSA	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **420.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20190508** *Time* **0838** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190530**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	18	F	H	HNBD		LFT TURN	E	A	0100	FORD	2012	- 3	N		-	L G
2	DRVR	66	F	W	HNBD		PROC ST	S	A	0700	GMC	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		16	F	3	0	L	G
PASS		16	F	4	0	M	G
PASS		16	F	6	0	M	G

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **125.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20191029** *Time* **1258** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20191205**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	A	0700	-		-	N		-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **1000** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1395** *Collision Date* **20190920** *Time* **1604** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	40	F	W	HNBD		STOPPED	N	A	0700	JEEP	2015	- 3	N		-	M G
2	DRVR	23	M	H	HNBD		STOPPED	N	A	0800	FORD	2017	- 3	N		-	M G
3	DRVR	50	M	W	HNBD		SLOWING	N	D	2200	FORD	1992	- 3	N		-	M G
4	DRVR	61	M		HNBD		SLOWING	N	H	1800	OTHER	2008	- 3	A	22400	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **322.** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20200122** *Time* **2002** *Day* **WED**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	M	A	HNBD		RAN OFF RD	S	A	0100	KIA	2020	- 1	F		-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **60.0** *Direction* **N** *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1461** *Collision Date* **20200207** *Time* **1609** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200608**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	31	F	H	HNBD		PROC ST	S	A	0100	FORD	2014	- 3	E		-	M G
2	DRVR	64	M	W	HNBD		STOPPED	S	A	0100	VOLKS	2005	- 3	N		-	M G
3	DRVR	47	F	A	HNBD		STOPPED	S	A	0100	NISSA	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **420.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20190508** *Time* **0838** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190530**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	18	F	H	HNBD		LFT TURN	E	A	0100	FORD	2012	- 3	N		-	L G
2	DRVR	66	F	W	HNBD		PROC ST	S	A	0700	GMC	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		16	F	3	0	L	G
PASS		16	F	4	0	M	G
PASS		16	F	6	0	M	G

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **507.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1461** *Collision Date* **20191009** *Time* **0748** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804B** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200124**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	16	F	A	HNBD		ENT TRAF	E	A	0100	TOYOT	2015	- 3	N		-	M G								
2	DRVR	47	F	W	HNBD		PROC ST	S	A	0700	BMW	2018	- 3	N		-	M G	PASS		14	F	3	0	M	G
																		PASS		16	M	4	3	M	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **435.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20191105** *Time* **2500** *Day* **TUE**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191126**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		- -	N		-	- -								

Primary Rd **ASSOCIATED RD** *Distance (ft)* **899.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1463** *Collision Date* **20191130** *Time* **0243** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200107**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	22	M	W	HBD-UI		PROC ST	S	D	2200	TOYOT	2004	- 3	A	22350	N	M G								
2	DRVR	34	M	W	HNBD		PROC ST	N	A	0100	TOYOT	2018	- 3	N		-	M G								

Primary Rd **ASSOCIATED RD** *Distance (ft)* **35.0** *Direction* **S** *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200314** *Time* **1635** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* *Process Date* **20200720**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	19	M		IMP UNK	IMP UNK	OTHER	N	A	0100	-	2013	- -	M		-	L B	PASS		17	F	3	0	L	B
2	DRVR	51	M	A	HNBD		STOPPED	N	A	0800	CHEVR	2016	- 3	N		-	M G	DRVR	COMP PN	51	M	1	0	M	G
																		PASS		16	F	3	0	M	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **11.0** *Direction* **N** *Secondary Rd* **SLEEPY HOLLOW** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20200210** *Time* **0858** *Day* **MON**
Primary Collision Factor **R-O-W PED** *Violation* **21950A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* *Process Date* **20200528**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DAYLIGHT** *Ped Action* **X-WLK AT** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	37	F	A	HNBD		LFT TURN	E	A	0100	CHEVR	2019	- 3	N		-	M G	PASS		6	M	6	0	M	S
																		PASS		75	F	5	0	M	G
																		PASS		77	M	3	0	M	G
																		PASS		8	F	4	0	M	S

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **75.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.620** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1382** *Collision Date* **20190717** *Time* **1220** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191211**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	H	HNBD		CHANG LN	E	A	0100	TOYOT	2009	-	3	N	-	M	G
2	DRVR	57	F	A	HNBD		PROC ST	E	A	0100	LEXUS	2009	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		24	F	3	0	M	G
PASS		61	M	3	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **435.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.730** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1461** *Collision Date* **20190806** *Time* **1245** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200918**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	70	F	W	HNBD		PROC ST	E	A	0100	NISSA	2011	-	3	N	-	M	G
2	DRVR	28	F	W	HNBD		STOPPED	E	A	0700	TOYOT	2013	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **160.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.620** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1562** *Collision Date* **20190924** *Time* **1510** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20200207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **HOLES** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	57	M	H	HNBD		PROC ST	W	F	7600	HINO	2013	-	3	N	-	M	G
2	DRVR	25	F	W	HNBD		STOPPED	W	A	0100	FORD	2002	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		45	F	2	0	M	G
PASS		60	M	3	0	M	G
DRVR	COMP PN	25	F	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **393.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.720** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1646** *Collision Date* **20191008** *Time* **1655** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200918**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	54	F	A	HNBD		SLOWING	E	A	0700	HONDA	2017	-	3	N	-	M	G
2	DRVR	44	M	W	HNBD		STOPPED	E	A	0800	TOYOT	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1650** *Collision Date* **20191117** *Time* **2206** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200609**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	33	M	A	HNBD		PROC ST	E	A	0100	HONDA	2011	-	3	N	-	L	G
2	DRVR	35	F	W	HNBD		PROC ST	E	A	0700	GMC	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		20	M	3	0	L	G

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **211.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.690** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20191206** *Time* **1749** *Day* **FRI**
Primary Collision Factor **NOT DRIVER** *Violation* *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20200609**
Weather1 **CLOUDY** *Weather2* **RAINING** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	56	M		HNBD		SLOWING	W	A	0100	MITSU	2004	A	-	N	-	M	G
2	DRVR	36	M	W	HNBD		STOPPED	W	A	0700	CHEVR	2017	A	-	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	56	M	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1678** *Collision Date* **20191207** *Time* **1544** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22100B** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200914**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	H			LFT TURN	E	D	2200	FORD	2015	-	3	N	-	M	G
2	DRVR	33	M	W			LFT TURN	E	A	0100	TOYOT	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		4	M	5	0	M	Q

Primary Rd **IMPERIAL HWY** *Distance (ft)* **75.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.660** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1395** *Collision Date* **20191220** *Time* **1703** *Day* **FRI**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200609**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	55	F	W	HNBD		CHANG LN	W	A	0700	FORD	2018	-	3	N	-	L	G
2	DRVR	30	M	H	HNBD		PROC ST	W	A	0100	CHEVR	2016	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **100.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.680** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1395** *Collision Date* **20200306** *Time* **1730** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200925**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M	B	IMP UNK	IMP UNK	SLOWING	W	D	2200	-	2006	-	1	A	23123	-	-
2	DRVR	48	M	W	HNBD		STOPPED	W	A	0100	-	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.001** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1490** *Collision Date* **20190412** *Time* **2031** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22100A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20191211**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	29	F	W	HNBD		RGT TURN	W	I	1100	FORD	2016	-	3	N	-	M	G
2	DRVR	19	M	O	HNBD		PROC ST	W	A	0100	HONDA	1993	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		55	M	3	0	M	G

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **400.** *Direction* **W** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **R** *Postmile* **5.520** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1653** *Collision Date* **20190629** *Time* **1645** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20191122**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	37	M	A	HBD-UI		PROC ST	E	A	0100	KIA	2013	-	3	A	22350	-	M	G
2	DRVR	38	M	W	HNBD		STOPPED	E	A	0100	SCION	2009	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **140.** *Direction* **E** *Secondary Rd* **BREA PLZ** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20190927** *Time* **1730** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20191017**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M		IMP UNK	IMP UNK	PROC ST	W	A	0100	NISSA	2014	-	3	N		-	-	-
2	DRVR	25	F	W	HNBD		STOPPED	W	A	0100	MERCE	2014	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **146.** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.900** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1665** *Collision Date* **20190402** *Time* **1308** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* *Process Date* **20190827**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	29	M	H	HNBD		PROC ST	W	A	0700	ACURA	2010	-	3	G		-	M	G
2	DRVR	30	M	A	HNBD		STOPPED	W	A	0100	TOYOT	2017	-	3	G		-	M	G
3	DRVR	30	M	A	HNBD		STOPPED	W	A	0100	HONDA	2018	-	3	G		-	M	G
4	DRVR	45	M	O	HNBD		STOPPED	W	A	0100	TOYOT	2007	-	3	G		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN 30		M	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **152.** *Direction* **E** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.960** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20191012** *Time* **1428** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200918**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	22	M	B	HNBD		SLOWING	W	A	0100	TOYOT	2001	-	3	N		-	L	G
2	DRVR	68	M	W	HNBD		STOPPED	W	A	0700	BMW	2006	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **250.** *Direction* **E** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.980** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20191119** *Time* **1840** *Day* **TUE**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20200609**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	41	M	H	HNBD		CHANG LN	W	A	0100	HONDA	2011	-	3	N		-	M	G
2	DRVR	20	F	B	HNBD		SLOWING	W	A	0100	HONDA	2018	-	3	N		-	L	G
3	DRVR	50	F		HNBD		SLOWING	W	A	0100	TESLA	2018	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		72	F	3	0	M	G
DRVR	COMP PN 50		F	1	0	M	G

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.941** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1665** *Collision Date* **20190831** *Time* **1100** *Day* **SAT**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200918**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	24	F	A	HNBD		PROC ST	N	A	0100	TOYOT	2008	-	3	A	22100	E	M	G
2	DRVR	22	F	W	HNBD		SLOWING	E	A	0100	TOYOT	1994	-	2	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **110.** *Direction* **W** *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.920** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20191230** *Time* **1149** *Day* **MON**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20200609**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **FELONY** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	998	M	H	IMP UNK	IMP UNK	SLOWING	E	-	9900	ACURA		-	-	N		-	-	-
2	DRVR	40	F	W	HNBD		STOPPED	E	A	0700	HONDA	2004	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN 40		F	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **262.** *Direction* **W** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.880** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20190715** *Time* **1157** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20191211**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	36	M		HNBD		PROC ST	E	D	2200	CHEVR	2013	-	3	N		-	M	G
2	DRVR	50	M	B	HNBD		PROC ST	E	A	0100	NISSA	2011	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN 50		M	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **297.** *Direction* **W** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1683** *Collision Date* **20190731** *Time* **1740** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20190829**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	27	F	H	HNBD		CHANG LN	E	A	0100	TOYOT	2003	-	3	N		-	M	C
2	DRVR	54	M	W	HNBD		CHANG LN	E	A	0100	JEEP	2016	-	3	-		-	M	C
3	DRVR	43	M	H	HNBD		PROC ST	E	A	0800	CHEVR	2000	-	3	N		-	M	C

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.910** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1684** *Collision Date* **20191003** *Time* **1227** *Day* **THU**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200204**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	83	F	A	HNBD		STOPPED	E	A	0100	TESLA	2015	-	3	N		-	M	G
2	DRVR	34	F	W	HNBD		STOPPED	E	A	0100	CADIL	2019	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **PALM ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BONITA PL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20191004** *Time* **1350** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20191104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	20	M	H	HNBD		LFT TURN	E	A	0100	TOYOT	1997	-	3	N	-	M G
2	DRVR	67	M	W	HNBD		PROC ST	N	D	2200	CHEVR	2017	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **PALM ST** *Distance (ft)* **475.** *Direction* **S** *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1653** *Collision Date* **20191113** *Time* **2500** *Day* **WED**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200208**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	N	-	9932	ACADI		-	-	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **PEPPER TREE DR** *Distance (ft)* **40.0** *Direction* **S** *Secondary Rd* **FOREST PL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1632** *Collision Date* **20200217** *Time* **0037** *Day* **MON**
Primary Collision Factor **NOT STATED** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200327**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	S	A	0100	HONDA		-	-	N	-	- -
2	PRKD	998	-				PARKED	N	A	0100	HONDA	2018	-	-	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **PINERIDGE ST** *Distance (ft)* **290.** *Direction* **W** *Secondary Rd* **TAMARACK AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1576** *Collision Date* **20191219** *Time* **2030** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200118**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	-		-	-	N	-	- -
2	PRKD	998	-				PARKED	W	A	0100	MAZDA	2012	-	3	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **PLACENTIA AV** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.931** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1653** *Collision Date* **20190828** *Time* **1920** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200918**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	80	F	W	HNBD		PROC ST	N	A	0700	CHEVR	2003	-	3	N	-	M G
2	DRVR	31	F	H	HNBD		STOPPED	N	A	0100	TOYOT	2011	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **STATE ROUTE 57** *Distance (ft)* **890.** *Direction* **N** *Secondary Rd* **TONNER CYN RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *S/B* *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20201025** *Time* **1951** *Day* **SUN**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20201103**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	26	M	B	HBD-UI		PROC ST	S	A	0100	NISS	2009	-	3	A	22350	-	L	G
2	DRVR	60	M	A	HNBD		PROC ST	S	A	0100	HONDA	2018	-	3	N		-	M	G
3	DRVR	42	M	W	HNBD		PROC ST	S	M	4700	THOR	2016	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	26	M	1	0	L	G

Primary Rd **STATE ROUTE 57** *Distance (ft)* **90.0** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *S/B TO IMPERIAL HWY* *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20200626** *Time* **1522** *Day* **FRI**
Primary Collision Factor **IMPROP PASS** *Violation* **21750A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20200702**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	S	-	9900	-		-	3	H		-	B	B
2	DRVR	71	M	W	HNBD		STOPPED	S	A	0700	SUBA	2019	-	3	H		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ACACIA ST** *Distance (ft)* **700.** *Direction* **E** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20201202** *Time* **2500** *Day* **WED**
Primary Collision Factor **NOT STATED** *Violation* *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210302**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	A	0100	-	2013	-	-	M		-	-	-
2	PRKD	998	-				PARKED	E	D	2200	-	2002	-	3	N		-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASH ST** *Distance (ft)* **11.0** *Direction* **W** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20201118** *Time* **0727** *Day* **WED**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20210218**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	50	M	W	HNBD		RGT TURN	S	A	0100	-	2005	-	3	N		-	M	G
2	DRVR	35	M	W	HNBD		LFT TURN	N	A	0100	-	2013	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **40.0** *Direction* **S** *Secondary Rd* **BIRCH ST E** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20210123** *Time* **0949** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210319**
Weather1 **CLOUDY** *Weather2* **RAINING** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	26	M	H	HNBD		PROC ST	N	A	0100	-	1997	-	3	E		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **28.0** *Direction* **N** *Secondary Rd* **CHEVY CHASE DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20200916** *Time* **1151** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20201120**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	40	F	A	HNBD		LFT TURN	W	A	0700	-	2016	-	3	N	-	M	G
2	DRVR	42	F	H	HNBD		PROC ST	N	A	0100	-	2008	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	42	F	1	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1645** *Collision Date* **20210215** *Time* **2259** *Day* **MON**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20210304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	32	M	H	HBD-UI		PROC ST	N	A	0100	MERCE	2018	-	3	A	-	L	-
2	DRVR	51	M	W	HNBD		LFT TURN	W	A	0700	NISSA	2019	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	POSSIBL	35	M	3	0	L	G
DRVR	POSSIBL	51	M	1	0	L	G
PASS	POSSIBL	41	F	3	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **40.0** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1382** *Collision Date* **20200501** *Time* **1305** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201001**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	S	A	0100	TOYOT		-	-	N	-	-	-
2	DRVR	25	M	H	HNBD		STOPPED	S	A	0100	TOYOT	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **100.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20200707** *Time* **1440** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	19	M	H	HNBD		PROC ST	S	A	0100	-	2004	-	3	N	-	L	G
2	DRVR	34	M	H	HNBD		STOPPED	S	A	0700	FORD	2015	-	3	N	-	M	H

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	34	M	1	0	M	H

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20200802** *Time* **1525** *Day* **SUN**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	38	M		HNBD		RGT TURN	S	A	0100	-	2012	-	3	N	-	M	G
2	DRVR	34	M	W	HNBD		LFT TURN	N	D	2200	-	2001	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		35	F	3	0	M	G

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **491.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1490** *Collision Date* **20200909** *Time* **1221** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20210120**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	64	F	B	HNBD		LFT TURN	E	A	0100	-	2020	-	3	N	-	M	G
2	DRVR	27	F	H	HNBD		PROC ST	S	A	0100	-	1998	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	OTH VIS	19	F	3	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **528.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20201013** *Time* **1436** *Day* **TUE**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* *Process Date* **20201102**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	42	F	W	HNBD		LFT TURN	E	A	0100	-	2015	-	3	N	-	M	G
2	DRVR	40	F	H	HNBD		PROC ST	S	A	0700	-	2003	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		37	M	3	0	M	G
DRVR	COMP PN	40	F	1	0	M	G
PASS	COMP PN	41	M	3	0	M	G
PASS		5	M	4	0	M	G
PASS		8	F	5	0	M	G
PASS		10	F	6	0	M	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **30.0** *Direction* **N** *Secondary Rd* **RT 90** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1632** *Collision Date* **20200425** *Time* **0237** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152F** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200825**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	34	M	W		DRUG	LFT TURN	N	A	0100	FORD	2002	-	3	A	22107	N	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BERRY ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200704** *Time* **1125** *Day* **SAT**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20200921**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	H	HNBD		PROC ST	E	A	0100	-	2015	-	3	F	-	M	G
2	DRVR	26	F	A	HNBD		PROC ST	N	A	0100	-	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	25	M	1	0	M	G
DRVR	COMP PN	26	F	1	0	M	G

Primary Rd **BERRY ST** *Distance (ft)* **60.0** *Direction* **N** *Secondary Rd* **MERCURY LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20200908** *Time* **1716** *Day* **TUE**
Primary Collision Factor **STRTNG|BCKNG** *Violation* **22106** *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201125**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	47	F	W	HNBD		BACKING	N	G	2731	-	2004	-	3	N	-	M	G
2	DRVR	34	F	A	HNBD		STOPPED	S	A	0100	-	2012	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **28.0** *Direction* **N** *Secondary Rd* **CHEVY CHASE DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20200916** *Time* **1151** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20201120**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	40	F	A	HNBD		LFT TURN	W	A	0700	-	2016	-	3	N	-	M	G
2	DRVR	42	F	H	HNBD		PROC ST	N	A	0100	-	2008	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	42	F	1	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **GREENBRIAR LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1645** *Collision Date* **20210215** *Time* **2259** *Day* **MON**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20210304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	32	M	H	HBD-UI		PROC ST	N	A	0100	MERCE	2018	-	3	A	-	L	-
2	DRVR	51	M	W	HNBD		LFT TURN	W	A	0700	NISSA	2019	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	POSSIBL	35	M	3	0	L	G
DRVR	POSSIBL	51	M	1	0	L	G
PASS	POSSIBL	41	F	3	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **40.0** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1382** *Collision Date* **20200501** *Time* **1305** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201001**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	S	A	0100	TOYOT		-	-	N	-	-	-
2	DRVR	25	M	H	HNBD		STOPPED	S	A	0100	TOYOT	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **100.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20200707** *Time* **1440** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	19	M	H	HNBD		PROC ST	S	A	0100	-	2004	-	3	N	-	L	G
2	DRVR	34	M	H	HNBD		STOPPED	S	A	0700	FORD	2015	-	3	N	-	M	H

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	34	M	1	0	M	H

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20200802** *Time* **1525** *Day* **SUN**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	38	M		HNBD		RGT TURN	S	A	0100	-	2012	-	3	N	-	M	G
2	DRVR	34	M	W	HNBD		LFT TURN	N	D	2200	-	2001	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		35	F	3	0	M	G

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Primary Rd **ASSOCIATED RD** *Distance (ft)* **491.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1490** *Collision Date* **20200909** *Time* **1221** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20210120**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	64	F	B	HNBD		LFT TURN	E	A	0100	-	2020	-	3	N	-	M	G
2	DRVR	27	F	H	HNBD		PROC ST	S	A	0100	-	1998	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	OTH VIS	19	F	3	0	L	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **528.** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20201013** *Time* **1436** *Day* **TUE**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* *Process Date* **20201102**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	42	F	W	HNBD		LFT TURN	E	A	0100	-	2015	-	3	N	-	M	G
2	DRVR	40	F	H	HNBD		PROC ST	S	A	0700	-	2003	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		37	M	3	0	M	G
DRVR	COMP PN	40	F	1	0	M	G
PASS	COMP PN	41	M	3	0	M	G
PASS		5	M	4	0	M	G
PASS		8	F	5	0	M	G
PASS		10	F	6	0	M	G

Primary Rd **ASSOCIATED RD** *Distance (ft)* **30.0** *Direction* **N** *Secondary Rd* **RT 90** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1632** *Collision Date* **20200425** *Time* **0237** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152F** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200825**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **6**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	34	M	W		DRUG	LFT TURN	N	A	0100	FORD	2002	-	3	A	22107	N	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BERRY ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200704** *Time* **1125** *Day* **SAT**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20200921**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	H	HNBD		PROC ST	E	A	0100	-	2015	-	3	F	-	M	G
2	DRVR	26	F	A	HNBD		PROC ST	N	A	0100	-	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	25	M	1	0	M	G
DRVR	COMP PN	26	F	1	0	M	G

Primary Rd **BERRY ST** *Distance (ft)* **60.0** *Direction* **N** *Secondary Rd* **MERCURY LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1562** *Collision Date* **20200908** *Time* **1716** *Day* **TUE**
Primary Collision Factor **STRTNG|BCKNG** *Violation* **22106** *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201125**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	47	F	W	HNBD		BACKING	N	G	2731	-	2004	-	3	N	-	M	G
2	DRVR	34	F	A	HNBD		STOPPED	S	A	0100	-	2012	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **175.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.620** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20200526** *Time* **1442** *Day* **TUE**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201114**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	61	M	W	HNBD		CHANG LN	E	A	0700	FORD	2001	-	3	N	-	M	G
2	DRVR	24	F	H	HNBD		STOPPED	E	A	0700	-	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		60	F	3	0	M	G
PASS		9	M	6	0	P	G
PASS		23	M	3	0	M	G
PASS		14	M	4	0	M	G
PASS		24	F	6	0	M	G
PASS		24	M	6	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **100.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **R** *Postmile* **5.580** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1695** *Collision Date* **20200726** *Time* **1240** *Day* **SUN**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201125**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	CHANG LN	W	-	9900	-		-	-	N	-	-	-
2	DRVR	23	M	H	HNBD		PROC ST	W	A	0100	-	2012	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **33.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.630** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1697** *Collision Date* **20200820** *Time* **1142** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201203**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	37	M	W	HNBD		PROC ST	E	D	2200	-	1996	-	3	N	-	M	G
2	DRVR	53	M	H	HNBD		STOPPED	E	D	2200	-	2006	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS		50	F	2	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **10.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.630** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1671** *Collision Date* **20200910** *Time* **1947** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201203**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **MV ON OTHER RD** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	29	M		HNBD		CHANG LN	E	A	0100	-	2018	-	3	N	-	M	G
2	DRVR	27	M	A	HNBD		PROC ST	E	A	0100	-	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **172.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.620** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1646** *Collision Date* **20201112** *Time* **1141** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201215**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	23	M	B	HNBD		CHANG LN	W	A	0100	-	2013	-	3	A	22350	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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2	DRVR	67	F	H	HNBD	PROC ST	W	A	0100	-	2013	-	3	N	-	M	G										
3	DRVR	51	F	H	HNBD	STOPPED	W	A	0100	-	2015	-	3	N	-	M	G	PASS	20	F	3	0	M	G			
																		PASS	2	F	6	0	M	G			

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20201214** *Time* **2059** *Day* **MON**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20210201**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	50	M	H	HNBD		PROC ST	E	G	2731	-	2011	-	3	N	-	M G								
2	DRVR	23	M	H	HNBD		PROC ST	N	A	0100	-	2016	-	3	N	-	L G	DRVR	OTH VIS	23	M	1	0	L	G
																		PASS	OTH VIS	22	F	3	0	L	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.651** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20210103** *Time* **1024** *Day* **SUN**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20210201**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	34	M	H	HNBD		PROC ST	E	A	0100	-	2018	-	3	N	-	L G								
2	DRVR	28	M	H	HNBD		LFT TURN	N	A	0100	-	2016	-	3	N	-	L G	DRVR	COMP PN	28	M	1	0	L	G
																		PASS	OTH VIS	39	M	3	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **60.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.660** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20210125** *Time* **0936** *Day* **MON**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20210219**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1	DRVR	22	M	H	HNBD		PROC ST	W	A	0100	FORD	2004	-	3	N	-	M G								
2	DRVR	65	M	W	HNBD		PROC ST	W	A	0700	JEEP	2014	-	3	N	-	M G								

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.000** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20200505** *Time* **1054** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200930**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	72	F	A	HNBD		CHANG LN	E	A	0100	TOYOT	2012	-	3	N	-	M G								
2	DRVR	36	M	B	HNBD		STOPPED	E	D	2200	KENW	2020	-	3	N	-	M G								

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **200.** *Direction* **W** *Secondary Rd* **VALENCIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **7.210** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20200902** *Time* **1453** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201203**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	64	F	H	HNBD		CHANG LN	E	A	0100	-	2000	- 3	N		-	M G
2	DRVR	57	F	A	HNBD		PROC ST	E	A	0100	-	2015	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **313.** *Direction* **W** *Secondary Rd* **VALENCIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **7.200** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1672** *Collision Date* **20201204** *Time* **0709** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20210114**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	M	A	HNBD		PROC ST	E	A	0700	-	2017	- 3	E		-	L G
2	DRVR	43	M	H	HNBD		STOPPED	E	E	2235	-	2015	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	OTH VIS	26	M	1	0	L	G
PASS		31	M	6	0	M	G
PASS		49	M	3	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **100.** *Direction* **E** *Secondary Rd* **VIKING AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **3.870** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1382** *Collision Date* **20200710** *Time* **0730** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	19	M	B	HNBD		PROC ST	E	A	0700	JEEP	2001	- 3	N		-	M G
2	DRVR	56	M	B	HNBD		PROC ST	E	A	0700	-	2005	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	56	M	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **138.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210202** *Time* **1645** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22100A** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20210304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	54	M	W	HNBD		RGT TURN	N	A	0100	TOYOT	2012	- 3	N		-	M G
2	DRVR	38	M	H	HNBD		PROC ST	E	C	0200	YAMAH	2017	- 3	N		-	- W

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	38	M	1	1	P	W

Primary Rd **IMPERIAL HY** *Distance (ft)* **15.0** *Direction* **W** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1695** *Collision Date* **20210220** *Time* **1351** *Day* **SAT**
Primary Collision Factor **R-O-W PED** *Violation* **21950A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20210309**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DAYLIGHT** *Ped Action* **X-WLK AT** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	M	H	HNBD		RGT TURN	E	A	0100	KIA	2012	- 3	N		-	M G
2	PED	64	M	W	HNBD			N	N	6000	-		- -	N		-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PED	MINOR	64	M	9	-	-	-

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Primary Rd **RT 90** *Distance (ft)* **44.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.670** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1697** *Collision Date* **20200420** *Time* **0909** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20200825**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	-	1994	-	-	N	-	- -
2	DRVR	43	M	A	HNBD		STOPPED	W	D	2200	FORD	2014	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **RT 90** *Distance (ft)* **3.00** *Direction* **W** *Secondary Rd* **LA CRESCENTA** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **7.370** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1693** *Collision Date* **20200420** *Time* **2300** *Day* **MON**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201105**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	N		-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **S BREA BL** *Distance (ft)* **0.00** *Direction* **W** *Secondary Rd* **ASH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20200912** *Time* **2027** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201202**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	21	M	A	HBD-UNK		UNS TURN	S	A	0100	-	2006	-	3	A	22350	- M B
2	PRKD	998	-				PARKED	N	A	0100	-	2017	-	-	N		- - -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SAINT CRISPEN AV** *Distance (ft)* **29.0** *Direction* **S** *Secondary Rd* **NAPOLI DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20200502** *Time* **1659** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20200908**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	M	A	IMP UNK	IMP UNK	LFT TURN	S	A	0100	-	2007	-	-	M	-	- -
2	PRKD	998	-				PARKED	S	D	2200	-	1988	-	3	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SAN JUAN DR** *Distance (ft)* **826.** *Direction* **N** *Secondary Rd* **NORTHWOOD AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1683** *Collision Date* **20200729** *Time* **2500** *Day* **WED**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20201120**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	N		-	- -
2	PRKD	998	-				PARKED	N	A	0100	-	2019	-	-	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **100.** *Direction* **W** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **3.990** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1650** *Collision Date* **20201006** *Time* **2038** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20201124**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	58	M		HNBD		PROC ST	E	A	0100	-	2018	-	3	N	-	M	G
2	DRVR	31	M	H	HNBD		STOPPED	E	A	0800	-	2011	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	31	M	1	0	M	G
PASS		8	F	3	0	M	G
PASS		11	F	6	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **39.0** *Direction* **E** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* **57** *Postmile Prefix* **-** *Postmile* **19.646** *Side of Hwy* **N**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1693** *Collision Date* **20200628** *Time* **1634** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20201125**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **FELONY** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **R** *Ramp/Int* **4**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	B	HNBD		PROC ST	W	A	0100	-	2012	-	3	N	-	M	G
2	DRVR	33	M	H	HNBD		STOPPED	W	A	0100	-	2019	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	COMP PN	33	M	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **55.0** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.920** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1628** *Collision Date* **20200708** *Time* **1000** *Day* **WED**
Primary Collision Factor **NOT DRIVER** *Violation* *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	29	M	H		PHYS	PROC ST	W	A	0700	JEEP	2012	-	3	N	-	M	G
2	DRVR	44	F	A	HNBD		PROC ST	W	A	0700	-	2018	-	2	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	OTH VIS	29	M	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **630.** *Direction* **E** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.990** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20200828** *Time* **1214** *Day* **FRI**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20201203**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **CONS ZONE** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	26	F	H	HNBD		CHANG LN	W	A	0700	-	2020	-	-	N	-	M	G
2	DRVR	57	M	H	HNBD		PROC ST	W	F	2700	-	2020	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HWY** *Distance (ft)* **35.0** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.920** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* **12** *Badge* **1696** *Collision Date* **20200903** *Time* **1515** *Day* **THU**
Primary Collision Factor **STRTNG|BCKNG** *Violation* **22106** *Collision Type* **OTHER** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* *Process Date* **20201201**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	36	F	W	IMP UNK	IMP UNK	BACKING	E	A	0100	-	2017	-	-	N	-	M	B
2	DRVR	32	M	H	HNBD		SLOWING	E	A	0100	-	2004	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	COMP PN	66	F	3	0	M	G

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Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **5.970** *Side of Hwy* **W**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* **12** *Badge* **1671** *Collision Date* **20201029** *Time* **1908** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20201221**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **H** *Ramp/Int* **-**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	24	M	W			PROC ST	W	A	0100	FORD	2018	-	3	N		-	M	G							
2	DRVR	40	M	W			STOPPED	-	A	0700	FORD	2019	-	3	N		-	M	G	PASS		2	M	4	0	M	G
3	DRVR	22	M	H			STOPPED	-	A	0100	-	2016	-	3	N		-	M	G	PASS		998	F	2	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CATALPA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **3.705** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1447** *Collision Date* **20200810** *Time* **1643** *Day* **MON**
Primary Collision Factor **R-O-W AUTO** *Violation* **21802A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20201130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	27	M	A	HNBD		LFT TURN	N	A	0100	-	2016	-	3	E		-	M	G	DRVR	COMP PN	27	M	1	0	M	G
2	DRVR	19	F	A	HNBD		PROC ST	E	A	0100	AUDI	2018	-	3	N		-	M	G	DRVR	COMP PN	19	F	1	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CATALPA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **3.705** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1698** *Collision Date* **20201211** *Time* **1237** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210119**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **I** *Ramp/Int* **5**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	42	M	W	HNBD		LFT TURN	W	A	0700	AUDI	2013	-	3	N		-	M	G							
2	DRVR	44	M		HNBD		PROC ST	E	A	0700	-	2019	-	3	N		-	M	-							

Primary Rd **IMPERIAL HWY** *Distance (ft)* **15.0** *Direction* **W** *Secondary Rd* **FLOWER AV** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.530** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* **12** *Badge* **1709** *Collision Date* **20201123** *Time* **1755** *Day* **MON**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20210119**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* **H** *Ramp/Int* **-**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	22	M	W	HNBD		CHANG LN	-	D	2200	-	2015	-	3	A	22350	-	M	H	DRVR	COMP PN	22	M	1	0	M	H
2	DRVR	37	F	H	HNBD		STOPPED	E	A	0100	-	2012	-	3	N		-	M	G	PASS	COMP PN	13	F	3	0	M	G

Primary Rd **IMPERIAL HWY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **GATEWAY** *NCIC* **3002** *State Hwy?* **Y** *Route* **90** *Postmile Prefix* **-** *Postmile* **4.260** *Side of Hwy* **E**
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* **12** *Badge* **1562** *Collision Date* **20200426** *Time* **1602** *Day* **SUN**
Primary Collision Factor **OTHER HAZ** *Violation* **21451A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* *Process Date* **20201112**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* **I** *Ramp/Int* **5**

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	46	M	W	HNBD		PROC ST	E	D	2200	TOYOT	2018	-	3	E		-	M	G	PASS		44	F	3	0	M	G
2	BICY	52	M	B	HNBD		PROC ST	S	L	0400	-		-	3	N		-	-	-							

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Primary Rd **RANDOLPH AV** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA MALL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20211108** *Time* **1531** *Day* **MON**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	67	F	A	HNBD		PROC ST	S	A	0100	HYUND	2013	-	3	N	-	L	G
2	DRVR	75	F	W	HNBD		LFT TURN	W	A	0700	TOYOT	2021	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **REDBAY AV** *Distance (ft)* **141.** *Direction* **S** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1508** *Collision Date* **20210507** *Time* **0250** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210527**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	32	F	W	HNBD	FATG	PROC ST	S	A	0100	HYUND	2013	-	3	N	-	M	G
2	PRKD	998	-				PARKED	S	A	0100	HONDA	2013	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **REDWOOD AV** *Distance (ft)* **67.0** *Direction* **N** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1516** *Collision Date* **20220109** *Time* **1533** *Day* **SUN**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152B** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220203**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	32	M	H	HBD-UI		RGT TURN	N	A	0100	CADIL	2007	-	3	A	-	M	C
2	PRKD	998	-				PARKED	N	A	0100	MERCE	1979	-	-	N	-	-	-
3	PRKD	998	-				PARKED	N	A	0700	GMC	2003	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ROSE DR** *Distance (ft)* **27.0** *Direction* **E** *Secondary Rd* **VALENCIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20220214** *Time* **1519** *Day* **MON**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220309**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	71	M	O	HNBD		LFT TURN	S	A	0100	TESLA	2020	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ROSE DR** *Distance (ft)* **15.0** *Direction* **S** *Secondary Rd* **VESUVIUS DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20211022** *Time* **1422** *Day* **FRI**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152F** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	46	M	H		DRUG	PROC ST	N	A	0100	NISSA	2005	-	3	A	N	L	G
2	DRVR	64	M	W	HNBD		STOPPED	N	A	0700	KIA	2021	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	64	M	1	0	M	G

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Primary Rd **834 E ALMOND DR** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **NOT STATED** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20220212** *Time* **2500** *Day* **SAT**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220311**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	-		-	-	-
2	PRKD	998	-				PARKED	E	A	0100	CHRYS	2015	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH ST (W)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210923** *Time* **0806** *Day* **THU**
Primary Collision Factor **PED VIOL** *Violation* **21950B** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20211015**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	BICY	10	M	O	HNBD		PROC ST	E	L	0400	MONG		- 3	N		-	-	W
2	DRVR	75	M	W	HNBD		RGT TURN	S	A	0100	HONDA	2017	- 3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	SERIOUS	10	M	1	2	-	W

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20211215** *Time* **1430** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	44	F	W	HNBD		LFT TURN	E	A	0100	HYUND	2013	- 3	N		-	L	G
2	DRVR	29	F	B	HNBD		PROC ST	S	A	0700	FORD	2012	- 3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CHEVY CHASE DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20211024** *Time* **1427** *Day* **SUN**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	36	M	W	HNBD		LFT TURN	W	A	0100	MERCE	2021	- 3	N		-	M	G
2	DRVR	32	F	H	HNBD		PROC ST	N	A	0700	HONDA	2011	- 3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CINNAMON RIDGE** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20220106** *Time* **1451** *Day* **THU**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20220128**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **OTHER** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	45	F	W	HNBD		LFT TURN	N	A	0100	TOYOT	2011	- 3	N		-	M	G
2	BICY	11	M	H	HNBD		PROC ST	S	L	0400	-		- 3	N		-	-	P

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	MINOR	11	M	1	2	-	P

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Primary Rd **BERRY ST** *Distance (ft)* **130.** *Direction* **N** *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20220303** *Time* **1447** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220407**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	54	F	H	HNBD		CHANG LN	S	A	0100	CHEVR	2016	-	3	N	-	M G
2	DRVR	28	F	H	HNBD		PROC ST	S	A	0700	DODGE	2019	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BERRY ST** *Distance (ft)* **30.0** *Direction* **W** *Secondary Rd* **STONEBRIDGE DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20210602** *Time* **1741** *Day* **WED**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20210629**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	78	M	W	HNBD		LFT TURN	N	A	0100	MERCE	2004	-	3	N	-	L H

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	78	M	1	0	L	H

Primary Rd **BERRY ST** *Distance (ft)* **127.** *Direction* **S** *Secondary Rd* **VANGUARD WY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1698** *Collision Date* **20210322** *Time* **1737** *Day* **MON**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20210413**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	20	M	H	IMP UNK	IMP UNK	RAN OFF RD	S	A	0100	HONDA	2015	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	20	M	1	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **17.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20210816** *Time* **0742** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210903**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	29	M	O	HNBD		PROC ST	E	A	0100	CHEVR	2017	-	-	N	-	M G
2	DRVR	998	-		IMP UNK	IMP UNK	STOPPED	E	-	9900	-		-	3	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **252.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20211206** *Time* **1545** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	16	M	O	HNBD		PROC ST	W	A	0700	FORD	2001	-	3	N	-	M G
2	DRVR	49	F	H	HNBD		STOPPED	W	A	0700	NISSA	2011	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	49	F	1	0	M	G

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Primary Rd **BIRCH ST** *Distance (ft)* **40.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20211028** *Time* **1219** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	21	F	H	HNBD		PROC ST	W	A	0100	HONDA	2005	-	3	N	-	M	G
2	DRVR	81	F	W	HNBD		STOPPED	W	A	0700	MAZDA	2011	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **115.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20211210** *Time* **1129** *Day* **FRI**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	60	F	W	HBD-UI		PROC ST	E	A	0100	NISSA	2009	-	3	A	-	M	G
2	DRVR	73	F	W	HNBD		STOPPED	E	A	0700	JEEP	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA MALL RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20220301** *Time* **1635** *Day* **TUE**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220329**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	LFT TURN	W	-	9900	-		-	-	N	-	-	-
2	DRVR	39	F	H	HNBD		PROC ST	E	A	0100	MAZDA	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **KRAEMER BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1710** *Collision Date* **20210801** *Time* **2303** *Day* **SUN**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20210902**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	42	F	H	HNBD		PROC ST	S	A	0700	CADIL	2014	-	3	N	-	L	G
2	DRVR	26	M	A	HNBD		PROC ST	E	A	0100	HONDA	2001	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	42	F	1	0	L	G
DRVR	POSSIBL	26	M	1	0	L	G
PASS	POSSIBL	30	F	3	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **KRAEMER BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1675** *Collision Date* **20211201** *Time* **2118** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	37	M	W	HNBD		PROC ST	N	A	0100	ACURA	2008	-	3	N	-	L	G
2	DRVR	63	F	A	HNBD		PROC ST	E	A	0700	HYUND	2019	-	3	N	-	L	G
3	DRVR	37	F	W	HNBD		STOPPED	W	A	0100	FORD	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **FLOWER AV** *Distance (ft)* **350.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210528** *Time* **1533** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210621**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	37	F	H	HNBD		PROC ST	N	A	0700	NISSA	2021	-	3	N	-	L	G
2	PRKD	998	-				PARKED	N	A	0700	LEXUS	2019	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **FLOWER AV** *Distance (ft)* **195.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1516** *Collision Date* **20211214** *Time* **1731** *Day* **TUE**
Primary Collision Factor **WRONG SIDE** *Violation* **21650** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	85	F	W	HNBD		PROC ST	S	A	0100	TOYOT	1983	-	3	N	-	M	G
2	DRVR	37	F	W	HNBD		BACKING	W	A	0100	MERCE	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **FLOWER AV** *Distance (ft)* **221.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1516** *Collision Date* **20211214** *Time* **1817** *Day* **TUE**
Primary Collision Factor **STRTNG|BCKNG** *Violation* **22106** *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	85	F	W	HNBD		BACKING	N	A	0100	TOYOT	1983	-	3	N	-	M	G
2	PRKD	998	-				PARKED	N	A	0100	INFIN	1992	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **GREENBRIAR LN** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20210904** *Time* **1421** *Day* **SAT**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20211007**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	F	W	HNBD		PROC ST	N	D	2200	TOYOT	2001	-	3	N	-	L	G
2	DRVR	50	M	W	HNBD		LFT TURN	W	D	2200	GMC	2004	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	20	F	1	0	L	G
PASS	POSSIBL	15	F	3	0	L	G
DRVR	MINOR	50	M	1	0	L	G

Primary Rd **HUMMINGBIRD DR** *Distance (ft)* **130.** *Direction* **S** *Secondary Rd* **WOODPECKER ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1706** *Collision Date* **20220312** *Time* **2148** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20220405**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DARK - ST** *Ped Action* **NOT IN RD** *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	52	M	H	HBD-UI		UNS TURN	S	A	0100	TOYOT	2013	-	3	A	N	L	G
2	PED	36	M	W	HNBD			N	N	6000	-		-	3	N	-	-	-
3	PED	35	F	A	HNBD			N	N	6000	-		-	3	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	52	M	1	0	L	G
PED	MINOR	36	M	9	-	-	P
PED	MINOR	35	F	9	-	-	P

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Primary Rd **834 E ALMOND DR** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **NOT STATED** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1650** *Collision Date* **20220212** *Time* **2500** *Day* **SAT**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220311**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	-	-	-	-
2	PRKD	998	-				PARKED	E	A	0100	CHRYS	2015	-	-	N	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH ST (W)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210923** *Time* **0806** *Day* **THU**
Primary Collision Factor **PED VIOL** *Violation* **21950B** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20211015**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	BICY	10	M	O	HNBD		PROC ST	E	L	0400	MONG		- 3	N		-	- W
2	DRVR	75	M	W	HNBD		RGT TURN	S	A	0100	HONDA	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	SERIOUS	10	M	1	2	-	W

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20211215** *Time* **1430** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	44	F	W	HNBD		LFT TURN	E	A	0100	HYUND	2013	- 3	N		-	L G
2	DRVR	29	F	B	HNBD		PROC ST	S	A	0700	FORD	2012	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CHEVY CHASE DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20211024** *Time* **1427** *Day* **SUN**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	36	M	W	HNBD		LFT TURN	W	A	0100	MERCE	2021	- 3	N		-	M G
2	DRVR	32	F	H	HNBD		PROC ST	N	A	0700	HONDA	2011	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **CINNAMON RIDGE** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20220106** *Time* **1451** *Day* **THU**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20220128**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **OTHER** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	45	F	W	HNBD		LFT TURN	N	A	0100	TOYOT	2011	- 3	N		-	M G
2	BICY	11	M	H	HNBD		PROC ST	S	L	0400	-		- 3	N		-	- P

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	MINOR	11	M	1	2	-	P

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Primary Rd **IMPERIAL HY** *Distance (ft)* **55.0** *Direction* **W** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1447** *Collision Date* **20210425** *Time* **1808** *Day* **SUN**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210511**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	28	F	W	HNBD		CHANG LN	W	A	0100	FORD	2015	-	3	N	-	M	G
2	DRVR	33	M	W	HNBD		PROC ST	W	A	0700	TOYOT	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20210805** *Time* **0616** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210826**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	38	M	H	HNBD		RGT TURN	E	F	2600	FREIG	2020	-	3	N	-	M	G
2	DRVR	55	F	A	HNBD		RGT TURN	E	A	0100	HONDA	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **50.0** *Direction* **W** *Secondary Rd* **RT 57 NB ONRAMP** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1382** *Collision Date* **20210414** *Time* **1330** *Day* **WED**
Primary Collision Factor **NOT DRIVER** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210430**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	48	F	H		PHYS	PROC ST	W	A	0100	FORD	2015	-	-	N	-	M	-
2	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	F	2500	-		-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **8.00** *Direction* **W** *Secondary Rd* **RT 57 NB ONRAMP** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20211005** *Time* **1118** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **N** *Process Date* **20211028**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	30	M	W	HNBD		PROC ST	W	A	0100	CHEVR	2014	-	3	N	-	M	G
2	DRVR	39	F	W	HNBD		SLOWING	W	A	0100	VOLKS	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	39	F	1	0	M	G
PASS	POSSIBL	20	F	3	0	M	G
PASS	POSSIBL	17	F	6	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 SB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20210915** *Time* **0906** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20211004**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	59	M	O	HNBD		RGT TURN	S	-	3132	VOLVO	1999	-	3	N	-	M	G
2	DRVR	56	M	O	HNBD		RGT TURN	S	-	3132	VOLVO	2011	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **SR-57 N/B TO** *Distance (ft)* **250.** *Direction* **S** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HIGHWAY** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **016748** *Collision Date* **20211218** *Time* **1117** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20211228**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	51	M	W	HNBD		PROC ST	N	A	0700	LNDR	2015	-	3	H	-	L	G
2	DRVR	38	M	H	HNBD		STOPPED	N	A	0700	GMC	2001	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	51	M	1	0	L	G

Primary Rd **SR-57 NB (ORANGE** *Distance (ft)* **686.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **FREEWAY)** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **020033** *Collision Date* **20211011** *Time* **1705** *Day* **MON**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20211020**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	44	M	H	HNBD		CHANG LN	N	D	2200	TOYT	2007	-	4	G	-	M	G
2	DRVR	30	M	H	HNBD		PROC ST	N	F	2600	ISU	2017	-	3	G	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **500.** *Direction* **N** *Secondary Rd* **ASSOCIATED RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019135** *Collision Date* **20211005** *Time* **1835** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20211015**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	21	F	H	HNBD		PROC ST	N	A	0100	CHEV	2014	-	3	G	-	M	G
2	DRVR	53	M	H	HNBD		STOPPED	N	D	2200	FORD	2021	-	3	G	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **466.** *Direction* **N** *Secondary Rd* **BASTANCHURY** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019897** *Collision Date* **20211120** *Time* **0615** *Day* **SAT**
Primary Collision Factor **NOT DRIVER** *Violation* *Collision Type* **OTHER** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20211202**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	26	M	H	HNBD		PROC ST	N	D	2200	CHEV	2017	-	3	N	-	M	G
2	DRVR	36	M	B	HNBD		PROC ST	S	A	0100	NISS	2013	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	POSSIBL	41	F	3	0	L	G

Primary Rd **SR-57** *Distance (ft)* **300.** *Direction* **N** *Secondary Rd* **BIRCH ST** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019135** *Collision Date* **20210608** *Time* **1750** *Day* **TUE**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210617**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **1**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	19	M	A	HNBD		CHANG LN	N	A	0700	PORS	2018	-	3	G	-	M	G
2	DRVR	52	M	B	HNBD		PROC ST	N	H	1300	BLUE	2017	-	3	G	-	P	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **SR-57** *Distance (ft)* **1500** *Direction* **S** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019979** *Collision Date* **20210408** *Time* **0550** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210408**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	51	M	H	HNBD		CHANG LN	N	G	2731	INTL	2016	-	3	N	-	M G
2	DRVR	75	M	W	HNBD		PROC ST	N	A	0100	NISS	2013	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **1800** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **016748** *Collision Date* **20210423** *Time* **0830** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210429**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	21	M	H	HNBD		PROC ST	N	A	0800	FORD	2018	-	3	N	-	M G
2	DRVR	53	M	W	HNBD		STOPPED	N	A	0100	GENES	2019	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **1584** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021960** *Collision Date* **20210603** *Time* **1428** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20210614**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	37	M	H	HNBD		PROC ST	N	A	0100	TOYT	2006	-	3	N	-	L G
2	DRVR	26	F	A	HNBD		SLOWING	N	A	0100	TOYT	2013	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	37	M	1	0	L	G

Primary Rd **SR-57** *Distance (ft)* **200.** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **016748** *Collision Date* **20210608** *Time* **0920** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210616**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **CONS ZONE** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	20	M	W	HNBD		PROC ST	N	A	0100	VOLK	2014	-	3	N	-	M G
2	DRVR	35	M	A	HNBD		STOPPED	N	A	0100	MITS	2010	-	3	N	-	M G
3	DRVR	66	M	A	HNBD		PROC ST	N	A	0100	TOYT	2020	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **2112** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021960** *Collision Date* **20210623** *Time* **1645** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210723**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	M	B	HNBD		CHANG LN	N	A	0100	TOYT	2013	-	3	N	-	M G
2	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	-	9900	-		-	4	N	-	B B
3	DRVR	67	F	A	HNBD		PROC ST	N	A	0800	TOYT	2013	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd SR-57 | Distance (ft) 775. | Direction S | Secondary Rd TONNER CYN RD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021633 | Collision Date 20220319 | Time 1600 | Day SAT
Primary Collision Factor IMPROP TURN | Violation 22107 | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20220325
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	N	-	9900	-		-	4	N	-	B	B
2	DRVR	38	F	H	HNBD		PROC ST	N	A	0100	CHEV	2020	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 600. | Direction N | Secondary Rd NUTWOOD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND FROM NUTWOOD | County Orange | Population 4 | Rpt Dist | Beat 571 | Type 1 | CalTrans | Badge 019518 | Collision Date 20211207 | Time 0800 | Day TUE
Primary Collision Factor STRTNG|BCKNG | Violation 22106 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20211214
Weather1 CLOUDY | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	33	M	O	HNBD		PROC ST	N	A	0100	HOND	2014	-	3	N	-	M	G
2	DRVR	51	F	A	HNBD		PROC ST	N	A	0100	HOND	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 157. | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND TO IMPERIAL HIGHWAY | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021960 | Collision Date 20210521 | Time 1058 | Day FRI
Primary Collision Factor LANE CHANGE | Violation 21658A | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20210615
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	28	M	H	IMP UNK	IMP UNK	CHANG LN	N	A	0100	LEXS	2000	-	3	N	-	M	G
2	DRVR	19	M	A	HNBD		CHANG LN	N	A	0100	TOYT	2016	-	3	A	21658	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 30.0 | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND TO IMPERIAL HIGHWAY | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019518 | Collision Date 20211111 | Time 1045 | Day THU
Primary Collision Factor STRTNG|BCKNG | Violation 22106 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20211119
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	21	F	H	HNBD		PROC ST	N	A	0700	JEEP	2017	-	3	H	-	M	G
2	DRVR	22	M	A	HNBD		STOPPED	N	A	0100	HOND	1998	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 55.0 | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND TO IMPERIAL HWY | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019942 | Collision Date 20210517 | Time 1305 | Day MON
Primary Collision Factor STRTNG|BCKNG | Violation 22106 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20210525
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	29	M	W	HNBD		PROC ST	N	D	2200	CHEV	2006	-	3	H	-	M	G
2	DRVR	23	F	A	HNBD		STOPPED	N	A	0100	TOYT	2014	-	3	H	-	M	G
3	DRVR	43	M	A	HNBD		STOPPED	N	A	0100	MERZ	2013	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd SR-57 | Distance (ft) 30.0 | Direction S | Secondary Rd IMPERIAL HWY | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021691 | Collision Date 20220106 | Time 2033 | Day THU
Primary Collision Factor NORTHBOUND TO IMPERIAL HWY | Violation DRVR ALC|DRG | Collision Type 23152A | Severity SIDESWIPE | #Killed PDO | #Injured 0 | Tow Away? 0 | Process Date N | 20220125
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DARK - ST | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	27	F	W	HBD-UI		PROC ST	N	A	0100	LINCO	2004	-	4	A	21755	H	M	B
2	DRVR	28	M	H	HNBD		STOPPED	N	A	0100	BMW	2000	-	3	H		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 500. | Direction S | Secondary Rd IMPERIAL HWY | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019320 | Collision Date 20211116 | Time 0745 | Day TUE
Primary Collision Factor NORTHBOUND TO IMPERIAL HWY | Violation UNSAFE SPEED | Collision Type 22350 | Severity REAR END | #Killed INJURY | #Injured 0 | Tow Away? 1 | Process Date N | 20211126
Weather1 CLOUDY | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	18	F	H	HNBD		PROC ST	N	C	0200	SUZI	2007	-	3	H	-	-	W
2	DRVR	39	M	H	HNBD		SLOWING	N	A	0100	KIA	2017	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	18	F	1	1	P	W

Primary Rd SR-57 | Distance (ft) 500. | Direction S | Secondary Rd IMPERIAL HWY. | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019320 | Collision Date 20220121 | Time 0830 | Day FRI
Primary Collision Factor NORTHBOUND TO IMPERIAL HWY | Violation IMPROP TURN | Collision Type 22107 | Severity REAR END | #Killed PDO | #Injured 0 | Tow Away? 0 | Process Date N | 20220202
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	30	M	W	HNBD		OTHER	N	D	2200	TOYT	2002	-	3	H	L	M	G
2	DRVR	58	F	A	HNBD		PROC ST	N	A	0700	ISU	2004	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 S/B | Distance (ft) 100. | Direction S | Secondary Rd BIRCH ST. | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 020923 | Collision Date 20211230 | Time 0934 | Day THU
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type BROADSIDE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20220104
Weather1 CLOUDY | Weather2 RAINING | Rdwy Surface WET | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	39	M	H	HNBD		PROC ST	S	A	0100	TOYT	2011	-	3	N	-	M	G
2	DRVR	52	M	H	HNBD		PROC ST	S	G	2531	FRHT	2019	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 S/B | Distance (ft) 500. | Direction S | Secondary Rd LAMBERT RD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021633 | Collision Date 20210430 | Time 1509 | Day FRI
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity INJURY | #Killed 0 | #Injured 5 | Tow Away? Y | Process Date 20210506
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	57	F	H	HNBD		PROC ST	S	A	0100	NISS	2006	-	3	N	-	L	G
2	DRVR	26	F	H	HNBD		SLOWING	S	A	0100	AUDI	2017	-	3	G	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	57	F	1	0	L	G
PASS	POSSIBL	15	F	3	0	L	G
DRVR	MINOR	26	F	1	0	M	G

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Primary Rd **STATE ROUTE 57** *Distance (ft)* **1000** *Direction* **N** *Secondary Rd* **TONNER CANYON** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **N/B** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20220129** *Time* **1956** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20220207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	38	M	O	HNBD		PROC ST	N	A	0700	BMW	2017	-	3	N		-	L	G
2	DRVR	60	M	A	HNBD		STOPPED	N	A	0100	CHEV	2018	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	60	M	1	0	M	G

Primary Rd **STATE ROUTE 57** *Distance (ft)* **95.0** *Direction* **S** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **N/B TO IMPERIAL HIGHWAY** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20210807** *Time* **1820** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210816**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	34	M	H	HNBD		PROC ST	N	D	2200	CHEV	2008	-	3	A	22350	H	M	G
2	DRVR	53	F	H	HNBD		STOPPED	N	A	0100	LEXS	2015	-	3	H		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **STATE ROUTE 57** *Distance (ft)* **790.** *Direction* **S** *Secondary Rd* **LAMBERT RD.** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **N/B TO LAMBERT** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20210926** *Time* **1650** *Day* **SUN**
Primary Collision Factor **NOT DRIVER** *Violation* *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20211006**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **CONS ZONE** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	58	M	H	HNBD		PROC ST	N	A	0700	TOYT	1998	-	3	N		-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **STATE ROUTE 57** *Distance (ft)* **1120** *Direction* **S** *Secondary Rd* **BIRCH STREET** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **S/B** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20210928** *Time* **1541** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20211007**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	M	H	HNBD		PROC ST	S	A	0100	TOYT	2007	-	3	N		-	M	G
2	DRVR	56	F	A	HNBD		PROC ST	S	A	0100	TESL	2021	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **STATE ROUTE 57** *Distance (ft)* **1100** *Direction* **S** *Secondary Rd* **LAMBERT ROAD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **S/B** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021274** *Collision Date* **20211223** *Time* **1959** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20211231**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	S	-	9900	-		-	3	N		-	B	B
2	DRVR	44	M	H	HNBD		PROC ST	S	A	0700	BMW	2018	-	3	N		-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	44	M	1	0	L	G

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Primary Rd **I-5 N/B FROM AUTO** *Distance (ft)* **1056** *Direction* **N** *Secondary Rd* **BEACH BLVD** *NCIC* **9670** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **CENTER DR** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **500** *Type* **1** *CalTrans* *Badge* **021579** *Collision Date* **20210406** *Time* **1700** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210412**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	44	M	O	HNBD		STOPPED	N	A	0100	MERZ	2006	-	3	N	-	M	G
2	DRVR	62	M	W	HNBD		PROC ST	N	A	0700	CHEV	2019	-	3	N	-	M	G

Victim Info

Party	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **42.0** *Direction* **W** *Secondary Rd* **AROVISTA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1704** *Collision Date* **20210508** *Time* **2035** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20210525**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **SLIPPERY** *Rdwy Cond1* **FLOODED** *Rdwy Cond2* **NO UNUSL CND** *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	16	M	W	HNBD		PROC ST	E	A	0700	JEEP	2006	-	1	F	-	L	G
2	DRVR	56	F	W	HNBD		STOPPED	E	A	0100	MERCE	2017	-	3	N	-	M	G

Victim Info

Party	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	POSSIBL	16	M	1	0	L	G
2	DRVR	POSSIBL	56	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **600.** *Direction* **W** *Secondary Rd* **AROVISTA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1710** *Collision Date* **20210524** *Time* **1945** *Day* **MON**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210609**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	UNS TURN	W	A	0700	MERCE	2014	-	-	N	-	M	G
2	DRVR	48	F	H	HNBD		PROC ST	W	A	0100	LEXUS	2010	-	3	N	-	M	G

Victim Info

Party	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **AROVISTA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20210908** *Time* **1555** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21453B** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20210928**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	83	F	W	HNBD		RGT TURN	N	A	0700	TOYOT	2015	-	3	N	-	L	G
2	DRVR	30	F	O	HNBD		PROC ST	E	A	0700	HONDA	2015	-	3	N	-	L	G

Victim Info

Party	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	POSSIBL	83	F	1	0	L	G
2	DRVR	POSSIBL	30	F	1	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **22.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1698** *Collision Date* **20210322** *Time* **1543** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210408**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	D	2200	FORD	2000	-	-	N	-	-	-
2	DRVR	22	F	W	HNBD		STOPPED	E	A	0100	TOYOT	2005	-	3	N	-	M	G

Victim Info

Party	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **60.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1395** *Collision Date* **20210414** *Time* **0800** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210430**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	54	M	W	HNBD		STOPPED	W	G	2531	FREIG	2012	-	3	N	-	M	G
2	DRVR	40	F	B	HNBD		STOPPED	W	A	0100	TOYOT	2007	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **500.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20210419** *Time* **1045** *Day* **MON**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210506**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	47	M	H	HNBD		CHANG LN	W	G	2528	FREIG	2008	-	3	N	-	M	G
2	DRVR	65	F	A	HNBD		SLOWING	W	A	0100	HONDA	2020	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **150.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20210611** *Time* **1250** *Day* **FRI**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210701**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M	H	IMP UNK	IMP UNK	CHANG LN	W	-	3100	-		-	-	N	-	-	-
2	DRVR	77	F	W	HNBD		PROC ST	W	A	0100	CADIL	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **200.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20210715** *Time* **1534** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210803**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	68	M	W	HNBD		PROC ST	W	-	3129	PETER	2021	-	3	N	-	M	G
2	DRVR	47	M	W	HNBD		STOPPED	W	A	0700	JEEP	2019	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **175.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20211009** *Time* **1424** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20211029**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	63	F	W	HNBD		PROC ST	W	A	0100	HYUND	2014	-	3	A	-	L	G
2	DRVR	39	F	W	HNBD		STOPPED	W	D	2200	TOYOT	2012	-	3	N	-	M	G
3	DRVR	39	M	O	HNBD		STOPPED	W	D	2300	TOYOT	2020	-	3	N	-	M	G
4	DRVR	61	F	O	HNBD		STOPPED	W	A	0100	TOYOT	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	63	F	1	0	L	G
PASS	POSSIBL	8	F	4	0	M	Q

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Primary Rd **IMPERIAL HY** *Distance (ft)* **43.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20211022** *Time* **1233** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	F	H	HNBD		RGT TURN	E	A	0100	HONDA	2020	-	3	N	-	L	G
2	DRVR	70	F	A	HNBD		PROC ST	E	A	0100	TOYOT	2012	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **100.** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1628** *Collision Date* **20211103** *Time* **1439** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	33	M	W	HNBD		PROC ST	E	D	2200	FORD	2019	-	3	N	-	M	G
2	DRVR	46	M	W	HNBD		STOPPED	E	A	0100	CHRYS	2010	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	46	M	1	0	M	G
PASS	POSSIBL	22	M	6	0	M	G
PASS	POSSIBL	32	M	3	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **75.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1676** *Collision Date* **20211209** *Time* **1827** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	35	M	W	HNBD		SLOWING	W	A	0100	HONDA	2004	-	3	A	-	M	G
2	DRVR	53	M	H	HNBD		SLOWING	W	A	0100	TOYOT	2018	-	3	N	-	M	G
3	DRVR	35	M	H	HNBD		SLOWING	W	A	0700	CHEVR	2021	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	35	M	1	0	M	G
DRVR	POSSIBL	35	M	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **1900** *Direction* **E** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **014** *Type* **0** *CalTrans* *Badge* **1654** *Collision Date* **20210703** *Time* **1157** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210722**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	M	H	HNBD		SLOWING	W	A	0100	BMW	2015	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1711** *Collision Date* **20220101** *Time* **2155** *Day* **SAT**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **HEAD-ON** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230124**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	-	M	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **CARBON CANYON** *Distance (ft)* **235.** *Direction* **E** *Secondary Rd* **TELEGRAPH** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **RD** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **012** *Type* **0** *CalTrans* *Badge* **1706** *Collision Date* **20220221** *Time* **0259** *Day* **MON**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **OVERTURNED** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220329**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER OBJ** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	M	W	HNBD		UNS TURN	W	A	0100	SCION	2016	- 3	A		N	L C

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **CARBON CANYON** *Distance (ft)* **816.** *Direction* **E** *Secondary Rd* **VALENCIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **RD** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20210825** *Time* **0756** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210909**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	33	F	H	HNBD		CHANG LN	W	A	0100	TOYOT	2015	- 3	N		-	M G
2	DRVR	32	M	H	HNBD		PROC ST	W	A	0100	FORD	2019	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **CARBON CANYON** *Distance (ft)* **193.** *Direction* **E** *Secondary Rd* **VALENCIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **RD** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1698** *Collision Date* **20211203** *Time* **1700** *Day* **FRI**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220104**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	MERGING	E	-	9900	-		- -	-		-	- -
2	DRVR	26	M	B	HNBD		PROC ST	E	A	0100	HONDA	2012	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **CASTLE GATE LN** *Distance (ft)* **23.0** *Direction* **N** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210402** *Time* **0943** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20210421**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	F	W	HNBD		RGT TURN	W	A	0700	FORD	2013	- 3	A		-	M G
2	DRVR	37	M	W	HNBD		STOPPED	S	D	2200	DODGE	2018	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **CATALPA AV** *Distance (ft)* **330.** *Direction* **S** *Secondary Rd* **OLEANDER ST (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20210401** *Time* **0812** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20210421**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	BICY	998	-		IMP UNK	IMP UNK	PROC ST	S	L	0400	-		- -	N		-	- -
2	DRVR	29	F	O	HNBD		STOPPED	E	A	0100	AUDI	2019	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **BIRCH ST** *Distance (ft)* **470.** *Direction* **W** *Secondary Rd* **POPLAR AV (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1707** *Collision Date* **20220322** *Time* **1844** *Day* **TUE**
Primary Collision Factor **UNKNOWN** *Violation* **23123** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220414**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	55	F	W	HNBD		PROC ST	W	A	0100	HONDA	2013	-	1	F	-	L	G
2	PRKD	998	-				PARKED	W	D	2200	CHEVR	2016	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **148.** *Direction* **E** *Secondary Rd* **POPLAR AV (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20221006** *Time* **0930** *Day* **THU**
Primary Collision Factor **OTHER IMPROP DRV** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221028**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	34	M	A	HNBD		PROC ST	W	D	2200	FORD	2021	-	3	N	-	M	G
2	PRKD	998	-				PARKED	W	A	0700	CHEVR	2005	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **30.0** *Direction* **W** *Secondary Rd* **RANDOLPH AV (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1673** *Collision Date* **20220701** *Time* **2145** *Day* **FRI**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220726**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	62	M	W	HBD-UI		PROC ST	E	A	0700	CADIL	2019	-	1	A	-	M	G
2	DRVR	46	M	W	HNBD		STOPPED	E	A	0700	DODGE	2020	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **30.0** *Direction* **W** *Secondary Rd* **REDBAY AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **012** *Type* **0** *CalTrans* *Badge* **1507** *Collision Date* **20220910** *Time* **1530** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221010**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	45	F	W	HNBD		SLOWING	E	A	0100	HONDA	2019	-	3	N	-	M	G
2	DRVR	20	M	H	HNBD		STOPPED	E	A	0100	LEXUS	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **200.** *Direction* **E** *Secondary Rd* **REDWOOD AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20230210** *Time* **1414** *Day* **FRI**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230301**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	-	-	9900	UNKNO		-	-	N	-	-	-
2	PRKD	998	-				PARKED	W	A	0700	NISSA	2003	-	3	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **BIRCH MALL** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **ENTRANCE RD** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230209** *Time* **0908** *Day* **THU**
Primary Collision Factor **OTHER HAZ** *Violation* **21451A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230301**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DAYLIGHT** *Ped Action* **X-WLK AT** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	27	F	A	HNBD		LFT TURN	S	A	0100	HONDA	2019	-	3	N	-	M	G
2	PED	22	F	H	HNBD		PROC ST	N	N	6000	-		-	3	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PED	MINOR	22	F	9	-	-	-

Primary Rd **BIRCH ST** *Distance (ft)* **90.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1705** *Collision Date* **20221106** *Time* **2139** *Day* **SUN**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20221205**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	23	M	W	HNBD		PROC ST	W	A	0100	KIA	2008	-	3	F	-	M	H

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **272.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20221129** *Time* **0921** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20221226**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	22	M	W	HNBD		PROC ST	E	A	0100	HONDA	2001	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	22	M	1	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **95.0** *Direction* **E** *Secondary Rd* **BIRCH MALL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20220920** *Time* **0741** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20221012**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	19	F	W	HNBD		PROC ST	E	A	0100	ACURA	2019	-	3	M	-	L	G
2	PRKD	998	-				PARKED	E	I	1900	NEW F	2007	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH MALL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1694** *Collision Date* **20221104** *Time* **1810** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21801A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20221121**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	H	HNBD		LFT TURN	N	A	0100	MERCE	2015	-	3	N	-	M	G
2	DRVR	44	M	H	HNBD		PROC ST	W	A	0100	TOYOT	2004	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	44	M	1	0	M	G
PASS	POSSIBL	29	M	3	0	M	G

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Primary Rd **FLOWER AV** *Distance (ft)* **22.0** *Direction* **N** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1681** *Collision Date* **20220924** *Time* **1853** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221010**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	29	M	H	HNBD		PROC ST	S	A	0100	TOYOT	2022	-	-	F	-	M G
2	DRVR	43	F	H	HNBD		STOPPED	S	A	0100	TESLA	2022	-	-	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **GREENBRIAR LN** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **HILLHAVEN DR** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20221108** *Time* **1630** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221124**
Weather1 **CLOUDY** *Weather2* **RAINING** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	LFT TURN	E	A	0700	TOYOT	2009	-	-	M	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **HAWKS DR** *Distance (ft)* **96.0** *Direction* **E** *Secondary Rd* **CONDOR AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1706** *Collision Date* **20220828** *Time* **2054** *Day* **SUN**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220922**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	62	F	H	HNBD		LFT TURN	W	A	0100	CHRYS	2008	-	3	F	-	M G
2	PRKD	998	-		HNBD		PARKED	W	A	0700	JEEP	2019	-	3	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HIGHWAY** *Distance (ft)* **25.0** *Direction* **E** *Secondary Rd* **PUENTE STREET** *NCIC* **9675** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea (EASTBOUND)** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **901** *Type* **4** *CalTrans* *Badge* **016748** *Collision Date* **20220506** *Time* **0656** *Day* **FRI**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20220516**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **1**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	33	M	H	HNBD		CHANG LN	E	A	0700	MITS	2019	-	3	N	-	M G
2	DRVR	77	M	H	HNBD		PROC ST	E	H	1300	CHEV	2001	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	77	M	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **6.00** *Direction* **N** *Secondary Rd* **57 NORTHBOUND** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1709** *Collision Date* **20220618** *Time* **0141** *Day* **SAT**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220801**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	A	0100	LEXUS	1999	-	-	N	-	- -
2	DRVR	24	M	O	HNBD		LFT TURN	N	A	0100	KIA	2020	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **185.** *Direction* **E** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230215** *Time* **0905** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230320**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	INFIN		- 3	N		-	- -
2	DRVR	39	F	A	HNBD		STOPPED	W	A	0800	HONDA	2021	- -	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **20.0** *Direction* **E** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **014** *Type* **0** *CalTrans* *Badge* **1576** *Collision Date* **20230311** *Time* **1303** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230424**
Weather1 **CLEAR** *Weather2* **CLOUDY** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	M	O	IMP UNK	IMP UNK	SLOWING	W	A	0800	TOYOT	2005	- -	N		-	- -
2	DRVR	41	F	O	HNBD		STOPPED	W	A	0700	LEXUS	2017	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20230315** *Time* **0630** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21453C** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230412**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DUSK/DAWN** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	LFT TURN	S	-	9900	UNKNO		- 3	N		-	- -
2	DRVR	56	F	W	HNBD		PROC ST	W	A	0700	TOYOT	2019	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20220624** *Time* **1332** *Day* **FRI**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220809**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	60	F	W	HNBD		LFT TURN	W	A	0100	VOLVO	2010	- 3	N		-	M G
2	DRVR	59	M	B	HNBD		LFT TURN	W	G	2599	PETER	2015	- 3	N		-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **150.** *Direction* **W** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20220828** *Time* **2335** *Day* **SUN**
Primary Collision Factor **PED VIOL** *Violation* **21954A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230220**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **FELONY** *Motor Vehicle Involved With* **PED** *Lighting* **DARK - ST** *Ped Action* **NOT IN X-** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	PED	75	M	W	IMP UNK	IMP UNK	ENT TRAF	N	N	6000	-		- -	N		-	- -
2	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	-		- -	N		-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PED	SERIOUS	76	M	9	-	-	P

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Primary Rd **IMPERIAL HY** *Distance (ft)* **65.0** *Direction* **W** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20230301** *Time* **0935** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230320**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **FELONY** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	23	F	W	HNBD		PROC ST	W	A	0100	HONDA	2014	-	3	N	-	L	G
2	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	UNKNO		-	3	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	21	F	1	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **331.** *Direction* **E** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20220519** *Time* **1429** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220623**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	57	M	H	HNBD		PROC ST	W	D	2200	FORD	2006	-	3	N	-	L	G
2	DRVR	50	F	H	HNBD		STOPPED	W	A	0700	FORD	2020	-	3	N	-	M	G
3	DRVR	40	F	H	HNBD		STOPPED	W	A	0700	TOYOT	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **675.** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1695** *Collision Date* **20230315** *Time* **1353** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230509**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	D	2200	NISSA	2015	-	-	M	-	-	-
2	DRVR	33	M	H	HNBD		STOPPED	W	D	2200	FORD	2019	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **25.0** *Direction* **W** *Secondary Rd* **GATEWAY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20220409** *Time* **1725** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220428**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	A	0700	-		-	-	N	-	-	-
2	DRVR	72	M	W	HNBD		STOPPED	E	A	0700	LEXUS	2013	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **50.0** *Direction* **W** *Secondary Rd* **KINGSWOOD CT** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20220928** *Time* **1708** *Day* **WED**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221024**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	45	F	H	HNBD		CHANG LN	E	D	8200	CHEVR	2004	-	2	N	-	M	G
2	DRVR	20	F	H	HNBD		PROC ST	E	A	0100	VOLKS	2017	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **300.** *Direction* **W** *Secondary Rd* **RANDOLPH AV (E)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20221119** *Time* **1125** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20221214**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	58	F	W	HNBD		PROC ST	E	A	0100	HONDA	2017	-	3	G	-	L	G
2	DRVR	63	M	A	HNBD		PROC ST	E	D	2200	TOYOT	2023	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	58	F	1	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **20.0** *Direction* **E** *Secondary Rd* **RANDOLPH AV (W)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1718** *Collision Date* **20221205** *Time* **0333** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20230102**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	50	F	H	HNBD		SLOWING	W	A	0100	NISSA	2011	-	3	N	-	L	G
2	DRVR	32	M	O	HNBD		STOPPED	W	A	0100	BMW	2020	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	32	M	1	0	L	G
PASS	POSSIBL	26	F	3	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **70.0** *Direction* **E** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20220325** *Time* **1525** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20220419**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	50	M	H	HNBD		PROC ST	W	A	0800	FORD	2021	-	3	N	-	M	G
2	DRVR	41	F	H	HNBD		STOPPED	W	A	0100	LEXUS	2007	-	3	N	-	M	G
3	DRVR	74	F	W	HNBD		STOPPED	W	A	0100	TOYOT	2021	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	74	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1509** *Collision Date* **20220409** *Time* **1715** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220513**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	LFT TURN	W	-	9900	-		-	-	N	-	-	-
2	DRVR	44	M	H	HNBD		LFT TURN	W	A	0100	INFIN	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20221108** *Time* **0630** *Day* **TUE**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221128**
Weather1 **CLOUDY** *Weather2* **RAINING** *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	44	M	H	HNBD		LFT TURN	N	-	3132	FREIG	2014	-	3	N	-	M	G
2	DRVR	39	F	H	HNBD		LFT TURN	N	A	0100	CHEVR	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1694** *Collision Date* **20221201** *Time* **2004** *Day* **THU**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20221219**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	21	M	H	HNBD		PROC ST	W	A	0100	DODGE	2020	-	3	F	-	L	G
2	DRVR	29	F	H	HNBD		PROC ST	N	A	0100	TOYOT	2013	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1632** *Collision Date* **20230107** *Time* **0115** *Day* **SAT**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20230130**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	28	M	H	HNBD		PROC ST	E	A	0700	FORD	2016	-	3	N	-	L	G
2	DRVR	24	M	B	HNBD		LFT TURN	N	A	0100	FORD	2019	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	28	M	1	0	L	G
DRVR	POSSIBL	24	M	1	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **12.0** *Direction* **E** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1706** *Collision Date* **20230212** *Time* **2059** *Day* **SUN**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230301**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	71	M	A	HNBD		RGT TURN	E	A	0700	LEXUS	2020	-	3	N	-	M	G
2	DRVR	27	M	W	HNBD		RGT TURN	E	A	0100	CHEVR	2013	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 SB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20220419** *Time* **1412** *Day* **TUE**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220601**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	52	F	H		DRUG	PROC ST	S	A	0100	NISSA	2017	-	3	A	N	M	G
2	DRVR	69	F	O	HNBD		PROC ST	E	A	0100	VOLKS	2000	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **82.0** *Direction* **E** *Secondary Rd* **RT 57 SB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1694** *Collision Date* **20221018** *Time* **2028** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20221115**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	71	F	W	HNBD		PROC ST	W	A	0100	TOYOT	2008	-	3	N	-	M	G
2	DRVR	20	F	W	HNBD		STOPPED	W	A	0100	HONDA	2008	-	3	N	-	M	G
3	DRVR	25	M	W	HNBD		STOPPED	W	A	0100	TOYOT	2012	-	3	N	-	M	G
4	DRVR	26	F	A	HNBD		STOPPED	W	A	0700	TOYOT	2010	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	71	F	1	0	M	G

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Primary Rd SR-57 N/B FROM | Distance (ft) 115. | Direction S | Secondary Rd IMPERIAL HWY | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | IMPERIAL HIGHWAY E/B | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 022099 | Collision Date 20220329 | Time 2300 | Day TUE
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type HIT OBJECT | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? Y | Process Date 20220408
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With FIXED OBJ | Lighting DARK - ST | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	25	F	H	HNBD		RAN OFF RD	N	A	0100	LEXS	2002	-	3	H	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 N/B FROM | Distance (ft) 635. | Direction N | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | IMPERIAL HWY W/B | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021274 | Collision Date 20230208 | Time 1550 | Day WED
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20230216
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	54	M	H	HNBD		PROC ST	N	D	2200	GMC	2002	-	3	H	-	M G
2	DRVR	53	M	A	HNBD		STOPPED	N	A	0700	ACUR	2016	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 N/B FROM | Distance (ft) 630. | Direction N | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | W/B IMPERIAL HIGHWAY | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 016748 | Collision Date 20221207 | Time 0812 | Day WED
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? Y | Process Date 20221215
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	34	F	H	HNBD		PROC ST	N	A	0700	TOYT	2016	-	2	H	-	L G
2	DRVR	61	M	W	HNBD		STOPPED	N	A	0700	HOND	2005	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 320. | Direction S | Secondary Rd ASSOCITATED RD. | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019320 | Collision Date 20230111 | Time 0532 | Day WED
Primary Collision Factor IMPROP TURN | Violation 22107 | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20230202
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DARK - NO | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	N	-	9900	-		-	3	N	-	- -
2	DRVR	42	M	H	HNBD		PROC ST	N	A	0100	NISS	2020	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 600. | Direction N | Secondary Rd BIRCH ST | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | NORTHBOUND | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 020694 | Collision Date 20220916 | Time 1856 | Day FRI
Primary Collision Factor LANE CHANGE | Violation 21658A | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20220926
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	51	M	B	HNBD		CHANG LN	N	A	0100	JAGU	2011	-	3	N	-	M G
2	DRVR	24	M	H	HNBD		PROC ST	N	D	2200	FORD	2014	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd SR-57 | Distance (ft) 500. | Direction N | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 020694 | Collision Date 20221005 | Time 1545 | Day WED
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? Y | Process Date 20221013
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

NORTHBOUND FROM IMPERIAL HIGHWAY EASTBOUND

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	59	M	W	HNBD		PROC ST	N	A	0700	INFI	2020	-	3	H	-	L	G
2	DRVR	73	F	A	HNBD		STOPPED	N	A	0100	TESL	2019	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 30.0 | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019652 | Collision Date 20220825 | Time 0655 | Day THU
Primary Collision Factor IMPROP TURN | Violation 22107 | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20220902
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

NORTHBOUND TO IMPERIAL HIGHWAY

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	31	M	H	HNBD		OTHER	N	G	2531	PTRB	2020	-	3	H	-	M	G
2	DRVR	36	F	W	HNBD		STOPPED	N	A	0700	SUBA	2011	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 60.0 | Direction S | Secondary Rd LAMBERT RD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021633 | Collision Date 20220402 | Time 1348 | Day SAT
Primary Collision Factor STRTNG|BCKNG | Violation 22106 | Collision Type REAR END | Severity INJURY | #Killed 0 | #Injured 1 | Tow Away? N | Process Date 20220412
Weather1 CLOUDY | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

NORTHBOUND TO LAMBERT RD

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	31	M	H	HNBD		PROC ST	N	D	2200	GMC	2021	-	3	H	-	M	G
2	DRVR	29	M	A	HNBD		STOPPED	N	A	0100	MAZD	2019	-	3	H	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	29	M	1	0	M	G

Primary Rd SR-57 | Distance (ft) 850. | Direction S | Secondary Rd LAMBERT ROAD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021691 | Collision Date 20220427 | Time 0225 | Day WED
Primary Collision Factor DRVR ALC|DRG | Violation 23152A | Collision Type HIT OBJECT | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? Y | Process Date 20220502
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With FIXED OBJ | Lighting DARK - ST | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

NORTHBOUND TO LAMBERT ROAD

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	22	F	H	HBD-UI		RAN OFF RD	N	A	0100	TOYT	2018	-	1	A	22350	H	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **210.** *Direction* **E** *Secondary Rd* **AROVISTA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20220419** *Time* **1416** *Day* **TUE**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220601**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	52	F	H		DRUG	UNS TURN	W	A	0100	NISSA	2017	-	3	A	N	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **16.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1705** *Collision Date* **20220407** *Time* **0610** *Day* **THU**
Primary Collision Factor **PED VIOL** *Violation* **21954A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20220503**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DUSK/DAWN** *Ped Action* **NOT IN X-** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	PED	998	M	W	IMP UNK	IMP UNK		N	N	6000	-		-	-	N	-	-	-
2	DRVR	42	M	O	HNBD		PROC ST	W	A	0100	LEXUS	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PED	SERIOUS	44	M	9	-	-	P

Primary Rd **IMPERIAL HY** *Distance (ft)* **5.00** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20220407** *Time* **1449** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HEAD-ON** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220510**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	18	M	A	HNBD		WRONG WY	W	A	0700	ACURA	2004	-	3	A	M	L	G
2	DRVR	22	F	H	HNBD		STOPPED	E	A	0100	KIA	2022	-	3	N	-	L	G
3	DRVR	45	M	W	HNBD		PROC ST	E	D	2200	FORD	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **35.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20220407** *Time* **0830** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220623**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	-	9900	-		-	-	-	-	-	-
2	DRVR	33	F	H	HNBD		STOPPED	W	A	0100	TOYOT	2011	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **72.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20220519** *Time* **1346** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220627**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	18	M	H	HNBD		CHANG LN	W	A	0100	TOYOT	2007	-	3	N	-	M	G
2	DRVR	39	M	A	HNBD		PROC ST	W	A	0100	KIA	2021	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20220726** *Time* **0736** *Day* **TUE**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220812**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	36	M	H	HNBD		PROC ST	W	D	2200	FORD	1998	-	3	N	-	M G
2	DRVR	26	F	A	HNBD		LFT TURN	S	A	0700	TOYOT	2018	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1713** *Collision Date* **20221108** *Time* **1850** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221205**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	F	W	HNBD		RGT TURN	W	A	0100	HONDA	2013	-	2	N	-	M G
2	DRVR	33	M	O	HNBD		PROC ST	W	A	0100	HONDA	2018	-	3	N	-	N G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **354.** *Direction* **W** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1675** *Collision Date* **20220506** *Time* **0129** *Day* **FRI**
Primary Collision Factor **UNKNOWN** *Violation* **23123A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220526**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	35	F	H	HNBD		PROC ST	E	A	0100	HONDA	2006	-	1	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20220511** *Time* **1538** *Day* **WED**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20220601**
Weather1 *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	BICY	37	M	B	HNBD		PROC ST	E	L	0400	-		-	3	A	N	- -
2	DRVR	57	M	H	HNBD		LFT TURN	S	A	0100	TOYOT	2006	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **352.** *Direction* **E** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1706** *Collision Date* **20220723** *Time* **2117** *Day* **SAT**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220823**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	51	M	H	HBD-UI		PROC ST	W	A	0700	CHEVR	2001	-	3	A	-	M -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1694** *Collision Date* **20220816** *Time* **2019** *Day* **TUE**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20221003**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	27	F	W	HBD-UI		PROC ST	W	A	0700	HYUND	2020	-	3	A	-	L G
2	DRVR	50	F	H	HNBD		PROC ST	W	A	0700	HYUND	2019	-	3	N	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **70.0** *Direction* **W** *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1646** *Collision Date* **20221120** *Time* **1137** *Day* **SUN**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221206**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	33	F	H	HNBD		CHANG LN	E	A	0700	HONDA	2013	-	3	N	-	M G
2	DRVR	53	F	H	HNBD		PROC ST	E	A	0100	AUDI	2014	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1695** *Collision Date* **20221216** *Time* **1650** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **HEAD-ON** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230116**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	68	F	W	HNBD		PROC ST	N	A	0100	TOYOT	2003	-	3	N	-	M G
2	BICY	76	M	H	HNBD		PROC ST	W	L	0400	WINDH		-	3	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	MINOR	76	M	1	3	-	-

Primary Rd **IMPERIAL HY** *Distance (ft)* **15.0** *Direction* **W** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1709** *Collision Date* **20220624** *Time* **1913** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20220801**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	66	M	A	HNBD		PROC ST	E	A	0100	LEXUS	2004	-	3	N	-	M G
2	DRVR	37	F	A	HNBD		STOPPED	E	A	0100	BMW	2021	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	37	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **30.0** *Direction* **W** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20221123** *Time* **1007** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20221219**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	18	F	W	HNBD		PROC ST	E	D	2200	FORD	2009	-	3	N	-	M G
2	DRVR	51	F	H	HNBD		STOPPED	E	A	0700	INFIN	2019	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **PALM ST** *Distance (ft)* **161.** *Direction* **S** *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1718** *Collision Date* **20221229** *Time* **1807** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20230117**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	40	M	H	HNBD		PROC ST	N	A	0700	TOYOT	2002	-	3	F	-	L G								
2	DRVR	21	F	W	HNBD		STOPPED	N	A	0700	FORD	2018	-	3	N	-	M G	DRVR	POSSIBL	21	F	1	0	L	G
3	DRVR	25	F	W	HNBD		STOPPED	N	A	0100	HONDA	2022	-	3	N	-	M G	DRVR	POSSIBL	25	F	1	0	M	G

Primary Rd **PLACENTIA AV** *Distance (ft)* **105.** *Direction* **S** *Secondary Rd* **17TH ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **015** *Type* **0** *CalTrans* *Badge* **P633** *Collision Date* **20230113** *Time* **0728** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20230214**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **OTHER** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	25	F	W	HNBD		PROC ST	S	A	0100	-	2013	-	3	N	-	L G	DRVR	POSSIBL	25	F	1	0	L	G
2	DRVR	43	M	H	HNBD		STOPPED	S	D	2200	-	2022	-	3	N	-	M G	DRVR	POSSIBL	43	M	1	0	M	G
3	DRVR	59	F	W	HNBD		STOPPED	S	A	0700	-	2003	-	3	N	-	M G								

Primary Rd **PLACENTIA AV** *Distance (ft)* **299.** *Direction* **S** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1713** *Collision Date* **20220729** *Time* **1800** *Day* **FRI**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152F** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220817**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	44	M	H		DRUG	PROC ST	S	D	2200	FORD	2007	-	3	A	N	M -								

Primary Rd **PLACENTIA AV** *Distance (ft)* **22.0** *Direction* **S** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20230127** *Time* **1320** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230216**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	76	M	W	HNBD		PROC ST	N	D	2200	NISSA	2006	-	3	N	-	M G								
2	DRVR	37	M	A	HNBD		STOPPED	N	A	0100	VOLKS	2013	-	3	N	-	M G	PASS	POSSIBL	34	F	3	0	M	G

Primary Rd **POPLAR AV** *Distance (ft)* **188.** *Direction* **N** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1707** *Collision Date* **20220622** *Time* **0040** *Day* **WED**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20220802**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	S	D	2200	FORD	2000	-	-	M	-	L -								
2	PRKD	998	-				PARKED	S	A	0100	LEXUS	2017	-	3	N	-	- -								

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Primary Rd **BIRCH ST** *Distance (ft)* **340.** *Direction* **W** *Secondary Rd* **KRAEMER BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **012** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20231025** *Time* **0218** *Day* **WED**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231115**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	33	M	O	HNBD		CHANG LN	W	D	2200	FORD	2016	-	3	M	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **KRAEMER BL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1738** *Collision Date* **20231217** *Time* **0938** *Day* **SUN**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20240119**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	66	F	O	HNBD		PROC ST	E	A	0700	HONDA	2014	-	3	N	-	L	G
2	DRVR	56	F	O	HNBD		PROC ST	N	A	0700	SUBAR	2021	-	3	N	-	L	G
3	DRVR	57	F	O	HNBD		STOPPED	W	A	0100	TOYOT	2007	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	66	F	1	0	L	G
DRVR	MINOR	56	F	1	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **MARKETPLACE** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20230723** *Time* **1506** *Day* **SUN**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230901**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	17	M	A	HNBD		PROC ST	W	A	0100	ACURA	2022	-	1	A	-	L	G
2	DRVR	60	M	H	HNBD		PROC ST	N	A	0100	ACURA	2013	-	3	N	-	L	G
3	DRVR	40	M	W	HNBD		PROC ST	S	A	0700	CHEVR	2019	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	40	M	1	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **175.** *Direction* **W** *Secondary Rd* **REDBAY AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1727** *Collision Date* **20230613** *Time* **0510** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230704**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **OBSTR ON RD** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	67	F	W	HNBD		PROC ST	W	A	0700	TOYOT	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **175.** *Direction* **W** *Secondary Rd* **S RANDOLPH AVE** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1730** *Collision Date* **20230721** *Time* **0900** *Day* **FRI**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230823**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	-	N	-	-	-
2	PRKD	998	-				PARKED	W	D	2200	CHEVR	2023	-	-	N	-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **305 W IMPERIAL** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **175 S MADRONA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1735** *Collision Date* **20240213** *Time* **0845** *Day* **TUE**
Primary Collision Factor **PED VIOL** *Violation* **21954A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20240313**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DAYLIGHT** *Ped Action* **NOT IN X-** *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	PED	54	F	O			ENT TRAF	W	N	6000	-		-	3	N		-	-	-
2	DRVR	54	M	O			PROC ST	S	A	0100	TOYOT	2005	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PED	MINOR	54	F	9	-	-	P

Primary Rd **904 REDBUD ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **NOT STATED** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20230427** *Time* **0351** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230517**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M	H	IMP UNK	IMP UNK	LFT TURN	E	A	0100	CHEVR	2021	-	-	N		-	-	-
2	PRKD	998	-				PARKED	S	A	0700	FORD	2001	-	-	N		-	-	-
3	PRKD	998	-				PARKED	S	A	0100	TOYOT	2007	-	-	N		-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **AROVISTA CI** *Distance (ft)* **168.** *Direction* **N** *Secondary Rd* **MARINER ST** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1672** *Collision Date* **20230428** *Time* **1355** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230517**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	35	M	H	HNBD		RGT TURN	S	F	2700	AUTOC	2015	-	3	N		-	M	G
2	PRKD	998	-				PARKED	S	A	0100	KIA	2015	-	-	N		-	-	-

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **ASSOCIATED RD** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BIRCH ST (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20230724** *Time* **0734** *Day* **MON**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230823**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	CHANG LN	S	-	9900	-		-	-	N		-	-	-
2	DRVR	34	F	H	HNBD		STOPPED	S	A	0700	DODGE	2021	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BERRY ST** *Distance (ft)* **1354** *Direction* **N** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1710** *Collision Date* **20231127** *Time* **1214** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231214**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	39	M	O	HNBD		PROC ST	N	I	1100	RAM	2022	-	3	N		-	L	G
2	DRVR	63	M	O	HNBD		STOPPED	N	I	1100	INTER	2021	-	3	N		-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **BERRY ST** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **LAMBERT RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1710** *Collision Date* **20230405** *Time* **0650** *Day* **WED**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230501**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	63	M	W	HNBD		PROC ST	W	D	2200	CHEVR	2021	-	3	F	-	L	G
2	DRVR	65	F	A	HNBD		PROC ST	S	A	0100	MERCE	2009	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	65	F	1	0	L	G

Primary Rd **BERRY ST** *Distance (ft)* **436.** *Direction* **N** *Secondary Rd* **MERCURY LN** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1678** *Collision Date* **20231101** *Time* **0305** *Day* **WED**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152B** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231116**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	O	HBD-UI		PROC ST	N	A	0100	NISSA	2010	-	1	A	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BERRY ST** *Distance (ft)* **25.0** *Direction* **S** *Secondary Rd* **NORTHWOOD AV** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **011** *Type* **0** *CalTrans* *Badge* **1719** *Collision Date* **20230427** *Time* **2154** *Day* **THU**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230522**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	34	M	H	HBD-UI		PROC ST	E	A	0100	DODGE	2017	-	3	A	N	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **BIRCH ST** *Distance (ft)* **55.0** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20231011** *Time* **0951** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20231027**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	78	F	O	HNBD		PROC ST	W	A	0100	SCION	2016	-	3	N	-	L	G
2	DRVR	87	F	O	HNBD		STOPPED	W	A	0700	LINCO	2004	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	78	F	1	0	L	G

Primary Rd **BIRCH ST** *Distance (ft)* **160.** *Direction* **W** *Secondary Rd* **BIRCH MALL** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1695** *Collision Date* **20240121** *Time* **1035** *Day* **SUN**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20240207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	37	M	O	HNBD		PROC ST	N	D	2200	FORD	2018	-	3	N	-	M	G
2	BICY	65	M	O	HNBD		PROC ST	W	L	0400	GIANT		-	3	N	-	-	P

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	MINOR	65	M	9	3	-	P

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Primary Rd **IMPERIAL HY** *Distance (ft)* **280.** *Direction* **W** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1728** *Collision Date* **20230616** *Time* **1805** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230714**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	27	M	W	HNBD		CHANG LN	W	A	0100	HONDA	2006	-	3	N	-	M	G
2	DRVR	50	M	H	HNBD		PROC ST	W	-	3100	FREIG	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	27	M	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **560.** *Direction* **W** *Secondary Rd* **BERRY ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1705** *Collision Date* **20230618** *Time* **2229** *Day* **SUN**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230714**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	40	M	O	HBD-UI		PROC ST	E	D	2200	FORD	2023	-	-	A	-	M	G
2	DRVR	68	F	W	HNBD		PROC ST	E	A	0100	FORD	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **100.** *Direction* **W** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20230512** *Time* **0943** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230608**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	RGT TURN	E	-	9900	-		-	-	N	-	-	-
2	DRVR	71	F	W	HNBD		PROC ST	E	A	0100	NISSA	2013	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **58.0** *Direction* **E** *Secondary Rd* **BREA BL** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20231224** *Time* **1031** *Day* **SUN**
Primary Collision Factor **OTHER IMPROP DRV** *Violation* *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240108**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	27	M	O	HNBD		BACKING	W	J	4800	FORD	2020	-	3	N	-	M	G
2	DRVR	29	F	O	HNBD		STOPPED	W	A	0700	HONDA	2006	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1730** *Collision Date* **20230712** *Time* **2058** *Day* **WED**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230728**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	25	M	W	HBD-NUI		PROC ST	W	A	0100	KIA	2014	-	3	N	-	L	G
2	DRVR	51	M	W	HNBD		PROC ST	N	D	2200	CHEVR	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **15.0** *Direction* **E** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1718** *Collision Date* **20230820** *Time* **1529** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231011**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	A	0100	CHEVR	2017	-	-	N	-	-	-
2	DRVR	46	M	A	HNBD		STOPPED	W	A	0700	MERCE	2022	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **50.0** *Direction* **W** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20240119** *Time* **1448** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20240207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	36	M	O	HNBD		CHANG LN	W	A	0100	HONDA	2020	-	3	N	-	M	G
2	DRVR	58	M	O	HNBD		PROC ST	W	F	2700	MACK	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **70.0** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20231222** *Time* **1118** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20240116**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	74	F	O	HNBD		SLOWING	W	A	0700	FORD	2016	-	3	N	-	M	G
2	DRVR	78	F	O	HNBD		PROC ST	W	A	0100	MERCE	2009	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	74	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **213.** *Direction* **W** *Secondary Rd* **CATALPA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1675** *Collision Date* **20231122** *Time* **1717** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231212**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	30	F	O	HNBD		PROC ST	E	D	2200	TOYOT	1999	-	1	A	-	L	G
2	DRVR	51	F	O	HNBD		PROC ST	E	A	0700	MERCE	2024	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **78.0** *Direction* **W** *Secondary Rd* **GATEWAY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230323** *Time* **1340** *Day* **THU**
Primary Collision Factor **OTHER IMPROP DRV** *Violation* *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230509**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	22	M	H	HNBD		PROC ST	E	D	2200	FORD	2022	-	1	A	N	M	G
2	DRVR	47	F	H	HNBD		STOPPED	E	A	0100	TOYOT	2011	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RANDOLPH AV (E)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20231222** *Time* **0515** *Day* **FRI**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **AUTO/PED** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20240112**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **PED** *Lighting* **DARK - ST** *Ped Action* **X-WLK AT** *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	20	M	O	HNBD		PROC ST	W	A	0100	HONDA	2023	-	1	A	-	M G								
2	PED	74	M	O	IMP UNK	IMP UNK		N	N	6000	-		-	3	N	-	- -	PED	SERIOUS	74	M	9	-	-	P

Primary Rd **IMPERIAL HY** *Distance (ft)* **26.0** *Direction* **W** *Secondary Rd* **RANDOLPH AV (W)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1719** *Collision Date* **20230602** *Time* **1209** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230630**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	38	M	W	HNBD		PROC ST	E	A	0700	JEEP	2017	-	3	N	-	M G								
2	DRVR	64	F	O	HNBD		STOPPED	E	A	0100	ACURA	2001	-	3	N	-	M G	DRVR	POSSIBL	64	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **199.** *Direction* **E** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1707** *Collision Date* **20230403** *Time* **1938** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230503**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	71	F	H	HNBD		PROC ST	W	A	0100	HONDA	2000	-	3	N	-	M G	DRVR	POSSIBL	33	F	1	0	M	G
2	DRVR	33	F	H	HNBD		STOPPED	W	A	0700	NISSA	2015	-	3	N	-	M G								

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1696** *Collision Date* **20230608** *Time* **1915** *Day* **THU**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230628**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	E	-	9900	-		-	-	N	-	- -								
2	DRVR	30	M	A	HNBD		PROC ST	N	A	0100	HONDA	2017	-	3	N	-	M G								

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1729** *Collision Date* **20230613** *Time* **2301** *Day* **TUE**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230713**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info / Victim Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip	ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
1F	DRVR	75	M	W	HNBD		PROC ST	E	D	2200	FORD	2018	-	3	N	-	M G								
2	DRVR	28	M	W	HNBD		LFT TURN	N	A	0100	TOYOT	2020	-	3	N	-	M G								

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Primary Rd **IMPERIAL HY** *Distance (ft)* **160.** *Direction* **E** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230707** *Time* **1350** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230803**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	A	0100	NISSA	2022	-	-	N	-	-	-
2	DRVR	45	M	W	HNBD		PROC ST	W	A	0100	LINCO	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* **N** *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1729** *Collision Date* **20231105** *Time* **0005** *Day* **SUN**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20231205**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	36	M	O	HBD-NUI		LFT TURN	N	A	0100	MERCE	2012	-	3	N	-	L	G
2	DRVR	17	F	O	HNBD		PROC ST	E	A	0100	HONDA	2010	-	3	N	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
PASS	POSSIBL	35	F	3	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 NB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1705** *Collision Date* **20231116** *Time* **1945** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231213**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	LFT TURN	N	A	0700	NISSA	2023	-	-	N	-	-	-
2	DRVR	33	F	O	HNBD		LFT TURN	N	A	0100	FORD	2010	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **RT 57 SB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20230417** *Time* **1031** *Day* **MON**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230503**
Weather1 **CLOUDY** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	35	F	H	HNBD		RGT TURN	S	A	0700	FORD	2003	-	3	N	-	L	G
2	DRVR	54	M	W	HNBD		PROC ST	W	G	2532	FREIG	2019	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* **S** *Secondary Rd* **RT 57 SB** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1729** *Collision Date* **20231016** *Time* **0453** *Day* **MON**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20231114**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	68	F	O	HNBD		PROC ST	W	A	0800	TOYOT	2004	-	3	N	-	M	G
2	DRVR	66	M	O	HNBD		RGT TURN	W	-	3132	INTER	2022	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	68	F	1	0	M	G

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Primary Rd **SR-57 N/B FROM** *Distance (ft)* **80.0** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HIGHWAY W/B** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021874** *Collision Date* **20231102** *Time* **2345** *Day* **THU**
Primary Collision Factor **DRVR ALC\|DRG** *Violation* **23152A** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231106**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	M	O	HBD-UI		OTHER	N	A	0100	VOLK	2019	-	3	A	22107	H L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57 N/B FROM** *Distance (ft)* **50.0** *Direction* **N** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HWY W/B** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021874** *Collision Date* **20230615** *Time* **2120** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230621**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	20	M	A	HNBD		RAN OFF RD	N	A	0100	MERZ	2011	-	3	H	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	20	M	1	0	L	G

Primary Rd **SR-57 N/B TO** *Distance (ft)* **15.0** *Direction* **S** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HIGHWAY** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021377** *Collision Date* **20231020** *Time* **2015** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231030**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	43	F	W	HNBD		PROC ST	N	A	0700	BUIC	2016	-	3	H	-	M G
2	DRVR	29	-	H	HNBD		STOPPED	N	A	0700	HYUN	2020	-	3	G	H	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57 N/B TO** *Distance (ft)* **500.** *Direction* **S** *Secondary Rd* **IMPERIAL HWY** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HWY** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **022639** *Collision Date* **20231217** *Time* **1625** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	33	M	W	HNBD		PROC ST	N	A	0100	HOND	2017	-	3	H	-	M G
2	DRVR	48	M	W	HNBD		STOPPED	N	A	0100	FORD	2019	-	3	H	-	M G
3	DRVR	998	-		IMP UNK	IMP UNK	STOPPED	N	-	9900	-		-	4	H	-	B B

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57 N/B TO** *Distance (ft)* **95.0** *Direction* **S** *Secondary Rd* **IMPERIAL** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **IMPERIAL HWY** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **021397** *Collision Date* **20231120** *Time* **0940** *Day* **MON**
Primary Collision Factor **STRTNG\|BCKNG** *Violation* **22106** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231128**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	56	M	H	HNBD		STOPPED	N	F	2500	FRHT	2012	-	3	H	-	M G
2	DRVR	36	F	H	IMP UNK	IMP UNK	STOPPED	N	B	0731	HOND	2016	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **SR-57** *Distance (ft)* **5808** *Direction* **N** *Secondary Rd* **TONNER CYN RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019320** *Collision Date* **20240219** *Time* **1110** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240227**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	21	M	A	HNBD		PROC ST	N	A	0100	SUBA	2024	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **3402** *Direction* **N** *Secondary Rd* **TONNER CYN RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019320** *Collision Date* **20240219** *Time* **1130** *Day* **MON**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240227**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	44	M	W	HNBD		MERGING	N	D	2200	FORD	2018	-	3	N	-	M G
2	DRVR	43	F	A	HNBD		PROC ST	N	A	0100	TESL	2021	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **60.0** *Direction* **S** *Secondary Rd* **TONNER CYN RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **019320** *Collision Date* **20240221** *Time* **1455** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240304**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	27	M	H	HNBD		PROC ST	N	A	0700	TOYT	2018	-	3	N	-	M G
2	DRVR	58	M	H	HNBD		SLOWING	N	D	2200	RAM	2017	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **2112** *Direction* **S** *Secondary Rd* **TONNER CYN RD** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **022866** *Collision Date* **20240302** *Time* **0015** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240306**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - NO** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	N	-	9900	-		-	4	N	-	B B
2	DRVR	29	M	A	HNBD		PROC ST	N	A	0100	NISS	2022	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **SR-57** *Distance (ft)* **40.0** *Direction* **N** *Secondary Rd* **IMPERIAL HWY** *NCIC* **9675** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** **NORTHBOUND FROM IMPERIAL HWY WESTBOUND** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **570** *Type* **1** *CalTrans* *Badge* **022046** *Collision Date* **20230406** *Time* **2146** *Day* **THU**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20230417**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	36	M	H	HNBD		RAN OFF RD	N	D	2200	FORD	2020	-	3	H	-	L G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd SR-57 | Distance (ft) 10.0 | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 021305 | Collision Date 20230410 | Time 2015 | Day MON
Primary Collision Factor IMPROP TURN | Violation 22107 | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20230612
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DARK - ST | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

NORTHBOUND TO IMPERIAL HIGHWAY

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	OTHER	N	-	9900	-		-	4	H	-	B B
2	DRVR	26	F	H	HNBD		STOPPED	N	A	0700	TOYT	2022	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 175. | Direction S | Secondary Rd IMPERIAL | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 016748 | Collision Date 20230726 | Time 1122 | Day WED
Primary Collision Factor LANE CHANGE | Violation 21658A | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20230913
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run MSDMNR | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

NORTHBOUND TO IMPERIAL HIGHWAY

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	F	W	IMP UNK	IMP UNK	CHANG LN	N	A	0100	FORD	2015	-	4	H	-	M G
2	DRVR	42	M	H	HNBD		PROC ST	N	D	2200	TOYT	2006	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 950. | Direction S | Secondary Rd LAMBERT RD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 019320 | Collision Date 20231008 | Time 1055 | Day SUN
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20231017
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

NORTHBOUND TO LAMBERT RD

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	37	F	H	HNBD		PROC ST	N	A	0700	HOND	2012	-	3	H	-	M G
2	DRVR	42	F	H	HNBD		STOPPED	N	A	0700	FORD	2020	-	3	H	-	M G
3	DRVR	29	M	H	HNBD		STOPPED	N	A	0100	CHEV	2020	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 160. | Direction S | Secondary Rd LAMBERT RD. | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 022159 | Collision Date 20231016 | Time 2149 | Day MON
Primary Collision Factor LANE CHANGE | Violation 21658A | Collision Type SIDESWIPE | Severity PDO | #Killed 0 | #Injured 0 | Tow Away? N | Process Date 20231026
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DARK - ST | Ped Action | Cntrl Dev NT PRS/FCTR | Loc Type | Ramp/Int

NORTHBOUND TO LAMBERT RD.

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	53	M	H	HNBD		CHANG LN	N	A	0100	NISS	2015	-	3	H	-	M G
2	DRVR	35	M	W	HNBD		PROC ST	N	A	0100	CHEV	2021	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd SR-57 | Distance (ft) 150. | Direction S | Secondary Rd LAMBERT RD | NCIC 9675 | State Hwy? Y | Route | Postmile Prefix | Postmile | Side of Hwy
City Brea | County Orange | Population 4 | Rpt Dist | Beat 570 | Type 1 | CalTrans | Badge 016748 | Collision Date 20230702 | Time 1311 | Day SUN
Primary Collision Factor UNSAFE SPEED | Violation 22350 | Collision Type REAR END | Severity INJURY | #Killed 0 | #Injured 1 | Tow Away? Y | Process Date 20230711
Weather1 CLEAR | Weather2 | Rdwy Surface DRY | Rdwy Cond1 NO UNUSL CND | Rdwy Cond2 | Spec Cond 0
Hit and Run | Motor Vehicle Involved With OTHER MV | Lighting DAYLIGHT | Ped Action | Cntrl Dev FNCTNG | Loc Type | Ramp/Int

NORTHBOUND TO LAMBERT ROAD

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	26	M	H	HNBD		PROC ST	N	D	2200	CHEV	1999	-	3	H	-	M G
2	DRVR	55	M	W	HNBD		STOPPED	N	A	0700	ACUR	2010	-	3	H	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	55	M	1	0	M	G

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1728** *Collision Date* **20230703** *Time* **2037** *Day* **MON**
Primary Collision Factor **STOP SGN|SIG** *Violation* **21453A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230728**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	19	F	W	HNBD		PROC ST	W	A	0100	HONDA	2012	-	3	N	-	L	G
2	DRVR	56	F	W	HNBD		LFT TURN	S	A	0700	TESLA	2021	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	SERIOUS	19	F	1	0	L	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **30.0** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **012** *Type* **0** *CalTrans* *Badge* **1642** *Collision Date* **20230713** *Time* **0043** *Day* **THU**
Primary Collision Factor **IMPROP TURN** *Violation* **22100B** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230817**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **MV ON OTHER RD** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	U-TURN	E	-	9900	-		-	-	N	-	-	-
2	DRVR	20	M	H	HNBD		LFT TURN	E	A	0100	HONDA	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **400.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20230720** *Time* **1751** *Day* **THU**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **3** *Tow Away?* **Y** *Process Date* **20230814**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1	DRVR	43	F	W	HNBD		PROC ST	E	A	0700	BMW	2005	-	3	N	-	M	G
2	DRVR	68	M	W	HNBD		STOPPED	E	A	0100	TOYOT	2017	-	3	N	-	M	G
3	DRVR	70	F	A	HNBD		PROC ST	E	A	0700	TOYOT	2014	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	68	M	1	0	M	G
DRVR	POSSIBL	70	F	1	0	M	G
PASS	POSSIBL	10	M	3	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **4.00** *Direction* **W** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1729** *Collision Date* **20230728** *Time* **1426** *Day* **FRI**
Primary Collision Factor **WRONG SIDE** *Violation* **21651B** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230830**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	20	M	H	IMP UNK	IMP UNK	WRONG WY	W	A	0100	SCION	2004	-	-	N	-	-	-
2	DRVR	27	F	B	HNBD		STOPPED	E	A	0100	VOLKS	2013	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **160.** *Direction* **E** *Secondary Rd* **ASSOCIATED RD** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20231012** *Time* **0925** *Day* **THU**
Primary Collision Factor **LANE CHANGE** *Violation* **21658A** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231030**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	CHANG LN	E	F	2700	-		-	-	N	-	-	-
2	DRVR	43	F	O	HNBD		PROC ST	E	A	0100	BMW	2016	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **15.0** *Direction* **E** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1718** *Collision Date* **20230820** *Time* **1529** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231011**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	W	A	0100	CHEVR	2017	-	-	N	-	- -
2	DRVR	46	M	A	HNBD		STOPPED	W	A	0700	MERCE	2022	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **50.0** *Direction* **W** *Secondary Rd* **BREA PLAZA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1671** *Collision Date* **20240119** *Time* **1448** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20240207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	36	M	O	HNBD		CHANG LN	W	A	0100	HONDA	2020	-	3	N	-	M G
2	DRVR	58	M	O	HNBD		PROC ST	W	F	2700	MACK	2016	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **70.0** *Direction* **W** *Secondary Rd* **CASTLE GATE LN** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20231222** *Time* **1118** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20240116**
Weather1 **RAINING** *Weather2* *Rdwy Surface* **WET** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	74	F	O	HNBD		SLOWING	W	A	0700	FORD	2016	-	3	N	-	M G
2	DRVR	78	F	O	HNBD		PROC ST	W	A	0100	MERCE	2009	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	POSSIBL	74	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **213.** *Direction* **W** *Secondary Rd* **CATALPA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1675** *Collision Date* **20231122** *Time* **1717** *Day* **WED**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20231212**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	30	F	O	HNBD		PROC ST	E	D	2200	TOYOT	1999	-	1	A	-	L G
2	DRVR	51	F	O	HNBD		PROC ST	E	A	0700	MERCE	2024	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **78.0** *Direction* **W** *Secondary Rd* **GATEWAY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230323** *Time* **1340** *Day* **THU**
Primary Collision Factor **OTHER IMPROP DRV** *Violation* *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230509**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	22	M	H	HNBD		PROC ST	E	D	2200	FORD	2022	-	1	A	N	M G
2	DRVR	47	F	H	HNBD		STOPPED	E	A	0100	TOYOT	2011	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **0.00** *Direction* *Secondary Rd* **LA CRESCENTA** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1710** *Collision Date* **20240113** *Time* **1315** *Day* **SAT**
Primary Collision Factor **OTHER HAZ** *Violation* **21451A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20240207**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **MV ON OTHER RD** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	83	F	O	HNBD		PROC ST	W	A	0100	DODGE	2006	-	3	N	-	M	G
2	DRVR	31	M	O	HNBD		LFT TURN	S	A	0100	TESLA	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
DRVR	MINOR	83	F	1	0	M	G
DRVR	MINOR	31	M	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **450.** *Direction* **E** *Secondary Rd* **LAUREL AV (E)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* *Type* **0** *CalTrans* *Badge* **1620** *Collision Date* **20230823** *Time* **2016** *Day* **WED**
Primary Collision Factor **R-O-W AUTO** *Violation* **21804A** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **N** *Process Date* **20230922**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **BICYCLE** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	59	M	W	HNBD		RGT TURN	N	A	0700	MAZDA	2015	-	3	N	-	M	G
2	BICY	20	M	O	HNBD		PROC ST	W	L	0400	UNKNO		-	3	N	-	-	A

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected
BICY	MINOR	20	M	1	0	-	A

Primary Rd **IMPERIAL HY** *Distance (ft)* **27.0** *Direction* **E** *Secondary Rd* **ORANGE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1717** *Collision Date* **20240209** *Time* **0846** *Day* **FRI**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **HIT OBJECT** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **Y** *Process Date* **20240227**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **FIXED OBJ** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	37	F	O	HNBD		PROC ST	E	A	0100	TESLA	2022	-	3	M	-	L	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **10.0** *Direction* **W** *Secondary Rd* **PINE AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1734** *Collision Date* **20240106** *Time* **1649** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20240227**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M		IMP UNK	IMP UNK	PROC ST	E	-	9900	-		-	-	N	-	-	-
2	DRVR	26	F	O	HNBD		STOPPED	E	A	0100	KIA	2015	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **IMPERIAL HY** *Distance (ft)* **79.0** *Direction* **W** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1727** *Collision Date* **20230507** *Time* **1713** *Day* **SUN**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230524**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety	Equip
1F	DRVR	998	M	H	IMP UNK	IMP UNK	PROC ST	E	-	9900	-		-	-	N	-	-	-
2	DRVR	38	F	O	HNBD		STOPPED	E	A	0100	TOYOT	2018	-	3	N	-	M	G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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Primary Rd **IMPERIAL HY** *Distance (ft)* **120.** *Direction* **E** *Secondary Rd* **PLACENTIA AV** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230721** *Time* **1449** *Day* **FRI**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230816**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info																	Victim Info							
Party	*Type*	*Age*	*Sex*	*Race*	*Sobriety1*	*Sobriety2*	*Move Pre*	*Dir*	*SW Veh*	*CHP Veh*	*Make*	*Year*	*SP Info*	*OAF1*	*Viol*	*OAF2*	*Safety*	*Equip*	*ROLE*	*Ext Of Inj*	*AGE*	*Sex*	*Seat Pos*	*Safety*	*EQUIP*	*Ejected*
1F	DRVR	80	M	W	HNBD		PROC ST	W	A	0100	AUDI	2013	-	3	N	-	L	G								
2	DRVR	65	M	W	HNBD		STOPPED	W	A	0100	KIA	2014	-	3	N	-	M	G								
3	DRVR	25	F	H	HNBD		STOPPED	W	A	0100	TOYOT	2020	-	3	N	-	M	G	DRVR	POSSIBL	25	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **15.0** *Direction* **E** *Secondary Rd* **PUENTE ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **014** *Type* **0** *CalTrans* *Badge* **1661** *Collision Date* **20230328** *Time* **1830** *Day* **TUE**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **2** *Tow Away?* **Y** *Process Date* **20230509**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info																	Victim Info							
Party	*Type*	*Age*	*Sex*	*Race*	*Sobriety1*	*Sobriety2*	*Move Pre*	*Dir*	*SW Veh*	*CHP Veh*	*Make*	*Year*	*SP Info*	*OAF1*	*Viol*	*OAF2*	*Safety*	*Equip*	*ROLE*	*Ext Of Inj*	*AGE*	*Sex*	*Seat Pos*	*Safety*	*EQUIP*	*Ejected*
1F	DRVR	43	M	W	HNBD		CHANG LN	W	A	0100	HONDA	2009	-	3	N	-	M	G	DRVR	POSSIBL	43	M	1	0	M	G
																			PASS	POSSIBL	33	F	3	0	M	G
2	DRVR	37	F	H	HNBD		PROC ST	W	D	7200	DODGE	2018	-	3	N	-	M	G								
3	DRVR	49	M	O	HNBD		PROC ST	W	A	0800	DODGE	2006	-	3	N	-	M	G								
4	DRVR	21	F	W	HNBD		PROC ST	W	A	0700	MAZDA	2021	-	3	N	-	M	G								

Primary Rd **IMPERIAL HY** *Distance (ft)* **485.** *Direction* **E** *Secondary Rd* **PUENTE ST** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1720** *Collision Date* **20231107** *Time* **1410** *Day* **TUE**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20231128**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info																	Victim Info							
Party	*Type*	*Age*	*Sex*	*Race*	*Sobriety1*	*Sobriety2*	*Move Pre*	*Dir*	*SW Veh*	*CHP Veh*	*Make*	*Year*	*SP Info*	*OAF1*	*Viol*	*OAF2*	*Safety*	*Equip*	*ROLE*	*Ext Of Inj*	*AGE*	*Sex*	*Seat Pos*	*Safety*	*EQUIP*	*Ejected*
1F	DRVR	44	M	O	HNBD		PROC ST	W	A	0100	TOYOT	2012	-	3	A	N	M	G								
2	DRVR	57	F	O	HNBD		PROC ST	W	A	0100	HONDA	2012	-	3	N	-	M	G								
3	DRVR	75	F	O	HNBD		PROC ST	W	A	0100	LEXUS	2013	-	3	N	-	M	G	DRVR	POSSIBL	75	F	1	0	M	G

Primary Rd **IMPERIAL HY** *Distance (ft)* **25.0** *Direction* **W** *Secondary Rd* **RANDOLPH AV (E)** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **014** *Type* **0** *CalTrans* *Badge* **1684** *Collision Date* **20230421** *Time* **1136** *Day* **FRI**
Primary Collision Factor **R-O-W AUTO** *Violation* **21453B** *Collision Type* **BROADSIDE** *Severity* **INJURY** *#Killed* **0** *#Injured* **1** *Tow Away?* **Y** *Process Date* **20230517**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info																	Victim Info							
Party	*Type*	*Age*	*Sex*	*Race*	*Sobriety1*	*Sobriety2*	*Move Pre*	*Dir*	*SW Veh*	*CHP Veh*	*Make*	*Year*	*SP Info*	*OAF1*	*Viol*	*OAF2*	*Safety*	*Equip*	*ROLE*	*Ext Of Inj*	*AGE*	*Sex*	*Seat Pos*	*Safety*	*EQUIP*	*Ejected*
1F	DRVR	63	F	A	HNBD		RGT TURN	W	A	0700	LAND	2020	-	3	N	-	L	G	DRVR	POSSIBL	63	F	1	0	L	G
2	DRVR	59	F	W	HNBD		LFT TURN	W	A	0100	HYUND	2022	-	3	N	-	M	G								

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Primary Rd **PLACENTIA AV** *Distance (ft)* **15.0** *Direction* **S** *Secondary Rd* **IMPERIAL HY** *NCIC* **3002** *State Hwy?* **Y** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **012** *Type* **0** *CalTrans* *Badge* **1718** *Collision Date* **20230527** *Time* **1714** *Day* **SAT**
Primary Collision Factor **UNSAFE SPEED** *Violation* **22350** *Collision Type* **REAR END** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230626**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	D	2200	TOYOT	2003	-	-	N	-	- -
2	DRVR	34	M	A	HNBD		STOPPED	N	A	0700	BMW	2023	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **POPLAR AV** *Distance (ft)* **40.0** *Direction* **N** *Secondary Rd* **BIRCH ST (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* **N/A** *Beat* **013** *Type* **0** *CalTrans* *Badge* **1576** *Collision Date* **20230326** *Time* **1633** *Day* **SUN**
Primary Collision Factor **DRVR ALC|DRG** *Violation* **23152A** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230502**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **FNCTNG** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	28	M	H	HBD-UI		OPPOS LN	N	A	0700	FORD	2003	-	3	A	-	M G
2	DRVR	35	F		HNBD		STOPPED	S	A	0700	SUBAR	2019	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **POPLAR AV** *Distance (ft)* **465.** *Direction* **S** *Secondary Rd* **BIRCH ST (E)** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1719** *Collision Date* **20231106** *Time* **2500** *Day* **MON**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **OTHER** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20231128**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	OTHER	-	-	9900	-		-	-	N	-	- -
2	PRKD	998	-				PARKED	N	A	0700	MAZDA	2010	-	-	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **POPLAR AV** *Distance (ft)* **103.** *Direction* **N** *Secondary Rd* **MADISON WY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1714** *Collision Date* **20230603** *Time* **0422** *Day* **SAT**
Primary Collision Factor **IMPROP TURN** *Violation* **22107** *Collision Type* **SIDESWIPE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230623**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **PKD MV** *Lighting* **DARK - ST** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1F	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	N	-	9900	-		-	-	N	-	- -
2	PRKD	998	-				PARKED	N	A	0100	MAZDA	2010	-	-	N	-	- -

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

Primary Rd **POPLAR AV** *Distance (ft)* **200.** *Direction* **N** *Secondary Rd* **MADISON WY** *NCIC* **3002** *State Hwy?* **N** *Route* *Postmile Prefix* *Postmile* *Side of Hwy*
City **Brea** *County* **Orange** *Population* **4** *Rpt Dist* *Beat* **013** *Type* **0** *CalTrans* *Badge* **1695** *Collision Date* **20230822** *Time* **1015** *Day* **TUE**
Primary Collision Factor **UNKNOWN** *Violation* *Collision Type* **BROADSIDE** *Severity* **PDO** *#Killed* **0** *#Injured* **0** *Tow Away?* **N** *Process Date* **20230922**
Weather1 **CLEAR** *Weather2* *Rdwy Surface* **DRY** *Rdwy Cond1* **NO UNUSL CND** *Rdwy Cond2* *Spec Cond* **0**
Hit and Run **MSDMNR** *Motor Vehicle Involved With* **OTHER MV** *Lighting* **DAYLIGHT** *Ped Action* *Cntrl Dev* **NT PRS/FCTR** *Loc Type* *Ramp/Int*

Party Info

Party	Type	Age	Sex	Race	Sobriety1	Sobriety2	Move Pre	Dir	SW Veh	CHP Veh	Make	Year	SP Info	OAF1	Viol	OAF2	Safety Equip
1	DRVR	998	-		IMP UNK	IMP UNK	PROC ST	S	-	9900	-		-	-	N	-	- -
2	DRVR	38	M	H	HNBD		LFT TURN	N	D	2200	TOYOT	2018	-	3	N	-	M G

Victim Info

ROLE	Ext Of Inj	AGE	Sex	Seat Pos	Safety	EQUIP	Ejected

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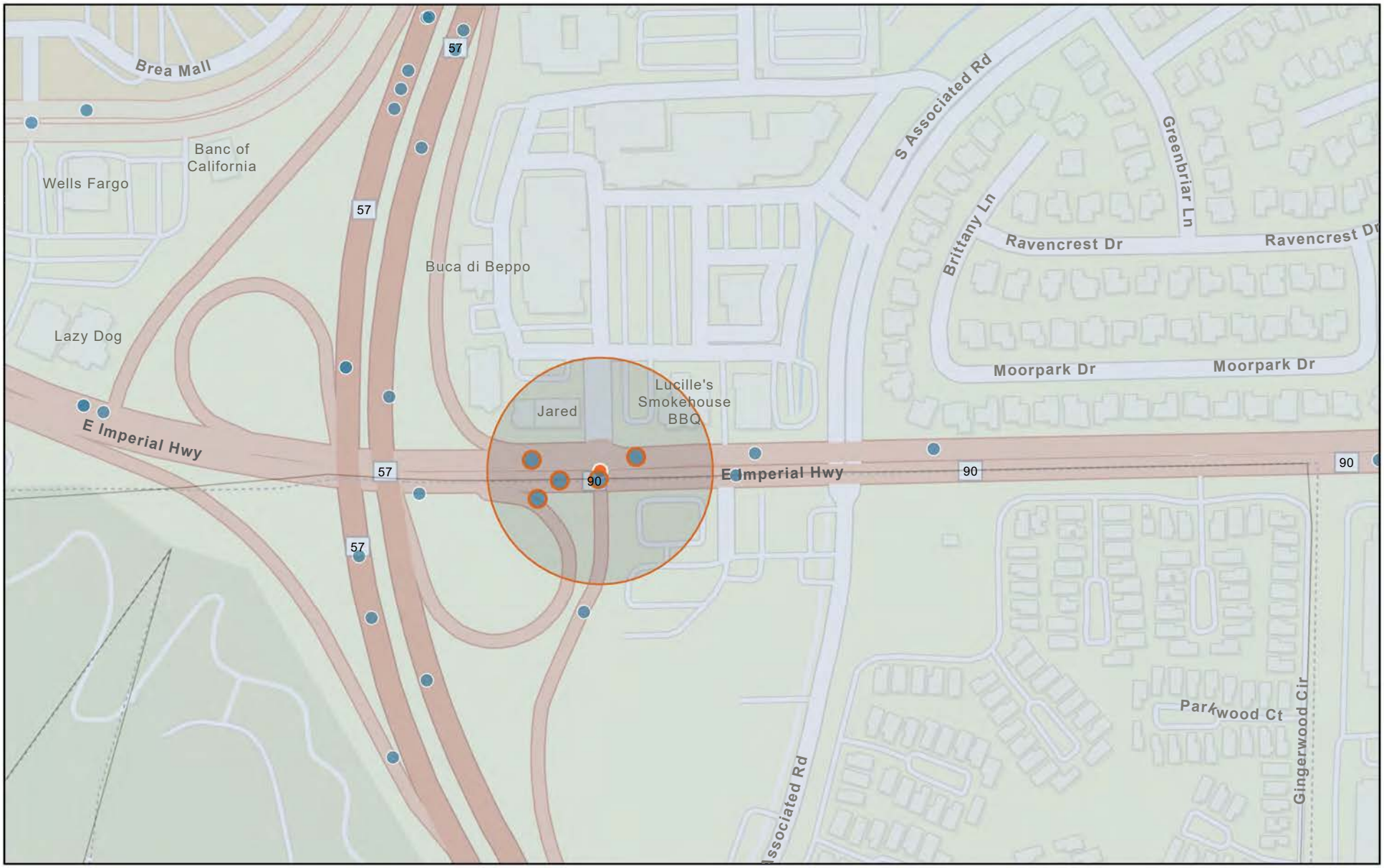
SWITRS GIS Map: Orange, Brea, Fullerton, Placentia 03/21/2019 - 03/20/2020



4/16/2024

SWITRS

Crashes

Crashes (Selected)

1:4,401

0 0.03 0.06 0.12 mi

0 0.05 0.1 0.2 km

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TIMS (https://tims.berkeley.edu), SafeTREC, UC Berkeley

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BerkeleySafeTREC

Crash Details for: Case ID 91179033

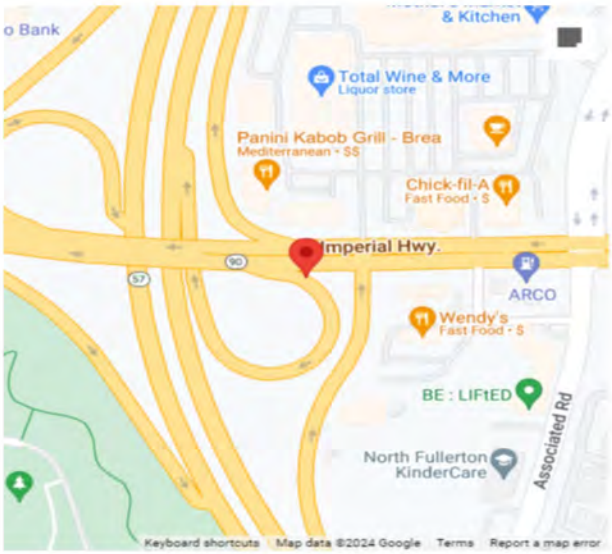
Crash Information

County	Orange
City	Fullerton
Date & Time (M/D/Y)	01/25/2020 13:52
Location (Intersection)	Sr-57 N/b From Imperial Hwy. & Imperial Highway
Dist. & Dir. from Intersection	30.00 ft South
State Highway Info	Route Number 57 Side of Hwy N Postmile N/A Location Type R - Ramp(or Collector)
Geocoded Location	33.9105682, -117.8823395

Type of Crash	D - Broadside
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	18 - Other Than Driver (or Pedestrian)
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View



Street View

Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	C - Ran Off Road
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	A - Stopped

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	84	7 - Possible Injury

BerkeleySafeTREC

Crash Details for: Case ID 8842626

Crash Information

County	Orange
City	Brea
Date & Time (M/D/Y)	03/29/2019 13:52
Location (Intersection)	Imperial Hwy & Rt 57
Dist. & Dir. from Intersection	14.00 ft East
State Highway Info	Route Number 90 Side of Hwy W Postmile R 5.560 Location Type H - Highway
Geocoded Location	33.9108238, -117.8816223

Type of Crash	C - Rear End
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	03 - Unsafe Speed
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View

Street View

Parties: 3

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	West	B - Proceeding Straight
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	West	A - Stopped
3	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	West	A - Stopped

Victims: 3

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	58	7 - Possible Injury

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
2	1 - Driver	F - Female	76	7 - Possible Injury
3	1 - Driver	F - Female	51	7 - Possible Injury

BerkeleySafeTREC

Crash Details for: Case ID 9020952

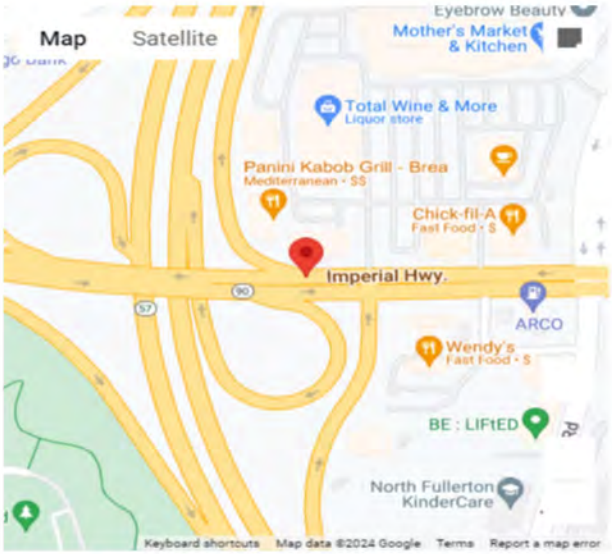
Crash Information

County	Orange
City	Brea
Date & Time (M/D/Y)	12/22/2019 15:34
Location (Intersection)	Imperial Hwy & Rt 57
Dist. & Dir. from Intersection	111.00 ft West
State Highway Info	Route Number 90 Side of Hwy W Postmile R 5.520 Location Type H - Highway
Geocoded Location	33.9108047, -117.8823853

Type of Crash	C - Rear End
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	03 - Unsafe Speed
Weather	B - Cloudy
Alcohol Involved	No

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View



Street View

Parties: 2

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	West	H - Slowing/Stopping
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	West	A - Stopped

Victims: 2

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	2 - Passenger	F - Female	0	0 - No Injury
2	1 - Driver	F - Female	52	7 - Possible Injury

BerkeleySafeTREC

Crash Details for: Case ID 9034224

Crash Information

County	Orange
City	Brea
Date & Time (M/D/Y)	12/31/2019 12:54
Location (Intersection)	Imperial Hwy & Rt 57
Dist. & Dir. from Intersection	49.00 ft West
State Highway Info	Route Number 90 Side of Hwy E Postmile R 5.530 Location Type H - Highway
Geocoded Location	33.9106789, -117.8821793

Type of Crash	C - Rear End
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	07 - Unsafe Lane Change
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View

Street View

Parties: 3

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	East	J - Changing Lanes
2	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	East	B - Proceeding Straight
3	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	East	E - Making Left Turn

Victims: 4

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
2	2 - Passenger	F - Female	32	0 - No Injury

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
2	2 - Passenger	M - Male	4	0 - No Injury
2	2 - Passenger	M - Male	0	0 - No Injury
3	1 - Driver	- - Not Stated	23	7 - Possible Injury

BerkeleySafeTREC

Crash Details for: Case ID 8873034

Crash Information

County	Orange
City	Brea
Date & Time (M/D/Y)	05/29/2019 14:50
Location (Intersection)	Imperial Hwy & Rt 57
Dist. & Dir. from Intersection	At Intersection
State Highway Info	Route Number 90 Side of Hwy E Postmile R 5.545 Location Type I - Intersection
Geocoded Location	33.9106865, -117.881897

Type of Crash	D - Broadside
Motor Vehicle Involved With	C - Other Motor Vehicle
Crash Severity	4 - Injury (Complaint of Pain)
PCF Violation Category	12 - Traffic Signals and Signs
Weather	A - Clear
Alcohol Involved	No

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View

Street View

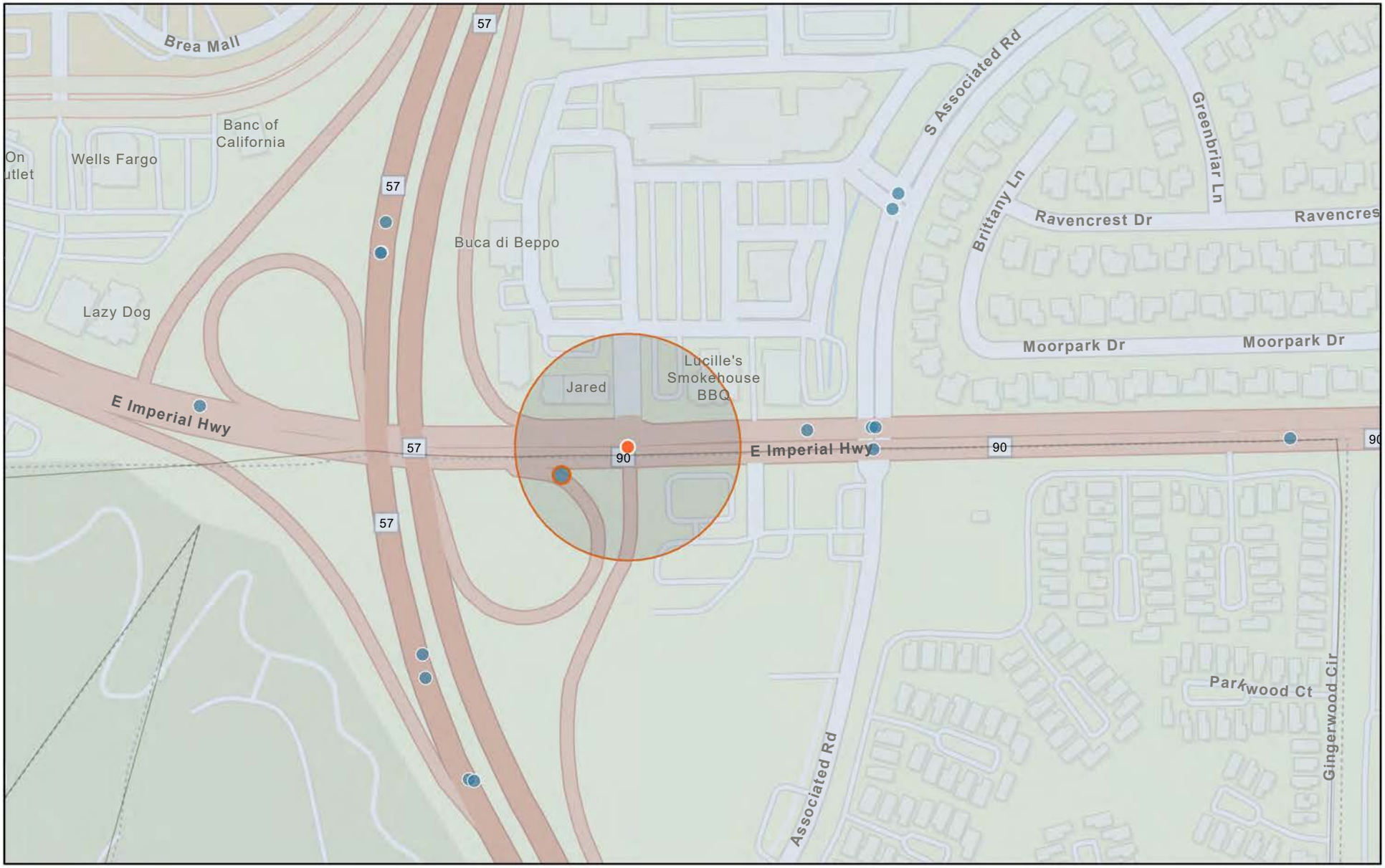
Parties: 3

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	East	B - Proceeding Straight
2	1 - Driver (including Hit and Run)	D - Pickup or Panel Truck	No	North	E - Making Left Turn
3	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	No	North	E - Making Left Turn

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
3	1 - Driver	M - Male	26	7 - Possible Injury

SWITRS GIS Map: Orange, Brea, Fullerton, Placentia 03/21/2020 - 03/20/2021



4/16/2024

SWITRS

Crashes

Crashes (Selected)

1:4,401

0 0.03 0.06 0.12 mi

0 0.05 0.1 0.2 km

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BerkeleySafeTREC

Crash Details for: Case ID 91288623

Crash Information

County	Orange
City	Brea
Date & Time (M/D/Y)	08/08/2020 00:40
Location (Intersection)	Sr-57 Northbound From Imperial Hwy & Imperial Highway
Dist. & Dir. from Intersection	694.00 ft South
State Highway Info	Route Number 57 Side of Hwy N Postmile N/A Location Type R - Ramp(or Collector)
Geocoded Location	33.9105682, -117.8823776

Type of Crash	E - Hit Object
Motor Vehicle Involved With	I - Fixed Object
Crash Severity	3 - Injury (Other Visible)
PCF Violation Category	01 - Driving or Bicycling Under the Influence of Alcohol or Drug
Weather	A - Clear
Alcohol Involved	Yes

Pedestrian Crash	No	Bicycle Crash	No
Motorcycle Crash	No	Truck Crash	No

Map View

Street View

Parties: 1

Party Number	Party Type	Statewide Vehicle Type	At Fault	Party Direction	Movement Preceding Collision
1	1 - Driver (including Hit and Run)	A - Passenger Car/Station Wagon	Yes	North	R - Other

Victims: 1

Party Number	Victim Role	Victim Gender	Victim Age	Victim Degree of Injury
1	1 - Driver	F - Female	26	6 - Suspected Minor Injury

Appendix K

Neighborhood Cut-Through Counts

RK19750.1
JN: 2827-2023-05

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2024
ROUTE SUMMARY
Weekday AM: 7:00 AM - 9:00 AM
Weekday PM: 4:00 PM - 6:00 PM
Saturday MD: 12:00 PM - 3:00 PM

Location List:

OD - 1A:	Reedbay Ave S/ Birch to Greenbriar Ln E/ Plum Ave (SB)
OD - 1B:	Greenbriar Ln E/ Plum Ave to Reedbay Ave S/ Birch (NB)

Route List:		**Origin Volume**	**Destination Volume**	**Matches**	**% Match**
Route 1A - AM	1A TO 1B	48	63	2	4%
Route 1A - PM	1A TO 1B	90	35	6	7%
Route 1A - SAT	1A TO 1B	80	56	1	1%
Route 1B - AM	1B TO 1A	25	109	4	16%
Route 1B - PM	1B TO 1A	68	67	0	0%
Route 1B - SAT	1B TO 1A	60	77	1	2%

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1A - From 1A to 1B
Reedbay Ave S/ Birch to Greenbriar Ln E/ Plum Ave (SB)
7:00 AM - 9:00 AM

	Enter at Origin:		**Exit at Destination:**	
	Reedbay Ave S/ Birch		Greenbriar Ln E/ Plum Ave	**Matches**
Time	SB Entering	**Time**	SB Exiting	
7:11:36	Beige Pickup - Work Rack	7:01:58	Silver Toyota Van	
7:14:28	White Chevy Box Truck	7:04:41	Silver Toyota Tacoma	
		7:06:10	Silver Lexus SUV	
		7:06:32	White Lexus SUV	
		7:06:55	Black BMW SUV	
		7:07:27	White Toyota Tacoma	
		7:09:26	Sivler 4 Door Sedan	
		7:11:04	Silver Toyota Corolla	
		7:11:27	Silver SUV	
		7:13:24	Silver Nissan SUV	
7:18:11	White Ford Pickup Truck	7:19:05	Silver Tesla	
7:24:50	White Ford Van	7:19:26	White GMC Yukon	
		7:20:27	White Toyota Van	
		7:20:33	Black SUV	
		7:20 58	Red Toyota Van	
		7:27:03	Silver Mazda Sedan	
7:32:12	Silver Toyota Rav4	7:30:15	Black Subaru Sedan	
7:32:46	Red Toyota Van	7:31:25	Yellow School Bus	
7:33:49	White Dodge SUV	7:31:34	Black Dodge Ram Truck	
7:33:55	Bronze Toyota Tacoma	7:32:02	White Honda Sedan	
		7:35:16	Black Honda CRV	
		7:36:27	Black Tesla	
		7:36:56	Silver Toyota Prius	
		7:37:18	Black Chevy Sedan	
		7:42:22	Black Kia SUV	
		7:42:26	Grey Toyota SUV	
		7:43:06	White Toyota Van	
		7:43:38	Grey Ford Truck	
		7:45:17	Grey Chevy SUV	
		7:45:39	Black Ford SUV	
7:47:05	Black Kia SUV	7:47:40	Silver Kia Soul	
7:47:31	Grey/Silver Toyota Rav4	7:48:01	Grey Scion Sedan	
7:51:28	Large White Work Truck	7:48:35	Red SUV	
7:55:52	White Honda CRV	7:56:13	White BMW Sedan	
		7:56:36	Silver Toyota Corolla	
8:06:29	White Chevy SUV	8:00:13	Small Red SUV	
8:07:29	Grey Ford Explorer	8:03:01	Black Nissan Sedan	
8:08:53	Black Mazda Miata	8:04:01	Grey Toyota Tacoma	
8:10:10	White Toyota Van	8:06:07	Whie BMW Sedan	
8:10:45	White Tesla SUV	8:07:47	White Kia Telluride	X
		8:08:15	Yellow School Bus	
		8:11:40	White Lexus SUV	
		8:11:58	Grey Nissan Sedan	
		8:13:12	White Ford Flex	
8:15:11	Silver Lexus SUV	8:14:43	Tan BMW Sedan	
8:16:26	Red Toyota Van	8:15:15	White Tesla SUV	
8:18:43	Black VW SUV	8:18:47	Grey SUV	
8:19:00	White Tank Truck	8:25:37	Silver Toyota Corolla	
8:19:45	Silver Hyundai Sedan	8:28:06	Black Audi Sedan	
8:20:55	Silver Toyota SUV			
8:21:57	Silver/Grey Honda CRV			
8:26:11	Blue/Silver SUV			

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1A - From 1A to 1B

8:26:25	Silver Kia Telluride			
8:30:17	Black BMW Sedan	8:32:45	Silver Toyota Corolla	
8:30:53	White Tesla SUV	8:35:07	Black Ford SUV	
8:33:12	White Lexus SUV	8:44:05	White Toyota Corolla Hatchback	
8:33:18	Silver Mercedes Sedan	8:44:25	Red Sedan	
8:35:43	Tan Honda Civic			
8:40:55	Silver/Grey SUV			
8:41:46	Black Chevy Truck			
8:42:27	Black Tesla SUV			
8:43:57	Black Mercedes SUV			
8:44:36	Silver Toyota Corolla			
8:45:22	Silver SUV	8:46:38	White Sedan	
8:46:34	White Toyota Highlander	8:48:19	Grey Toyota Sequoia	
8:47:23	Black Truck w/Bed Cover	8:50:34	Grey Chevy SUV	
8:49:08	Black SUV	8:51:37	Grey Ford Explorer	
8:50:08	Bronze Jeep Wrangler	8:54:35	Grey Subaru Crossover	X
8:54:41	White Honda Accord	8:55:27	Blue Toyota Rav 4	
8:55:03	Grey SUV	8:55:37	Silver Toyota Tacoma	
8:55:18	Silver/Grey Ford Sedan	8:56:57	Bronze Jeep Wrangler	
8:58:28	Black SUV	8:57:29	White SUV	
8:58:47	White Ford Flex	8:58:29	Silver Toyota Rav 4	
TOTALS	**48**		**63**	**2**

% of Matches from Origin to Destination: **4%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1A - From 1A to 1B
Reedbay Ave S/ Birch to Greenbriar Ln E/ Plum Ave (SB)
4:00 PM - 6:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Reedbay Ave S/ Birch		Greenbriar Ln E/ Plum Ave	**Matches**
Time	SB Entering	**Time**	SB Exiting	
16:00:00		16:00:00		
16:02:00	Black BMW Sedan	16:01:14	Black SUV	
16:03:06	Blue Tesla SUV	16:02:28	Amazon Delivery Truck	
16:03:23	White Orkin Work Truck	16:10:10	White Lexus SUV	
16:06:18	Black Truck	16:13:08	White Jeep SUV	
16:06:45	Silver/Blue SUV	16:13:22	Silver Toyota Camry	
16:08:20	Black Mini Cooper	16:13:30	Silver Toyota Camry	
16:09:50	Red Toyota Van	16:14:23	Red Toyota Van	X
16:09:58	Silver SUV			
16:10:04	White Chevy Sedan			
16:10:56	Red Chevy Sedan			
16:12:27	White Jeep Wrangler			
16:13:18	White Honda Pilot			
16:14:01	Black Sedan			
16:15:12	White Ford Truck			X
16:16:41	White Mercedes Sedan	16:15:00	Light Blue SUV	
16:17:09	White Toyota Highlander	16:16:46	White Ford Truck	
16:18:29	White Lexus SUV	16:18:57	Silver Honda SUV	
16:19:21	Silver Jeep SUV	16:28:51	White VAN	
16:20:23	Silver Honda CRV			
16:20:38	White Toyota 4Runner			
16:26:10	Grey Toyota Camry			
16:27:01	White SUV			
16:28:09	Silver Infiniti Sedan			
16:29:59	Grey Chevy Truck	16:33:42	Silver Toyota Camry	
16:30:04	White Honda SUV			
16:30:44	Black Tesla Sedan			
16:30:47	Grey Toyota Tacoma	16:35:19	White Honda Sedan (U-Turn may not count)	
16:33:57	White Van	16:36:24	Tan Crown Victoria	
16:34:06	Black Sedan	16:39:01	Blue Honda Truck	
16:34:51	Black SUV	16:40:25	White Van	
16:35:38	White Lexus Sedan	16:40:28	Blue Toyota Van	
16:37:37	Black Toyota Corolla	16:44:09	Grey Honda Accord	
16:37:42	Blue BMW Sedan			
16:37:55	Silver Truck			
16:41:15	Grey Honda Accord			X
16:41:19	Red Honda Pilot			
16:42:53	White BMW Sedan			
16:43:03	Black Lexus Sedan			
16:43:05	Grey Chevy Truck			
16:47:54	Black SUV	16:51:25	Grey Honda Accord	
16:48:40	Grey Truck	16:53:26	Black Tesla Sedan	
16:50:22	Grey Chysler Van	16:53:49	Black Kia Telluride	
16:51:56	Grey Honda Accord	16:54:11	Silver Honda CRV	
16:53:45	Black Cadillac Escalade			
16:56:29	Grey Kia Telluride			
16:57:16	Silver Sedan			
17:01:07	White SUV	17:03:41	Silver Honda Prelude	
17:01:34	Grey SUV	17:08:59	Black Dodge Truck	
17:02:47	Grey Honda Accord	17:11:21	Silver Nissan Altima	
17:03:09	Black Chevy Truck	17:12:37	White SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1A - From 1A to 1B

17:04:24	Black Dodge Truck	17:13:45	Blue Sedan	X
17:04:33	Black BMW Sedan			
17:05:52	Black Acura Sedan			
17:06:41	Red Toyota Van			
17:08:28	Grey Scion TC			
17:08:58	Silver Nissan Altima			X
17:10:52	White SUV			
17:14:28	Black Chevy Suburban			
17:15:31	White Van	17:15:12	Grey Subaru Crossover	
17:16:36	Black SUV			
17:18:14	Light Blue Toyota Highlander			
17:19:14	Blue Toyota Rav 4			
17:19:33	Silver Honda Prelude			
17:20:07	Silver SUV			
17:20:51	Grey Hyundai Sedan			
17:22:09	Dark Red Van			
17:22:45	White Jeep SUV			
17:24:55	White Ford Explorer			
17:24:57	Black Toyota Camry			
17:25:53	Red Tesla SUV			
17:28:14	Black Mercedes Sedan			
19:29:13	White Chevy Truck			
17:31:58	Red Ford Truck	17:33:43	Silver Toyota Prius	
17:33:33	Lifted Black truck	17:34:11	Silver Jeep SUV	
17:34:14	White Tesla SUV	17:35:27	Silver/Grey Honda CRV	
17:35:54	Red Toyota Van	17:39:48	RedToyota Van	X
17:36:41	Black Sedan			
17:38:36	Silver SUV			
17:38:38	Grey Work Van Eagle Air			
17:40:21	Blue Ford Truck			
17:40:25	Silver Lexus SUV			
17:45:38	Red Honda Accord	17:46:41	Silver SUV	
17:46:23	White SUV	17:52:04	White Toyota 4Runner	
17:48:40	Black SUV			
17:49:03	Silver Hatchback			
17:50:37	Grey SUV			
17:51:50	White SUV			
17:54:43	White Toyota Van			
17:56:01	White Sedan			
17:59:10	Black SUV			
TOTALS	**90**		**35**	**6**

% of Matches from Origin to Destination: **7%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 1A - From 1A to 1B
Reedbay Ave S/ Birch to Greenbriar Ln E/ Plum Ave (SB)
12:00 PM to 3:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Reedbay Ave S/ Birch		Greenbriar Ln E/ Plum Ave	**Matches**
Time	SB Entering	**Time**	SB Exiting	
12:00:00		12:00:00		
12:00:41	Silver Hyundai Sedan	12:03:24	Red Toyota Rav4	
12:04:29	Black Sedan	12:03:54	Blue Sedan	
12:07:54	Grey Chevy Truck	12:11:26	Blue Chevy Truck	
12:08:09	White Toyota Corolla Hatchback	12:14:39	Black Kia SUV	
12:09:29	Grey Honda Accord			
12:09:54	Black Sedan			
12:13:00	Red Tesla SUV			
12:13:02	Grey Honda Sedan			
12:13:09	Blue Tesla SUV			
12:23:06	Blue Work Van	12:15:55	Silver Lexus SUV	
12:24:04	Silver SUV	12:20:08	Grey SUV	
12:25:32	Black Kia SUV	12:23:30	Grey Sedan Hatchback	
12:26:09	White Toyota 4 Runner	12:24:29	Red Honda Pilot	
12:27:55	Tan Ford Expedition	12:25:16	White Sedan	
12:29:41	Grey Ford Bronco	12:27:27	Silver Toyota Camry	
12:30:24	White SUV	12:41:44	Black Tesla SUV	
12:31:32	White Sedan	12:42:56	Silver Honda CRV	
12:33:17	Silver Chevy Truck			
12:36:40	Silver SUV			
12:38:13	Silver Lexus SUV			
12:39:00	White Chevy Truck			
12:41:51	Red SUV			
12:42:05	Blue Ford Bronco			
12:42:37	Silver/Beige SUV			
12:44:41	Black SUV			
12:45:48	Black SUV	12:45:53	Black SUV	
12:51:18	Silver Toyota Sequoia	12:47:17	Red Tesla SUV	
12:51:51	White Chevy Truck	12:50:34	White SUV	
13:01:18	Grey Honda Accord	12:58:20	Red SUV	
13:04:16	Black Lexus SUV Lifted	13:04:20	Silver Honda SUV	
13:04:31	Silver/Grey Audi SUV	13:05:01	Gold Toyota Camry	
13:06:00	Silver Mercedes Sedan	13:05:41	Black SUV	
13:07:18	Grey BMW Sedan	13:06:40	Beige Tooyota Corolla	
13:14:02	Black Tesla Sedan	13:07:22	White Mail Car	
13:14:32	Blue Lexus SUV	13:07:38	Grey Tesla Sedan	
13:16:44	Silver Sedan	13:12:04	Grey Tesla SUV	
13:23:36	Silver/Grey Lexus SUV	13:12:44	Silver Hyundai Hatchback Sedan	
13:25:01	Black Jeep SUV	13:13:13	Black SUV	
13:25:11	Blue/Black Toyota Highlander	13:13:14	Grey Scion TC	
13:33:03	Red Ram Truck	13:14:33	Black Ford SUV	
		13:17:29	Blue Tesla Sedan	
		13:20:35	Silver Lexus Sedan	
		13:21:00	Black Sedan	
		13:26:46	Silver SUV	
		13:30:44	Silver/Grey Lexus SUV	
		13:31:10	White SUV	
		13:33:27	White Toyota Prius	
		13:37:24	White Kia Soul	
		13:39:51	Tan Van	
		13:40:24	Black Honda Sedan	
13:46:10	Black SUV	13:46:49	Grey SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 1A - From 1A to 1B

13:47:27	White Nissan Sentra	13:50:28	Silver Chevy Truck	
13:47:29	White Toyota Corolla	13:51:57	Silver Toyota Rav4	
13:49:21	Blue BMW Sedan	13:54:13	White SUV	
13:50:18	Grey Chevy Truck	13:54:26	Red Chevy SUV	
13:50:20	Black Tesla Sedan	13:55:05	Grey Toyota 4 Runner	
13:50:52	Black Sedan	13:57:35	Black SUV	
13:51:34	Silver Sedan	14:01:42	Light Blue Toyota Corolla	
13:51:57	Black Buick SUV			
13:52:02	Silver Toyota Sedan			
13:57:18	Red Honda Pilot			
13:59:01	Silver Ford Flex			
14:03:53	White Toyota 4Runner			
14:04:17	UPS Delivery Truck			
14:06:24	White Toyota Corolla			
14:06:39	Silver Ford Sedan			
14:10:42	Black Lexus Sedan			
14:17:59	Black Ford SUV	14:15:15	Red Toyota Corolla	
14:18:33	Red Lexus SUV	14:15:50	Black Tesla Sedan	
14:19:03	Black Tesla SUV	14:16:31	Tan Chevy Tahoe	
14:19:04	Grey Honda Accord	14:27:28	Black Ford SUV	
14:20:09	Black SUV	14:29:37	White Tesla SUV	
14:20:16	Black Honda Acoord			
14:21:49	Red GMC SUV			
14:23:48	Amazon Prime Truck			
14:24:09	Black Subaru Crossover			
14:24:12	Black Sedan			
14:25:57	Black Honda Sedan			
14:26:58	Dark Red Honda Pilot			
14:33:29	Black Chevy SUV	14:39:32	Dark Red Honda Pilot	
14:36:57	Grey SUV	14:40:42	White Lexus Sedan	
14:37:11	Silver Toyota Corolla	14:42:50	Black Tesla SUV	
14:37:24	Black Toyota Rav4			
14:39:37	Red SUV			
14:40:02	Silver Truck			
14:41:49	Blue Ford Mustang			
14:52:02	White Tesla SUV	14:48:25	Amazon Delivery Truck	
14:56:45	White Chevy SUV			
14:57:28	Red Tesla SUV			
14:57:31	White Dodge Truck	15:02:10	White Dodge Truck	X
TOTALS	**80**		**56**	**1**

% of Matches from Origin to Destination: **1%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1B - From 1B to 1A
Greenbriar Ln E/ Plum Ave to Reedbay Ave S/ Birch (NB)
7:00 AM - 9:00 AM

	Enter at Origin: Greenbriar Ln E/ Plum Ave		**Exit at Destination:** Reedbay Ave S/ Birch	
Time	NB Entering	**Time**	NB Exiting	**Matches**
7:00:00		7:00:00		
7:03:28	Black Mazda SUV	7:02:33	Blue Mini Coooper	
		7:02:34	Light Blue Toyota Highlander	
		7:03:32	White Range Rover	
		7:03:41	White Sedan	
		7:06:39	Grey Honda Civic	
		7:09:56	White SUV	
7:22:57	Blue Subaru Crossover	7:19:27	Black BMW Sedan	
7:23:53	White Work Truck with Green Trailer	7:19:34	Black Hyundai SUV	X
		7:20:45	Silver Toyota Rav4	
		7:20:46	White Toyota Highlander	
		7:23:36	Black Acura Sedan	
		7:24:55	Red Ford Sedan	
		7:26:00	White Work Truck with Green Trailer	
		7:27:25	White Toyota Rav4	
		7:27:43	White Honda Civic	
		7:28:00	Black 2 door BMW	
		7:29:06	Grey Honda Accord	
7:30:15	Yellow School Bus	7:30:28	White Work Van	
7:30:43	Silver SUV	7:31:27	White Toyota Corolla	
7:32:18	Black Chevy Hatchback	7:33:59	White Tesla SUV	
7:32:33	Silver SUV	7:34:03	White Honda SUV	
7:39:53	Tan Crown Victoria	7:35:37	White Toyota Corolla	
7:44:42	Black Honda Civic	7:36:39	Silver Toyota Highlander	
		7:37:50	Red Honda Pilot	
		7:38:50	White Infiniti Sedan	
		7:40:28	Grey Ford Sedan	
		7:40:35	Silver Honda CRV	
		7:41:00	White Tesla SUV	
		7:44:16	Blue BMW Sedan	
		7:47:49	White Lexus SUV	
		7:48:15	White Sedan	
		7:49:59	Grey Ford SUV	
		7:52:28	Large White Work Truck	
7:53:29	White Kia Tellruide	7:53:27	White Chevy Volt	X
7:54:14	Grey Sedan	7:54:13	Grey Ford Explorer	
7:55:20	Red Buick Sedan	7:54:14	Brown Chevy Truck	
		7:55:41	White Kia Telluride	
		7:57:18	Tan Chevy Tahoe	
		7:57:36	Silver Toyota Camry	
		7:58:45	White Toyota Van	
		7:58:47	Black Tesla Sedan	
8:06:40	Yellow School Bus	8:00:22	Grey Chevy SUV	
8:08:51	Grery Nisssan Hatchback	8:03:39	Silver Lexus SUV	
8:10:52	Silver Hyundai Sedan	8:04:23	Black Mazda SUV	X
8:14:32	Grey Crossover	8:04:30	Black Sedan	
8:14:58	Grey Honda SUV	8:05:09	Black VW SUV	X
		8:06:29	Grey Honda Accord	
		8:06:47	Grey Toyota Tacoma	
		8:06:48	Grey Honda CRV	
		8:06:52	Black Toyota Hatchback	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1B - From 1B to 1A

		8:06:57	Silver Hyundai Sedan
		8:07:30	Lifted Black Lexus SUV
		8:10:13	Silver Toyota Van
		8:10:20	Red Toyota Van
		8:11:38	Silver Infiniti Sedan
		08:11:41	White Kia SUV
		8:11:56	Silver Hyundai SUV
		8:12:05	White Box Truck
		8:13:21	Blue Lexus SUV
		8:13:28	Silver Chevy Tahoe
		8:13:30	Silver Toyota Corolla
		8:13:35	Grey Chevy Truck
		8:15:21	Blue Toyota Camry
		8:15:29	Silver Hyundai Sedan
		8:16:05	Black Toyota Rav4
		8:16:32	Black Toyota Truck
		8:16:41	White Honda SUV
		8:16:54	Grey Honda SUV
		8:21:40	Red SUV
		8:22:20	Silver Hyundai Sedan
		8:22:52	Silver SUV
		8:23:38	Yellow Truck
		8:23:40	Black SUV
		8:24:38	Grey Toyota Van
		8:25:55	Silver SUV
		8:26:45	Silver Lexus SUV
		8:27:52	Grey Toyota Camry
		8:28:37	Silver Mercedes Sedan
		8:29:57	Grey/Blue SUV
8:32:57	Black Ford Explorer	8:30:04	White Toyota Van
8:34:44	Red Toyota Tacoma with Rack	8:30:21	White Honda SUV
8:44:48	Red Ford Mustang	8:30:23	White Hyundai Hatchback
		8:31:31	Black Mercedes Sedan
		8:32:41	Grey Tesla Sedan
		8:32:48	White Tank Truck
		8:32:53	Black Audi SUV
		8:33:36	Blue Tesla Sedan
		8:33:55	Grey Toyota Rav4
		8:35:12	Black Mercedes SUV
		8:35:24	Black Ford Truck Camper Shell
		8:36:00	Light Blue Chrysler 300
		8:36:06	Black Tesla SUV
		8:36:28	Tan Chevy Tahoe
		8:37:47	White Tesla SUV
		8:38:35	Silver Subaru Sedan
		8:41:05	Silver/Grey SUV
		8:41:58	White Toyota SUV
		8:42:36	Red SUV
		8:42:48	White Chevy SUV
		8:43:55	White Ford Explorer
		8:44:10	Blue/Grey Chevy SUV
		8:44:47	White Toyota Camry
8:50:36	White Toyota Hatchback	8:47:03	Black Honda Truck
8:51:35	White Sedan	8:47:09	Tan SUV
8:52:02	Silver Honda Civic	8:47:35	Light Blue Van
8:56:30	Black Mazda SUV	8:48:53	Black Scion SUV
8:58:32	Black Mercedes Sedan	8:49:12	Black VW SUV

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1B - From 1B to 1A

		8:55:07	Red Lexus SUV	
		8:56:52	Red Acura Sedan	
TOTALS	**25**		**109**	**4**

% of Matches from Origin to Destination: **16%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1B - From 1B to 1A
Greenbriar Ln E/ Plum Ave to Reedbay Ave S/ Birch (NB)
4:00 PM - 6:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Greenbriar Ln E/ Plum Ave		Reedbay Ave S/ Birch	**Matches**
Time	NB Entering	**Time**	NB Exiting	
16:00:00		16:00:00		
16:01:24	White Work Van	16:00:32	Black Tesla Sedan	
16:01:59	Black Honda Hatchback	16:00:42	Grey Honda Accord	
16:04:45	Silver Toyota Van	16:01:05	Grey Toyota Rav4	
16:07:27	Silver/Grey Lexus Sedan	16:04:20	White Kia SUV	
16:07:40	White Toyota Prius	16:05:10	White Honda Van	
16:10:18	Silver Toyota Camry	16:05:19	White Box truck	
16:11:11	White Chevy Van	16:09:32	Red Honda Pilot	
16:12:41	Black/Blue Honda Accord	16:09:49	Black Buick SUV	
16:12:45	Light Blue Cadillac SUV	16:10:44	White Tesla SUV	
		16:10:47	Grey Toyota Van	
		16:11:51	Light Blue Ford Sedan	
16:16:58	Black Honda Accord	16:15:12	Grey Toyota Tacoma	
16:17:01	Black Dodge Ram	16:16:22	Grey Hyundai Sedan	
16:17:09	Silver Mazda SUV	16:16:30	Grey Honda Civic	
16:18:10	White Work Van	16:17:17	Silver Van	
16:18:35	Black Honda Fit	16:17:47	White Honda SUV	
16:25:46	White Toyota Tacoma	16:19:02	Red Honda Pilot	
16:26:11	Black Honda Accord	16:19:42	White Orkin Toyota Tacoma	
16:27:56	Silver Lexus SUV	16:20:47	Grey Lexus SUV	
16:31:45	Black Tesla SUV	16:21:37	White Lexus SUV	
16:31:50	Black Ford SUV	16:21:41	Balck Toyota Prius	
16:33:16	Silver SUV	16:33:22	White Tesla SUV	
16:35:10	White Honda Hatchback (U-Turn)	16:33:40	Grey Chevy Truck	
16:36:12	White BMW Sedan	16:37:23	White Lexus SUV	
16:36:37	Black Ford Truck	16:39:49	Silver Infiniti Sedan	
16:37:34	Silver Mitsubishi SUV	16:42:53	Grey Tesla SUV	
16:37:39	Silver Nissan SUV	16:43:23	White Toyota Highlander	
16:37:41	Silver SUV	16:43:26	Grey Tesla Sedan	
16:38:13	White Lexus SUV	16:43:39	Black Toyota Rav4	
16:38:16	Silver Toyota Tacoma	16:44:43	Red Tesla SUV	
16:38:37	White Kia SUV	16:44:59	White BMW Sedan	
16:39:05	Black Mazda SUV	16:51:07	Grey Toyota Camry	
16:40:06	Silver/Grey Honda CRV	16:51:39	Black Mazda SUV	
16:41:02	Silver Toyota Camry	16:56:47	White Toyota Van	
16:43:21	White Ford Truck	16:59:10	White Toyota Corolla Hatchback	
16:46:42	Black Jeep SUV	16:59:21	Black Honda Accord	
16:49:24	White Toyota Rav4			
16:51:34	Black Honda Sedan			
16:53:19	White GMC Van			
16:53:36	Grey Nissan SUV			
16:53:58	Black Toyota Van			
16:55:43	White Honda Accord			
17:00:01	Silver Honda Accord	17:00:00	White Nissan Work Van	
17:04:22	Grey Honda Accord	17:01:00	Silver Kia Soul	
17:17:38	Silver Honda SUV	17:01:15	Black Honda CRV	
17:19:44	Black Hyundai Sedan	17:10:19	Grey Crossover	
17:20:21	Silver/Grey SUV	17:12:58	Silver Maxda SUV	
17:21:58	Silver Toyota Corolla	17:13:59	Black BMW Sedan	
17:27:16	White Toyota Van	17:16:31	Silver Chevy Truck	
		17:18:37	Silver Toyota Camry	
		17:20:23	Black/Blue SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 1B - From 1B to 1A

		17:22:39	Blue/Grey Chevy Tahoe	
		17:25:28	Black Honda Accord	
		17:27:37	Silver SUV (Kia/Hyundai?)	
		17:27:47	Grey Honda Accord	
		17:28:45	Grey BMW Sedan	
		17:29:22	White Jeep SUV	
17:30:04	Silver Sedan	17:31:12	Blue Ford Bronco	
17:32:31	White BMW Sedan	17:37:33	Blue SUV	
17:32:42	Black Lexus SUV Lifted	17:41:25	Grey Honda SUV	
17:33:46	Blue Honda Truck	17:41:35	Silver Mazda SUV	
17:35:13	Red Honda Pilot	17:42:11	White Chevy Truck	
17:37:36	White Honda Fit	17:43:24	Red Honda Pilot	
17:39:41	Blue Honda CRV			
17:43:19	Black Kia SUV			
17:45:04	White Range Rover	17:45:08	Silver Toyota Corolla	
17:45:33	Silver Honda SUV	17:45:17	White Jeep Wrangler	
17:46:49	Silver SUV	17:46:50	White Toyota Rav4	
17:47:23	Blue Tesla Sedan	17:46:52	White Toyota Camry	
17:50:05	Tan BMW Sedan	17:47:50	red Sedan	
17:50:39	Black Lexus Sedan	17:51:22	Black Acura Sedan	
17:51:48	White SUV	17:52:10	Silver Chevy SUV	
17:51:51	White Toyota Rav4	17:53:12	Black Kia SUV	
17:52:11	Black Tesla Sedan	17:54:16	White Lexus SUV	
17:52:43	White Toyota Highlander	17:57:03	Red Tesla SUV	
17:55:36	Silver Kia SUV			
17:57:10	Tan Chevy/GMC SUV			
17:59:52	White SUV			
TOTALS	**68**		**67**	**0**

% of Matches from Origin to Destination: **0%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 1B - From 1B to 1A
Greenbriar Ln E/ Plum Ave to Reedbay Ave S/ Birch (NB)
12:00 PM to 3:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Greenbriar Ln E/ Plum Ave		Reedbay Ave S/ Birch	**Matches**
Time	NB Entering	**Time**	NB Exiting	
12:00:00		12:00:00		
12:10:22	White Chevy Truck	12:00:14	Silver Honda SUV	
12:21:27	White BMW Sedan	12:00:51	Silver Toyota Camry	
12:23:10	Grey Hyundai SUV	12:02:44	Grey Chevy Pickup	
12:25:12	Silver Honda CRV	12:08:13	Silver SUV	
12:25:46	Silver Chevy Tahoe	12:11:57	Grey Honda Accord	
12:29:07	Silver/Grey Honda Element	12:12:02	Silver Toyota Highlander	
12:29:12	Grey Tesla SUV	12:13:19	Black SUV	
		12:13:22	White SUV	
		12:13:22	Blue Lexus SUV	
		12:15:29	Red Chevy Corvette	
		12:19:29	White Chevy Truck	
		12:19:35	Silver Infiniti Sedan	
		12:22:27	Tan SUV	
		12:23:08	Red Chevy Tahoe	
		12:25:08	Grey SUV	
		12:25:23	White Van	
		12:27:31	Blue Work Van	
12:31:13	Fedex Truck	12:30:28	White Chevy Truck	
12:31:21	Red Tesla SUV	12:31:03	Blue SUV	
12:32:27	Silver Toyota Sequoia	12:37:25	Black Dodge Ram	
12:33:55	Silver SUV	12:38:33	Silver Mercedes Sedan	
12:35:08	Red Chevy Corvette	12:42:21	White Toyota Rav4	
12:35:19	White Toyota Prius	12:42:26	White SUV	
12:35:49	Silver Chevy Truck			
12:48:30	Silver Nissan SUV	12:50:56	Fedex Truck	
12:50:07	Black Scion SUV	12:52:26	Blue BMW Sedan	
12:50:29	Black Hyundai SUV	12:52:55	White Toyota 4Runner	
12:55:33	Black Ford Explorer	12:52:55	Silver Honda CRV	
12:56:25	White Nissan Sedan	12:52:00	Silver Toyota Corolla	
12:58:21	White Sedan	12:58:31	Balck Mercedes Sedan	X
12:59:39	White Honda Hatchback	13:02:05	Silver Toyota Corolla	
13:00:10	Black Dodge Ram	13:02:08	White Sedan	
13:05:51	White Chevy Van	13:07:44	Silver SUV	
13:10:37	White GMC SUV	13:10:43	Silver Nissan Hatchback	
13:12:34	Black Hyundai Sedan	13:12:26	White Chevy Truck	
13:16:30	White Toyota SUV	13:17:37	Black Tesla Sedan	
13:27:30	Black Hyundai SUV	13:18:52	Red Dodge Ram	
		13:19:19	Grey Chevy Truck	
		13:20:33	Black Sedan	
		13:21:53	Black Honda Sedan	
		13:21:59	White Toyota hatchback	
		13:22:49	Black Ford SUV	
		13:26:52	Blue Toyota Highlander	
		13:27:38	Grey Ford Fusion	
13:31:40	Black Honda Truck	13:34:25	Grey Honda Accord	
13:33:01	Grey Toyota Tacoma	13:34:27	White Toyota Highlander	
13:34:11	Black SUV	13:35:59	White Chevy SUV	
13:36:27	Amazon Delivery Truck	13:36:48	White Mercedes Sedan	
13:38:33	Black Honda Sedan	13:40:03	White Range Rover	
13:38:34	Grey Hyundai SUV			
13:40:28	Black/Grey Jeep SUV			

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 1B - From 1B to 1A

13:47:15	GreyTesla Sedan	13:45:09	Grey Buick SUV	
13:51:17	White Honda Accord	13:46:22	Silver Chevy Truck	
13:54:05	Silver Honda CRV	13:51:11	Black Honda SUV	
13:55:24	Blue/Grey Toyota Sedan	13:52:36	White Toyota Van	
14:01:38	Silver Chevy Tahoe	13:56:01	White Toyota Tundra	
14:02:06	Silver Honda Van	14:02:52	Light Blue Toyota Hatchback	
14:03:19	White Chevy Truck	14:03:02	White Chevy Volt	
14:03:34	Black Toyota Tacoma	14:03:03	Silver Ford Flex	
14:03:39	White Toyota Highlander	14:08:29	Black/Grey Mazda SUV	
14:06:04	Silver Honda SUV	14:08:58	Blue/Grey Audi SUV	
14:06:49	White Chevy Suburban	14:12:52	Blue Ford Bronco	
14:10:13	White Kia SUV	14:13:25	UPS Truck	
14:15:08	Red SUV	14:23:09	Black Ford SUV	
14:15:11	Black Ford SUV	14:23:12	Red Acura Sedan	
14:15:13	White Tesla SUV	14:24:13	White Land Rover	
14:17:36	Grey Honda Accord	14:24:21	Black Ford SUV	
14:22:06	Black Mazda SUV	14:27:02	Blue Ford Mustang	
14:22:40	Bronze Toyota Rav4	14:27:15	Blue Hatchback	
14:23:37	Grey Nissan Sedan			
14:27:01	Silver Chevy Tahoe			
14:28:28	Black Kia Optima			
14:34:00	Silver Ford Fusion	14:32:15	Grey Nissan Sedan	
14:39:04	Black Mitsubishi Sedan	14:33:09	Grey SUV	
		14:41:03	Grey/Blue Chevy Tahoe	
		14:43:49	Red SUV	
14:49:45	White Chevy Work Truck	14:47:43	Amazon Truck	
14:54:09	Grey Crossover	14:53:17	Blue Lexus SUV	
14:55:18	Silver Lexus Sedan	14:55:48	Silver Toyota Van	
		14:56:57	White Range Rover	
		14:57:36	Grey Chevy Truck	
		14:57:37	Grey Toyota Rav4	
		14:57:45	Grey/Blue Honda Accord	
TOTALS	**60**		**77**	**1**

% of Matches from Origin to Destination: **2%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2024
ROUTE SUMMARY
Weekday AM: 7:00 AM - 9:00 AM
Weekday PM: 4:00 PM - 6:00 PM
Saturday MD: 12:00 PM - 3:00 PM

Location List:

OD - 2A:	Greenbriar Ln S/ Associated Rd to Castlegate Ln N/ Imperial Blvd (SB)
OD - 2B:	Castlegate Ln N/ Imperial Blvd to Greenbriar Ln S/ Associated Rd (NB)

Route List:		**Origin Volume**	**Destination Volume**	**Matches**	**% Match**
Route 2A - AM	2A TO 2B	45	116	6	13%
Route 2A - PM	2A TO 2B	85	87	16	19%
Route 2A - SAT	2A TO 2B	95	129	18	19%
Route 2B - AM	2B TO 2A	63	133	24	38%
Route 2B - PM	2B TO 2A	176	121	60	34%
Route 2B - SAT	2B TO 2A	178	147	53	30%

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2A - From 2A to 2B
Greenbriar Ln S/ Associated Rd to Castlegate Ln N/ Imperial Blvd (SB)
7:00 AM - 9:00 AM

	Enter at Origin:		**Exit at Destination:**	
	Greenbriar Ln S/ Associated Rd		Castlegate Ln N/ Imperial Blvd	**Matches**
Time	SB Entering	**Time**	SB Exiting	
7:00:00		7:00:00		
7:06:58	Bronze Toyota Corolla	7:00:48	Black Honda Accord	
7:11:54	White Toyota Tacoma Bed Rack	7:02:56	Silver Kia Soul	
7:14:22	Grey SUV	7:02:57	White Honda CRV	
7:19:56	Red SUV	7:05:01	Silver SUV	
7:22:24	Black Jeep Truck	7:09:06	White Toyota Corolla	
7:28:01	Silver Lexus SUV	7:09:09	Grey Toyota Rav 4	
		7:10:40	Silver Honda Sedan	
		7:11:27	White Honda Accord	
		7:11:29	Silver Chevy SUV	
		7:11:30	Blue/Grey Toyota Corolla	
		7:13:36	Silver Ford SUV	
		7:15:31	White BMW SUV	
		7:15:34	Black Lexus Sedan	
		7:16:07	White Tesla SUV	
		7:18:03	Silver Jeep SUV	
		7:19:05	Black Acura SUV	
		7:20:10	Black Ford Truck	
		7:22:17	White Honda Civic	
		7:24:31	White BMW SUV	
		7:28:49	Silver Toyota Tacoma	
7:30:09	Grey/Black Chevy Tahoe	7:32:28	Black Chevy Volt	
7:30:50	White Honda Civic	7:32:46	Grey Ford Truck	X
7:31:46	Grey Toyota Prius	7:33:20	Silver Honda Accord	
7:32:45	White Chevy Tahoe	7:35:21	Black Ford SUV	
7:33:26	White Honda Fit	7:35:22	White Honda Fit	X
7:43:13	Black SUV	7:36:38	White Honda Civic	
7:44:50	Bronze Toyota Tundra	7:37:10	Black SUV	
		7:37:36	Silver Jeep SUV	
		7:39:04	White Ford SUV	
		7:39:39	Grey/Blue Honda Accord	
		7:41:06	White Toyota SUV	
		7:41:54	Black SUV	
		7:41:55	White Tesla Sedan	
		7:41:57	White Toyota Camry	
		7:42:00	Grey Nissan SUV	
		7:43:30	White BMW SUV	
7:46:35	Bronze/Silver Hyundai Sedan	7:46:33	Black Hyundai SUV	X
7:48:01	Grey Ford Truck	7:46:36	Grey Toyota Van	
7:54:58	Black SUV	7:46:37	White Chrysler 300	
		7:46:36	White Chevy Work Truck	
		7:48:22	Bronze/Silver Hyundai Sedan	
		7:48:24	White Hyundai Hatchback	
		7:49:46	Bronze Toyota Rav4	
		7:50:35	Black Hyundai SUV	
		7:50:37	Black Honda SUV	
		7:52:54	White SUV	
		7:52:55	Grey Honda Accord	
		7:52:54	Grey Acura TL	
		7:54:48	Black Tesla SUV	
		7:56:27	Red Sedan	
8:05:20	Black SUV	7:59:12	Black Toyota Corolla	X

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2A - From 2A to 2B

8:11:42	White Work Truck (Cones)	7:59:13	Black SUV	
8:12:12	Tan Chevy Tahoe	8:03:30	WhiteSUV	X
8:13:10	Grey SUV	8:03:31	White Toyota Camry	
		8:03:46	White Subaru Hatchback	
		8:05:48	Silver Honda SUV	
		8:08:16	Black Mazda SUV	
		8:09:34	White Mercedes Sedan	
		8:09:45	Silver Chevy SUV	
		8:09:58	White Sedan	
		8:10:01	Grey Toyota Rav 4	
		8:10:09	Black SUV	
		8:12:14	Red Toyota Rav4	
		8:12:14	Black Porsche Sedan	
8:16:50	Grey Toyota Van	8:13:48	Red Sedan	
8:21:22	Red Sedan	8:14:27	Grey Ford Explorer	
8:22:55	Red Covnertible Mustang	8:14:28	Yellow School Bus	
8:23:10	White Kia SUV	8:14:30	Tan Toyota Highlander	
8:25:58	Grey/Bronze Toyota Rav4	8:14:31	Tan Chevy Tahoe	
		8:14:33	White Toyota Tacoma	
		8:18:52	Grey Hummer	
		8:19:06	Black Infinti SUV	
		8:20:03	Grey Hyundai SUV	
		8:20:59	White Toyota Van	
		8:21:26	Silver Jeep SUV	
		8:23:06	Grey Cube	
		8:23:08	White Honda Civic	
		8:24:26	Black Honda Civic	
		8:24:55	White Box Truck	
		8:27:29	Grey Honda SUV	
		8:27:57	Black Honda Accord	
		8:28:02	Bronze Toyota Corolla	
		8:29:41	Grey Infiniti Sedan	
		8:29:43	Black Tesla Sedan	
		8:29:46	Black Toyota Prius	
8:33:55	Silver Toyota Corolla	8:30:58	Black Jeep Grand Cherokee	X
8:34:14	Black SUV	8:31:11	Black Toyota Tacoma	
8:35:48	Black Honda SUV	8:31:59	White Kia SUV	
8:36:02	White Chevy SUV	8:32:00	Grey Mazda Sedan	
8:37:50	Grey Kia SUV	8:33:52	Grey Honda SUV	
8:43:07	Blue/Grey Kia/Hyundai SUV	8:35:31	Silver Toyota Corolla	
8:43:12	Black SUV	8:40:28	Blue Subaru Crossover	
		8:40:29	Silver Toyota Tundra	
		8:41:01	Black Rav 4	
		8:42:24	Black SUV	
		8:42:25	White Chevy SUV	
		8:42:26	Silver Ford Truck	
		8:42:41	Grey Toyota SUV	
		8:44:51	Blue Tesla SUV	
8:45:01	White Honda Van	8:48:37	Black Honda Accord	
8:45:08	Grey SUV	8:49:03	Grey Mazda SUV	
8:46:57	White Van w/ Black Top	8:49:08	Black SUV	
8:47:00	Black Mercedes SUV	8:51:21	Bklue 4 Runner	
8:47:31	White Hatchback	8:51:22	Silver Ford Hatchback	
8:47:42	Grey Toyota Corolla	8:51:24	Black Kia SUV	
8:50:36	White Toyota Highlander	8:51:28	Black Honda SUV	
8:51:21	White Ford Explorer	8:53:34	White Toyota Tundra	
8:52:33	Silver Jeep SUV	8:53:34	White SUV	

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2A - From 2A to 2B

8:53:00	Grey Ford Explorer	8:55:15	Silver Hyundai Sedan	X
8:55:22	Black/Blue Tesla SUV	8:55:39	Grey Ford Explorer	
8:58:03	White Chevy Truck	8:55:41	Black BMW SUV	
8:59:28	Silver Toyota Rav 4	8:57:50	Grey Ford Hatchback	
		8:59:55	White Honda Van	
		8:59:57	Grey BMW SUV	
		9:02:05	White Lexus SUV	
		9:02:06	Black Chevy SUV	
TOTALS	**45**		**116**	**6**

% of Matches from Origin to Destination: **13%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2A - From 2A to 2B
Greenbriar Ln S/ Associated Rd to Castlegate Ln N/ Imperial Blvd (SB)
4:00 PM - 6:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Greenbriar Ln S/ Associated Rd		Castlegate Ln N/ Imperial Blvd	**Matches**
Time	SB Entering	**Time**	SB Exiting	
16:00:00		16:00:00		
16:01:50	Black Ford SUV	16:01:18	Chevy Work Truck	X
16:09:28	Silver Toyota Van	16:02:58	Black Ford SUV	
16:11:05	White Honda Van	16:02:59	White Chrysler 300	X
16:13:12	White Mercedes SUV	16:05:05	White Dodge Ram	X
16:14:04	White Work Van	16:05:06	White Van Orange Top	
16:14:25	Amazon Box Truck	16:05:07	Grey SUV	
		16:05:08	White Honda Accord	
		16:05:11	Grey Toyota Prius	
		16:06:22	Silver Honda Civic	
		16:09:28	Gold Hummer	
		16:09:30	White SUV	
		16:10:34	Black Honda Accord	
		16:11:52	Black Ford SUV	
		16:11:53	White Chevy SUV	
		16:12:45	White VW Hatchback	
		16:13:57	White Honda Van	
16:20:56	White SUV	16:16:06	White Mercedes SUV	
16:21:00	White Work Van w/ Ladder	16:16:08	White Dodge Ram with Red Bed	
16:22:32	Grey Hatchback	16:18:15	Grey SUV	
16:22:37	Grey Mercedes Sedan	16:22:27	Amazon Box Truck	
16:24:52	White Tesla SUV	16:22:30	White Work Van	
16:24:57	Grey SUV	16:24:47	Grey Toyota 4 Runner	
16:26:55	Grey/Tan Lexus Sedan	16:24:47	Light Blue Porsche Sedan	
		16:26:54	White Lexus SUV	
		16:26:55	White Van	
		16:26:54	White Honda Civic	
		16:29:27	Grey SUV	
16:30:09	White Work Van	16:31:09	Black SUV	X
16:31:51	Grey Honda Fit	16:33:23	White Work Van	
16:33:16	Black Sedan	16:37:21	Grey Kia SUV	
16:33:21	Grey SUV	16:39:45	Black SUV	
16:36:04	Black SUV	16:39:48	White Toyota Tundra	X
16:36:07	White Small Hatchback	16:40:13	Grey Toyota Tundra	
16:37:31	White BMW Sedan	16:40:14	White Honda SUV	
16:38:33	White Kia SUV	16:42:06	White Tesla Sedan	
16:41:06	White SUV	16:46:24	Black/Grey Ford SUV	
16:43:37	White Corolla Hatchback	16:48:34	Red Toyota Rav4	
16:43:40	Orange Chevy SUV	16:48:35	White Ocacess Bus	
16:43:41	Black Mercedes SUV	16:48:39	Grey Lexus SUV	
16:44:43	White Honda Civic	16:50:39	Blue Convertible BMW Coupe	
16:45:05	Silver Kia SUV	16:50:42	White Toyota Corolla	
16:45:45	Red Toyota Rav 4	16:52:51	Grey Tesla SUV	X
16:47:19	White Ford Truck	16:54:59	White Honda Van	
16:48:37	Silver Honda CRV	16:55:01	White Ford Truck	
16:48:56	Silver Honda CRV	16:57:12	Grey SUV	
16:53:59	White VW Sedan	16:57:15	Black Honda CRV	
16:54:31	White Chevy Camaro	16:57:17	Burgundy BMW SUV	
16:55:06	Black Honda CRV	16:59:20	White Toyota Corolla	X
16:55:19	White BMW SUV	16:59:20	Green Subaru Crossover	
16:55:21	Grey SUV	16:59:22	Silver Honda Pilot	X
16:56:21	Green Subaru Crossover			X

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2A - From 2A to 2B

16:58:32	Black SUV			
17:02:00	Grey Ford Hatchback	17:02:54	Silver Toyota Tundra	
17:02:06	Black Mercedes Sedan	17:03:34	Grey Honda Accord	
17:02:21	Silver Toyota Rav 4	17:03:35	Black SUV	
17:03:10	Bronze Mercedes SUV	17:07:08	Blue/Grey Ford Explorer	
17:03:18	Bronze Toyota Highlander	17:08:05	Grey Chevy Volt	
17:03:39	Black SUV	17:12:21	Grey Dodge Ram	
17:04:12	White Toyota Corolla			
17:04:10	Black Truck			
17:06:24	Silver Nissan SUV			
17:09:15	Black/Grey Chevy Tahoe			
17:09:20	Grey Dodge Ram			X
17:11:48	Bronze Dodge Ram			
17:12:56	White Toyota Prius			
17:13:01	Bronze SUV			
17:13:10	Silver Toyota Van			
17:13:54	White Honda Civic			
17:15:05	Black Audi SUV	17:18:52	Silver Honda Civic	X
17:15:12	Black Lexus SUV	17:21:03	Red Tesla Sedan	
17:15:46	Silver Honda Civic	17:21:04	Grey Lexus SUV	
17:16:02	White Ford Truck	17:21:05	Blue Tesla SUV	
17:16:48	Red SUV	17:23:28	Silver Ford Truck	
17:17:18	White Chevy Truck	17:25:27	Grey Toyota Highlander	
17:18:59	Black Toyota Tundra	17:25:28	White Lexus SUV	
17:19:15	White Ford Truck	17:25:29	Light Blue Porsche Sedan	
17:20:06	White Ford Truck	17:26:53	Black Cadillac SUV	
17:21:47	Silver Honda Civic	17:27:50	White Honda Accord	
17:25:44	Black Hatchback	17:27:51	Black Hatchback	X
17:26:07	Black/Grey Chevy SUV	17:29:39	Black Mercedes SUV	
17:29:49	White Ford SUV			
17:29:51	White Subaru Crossover			
17:29:51	Silver GMC SUV			X
17:31:51	Black/White Toyota Tacoma	17:31:45	Grey Honda SUV	
17:31:58	Flatbed Truck	17:31:46	Silver GMC SUV	
17:32:17	White Ford SUV	17:34:00	White Honda Accord	
17:34:00	Silver Toyota Corolla	17:36:27	Blue Tesla Sedan	
17:37:37	Blue/Silver SUV	17:41:01	Grey Chevy SUV	
17:38:16	Black Mercedes SUV	17:42:40	Grey Honda Accord	
17:40:58	Black Lexus SUV	17:42:41	Black SUV	
17:42:48	White Chevy Truck	17:44:48	Black SUV	X
17:43:18	Grey SUV	17:44:53	White Chevy Truck	X
17:45:05	White Tesla SUV	17:44:54	Grey SUV	
17:45:42	White Lexus SUV	17:46:11	Black Honda Civic	
17:49:23	White Tesla Sedan	17:49:16	Black Jeep SUV	
17:51:50	White SUV	17:53:02	White Mercedes SUV	
17:53:52	White Honda Civic	17:53:32	Blue/Grey SUV	X
17:55:02	Tan Toyota Corolla	17:56:02	Grey SUV	
17:56:27	Silver Honda CRV	17:55:02	White Honda Civic	
		17:59:59	White Sedan	
		18:00:01	White SUV	
		18:00:04	Black SUV	
TOTALS	**85**		**87**	**16**

% of Matches from Origin to Destination: **19%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2A - From 2A to 2B
Greenbriar Ln S/ Associated Rd to Castlegate Ln N/ Imperial Blvd (SB)
12:00 PM to 3:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Greenbriar Ln S/ Associated Rd		Castlegate Ln N/ Imperial Blvd	**Matches**
Time	SB Entering	**Time**	SB Exiting	
12:00:00		12:00:00		
12:00:49	White SUV	12:01:51	Black Toyota Highlander	
12:04:26	Black Mazda Sedan	12:04:13	White Honda Civic	
12:04:02	Black Honda Accord	12:06:16	Silver Toyota Camry	
12:04:59	Silver Toyota Tacoma	12:06:18	Bronze Honda CRV	
12:06:06	White BMW Sedan	12:08:20	Black Toyota Highlander	
12:08:51	Silver Toyota Rav 4	12:08:23	Black SUV	X
12:11:10	White Ford Explorer	12:10:38	Dump Truck	
12:13:29	Silver Toyota Camry	12:10:36	Grey /Silver SUV	
		12:10:39	Silver Rav 4	
12:15:23	Black SUV	12:15:05	Grey Ford Explorer	
12:19:09	White SUV	12:15:06	Black Dodge Ram	X
12:20:01	Black Dodge Ram	12:17:09	Silver/Grey SUV	
12:21:31	White Honda Accord	12:18:24	Grey Toyota Tundra	
12:23:24	White Crossover	12:21:34	Grey Jeep SUV	X
12:23:57	Grey SUV	12:21:35	Silver VAN	
12:24:26	Silver Grey SUV	12:12:37	White SUV	
12:25:53	Silver Chevy SUV	12:23:31	Black Honda SUV	
12:29:48	Black SUV	12:26:10	White Chevy SUV	
		12:26:11	White Subaru Crossover	
		12:26:15	Silver/Tan Lexus SUV	
		12:26:16	Silver SUV	
		12:26:17	Blue Honda Civic	
		12:26:18	White BMW Sedan	
		12:26:19	White Toyota Tacoma	
		12:26:19	Grey Honda Hatchback	
		12:27:51	White SUV	
12:30:11	Black/Grey Toyota Rav 4	12:32:16	White Chrysler 300	
12:32:15	Black Convertible Mustang	12:32:17	Silver Honda CRV	X
12:32:15	Black SUV	12:32:18	White Tesla SUV	X
12:34:22	Red Dodge Van	12:34:24	Red Chevy Truck	
12:35:32	Black SUV	12:34:25	Black Convetible Mustang	
12:36:57	White Lexus SUV	12:36:38	Black SUV	
12:41:16	Silver Toyota Van	12:41:01	Blue Ford Truck	
		12:43:09	Black Chevy Tahoe	
		12:43:10	Blue Chevy Truck	
		12:44:27	Silver Toyota Tacoma	
12:45:10	Black SUV	12:45:20	White Ford Truck	
12:45:51	Silver SUV	12:45:22	Grey Ford Explorer	
12:47:14	Small Black SUV	12:48:22	Blue Honda CRV	
12:47:40	White Tesla Sedan	12:49:31	Grey Hatchback	
12:47:54	Grey Hatchback	12:53:52	White Toyota Camry	X
12:52:08	Black SUV	12:55:11	Blue/Black SUV	
12:53:03	White Kia SUV	12:56:13	Black Toyota Camry	
12:53:42	Black Toyota Camry	12:56:14	Black BMW Sedan	
12:53:55	Silver Van	12:58:19	White Nissan Sentra	
12:57:23	Black Mercedes SUV	12:59:42	White Toyota Prius	
12:58:48	Black SUV			X
13:00:56	Black Sedan	13:00:24	White Ford Explorer	
13:03:01	Black Sedan	13:02:37	Black SUV	X
13:03:27	Grey SUV	13:02:38	White Hatchback	
13:07:27	White Toyota Corolla	13:04:47	Grey/Silver SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2A - From 2A to 2B

13:09:34	Grey Mercedes Sedan	13:09:00	Black Sedan	
13:09:38	White Ford Truck	13:11:14	Black Chevy Truck	
13:14:01	Black GMC SUV	13:13:18	Grey Honda CRV	X
13:15:24	Black Ford SUV	13:15:29	White Work Van	X
13:18:02	White Honda Accord	13:15:29	Black GMC SUV	
13:18:51	White BMW Sedan	13:15:31	Black BMW SUV	X
13:20:06	Mail Car	13:17:56	Black Ford SUV	
13:20:37	Black Chevy Truck	13:17:57	Silver Honda Accord	
13:22:28	Black SUV	13:17:58	White Toyota Camry	
13:26:49	Black SUV	13:17:59	Grey Mercedes Sedan	
13:26:55	Grey Nissan SUV	13:18:01	Tan Nissan Sedan	
13:26:58	Black SUV	13:21:58	White BMW Sedan	
13:28:57	Silver Sedan	13:21:59	White Honda Civic	X
		13:24:14	Black SUV	
		13:24:18	Grey Honda CRV	
		13:24:19	Light Blue SUV	
		13:24:22	Blue Ford Truck	
		13:26:35	Grey Ford Explorer	
		13:26:36	White Cadillac Sedan	
		13:28:40	Grey GMC Truck	
13:33:11	White Dodge Ram	13:30:36	Silver Honda CRV	
13:37:38	White Tesla Sedan	13:30:37	Red Tesla Sedan	
13:40:02	Grey Sedan	13:30:41	Green Toyota 4 Runner	
13:42:00	White Van	13:30:42	Silver Sedan	
		13:35:33	Silver/Grey Honda Van	
		13:39:27	Silver BMW Hatchback	
13:48:34	Black SUV	13:45:27	Blue Honda Civic	
13:50:49	Black Honda SUV	13:47:29	Grey Jeep SUV	
13:58:58	Yellow Hummer	13:50:17	Black Mazda Sedan	
13:59:19	Black Dodge Challenger	13:52:08	Black Mercedes SUV	
		13:52:25	Yellow Hummer	
		13:53:57	Silver Chevy Truck	
		13:54:07	Grey Ford Truck	
		13:54:48	White SUV	
		13:57:07	Black SUV	
		13:57:08	Blue Muscle Car	
14:01:18	White Kia SUV	14:00:42	White GMC SUV	
14:01:27	White Toyota Corolla	14:00:48	White Tesla Sedan	
14:01:33	Black Sedan	14:01:30	White Cadillac Sedan	
14:05:44	White Honda SUV	14:01:31	Red Tesla Sedan	
14:09:40	Black Nissan SUV	14:05:19	Silver Hyundai Sedan	
14:10:31	White Toyota Corolla	14:07:35	Red Sedan	
14:10:43	Grey Toyota Camry	14:07:36	White Honda SUV	
14:11:24	Silver Toyota Tundra	14:07:37	Silver Toyota Camry	X
14:14:04	White Ford Truck	14:14:06	Silver Toyota Tundra	
14:15:24	Yellow Hummer	14:18:25	Silver Honda Acoord	
14:17:17	White Ford Truck	14:18:26	White Nissan Truck	X
14:18:16	Grey/Silver Sedan	14:18:27	White Ford Truck	
14:18:39	Silver Toyota Tacoma	14:18:29	White Toyota Corolla	
14:21:28	Green Toyota 4 Runner	14:20:36	Black Toyota Corolla	
14:23:08	White Chevy Tahoe	14:20:37	Grey Tesla Sedan	
14:26:17	Black Mercedes Sedan	14:22:52	Blue Chevy Truck	X
14:29:29	Black GMC Sedan	14:24:53	White Honda SUV	
14:29:31	White Honda Civic	14:26:56	Silver Honda CRV	
		14:26:58	Silver Toyota Tacoma	
		14:29:11	Black Mercedes Sedan	
		14:29:12	Gold Cadillac SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2A - From 2A to 2B

		14:29:15	White BMW Sedan	
		14:29:16	White Van	
		14:29:17	Grey Jeep SUV	
		14:29:18	Silver Kia SUV	
14:34:30	White Truck with rack	14:33:33	Silver/Grey SUV	
14:35:41	White BMW SUV	14:37:56	Black SUV	
14:36:31	Silver Nissan SUV	14:37:57	Silver Nissan SUV	X
14:40:00	Black SUV	14:40:00	Silver Grey SUV	
14:41:34	Silver SUV	14:44:28	Silver Nissan Sedan	
14:42:07	Black Sedan	14:44:29	Silver Toyota 4 Runner	
14:42:34	Gold Toyota Camry			
14:43:09	Silver Toyota 4 Runner			X
14:43:19	Black SUV			
14:44:44	Black Ford SUV			
14:44:48	White SUV			
14:46:31	Silver SUV	14:48:48	Red Sedan	
14:47:15	Black SUV	14:48:50	White Mercedes Sedan	
14:48:00	Grey/Silver Sedan	14:50:24	White Truck with rack	X
14:55:12	Silver Sedan	14:50:55	Grey Sedan	
14:57:54	Grey Honda Accord	14:50:56	Silver Toyota Van	
14:57:58	White Toyota Camry	14:50:58	Black Jeep SUV	
		14:54:15	Blue Toyota Prius	
		14:55:15	Black GMC SUV	
		14:55:16	Silver SUV	
		14:58:08	White BMW Sedan	
		14:58:26	Grey Ford Truck	
		14:59:26	Black Dodge Challenger	
TOTALS	**95**		**129**	**18**

% of Matches from Origin to Destination: **19%**

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A
Castlegate Ln N/ Imperial Blvd to Greenbriar Ln S/ Associated Rd (NB)
7:00 AM - 9:00 AM

	Enter at Origin:		**Exit at Destination:**	
	Castlegate Ln N/ Imperial		Greenbriar Ln S/ Associate Rd	**Matches**
Time	NB Entering	**Time**	NB Exiting	
7:00:00		7:00:00		
7:02:50	Black SUV	7:00:00	Blue Toyota Van	
7:03:23	Black SUV	7:02:26	White Toyota Rav4	
7:09:22	Black Sedan	7:02:27	Silver Toyota Rav 4	
7:10:35	Silver SUV	7:03:42	White Chevy Truck	
7:13:49	Truck with Red Bed	7:03:43	Black Mercedes Sedan	
		7:03:46	White SUV	
		7:07:57	Black Sedan	
		7:08:29	Black Lexus SUV	
		7:09:18	White Honda Accord	
		7:09:27	Tan Toyota Camry	
		7:09:45	White Lexus SUV	
		7:09:46	White Toyota Corolla	
		7:10:18	White Honda Truck	
		7:11:16	White Subaru Crossover	
		7:11:19	White Honda Civic	
		7:12:33	Silver Kia SUV	
		7:14:04	Black Ford Truck	
		7:14:06	Silver Honda Accord	
7:15:22	White Jeep Wrangler	7:15:45	Grey Chevy Tahoe	X
		7:16:24	White Jeep Wrangler	
		7:18:26	White Tesla Sedan	
		7:19:41	Black Toyota Rav4	
		7:21:35	White Toyota Camry	
		7:23:16	Silver Hyundai Sedan	
		7;24:30	Silver Toyota Corolla	
		7:24:32	Black Jeep Truck	
		7:27:23	White Lexus Hatchback	
		7:28:32	Yellow School Bus	
		7:29:51	Black Audi Sedan	
7:31:05	White Honda Accord	7:32:13	White Ford Truck	
7:32:23	Black Toyota Camry	7:33:24	Black Toyota Camry	X
7:33:06	White SUV	7:33:31	Silver Honda SUV	X
7:33:30	White SUV	7:34:02	White SUV	
7:39:53	Silver Sedan	7:34:15	Black SUV	
7:46:05	Large White SUV	7:34:49	Grey Hatchback	X
7:46:11	White Truck	7:37:22	Grey SUV	X
7:50:47	Grey Toyota Rav4	7:37:22	Black Toyota Prius	
7:51:55	White Kia SUV	7:38:35	Black Toyota Tundra	X
7:52:31	Grey SUV	7:39:50	White SUV	
7:52:41	Black Chevy Truck	7:39:51	White Chevy Truck	
7:52:44	Silver GMC SUV	7:39:53	White Ford Explorer	X
		7:41:14	Black MercedesSedan	
		7:41:17	White SUV	
		7:42:53	Black Nissan SUV	
		7:42:57	White Lexus SUV	
		7:44:30	Bronze Toyota Rav 4	
		7:44:32	Black Chevy Volt	
		7:46:37	Grey SUV	
		7:47:11	Large White SUV	
		7:47:17	White Truck	
		7:47:35	Silver Lexus SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A

		7:48:17	Silver SUV	
		7:48:19	Black Mercedes Sedan	
		7:48:24	White Crossover	
		7:49:56	Silver Honda Accord	
		7:49:59	Blue Sedan	
		7:50:04	White VW Sedan	
		7:51:34	White Tesla Sedan	
		7:51:35	Black Honda SUV	
		7:51:38	Bronze Honda Pilot	
		7:53:10	White Kia SUV	
		7:53:45	Silver SUV	
		7:53:53	Black Chevy Truck	
		7:54:26	White Lexus SUV	
		7:55:43	White Truck w/ Bike	
		7:56:02	Grey Van	
		7:58:28	White Toyota Tundra	
		7:58:29	Silver Kia SUV	
		7:59:55	Red Sedan	
8:01:13	White Hatchback	8:01:16	White Toyota Camry	X
8:01:18	Grey Van	8:02:22	White Hatchback	X
8:02:37	Silver SUV	8:02:28	Grey Van	
8:03:00	Grey Honda Accord	8:02:36	White SUV	
8:05:34	Grey Sedan	8:06:19	Black SUV	X
8:06:02	Red Sedan	8:06:20	Black/Grey Sedan	
8:07:45	Silver Grey BMW Sedan	8:06:39	Grey Sedan	
8:08:30	White SUV	8:07:38	White SUV	X
8:09:52	Grey SUV	8:08:42	Silver Grey BMW Sedan	X
8:09:56	White Sedan	8:10:02	Grey Honda Accord	X
8:10:26	Yellow School Bus	8:10:31	White SUV	
8:14:48	White Honda Civic	8:10:53	Grey SUV	
		8:10:59	White Sedan	
		8:11:51	Grey Honda Sedan	
		8:14:43	Red Convertible Mustang	
8:15:25	Silver Jeep SUV	18:17:04	White Ford Truck w/Cones	
8:16:17	White SUV	8:17:06	White Nissan Truck	
8:16:26	White SUV	8:18:42	Red Ford Truck	
8:17:16	White Chevy Truck w/ Roof Rack	8:19:10	Silver Mercedes Van	
8:19:07	Yellow School Bus	8:20:41	White Chevy SUV	X
8:23:23	White AC Box Truck	8:23:50	Yellow School Bus	
8:23:45	Silver Honda Accord	8:23:52	Black Mercedes Sedan	X
8:25:28	Grey SUV	8:23:57	Grey Mazda SUV	X
8:27:44	Grey Sedan	8:24:41	Silver Honda Accord	
8:28:39	Black Sedan	8:25:20	Grey Van	
		8:26:31	Grey SUV	
		8:28:46	Silver Honda CRV	
		8:29:35	Grey/Silver Toyota Corolla	
8:30:44	Red Toyota Camry	8:30:45	Black SUV	
8:30:47	Black Ford Explorer	8:32:38	Grey SUV	X
8:31:34	Black Honda SUV	8:32:39	Black Ford Explorer	X
8:31:47	Black SUV	8:32:39	Black Honda SUV	X
8:32:09	Black Tesla SUV	8:33:15	Black SUV	
8:32:13	Grey SUV	8:34:33	Grey SUV	X
8:32:54	Black Mercedes SUV	8:34:46	Black Ford SUV	
8:33:42	Grey SUV	8:35:09	Red Ford Mustang	
8:35:44	Black Chevy Truck	8:35:48	White Van	
8:40:39	Black Toyota Rav4	8:37:04	Grey SUV	
8:42:40	Silver Truck	8:37:28	Silver Van	X

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A

8:43:36	Black Toyota Prius	8:37:31	Grey Ford Truck	
		8:37:53	White Dodge Van	
		8:38:44	Red Toyota Camry	
		8:38:47	Grey Toyota Tacoma	
		8:39:35	Black Mercedes SUV	
		8:40:02	Silver Toyota Camry	
		8:41:19	Silver Toyota Prius	
		8:42:31	White/Black Toyota Tacoma	
		8:44:11	Silver Truck	
8:45:16	Silver SUV	8:45:27	White Tesla Sedan	X
8:45:41	Tan/ Gold Nissan Sedan	8:45:28	White SUV	
8:47:00	Grey SUV	8:45:56	White Toyota Rav4	
8:47:21	Silver Honda Pilot	8:46:02	White Toyota Highlander	
8:50:18	Silver Honda CRV	8:46:20	Silver SUV	
8:51:41	White Toyota Tundra	8:49:05	White Toyota Corolla	
8:53:47	White Truck Bed Rack	8:49:49	Silver SUV	
8:54:04	Grey Infiniti Sedan	8:51:48	White Honda Accord	
8:55:24	Silver Lexus Sedan	8:52:26	White Chevy Camaro	X
8:55:25	White Tesla Sedan	8:53:10	Black Sedan	X
8:55:54	Grey/ Black SUV	8:54:11	Silver BMW Sedan	
		8:55:31	Silver Honda SUV	
		8:56:31	Grey SUV	
		8:56:33	Silver Lexus Sedan	
		8:56:38	White Tesla Sedan	
		8:59:42	White Truck	
TOTALS	**63**		**133**	**24**

% of Matches from Origin to Destination: **38%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A
Castlegate Ln N/ Imperial Blvd to Greenbriar Ln S/ Associated Rd (NB)
4:00 PM - 6:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Castlegate Ln N/ Imperial		Greenbriar Ln S/ Associate Rd	**Matches**
Time	NB Entering	**Time**	NB Exiting	
16:00:00		16:00:00		
16:00:17	Bronze Sedan	16:01:39	Bronze Sedan	X
16:00:50	Grey/Silver Toyota 4 Runner	16:02:09	Black Mercedes SUV	
16:01:28	Black Hatchback	16:03:30	Silver SUV	
16:01:31	Silver Honda Civic	16:04:10	Silver/Green Toyota Prius	
16:01:32	Silver Ford Truck	16:04:26	Silver Van	
16:02:19	Silver SUV	16:05:33	Black Truck	X
16:03:47	Black Mercedes Sedan	16:05:59	White Sedan	
16:04:31	Black Ford Truck	16:06:58	White Ford Truck	
16:04:54	White Sedan	16:07:45	White Work Truck	X
16:08:39	White Chevy Van	16:08:15	Grey Tesla SUV	X
16:08:43	Silver Kia Optima	16:08:53	Black Honda SUV	X
16:09:14	Silver Chevy Truck	16:09:36	Grey SUV	
16:11:36	Bronze Mitsubishi Eclipse	16:10:21	Silver Kia Optima	
16:11:38	White Toyota Highlander	16:10:51	White Chevy Van	X
16:12:26	Blue Honda CRV	16:11:47	Black Sedan	
16:12:59	White Nissan SUV	16:13:07	Whte Toyota Highlander	X
16:13:44	White VW Sedan	16:14:16	White Nissan SUV	
16:15:44	Silver Sedan	16:14:59	Black Sedan	X
16:15:47	Silver/Blue Toyota Highlander	16:15:42	Grey SUV	
16:15:53	Grey Toyota Highlander	16:16:53	Silver Sedan	X
16:15:55	Silver Convertible	16:17:15	Silver Covertible	X
16:15:58	Silver/Grey Toyota Prius	16:17:19	Grey Toyota Highlander	
16:16:22	Black BMW Sedan	16:17:33	Black BMW Sedan	X
16:16:50	Light Blue Porsche Sedan	16:18:31	Silver Acura SUV	
16:17:55	Silver Chevy SUV	16:19:13	Grey Dodge Truck	
16:17:57	Silver Hyundai Sedan	16:21:08	Black Mercedes Sedan	
16:18:03	Grey Dodge Ram	16:22:19	Silver Ford Mustang	X
16:18:28	Silver Ford Mustang	16:23:15	White Tesla SUV	X
16:19:30	Black Mercedes Sedan	16:26:18	White Toyota Corolla	
16:20:09	Grey/Tan Toyota Camry	16:27:41	Grey Toyota Tundra	
16:20:10	White Toyota Camry	16:28:56	White VW Sedan	
16:20:43	Black Mercedes Sedan	16:28:57	Grey Toyota Tacoma w/ Camper	
16:22:40	White Bus OCAccess			
16:24:25	Grey Mazda SUV			
16:24:43	White Toyota Corolla			X
16:25:01	Red Toyota Rav 4			
16:26:43	Gold/Tan Toyota Corolla			
16:26;49	Grey Toyota Tundra			
16:27:53	Yellow VW Bug			
16:28:29	Light Blue Ford Bronco			
16:28:53	Grey/Silver Ford Explorer			
16:28:55	Silver/Grey Honda Van			
16:28:58	Grey Toyota 4 Runner			
16:29:00	Silver/Grey Honda Civic			
16:29:03	White SUV			
16:29:54	White Work Van			
16:29:58	Black Ford SUV			X
16:30:56	White Toyota Camry	16:30:05	Bronze Honda Van	X
16:30:59	Blue Subaru Crossover	16:30:09	Grey Honda Civic	
16:31:00	Red Jeep SUV	16:31:27	Grey Tesla SUV	X
16:31:25	Grey Tesla SUV	16:31:28	Red SUV	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A

16:31:49	Black SUV	16:31:29	Black Ford SUV	
16:31:53	White SUV	16:31:30	Silver SUV	
16:31:55	Silver Hyundai SUV	16:32:02	White Toyota Camry	X
16:32:38	White SUV	16:32:05	Red Jeep SUV	
16:33:40	White Honda Van	16:32:56	Black Toyota Prius	
16:33:42	Grey/Blue SUV	16:32:58	Silver Hyundai SUV	
16:35:09	Brown BMW SUV	16:34:13	Red Ford Truck	
16:35:13	Grey/Silver SUV	16:37:15	Slver Mitsubishi SUV	
16:35:16	Silver Mitsubishi SUV	16:37:18	Silver Nissan SUV	X
16:35:36	White Toyota Camry	16:37:20	Silver Mazda SUV	
16:35:51	Blue Tesla SUV	16:37:21	Black Sedan	
16:36:03	Silver Nissan SUV	16:38:37	Black SUV	X
16:36:09	Silver Mazda SUV	16:40:27	Blue Toyota Corolla	X
16:36:26	White Toyota Rav 4	16:41:23	Silver/Grey Sedan	
16:36:56	Black SUV	16:41:42	Grey Sedan	X
16:37:49	Grey/Silver Sedan	16:41:43	Black Lexus SUV	X
16:38:18	Silver/Grey SUV	16:41:47	Black Lincoln SUV	
16:40:32	White BMW SUV	16:43:01	Grey Nissan Sedan	
16:41:32	Black SUV	16:43:03	Silver Ford Truck	
16:41:36	Silver Ford Truck	16:43:37	Silver Toyota Highlander	X
16:41:49	Silver Toyota Highlander			X
16:42:45	Tan Chevy Tahoe			
16:43:30	Black SUV			
16:43:59	White SUV			
16:44:02	White Audi Sedan			
16:44:07	Silver SUV			X
16:46:11	Silver Toyota Camry	16:45:20	Silver SUV	
16:46:13	Silver Toyota Tacoma	16:47:32	Silver Toyota Tacoma	X
16:47:31	Yellow GMC Truck	16:47:37	Black Toyota Tundra	
16:48:20	White Toyota Tacoma	16:48:15	Black SUV	X
16:50:55	Grey Ford Explorer	16:49:19	White Tesla Sedan	
16:51:32	Black GMC Truck	16:49:20	White Toyota Tacoma	
16:54:41	White SUV	16:51:54	Grey Chevy Tahoe	
16:54:43	Silver Toyota Tacoma	16:55:47	Silver Toyota Tacoma	
16:55:13	Grey Honda Accord			
16:55:16	Silver Ford Truck			
16:56:57	Tan/ Beige Ford SUV			
16:57:41	Black GMC Truck			
16:58:12	Light Blue Porsche Sedan			
16:59:08	Black Honda Civic			X
16:59:12	White Honda SUV			X
17:00:30	Grey Toyota Highlander	17:00:07	Black Honda Civic	
17:00:41	Grey/Bronze Sedan	17:00:20	White Honda SUV	X
17:01:15	Grey Tesla SUV	17:01:48	Grey/Bronze Sedan	X
17:01:57	Black Infiniti Sedan	17:02:44	Grey Tesla SUV	
17:02:20	Silver Ford Truck	17:03:32	Silver Ford Truck	X
17:02:46	Silver Chevy SUV	17:06:44	Silver Toyota Rav 4	
17:04:56	Silver/Grey Sedan	17:07:22	Black SUV	
17:05:11	White Sedan	17:09:25	Silver Honda Civic	
17:05:35	Grey/Bronze Toyota Corolla	17:10:14	Black Toyota Prius	
17:08:27	Red Toyota Rav 4	17:10:59	Grey Chevy Tahoe	
17:08:30	White Toyota Camry	17:11:00	Tan/Grey SUV	
17:08:32	Black Toyota Prius	17:11:21	White Chrysler 300	X
17:09:11	Silver Subaru SUV	17:12:35	Grey Van	
17:09:25	Black SUV	17:13:12	Black BMW Sedan	
17:09:55	Grey/Bronze SUV	17:13:53	White Honda SUV	X
17:10:08	White Van Orange Top	17:14:31	White Ford Sedan	

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A

17:10:09	White Chrysler 300	17:14:37	Grey Toyota Corolla	X
17:10:18	Black/Burgundy Kia Optima			
17:11:38	Black SUV			
17:11:42	White Ford Truck			
17:12:05	Black BMW Sedan			X
17:13:16	White BMW Sedan			
17:13:19	Blue Tesla SUV			
17:14:43	Grey Ford Explorer			
17:15:22	Black SUV	17:19:51	White Chevy Truck	
17:15:41	Silver Honda Pilot	17:19:53	Black SUV	
17:18:40	White Chevy Truck	17:20:19	Black BMW Sedan	X
17:18:43	Black SUV	17:21:36	Silver Toyota Corolla	X
17:19:10	Black BMW Sedan	17:21:37	White Ford Truck	X
17:19:45	White Toyota Corolla	17:21:38	White Nissan Truck	
17:20:02	Silver Toyota Corolla	17:22:12	Black Hatchback	X
17:20:39	White Nissan Truck	17:26:57	White Van	X
17:20:46	Black Hatchback	17:27:18	Grey Hatchback	X
17:21:32	Silver Ford Truck	17:27:22	White Honda Civic	
17:22:15	Grey/Green Toyota 4 Runner			
17:23:44	Blue SUV			
17:24:46	Black SUV			
17:25:17	Silver SUV			
17:25:49	White Van			X
17:26:04	White Lexus Hatchback			
17:26:06	White Toyota Camry			
17:26:20	White Honda Civic			X
17:28:03	Burgundy Toyota Tundra	17:31:12	Burgundy Toyota Tundra	X
17:28:26	White Mercedes SUV	17:32:37	White Flatbed Truck	
17:32:35	Black Mercedes Sedan	17:35:53	Blue Sedan	
17:33:42	Balck Hatchback	17:36:01	Grey Honda Accord	
17:35:23	Grey Honda Accord	17:37:14	Grey Toyota 4 Runner	X
17:36:00	White Honda Fit	17:37:16	White Hatchback	X
17:36:02	Grey Toyota 4 Runner	17:37:19	White Honda Fit	X
17:36:15	White Hatchback	17:37:24	White Tesla Sedan	X
17:38:06	Grey Ford Truck	17:40:43	Black Toyota Tundra	
17:38:09	Black SUV	17:40:50	Grey SUV	
17:38:45	White Van	17:41:55	Black Toyota Rav 4	
17:40:21	Black Toyota Rav4	17:44:50	White Range Rover	X
17:40:23	Red Tesla Sedan	17:44:51	Black Jeep SUV	
17:41:22	White Van			
17:42:51	Silver SUV			
17:43:26	White Range Rover			X
17:43:47	Black SUV			
17:45:09	Black SUV	17:46:04	Tan SUV	
17:45:23	Black Mercedes Sedan	17:47:47	White Tesla Sedan	
17:46:23	White Sedan	17:50:21	White Van	
17:47:07	Grey Tesla SUV	17:50:24	Silver/ Grey Lexus Sedan	
17:47:09	Black Ford Sedan	17:50:25	Grey Chevy Tahoe	
17:47:47	Grey Sedan	17:52:27	White Toyota Highlander	
17:48:57	Black Sedan	17:54:03	White SUV	
17:49:29	Black/Grey SUV	17:54:41	Black/Grey SUV	
17:50:38	Black/Burgundy SUV	17:55:18	Silver Kia SUV	
17:51:05	Burgundy/Red SUV	17:56:31	Silver SUV	
17:51:18	White Toyota Highlander	17:56:33	Black Sedan	X
17:53:02	White SUV	17:56:54	Red Toyota Camry	X
17:53:19	Grey SUV	17:57:37	Black SUV	X
17:53:49	Black SUV	17:57:47	Grey Honda Accord	

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/13/2023
Route 2B - From 2B to 2A

17:53:49	White SUV	17:57:49	Grey SUV	
17:54:06	Silver Kia SUV	17:58:34	Black SUV	X
17:55:26	Silver SUV	17:58:38	Silver Sedan	X
17:55:43	Red Toyota Camry			X
17:56:23	Black SUV			X
17:56:56	Silver Sedan			X
17:57:48	Black Hatchback			
17:58:02	White Sedan			
17:58:22	White Range Rover			
17:59:22	Silver Honda Accord			
17:59:48	Black Sedan			
TOTALS	**176**		**121**	**60**

% of Matches from Origin to Destination: **34%**

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2B - From 2B to 2A
Castlegate Ln N/ Imperial Blvd to Greenbriar Ln S/ Associated Rd (NB)
12:00 PM - 3:00 PM

	Enter at Origin:		**Exit at Destination:**	
	Castlegate Ln N/ Imperial		Greenbriar Ln S/ Associate Rd	**Matches**
Time	NB Entering	**Time**	NB Exiting	
12:00:00		12:00:00		
12:00:12	White Mini Cooper	12:01:30	White Mini Cooper	X
12:03:57	Black SUV	12:02:17	White Van	
12:06:35	Black GMC Truck	12:03:32	Black BMW Sedan	X
12:06:42	Blue Tesla SUV	12:04:08	White Tesla SUV	
12:06:47	Blue Gray Toyota Corolla	12:04:47	Black Honda Civic	
12:07:07	Black Toyota Tacoma	12:06:01	White Tesla Sedan	
12:08:37	White Chevy Truck	12:06:02	Motorcycle	X
12:08:49	White Lexus Hatchback	12:07:17	Red Van	
12:13:19	Grey SUV	12:08:31	Black Sedan	
12:14:05	Brown Toyota Tundra	12:08:33	Black GMC Truck	
		12:10:02	Whte Chevy Truck	
		12:10:03	White Toyota Camry	
		12:11:18	White BMW SUV	
		12:13:03	White Truck	
		12:13:15	Silver Mazda hatchback	
		12:13:20	Silver SUV	
12:16:56	Silver Rav4	12:15:05	Blue Toyota Prius	
12:19:28	Grey Honda Accord	12:17:14	Silver Ford SUV	
12:20:26	Silver Rav 4	12:20:47	White Work Truck	X
12:21:19	White Sedan	12:21:37	Silver Rav 4	
12:21:25	Grey Hyundai SUV	12:22:50	Grey Hyundai SUV	X
12:21;50	White Toyota Sedan	12:24:02	White Sedan	
12:23:18	Silver/Tan Chevy Suburban	12:24:34	Silver Nissan Pathfinder	X
12:23:20	Silver Nissan Pathfinder	12:25:27	Silver/ Tan Chevy Suburban	X
12:23:47	Amazon Prime Truck	12:27:29	Black Honda Accord	
12:26:45	Silver Honda SUV	12:28:44	Silver Honda SUV	X
12:26:53	Silver/Grey Chevy Volt	12:28:45	Grey Tesla SUV	
12:26:56	Grey Tesla SUV	12:28:48	White Lexus SUV	X
12:27:14	Silver Chevy Tahoe	12:28:51	Black Honda SUV	
12:29:05	Grey Tesla SUV	12:29:29	Silver Van	
12:29:13	Silver Toyota Tacoma w/ Rack			
12:29:35	Silver/Grey Toyota Highlander			
12:29:48	White BMW Sedan			X
12:30:15	White Honda Accord	12:30:04	Silver Honda SUV	
12:31:41	Grey Honda Accord	12:30:08	White Honda Accord	
12:31:44	Silver Sedan	12:30:09	Red Mercedes SUV	
12:31:47	Black Jeep SUV	12:31:19	White BMW Sedan	
12:32:02	Grey Toyota Rav 4	12:31:24	Red Ford Mustang	
12:33:39	Black Dodge Ram	12:31:30	Blue Sedan	
12:34:11	Black Rav 4	12:34:53	White Honda Accord	X
12:35:19	Black Honda SUV	12:35:20	Black Toyota Rav 4	
12:36:17	Black Mercedes Sedan	12:37:22	Black Mercedes Sedan	X
12:36:23	Black Toyota Highlander	12:37:33	White Honda Civic	
12:36:51	White KIA SUV	12:37:34	Grey Honda Accord	
12:37:30	Black Acura SUV	12:39:54	Silver Toyota Prius	
12:38:04	White BMW SUV	12:40:15	Grey SUV	
12:38:39	Silver/Grey Acura SUV	12:42:34	White Kia SUV	
12:38:52	Silver Toyota Tacoma	12:43:54	Red Ford Sedan	
12:38:54	Black SUV	12:44:45	Black Chevy Tahoe	
12:39:14	White Van Orange Top			
12:42:54	Red Ford Sedan			X

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2B - From 2B to 2A

12:43:22	Black Toyota 4 Runner			
12:44:46	Black SUV			
12:47:08	Silver Honda Accord	12:46:02	Amazon Prime Truck	
12:47:43	White Honda Fit	12:46:04	Black/Grey Honda Sedan	X
12:47:46	Black Scion SUV	12:46:06	Black Coupe	X
12:49:16	Silver Honda CRV	12:47:19	White Van	
12:50:34	White SUV Black Top	12:48:34	Silver Mazda SUV	
12:50:51	Black SUV	12:48:42	White Honda Fit	
12:51:34	White Ford Sedan	12:49:49	Black Scion SUV	
12:51:36	Black SUV	12:51:43	White Ford Truck	X
12:51:55	White Toyota Camry	12:52:36	Black SUV	
12:52:41	Gold Cadillac SUV	12:53:26	Grey Mini Cooper	
12:52:54	Black Jeep SUV			
12:53:44	White Toyota Prius			
12:54:25	Black BMW Coupe			
12:56:52	Silver Toyota Van			
12:58:10	Silver/Green Honda CRV			X
13:00:37	Black Sedan	13:00:12	White SUV	X
13:02:23	Grey Crossover/ Wagon	13:00:13	Silver/Green Honda CRV	X
13:03:36	Blue Honda Truck	13:01:33	Black Toyota 4 Runner	
13:06:45	White Honda Civic	13:01:38	Black Sedan	
13:07:47	White SUV	13:02:25	Blue Tesla SUV	
13:08:20	White Chevy Tahoe	13:03:20	Grey Crossover/ Wagon	X
13:08:56	Grey Mazda Hatchback	13:04:48	Grey Sedan	X
13:11:01	Grey Toyota Camry	13:07:39	White Honda Civic	
13:11:27	White Transit Van	13:08:59	Black Chevy Camaro	
13:11:59	Grey Range Rover	13:10:03	Grey Mazda Hatchback	
13:12:27	Silver Nissan Sedan	13:10:15	White Chevy Tahoe	
13:13:03	Grey Acura SUV	13:11:28	White Range Rover	X
13:13:37	Grey Honda SUV	13:12:50	White Ford Truck	
13:13:43	Grey Ford Explorer	13:14:09	White Van	
13:16:04	Grey Ford Sedan	13:14:09	Grey Acura SUV	
13:18:13	Black Sedan	13:15:32	Grey Toyota Highlander	X
13;19:44	Silver Honda Accord	13:17:08	Grey Ford Sedan	X
13:20:12	Black Sedan	13:20:51	Silver Honda Accord	
13:22:17	White Hachback/Mini SUV	13:21:20	Grey Toyota Camry	
13:23:26	Red Chevy Truck	13:21:21	White Honda Accord	
13:24:05	Grey Toyota Camry	13:23:50	Silver Ford Explorer	
13:24:32	White Lexus Sedan	13:25:15	Silver SUV	X
13:26:15	Grey Nissan Truck	13:25:19	Grey Toyota Camry	
13:26:56	Silver Lexus SUV	13:25:41	White Lexus Sedan	
13:28:22	Blue Chevy Truck	13:26:32	Black BMW Sedan	
13:28:26	Black Chevy Tahoe	13:28:40	Silver Highlander	
13:29:24	Black BMW SUV	13:29:55	Black Acura SUV	
13:30:10	Mail Car	13:32;04	Bronze Toyota Camry	
13:31:02	Bronze Toyota Camry	13:32:35	White SUV	X
13:31:31	White SUV	13:32:51	Silver Mercedes SUV	X
13:32:35	Silver Chevy Truck	13:33:56	Black SUV	
13:32:37	Black Mazda SUV	13:34:11	White Honda Accord	X
13:36:58	Black Honda Civic	13:35:24	Silver Chevy SUV	X
13:37:01	Grey SUV	13:35:25	White SUV	X
13:39:17	Red Sedan	13:38:12	Black Honda Civic	X
13:40:58	Silver Nissan SUV	13:38:14	Grey SUV	
13:43:56	Silver SUV	13:40:04	Black Chevy Truck	
13:44:39	Blue Chevy Truck	13:40:24	Red Sedan	
13:45:18	Grey Tesla SUV	13:42:08	White Tesla SUV	X
13:47:53	Silver Nissan Sedan	13:46:49	Grey Tesla SUV	X

Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2B - From 2B to 2A

13:47:57	Amazon Prime Truck	13:49:24	Silver Nissan Sedan	
13:48:22	White Honda SUV	13:52:34	Blue Honda Civic	
13:50:02	White Range Rover	13:53:41	Silver Honda CRV	
13:50:32	Silver Toyota Prius	13:54:18	Grey Truck	
13:51:34	Blue Honda Civic	13:54:55	Red Jeep SUV	X
13:52:16	White Cadillac Sedan	13:55:01	White VW Sedan	
13:52:19	Silver Honda CRV	13:55:03	Grey Toyota Sedan	
13:52:30	Black Kia Soul	13:56:16	Black Van	
13:52:46	Grey Ford Truck	13:56:19	Black GMC SUV	
13:53:05	Black Dodge Ram	13:56:59	White Honda Civic	
13:53:37	Silver Cube			
13:55:12	White GMC SUV			
13:57:59	Red Tesla SUV			
14:00:16	Black Jeep Grand Cherokee	14:01:45	Black Nissan SUV	X
14:00:28	Silver Honda Van	14:01:47	Silver Honda Van	X
14:01:42	White SUV	14:01:48	Silver Toyota Prius	
14:02:05	White Toyota Highlander	14:02:15	Black Jeep Grand Cherokee	X
14:02:11	Black SUV	14:03:19	White Toyota Highlander	
14:03:03	Grey Tesla Sedan	14:04:29	Black Mercedes SUV	
14:03:18	Black Mercedes Sedan	14:04:33	Black Chevy Camaro	
14:04:12	Silver Honda CRV	14:04:47	Black Honda SUV	
14:05:32	White Chevy Tahoe	14:06:25	White SUV	
14:07:22	Blue SUV	14:06:30	White Chevy SUV	X
14:09:25	Silver Ford SUV	14:08:27	Blue SUV	X
14:09:29	Blue SUV	14:10:15	Silver Sedan	
14:11:45	White Honda Civic	14:10:16	Yellow Hummer	
14:12:05	Black Infiniti Coupe	14:10:43	Silver Ford SUV	X
14:12:17	Light Blue SUV	14:10:47	Black SUV	
14:13:52	Silver Honda SUV	14:13:11	Black Infiniti Coupe	
		14:14:30	Honda Black SUV	
14:16:02	Tan Ford Flex	14:17:03	Tan Ford Flex	X
14:16:10	Black Honda Accord	14:18:22	Grey Toyota Tundra	
14:16:17	White Honda Civic	14:18:52	White Toyota Camry	
14:18:40	White Van	14:20:40	White Toyota 4 Runner	
14:19:42	White Toyota 4 Runner	14:21:09	Black Mercedes SUV	X
14:22:40	Grey Jeep SUV	14:22:44	Silver Nissan Truck	
14:23:05	White Tesla SUV	14:22:46	Black Lexus SUV	
14:24:21	Silver Toyota Tundra	14:24:08	Red Sedan	X
14:25:17	Silver/Tan Chevy Tahoe	14:25:30	Silver Toyota Tundra	X
14:27:19	Silver Honda CRV	14:26:39	Silver/Tan Chevy Tahoe	
14:29:34	White Tesla SUV	14:27:53	Black SUV	
14:31:21	White BMW SUV	14:32:54	Silver Acura SUV	
14:31:40	Black Hatchback	14:34:22	Grey Toyota Tacoma	
14:33:16	Grey Toyota Tacoma	14:35:57	Black Toyota Highlander	X
14:35:29	White Subaru SUV	14:36:39	White Subaru SUV	X
14:35:36	White Jeep SUV	14:44:48	Blue Tesla SUV	
14:38:12	Blue Honda Civic			
14:42:45	White SUV			
14:43:31	Blue Tesla SUV			X
14:44:11	White Nissan Altima			X
14:44:14	White Toyota Corolla			
14:45:21	Grey Honda SUV	14:45:11	White Nissan Altima	
14:45:40	White Toyota Camry	14:48:32	Grey Truck	
14:46:10	Bronze Honda CRV	14:49:35	Grey Jeep Wrangler	
14:46:38	Red Tesla Sedan	14:49:45	Grey Acura SUV	
14:46:40	Black SUV	14:52:36	Red SUV	
14:46:42	Green Work Van	14:54:06	Black Sedan	

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Brea - Origin-Destination Study
Location: City of Brea
Date: 2/10/2023
Route 2B - From 2B to 2A

14:47:15	Burgundy Kia Optima	14:58:08	Black Ford Explorer	
14:47:41	Black/ Burgundy SUV			
14:48:31	Grey Jeep Wrangler			X
14:49:39	White Tesla SUV			
14:50:05	Blue Chevy Truck			
14:50:43	Brown/Orange Sedan			
14:51:13	Black Toyota Prius			
14:51:33	Red SUV			X
14:51:36	Blue Range Rover			
14:52:23	Silver/Grey Nissan SUV			
14:52:54	Red Honda Civic			
14:53:42	Silver Toyota Tacoma			
14:56:14	Black Ford Explorer			X
14:57:10	Silver Toyota Rav 4			
14:57:15	Black Sedan			
14:57:29	Black Tesla Sedan			
14:59;00	Silver Van			
14:59:05	Light Blue Toyota Corolla			
14:59:23	Red Dodge Crossover			X
14:59:26	White Ford Truck Wood Bed	15:00:28	Red Dodge Crossover	X
		15:00:59	White Ford Truck Wood Bed	
TOTALS	**178**		**147**	**53**

% of Matches from Origin to Destination: **30%**

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Appendix C. Updated Preliminary Sewer System Hydraulic Analysis

Appendix

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HUNSAKER
& ASSOCIATES
IRVINE, INC.

PLANNING
ENGINEERING
SURVEYING
GOVERNMENT RELATIONS

IRVINE
LOS ANGELES
RIVERSIDE
SAN DIEGO

REGISTERED PROFESSIONAL ENGINEER
KATHRYN LEE O'CONNOR
No. 60440
CIVIL
STATE OF CALIFORNIA

Preliminary Sewer System Hydraulic Analysis

Date: January 9, 2025

For: City of Brea
Public Works
Brea, CA

By: Katie O'Connor, P.E.
Hunsaker & Associates Irvine, Inc.

Project: **Greenbriar**

Hunsaker & Associates Irvine, Inc. (H&A) is pleased to submit the Preliminary Sewer System Hydraulic Analysis for the Greenbriar development. This analysis has been prepared to describe the preliminary proposed sewer system for the aforementioned residential development project and examine the existing sewer system in the City of Brea. The project lies within the jurisdiction of the City of Brea and their standards have been used for this report. Hydraulic models were prepared using Bentley Systems modeling software to model the peak flows the proposed sewer systems would experience.

BASED ON THE INFORMATION PROVIDED IN THE CITY OF BREA SEWER MASTER PLAN (NOVEMBER 2021) AND FLOW MONITORING PREFORMED DECEMBER 2024, THE EXISTING AND PROPOSED SEWER COLLECTION SYSTEM FOR THE GREENBRIAR PROJECT MEETS THE DESIGN STANDARDS SPECIFIED BY THE CITY OF BREA. This evaluation is based on existing and known conditions and should be re-evaluated if these conditions change or new information becomes available. Any interpretation of the information presented in this report should be referred to H&A to ensure the integrity of the results.

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Project Location

The Greenbriar project is a proposed 179 unit residential development located adjacent to the 57 freeway, south of Greenbriar Lane, and west of Associated Road. The project is north of the existing Brea Plaza commercial development.

Summary of Findings

1. The proposed development is on the site of the existing Mercury Insurance Complex. The proposed development will include 99 multifamily residential units and 80 high density residential units on approximately 9.5 acres.

2. The proposed sewer system schematic is shown on the attached "Greenbriar Preliminary Sewer Exhibit – Figure 1." The exhibit identifies points of sewer connection, sewer reaches, manholes, proposed and existing sewer mains that are affected by the proposed development.

3. US^3 was contracted to complete a flow monitoring study for 10 days, as requested by the City of Brea. A flow monitoring study was performed on 4 December 2024 through 16 December 2024. The flow monitoring provided average and maximum flows at two sites. Site 01 is located on Greenbriar Lane and Site 02 is located on Associated Road. These locations were chosen with the approval of the City of Brea. The results of the flow monitoring study and an exhibit showing the locations of the sites can be found in the Appendix.

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4. The flow monitoring study found that the existing pipes in Greenbriar Land and Associated Road that were examined meet the City of Brea design criteria. The table below summarizes the flow monitoring results.

SITE	PIPE SIZE (inches)	AVG. VELOCITY (fps)	AVG. FLOW (mgd)	AVG. d/D	MAX. VELOCITY (fps)	MAX FLOW (mgd)	MAX. d/D
01	8	4.06	0.14	0.21	5.16	0.22	0.25
02	12	2.89	0.40	0.31	3.66	0.65	0.39

5. The proposed onsite private sewer collection system consists of 6-inch diameter mains to be constructed at slopes of one percent or greater. There will be a small section of 8-inch diameter public sewer line constructed between the proposed private 6-inch diameter sewer line and the existing sewer line in Greenbriar Lane. The existing sewer mains examined include an 8-inch sewer main in Greenbriar Lane and 12-inch sewer mains in Associated Road.

6. The proposed sewer system is a private system. At the direction of the City of Brea, public sewer flow criteria and design criteria were used to design the proposed sewer system.

7. The total estimated sanitary sewer flows for the proposed Greenbriar residential development are based upon Table ES-1 of the City of Brea Sewer Master Plan (November 2021). Excerpt from the Sewer Master Plan (November 2021) can be found in the Appendix. Based on the duty factors and peaking equation provided in the City of Brea Sewer Master Plan (November 2021), the City Average Dry Weather Flow factor is 210 gpd/DU for high density residential with a density of 12.1-24.89 DU/AC. The proposed project is 18.84 DU/acre. The table below summarizes the City of Brea Design Criteria as provided in the Table ES-2 of the Sewer Master Plan (November 2021).

TABLE ES-2 SUMMARY: CITY OF BREA DESIGN CRITERIA

	AVERAGE DRY WEATHER FLOW (ADWF)	PEAK DRY WEATHER FLOW (PDWF)	PEAK WET WEATHER FLOW (PWWF)
FLOWS	ADWF = Unit Flow Factor*DU	PDWF = 1.777*ADWF^0.92	PWWF = 1.25*PDWF
VELOCITY	ADWF Velocity> 2 fps	3 fps<PDWF Velocity<5 fps	
NEW CONSTRUCTION d/D	N/A	0.50	0.75
EXISTING CONSTRUCTION d/D	N/A	0.64	0.75

8. The sewer system for the proposed Greenbriar residential development was designed to meet all the design criteria contained within the City of Brea Sewer Master Plan (November 2021) and industry standards.

9. Industry standards allow for pipes that do not have the volume of flow to obtain the minimum required velocity due to the number of connections and/ or topographic constraints to be constructed at one percent minimum. Every effort will be made during final engineering design for the slopes to be greater than one percent and for velocities to exceed 2 feet per second during average dry weather flows and 3 feet per second during peak dry weather flow.

10. The proposed pipe analysis was provided for the pipes labeled P-31 and P-30 at a slope of one percent. These pipes represent the maximum and minimum sewer flows from the entire development. The representative pipes depict the worst possible scenario for the project site.

11. The December 2024 sewer flow monitoring provided existing average and peak flows for the existing system at the locations of P-33 and A26-A27. The actual flows in pipes P-33 and A26-A27 have been used in the capacity calculations for those pipes.

    The actual flows measured during the flow monitoring period were less than the flows anticipated in the City of Brea Sewer Master Plan (November 2021). The remaining existing pipes in the sewer system were examined using flows indicated in the Sewer Master Plan (November 2021) to provide an additional factor of safety when adding proposed flows to the existing sewer system. The following table summarizes information on the existing sewer mains affected by the proposed development:

Table 2: Existing Sewer Flows Summary

EX. PIPE ID	SLOPE (ft/ft)	EX. ADWF (mgd)	EX PDWF (mgd)	EX PDWF Velocity (fps)	EX. PDWF d/D
P-33*	0.0040	0.1389	0.2207	5.16	0.25
A26-A27*	0.0099	0.3954	0.6522	3.54	0.39
A27-A28	0.0088	0.44211	0.868676	3.99	0.43
A28-A29	0.0088	0.45614	0.863093	4.03	0.44
A29-A30	0.0098	0.45614	0.863093	4.91	0.43
A30-OUTLET	0.0111	0.474686	0.895326	4.43	0.42

*Information from December 2024 flow monitoring.

12. The proposed development of 179 residential units produces the following sewer flows:

Table 4: Proposed Greenbriar Residential Development Sewer Flows

	UNITS (DU)	DUTY FACTOR (gpd/DU)	ADWF (mgd)	PDWF (mgd)	PWWF (mgd)
Multi-Family Residential	99	248	0.0246		
High Density Residential	80	210	0.0168		
TOTALS	**179**		**0.0414**	**0.0948**	**0.1185**

13. Through hydraulic calculations and flow monitoring, it was determined that existing sewer mains have the capacity to accommodate the flows from the proposed development. The summary of outputs from the model runs is included in the Appendix of this report.

14. In order to calculate the pipe sizes and capacity of the proposed sewer system for Greenbriar and verify that the existing system has capacity to accept flows from Greenbriar, we have prepared a hydraulic model using Bentley FlowMaster V8i. The summary of outputs from the model runs is included in the Appendix of this report.

15. The hydraulic model of the existing sewer system that is affected by the Greenbriar residential development, using the design criteria provided by the City of Brea, indicates the existing sewer system has capacity for the development. Additionally, the proposed system will be designed in final engineering to meet or exceed the criteria presented in this report.

    We sincerely trust these calculations will provide sufficient evidence that the proposed and existing sewer system is adequate for the proposed Greenbriar development. Please contact me at (949) 458-5437 if you have any questions.

KO
Enclosures
xc: Gary Jones, Lennar
Peter Carlson, CSLS
Kamal Karam, H&A
Sean Swanson, H&A

W.O. 3916-89X
(F:\1285\Engineering\WS STUDIES\SEWER\Greenbriar Prelim_ss report.doc)

SEE FIGURE APP 4-1f
SEWERSHED 6 (ASSOCIATED) AND MAINLINE SEWER
FROM THE CITY OF BREA SEWER MASTER PLAN
FOR EXISTING PIPE NODES

LEGEND

- SEWER JUNCTION
- P-# PROPOSED 6" PRIVATE SEWER MAINS & PIPE NUMBER
- P-# PROPOSED 8" PUBLIC SEWER MAINS & PIPE NUMBER
- P-# EXISTING 8" PUBLIC SEWER MAINS & PIPE NUMBER
- EXISTING 12" PUBLIC SEWER MAINS & PIPE NUMBER

GRAPHIC SCALE: 1"=80'

PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92615

PREPARED BY:

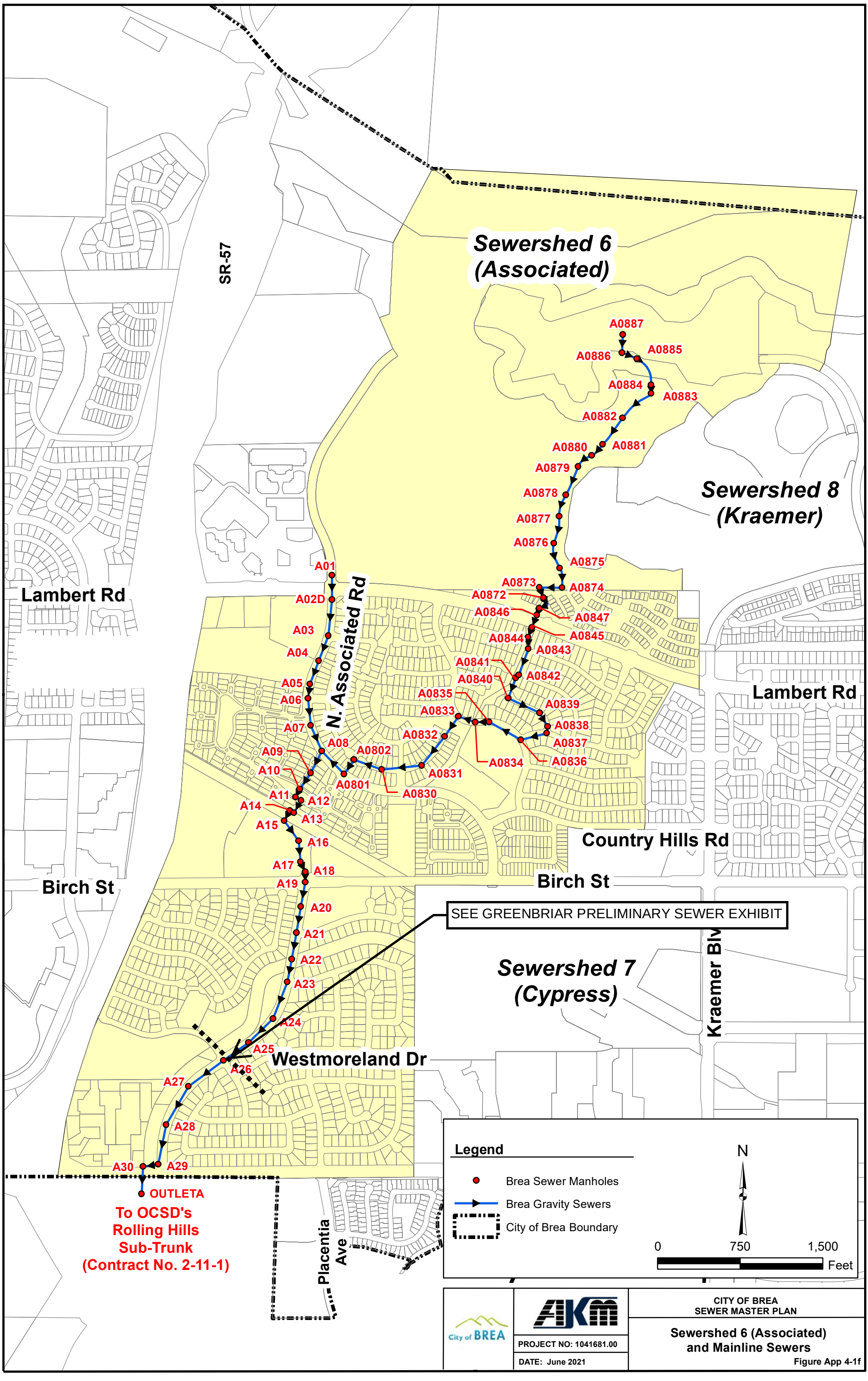
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949)583-1010 ▪ FX: (949)583-0759

GREENBRIAR
PRELIMINARY SEWER EXHIBIT

WO NO. 3916-89X | DATE: 9 JAN 2024

FIGURE 1

PLOTTED BY: katieo DATE: Jan. 09, 2025 TIME: 08:29 AM F:\1285\Engineering\WS STUDIES\SEWER\Greenbriar SS EXHIBIT.dwg


Sewershed 6
(Associated)
Sewershed 8
(Kraemer)
Sewershed 7
(Cypress)
SR-57
Lambert Rd
Lambert Rd
Birch St
Birch St
Country Hills Rd
N. Associated Rd
Kraemer Blv
Westmoreland Dr
Placentia Ave
SEE GREENBRIAR PRELIMINARY SEWER EXHIBIT
A01
A02D
A03
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A30
OUTLETA
To OCSD's
Rolling Hills
Sub-Trunk
(Contract No. 2-11-1)
A0887
A0886
A0885
A0884
A0883
A0882
A0881
A0880
A0879
A0878
A0877
A0876
A0875
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A0840
A0839
A0838
A0837
A0836
A0835
A0834
A0833
A0832
A0831
A0830
A0802
A0801
Legend
Brea Sewer Manholes
Brea Gravity Sewers
City of Brea Boundary
N
0
750
1,500
Feet
City of BREA
AKM
PROJECT NO: 1041681.00
DATE: June 2021
CITY OF BREA
SEWER MASTER PLAN
Sewershed 6 (Associated)
and Mainline Sewers
Figure App 4-1f

APPENDIX

GREENBRIAR EXISTING PIPES: SEWER FLOW SUMMARY

Information from Sewer Master Plan (EXISTING)								Calculations based on Sewer Master Plan flows (EX) + Proposed flows (PR)						
EXISTING NODES FROM MASTER PLAN		PIPE SIZE (inches)	PIPE SLOPE (ft/ft)	EXISTING ADWF (mgd)	EXISTING PDWF (mgd)	EX. PDWF Velocity (fps)	EX. PDWF d/D	PR + EX ADWF (mgd)	PR + EX ADWF Velocity (fps) > 2 fps	PR+EX PDWF (mgd)	PR. + EX. PDWF Velocity (fps) (3 fps<V< 5 fps)	PR. + EX. PDWF d/D (must be <0.64)	PROPOSED & EX PWWF (mgd)	PR. + EX. PWWF d/D (must be <0.75)
P-33		8	0.004	0.1389	0.2207	5.16	0.25	0.1803	2.02	0.31551	2.32	0.581	0.3944	0.676
A26	A27	12	0.0099	0.3954	0.6522	3.54	0.39	0.43675	3.48	0.74701	4.03	0.393	0.934	0.445
A27	A28	12	0.0088	0.44211	0.838676	3.99	0.43	0.48346	3.43	0.91054	4.08	0.453	1.138	0.516
A28	A29	12	0.0088	0.45614	0.863093	4.03	0.44	0.49749	3.46	0.93483	4.1	0.46	1.169	0.524
A29	A30	12	0.0098	0.45614	0.863093	4.91	0.43	0.49749	3.59	0.93483	4.27	0.446	1.169	0.507
A30	OUTLETA	12	0.0111	0.474686	0.895326	4.43	0.42	0.51604	3.80	0.96684	4.51	0.439	1.209	0.499

Indicates existing flow information from flow monitoring preformed by US[3] 4 December 2024 through 16 December 2024.

Indicates information taken directly from the City of Brea Sewer Master Plan (November 2021). Average and peak flow obtained from flow monitoring information is less than flows indicated in City of Brea Sewer Master Plan (November 2021). Higher flows were used to maintain a factor of saftey.

GREENBRIAR PROPOSED PIPES: SEWER FLOW SUMMARY

PROPOSED PIPE	PIPE SIZE (inches)	PIPE SLOPE (ft/ft)	ADWF (mgd)	ADWF Velocity (fps) > 2 fps	PDWF (mgd)	PDWF Velocity (fps) (3 fps<V< 5 fps)	PDWF d/D (must be <0.50)	PWWF (mgd)	PWWF d/D (must be <0.75)	
P- 32	8	0.01	0.0414	1.84	0.0948	2.34	0.235	0.1185	0.263	PROPOSED PUBLIC PIPE
P- 31	6	0.01	0.0414	1.89	0.0948	2.4	0.3490	0.1185	0.393	PROPOSED PRIVATE PIPE WITH MOST FLOW
P- 30	6	0.01	0.0010	0.62	0.0031	0.87	0.0460	0.0038	0.072	PROPOSED PRIVATE PIPE WITH LEAST FLOW

GREENBRIAR PROPOSED SEWER FLOW SUMMARY

	Units (DU)	City Duty Factor (gpd/DU)	ADWF (gpd)	ADWF (MGD)	PDWF =1.777*ADWF $^{0.92}$ (MGD)	PWWF = 1.25 *PDWF (MGD)
Mulit-family Residential (MF)	99	248	24552	0.0246		
High Density Residential (HD)	80	210	16800	0.0168		
TOTALS	179		41352	0.0414	0.0948	0.1185

GREENBRIAR PROPOSED SEWER FLOWS

PIPE	Units (DU)	Land Use: HD or MF	ADWF (gpd)	PDWF =1.777*ADWF $^{0.92}$ (MGD)	PWWF = 1.25 *PDWF (MGD)	TOTAL UNITS (DU)	TOTAL ADWF (gpd)	TOTAL ADWF (MGD)	TOTAL PDWF (MGD)	TOTAL PWWF (MGD)
P- 1	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 2	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 3						20	4200	0.0042	0.0116	0.0145
P- 4	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 5						30	6300	0.0063	0.0168	0.0210
P- 6A	5	HD	1050	0.0032	0.0040	5	1050	0.0011	0.0032	0.0040
P- 7A						35	7350	0.0074	0.0193	0.0242
P- 6	5	HD	1050	0.0032	0.0040	5	1050	0.0011	0.0032	0.0040
P- 7	16	MF	3968	0.0109	0.0137	16	3968	0.0040	0.0110	0.0137
P- 8						56	12368	0.0124	0.0312	0.0390
P- 9	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 10						66	14468	0.0145	0.0361	0.0451
P- 11	13	MF	3224	0.0090	0.0113	13	3224	0.0032	0.0091	0.0113
P- 12						79	17692	0.0177	0.0434	0.0543
P- 13	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 14						89	19792	0.0198	0.0481	0.0602
P- 15	9	MF	2232	0.0064	0.0080	9	2232	0.0022	0.0065	0.0081
P- 16						98	22024	0.0220	0.0531	0.0664
P- 17	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 18						108	24124	0.0241	0.0577	0.0722
P- 19	8	MF	1984	0.0058	0.0072	8	1984	0.0020	0.0058	0.0072
P- 20						116	26108	0.0261	0.0621	0.0776
P- 21	10	HD	2100	0.0061	0.0076	10	2100	0.0021	0.0061	0.0076
P- 22						126	28208	0.0282	0.0667	0.0834
P- 23	8	MF	1984	0.0058	0.0072	8	1984	0.0020	0.0058	0.0072
P- 24						134	30192	0.0302	0.0710	0.0887
P- 25	4	MF	992	0.0031	0.0038	4	992	0.0010	0.0031	0.0038
P- 26						138	31184	0.0312	0.0731	0.0914
P- 27	4	MF	992	0.0031	0.0038	4	992	0.0010	0.0031	0.0038
P- 28						142	32176	0.0322	0.0753	0.0941
P- 29	33	MF	8184	0.0213	0.0266	33	8184	0.0082	0.0214	0.0267
P- 30	4	MF	992	0.0031	0.0038	4	992	0.0010	0.0031	0.0038
P- 31						179	41352	0.0414	0.0948	0.1185

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*6IN PIPE 30_ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0010	mgd

Results		
Normal Depth	0.20	in
Flow Area	0.00	ft²
Wetted Perimeter	0.20	ft
Top Width	0.19	ft
Critical Depth	0.20	in
Percent Full (**d/D)**	3.90	%
Critical Slope	0.01071	ft/ft
Velocity	0.62	ft/s
Velocity Head	0.01	ft
Specific Energy	0.03	ft
Froude Number	0.96	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00000	ft/ft
Flow Type	Subcritical	

Project Description		
Worksheet:	*6IN PIPE 31_ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0414	mgd

Results		
Normal Depth	1.40	in
Flow Area	0.03	ft²
Wetted Perimeter	0.50	ft
Top Width	0.42	ft
Critical Depth	1.50	in
Percent Full (**d/D**)	22.90	%
Critical Slope	0.00704	ft/ft
Velocity	1.89	ft/s
Velocity Head	0.06	ft
Specific Energy	0.17	ft
Froude Number	1.18	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00013	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*8IN PIPE 32_ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	8	in
Discharge	0.0414	mgd

Results		
Normal Depth	1.30	in
Flow Area	0.03	ft²
Wetted Perimeter	0.50	ft
Top Width	0.48	ft
Critical Depth	1.40	in
Percent Full (**d/D)**	15.60	%
Critical Slope	0.00681	ft/ft
Velocity	1.84	ft/s
Velocity Head	0.05	ft
Specific Energy	0.16	ft
Froude Number	1.21	
Maximum Discharge	0.84	mgd
Discharge Full	0.78	mgd
Slope Full	0.00003	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*proposed+existing PIPE 33_ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.1803	mgd

Results		
Normal Depth	3.30	in
Flow Area	0.13	ft²
Wetted Perimeter	0.90	ft
Top Width	0.66	ft
Critical Depth	2.90	in
Percent Full (**d/D**)	41.80	%
Critical Slope	0.00652	ft/ft
Velocity	2.02	ft/s
Velocity Head	0.06	ft
Specific Energy	0.34	ft
Froude Number	0.78	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00053	ft/ft
Flow Type	Subcritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A26-A27 ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	0.4368	mgd
Results		
Normal Depth	3.60	in
Flow Area	0.19	ft²
Wetted Perimeter	1.20	ft
Top Width	0.91	ft
Critical Depth	4.10	in
Percent Full (**d/D)**	29.60	%
Critical Slope	0.00564	ft/ft
Velocity	3.48	ft/s
Velocity Head	0.19	ft
Specific Energy	0.48	ft
Froude Number	1.33	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00036	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*A27-A28 ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.4835	mgd
Results		
Normal Depth	3.90	in
Flow Area	0.22	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.30	in
Percent Full (**d/D**)	32.20	%
Critical Slope	0.00568	ft/ft
Velocity	3.43	ft/s
Velocity Head	0.18	ft
Specific Energy	0.50	ft
Froude Number	1.25	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00044	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A28-A29 ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.4975	mgd
Results		
Normal Depth	3.90	in
Flow Area	0.22	ft²
Wetted Perimeter	1.20	ft
Top Width	0.94	ft
Critical Depth	4.40	in
Percent Full (**d/D)**	32.60	%
Critical Slope	0.00567	ft/ft
Velocity	3.46	ft/s
Velocity Head	0.19	ft
Specific Energy	0.51	ft
Froude Number	1.25	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00047	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*A29-A30 ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	0.4975	mgd
Results		
Normal Depth	3.80	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.40	in
Percent Full (**d/D**)	31.70	%
Critical Slope	0.00567	ft/ft
Velocity	3.59	ft/s
Velocity Head	0.20	ft
Specific Energy	0.52	ft
Froude Number	1.32	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00047	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A30-OUTLET ADWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	0.5160	mgd
Results		
Normal Depth	3.80	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.93	ft
Critical Depth	4.50	in
Percent Full (**d/D)**	31.30	%
Critical Slope	0.00570	ft/ft
Velocity	3.80	ft/s
Velocity Head	0.22	ft
Specific Energy	0.54	ft
Froude Number	1.41	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00050	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*6IN PIPE 30_PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0031	mgd
Results		
Normal Depth	0.40	in
Flow Area	0.01	ft²
Wetted Perimeter	0.30	ft
Top Width	0.25	ft
Critical Depth	0.40	in
Percent Full (**d/D**)	6.60	%
Critical Slope	0.00921	ft/ft
Velocity	0.87	ft/s
Velocity Head	0.01	ft
Specific Energy	0.04	ft
Froude Number	1.03	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00000	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*6IN PIPE 31_PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0948	mgd

Results		
Normal Depth	2.10	in
Flow Area	0.06	ft²
Wetted Perimeter	0.60	ft
Top Width	0.48	ft
Critical Depth	2.30	in
Percent Full (**d/D)**	34.90	%
Critical Slope	0.00721	ft/ft
Velocity	2.40	ft/s
Velocity Head	0.09	ft
Specific Energy	0.26	ft
Froude Number	1.18	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00068	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*8IN PIPE 32_PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	8	in
Discharge	0.0948	mgd

Results		
Normal Depth	1.90	in
Flow Area	0.06	ft²
Wetted Perimeter	0.70	ft
Top Width	0.57	ft
Critical Depth	2.10	in
Percent Full (**d/D**)	23.50	%
Critical Slope	0.00644	ft/ft
Velocity	2.34	ft/s
Velocity Head	0.09	ft
Specific Energy	0.24	ft
Froude Number	1.24	
Maximum Discharge	0.84	mgd
Discharge Full	0.78	mgd
Slope Full	0.00015	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*proposed+existing PIPE 33_PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.3155	mgd
Results		
Normal Depth	4.60	in
Flow Area	0.21	ft²
Wetted Perimeter	1.20	ft
Top Width	0.66	ft
Critical Depth	3.90	in
Percent Full (**d/D)**	58.10	%
Critical Slope	0.00697	ft/ft
Velocity	2.32	ft/s
Velocity Head	0.08	ft
Specific Energy	0.47	ft
Froude Number	0.73	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00163	ft/ft
Flow Type	Subcritical	

Project Description		
Worksheet:	*A26-A27 PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	0.7470	mgd
Results		
Normal Depth	4.70	in
Flow Area	0.29	ft²
Wetted Perimeter	1.40	ft
Top Width	0.98	ft
Critical Depth	5.40	in
Percent Full (**d/D**)	39.30	%
Critical Slope	0.00593	ft/ft
Velocity	4.03	ft/s
Velocity Head	0.25	ft
Specific Energy	0.65	ft
Froude Number	1.31	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00105	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A27-A28 PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.9105	mgd
Results		
Normal Depth	5.40	in
Flow Area	0.35	ft²
Wetted Perimeter	1.50	ft
Top Width	1.00	ft
Critical Depth	6.00	in
Percent Full (**d/D)**	45.30	%
Critical Slope	0.00615	ft/ft
Velocity	4.08	ft/s
Velocity Head	0.26	ft
Specific Energy	0.71	ft
Froude Number	1.22	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00156	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*A28-A29 PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	0.9348	mgd
Results		
Normal Depth	5.50	in
Flow Area	0.35	ft²
Wetted Perimeter	1.50	ft
Top Width	1.00	ft
Critical Depth	6.10	in
Percent Full (**d/D**)	46.00	%
Critical Slope	0.00619	ft/ft
Velocity	4.10	ft/s
Velocity Head	0.26	ft
Specific Energy	0.72	ft
Froude Number	1.22	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00165	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A29-A30 PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	0.9348	mgd

Results		
Normal Depth	5.40	in
Flow Area	0.34	ft²
Wetted Perimeter	1.50	ft
Top Width	0.99	ft
Critical Depth	6.10	in
Percent Full (**d/D)**	44.60	%
Critical Slope	0.00619	ft/ft
Velocity	4.27	ft/s
Velocity Head	0.28	ft
Specific Energy	0.73	ft
Froude Number	1.29	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00165	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*A30-OUTLET PDWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	0.9668	mgd

Results		
Normal Depth	5.30	in
Flow Area	0.33	ft²
Wetted Perimeter	1.40	ft
Top Width	0.99	ft
Critical Depth	6.20	in
Percent Full (**d/D**)	43.90	%
Critical Slope	0.00624	ft/ft
Velocity	4.51	ft/s
Velocity Head	0.32	ft
Specific Energy	0.75	ft
Froude Number	1.37	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00176	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*6IN PIPE 30_PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.0038	mgd

Results		
Normal Depth	0.40	in
Flow Area	0.01	ft²
Wetted Perimeter	0.30	ft
Top Width	0.26	ft
Critical Depth	0.40	in
Percent Full (**d/D)**	7.20	%
Critical Slope	0.00903	ft/ft
Velocity	0.92	ft/s
Velocity Head	0.01	ft
Specific Energy	0.05	ft
Froude Number	1.04	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00000	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*6IN PIPE 31_PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	6	in
Discharge	0.1185	mgd

Results		
Normal Depth	2.40	in
Flow Area	0.07	ft²
Wetted Perimeter	0.70	ft
Top Width	0.49	ft
Critical Depth	2.60	in
Percent Full (**d/D**)	39.30	%
Critical Slope	0.00734	ft/ft
Velocity	2.56	ft/s
Velocity Head	0.10	ft
Specific Energy	0.30	ft
Froude Number	1.18	
Maximum Discharge	0.39	mgd
Discharge Full	0.36	mgd
Slope Full	0.00107	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*8IN PIPE 32_PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0100	ft/ft
Diameter	8	in
Discharge	0.1185	mgd

Results		
Normal Depth	2.10	in
Flow Area	0.07	ft²
Wetted Perimeter	0.70	ft
Top Width	0.59	ft
Critical Depth	2.40	in
Percent Full (**d/D)**	26.30	%
Critical Slope	0.00644	ft/ft
Velocity	2.50	ft/s
Velocity Head	0.10	ft
Specific Energy	0.27	ft
Froude Number	1.25	
Maximum Discharge	0.84	mgd
Discharge Full	0.78	mgd
Slope Full	0.00023	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*proposed+existing PIPE 33_PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0040	ft/ft
Diameter	8	in
Discharge	0.3944	mgd

Results		
Normal Depth	5.40	in
Flow Area	0.25	ft²
Wetted Perimeter	1.30	ft
Top Width	0.62	ft
Critical Depth	4.40	in
Percent Full (**d/D**)	67.60	%
Critical Slope	0.00737	ft/ft
Velocity	2.43	ft/s
Velocity Head	0.09	ft
Specific Energy	0.54	ft
Froude Number	0.68	
Maximum Discharge	0.53	mgd
Discharge Full	0.49	mgd
Slope Full	0.00255	ft/ft
Flow Type	Subcritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A26-A27 PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0099	ft/ft
Diameter	12	in
Discharge	0.9340	mgd
Results		
Normal Depth	5.30	in
Flow Area	0.34	ft²
Wetted Perimeter	1.50	ft
Top Width	1.00	ft
Critical Depth	6.10	in
Percent Full (**d/D)**	44.50	%
Critical Slope	0.00619	ft/ft
Velocity	4.28	ft/s
Velocity Head	0.28	ft
Specific Energy	0.73	ft
Froude Number	1.30	
Maximum Discharge	2.46	mgd
Discharge Full	2.29	mgd
Slope Full	0.00165	ft/ft
Flow Type	Supercritical	

Project Description		
Worksheet:	*A27-A28 PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	1.1380	mgd
Results		
Normal Depth	6.20	in
Flow Area	0.41	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.80	in
Percent Full (**d/D**)	51.60	%
Critical Slope	0.00654	ft/ft
Velocity	4.31	ft/s
Velocity Head	0.29	ft
Specific Energy	0.80	ft
Froude Number	1.19	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00244	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description		
Worksheet:	*A28-A29 PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0088	ft/ft
Diameter	12	in
Discharge	1.1690	mgd
Results		
Normal Depth	6.30	in
Flow Area	0.42	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.90	in
Percent Full (**d/D)**	52.40	%
Critical Slope	0.00660	ft/ft
Velocity	4.34	ft/s
Velocity Head	0.29	ft
Specific Energy	0.82	ft
Froude Number	1.18	
Maximum Discharge	2.32	mgd
Discharge Full	2.16	mgd
Slope Full	0.00258	ft/ft
Flow Type	Supercritical	

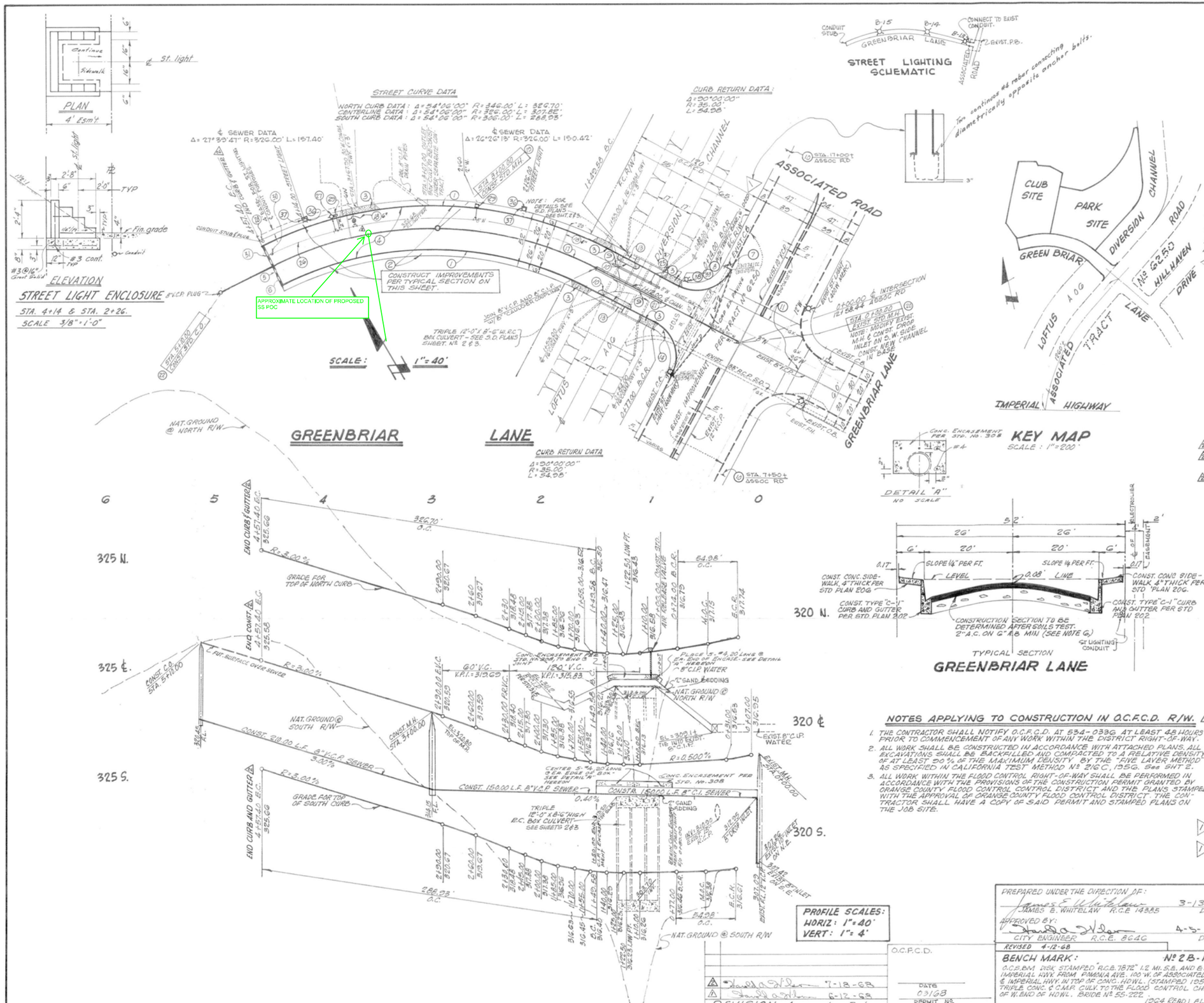
Project Description		
Worksheet:	*A29-A30 PWWF	
Flow Element:	Circular Pipe	
Friction Method:	Manning's Formula	
Solve For:	Normal Depth	
Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0098	ft/ft
Diameter	12	in
Discharge	1.1690	mgd
Results		
Normal Depth	6.10	in
Flow Area	0.40	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	6.90	in
Percent Full (**d/D**)	50.70	%
Critical Slope	0.00660	ft/ft
Velocity	4.52	ft/s
Velocity Head	0.32	ft
Specific Energy	0.82	ft
Froude Number	1.26	
Maximum Discharge	2.45	mgd
Discharge Full	2.28	mgd
Slope Full	0.00258	ft/ft
Flow Type	Supercritical	

Greenbriar
Proposed Onsite & Existing Offsite Sewer System
FlowMaster Calculations

Project Description	
Worksheet:	*A30-OUTLET PWWF
Flow Element:	Circular Pipe
Friction Method:	Manning's Formula
Solve For:	Normal Depth

Input Data		
Roughness Coefficient	0.013	
Channel Slope	0.0111	ft/ft
Diameter	12	in
Discharge	1.2090	mgd

Results		
Normal Depth	6.00	in
Flow Area	0.39	ft²
Wetted Perimeter	1.60	ft
Top Width	1.00	ft
Critical Depth	7.00	in
Percent Full (**d/D**)	49.90	%
Critical Slope	0.00668	ft/ft
Velocity	4.78	ft/s
Velocity Head	0.35	ft
Specific Energy	0.85	ft
Froude Number	1.35	
Maximum Discharge	2.61	mgd
Discharge Full	2.43	mgd
Slope Full	0.00276	ft/ft
Flow Type	Supercritical	



GENERAL NOTES

1. SEE STANDARD 104 FOR TYPICAL SECTION OF LOCAL
2. SEE STANDARD 902.
3. ONE PARKWAY TREE SHALL BE PLANTED AT APPR
4. STREET LIGHTING SPECIFICATIONS - SEE STANDARD
5. NO JOINT PIPE MAY BE SUBSTITUTED FOR R.C.P. WH STANDARD PLAN 515.
6. UPON COMPLETION OF THE ROUGH GRADING, THE CI HAVE THE ORANGE COUNTY ROAD DEPARTMENT MAK TESTS AND DETERMINE THE CONSTRUCTION SECTI AND BASE THICKNESS SHOWN ON THESE PLANS A THE ENGINEER AND DO NOT INDICATE FINAL SECTIO TO BE INCLUDED IN CONTRACT.
7. THE CITY OF BREA WILL DO ALL NECESSARY STR DEVELOPER FOR COSTS THEREOF.
8. THE EXISTENCE AND LOCATION OF ANY UNDERGROU STRUCTURES SHOWN ON THESE PLANS ARE OBTAIN OF THE AVAILABLE RECORDS. TO THE BEST OF OUR ARE NO EXISTING UTILITIES OTHER THAN SHOWN THE CONTRACTOR IS REQUIRED TO TAKE ALL PRE URES TO PROTECT THE UTILITY LINES AND ANY O RECORD OR NOT SHOWN ON THESE PLANS.
9. TYPE I BEDDING PER STD. 308 SHALL BE USED ATIONS UNLESS OTHERWISE NOTED ON THESE PLA
10. DRIVEWAYS TO BE CONSTRUCTED PER CITY OF BRE UNLESS OTHERWISE NOTED ON THESE PLANS.
11. ALL LOCAL STREETS TO HAVE SOLID WHITE CENTER
12. ELECTROLIER (38) SHALL BE FURNISHED WITHO BUT, WITH: PLATE OVER ARM SOCKET, HAND OPPOSITE TRAFFIC, PLUGGED HOLES FO PEDESTRIAN BUTTON - SIGNAL HEADS AN WALK SIGNALS.

STREET NAME SIGN			
NO. COR.	ASSOCIATED RD.	400 S.	GREENB

NOTES APPLYING TO CONSTRUCTION IN O.C.F.C.D. R/W.

1. THE CONTRACTOR SHALL NOTIFY O.C.F.C.D. AT 534-0330 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE DISTRICT RIGHT-OF-WAY.
2. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH ATTACHED PLANS. ALL EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED TO A RELATIVE DENSITY OF AT LEAST 90 % OF THE MAXIMUM DENSITY BY THE "FIVE LAYER METHOD" AS SPECIFIED IN CALIFORNIA TEST METHOD Nº 216 C.I., 1965. See SHT. 2.
3. ALL WORK WITHIN THE FLOOD CONTROL RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY ORANGE COUNTY FLOOD CONTROL DISTRICT AND THE PLANS STAMPED WITH THE APPROVAL OF ORANGE COUNTY FLOOD CONTROL DISTRICT. THE CONTRACTOR SHALL HAVE A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE.

ESTIMATE OF QUANTIT

		STREETS	
	1	CURB & GUTTER TYPE "C-1"	
	2	P.C.C. SIDEWALK 4" THICK	206
	3	P.C.C. COMMERCIAL DRIVEWAY	2
	4	2" A.C. W/SC.250 P.C. ON 6" A.B. (SEE NOTE G)	214
	5	BARRICADE	6
	6	2" x 6" REDWOOD HEADER	6
	7	STREET NAME SIGN	6
	8	TRAFFIC SIGN W33R (TEMP.)	6
	9	CONCRETE ENCASEMENT	3
	10	"GREENBRIAR LANE" ADVANCE SIGN 8" U.G. GTR W/BACK FRAME 6" L.C.	6
	11	CROSSWALK	6
	12		
	13	INLET - VARIABLE LENGTH PER SHT. 8	
	14	TRAFFIC SIGN R1R	
		SEWERS	
	17	8" V.C.P. MAINLINE SEWER	4
	18	4"&6" V.C.P. HOUSE LATERAL	4
	19	STD. MANHOLE	4
	20	CONST. DROP INTO EXIST STD. MANHOLE	4
	21	8" C.I.P. MAINLINE SEWER	301
	22	STD. CLEAN-OUT	4
		WATER	
	22	AIR RELEASE VALVE ASSEMBLY	3
	26	4"&8" C.I.P. WATER	5
	27	FIRE HYDRANT ASSEMBLIES, A 24015	3
	28	BLOW-OFF ASSEMBLY	3
	29	WATER SERVICE - 2"	3
	30	8" G.V. & 6" G.V.	312
	31	8" C.I.P. PLUG	3
		STREET LIGHTS	
	33	EXTERNAL SHIELDS 35-100947-02	6
	34	SHIELDS (STREET) 35-103413-01	6
	35	SHIELDS (HOUSE) 35-104562-02	6
	36	D7425120 175W II Pfaff & Kanoff ELECTROLIER	
	37	STREET LIGHT ENCLOSURE	
	38	WR-15-J-309-5-0, 400W II Westrick ELECTROLIER	822
ITEM		DESCRIPTION	PER B

PREPARED UNDER THE DIRECTION OF:
JAMES B. WHITELAW R.C.E. 14885 — 3-13-68 DATE
APPROVED BY:
CITY ENGINEER R.C.E. 8640 — 4-5-68 DATE
REVISED 4-12-68

BENCH MARK: Nº 2B-17-58
O.C.S. B.M. DISK STAMPED "R.C.B. 7872" 1.2 MI. S.E. AND E. ALONG IMPERIAL HWY. FROM PIMONA AVE. 100' W. OF ASSOCIATED RD. 18' S. ℄ IMPERIAL HWY. IN TOP OF CONC. HDWL. (STAMPED 1954) OF A TRIPLE CONC. C.M.P. CULV. TO THE FLOOD CONTROL CHANNEL 1' E. OF W. END OF HDWL. BRIDGE Nº 55-222. 1004 READJ. EL. 308.483.

REVISION	Approved	Date
1		7-18-68
2		8-12-68

O.C.F.C.D.
DATE 03168
PERMIT Nº

CITY OF BRE
IMPROVEMENT FOR GREENBRIAR

PREPARED IN THE OFFICE OF
Voorheis-Trindle & Nelson, Inc.
13794 Beach Blvd
Westminster, Calif

Date: 3-5-68 J.N.G. 3015

US^3 FLOW MONITORING STUDY

4 DECEMBER 2024 - 16 DECEMBER 2024

LEGEND

- PROPOSED SEWER MANHOLE
- EXISTING SEWER MANHOLE / CITY APPROVED FLOW MONITORING LOCATION
- EXISTING 8" PUBLIC SEWER MAINS & PIPE NUMBER
- EXISTING 12" PUBLIC SEWER MAINS & PIPE NUMBER

PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92615

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949)583-1010 ▪ FX: (949)583-0759

GREENBRIAR FLOW MONITORING EXHIBIT

WO NO. 3916-89X | DATE: 4 NOV 2024

FIGURE 1

PLOTTED BY: katieo DATE: Jan. 09, 2025 TIME: 08:44 AM F:\1285\Engineering\WS STUDIES\SEWER\Greenbriar FLOW MONITORING EXHIBIT.dwg

Methods & Procedures & Equipment

Methods and Procedures

Utility Systems Science & Software provided Hunsaker and Associates, Inc. with an off the shelf, non-proprietary flow monitoring solution that included two state of the art Hach Flo-Dar® AV Sensor systems. The project course of action is listed below. The US^3 team:

- Assessed permitting and traffic control at the sites on Greenbriar Ln and Associated Rd in City of Brea, CA.
- Prepared the traffic control plan and obtained a City Encroachment Permit.
- Coordinated with the City of Brea Department of Public Works and the City Inspector for installation and removal of equipment.
- Installed and removed traffic control in accord with site-specific California Temporary Traffic Control Handbook (CATTCH) requirements for the installation, calibration and removal of equipment.
- Validated the sites for suitability for sewer flow monitoring for the Greenbriar Development Project.
  - **Site 01:** Greenbriar Ln MH 1 had no laterals with moderate to rapid open channel hydraulics. The monitoring began on the upstream line as it provided the best hydraulics during the inspection.
  - **Site 02:** Associated Rd MH 2 had no laterals with moderate to rapid open channel hydraulics. The monitoring began on the downstream line to get the total flow.
- Installed and calibrated the flow monitoring equipment at the sites per manufacturer recommendations on 12/04/2024.
  - Follow-up on the installations confirmed equipment was reading properly.
  - Collected 15-minute interval depth and velocity data points over the entire monitoring period.
- Removed the equipment on 12/16/2024 and validated the data.
  - All of the equipment went through diagnostic testing before and after the study with less than a 1% deviation between manual and meter level readings and less than a 5% deviation between manual and meter velocity readings.
  - Equipment calibration was verified in accordance with manufacturer specifications.
- Prepared the data reports.
  - The table below contains a summary of the average (Avg) and maximum (Max) velocities (Vel) and levels (Lev) collected during this study as well as the calculated flow rates (Flow) and depth versus diameter ratios (d/D).

Site	Pipe Size (in)	Avg Vel (fps)	Max Vel (fps)	Avg Lev (in)	Max Lev (in)	Avg Flow (gpm)	Max Flow (gpm)	Avg d/D	Max d/D
01	8	4.06	5.16	1.64	1.97	96.43	153.25	0.21	0.25
02	12	2.89	3.54	3.66	4.72	274.55	452.91	0.31	0.39

Equipment

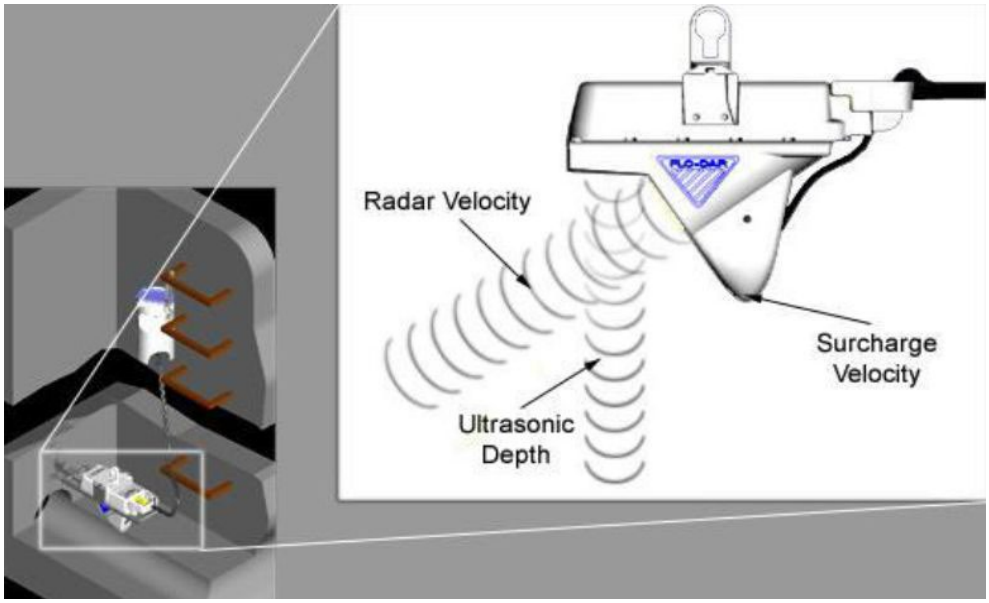


Figure above: Equipment installed for the Sewer Flow Monitoring Study

Figure above: Web-Enabled Flo-Dar® AV Sensor, Radar-Based Velocity/Area Flow Meter

FloDar® AV Sensor Specifications:

- **Enclosure**
  - IP68 Waterproof rating, Polystyrene
- **Dimensions**
  - 160.5 W x 432.2 L x 297 D mm (6.32 x 16.66 x 11.7 in.),
  - With SVS, D = 387 mm (15.2 in.)
- **Weight**
  - 4.8 kg (10.5 lbs.)
- **Operating Temperature**
  - -10 to 50°C (14 to 122°F)
- **Storage Temperature**
  - -40 to 60°C (-40 to 140°F)
- **Power Requirements**
  - Supplied by FL900 Flow Logger, Flo-Logger, or Flo-Station
- **Interconnecting Cable**
  - Disconnect available at both sensor and logger or Flo-Station
  - Polyurethane, 0.400 (±0.015) in. diameter; IP68
  - Standard length 9 m (30 ft), maximum 305 m (1000 ft)
- **Cables – available in two styles:**
  - connectors at both ends
  - connector from sensor with open leads to desiccant hub, desiccant hub with connector to logger. A potting/sealant kit will be included. This can be used to run the cable through conduit.
- **Certification**
  - Certified to: FCC Part 15.245: FCC ID: VIC-FLODAR24
  - Industry Canada Spec. RSS210. v7: IC No.: 6149A-FLODAR24

SURCHARGE DEPTH MEASUREMENT

  - Auto zero function maintains zero error below 0.5 cm (0.2 in.)
- **Method**
  - Piezo-resistive pressure transducer with stainless steel diaphragm
- **Range**
  - 3.5 m (138 in.), overpressure rating 2.5 x full scale

VELOCITY MEASUREMENT

- **Method**
  - Radar
- **Range**
  - 0.23 to 6.10 m/s (0.75 to 20 ft/s)

- **Frequency Range**
  - 24.075 to 24.175 GHz, 15.2 mW (max.)
- **Accuracy**
  - ±0.5%; ±0.03 m/s (±0.1 ft/s)

DEPTH MEASUREMENT

- **Method**
  - Ultrasonic
- **Standard Operating Range from Flo-Dar® Housing to Liquid**
  - 0 to 152.4 cm (0 to 60 in.)
- **Optional Extended Level Operating Range from Transducer Face to Liquid**
  - 0 to 6.1 m (0 to 20 ft.) with 43.18 cm (17 in.) dead band, temperature compensated.
- **Accuracy**
  - ±1%; ±0.25 cm (±0.1 in.)

FLOW MEASUREMENT

- **Method**
  - Based on Continuity Equation
- **Accuracy**
  - ±5% of reading typical where flow is in a channel with uniform flow conditions and is not surcharged, ±1% full scale max.

SURCHARGE CONDITIONS DEPTH/VELOCITY DEPTH (Std with Flo-Dar® Sensor)

- **Surcharge depth supplied by Flo-Dar® sensor.**

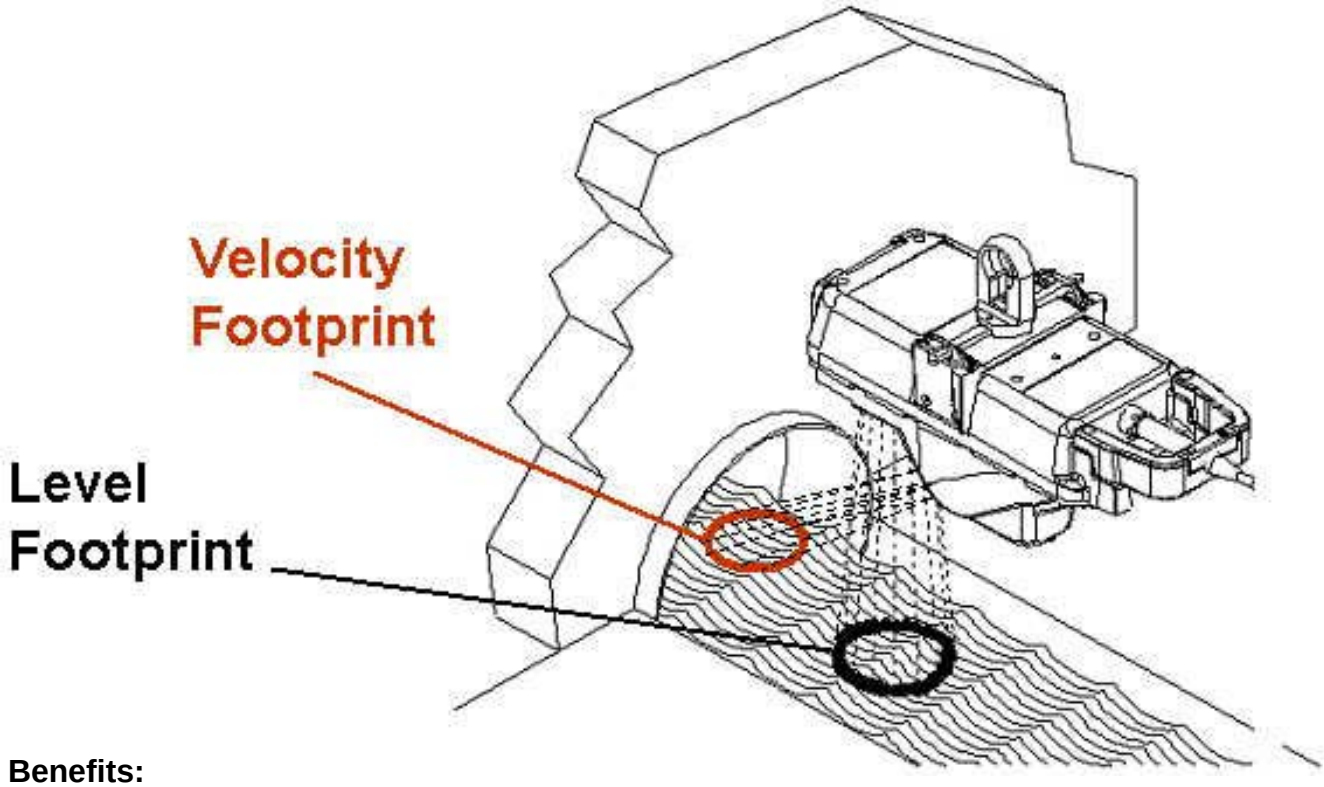
VELOCITY (Optional Surcharge Velocity Sensor)

- **Method**
  - Electromagnetic
- **Range**
  - ±4.8 m/s (±16 ft/s)
- **Accuracy**
  - ±0.15 ft/s or 4% of reading, whichever is greater.
- **Zero Stability**
  - ±0.05 ft/s

The Flo-Dar® Open Channel Flow Meters provide an innovative approach to open channel flow monitoring. Combining digital Doppler radar velocity sensing with ultrasonic pulse echo level sensing Flo-Dar® provides accurate open channel flow monitoring without the fouling problems associated with submerged sensors.

Perfect Solution for Difficult Flow Conditions:

- Flows with High Solids Content
- High Temperature Flows
- Caustic Flows
- Large Man-Made Channel
- High Velocities
- Shallow Flows



Benefits:

1. Personnel have no contact with the flow during installation.
2. Maintenance caused by sensor fouling is eliminated.
3. Field Replaceable/Interchangeable Sensors and Monitors

How It Works

Flo-Dar® transmits a digital Doppler radar beam that interacts with the fluid and reflects back signals at a different frequency than that which was transmitted. These reflected signals are compared with the transmitted frequency. The resulting frequency shift provides an accurate measure of the velocity and the direction of the flow. Level is detected by ultrasonic pulse echo. Flow is then calculated based on the Continuity Equation:

Q = V x A, Where Q = Flow, V = Average Velocity and A = Area

Accurate Flow Measurements

Flo-Dar® provides the user with highly accurate flow measurements under a wide range of flows and site conditions. By measuring the velocity of the fluid from above, Flo-Dar® eliminates accuracy problems inherent with submerged sensors including sensor disturbances, high solids content and distribution of reflectors.

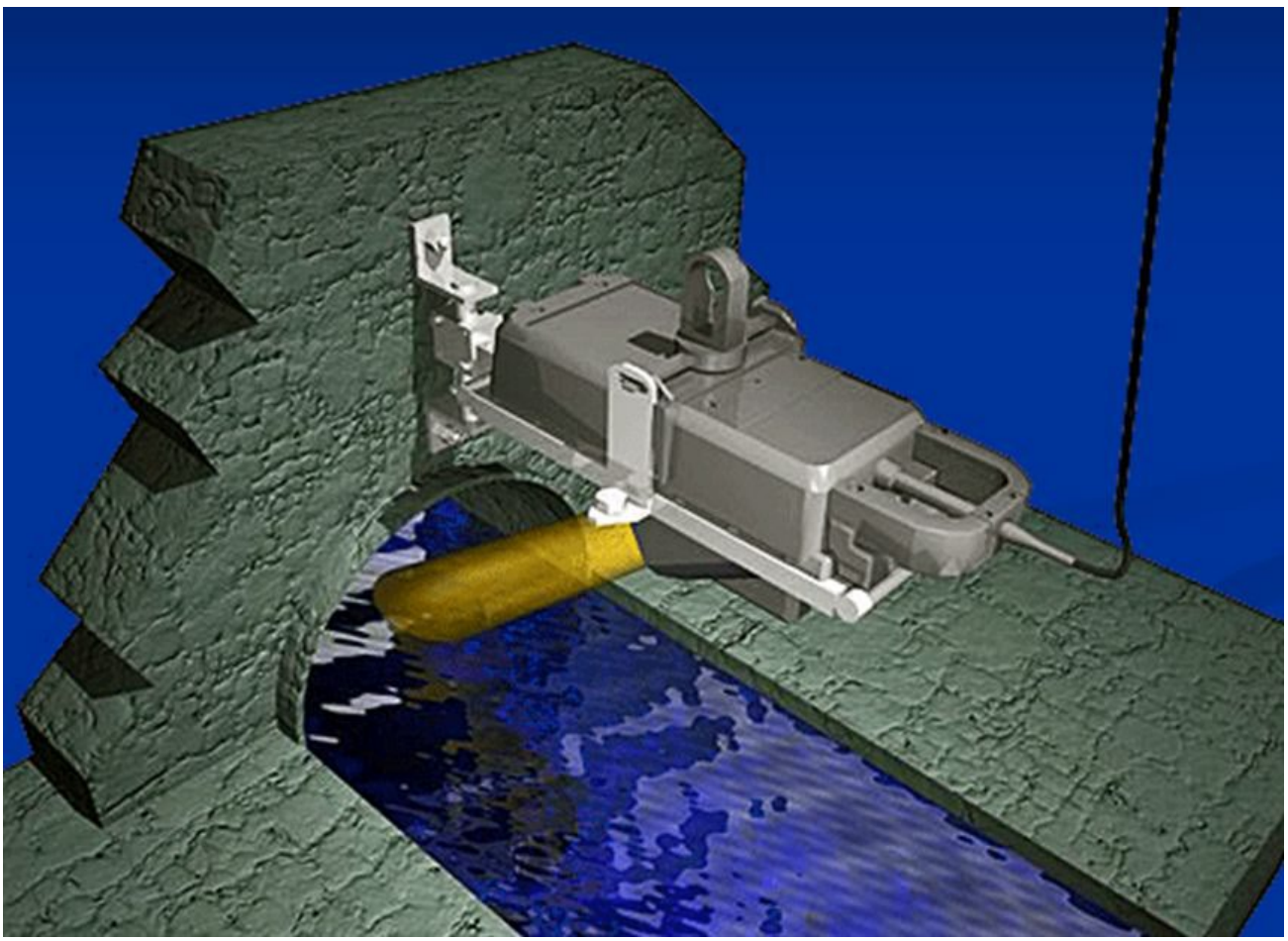


Figure above: US^3 utilizes exclusively Hach March-McBirney Flo-Dar® Meters

US^3 Company Information

US^3 is a California Corporation **Federal ID No. 33-0729605** and qualifies as a Minority Business Enterprise. US^3 has certified as an MBE with the California Public Utility Commission's authorized clearinghouse, **Verification Number: 97ES0008.**

US^3 is a specialty service company for the Water & Waste Water industry, providing monitoring and control for Utilities since 1996. US^3 is in the forefront of this industry by taking the proven technological approaches developed in other high-tech industries and applying them to protect one of our most precious natural resources - our water.

US^3 engineers and technical personnel have applied advanced instrumentation system technology to water/wastewater open channel flow monitoring, pipeline evaluation, engineering, and data analysis, all coupled to the power of the Internet. This unique integrated systems approach allows the company to bring greater insight and intelligence to gathering information about water/wastewater system performance of our clients, and in turn, to support the fulfillment of their commitments to manage and cost effectively design, operate, and maintain these systems.

Moreover, ***US^3*** supports Municipalities, Consulting Engineering firms and other water/waste water systems integrators by providing temporary technical services for engineering, software programming and technical site maintenance and calibration site support work, primarily in the Water and Waste Water industries.

Figure at right: All US^3 technicians are certified for Confined Space Entry.

Key Personnel Assigned

US³ provided the necessary resources to fully implement this project. Primary in support of this effort were the following personnel:

Mr. Mark Serres: Mr. Serres is a degreed electrical engineer with over 30 years of experience with fresh/wastewater systems, project management, and systems integration in relation to complex industrial systems. This includes experience in industrial automation and water/wastewater industries. Mr. Serres is responsible for assuring client satisfaction and marshalling the required resources to meet the project requirements.

Mr. Thomas Williams: Mr. Williams is an Engineering Manager with over 25 years of experience in complex systems development for wastewater monitoring. This experience includes hydraulic compatibility, instrumentation, communications and analysis. Mr. Williams is responsible for assuring that the required equipment is designed and calibrated to meet the project requirements.

Darlene Szczublewski, PE: Mrs. Szczublewski is a licensed Civil Engineer in multiple states. She has over 20 years of engineering experience with stormwater/wastewater related projects. She assisted in the completion of several Sanitary Sewer Evaluation Surveys and Capacity Analysis projects to meet Consent Decrees as well as completing numerous Infiltration and Inflow (I&I) studies for other clients. Mrs. Szczublewski has developed numerous flow data analysis techniques to present a clear informative picture of flow in a monitored system. Her work also includes the development of training programs for clients describing I&I and capacity analysis methodologies. Mrs. Szczublewski is responsible for analyzing the data as well as the data collection process and assuring that the reports meet the project requirements.

Name, title, address and telephone number of persons to contact regarding this US³ project.

Darlene Szczublewski, PE
Senior Civil Engineer
darlene.szczublewski@uscubed.com

1300 Hill Street
El Cajon, CA 92020
619-546-4281 (work)
619-246-5304 (cell)

Tom Williams
Engineering Manager
tom.williams@uscubed.com

1300 Hill Street
El Cajon, CA 92020
619-546-4281 (work)
619-398-7799 (cell)

Site Report

December 4, 2024

Customer Name: Hunsaker and Associates, Inc.	Site Address:~1698 Greenbriar Ln Brea CA 92821	Site Name: Greenbriar Ln MH 1

Access:

MH is north of address, located on Greenbriar Ln

System Type			
Sanitary	Storm	Combined	Other
X			

Install Date:

December 4, 2024

Install Time:

11:42

Map

Traffic Safety

Gas			
O2	H2S	CO	LEL
20.9%	0ppm	0ppm	0%

Device Statistics	
Meter Depth (in): 72.70"	
MH Coordinates: 33.91423, -117.878963	
Device SN: FD10076	
Avg Measured Level (in)	1.75"
Avg Measured Velocity	4.49FPS
Multiplier	1.00

Notes

Moderate to rapid open channel hydraulics

Traffic Safety

Used arrow board, cones & signs in accord w/site-specific CATTCH requirements.

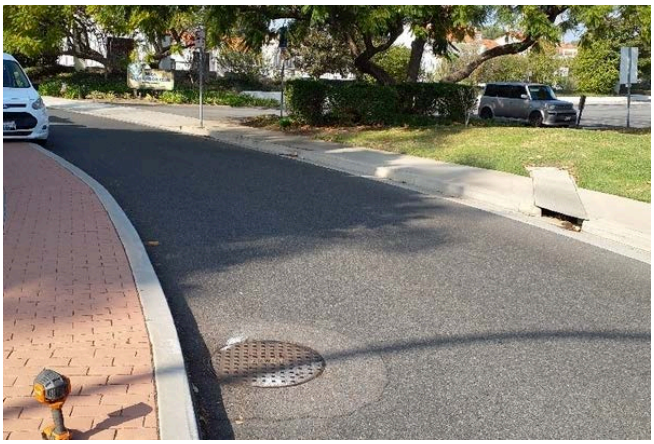
Land Use			
Residential	Commercial	Industrial	Trunk
X			

Field Conditions	Sunshine
Manhole Depth (in)	87.00"
Monitored Pipe Size (in)	8"
Inner Pipe Size (in) (In/Out)	8"/8"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Brick
Silt (in)	0.00"
Sensor Offset (in)	14.30"
Sensor Dist. to Crown (in)	6.30"
Flow Direction	Southeast
Sensor Direction	Upstream

Site Report

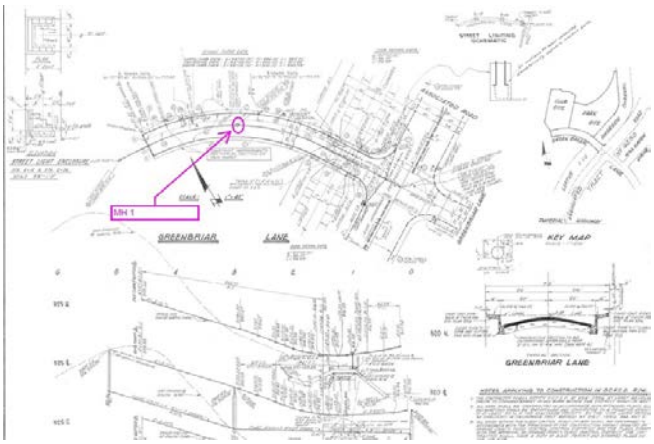
December 4, 2024

Customer Name: Hunsaker and Associates, Inc.	Site Address:~1698 Greenbriar Ln Brea CA 92821	Site Name: Greenbriar Ln MH 1



Site

Before Install

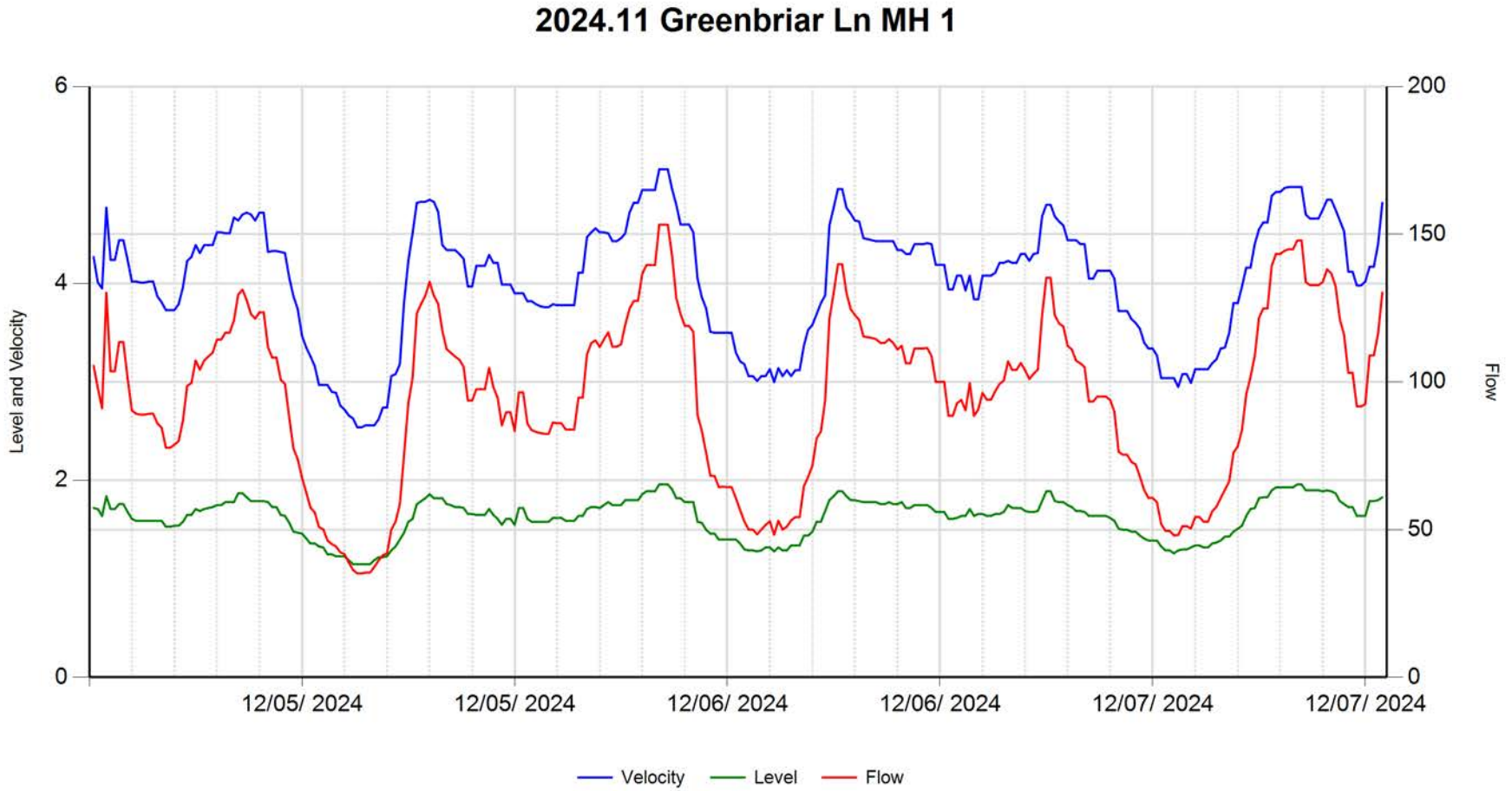


Sewer Map

Installed

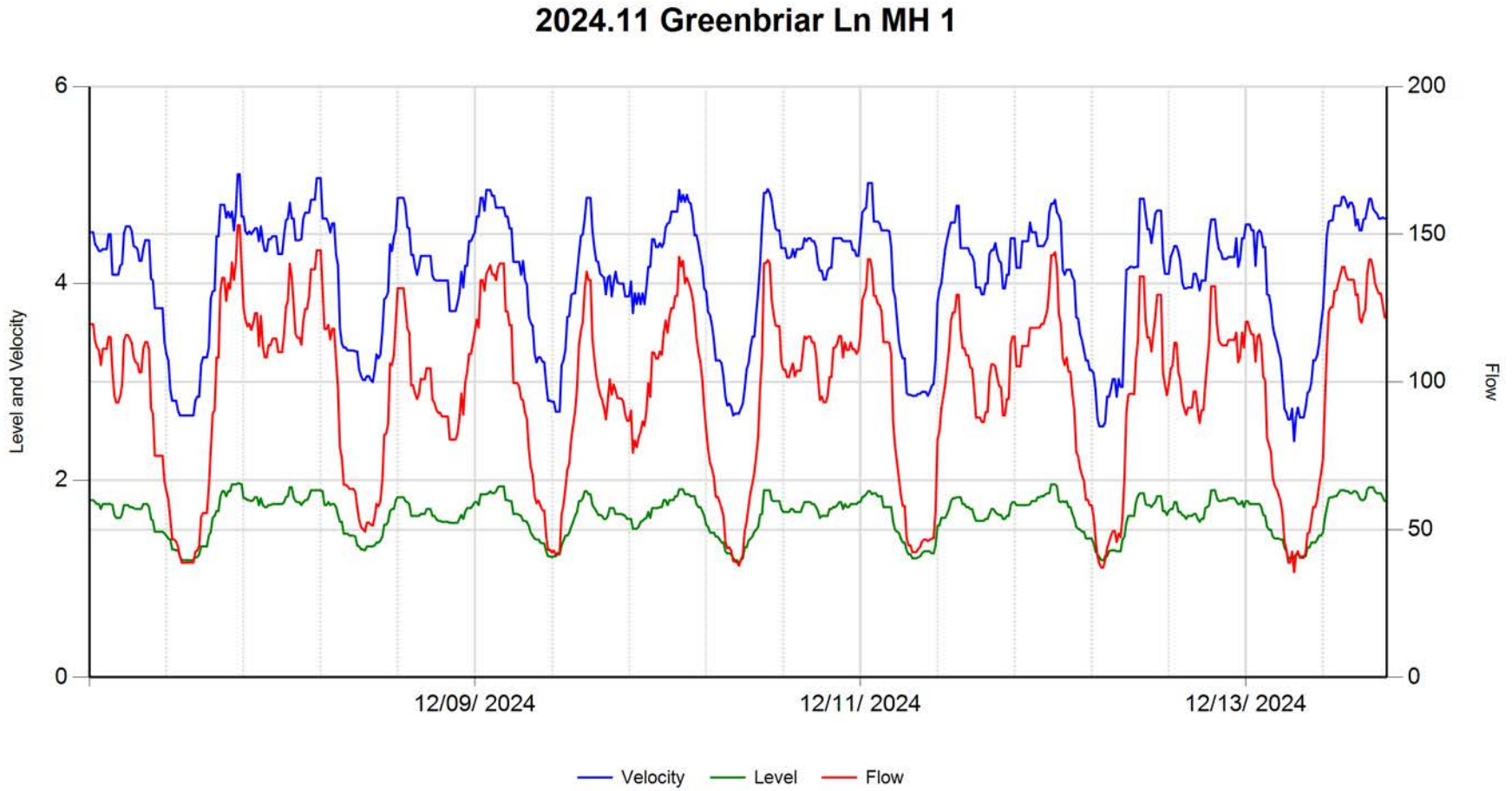
Upstream

Upstream Pipe Size



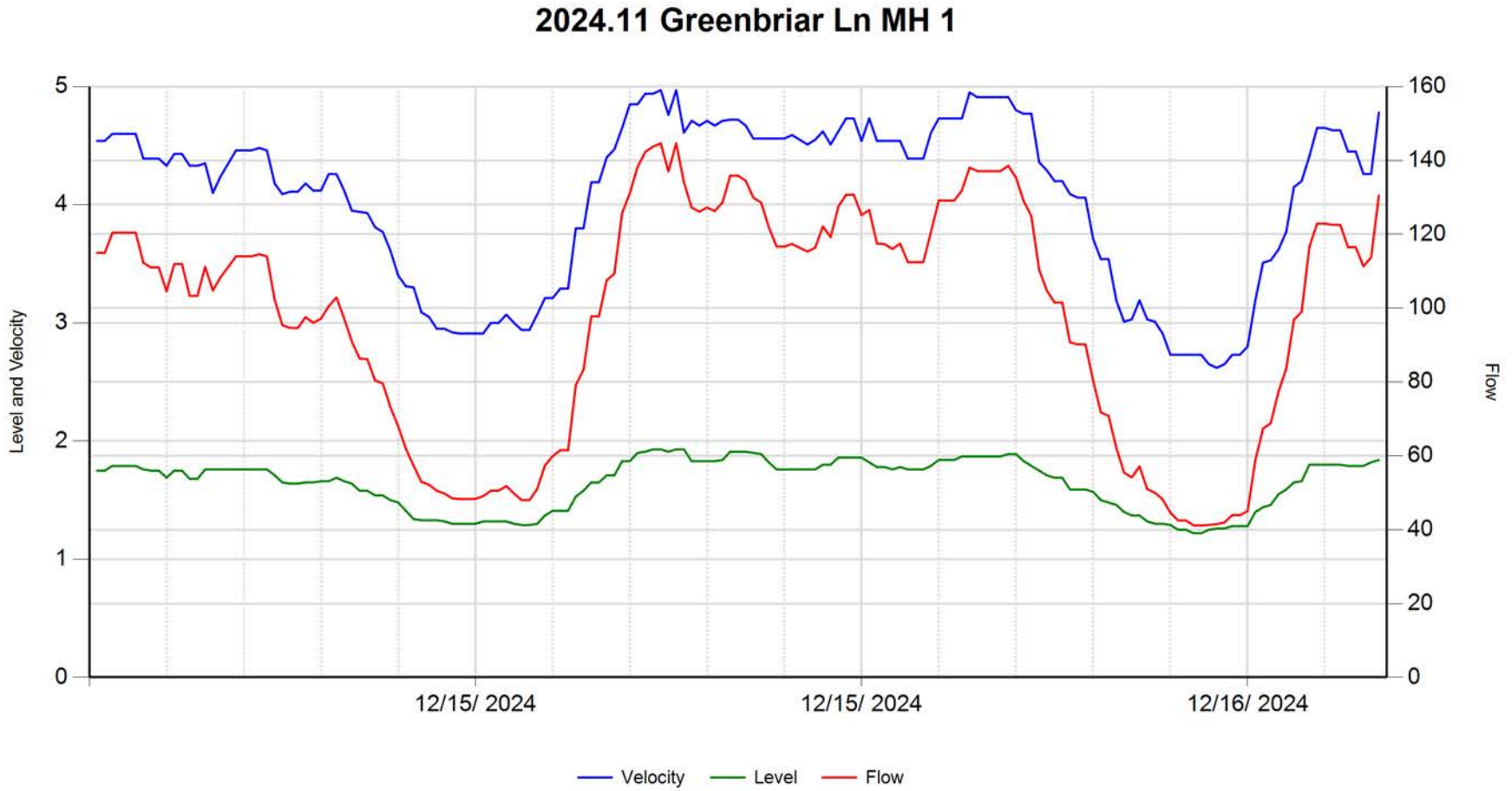
	Velocity (fps)	Level (in)	Flow (gpm)		
Average	4.041	1.625	94.876	**RainFall**	Inches
Maximum	5.160	1.960	153.249		
Minimum	2.540	1.150	35.194		

12/16/2024



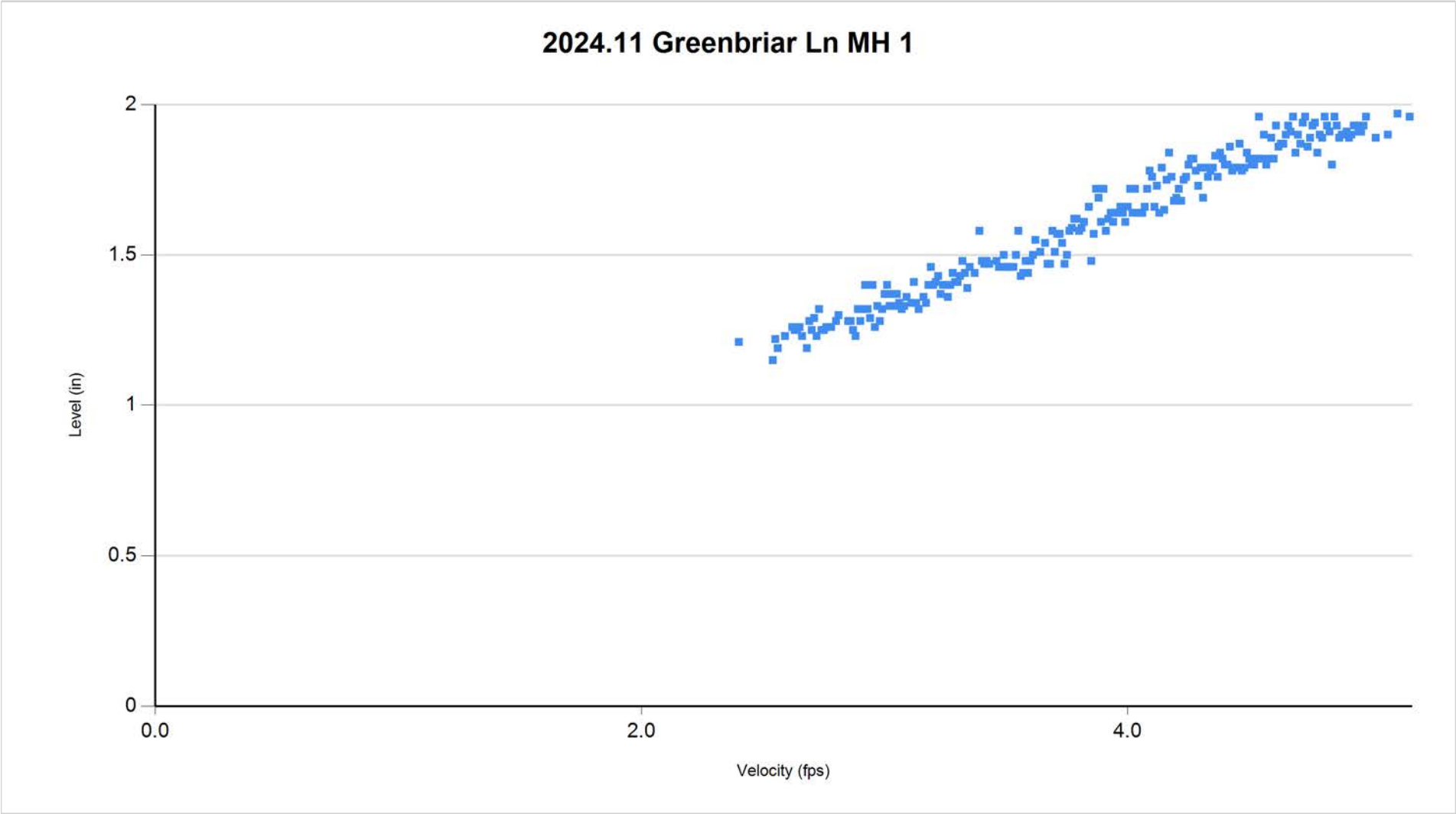
	Velocity (fps)	Level (in)	Flow (gpm)		
Average	4.061	1.641	96.884	**RainFall**	Inches
Maximum	5.110	1.970	153.095		
Minimum	2.400	1.160	35.648		

12/16/2024



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	4.057	1.644	97.453	**RainFall**	Inches
Maximum	4.970	1.930	144.635		
Minimum	2.620	1.220	41.150		

12/16/2024

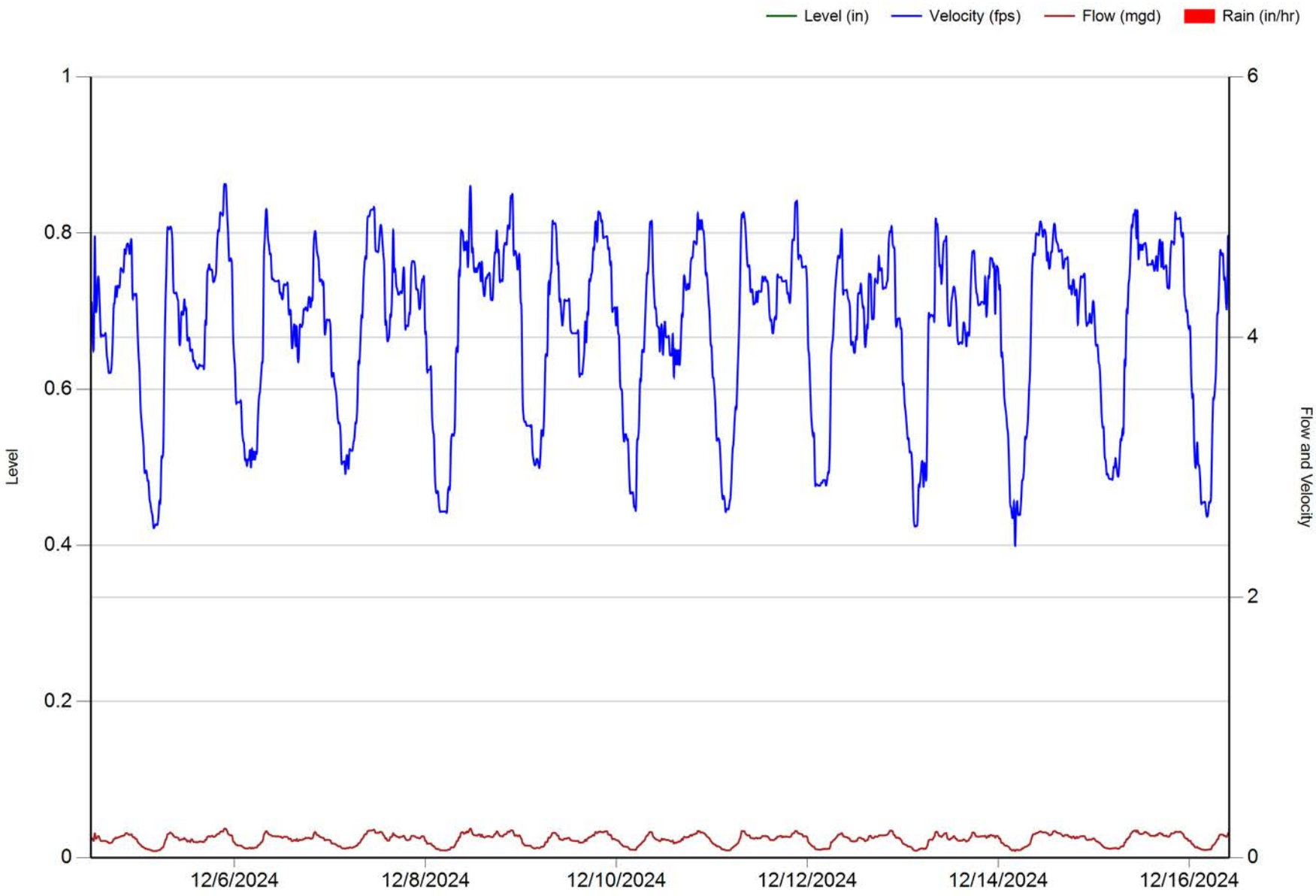


12/4/2024 thru 12/16/2024

12/16/2024 2:57:03 PM

2024.11 Greenbriar Ln MH 1:
12/04/2024 thru 12/16/2024

Report Date: 12/16/2024
Customer: Hunsaker & Associates
Group: Greenbriar Development
Site: 2024.11 Greenbriar Ln MH 1



Site Report

December 4, 2024

Customer Name: Hunsaker and Associates, Inc.	Site Address:~427 Brittany Ln Brea CA 92821	Site Name: Associated Rd MH 2

Access:

MH is west of address, located on lane divider of Associated Rd

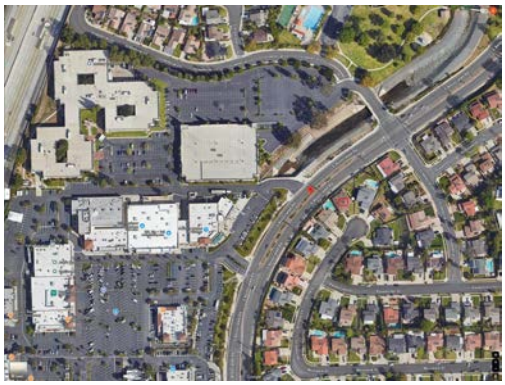
System Type			
Sanitary	Storm	Combined	Other
X			

Install Date:

December 4, 2024

Install Time:

09:46



Map

Traffic Safety

Gas			
O2	H2S	CO	LEL
20.9%	0ppm	0ppm	0%

Device Statistics	
Meter Depth (in): 127.07"	
MH Coordinates: 33.91302, -117.879277	
Device SN: FD10059	
Avg Measured Level (in)	3.80"
Avg Measured Velocity	3.29FPS
Multiplier	1.00

Notes

Moderate to rapid open channel hydraulics

Traffic Safety

Used arrow board, cones & signs in accord w/site-specific CATTCH requirements.

Land Use			
Residential	Commercial	Industrial	Trunk
	X		

Manhole Depth (in)	145.00"
Monitored Pipe Size (in)	12"
Inner Pipe Size (in) (In/Out)	12"/12"
Pipe Shape	Round
Pipe Condition	Good
Manhole Material	Concrete (cast in place)
Silt (in)	0.00"
Sensor Offset (in)	17.93"
Sensor Dist. to Crown (in)	5.93"
Flow Direction	Southwest
Sensor Direction	Downstream

Site Report

December 4, 2024

Customer Name: Hunsaker and Associates, Inc.	Site Address:~427 Brittany Ln Brea CA 92821	Site Name: Associated Rd MH 2

Site

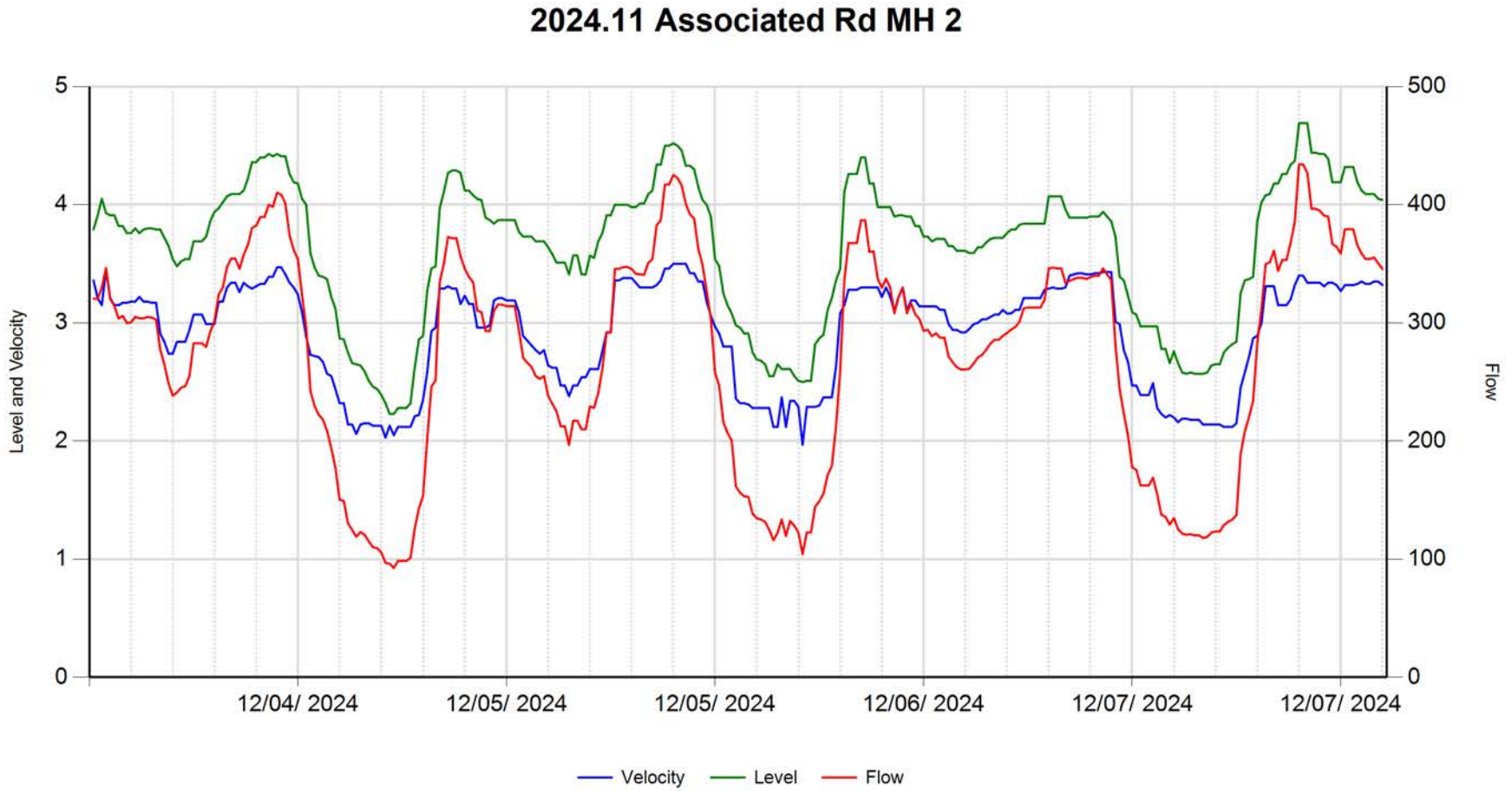
Before Install

Sewer Map

Installed

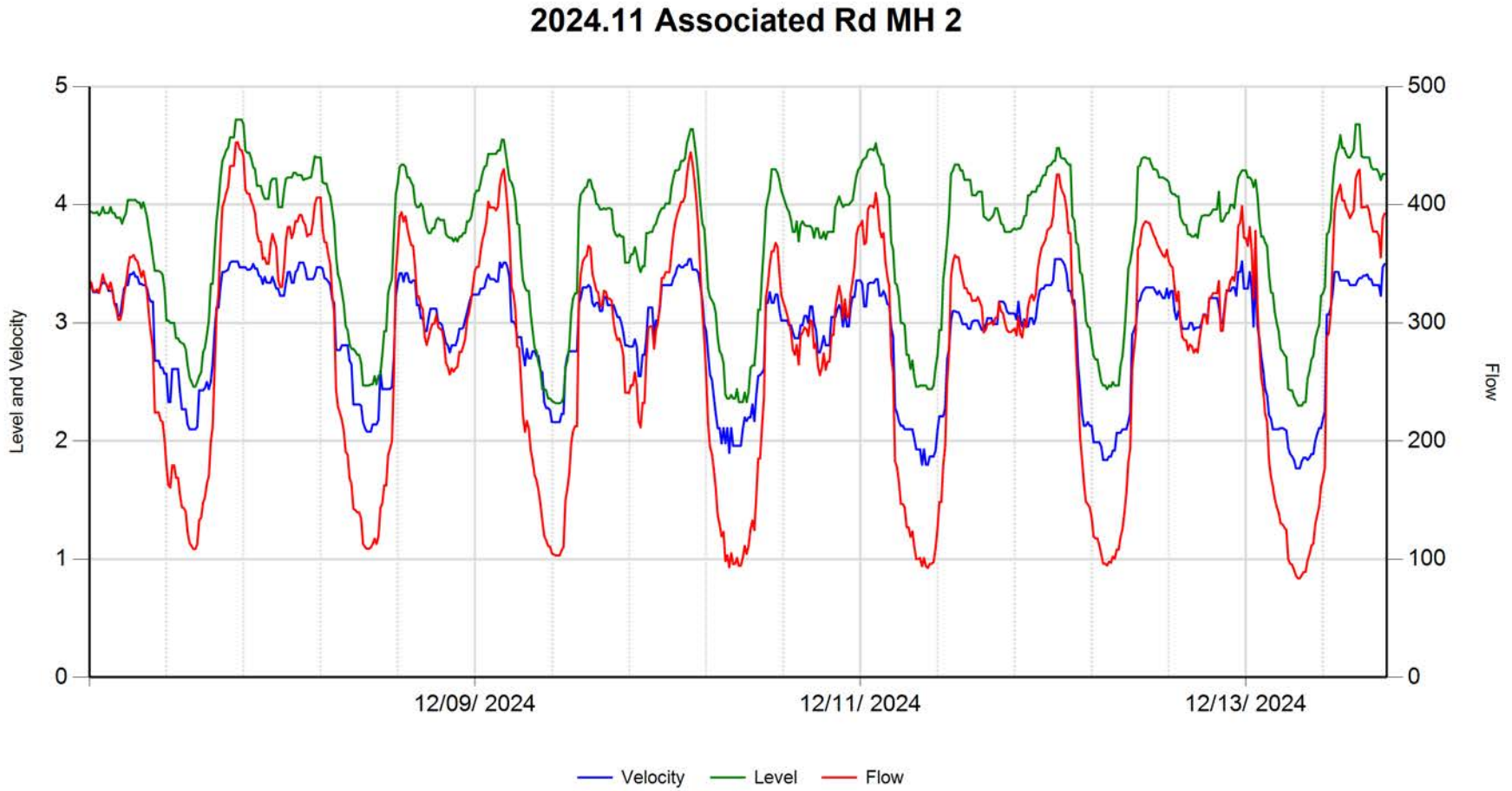
Downstream

Downstream Pipe Size



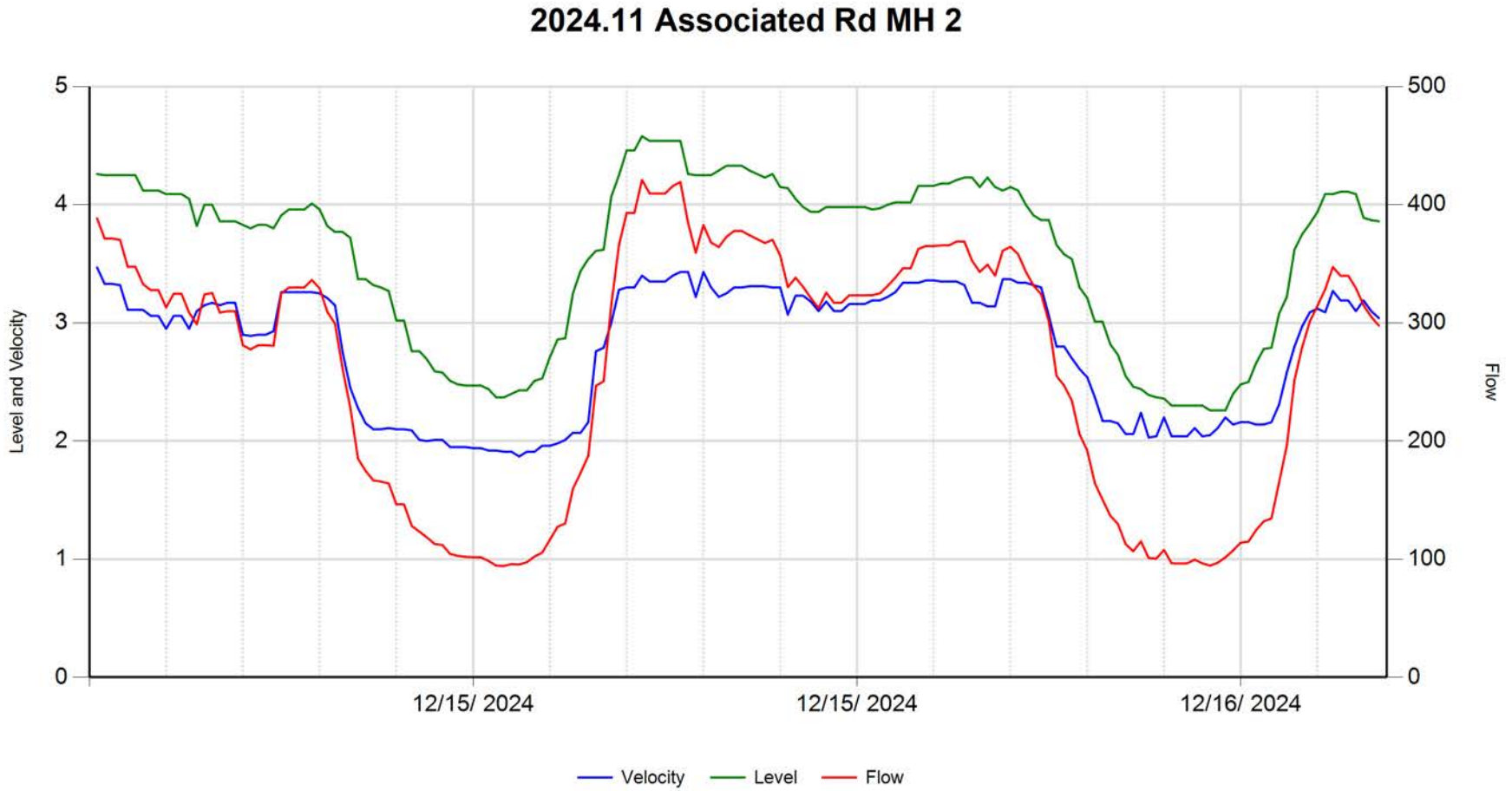
	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.916	3.629	272.158	**RainFall**	Inches
Maximum	3.500	4.690	434.139		
Minimum	1.970	2.230	92.643		

12/16/2024



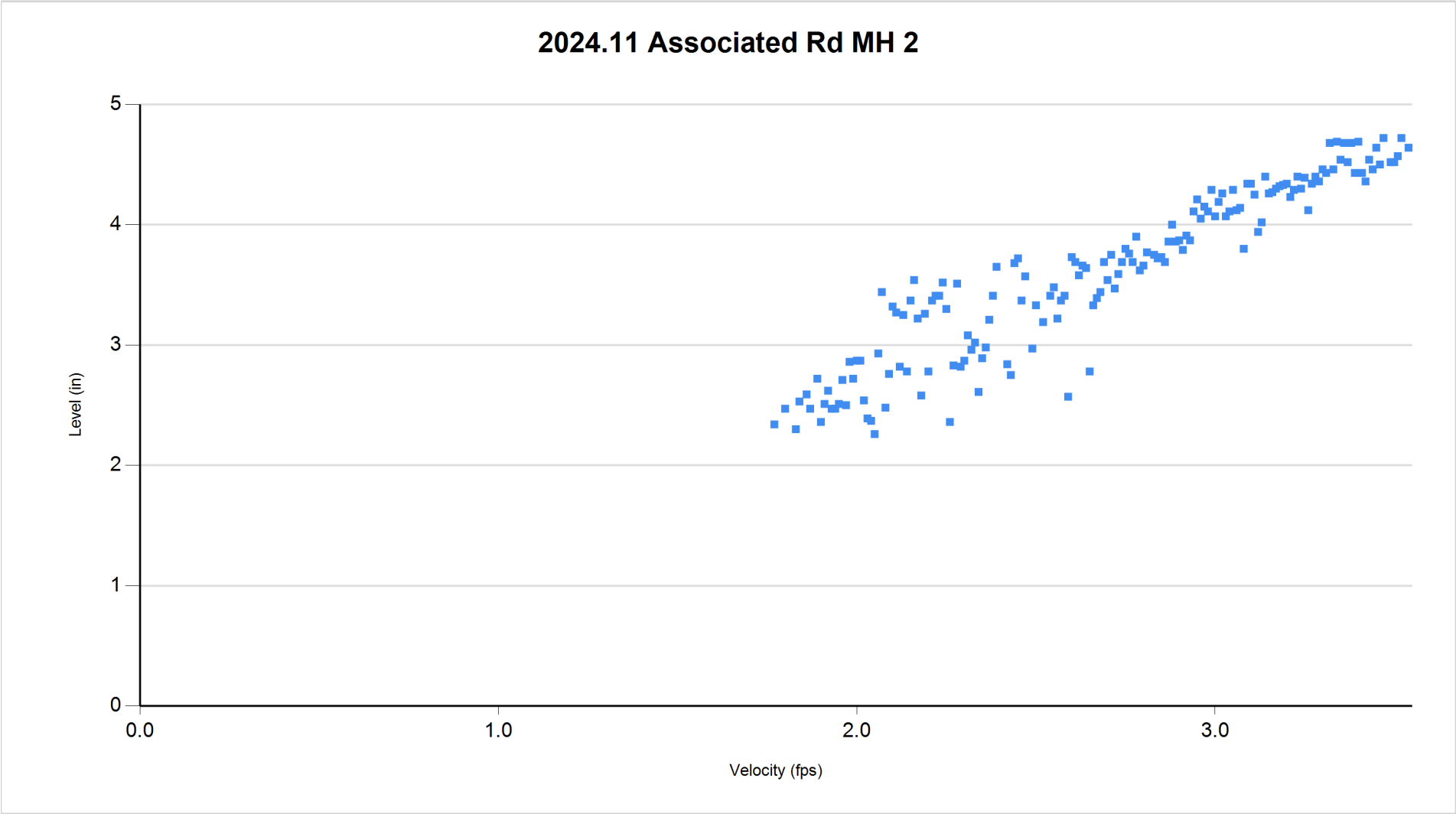
	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.902	3.688	278.948	**RainFall**	Inches
Maximum	3.540	4.720	452.907		
Minimum	1.770	2.300	83.882		

12/16/2024



	Velocity (fps)	Level (in)	Flow (gpm)		
Average	2.794	3.585	261.344	**RainFall**	Inches
Maximum	3.470	4.580	420.950		
Minimum	1.870	2.260	94.308		

12/16/2024

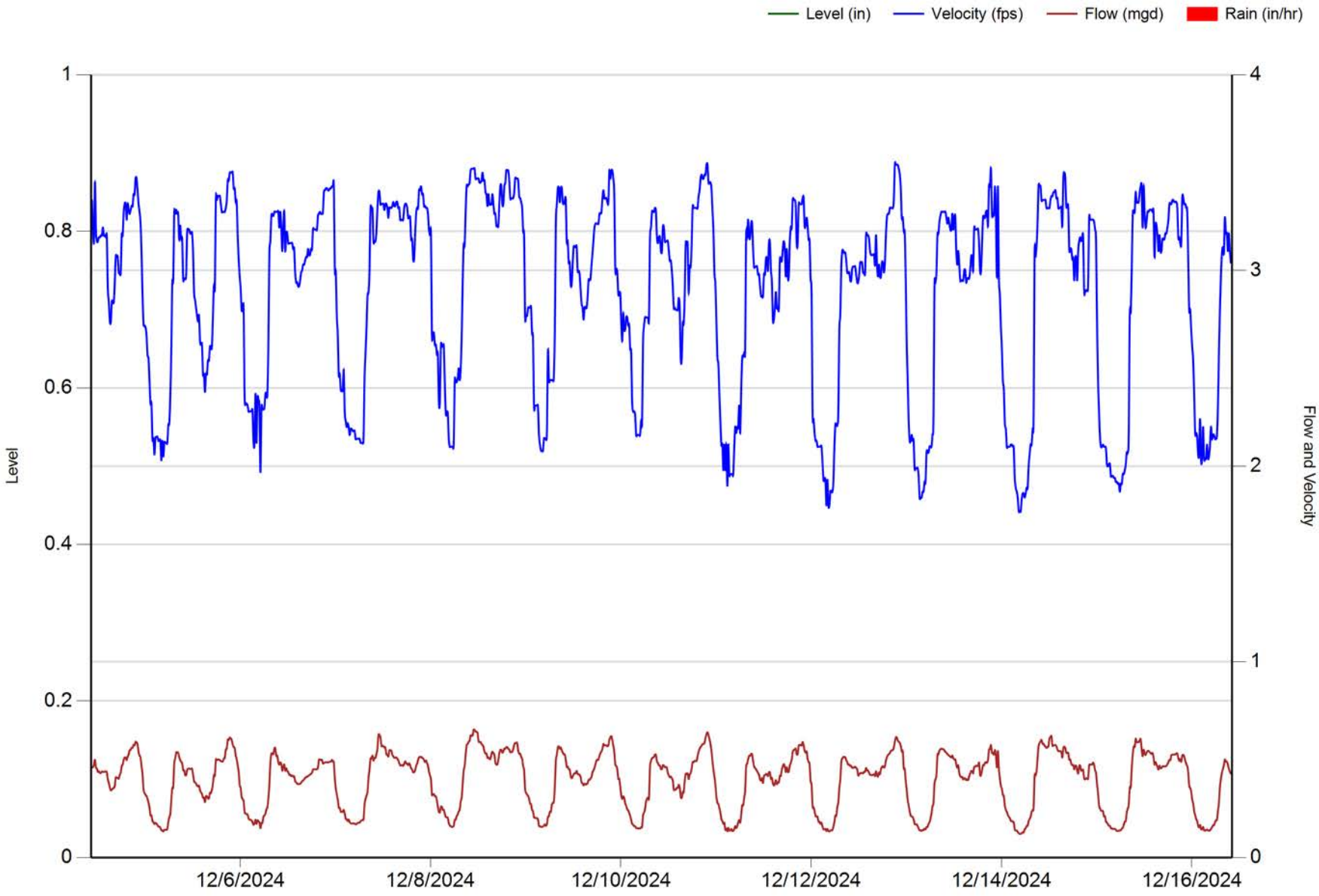


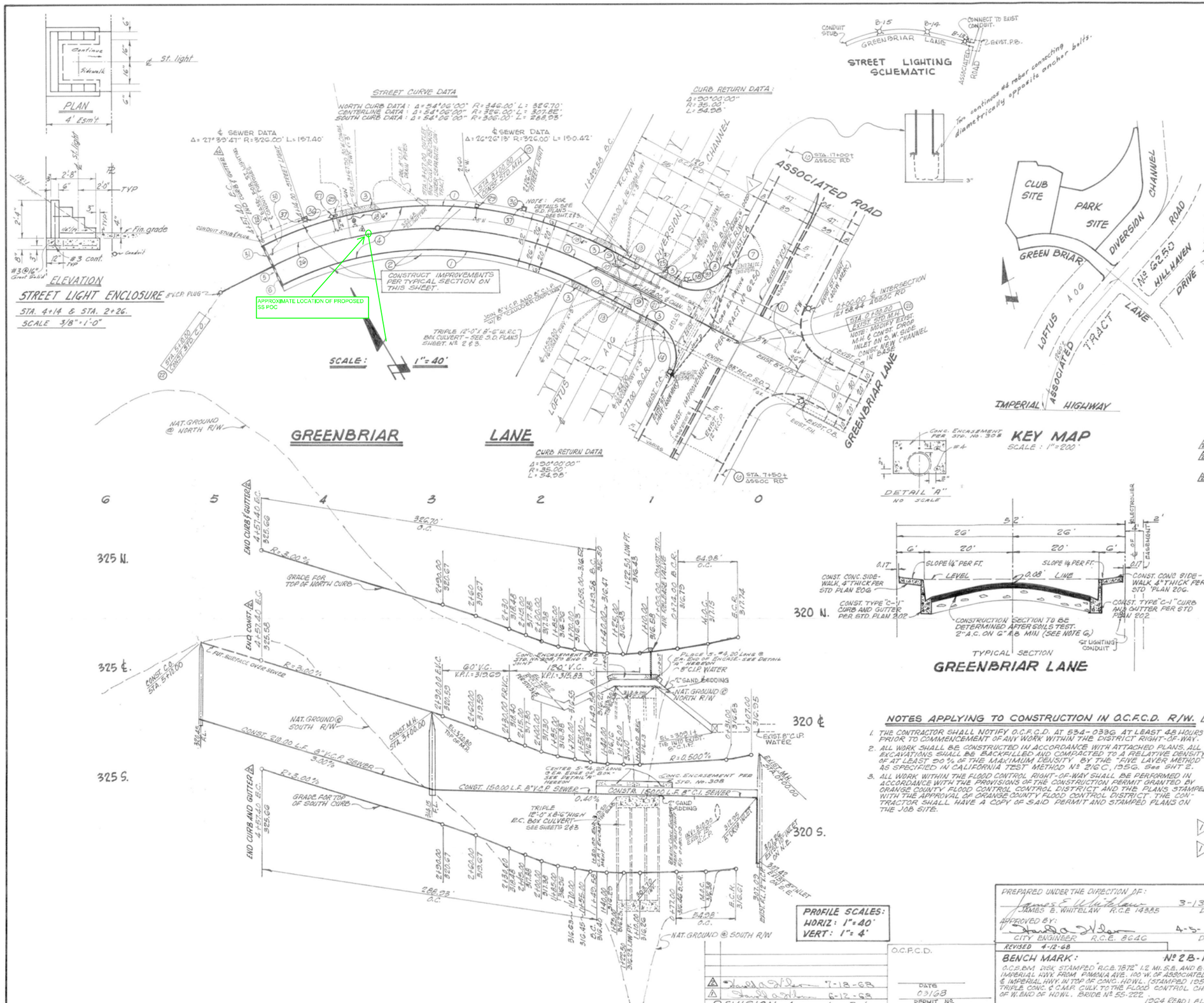
12/4/2024 thru 12/16/2024

12/16/2024 3:13:54 PM

Report Date: 12/16/2024
Customer: Hunsaker & Associates
Group: Greenbriar Development
Site: 2024.11 Associated Rd MH 2

2024.11 Associated Rd MH 2:
12/04/2024 thru 12/16/2024





GENERAL NOTES

1. SEE STANDARD 104 FOR TYPICAL SECTION OF LOCAL
2. SEE STANDARD 902.
3. ONE PARKWAY TREE SHALL BE PLANTED AT APPR
4. STREET LIGHTING SPECIFICATIONS - SEE STANDARD
5. NO JOINT PIPE MAY BE SUBSTITUTED FOR R.C.P. WH STANDARD PLAN 515.
6. UPON COMPLETION OF THE ROUGH GRADING, THE CI HAVE THE ORANGE COUNTY ROAD DEPARTMENT MAK TESTS AND DETERMINE THE CONSTRUCTION SECTI AND BASE THICKNESS SHOWN ON THESE PLANS A THE ENGINEER AND DO NOT INDICATE FINAL SECTIO TO BE INCLUDED IN CONTRACT.
7. THE CITY OF BREA WILL DO ALL NECESSARY STR DEVELOPER FOR COSTS THEREOF.
8. THE EXISTENCE AND LOCATION OF ANY UNDERGROU STRUCTURES SHOWN ON THESE PLANS ARE OBTAIN OF THE AVAILABLE RECORDS. TO THE BEST OF OUR ARE NO EXISTING UTILITIES OTHER THAN SHOWN THE CONTRACTOR IS REQUIRED TO TAKE ALL PRE URES TO PROTECT THE UTILITY LINES AND ANY O RECORD OR NOT SHOWN ON THESE PLANS.
9. TYPE I BEDDING PER STD. 308 SHALL BE USED ATIONS UNLESS OTHERWISE NOTED ON THESE PLA
10. DRIVEWAYS TO BE CONSTRUCTED PER CITY OF BRE UNLESS OTHERWISE NOTED ON THESE PLANS.
11. ALL LOCAL STREETS TO HAVE SOLID WHITE CENTER
12. ELECTROLIER (38) SHALL BE FURNISHED WITHO BUT, WITH: PLATE OVER ARM SOCKET, HAND OPPOSITE TRAFFIC, PLUGGED HOLES FO PEDESTRIAN BUTTON - SIGNAL HEADS AN WALK SIGNALS.

STREET NAME SIGN			
NO. COR.	ASSOCIATED RD.	400 S.	GREENB

NOTES APPLYING TO CONSTRUCTION IN O.C.F.C.D. R/W.

1. THE CONTRACTOR SHALL NOTIFY O.C.F.C.D. AT 534-0330 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE DISTRICT RIGHT-OF-WAY.
2. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH ATTACHED PLANS. ALL EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED TO A RELATIVE DENSITY OF AT LEAST 90 % OF THE MAXIMUM DENSITY BY THE "FIVE LAYER METHOD" AS SPECIFIED IN CALIFORNIA TEST METHOD Nº 216 C.I., 1965. See SHT. 2.
3. ALL WORK WITHIN THE FLOOD CONTROL RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY ORANGE COUNTY FLOOD CONTROL DISTRICT AND THE PLANS STAMPED WITH THE APPROVAL OF ORANGE COUNTY FLOOD CONTROL DISTRICT. THE CONTRACTOR SHALL HAVE A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE.

ESTIMATE OF QUANTIT

		STREETS	
	1	CURB & GUTTER TYPE "C-1"	
	2	P.C.C. SIDEWALK 4" THICK	206
	3	P.C.C. COMMERCIAL DRIVEWAY	2
	4	2" A.C. W/SC.250 P.C. ON 6" A.B. (SEE NOTE G)	214
	5	BARRICADE	6
	6	2" x 6" REDWOOD HEADER	6
	7	STREET NAME SIGN	6
	8	TRAFFIC SIGN W33R (TEMP.)	6
	9	CONCRETE ENCASEMENT	3
	10	"GREENBRIAR LANE" ADVANCE SIGN 8" U.G. GTR W/BACK FRAME 6" L.C.	6
	11	CROSSWALK	6
	12		
	13	INLET - VARIABLE LENGTH PER SHT. 8	
	14	TRAFFIC SIGN R1R	
		SEWERS	
	17	8" V.C.P. MAINLINE SEWER	4
	18	4"&6" V.C.P. HOUSE LATERAL	4
	19	STD. MANHOLE	4
	20	CONST. DROP INTO EXIST STD. MANHOLE	4
	21	8" C.I.P. MAINLINE SEWER	301
	22	STD. CLEAN-OUT	4
		WATER	
	22	AIR RELEASE VALVE ASSEMBLY	3
	26	4"&8" C.I.P. WATER	5
	27	FIRE HYDRANT ASSEMBLIES, A 24015	3
	28	BLOW-OFF ASSEMBLY	3
	29	WATER SERVICE - 2"	3
	30	8" G.V. & 6" G.V.	312
	31	8" C.I.P. PLUG	3
		STREET LIGHTS	
	33	EXTERNAL SHIELDS 35-100947-02	6
	34	SHIELDS (STREET) 35-103413-01	6
	35	SHIELDS (HOUSE) 35-104562-02	6
	36	D7425120 175W II Pfaff & Kanoff ELECTROLIER	
	37	STREET LIGHT ENCLOSURE	
	38	WR-15-J-309-5-0, 400W II Westrick ELECTROLIER	822
ITEM		DESCRIPTION	PER B

PREPARED UNDER THE DIRECTION OF:
JAMES B. WHITELAW R.C.E. 14885 — 3-13-68 DATE
APPROVED BY:
CITY ENGINEER R.C.E. 8640 — 4-5-68 DATE
REVISED 4-12-68

BENCH MARK: Nº 2B-17-58
O.C.S. B.M. DISK STAMPED "R.C.B. 7872" 1.2 MI. S.E. AND E. ALONG IMPERIAL HWY. FROM PIMONA AVE. 100' W. OF ASSOCIATED RD. 18' S. ℄ IMPERIAL HWY. IN TOP OF CONC. HDWL. (STAMPED 1954) OF A TRIPLE CONC. C.M.P. CULV. TO THE FLOOD CONTROL CHANNEL 1' E. OF W. END OF HDWL. BRIDGE Nº 55-222. 1004 READJ. EL. 308.483.

REVISION	Approved	Date
1		7-18-68
2		8-12-68

O.C.F.C.D.
DATE 03168
PERMIT Nº

CITY OF BRE
IMPROVEMENT FOR GREENBRIAR

PREPARED IN THE OFFICE OF
Voorheis-Trindle & Nelson, Inc.
13794 Beach Blvd
Westminster, Calif

Date: 3-5-68 J.N.G. 3015

SEWER MASTER PLAN

November 2021

City of Brea
1 Civic and Cultural Center
Brea, CA 92821

ES-3.2 Existing Wastewater Flows and Peaking Factors

Peaking factors are needed for estimating peak dry weather flows (PDWF) and peak wet weather flows (PWWF). These relationships are based on the average dry weather flows (ADWF). PWWF flows include an allowance for inflow and infiltration (I/I).

The following dry weather peaking relationship was selected for this study:

$$\mathbf{PDWF = 1.777 \times ADWF^{0.92}}$$

Note: Above peaking factor formula is used for 2021 Sewer Master Plan analysis and is based on 2005 Sewer Master Plan Study

Peak wet weather flow estimates were based on the following relationship:

$$\mathbf{PWWF = 1.25 \times PDWF}$$

Although the PWWF/PDWF factor of 1.25 may not cover all situations, it is not reasonable or feasible to design the sewer system to carry the flows that would result from the use of a larger ratio. Instead, it is recommended that the City concentrate on projects such as replacing manhole covers, installing plugs in manhole covers, and replacing or relining cracked pipes to reduce inflow and infiltration.

ES-3.3 Sewer Unit Flow Factors

Non-residential land uses typically include a wide variety of businesses and manufacturing processes that cause sewage generation to vary significantly from one customer to another. This is evident in the wide range of water use for different non-residential businesses. For example, warehouses typically use a low amount of water and generate low amounts of sewage. On the other hand, some manufacturing businesses can use large of amounts of water and contribute large amounts of sewage to the sewer system.

In addition, the flow monitoring conducted in 2020 was subjected to California and Orange County stay-at-home orders, which affected the estimated unit flow factors. For these reasons, the unit flow factors were primarily based on the City's 2005 Sewer Master Plan. The unit flow factors developed in 2005 were based on flow monitoring completed under more normal conditions. The sewer unit flow factors are detailed in Table ES-1.

Moving forward, the City will require that potential developers perform a sewage generation analysis on a case by case basis, as details regarding the proposed development or redevelopment area becomes available. Specific data regarding the proposed dwelling units, gross building floor area, and floor to area ratios is to be used to develop the sewage flow estimate. Hydraulic analyses are to be conducted to verify available downstream system capacity and ensure that the system can convey the proposed sewage generation.

ES-3.4 Sewer System Performance Evaluation Criteria

Collection system design standards include minimum pipe size, minimum flow velocity, and depth of flow to pipe diameter ratio (d/D). Lift station criteria includes but is not limited to: the capacity and number of pumps, wet well and force main sizes, redundancy, and emergency power.

A summary of sewer system performance evaluation criteria used for this study is listed in Table ES-2.

Table ES-1
Sewer Unit Flow Factors

Land Use Type	Land Use	Land Use Code	Unit Density/ Maximum (FAR)[1]	Unit Flow Factor[2]	Units	Unit Flow Factor[3]	Units
Single-Family Residential	Hillside Residential	HR, R1-H	0.05 -2.2 DU/AC	385	gpd/DU	20 - 847	gpd/AC
	Single Family Residential	R-1	1.0-6.0 DU/AC	270	gpd/DU	270 - 1,620	gpd/AC
	Single Family Residential 5000[4]	R-1(5000)	1.0-6.0 DU/AC	270	gpd/DU	270 - 1,620	gpd/AC
Multi-Family Residential	Multiple Family: Medium Density	R-2	6.1 - 12.0 DU/AC	248	gpd/DU	1,515 - 2,980	gpd/AC
	Planned Community[5]	P-C	6.1 - 12.0 DU/AC	248	gpd/DU	1,515 - 2,980	gpd/AC
High Density Residential	Multiple Family: High Density	R-3	12.1 -24.89 DU/AC	210	gpd/DU	2,545 - 5,230	gpd/AC
Business/ Commercial[6]	General Commercial	C-G	0.5	73.5	gpd/TSF	1,605	gpd/AC
	Major Shopping Center	C-C	0.65	73.5	gpd/TSF	2,085	gpd/AC
	Administrative and Professional Office	C-P	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Neighborhood Commercial	C-N	0.35	73.5	gpd/TSF	1,125	gpd/AC
Industrial[6]	Industrial Commercial	C-M	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Light Industrial	M-1	0.75	73.5	gpd/TSF	2,405	gpd/AC
	General Industrial	M-2	0.75	73.5	gpd/TSF	2,405	gpd/AC
	Planned Industrial[6]	M-P	1.5	73.5	gpd/TSF	4,805	gpd/AC
	Brea Industrial Specific Plan[6]	BISP	1.5	73.5	gpd/TSF	4,805	gpd/AC
Restaurant	Restaurant			1,575	gpd/TSF		
Car Wash	Car wash			21,000	gpd/Location		
Commercial Recreational	Commercial Recreational	C-RC		3.15	gpd/AC		
Motel/Hotel	Motel/ Hotel			173.25	gpd/Room		
Parks	Parks/ Recreation/ Open Space - Parks and Recreation	P/R/OS-NOS P/R/OS-PR		10.5	gpd/AC		
Schools	High School			21	gpd/Student		
Schools	School			10.5	gpd/Student		
Theater	Theater			8.4	gpd/Seat		

[1] Unit Density and FAR are based on values included in the City's 2003 General Plan

[2] Unit flow factors are based on values from the City's 2005 Sewer Master Plan

[3] Unit flow factors by acreage were calculated from Unit Density/FAR and unit flow factors from the 2005 Sewer Master Plan. For planning purposes the maximum unit flow factors were used for this planning study . As the development plans are updated, the more detailed planning data should be used to estimate the future sewer loads.

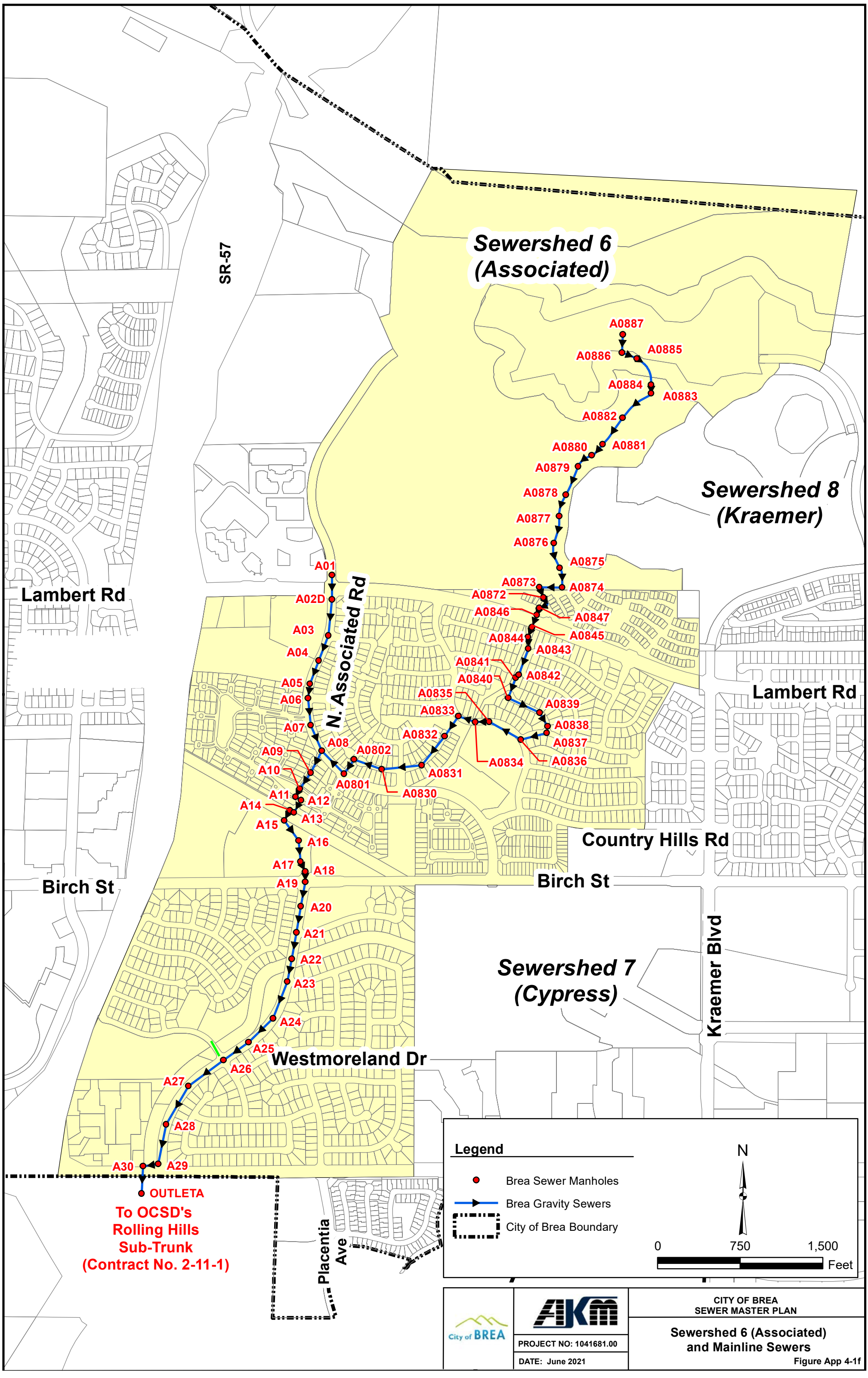
[4] Unit Density for R-1-5000 is assumed to be the same as R-1

[5] Unit Density for P-C is assumed to be the same as R-2

[6] FAR for Planned Industrial (M-P) is assumed to be the same as Industrial Commercial (C-M)

Table ES-2
Sewer System Criteria

Collection System	
Minimum Pipe Size	8-inch
Minimum Velocity	2.0 fps at average dry weather flow 3.0 fps at peak dry weather flow
Maximum Velocity	6.0 fps at peak dry weather flow for VCP 5.0 fps at peak dry weather flow for PVC
Minimum Slope	Refer to Table 3-3
Maximum Slope	Slope that generates the maximum flow velocity.
Pipe Depth to Diameter Ratio	0.64 at peak dry weather flows for all pipes existing prior to the Sewer Master Plan hydraulic analysis 0.50 at peak dry weather flows for all newly constructed pipes 15-inches and smaller 0.64 at peak dry weather flows for all newly constructed pipes 18-inches and larger 0.75 at peak wet weather flows for all pipes
Lift Station	
Pumps	• Minimum 2 each sized at peak wet weather flow • Minimum solids handling capacity 3”
Wet Wells	• Sized to limit pump cycling to less than 6 times/hr for motor HP up to 20; 4 times/hr up to 50 HP; 3 times/hr up to 75 HP; 2 times/hr 100 HP and above • Provide 30 minutes of storage at peak flow to allow response to a failure • Equipment to be maintained must be accessible without entering the structure
Ventilation	• 15-air change/hour minimum in wet wells operated continuously • 30-air change/hour minimum in wet wells not operated continuously • 15-air changes/hour minimum in dry well
Controls	Redundant system. Ultrasonic level sensor for primary level controls. Float operated back-up controls.
Emergency Power	Stationary source with automatic transfer switch
Telemetry	Dialer system at all pump stations to alert personnel in the event of a station failure
Force Mains	• Minimum velocity 3 fps • Maximum velocity 5 fps • Minimum size 4” • Air/Vacs installed in vaults
Inverted Siphons	
Siphon Barrels	• Dual or multiple • Minimum diameters of 8-inches • Minimum velocity of 3 fps ADWF and 4 fps PDWF • Vertical curves, with no sharp horizontal angles or changes of grade • If crossing a waterway, minimum 5 ft between the top of the siphon and the level of possible scour in the waterway • Location away from an outlet of a lateral or a drop manhole • Invert at the outlet structure at least 0.1 ft lower than invert of inlet structure • Material is HDPE or PVC • Maximum angle of downstream leg no more than 15 degrees from horizontal • Maximum angle of upstream leg no more than 30 degrees from horizontal


Sewershed 6
(Associated)
Sewershed 8
(Kraemer)
Sewershed 7
(Cypress)
SR-57
Lambert Rd
Lambert Rd
Birch St
Birch St
Country Hills Rd
N. Associated Rd
Westmoreland Dr
Kraemer Blvd
Placentia Ave
A01
A02D
A03
A04
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OUTLETA
To OCSD's
Rolling Hills
Sub-Trunk
(Contract No. 2-11-1)
A0887
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A0882
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A0880
A0879
A0878
A0877
A0876
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A0840
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A0836
A0835
A0834
A0833
A0832
A0831
A0830
A0802
A0801
Legend
Brea Sewer Manholes
Brea Gravity Sewers
City of Brea Boundary
N
0
750
1,500
Feet
City of BREA
AKM
PROJECT NO: 1041681.00
DATE: June 2021
CITY OF BREA
SEWER MASTER PLAN
Sewershed 6 (Associated)
and Mainline Sewers
Figure App 4-1f

7-1 Infosewer Model Results

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2147-A2145	A2147	A2145	8	125	0.0016	0.001838	0.000000	0.000569	0.38	0.04	0.05	0.001838	0.000000	0.000569	0.38	0.04	0.05	0.001838	0.000000	0.000569	0.38	0.04	0.05
A2148-A2111	A2148	A2111	8	361	0.0503	0.012708	0.000000	0.004654	2.27	0.04	0.06	0.012708	0.000000	0.004654	2.27	0.04	0.06	0.012708	0.000000	0.004654	2.27	0.04	0.06
A2149-A2148	A2149	A2148	8	188	0.0301	0.007895	0.000000	0.002774	1.64	0.04	0.05	0.007895	0.000000	0.002774	1.64	0.04	0.05	0.007895	0.000000	0.002774	1.64	0.04	0.05
A2150-A2146BS	A2150	A2146BS	8	30	0.0067	0.000735	0.000000	0.000210	0.47	0.02	0.03	0.000735	0.000000	0.000210	0.47	0.02	0.03	0.000735	0.000000	0.000210	0.47	0.02	0.03
A2151-A2102	A2151	A2102	8	127	0.0212	0.001713	0.000000	0.000527	0.91	0.02	0.03	0.001713	0.000000	0.000527	0.91	0.02	0.03	0.001713	0.000000	0.000527	0.91	0.02	0.03
A22-A23	A22	A23	10	247	0.0180	0.620293	0.000000	0.318539	4.83	0.33	0.39	0.620293	0.000000	0.318539	4.83	0.33	0.39	0.620293	0.000000	0.318539	4.83	0.33	0.39
A23-A24	A23	A24	10	317	0.0197	0.644013	0.000000	0.331801	5.04	0.33	0.39	0.644013	0.000000	0.331801	5.04	0.33	0.39	0.644013	0.000000	0.331801	5.04	0.33	0.39
A2301-A23	A2301	A23	8	200	0.0270	0.031861	0.000000	0.012639	2.41	0.07	0.11	0.031861	0.000000	0.012639	2.41	0.07	0.11	0.031861	0.000000	0.012639	2.41	0.07	0.11
A2302-A2301	A2302	A2301	8	235	0.0648	0.030697	0.000000	0.012138	3.23	0.06	0.09	0.030697	0.000000	0.012138	3.23	0.06	0.09	0.030697	0.000000	0.012138	3.23	0.06	0.09
A2303-A2302	A2303	A2302	8	265	0.0248	0.018617	0.000000	0.007048	1.99	0.06	0.09	0.018617	0.000000	0.007048	1.99	0.06	0.09	0.018617	0.000000	0.007048	1.99	0.06	0.09
A2304-A2303	A2304	A2303	8	347	0.0140	0.015054	0.000000	0.005595	1.53	0.06	0.09	0.015054	0.000000	0.005595	1.53	0.06	0.09	0.015054	0.000000	0.005595	1.53	0.06	0.09
A2305-A2304	A2305	A2304	8	350	0.0243	0.006346	0.000000	0.002188	1.42	0.03	0.05	0.006346	0.000000	0.002188	1.42	0.03	0.05	0.006346	0.000000	0.002188	1.42	0.03	0.05
A2306S-A2305	A2306S	A2305	8	131	0.0095	0.001844	0.000000	0.000571	0.70	0.02	0.04	0.001844	0.000000	0.000571	0.70	0.02	0.04	0.001844	0.000000	0.000571	0.70	0.02	0.04
A2307-A2302	A2307	A2302	8	202	0.0264	0.011310	0.000000	0.004100	1.75	0.04	0.07	0.011310	0.000000	0.004100	1.75	0.04	0.07	0.011310	0.000000	0.004100	1.75	0.04	0.07
A2308-A2307	A2308	A2307	8	180	0.0177	0.009061	0.000000	0.003222	1.42	0.04	0.07	0.009061	0.000000	0.003222	1.42	0.04	0.07	0.009061	0.000000	0.003222	1.42	0.04	0.07
A2309-A2308	A2309	A2308	8	323	0.0100	0.006703	0.000000	0.002322	1.06	0.04	0.07	0.006703	0.000000	0.002322	1.06	0.04	0.07	0.006703	0.000000	0.002322	1.06	0.04	0.07
A24-A25	A24	A25	10	312	0.0212	0.644013	0.000000	0.331801	5.18	0.32	0.38	0.644013	0.000000	0.331801	5.18	0.32	0.38	0.644013	0.000000	0.331801	5.18	0.32	0.38
A25-A26	A25	A26	10	324	0.0217	0.644013	0.000000	0.331801	5.23	0.32	0.38	0.644013	0.000000	0.331801	5.23	0.32	0.38	0.644013	0.000000	0.331801	5.23	0.32	0.38
A26-A27	A26	A27	12	350	0.0099	0.837112	0.000000	0.441235	4.17	0.42	0.42	0.837112	0.000000	0.441235	4.17	0.42	0.42	0.837112	0.000000	0.441235	4.17	0.42	0.42
A2601-A26	A2601	A26	8	192	0.0341	0.092504	0.000000	0.040259	3.59	0.11	0.17	0.092504	0.000000	0.040259	3.59	0.11	0.17	0.092504	0.000000	0.040259	3.59	0.11	0.17
A2602-A2601	A2602	A2601	8	221	0.0428	0.087875	0.000000	0.038074	3.83	0.11	0.16	0.087875	0.000000	0.038074	3.83	0.11	0.16	0.087875	0.000000	0.038074	3.83	0.11	0.16
A2603-A2602	A2603	A2602	8	285	0.0439	0.085911	0.000000	0.037150	3.84	0.10	0.16	0.085911	0.000000	0.037150	3.84	0.10	0.16	0.085911	0.000000	0.037150	3.84	0.10	0.16
A2604-A2603	A2604	A2603	8	232	0.0439	0.080851	0.000000	0.034778	3.77	0.10	0.15	0.080851	0.000000	0.034778	3.77	0.10	0.15	0.080851	0.000000	0.034778	3.77	0.10	0.15
A2605-A2604	A2605	A2604	8	250	0.0301	0.027664	0.000000	0.010840	2.40	0.07	0.10	0.027664	0.000000	0.010840	2.40	0.07	0.10	0.027664	0.000000	0.010840	2.40	0.07	0.10
A2606-A2605	A2606	A2605	8	279	0.0334	0.020813	0.000000	0.007956	2.28	0.06	0.08	0.020813	0.000000	0.007956	2.28	0.06	0.08	0.020813	0.000000	0.007956	2.28	0.06	0.08
A2607-A2606	A2607	A2606	8	274	0.0208	0.006788	0.000000	0.002354	1.38	0.04	0.06	0.006788	0.000000	0.002354	1.38	0.04	0.06	0.006788	0.000000	0.002354	1.38	0.04	0.06
A2608-A2607	A2608	A2607	8	159	0.0098	0.003360	0.000000	0.001096	0.86	0.03	0.05	0.003360	0.000000	0.001096	0.86	0.03	0.05	0.003360	0.000000	0.001096	0.86	0.03	0.05
A2609-A2601	A2609	A2601	8	260	0.0719	0.004476	0.000000	0.001497	1.87	0.02	0.03	0.004476	0.000000	0.001497	1.87	0.02	0.03	0.004476	0.000000	0.001497	1.87	0.02	0.03
A2610-A2603	A2610	A2603	8	111	0.0177	0.002019	0.000000	0.000630	0.90	0.02	0.03	0.002019	0.000000	0.000630	0.90	0.02	0.03	0.002019	0.000000	0.000630	0.90	0.02	0.03
A2611-A2605	A2611	A2605	8	239	0.0115	0.005273	0.000000	0.001789	1.04	0.04	0.06	0.005273	0.000000	0.001789	1.04	0.04	0.06	0.005273	0.000000	0.001789	1.04	0.04	0.06
A2612-A2606	A2612	A2606	8	265	0.0076	0.010799	0.000000	0.003899	1.12	0.06	0.09	0.010799	0.000000	0.003899	1.12	0.06	0.09	0.010799	0.000000	0.003899	1.12	0.06	0.09
A2613-A2612	A2613	A2612	8	273	0.0104	0.005474	0.000000	0.001863	1.01	0.04	0.06	0.005474	0.000000	0.001863	1.01	0.04	0.06	0.005474	0.000000	0.001863	1.01	0.04	0.06
A2614S-A2612	A2614S	A2612	8	266	0.0136	0.003873	0.000000	0.001279	1.00	0.03	0.05	0.003873	0.000000	0.001279	1.00	0.03	0.05	0.003873	0.000000	0.001279	1.00	0.03	0.05
A2615-A2604	A2615	A2604	8	286	0.0067	0.055456	0.000000	0.023085	1.74	0.13	0.20	0.055456	0.000000	0.023085	1.74	0.13	0.20	0.055456	0.000000	0.023085	1.74	0.13	0.20
A2616-A2615	A2616	A2615	8	333	0.0072	0.007011	0.000000	0.002438	0.96	0.05	0.07	0.007011	0.000000	0.002438	0.96	0.05	0.07	0.007011	0.000000	0.002438	0.96	0.05	0.07
A2617-A2615	A2617	A2615	8	300	0.0307	0.021498	0.000000	0.008241	2.24	0.06	0.09	0.021498	0.000000	0.008241	2.24	0.06	0.09	0.021498	0.000000	0.008241	2.24	0.06	0.09
A2618-A2617	A2618	A2617	8	225	0.0351	0.010260	0.000000	0.003688	1.87	0.04	0.06	0.010260	0.000000	0.003688	1.87	0.04	0.06	0.010260	0.000000	0.003688	1.87	0.04	0.06
A2619-A2618	A2619	A2618	8	278	0.0252	0.007399	0.000000	0.002585	1.51	0.04	0.06	0.007399	0.000000	0.002585	1.51	0.04	0.06	0.007399	0.000000	0.002585	1.51	0.04	0.06
A2620AS-A2619	A2620AS	A2619	8	131	0.0109	0.002341	0.000000	0.000740	0.80	0.03	0.04	0.002341	0.000000	0.000740	0.80	0.03	0.04	0.002341	0.000000	0.000740	0.80	0.03	0.04
A2620BS-A2626	A2620BS	A2626	8	128	0.0050	0.003303	0.000000	0.001076	0.67	0.04	0.06	0.003303	0.000000	0.001076	0.67	0.04	0.06	0.003303	0.000000	0.001076	0.67	0.04	0.06
A2621-A2615	A2621	A2615	8	308	0.0160	0.027957	0.000000	0.010965	1.93	0.08	0.12	0.027957	0.000000	0.010965	1.93	0.08	0.12	0.027957	0.000000	0.010965	1.93	0.08	0.12
A2622-A2621	A2622	A2621	8	330	0.0086	0.025572	0.000000	0.009952	1.51	0.09	0.13	0.025572	0.000000	0.009952	1.51	0.09	0.13	0.025572	0.000000	0.009952	1.51	0.09	0.13
A2623-A2622	A2623	A2622	8	320	0.0180	0.017002	0.000000	0.006386	1.73	0.06	0.09	0.017002	0.000000	0.006386	1.73	0.06	0.09	0.017002	0.000000	0.006386	1.73	0.06	0.09
A2624-A2623	A2624	A2623	8	324	0.0180	0.013473	0.000000	0.004959	1.61	0.05	0.08	0.013473	0.000000	0.004959	1.61	0.05	0.08	0.013473	0.000000	0.004959	1.61	0.05	0.08
A2625-A2624	A2625	A2624	8	71	0.0327	0.006929	0.000000	0.002407	1.62	0.03	0.05	0.006929	0.000000	0.002407	1.62	0.03	0.05	0.006929	0.000000	0.002407	1.62	0.03	0.05
A2626-A2625	A2626	A2625	8	161	0.0200	0.006421	0.000000	0.002216	1.34	0.04	0.05	0.006421	0.000000	0.002216	1.34	0.04	0.05	0.006421	0.000000	0.002216	1.34	0.04	0.05

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2627-A2624	A2627	A2624	8	127	0.0116	0.003492	0.000000	0.001143	0.92	0.03	0.05	0.003492	0.000000	0.001143	0.92	0.03	0.05	0.003492	0.000000	0.001143	0.92	0.03	0.05
A2628-A2622	A2628	A2622	8	76	0.0074	0.005512	0.000000	0.001877	0.90	0.04	0.06	0.005512	0.000000	0.001877	0.90	0.04	0.06	0.005512	0.000000	0.001877	0.90	0.04	0.06
A2629-A2617	A2629	A2617	8	373	0.0105	0.009801	0.000000	0.003509	1.21	0.05	0.08	0.009801	0.000000	0.003509	1.21	0.05	0.08	0.009801	0.000000	0.003509	1.21	0.05	0.08
A2630-A2629	A2630	A2629	8	172	0.0211	0.006464	0.000000	0.002232	1.36	0.04	0.05	0.006464	0.000000	0.002232	1.36	0.04	0.05	0.006464	0.000000	0.002232	1.36	0.04	0.05
A2631-A26	A2631	A26	8	300	0.0235	0.102141	0.000000	0.044838	3.25	0.13	0.20	0.102141	0.000000	0.044838	3.25	0.13	0.20	0.102141	0.000000	0.044838	3.25	0.13	0.20
A2632-A2631	A2632	A2631	8	90	0.0300	0.102141	0.000000	0.044838	3.54	0.12	0.19	0.102141	0.000000	0.044838	3.54	0.12	0.19	0.102141	0.000000	0.044838	3.54	0.12	0.19
A2633-A2632	A2633	A2632	8	353	0.0173	0.077483	0.000000	0.033206	2.68	0.12	0.19	0.077483	0.000000	0.033206	2.68	0.12	0.19	0.077483	0.000000	0.033206	2.68	0.12	0.19
A2634-A2633	A2634	A2633	8	180	0.0046	0.065449	0.000000	0.027640	1.59	0.16	0.24	0.065449	0.000000	0.027640	1.59	0.16	0.24	0.065449	0.000000	0.027640	1.59	0.16	0.24
A2635-A2634	A2635	A2634	8	59	0.0112	0.047190	0.000000	0.019370	1.99	0.11	0.16	0.047190	0.000000	0.019370	1.99	0.11	0.16	0.047190	0.000000	0.019370	1.99	0.11	0.16
A2636-A2635	A2636	A2635	8	258	0.0103	0.046714	0.000000	0.019158	1.93	0.11	0.16	0.046714	0.000000	0.019158	1.93	0.11	0.16	0.046714	0.000000	0.019158	1.93	0.11	0.16
A2637-A2636	A2637	A2636	8	216	0.0031	0.018947	0.000000	0.007184	0.97	0.09	0.14	0.018947	0.000000	0.007184	0.97	0.09	0.14	0.018947	0.000000	0.007184	0.97	0.09	0.14
A2638-A2637	A2638	A2637	8	85	0.0040	0.009252	0.000000	0.003296	0.85	0.06	0.09	0.009252	0.000000	0.003296	0.85	0.06	0.09	0.009252	0.000000	0.003296	0.85	0.06	0.09
A2639-A2638	A2639	A2638	8	250	0.0138	0.008248	0.000000	0.002909	1.27	0.04	0.07	0.008248	0.000000	0.002909	1.27	0.04	0.07	0.008248	0.000000	0.002909	1.27	0.04	0.07
A2640-A2639	A2640	A2639	8	255	0.0232	0.004742	0.000000	0.001594	1.28	0.03	0.05	0.004742	0.000000	0.001594	1.28	0.03	0.05	0.004742	0.000000	0.001594	1.28	0.03	0.05
A2641-A2632	A2641	A2632	8	120	0.0300	0.029518	0.000000	0.011632	2.44	0.07	0.10	0.029518	0.000000	0.011632	2.44	0.07	0.10	0.029518	0.000000	0.011632	2.44	0.07	0.10
A2642-A2641	A2642	A2641	8	124	0.0313	0.029518	0.000000	0.011632	2.48	0.07	0.10	0.029518	0.000000	0.011632	2.48	0.07	0.10	0.029518	0.000000	0.011632	2.48	0.07	0.10
A2643-A2642	A2643	A2642	8	246	0.0300	0.021646	0.000000	0.008303	2.22	0.06	0.09	0.021646	0.000000	0.008303	2.22	0.06	0.09	0.021646	0.000000	0.008303	2.22	0.06	0.09
A2644-A2643	A2644	A2643	8	313	0.0300	0.004184	0.000000	0.001391	1.35	0.03	0.04	0.004184	0.000000	0.001391	1.35	0.03	0.04	0.004184	0.000000	0.001391	1.35	0.03	0.04
A2645-A2642	A2645	A2642	8	208	0.0263	0.009032	0.000000	0.003211	1.63	0.04	0.06	0.009032	0.000000	0.003211	1.63	0.04	0.06	0.009032	0.000000	0.003211	1.63	0.04	0.06
A2646-A2645	A2646	A2645	8	217	0.0317	0.006889	0.000000	0.002392	1.60	0.03	0.05	0.006889	0.000000	0.002392	1.60	0.03	0.05	0.006889	0.000000	0.002392	1.60	0.03	0.05
A2647-A2646	A2647	A2646	8	225	0.0312	0.004228	0.000000	0.001407	1.37	0.03	0.04	0.004228	0.000000	0.001407	1.37	0.03	0.04	0.004228	0.000000	0.001407	1.37	0.03	0.04
A2648-A2633	A2648	A2633	8	265	0.0271	0.009024	0.000000	0.003208	1.65	0.04	0.06	0.009024	0.000000	0.003208	1.65	0.04	0.06	0.009024	0.000000	0.003208	1.65	0.04	0.06
A2649-A2648	A2649	A2648	8	289	0.0228	0.007114	0.000000	0.002477	1.44	0.04	0.06	0.007114	0.000000	0.002477	1.44	0.04	0.06	0.007114	0.000000	0.002477	1.44	0.04	0.06
A2650-A2649	A2650	A2649	8	255	0.0290	0.003873	0.000000	0.001279	1.30	0.03	0.04	0.003873	0.000000	0.001279	1.30	0.03	0.04	0.003873	0.000000	0.001279	1.30	0.03	0.04
A2651-A2634	A2651	A2634	8	283	0.0244	0.018352	0.000000	0.006939	1.97	0.06	0.09	0.018352	0.000000	0.006939	1.97	0.06	0.09	0.018352	0.000000	0.006939	1.97	0.06	0.09
A2652-A2651	A2652	A2651	8	350	0.0257	0.014668	0.000000	0.005439	1.87	0.05	0.08	0.014668	0.000000	0.005439	1.87	0.05	0.08	0.014668	0.000000	0.005439	1.87	0.05	0.08
A2653-A2652	A2653	A2652	8	342	0.0100	0.007483	0.000000	0.002617	1.10	0.05	0.07	0.007483	0.000000	0.002617	1.10	0.05	0.07	0.007483	0.000000	0.002617	1.10	0.05	0.07
A2654-A2636	A2654	A2636	8	176	0.0140	0.027702	0.000000	0.010856	1.84	0.08	0.12	0.027702	0.000000	0.010856	1.84	0.08	0.12	0.027702	0.000000	0.010856	1.84	0.08	0.12
A2655-A2654	A2655	A2654	8	223	0.0260	0.025078	0.000000	0.009743	2.21	0.07	0.10	0.025078	0.000000	0.009743	2.21	0.07	0.10	0.025078	0.000000	0.009743	2.21	0.07	0.10
A2656-A2655	A2656	A2655	8	215	0.0123	0.017097	0.000000	0.006425	1.52	0.06	0.10	0.017097	0.000000	0.006425	1.52	0.06	0.10	0.017097	0.000000	0.006425	1.52	0.06	0.10
A2657-A2656	A2657	A2656	8	318	0.0158	0.011614	0.000000	0.004220	1.47	0.05	0.08	0.011614	0.000000	0.004220	1.47	0.05	0.08	0.011614	0.000000	0.004220	1.47	0.05	0.08
A2658-A2657	A2658	A2657	8	108	0.0296	0.003464	0.000000	0.001133	1.27	0.02	0.04	0.003464	0.000000	0.001133	1.27	0.02	0.04	0.003464	0.000000	0.001133	1.27	0.02	0.04
A2659-A2657	A2659	A2657	8	190	0.0123	0.004871	0.000000	0.001641	1.04	0.04	0.05	0.004871	0.000000	0.001641	1.04	0.04	0.05	0.004871	0.000000	0.001641	1.04	0.04	0.05
A2660-A2656	A2660	A2656	8	225	0.0129	0.005072	0.000000	0.001715	1.07	0.04	0.05	0.005072	0.000000	0.001715	1.07	0.04	0.05	0.005072	0.000000	0.001715	1.07	0.04	0.05
A2661-A2655	A2661	A2655	8	324	0.0082	0.007259	0.000000	0.002532	1.02	0.05	0.07	0.007259	0.000000	0.002532	1.02	0.05	0.07	0.007259	0.000000	0.002532	1.02	0.05	0.07
A2662-A2661	A2662	A2661	8	172	0.0077	0.001972	0.000000	0.000614	0.67	0.03	0.04	0.001972	0.000000	0.000614	0.67	0.03	0.04	0.001972	0.000000	0.000614	0.67	0.03	0.04
A2663-A2637	A2663	A2637	8	250	0.0126	0.009234	0.000000	0.003289	1.27	0.05	0.07	0.009234	0.000000	0.003289	1.27	0.05	0.07	0.009234	0.000000	0.003289	1.27	0.05	0.07
A2664-A2663	A2664	A2663	8	253	0.0223	0.006490	0.000000	0.002242	1.39	0.04	0.05	0.006490	0.000000	0.002242	1.39	0.04	0.05	0.006490	0.000000	0.002242	1.39	0.04	0.05
A27-A28	A27	A28	12	400	0.0088	0.838676	0.000000	0.442131	3.99	0.43	0.43	0.838676	0.000000	0.442131	3.99	0.43	0.43	0.838676	0.000000	0.442131	3.99	0.43	0.43
A28-A29	A28	A29	12	367	0.0088	0.863093	0.000000	0.456140	4.03	0.44	0.44	0.863093	0.000000	0.456140	4.03	0.44	0.44	0.863093	0.000000	0.456140	4.03	0.44	0.44
A2801-A28	A2801	A28	8	194	0.0295	0.035025	0.000000	0.014009	2.56	0.07	0.11	0.035025	0.000000	0.014009	2.56	0.07	0.11	0.035025	0.000000	0.014009	2.56	0.07	0.11
A2802-A2801	A2802	A2801	8	190	0.0303	0.021243	0.000000	0.008135	2.22	0.06	0.09	0.021243	0.000000	0.008135	2.22	0.06	0.09	0.021243	0.000000	0.008135	2.22	0.06	0.09
A2803-A2802	A2803	A2802	8	316	0.0368	0.018998	0.000000	0.007205	2.30	0.05	0.08	0.018998	0.000000	0.007205	2.30	0.05	0.08	0.018998	0.000000	0.007205	2.30	0.05	0.08
A2804-A2803	A2804	A2803	8	316	0.0400	0.013782	0.000000	0.005083	2.14	0.04	0.07	0.013782	0.000000	0.005083	2.14	0.04	0.07	0.013782	0.000000	0.005083	2.14	0.04	0.07
A2805-A2804	A2805	A2804	8	317	0.0361	0.009531	0.000000	0.003404	1.85	0.04	0.06	0.009531	0.000000	0.003404	1.85	0.04	0.06	0.009531	0.000000	0.003404	1.85	0.04	0.06
A2806-A2805	A2806	A2805	8	151	0.0113	0.005146	0.000000	0.001742	1.02	0.04	0.06	0.005146	0.000000	0.001742	1.02	0.04	0.06	0.005146	0.000000	0.001742	1.02	0.04	0.06

City of Brea - Sewer Master Plan (November 2021)
Sewer Model Results

Model Data						Existing Condition						Near-Term Future Condition (without SOI or Carbon Canyon Developments)						Future Condition (with SOI or Carbon Canyon Developments)					
Pipe ID	U/S MH	D/S MH	Diameter (in)	Length (ft)	Slope	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D	PDWF (mgd)	Unpeakable ADWF (mgd)	ADWF (mgd)	PDWF Velocity (ft/s)	PDWF Water Depth (ft)	PDWF d/D
A2807-A2801	A2807	A2801	8	155	0.0133	0.014417	0.000000	0.005338	1.48	0.06	0.09	0.014417	0.000000	0.005338	1.48	0.06	0.09	0.014417	0.000000	0.005338	1.48	0.06	0.09
A2808-A2807	A2808	A2807	8	260	0.0407	0.012663	0.000000	0.004636	2.10	0.04	0.06	0.012663	0.000000	0.004636	2.10	0.04	0.06	0.012663	0.000000	0.004636	2.10	0.04	0.06
A2809-A2808	A2809	A2808	8	371	0.0700	0.010209	0.000000	0.003668	2.38	0.03	0.05	0.010209	0.000000	0.003668	2.38	0.03	0.05	0.010209	0.000000	0.003668	2.38	0.03	0.05
A2810-A2809	A2810	A2809	8	371	0.0200	0.004816	0.000000	0.001621	1.22	0.03	0.05	0.004816	0.000000	0.001621	1.22	0.03	0.05	0.004816	0.000000	0.001621	1.22	0.03	0.05
A2811-A2807	A2811	A2807	8	234	0.0100	0.001433	0.000000	0.000434	0.66	0.02	0.03	0.001433	0.000000	0.000434	0.66	0.02	0.03	0.001433	0.000000	0.000434	0.66	0.02	0.03
A29-A30	A29	A30	12	140	0.0098	0.863093	0.000000	0.456140	4.19	0.43	0.43	0.863093	0.000000	0.456140	4.19	0.43	0.43	0.863093	0.000000	0.456140	4.19	0.43	0.43
A30-OUTLETA	A30	OUT_ASSOCIATED	12	245	0.0111	0.895326	0.000000	0.474686	4.43	0.42	0.42	0.966681	0.000000	0.515946	4.52	0.44	0.44	0.966681	0.000000	0.515946	4.52	0.44	0.44
B01-B02	B01	B02	8	313	0.0121	0.007979	0.000000	0.002806	1.20	0.05	0.07	0.007979	0.000000	0.002806	1.20	0.05	0.07	0.007979	0.000000	0.002806	1.20	0.05	0.07
B02-B03	B02	B03	8	237	0.0217	0.023910	0.000000	0.009251	2.05	0.07	0.10	0.023910	0.000000	0.009251	2.05	0.07	0.10	0.023910	0.000000	0.009251	2.05	0.07	0.10
B03-B04	B03	B04	8	274	0.0067	0.029845	0.000000	0.011772	1.45	0.10	0.15	0.029845	0.000000	0.011772	1.45	0.10	0.15	0.029845	0.000000	0.011772	1.45	0.10	0.15
B04-B05	B04	B05	8	182	0.0158	0.039876	0.000000	0.016130	2.14	0.09	0.14	0.083945	0.000000	0.036227	2.66	0.13	0.20	0.083945	0.000000	0.036227	2.66	0.13	0.20
B05-B06	B05	B06	8	182	0.0104	0.044180	0.000000	0.018031	1.90	0.11	0.16	0.087990	0.000000	0.038128	2.33	0.15	0.22	0.087990	0.000000	0.038128	2.33	0.15	0.22
B06-B07	B06	B07	8	216	0.0014	0.044180	0.000000	0.018031	0.93	0.18	0.26	0.087990	0.000000	0.038128	1.13	0.25	0.38	0.087990	0.000000	0.038128	1.13	0.25	0.38
B07-B08	B07	B08	8	148	0.0032	0.044180	0.000000	0.018031	1.26	0.14	0.21	0.087990	0.000000	0.038128	1.54	0.20	0.30	0.087990	0.000000	0.038128	1.54	0.20	0.30
B08-B09	B08	B09	8	48	0.0083	0.044180	0.000000	0.018031	1.76	0.11	0.17	0.087990	0.000000	0.038128	2.15	0.16	0.24	0.087990	0.000000	0.038128	2.15	0.16	0.24
B09-B10	B09	B10	8	43	0.0093	0.136239	0.000000	0.061323	2.54	0.19	0.29	0.178943	0.000000	0.082477	2.74	0.22	0.33	0.178943	0.000000	0.082477	2.74	0.22	0.33
B0901-B09	B0901	B09	8	179	0.0063	0.098897	0.000000	0.043292	2.02	0.18	0.27	0.101116	0.000000	0.044349	2.03	0.18	0.27	0.101116	0.000000	0.044349	2.03	0.18	0.27
B0902-B0901	B0902	B0901	8	308	0.0056	0.098018	0.000000	0.042874	1.93	0.18	0.28	0.100239	0.000000	0.043931	1.94	0.19	0.28	0.100239	0.000000	0.043931	1.94	0.19	0.28
B0903-B0902	B0903	B0902	8	420	0.0052	0.098018	0.000000	0.042874	1.88	0.19	0.28	0.100239	0.000000	0.043931	1.89	0.19	0.28	0.100239	0.000000	0.043931	1.89	0.19	0.28
B0904-B0903	B0904	B0903	8	366	0.0058	0.098018	0.000000	0.042874	1.95	0.18	0.27	0.100239	0.000000	0.043931	1.96	0.18	0.28	0.100239	0.000000	0.043931	1.96	0.18	0.28
B0905-B0904	B0905	B0904	8	217	0.0057	0.098018	0.000000	0.042874	1.94	0.18	0.28	0.100239	0.000000	0.043931	1.95	0.19	0.28	0.100239	0.000000	0.043931	1.95	0.19	0.28
B0906-B0905	B0906	B0905	8	179	0.0063	0.085928	0.000000	0.037158	1.93	0.17	0.25	0.088174	0.000000	0.038215	1.95	0.17	0.25	0.088174	0.000000	0.038215	1.95	0.17	0.25
B0907-B0906	B0907	B0906	8	500	0.0044	0.085928	0.000000	0.037158	1.70	0.18	0.28	0.088174	0.000000	0.038215	1.72	0.19	0.28	0.088174	0.000000	0.038215	1.72	0.19	0.28
B0908D-B0907	B0908D	B0907	8	248	0.0006	0.064555	0.000000	0.027230	0.77	0.27	0.40	0.066857	0.000000	0.028287	0.78	0.27	0.41	0.066857	0.000000	0.028287	0.78	0.27	0.41
B0909-B0908D	B0909	B0908D	8	19	0.0063	0.064555	0.000000	0.027230	1.78	0.14	0.22	0.066857	0.000000	0.028287	1.80	0.15	0.22	0.066857	0.000000	0.028287	1.80	0.15	0.22
B0911-B0920	B0911	B0920	8	151	0.0070	0.060687	0.000000	0.025461	1.81	0.14	0.21	0.063001	0.000000	0.026518	1.83	0.14	0.21	0.063001	0.000000	0.026518	1.83	0.14	0.21
B0912-B0911	B0912	B0911	8	20	0.0125	0.060129	0.000000	0.025207	2.22	0.12	0.18	0.062445	0.000000	0.026264	2.25	0.12	0.18	0.062445	0.000000	0.026264	2.25	0.12	0.18
B0913-B0912	B0913	B0912	8	337	0.0066	0.054107	0.000000	0.022475	1.72	0.13	0.20	0.056443	0.000000	0.023532	1.74	0.13	0.20	0.056443	0.000000	0.023532	1.74	0.13	0.20
B0914-B0913	B0914	B0913	8	6	0.0667	0.052250	0.000000	0.021638	3.83	0.07	0.11	0.054594	0.000000	0.022695	3.88	0.08	0.11	0.054594	0.000000	0.022695	3.88	0.08	0.11
B0915-B0914	B0915	B0914	8	378	0.0099	0.041672	0.000000	0.016921	1.84	0.10	0.16	0.044061	0.000000	0.017978	1.87	0.11	0.16	0.044061	0.000000	0.017978	1.87	0.11	0.16
B0916-B0915	B0916	B0915	8	371	0.0073	0.033643	0.000000	0.013409	1.55	0.10	0.15	0.036075	0.000000	0.014466	1.58	0.11	0.16	0.036075	0.000000	0.014466	1.58	0.11	0.16
B0917-B0914	B0917	B0914	8	213	0.0052	0.012866	0.000000	0.004717	1.03	0.07	0.10	0.012866	0.000000	0.004717	1.03	0.07	0.10	0.012866	0.000000	0.004717	1.03	0.07	0.10
B0918-B0917	B0918	B0917	8	268	0.0050	0.012866	0.000000	0.004717	1.02	0.07	0.11	0.012866	0.000000	0.004717	1.02	0.07	0.11	0.012866	0.000000	0.004717	1.02	0.07	0.11
B0919-B0914	B0919	B0914	6	172	0.0300	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.00	0.00
B0920-B0909	B0920	B0909	8	217	0.0067	0.064555	0.000000	0.027230	1.82	0.14	0.21	0.066857	0.000000	0.028287	1.84	0.15	0.22	0.066857	0.000000	0.028287	1.84	0.15	0.22
B0921-B0920	B0921	B0920	6	98	0.0626	0.004128	0.000000	0.001371	1.81	0.02	0.05	0.004128	0.000000	0.001371	1.81	0.02	0.05	0.004128	0.000000	0.001371	1.81	0.02	0.05
B0922-B0921	B0922	B0921	6	244	0.0148	0.003011	0.000000	0.000973	1.00	0.03	0.06	0.003011	0.000000	0.000973	1.00	0.03	0.06	0.003011	0.000000	0.000973	1.00	0.03	0.06
B10-B1001	B10	B1001	8	212	0.0057	0.156370	0.000000	0.071233	2.68	0.20	0.31	0.198632	0.000000	0.092387	2.86	0.23	0.35	0.198632	0.000000	0.092387	2.86	0.23	0.35
B1001-B11	B1001	B11	8	434	0.0073	0.160338	0.000000	0.073200	2.44	0.22	0.33	0.202520	0.000000	0.094354	2.60	0.25	0.38	0.202520	0.000000	0.094354	2.60	0.25	0.38
B11-B12	B11	B12	8	180	0.0258	0.244564	0.000000	0.115827	4.32	0.20	0.30	0.292548	0.000000	0.140728	4.54	0.22	0.33	0.292548	0.000000	0.140728	4.54	0.22	0.33
B1101-B11	B1101	B11	8	360	0.0083	0.085579	0.000000	0.036994	2.14	0.16	0.23	0.093523	0.000000	0.040741	2.19	0.16	0.24	0.093523	0.000000	0.040741	2.19	0.16	0.24
B1102-B1101	B1102	B1101	8	660	0.0099	0.080993	0.000000	0.034844	2.24	0.15	0.22	0.088972	0.000000	0.038591	2.30	0.15	0.23	0.088972	0.000000	0.038591	2.30	0.15	0.23
B1103-B1102	B1103	B1102	8	650	0.0072	0.070647	0.000000	0.030034	1.92	0.15	0.22	0.078717	0.000000	0.033781	1.98	0.15	0.23	0.078717	0.000000	0.033781	1.98	0.15	0.23
B1104-B1103	B1104	B1103	6	699	0.0068	0.047828	0.000000	0.019655	1.73	0.13	0.27	0.047828	0.000000	0.019655	1.73	0.13	0.27	0.047828	0.000000	0.019655	1.73	0.13	0.27
B1105-B1104	B1105	B1104	6	120	0.0070	0.019175	0.000000	0.007278	1.34	0.09	0.17	0.019175	0.000000	0.007278	1.34	0.09	0.17	0.019175	0.000000	0.007278	1.34	0.09	0.17

Appendix D. Updated Preliminary Hydrology Analysis for Greenbriar Residential Development Project

Appendix

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PRELIMINARY HYDROLOGY ANALYSIS

FOR

GREENBRIAR RESIDENTIAL DEVELOPMENT PROJECT

City of Brea

County of Orange, California

January 28, 2025

Prepared for:

LENNAR

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PRELIMINARY HYDROLOGY ANALYSIS

FOR

GREENBRIAR RESIDENTIAL DEVELOPMENT PROJECT

City of Brea

County of Orange

January 28, 2025

PREPARED UNDER THE SUPERVISION OF:

01/28/2025

Jianhua "Gary" Guan, R.C.E. 64519, Exp. 06/30/25 Date:

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SECTION I

INTRODUCTION

A. PROJECT LOCATION

The approximate 9.7-acre project site is located at 1698-1700 Greenbriar Lane in the City of Brea, County of Orange. More specifically, it is located off northwest intersection of Greenbriar Lane and South Associated Road (refer to Vicinity Map for general locations).

B. STUDY PURPOSE

The purpose of this hydrology study is to determine the flow rates produced by the site in its existing and proposed conditions for comparisons. It will also serve as the basis for analyzing and designing the proposed development's required storm drain system. As part of the report, the 2-, 25- and 100-year storm events for both existing and proposed conditions were analyzed. In addition, water quality BMPs are provided to ensure all flows will be treated prior to releasing into the existing downstream storm drain systems along Loftus Diversion Channel (Facility No. A-06).

C. DISCUSSION

Existing Condition:

The project site is currently fully developed with an existing 164,908 square foot office building and a three- level parking structure with parking lot.

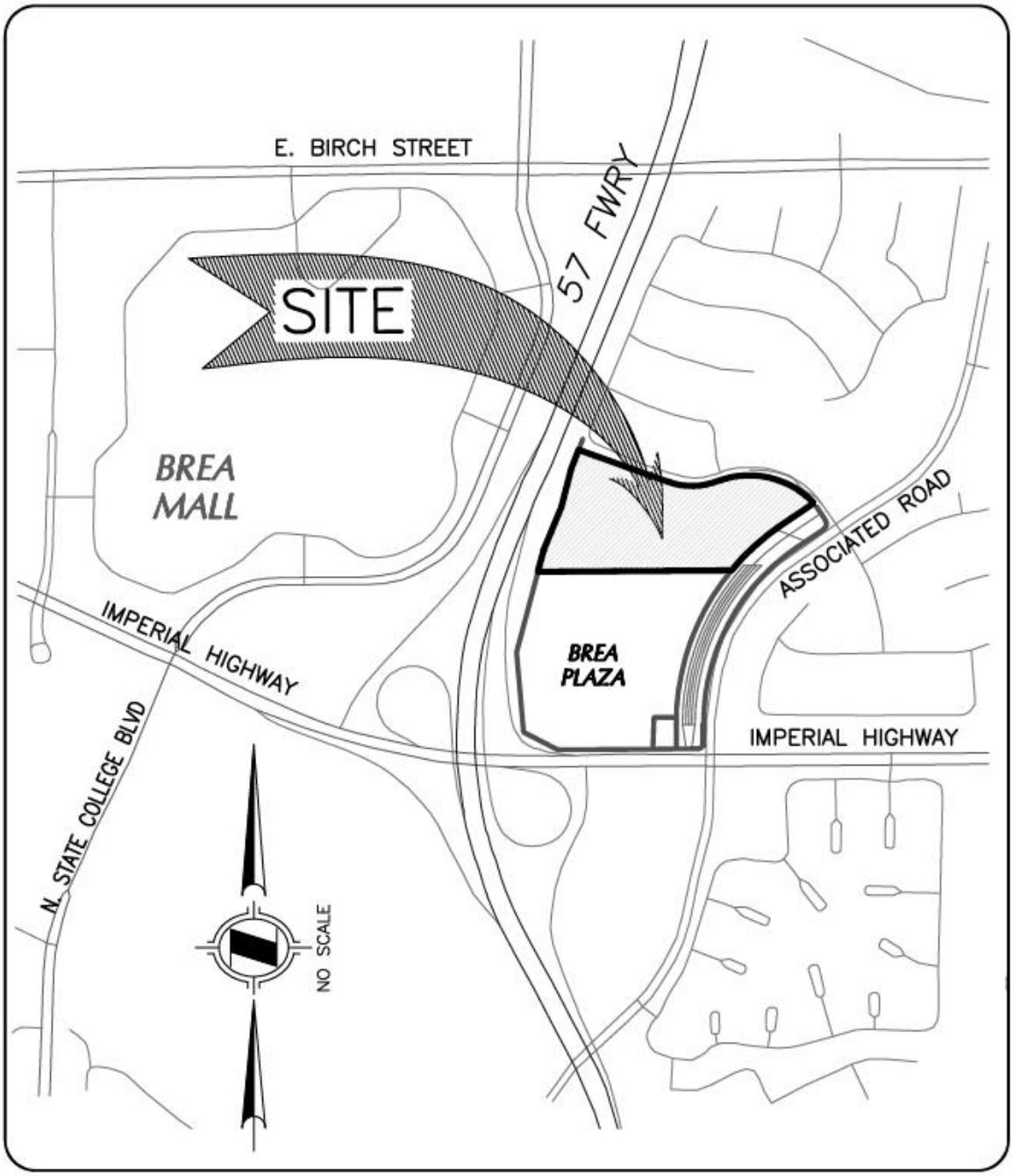
The project is located north of the Loftus Channel (Orange County Flood Control Facility No. A06). All the project site runoffs including off-site tributary areas drain into Loftus Channel. Loftus Channel is located 2/3 miles south of Lambert Road and runs east to west from Voyager to Associated Road and then runs southwest until crosses 57 Freeway and drains into U.S. Army Corps of Engineers Fullerton Creek Reservoir at Craig Regional Park. Loftus Channel is an engineered channel.

There is an existing triple 12'w x 8.5'h RCB culvert under Greenbriar Lane with an existing 10-ft catch basin on the north and a 21-ft catch basin on the south of Greenbriar Lane. Those catch basins are located right above the RCB culverts. There is an existing 4-cell RCB channel approximately 400' downstream of Greenbriar Lane; refer to the reference section for details.

There are four (4) drainage areas during the existing condition hydrology studies and refer to the existing condition hydrology map for details.

Drainage Area "A" contains the Northerly portion of the project site and off-site areas. The northern portion of the project (Drainage Areas "A5") sheet flows to the northeast corner with an existing catch basin. There are also off-site areas (Areas "A1" to "A5") which contain the flows from Chevy Chase Drive and portions of Greenbriar Lane. The off-site area flows were conveyed via an existing 15" RCP and 18" RCP. Drainage Area "A" discharges into an existing 18" pipe to Loftus Channel.

Drainage Area “B” contains the off-site areas along Greenbriar Lane and drains to the existing 10-ft catch basin on top of the triple RCB culvert.



LOCATION MAP

N.T.S

Drainage Area “C” contains the areas to the existing 21-ft catch basins on top of the triple RCB culvert. Please note that the catch basin at Node 13 is a flow through catch basin, not all the flows will be captured at the catch basin at Node 13. Detailed catch basin capacity analysis will be provided during the final improvement phase.

Drainage Area “D” contains the southern half the project site, sheet flows to the existing parkway culvert and ultimately to Loftus Channel via existing 18” pipe.

The existing drainage facilities and existing condition hydrology calculations can be found in Section 2.

Proposed Condition

The proposed project consists of demolishing the existing office building, parking structure and construction of 183 single-family attached dwelling units.

The runoffs from the proposed project including the off-site are collected and ultimately to Loftus Channel.

Drainage Area “A” contains the overall project site with proposed on-site storm drains, inlets and catch basins. The storm drain systems were proposed for the off-site areas (for the areas from Chevy Chase Drive and portions of Greenbriar Lane with existing 15” and 18” pipes). The proposed off-site storm drain is proposed to join the on-site storm drain systems at the northeast corner of the project site and join the existing 18” pipe and then ultimately to Loftus Channel.

Drainage “B” contains the off-site areas tributary to the existing 10-ft catch basin which is located north of Greenbriar Lane and on top of the existing triple RCB culvert. The off-site existing 15” RCP has been revised to discharge to Greenbriar Lane via Parkway culvert.

Drainage “C” contains the off-site areas tributary to the existing 21-ft catch basin which is located south of Greenbriar Lane and on top of the existing triple RCB culvert.

In addition to the proposed on-site drainage improvements, the water quality treatment BMPs are provided to ensure all flows will be treated prior to releasing into the downstream storm drain systems.

The proposed drainage facilities and proposed condition hydrology calculations can be found in Section 3.

D. HYDROLOGY METHODOLOGY

The rational method was used to calculate the design discharge for the local drainage areas since the watershed area to the proposed storm drain systems is less than one square mile.

Hydrologic calculations to determine the 25- and 100-year discharges at critical locations throughout the project site were performed using the Orange County Rational Method. A technical description of the rational method is provided in the Orange County Hydrology Manual dated October, 1986. The Rational Method is an empirical computation procedure for developing a peak runoff rate (discharge) for small watersheds for storms of a specified recurrence interval. The rational method equation is based on the assumption that the peak flow rate is directly proportional to the drainage area, rainfall intensity and a loss coefficient which describes the effects of land use and soil type. The design discharges were computed by generating a hydrologic "link-node" model which divides the area into subareas, each tributary to a concentration point or hydrologic "node" point determined by the proposed terrain or street layout.

The following assumptions/guidelines were applied for use of the Rational Method.

- The rational Method Hydrology includes the effects of infiltration caused by soil surface characteristics. The soil map from Orange County Hydrology Manual indicates that the study area consists of soil type D. Hydrologic soils ratings are based on a scale of A through D, where A is the most pervious, providing the least runoff.
- The infiltration rate is also affected by the type of vegetation or ground cover and percentage of impervious surface. The runoff coefficients used for this study were based on the proposed land uses.
- Standard intensity-duration curve data was taken from the Orange County Hydrology Manual, dated October, 1986.

The hydrologic calculations were prepared using the Advanced Engineering Software (A.E.S.) Rational Method computer program. The results of the hydrologic calculations were used to design the required storm drain facilities.

E. HYDROLOGY RESULTS

There are 4 drainage areas within the studied area for the existing condition. All the runoffs drain to the adjacent Loftus Channel. There are 3 drainage areas for the proposed condition with Drainage Area "D" (existing condition) discharges into the on-site proposed storm drain systems.

Table 1 summarizes the hydrology analysis results for the overall hydrology study for both the existing and proposed conditions.

As indicated in table 1, the overall drainage acreage for the studied area remain the same with approximately 22.6 acres.

Table 1 Overall Hydrology Analysis Summary
Greenbriar Project
City of Brea, Orange County

Existing Condition					Proposed Condition					Difference (Proposed-Existing)			
Area	Area (acre)	2-yr (cfs)	25-yr (cfs)	100-yr (cfs)	Area	Area (acre)	2-yr (cfs)	25-yr (cfs)	100-yr (cfs)	Area (acre)	2-yr (cfs)	25-yr (cfs)	100-yr (cfs)
A	9.1	9.6	21.7	28.2	A	14.3	16.6	37.5	48.7	5.2	7.0	15.8	20.5
B	8.5	8.8	20.3	26.2	B	8.1	8.3	19.2	24.8	-0.4	-0.5	-1.1	-1.4
C	0.5	0.9	2.0	2.6	C	0.2	0.4	0.9	1.2	-0.3	-0.5	-1.1	-1.4
D	4.5	6.5	14.4	18.6	D	-	-	-	-	-4.5	-6.5	-14.4	-18.6
Overall	22.60	25.80	58.40	75.60	Overall	22.60	25.30	57.60	74.70	0.00	-0.50	-0.80	-0.90

Note:

Existing Drainage Area "D" was combined into the project site drainage areas

During the existing condition, the overall 2-year peak flow is approximately 25.8 cfs, 25-year peak flow is approximately 58.4 cfs and 100-year flow rate is approximately 75.6 cfs. The overall proposed peak flows are very close to the existing condition with minor decreases. The total 2-year peak flow is approximately 25.3 cfs, 25-year peak flow is approximately 57.6 cfs and 100-year flow rate is approximately 74.7 cfs with the same overall tributary area.

F. STREET AND EXISTING STORM DRAIN CAPACTIY

As shown from Table 1, the overall combined proposed runoffs are less than the overall combined existing condition ones.

Loftus Channel -Facility No. A06

The hydrology study and channel improvement plans were obtained and can be found in the Reference Section. As shown from the references, the Loftus Channel reach along the project site applied the same flow rates – 4,235 cfs. Even though Drainage Area "D" (existing condition) has been rerouted with on-site storm drain systems and discharge to Loftus Channel via existing 18" RCP at the northeastern corner of the project site, there should have no negative impacts to Loftus Channel since Loftus Channel design applied the same peak flow rates in this reach.

Greenbriar Lane Street Capacity

As part of the drainage modification, storm drains were proposed along Greenbriar Lane to connect the existing off-site 15" RCP, which collects the flows along Chevy Chase Drive. The proposed off-site storm drains were proposed to join the existing 18" pipe along with the proposed on-site drainage systems.

The proposed flows to the existing 10-ft and 21-ft catch basins on top of the Loftus Channel box culvert are less than the existing levels.

10-ft catch basin: Existing Q_{100}=26.2 cfs, Proposed Q_{100}=24.8 cfs.
21-ft catch basin: Existing Q_{100}=2.6 cfs, Proposed Q_{100}=1.2 cfs.
Overall proposed Q_{100}=26.0 cfs and overall catch basin opening = 31 ft with 8" curb.

The catch basin capacities were performed for the proposed 100-year flows. The combined basin openings of 31 ft (one 10-ft catch basin opening on the north side and one 21-ft catch basin opening on the south side of Greenbriar Lane) was performed in the catch basin calculations. It indicated that the ponding depth of the catch basin is about 0.42' which will be contained within the 8" curb.

Existing 18" RCP Capacity

As indicated by the Orange County Local Drainage manual, the proposed project will follow the specified flood protection criteria.

Storm drains with tributary areas of less than 640 acres are designed for a minimum of 10-year frequency below top of curb using a combination of street and storm drain flow. In sump conditions, catch basins and the connecting storm drains should be designed to a 25-year frequency with secondary overflow or provide 100-year protection.

Detailed storm drain capacity analysis will be performed during the final engineering phase.

The runoff from the project including off-site areas will be collected via area drains, inlets and catch basins and discharge to Loftus Channel via existing 18" storm drain. Preliminary capacity analysis was performed by applying FlowMaster program. The preliminary capacity calculations indicated that the existing 18" RCP can convey about 33.2 cfs with free flow condition without pressure. The calculated 25-year storm is about 37.4 cfs. Detailed pressured flow hydraulic calculation by applying WSPG program will be performed during the final engineering phase when the detailed designs are available.

The ponding exhibit is provided for the sump location for the project. The ponding exhibit shows the ponding limits assuming the catch basins at the sump locations being clogged. The storm water will escape via the secondary overflow path to Loftus Channel in case the catch basin was clogged and during the 100-year storm. The ponding exhibits can be found at Section 4.

G. WATER QUALITY REPORT

The WQMP report in compliance of the water quality and hydromodification requirements can be found in the separate report.

H. CONCLUSIONS

The proposed project consists of demolishing the existing office building, parking structure and construction of 183 single-family attached dwelling units.

The on-site and off-site drainage improvements are proposed for the project.

In addition, water quality BMPs are provided to ensure all flows will be treated prior to releasing into the existing downstream storm drain systems along Loftus Diversion Channel (Facility No. A-06).

Soil map from Orange County Hydrology Manual

SECTION II
EXISTING CONDITION HYDROLOGY CALCULATIONS &MAP

A. 2-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2016 Advanced Engineering Software (aes)
              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Existing Condition - Area "A"                                            *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: GBEXA.DAT
  TIME/DATE OF STUDY: 15:20 05/26/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.571
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    57    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =   11.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.405
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    1.10
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       1.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.47
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.79   Tc(MIN.) =   13.26
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.293
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    2.85
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =       4.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  13.68
  FLOW VELOCITY(FEET/SEC.) =  2.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     12.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   328.50
  FLOW LENGTH(FEET) =   460.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =   14.26
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =    1330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.26
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.240
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.05      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    1.15
  EFFECTIVE AREA(ACRES) =      4.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        5.0       PEAK FLOW RATE(CFS) =       5.19

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.50  DOWNSTREAM(FEET) =   322.00
  FLOW LENGTH(FEET) =   280.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.78
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.19
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   14.86
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     14.00 =    1610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.86
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.211
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.15      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.15      SUBAREA RUNOFF(CFS) =    4.45
  EFFECTIVE AREA(ACRES) =      9.13   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.27
```

```
  TOTAL AREA(ACRES) =        9.1       PEAK FLOW RATE(CFS) =       9.50
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.1  TC(MIN.) =     14.86
  EFFECTIVE AREA(ACRES) =      9.13  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.272
  PEAK FLOW RATE(CFS)   =       9.50
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "B"                                            *
* 2-year Storm                                                             *
 ***************************************************************************

  FILE NAME: GBEXB.DAT
  TIME/DATE OF STUDY: 13:54 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.597
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    57    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   10.96
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.443
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.17
  FLOW VELOCITY(FEET/SEC.) =  3.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =   12.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.340
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    3.14
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =       4.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =   13.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.307
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    1.75
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =       6.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  4.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  320.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.58
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.04   Tc(MIN.) =   14.06
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.250
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.72      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.72      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      8.31    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        8.3        PEAK FLOW RATE(CFS) =       8.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.39
  FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.72
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  320.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   16.02
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   0.52   Tc(MIN.) =   14.58
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.225
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.21
  EFFECTIVE AREA(ACRES) =      8.50    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        8.5        PEAK FLOW RATE(CFS) =       8.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.02
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     14.58
  EFFECTIVE AREA(ACRES) =      8.50  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.363
  PEAK FLOW RATE(CFS)   =       8.81
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "C"                                            *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: GBEXC.DAT
  TIME/DATE OF STUDY: 11:38 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    339.00  DOWNSTREAM(FEET) =    328.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    57    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.00
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    6.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.950
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.34      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       0.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.51
  FLOW VELOCITY(FEET/SEC.) =  3.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.65
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     500.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      6.49
  EFFECTIVE AREA(ACRES) =      0.54  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.94
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "D"                                            *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: GBEXD.DAT
  TIME/DATE OF STUDY: 08:04 02/27/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    342.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.959
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.047
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    57    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  329.50
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.73
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
  STREET FLOW TRAVEL TIME(MIN.) =   1.79   Tc(MIN.) =    7.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.761
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        3.19      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    3.19      SUBAREA RUNOFF(CFS) =    5.00
  EFFECTIVE AREA(ACRES) =      3.84    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =       6.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.16
  FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
```

```
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  329.50  DOWNSTREAM ELEVATION(FEET) =  323.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.41
  STREET FLOW TRAVEL TIME(MIN.) =   1.06   Tc(MIN.) =    8.81
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.636
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.62      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =      4.46    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =       6.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.18
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     930.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      8.81
  EFFECTIVE AREA(ACRES) =      4.46  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       6.48
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B. 25-YEAR STORM

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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Existing Condition - Area "A"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBEXA.DAT
  TIME/DATE OF STUDY: 16:30 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.365
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    75    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   11.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.62
  FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   16.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =   12.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.852
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    6.56
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =       9.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     12.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   328.50
  FLOW LENGTH(FEET) =   460.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.93
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.73
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =    1330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.735
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.05      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      4.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        5.0       PEAK FLOW RATE(CFS) =      11.89

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.50  DOWNSTREAM(FEET) =   321.00
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.53
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.89
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   14.02
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.02
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.691
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        4.15      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.15      SUBAREA RUNOFF(CFS) =    9.98
  EFFECTIVE AREA(ACRES) =      9.13   AREA-AVERAGED Fm(INCH/HR) =  0.05
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.27
  TOTAL AREA(ACRES) =        9.1       PEAK FLOW RATE(CFS) =      21.67
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.1  TC(MIN.) =     14.02
  EFFECTIVE AREA(ACRES) =      9.13  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.272
  PEAK FLOW RATE(CFS)   =      21.67
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "B"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBEXB.DAT
  TIME/DATE OF STUDY: 13:53 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.419
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    2.27
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.21
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   11.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.947
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    7.20
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      10.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.51
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   12.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.886
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    4.04
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =      14.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.63
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  320.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.39
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.11
    SPLIT DEPTH(FEET) =    0.26   SPLIT FLOOD WIDTH(FEET) =    7.29
    SPLIT FLOW(CFS) =    1.86   SPLIT VELOCITY(FEET/SEC.) =    3.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.32
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =   13.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.776
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.72      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.72      SUBAREA RUNOFF(CFS) =    6.75
  EFFECTIVE AREA(ACRES) =      8.31    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        8.3        PEAK FLOW RATE(CFS) =      20.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.11   DEPTH*VELOCITY(FT*FT/SEC.) =   2.32
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  320.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.44
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    3.92
    SPLIT DEPTH(FEET) =    0.41   SPLIT FLOOD WIDTH(FEET) =   15.82
    SPLIT FLOW(CFS) =    8.55   SPLIT VELOCITY(FEET/SEC.) =    3.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.78
  STREET FLOW TRAVEL TIME(MIN.) =   0.49   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.46
  EFFECTIVE AREA(ACRES) =      8.50    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        8.5        PEAK FLOW RATE(CFS) =      20.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     13.76
  EFFECTIVE AREA(ACRES) =      8.50  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.363
  PEAK FLOW RATE(CFS)   =      20.25
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "C"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBEXC.DAT
  TIME/DATE OF STUDY: 11:39 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    339.00  DOWNSTREAM(FEET) =    328.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.800
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    75    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   1.30   Tc(MIN.) =    6.35
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.215
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.34      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.28
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.08
  FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     500.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      6.35
  EFFECTIVE AREA(ACRES) =      0.54  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       2.04
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "D"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBEXD.DAT
  TIME/DATE OF STUDY: 08:05 02/27/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    342.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.959
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.368
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    75    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.54
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  329.50
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   13.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =    7.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.848
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        3.19      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    3.19      SUBAREA RUNOFF(CFS) =   10.99
  EFFECTIVE AREA(ACRES) =      3.84    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      13.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.73
  FLOW VELOCITY(FEET/SEC.) =  5.01   DEPTH*VELOCITY(FT*FT/SEC.) =   2.16
```

```
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  329.50  DOWNSTREAM ELEVATION(FEET) =  323.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.23
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.65
    SPLIT DEPTH(FEET) =    0.16   SPLIT FLOOD WIDTH(FEET) =    1.55
    SPLIT FLOW(CFS) =    0.12   SPLIT VELOCITY(FEET/SEC.) =    0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.613
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.62      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.00
  EFFECTIVE AREA(ACRES) =      4.46    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      14.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.11
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     930.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      8.33
  EFFECTIVE AREA(ACRES) =      4.46  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      14.42
============================================================================
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============================================================================
  END OF RATIONAL METHOD ANALYSIS
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C. 100-YEAR STORM

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Existing Condition - Area "A"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBEXA.DAT
  TIME/DATE OF STUDY: 16:31 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.298
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    91    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   11.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.916
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    3.23
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  3.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.64
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.77
    SPLIT DEPTH(FEET) =    0.16   SPLIT FLOOD WIDTH(FEET) =    1.55
    SPLIT FLOW(CFS) =    0.23   SPLIT VELOCITY(FEET/SEC.) =    1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   12.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.661
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    8.49
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =      12.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     12.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   328.50
  FLOW LENGTH(FEET) =   460.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.60
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   13.24
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     13.00 =    1330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.24
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.542
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.05      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.05      SUBAREA RUNOFF(CFS) =    3.33
  EFFECTIVE AREA(ACRES) =      4.98   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        5.0       PEAK FLOW RATE(CFS) =      15.50

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.50  DOWNSTREAM(FEET) =   321.00
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.05
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.50
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   13.62
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.485
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  COMMERCIAL                 D        4.15      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.15      SUBAREA RUNOFF(CFS) =   12.94
  EFFECTIVE AREA(ACRES) =      9.13   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.27
  TOTAL AREA(ACRES) =        9.1       PEAK FLOW RATE(CFS) =      28.19
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.1  TC(MIN.) =     13.62
  EFFECTIVE AREA(ACRES) =      9.13  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.272
  PEAK FLOW RATE(CFS)   =      28.19
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "B"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBEXB.DAT
  TIME/DATE OF STUDY: 13:53 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =   10.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.022
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    2.93
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   11.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.787
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    9.32
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      13.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.24
  FLOW VELOCITY(FEET/SEC.) =  4.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   17.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.45
  STREET FLOW TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =   12.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.711
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    5.23
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =      18.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     24.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  320.00
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.51
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.11
    SPLIT DEPTH(FEET) =    0.36   SPLIT FLOOD WIDTH(FEET) =   13.07
    SPLIT FLOW(CFS) =    6.98   SPLIT VELOCITY(FEET/SEC.) =    4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.32
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =   13.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.566
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.72      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.72      SUBAREA RUNOFF(CFS) =    8.68
  EFFECTIVE AREA(ACRES) =      8.31    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        8.3        PEAK FLOW RATE(CFS) =      26.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.11   DEPTH*VELOCITY(FT*FT/SEC.) =   2.32
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     25.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  320.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.42
    ***STREET FLOWING FULL***
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.47   Tc(MIN.) =   13.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.495
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      8.50    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        8.5        PEAK FLOW RATE(CFS) =      26.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.88
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     26.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.5  TC(MIN.) =     13.55
  EFFECTIVE AREA(ACRES) =      8.50  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.363
  PEAK FLOW RATE(CFS)   =      26.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "C"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBEXC.DAT
  TIME/DATE OF STUDY: 11:40 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    339.00  DOWNSTREAM(FEET) =    328.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.157
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    91    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    6.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.436
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.34      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.10
  FLOW VELOCITY(FEET/SEC.) =  3.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
```

```
  LONGEST FLOWPATH FROM NODE     30.00 TO NODE     32.00 =     500.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      6.27
  EFFECTIVE AREA(ACRES) =      0.54  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       2.63
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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____________________________________________________________________________
****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development                               *
* Existing Condition - Area "D"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBEXD.DAT
  TIME/DATE OF STUDY: 08:06 02/27/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.00  DOWNSTREAM(FEET) =    342.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.959
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.596
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    91    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.26
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      3.26

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  329.50
  STREET LENGTH(FEET) =   400.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   15.21
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.90
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    7.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.952
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        3.19      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    3.19      SUBAREA RUNOFF(CFS) =   14.16
  EFFECTIVE AREA(ACRES) =      3.84    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      17.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.25   DEPTH*VELOCITY(FT*FT/SEC.) =   2.38
```

```
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  329.50  DOWNSTREAM ELEVATION(FEET) =  323.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

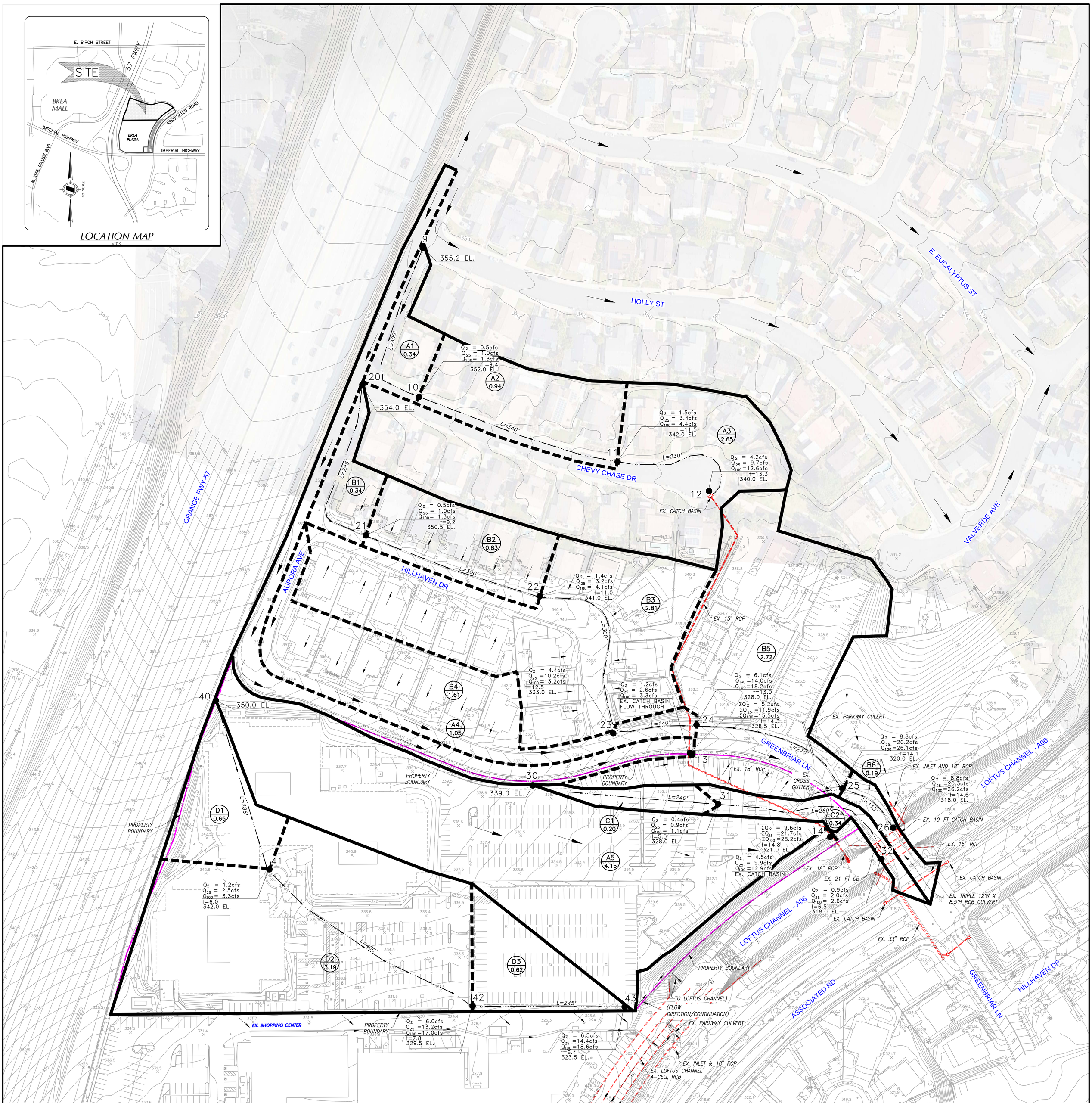
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.33
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.65
    SPLIT DEPTH(FEET) =    0.33   SPLIT FLOOD WIDTH(FEET) =   11.04
    SPLIT FLOW(CFS) =    4.22   SPLIT VELOCITY(FEET/SEC.) =    3.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.25
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.642
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.62      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.58
  EFFECTIVE AREA(ACRES) =      4.46    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        4.5        PEAK FLOW RATE(CFS) =      18.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.65   DEPTH*VELOCITY(FT*FT/SEC.) =   2.11
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     930.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        4.5  TC(MIN.) =      8.25
  EFFECTIVE AREA(ACRES) =      4.46  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =      18.55
============================================================================
```

```
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- PEAK FLOW RATE / TIME OF CONCENTRATION
- PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- SOIL GROUP

SCALE: 1"=50'

50 25 0 50 150

PREPARED BY:

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HYDROLOGY MAP
GREENBRIAR - BREA
EXISTING CONDITION
CITY OF BREA

WO: 3916-839
HYDROLOGY MAP FOR GREENBRIAR - BREA

DATE: Jan. 28, 2025 09:52:48 AM FILE: F:\1285\Engineering\SY_Hydrology\Greenbriar Existing Hydrology.dwg

SECTION III
PROPOSED CONDITION HYDROLOGY CALCULATIONS &MAP

A. 2-YEAR STORM

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2016 Advanced Engineering Software (aes)
              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "A"                                            *
* 2-year Storm                                                             *
 ***************************************************************************

  FILE NAME: GBPRA.DAT
  TIME/DATE OF STUDY: 14:56 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.50  DOWNSTREAM(FEET) =    344.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.368
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.173
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    57    5.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   344.30  DOWNSTREAM(FEET) =   342.70
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.33
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.61
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.61
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.119
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.60
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       0.92

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.70  DOWNSTREAM(FEET) =   341.10
```

```
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.92
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.057
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.63   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.15

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.10  DOWNSTREAM(FEET) =   340.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.15
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.07
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.025
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.54
  EFFECTIVE AREA(ACRES) =      0.93   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.67

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.30  DOWNSTREAM(FEET) =   339.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.67
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.21
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.000
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.09      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.16
  EFFECTIVE AREA(ACRES) =      1.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       1.81

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.30  DOWNSTREAM(FEET) =   337.70
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.81
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     525.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.45
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.956
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.33      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      1.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       2.34

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.70  DOWNSTREAM(FEET) =   337.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.34
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.62
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.927
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.17      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =      1.52   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       2.59

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.30  DOWNSTREAM(FEET) =   336.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.59
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    6.90
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     18.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.882
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.42      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      1.94   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       3.23

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   336.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.04
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     19.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.04
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.859
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.74      0.20     0.200    57
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      2.68   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       4.40

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.00  DOWNSTREAM(FEET) =   335.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.40
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    7.30
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     20.00 =     775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.30
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.822
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       0.14      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.23
  EFFECTIVE AREA(ACRES) =      2.82   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       4.53

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.30  DOWNSTREAM(FEET) =   334.80
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.53
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.803
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D       0.30      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      3.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =       4.96

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.80  DOWNSTREAM(FEET) =   334.30
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    7.58
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     22.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.58
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.783
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D       0.62      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    0.97
  EFFECTIVE AREA(ACRES) =      3.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.7       PEAK FLOW RATE(CFS) =       5.88

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.30  DOWNSTREAM(FEET) =   334.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.65
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.65
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.774
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      3.85   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       6.02

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.00  DOWNSTREAM(FEET) =   333.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.02
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     24.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.758
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.46
  EFFECTIVE AREA(ACRES) =      4.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.1       PEAK FLOW RATE(CFS) =       6.43

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.50  DOWNSTREAM(FEET) =   332.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.43
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.90
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.741
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.39      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.39      SUBAREA RUNOFF(CFS) =    0.60
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.90  DOWNSTREAM(FEET) =   332.40
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
```

```
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.95
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.735
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.17
  EFFECTIVE AREA(ACRES) =      4.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =       7.11

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.40  DOWNSTREAM(FEET) =   331.60
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.11
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    1060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.05
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.723
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =       7.51

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.60  DOWNSTREAM(FEET) =   330.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.51
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     28.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.710
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.35      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.53
  EFFECTIVE AREA(ACRES) =      5.30   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =       7.98

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.50  DOWNSTREAM(FEET) =   329.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.98
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     29.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
```

```
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.20
  EFFECTIVE AREA(ACRES) =      5.43   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =       8.15

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.70  DOWNSTREAM(FEET) =   328.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.15
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.28
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.28
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.695
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.51
  EFFECTIVE AREA(ACRES) =      5.77   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =       8.61

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.30  DOWNSTREAM(FEET) =   327.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.61
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =    1245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.12      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.18
  EFFECTIVE AREA(ACRES) =      5.89   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =       8.71

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.679
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      6.23   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.2       PEAK FLOW RATE(CFS) =       9.21

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.40  DOWNSTREAM(FEET) =   327.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.21
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.55
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     32.00 =    1295.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.664
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      6.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.6       PEAK FLOW RATE(CFS) =       9.62

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.00  DOWNSTREAM(FEET) =   326.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.62
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    8.88
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.88
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.628
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.17      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.24
  EFFECTIVE AREA(ACRES) =      6.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =       9.65

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.30  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.65
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     36.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.600
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.18
  EFFECTIVE AREA(ACRES) =      6.87   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =       9.67

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.09
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.67
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.29
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.29
  RAINFALL INTENSITY(INCH/HR) =   1.59
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       6.87
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.67

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    342.00  DOWNSTREAM(FEET) =    341.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.128
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.602
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 D        0.37      0.20     0.200    57    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      0.52

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.40  DOWNSTREAM(FEET) =   339.10
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.52
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.67
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.67
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.551
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.28      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       0.88

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.10  DOWNSTREAM(FEET) =   336.40
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.88
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.15
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.29      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.40  DOWNSTREAM(FEET) =   334.20
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.54
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   10.54
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.475
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.28      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.36
  EFFECTIVE AREA(ACRES) =      1.22   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       1.58

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.20  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.58
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.91
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.447
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.25      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.32
  EFFECTIVE AREA(ACRES) =      1.47   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.90  DOWNSTREAM(FEET) =   327.60
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     46.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.58
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.398
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.69      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       2.64

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.60  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.64
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.72
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.72
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.388
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.05      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.06
  EFFECTIVE AREA(ACRES) =      2.21   AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       2.68

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.13
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.68
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     48.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.78
  RAINFALL INTENSITY(INCH/HR) =   1.38
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.68

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.67    9.29    1.586  0.20( 0.04) 0.18       6.9      10.00
      2        2.68   11.78    1.384  0.20( 0.04) 0.20       2.2      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.10    9.29    1.586  0.20( 0.04) 0.18       8.6      10.00
      2       11.09   11.78    1.384  0.20( 0.04) 0.19       9.1      40.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.10    Tc(MIN.) =     9.29
  EFFECTIVE AREA(ACRES) =       8.61   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.90  DOWNSTREAM(FEET) =   325.40
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     49.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.573
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =      8.93   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.4       PEAK FLOW RATE(CFS) =      12.35

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.40  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.35
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     58.00 =    1645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.65
  RAINFALL INTENSITY(INCH/HR) =   1.55
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       8.93
  TOTAL STREAM AREA(ACRES) =       9.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.35

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.571
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    57    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =   11.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.405
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    1.10
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       1.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.47
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   1.79   Tc(MIN.) =   13.26
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.293
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    2.85
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =       4.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  13.68
  FLOW VELOCITY(FEET/SEC.) =  2.34   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   329.00
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.00  DOWNSTREAM(FEET) =   326.20
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   14.38
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.38
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.235
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.02      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    1.12
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =       5.13

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.20  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.13
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   15.46
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.46
  RAINFALL INTENSITY(INCH/HR) =   1.18
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =       4.95
  TOTAL STREAM AREA(ACRES) =       4.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.35    9.65    1.552  0.20( 0.04) 0.18       8.9      10.00
      1       11.32   12.15    1.360  0.20( 0.04) 0.19       9.4      40.00
      2        5.13   15.46    1.184  0.20( 0.08) 0.42       4.9      50.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.62    9.65    1.552  0.20( 0.05) 0.24      12.0      10.00
      2       15.99   12.15    1.360  0.20( 0.05) 0.25      13.3      40.00
      3       14.94   15.46    1.184  0.20( 0.05) 0.27      14.3      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.62    Tc(MIN.) =     9.65
  EFFECTIVE AREA(ACRES) =      12.02   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.24
  TOTAL AREA(ACRES) =       14.3
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.
```

```
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =      9.65
  EFFECTIVE AREA(ACRES) =     12.02  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.245
  PEAK FLOW RATE(CFS)   =      16.62

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.62    9.65    1.552  0.20( 0.05) 0.24      12.0      10.00
      2       15.99   12.15    1.360  0.20( 0.05) 0.25      13.3      40.00
      3       14.94   15.46    1.184  0.20( 0.05) 0.27      14.3      50.00
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "B"                                            *
* 2-year Storm                                                             *
 ****************************************************************************

  FILE NAME: GBPRB.DAT
  TIME/DATE OF STUDY: 14:41 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.597
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    57    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   10.96
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.443
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       1.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.17
  FLOW VELOCITY(FEET/SEC.) =  3.06   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =   12.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.340
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    3.14
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =       4.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     63.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.55   Tc(MIN.) =   13.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.307
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    1.75
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =       6.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  4.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     64.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.40
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =   14.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.224
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.46      SUBAREA RUNOFF(CFS) =    2.66
  EFFECTIVE AREA(ACRES) =      8.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =        8.1        PEAK FLOW RATE(CFS) =       8.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.39
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.63
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     65.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.1  TC(MIN.) =     14.60
  EFFECTIVE AREA(ACRES) =      8.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.378
  PEAK FLOW RATE(CFS)   =       8.32
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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****************************************************************************
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "C"                                            *
* 2-year Storm                                                             *
 ***************************************************************************

  FILE NAME: GBPRC.DAT
  TIME/DATE OF STUDY: 16:39 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    318.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.42
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.42
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      6.31
  EFFECTIVE AREA(ACRES) =      0.24  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.42
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B. 25-YEAR STORM

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____________________________________________________________________________
****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea              *
* Proposed Condition - Area "A"                                           *
* 25-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBPRA.DAT
  TIME/DATE OF STUDY: 14:57 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.50  DOWNSTREAM(FEET) =    344.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.368
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.633
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.71
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.71

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   344.30  DOWNSTREAM(FEET) =   342.70
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.71
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.56
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.30
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       1.99

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.70  DOWNSTREAM(FEET) =   341.10
```

```
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.80
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.435
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      0.63   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.50

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.10  DOWNSTREAM(FEET) =   340.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.50
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.380
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.17
  EFFECTIVE AREA(ACRES) =      0.93   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.64

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.30  DOWNSTREAM(FEET) =   339.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.04
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.336
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.09      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.35
  EFFECTIVE AREA(ACRES) =      1.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       3.95

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.30  DOWNSTREAM(FEET) =   337.70
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.95
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.23
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     525.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.258
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.33      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.25
  EFFECTIVE AREA(ACRES) =      1.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       5.13

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.70  DOWNSTREAM(FEET) =   337.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.13
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.37
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.37
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.206
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.17      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.64
  EFFECTIVE AREA(ACRES) =      1.52   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       5.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.30  DOWNSTREAM(FEET) =   336.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.71
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    6.60
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     18.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.123
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.42      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.54
  EFFECTIVE AREA(ACRES) =      1.94   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       7.14

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   336.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.14
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.72
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     19.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.082
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.74      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      2.68   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       9.76

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.00  DOWNSTREAM(FEET) =   335.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.76
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    6.93
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     20.00 =     775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.011
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      2.82   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      10.09

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.30  DOWNSTREAM(FEET) =   334.80
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.09
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.04
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.975
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      3.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =      11.06

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.80  DOWNSTREAM(FEET) =   334.30
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.06
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.16
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     22.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.937
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.62      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.17
  EFFECTIVE AREA(ACRES) =      3.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.7       PEAK FLOW RATE(CFS) =      13.13

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.30  DOWNSTREAM(FEET) =   334.00
```

```
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.60
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.13
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.21
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.21
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.920
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      3.85   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      13.46

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.00  DOWNSTREAM(FEET) =   333.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.40
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.46
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.32
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     24.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.889
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =      4.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.1       PEAK FLOW RATE(CFS) =      14.39

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.50  DOWNSTREAM(FEET) =   332.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.39
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.42
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.42
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.857
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.39      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.39      SUBAREA RUNOFF(CFS) =    1.34
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      15.61

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.90  DOWNSTREAM(FEET) =   332.40
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.61
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.47
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    7.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.844
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      4.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      15.94

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.40  DOWNSTREAM(FEET) =   331.60
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.25
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.94
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.55
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    1060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.821
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.02
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      16.86

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.60  DOWNSTREAM(FEET) =   330.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.86
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     28.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.797
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.35      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      5.30   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      17.94

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.50  DOWNSTREAM(FEET) =   329.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.14
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.94
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     29.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.785
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =      5.43   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      18.32
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.70  DOWNSTREAM(FEET) =   328.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.89
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.74
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.767
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.14
  EFFECTIVE AREA(ACRES) =      5.77   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      19.37

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.30  DOWNSTREAM(FEET) =   327.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.37
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.85
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =    1245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.737
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.12      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      5.89   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =      19.62

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.737
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.13
  EFFECTIVE AREA(ACRES) =      6.23   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.2       PEAK FLOW RATE(CFS) =      20.75

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.40  DOWNSTREAM(FEET) =   327.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.75
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.96
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     32.00 =    1295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.96
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.707
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.12
  EFFECTIVE AREA(ACRES) =      6.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.6       PEAK FLOW RATE(CFS) =      21.71

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.00  DOWNSTREAM(FEET) =   326.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.71
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.24
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.637
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.17      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.55
  EFFECTIVE AREA(ACRES) =      6.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      21.84

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.30  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.84
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     36.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.583
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.42
  EFFECTIVE AREA(ACRES) =      6.87   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.93
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.57
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.57
  RAINFALL INTENSITY(INCH/HR) =   3.56
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       6.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    342.00  DOWNSTREAM(FEET) =    341.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.128
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                 D        0.37      0.20     0.200    75    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.40  DOWNSTREAM(FEET) =   339.10
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.13
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.55
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.344
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.28      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.83
  EFFECTIVE AREA(ACRES) =      0.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.93

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.10  DOWNSTREAM(FEET) =   336.40
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.93
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    9.93
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.29      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      0.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.73

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.40  DOWNSTREAM(FEET) =   334.20
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.73
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.213
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.28      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =      1.22   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       3.48
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.20  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.48
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.54
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.25      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      1.47   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       4.13

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.90  DOWNSTREAM(FEET) =   327.60
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.87
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.13
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   11.07
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     46.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.076
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.69      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    1.89
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       5.90

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.60  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.90
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.05      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.14
  EFFECTIVE AREA(ACRES) =      2.21   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       6.00

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.00
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     48.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.24
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.93    8.57    3.555  0.20( 0.04) 0.18       6.9      10.00
      2        6.00   11.24    3.049  0.20( 0.04) 0.20       2.2      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.27    8.57    3.555  0.20( 0.04) 0.18       8.6      10.00
      2       24.78   11.24    3.049  0.20( 0.04) 0.19       9.1      40.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.27    Tc(MIN.) =     8.57
  EFFECTIVE AREA(ACRES) =       8.56   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.90  DOWNSTREAM(FEET) =   325.40
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.27
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     49.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.69
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.529
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      8.88   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.4       PEAK FLOW RATE(CFS) =      27.89

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.40  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.60
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.89
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.88
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     58.00 =    1645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.88
  RAINFALL INTENSITY(INCH/HR) =   3.49
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       8.88
  TOTAL STREAM AREA(ACRES) =       9.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.89

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.365
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    75    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =   11.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.62
  FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   16.43
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =   12.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.852
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    6.56
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =       9.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   329.00
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.73
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   13.44
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.00  DOWNSTREAM(FEET) =   326.20
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.73
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   13.59
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   13.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.739
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.02      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      11.83

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.20  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.09
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.83
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   14.48
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.48
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =       4.95
  TOTAL STREAM AREA(ACRES) =       4.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.89    8.88    3.486  0.20( 0.04) 0.18       8.9      10.00
      1       25.34   11.55    3.003  0.20( 0.04) 0.19       9.4      40.00
      2       11.83   14.48    2.643  0.20( 0.08) 0.42       4.9      50.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       37.53    8.88    3.486  0.20( 0.05) 0.24      11.9      10.00
      2       36.10   11.55    3.003  0.20( 0.05) 0.25      13.3      40.00
      3       34.09   14.48    2.643  0.20( 0.05) 0.27      14.3      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.53    Tc(MIN.) =     8.88
  EFFECTIVE AREA(ACRES) =      11.91   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.24
  TOTAL AREA(ACRES) =       14.3
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =      8.88
  EFFECTIVE AREA(ACRES) =      11.91  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.244
  PEAK FLOW RATE(CFS)   =      37.53

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       37.53    8.88    3.486  0.20( 0.05) 0.24      11.9      10.00
      2       36.10   11.55    3.003  0.20( 0.05) 0.25      13.3      40.00
      3       34.09   14.48    2.643  0.20( 0.05) 0.27      14.3      50.00
```

==========
==========
END OF RATIONAL METHOD ANALYSIS

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____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "B"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBPRB.DAT
  TIME/DATE OF STUDY: 14:42 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.419
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    2.27
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.21
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.04
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =   11.94
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.947
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    7.20
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      10.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.51
  FLOW VELOCITY(FEET/SEC.) =  4.46   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     63.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.13
  STREET FLOW TRAVEL TIME(MIN.) =   0.45   Tc(MIN.) =   12.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.886
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    4.04
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =      14.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.63
  FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     64.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.01
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.79
    SPLIT DEPTH(FEET) =    0.28   SPLIT FLOOD WIDTH(FEET) =    8.61
    SPLIT FLOW(CFS) =    2.47   SPLIT VELOCITY(FEET/SEC.) =    3.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   13.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.723
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.46      SUBAREA RUNOFF(CFS) =    5.98
  EFFECTIVE AREA(ACRES) =      8.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =        8.1        PEAK FLOW RATE(CFS) =      19.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     65.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.1  TC(MIN.) =     13.73
  EFFECTIVE AREA(ACRES) =      8.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.378
  PEAK FLOW RATE(CFS)   =      19.18
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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****************************************************************************
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "C"                                            *
* 25-year Storm                                                            *
 ****************************************************************************

  FILE NAME: GBPRC.DAT
  TIME/DATE OF STUDY: 16:39 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    318.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.228
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.91
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      6.31
  EFFECTIVE AREA(ACRES) =      0.24  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       0.91
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

C. 100-YEAR STORM

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****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea              *
* Proposed Condition - Area "A"                                           *
* 100-year Storm                                                          *
 ***************************************************************************

  FILE NAME: GBPRA.DAT
  TIME/DATE OF STUDY: 14:58 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    350.50  DOWNSTREAM(FEET) =    344.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.368
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.940
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   344.30  DOWNSTREAM(FEET) =   342.70
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.91
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    5.55
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.55
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.830
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.67
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       2.56

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   342.70  DOWNSTREAM(FEET) =   341.10
```

```
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.56
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    5.77
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     13.00 =     355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.77
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.72
  EFFECTIVE AREA(ACRES) =      0.63   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.22

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.10  DOWNSTREAM(FEET) =   340.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.22
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.634
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.51
  EFFECTIVE AREA(ACRES) =      0.93   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       4.69

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.30  DOWNSTREAM(FEET) =   339.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.69
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.99
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     15.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.99
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.579
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.09      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      1.02   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.30  DOWNSTREAM(FEET) =   337.70
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.09
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.17
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     16.00 =     525.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.484
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.33      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.62
  EFFECTIVE AREA(ACRES) =      1.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       6.62

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.70  DOWNSTREAM(FEET) =   337.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.30
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     17.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.419
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.17      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.83
  EFFECTIVE AREA(ACRES) =      1.52   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       7.37

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   337.30  DOWNSTREAM(FEET) =   336.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.37
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    6.52
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     18.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.315
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.42      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =      1.94   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        1.9       PEAK FLOW RATE(CFS) =       9.22

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.50  DOWNSTREAM(FEET) =   336.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.22
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.63
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     19.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.63
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.264
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.74      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.74      SUBAREA RUNOFF(CFS) =    3.48
```

```
  EFFECTIVE AREA(ACRES) =      2.68   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =      12.61

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.00  DOWNSTREAM(FEET) =   335.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.61
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     20.00 =     775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.174
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.65
  EFFECTIVE AREA(ACRES) =      2.82   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   335.30  DOWNSTREAM(FEET) =   334.80
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.04
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.93
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     21.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.131
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.37
  EFFECTIVE AREA(ACRES) =      3.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =      14.31

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.80  DOWNSTREAM(FEET) =   334.30
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.31
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.05
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     22.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.081
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.62      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.62      SUBAREA RUNOFF(CFS) =    2.81
  EFFECTIVE AREA(ACRES) =      3.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.7       PEAK FLOW RATE(CFS) =      16.98

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.30  DOWNSTREAM(FEET) =   334.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.98
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.10
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.060
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      3.85   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      17.41

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.00  DOWNSTREAM(FEET) =   333.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.41
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.20
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     24.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.022
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.35
  EFFECTIVE AREA(ACRES) =      4.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.1       PEAK FLOW RATE(CFS) =      18.62

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   333.50  DOWNSTREAM(FEET) =   332.90
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.62
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.30
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     25.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.983
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.39      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.39      SUBAREA RUNOFF(CFS) =    1.73
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      20.21

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.90  DOWNSTREAM(FEET) =   332.40
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.06
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.21
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     26.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.49
  EFFECTIVE AREA(ACRES) =      4.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      20.63

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   332.40  DOWNSTREAM(FEET) =   331.60
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.92
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.63
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     27.00 =    1060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.937
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.30      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      21.83

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.60  DOWNSTREAM(FEET) =   330.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.57
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.83
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     28.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.908
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.35      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.53
  EFFECTIVE AREA(ACRES) =      5.30   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      23.23

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   330.50  DOWNSTREAM(FEET) =   329.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.23
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     29.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.54
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.891
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      5.43   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      23.73

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.70  DOWNSTREAM(FEET) =   328.30
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.46
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.60
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     30.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.869
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.48
  EFFECTIVE AREA(ACRES) =      5.77   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      25.10

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   328.30  DOWNSTREAM(FEET) =   327.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.10
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     31.00 =    1245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.831
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.12      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      5.89   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.831
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      6.23   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.2       PEAK FLOW RATE(CFS) =      26.88

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.40  DOWNSTREAM(FEET) =   327.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.83
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.88
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.81
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     32.00 =    1295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.81
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.793
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.34      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.45
  EFFECTIVE AREA(ACRES) =      6.57   AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.6       PEAK FLOW RATE(CFS) =      28.13

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.00  DOWNSTREAM(FEET) =   326.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.16
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.13
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     35.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.705
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.17      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.71
  EFFECTIVE AREA(ACRES) =      6.74   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      28.32

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.30  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.32
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    8.27
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     36.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.638
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.13      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.54
  EFFECTIVE AREA(ACRES) =      6.87   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        6.9       PEAK FLOW RATE(CFS) =      28.45

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.45
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.38
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       6.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.45

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    342.00  DOWNSTREAM(FEET) =    341.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.128
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.382
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  D        0.37      0.20     0.200    91    9.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   341.40  DOWNSTREAM(FEET) =   339.10
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.45
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.277
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  D        0.28      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      0.65   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.48

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   339.10  DOWNSTREAM(FEET) =   336.40
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.88
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.188
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  D        0.29      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      0.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   336.40  DOWNSTREAM(FEET) =   334.20
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.51
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.17
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.118
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  D        0.28      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.03
  EFFECTIVE AREA(ACRES) =      1.22   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       4.48

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   334.20  DOWNSTREAM(FEET) =   331.90
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.48
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     45.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.44
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.057
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.25      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.90
  EFFECTIVE AREA(ACRES) =      1.47   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       5.31

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   331.90  DOWNSTREAM(FEET) =   327.60
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.31
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     46.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.94
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.950
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.69      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    2.43
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.60

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   327.60  DOWNSTREAM(FEET) =   326.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.60
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.927
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.05      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.18
  EFFECTIVE AREA(ACRES) =      2.21   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.73

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.00  DOWNSTREAM(FEET) =   325.90
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       7.73
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     48.00 =     995.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.10
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.21
  TOTAL STREAM AREA(ACRES) =       2.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.73

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.45    8.38    4.603  0.20( 0.04) 0.18       6.9      10.00
      2        7.73   11.10    3.918  0.20( 0.04) 0.20       2.2      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.32    8.38    4.603  0.20( 0.04) 0.18       8.5      10.00
      2       31.91   11.10    3.918  0.20( 0.04) 0.19       9.1      40.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.32    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       8.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     48.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.90  DOWNSTREAM(FEET) =   325.40
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.60
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.32
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     49.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.570
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 D        0.32      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.30
  EFFECTIVE AREA(ACRES) =      8.86   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =        9.4       PEAK FLOW RATE(CFS) =      36.14

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   325.40  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.14
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     58.00 =    1645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.66
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =       8.86
  TOTAL STREAM AREA(ACRES) =       9.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.14

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    355.20  DOWNSTREAM(FEET) =    352.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.445
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.298
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    91    9.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  352.00  DOWNSTREAM ELEVATION(FEET) =  342.00
  STREET LENGTH(FEET) =   340.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   11.11
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.916
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.94      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    3.23
  EFFECTIVE AREA(ACRES) =      1.28    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.74
  FLOW VELOCITY(FEET/SEC.) =  3.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.22
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  342.00  DOWNSTREAM ELEVATION(FEET) =  340.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.64
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.77
    SPLIT DEPTH(FEET) =    0.16   SPLIT FLOOD WIDTH(FEET) =    1.55
    SPLIT FLOW(CFS) =    0.23   SPLIT VELOCITY(FEET/SEC.) =    1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   12.49
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.661
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.65      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.65      SUBAREA RUNOFF(CFS) =    8.49
  EFFECTIVE AREA(ACRES) =      3.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.9        PEAK FLOW RATE(CFS) =      12.60

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   340.00  DOWNSTREAM(FEET) =   329.00
  FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.60
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     54.00 =    1300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   329.00  DOWNSTREAM(FEET) =   326.20
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.60
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     55.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.02      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.22
  EFFECTIVE AREA(ACRES) =      4.95   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        4.9       PEAK FLOW RATE(CFS) =      15.34

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   326.20  DOWNSTREAM(FEET) =   325.00
  FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.34
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   14.15
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.15
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =       4.95
  TOTAL STREAM AREA(ACRES) =       4.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       36.14    8.66    4.516  0.20( 0.04) 0.18       8.9      10.00
      1       32.65   11.39    3.861  0.20( 0.04) 0.19       9.4      40.00
      2       15.34   14.15    3.408  0.20( 0.08) 0.42       4.9      50.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.66    8.66    4.516  0.20( 0.05) 0.24      11.9      10.00
      2       46.67   11.39    3.861  0.20( 0.05) 0.25      13.4      40.00
      3       44.13   14.15    3.408  0.20( 0.05) 0.27      14.3      50.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.66    Tc(MIN.) =     8.66
  EFFECTIVE AREA(ACRES) =      11.89   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.24
  TOTAL AREA(ACRES) =       14.3
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     58.00 =    1660.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.3  TC(MIN.) =      8.66
  EFFECTIVE AREA(ACRES) =     11.89  AREA-AVERAGED Fm(INCH/HR)=  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.244
  PEAK FLOW RATE(CFS)   =      48.66

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
     1       48.66    8.66    4.516  0.20( 0.05) 0.24      11.9      10.00
     2       46.67   11.39    3.861  0.20( 0.05) 0.25      13.4      40.00
     3       44.13   14.15    3.408  0.20( 0.05) 0.27      14.3      50.00
==========================================================================
==========================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
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 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "B"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBPRB.DAT
  TIME/DATE OF STUDY: 14:43 01/23/2025
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    354.00  DOWNSTREAM(FEET) =    350.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.34      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  350.50  DOWNSTREAM ELEVATION(FEET) =  341.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =   10.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.022
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.83      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.83      SUBAREA RUNOFF(CFS) =    2.93
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
```
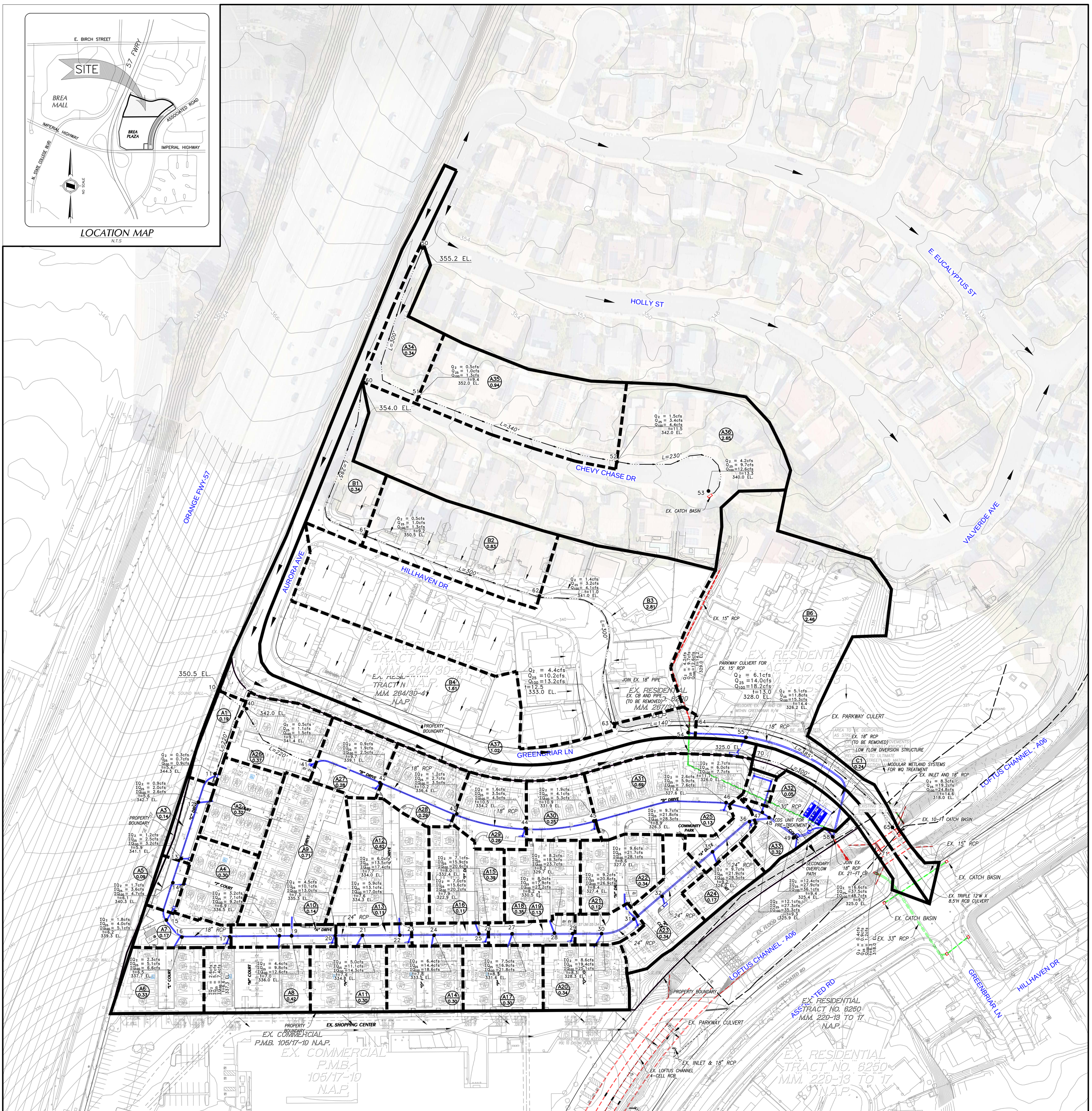

```
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     62.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  341.00  DOWNSTREAM ELEVATION(FEET) =  333.00
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   11.78
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.787
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        2.81      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.81      SUBAREA RUNOFF(CFS) =    9.32
  EFFECTIVE AREA(ACRES) =      3.98    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      13.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.24
  FLOW VELOCITY(FEET/SEC.) =  4.73   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     63.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  333.00  DOWNSTREAM ELEVATION(FEET) =  328.00
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   17.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.45
  STREET FLOW TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =   12.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.711
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.61      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.61      SUBAREA RUNOFF(CFS) =    5.23
  EFFECTIVE AREA(ACRES) =      5.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        5.6        PEAK FLOW RATE(CFS) =      18.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  5.61   DEPTH*VELOCITY(FT*FT/SEC.) =   2.54
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     64.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  328.00  DOWNSTREAM ELEVATION(FEET) =  318.00
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      22.02
```

```
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.45   FLOOD WIDTH(FEET) =   18.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    4.79
    SPLIT DEPTH(FEET) =    0.38   SPLIT FLOOD WIDTH(FEET) =   13.79
    SPLIT FLOW(CFS) =    7.48   SPLIT VELOCITY(FEET/SEC.) =    4.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   13.54
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.496
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.46      SUBAREA RUNOFF(CFS) =    7.70
  EFFECTIVE AREA(ACRES) =      8.05    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =        8.1        PEAK FLOW RATE(CFS) =      24.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  4.79   DEPTH*VELOCITY(FT*FT/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE     60.00 TO NODE     65.00 =    1420.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.1  TC(MIN.) =     13.54
  EFFECTIVE AREA(ACRES) =      8.05  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.378
  PEAK FLOW RATE(CFS)   =      24.78
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
____________________________________________________________________________
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2016 Advanced Engineering Software (aes)
              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* Hydrology Study for Greenbriar Development in City of Brea               *
* Proposed Condition - Area "C"                                            *
* 100-year Storm                                                           *
 ***************************************************************************

  FILE NAME: GBPRC.DAT
  TIME/DATE OF STUDY: 16:37 07/02/2024
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   35.0     20.0    0.018/0.018/0.020   0.50    2.00 0.0312 0.167 0.0150
  2   18.0     13.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   55.0     45.0    0.011/0.011/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    325.00  DOWNSTREAM(FEET) =    318.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      1.17
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.2  TC(MIN.) =      6.31
  EFFECTIVE AREA(ACRES) =      0.24  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)   =       1.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 — NODE NUMBER
- A / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN (TO BE REMOVED)
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- D — SOIL GROUP

SCALE: 1"=50'

50 25 0 50 150

NOTE: THE PROPOSED STORM DRAIN PIPE SIZES ARE APPROXIMATE AND SUBJECT TO CHANGE DURING THE FINAL DESIGN

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92618
(949) 349-8000

HYDROLOGY MAP
GREENBRIAR - BREA
PROPOSED CONDITION
CITY OF BREA

WO: 3916-89X
HYDROLOGY MAP FOR GREENBRIAR - BREA

DATE: Jan. 28, 2025 09:54:23 AM FILE: F:\1285\Engineering\SY_Hydrology\Greenbriar Proposed Hydrology.dwg

SECTION IV
EXISTING STORM DRAIN CAPACITY CALCULATIONS

A. EXISTING 18” STORM DRAIN

Ex 18" RCP Capacity Calculations

Project Description	
Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.100 ft/ft
Normal Depth	18.0 in
Diameter	18.0 in
Discharge	33.22 cfs

25-YEAR FLOW RATE IS 37.4 CFS. PRESSURED FLOW CALCULATIONS BY APPLYING WSPG PROGRAM WILL BE PERFORMED DUING THE FINAL WHEN DESIGN INFORMATION AVAILABLE.

Results	
Discharge	33.22 cfs
Normal Depth	18.0 in
Flow Area	1.8 ft²
Wetted Perimeter	4.7 ft
Hydraulic Radius	4.5 in
Top Width	0.00 ft
Critical Depth	17.9 in
Percent Full	100.0 %
Critical Slope	0.096 ft/ft
Velocity	18.80 ft/s
Velocity Head	5.49 ft
Specific Energy	6.99 ft
Froude Number	(N/A)
Maximum Discharge	35.73 cfs
Discharge Full	33.22 cfs
Slope Full	0.100 ft/ft
Flow Type	Undefined

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	100.0 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	18.0 in
Critical Depth	17.9 in
Channel Slope	0.100 ft/ft
Critical Slope	0.096 ft/ft

B. CATCH BASIN CAPACITY

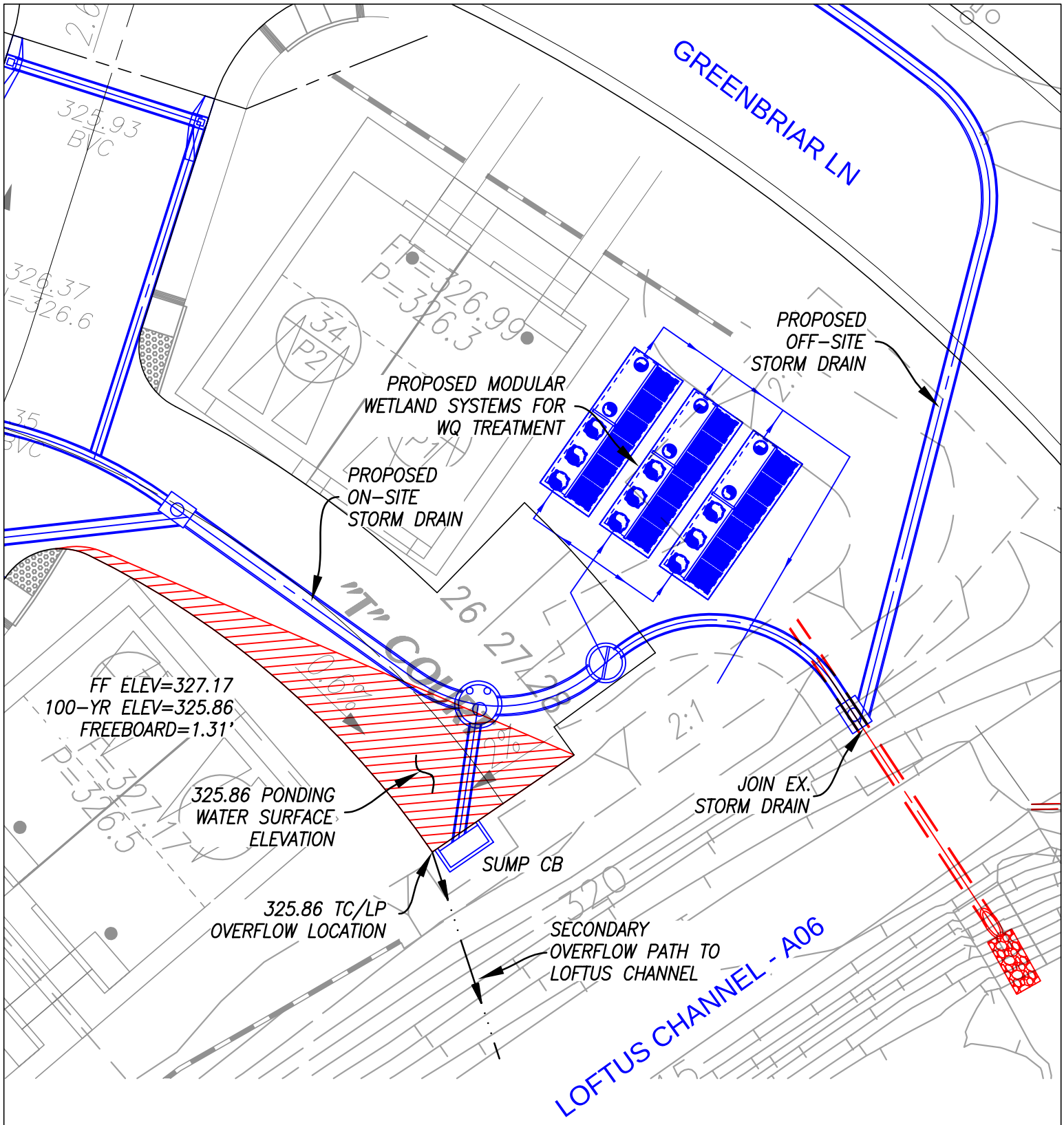
Hunsaker & Associates Irvine, Inc. DATE: 01/28/25
Greernbriar Ln at Loftus Channel BY: G. Guan

There are two existing catch basins (1-10' catch basin and 1-21' catch basin) with total catch basin opening of 31'

Curb Opening (Sump)

Given:	(a) discharge Q25	=	26.0	c.f.s.	100-year flow rate: 24.8 cfs from Area "B" 1.2 cfs from Area "C"
				Total	26 cfs
	(b) 8" curb				
Solution:					
	H (depth at opening)	=	0.67	'	
	L = Q/3.087H^3/2	=	15.36	'	(Required)
Use:					
		L=	31.00	'	(31-ft catch basin opening with existing 10-ft and 21-ft catch basin)
Then:					
		H=	0.4195	'	(Ponding depth)

C. PONDING EXHIBIT



LEGEND

- PROPOSED STORM DRAIN
- PONDING LIMITS
- SECONDARY OVERFLOW PATH

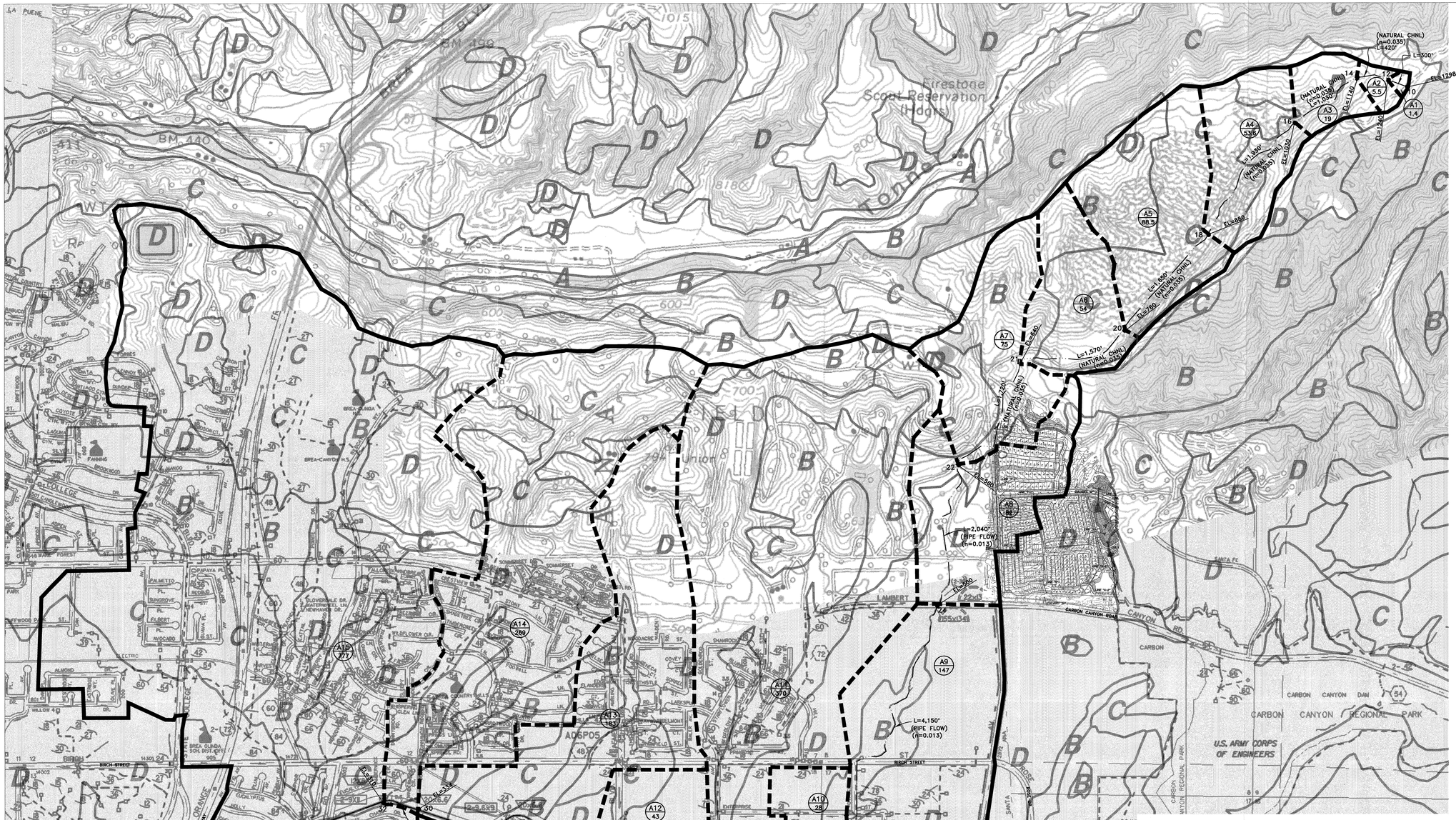
20 10 0 20

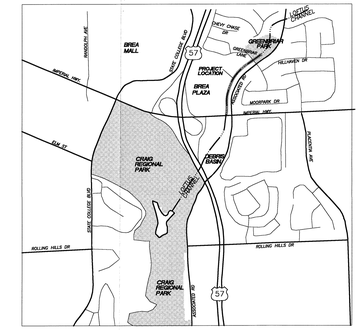
GRAPHIC SCALE 1"=20'

PONDING EXHIBIT
GREENBRIAR - BREA
CITY OF BREA
100-YEAR OVERFLOW

SECTION V
REFERENCES

A. LOFTUS CHANNEL HYDROLOGY MAP PREPARED BY HUNSAKER & ASSOCIATES IN 2007





PROJECT LOCATION MAP
N.T.S.

PREPARED FOR:

BOSC EQUITIES
719 Griswold Street, Suite 530
Detroit, MI 48226
Telephone: (313) 965-8204

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

SCALE: 1" = 500'

500 250 0 500 1500
GRAPHIC SCALE 1"=500'

MAP DATE IDENTIFIER
DATE OF ADVICE PUBLIC HEARING MAP
04/30/07 BY: G.G
DATE OF THIS PLOT
05/01/07

LEGEND

10 EL=210	NODE NUMBER
Q_{100}=2,000CFS	100-YEAR HIGH CONFIDENCE PEAK DISCHARGE (IN CFS)
TC=37.0 MIN	TIME OF CONCENTRATION (IN MINUTES)
A	AREA DESIGNATION
1.0	AREA ACREAGE (IN ACRES)
	MAJOR DRAINAGE BOUNDARY
	MINOR DRAINAGE BOUNDARY
	FLOW LINE
	EXISTING STORM DRAIN
B / D	SOIL GROUP BOUNDARY

EXHIBIT 1
HYDROLOGY MAP FOR LOFTUS CHANNEL (A06) AT BREA PLAZA CITY OF BREA

WO: 3210-2
HYDROLOGY MAP LOFTUS CHANNEL

MAY 01 2007

F:\0381\Engineering\SY_Hydrology\hydmap-loftus channel.dwg

B. LOFTUS CHANNEL RCB IMPROVEMENT AT BREA PLAZA PREPARED BY HUNSAKER & ASSOCIATES IN 2008

ORANGE COUNTY
PUBLIC WORKS DEPARTMENT

SANTA ANA, CALIFORNIA

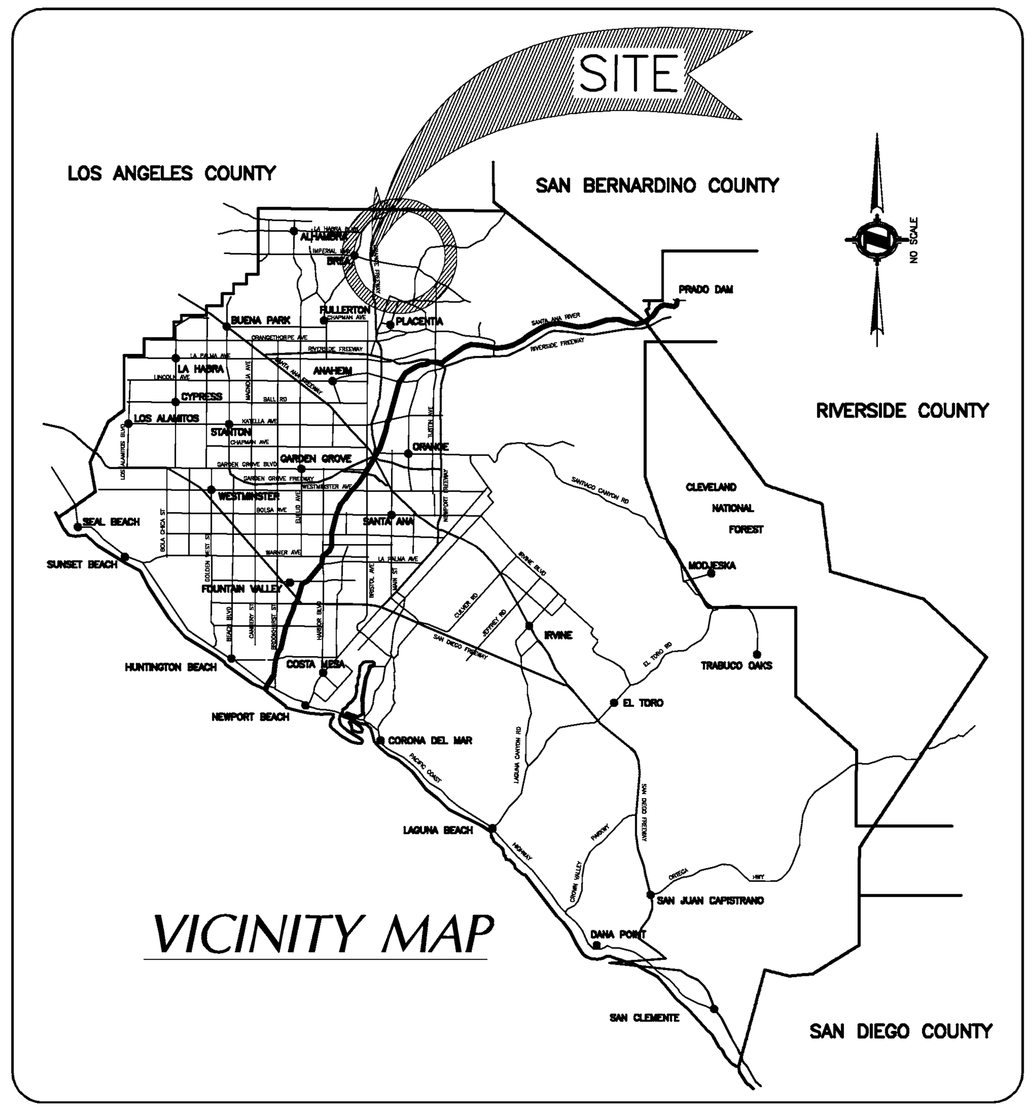
BRYAN SPEEGLE, DIRECTOR

PLANS FOR CONSTRUCTION OF A PORTION OF

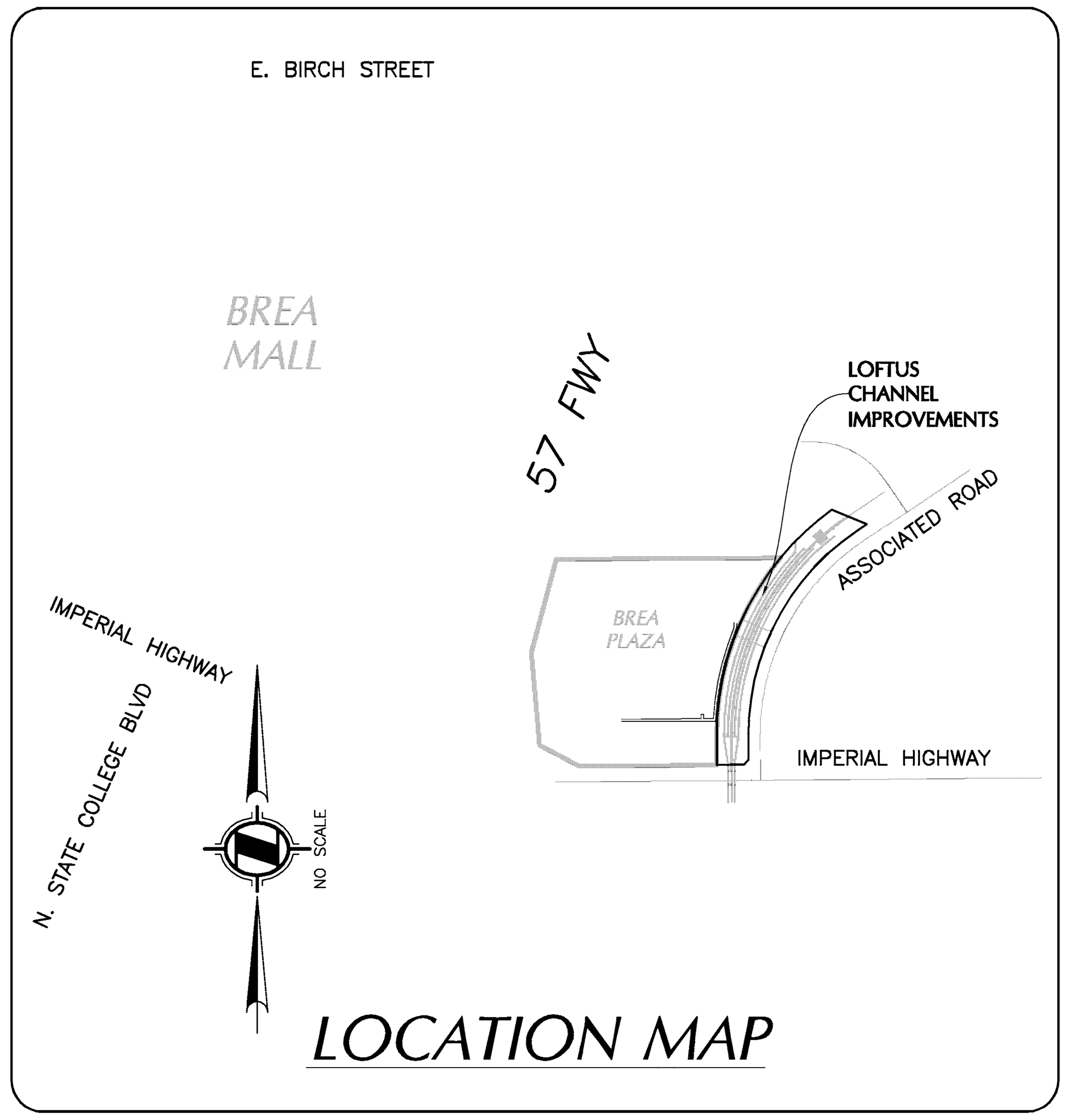
LOFTUS DIVERSION CHANNEL FACILITY A06

FROM: STA. 10+82.00 TO STA. 19+80.00±

IN THE CITY OF BREA, CALIFORNIA



VICINITY MAP



LOCATION MAP

R.C. BOX GENERAL NOTES

1. ALL CONCRETE IN REINFORCED CONCRETE STRUCTURES MUST BE 4000 LBS PER SQUARE INCH IN 28 DAYS; TYPE OF PORTLAND CEMENT CONCRETE PER RECOMMENDATION OF SOILS ENGINEER.
2. ALL CHANNEL AND PIPE LENGTHS ARE HORIZONTAL PROJECTIONS, UNLESS OTHERWISE SHOWN.
3. FOR TRENCH EXCAVATIONS IN NATIVE SOIL, SHORING SHALL BE PROVIDED TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.
4. PIPE CONSTRUCTION IN FILL AREA MUST BE COORDINATED WITH THE GRADING TO INSURE THAT WHEN THE FILL OPERATION HAS BEEN COMPLETED AT GRADE, THERE IS A MINIMUM OF 2 FEET OF FILL ABOVE THE TOP OF PIPE.
5. ALL WORK SHALL CONFORM WITH OCPW STANDARD PLANS AND STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITIONS, COPIES WHICH SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.
6. THE CONTRACTOR MUST NOTIFY THE OCPW INSPECTOR AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION BY TELEPHONING (714) 567–7804 OR BY WRITING THE ORANGE COUNTY PW, ATTN: CONSTRUCTION, 1152 E. FRUIT STREET, SANTA ANA, CA 92701.
7. ALL FILLS MUST BE COMPACTED TO 90% RELATIVE COMPACTION AS DETERMINED BY THE CALIFORNIA TEST METHOD NO. 216, 1978 "FIVE LAYER METHOD." ALL BACKFILL MUST BE FREE OF ORGANIC MATTER.
8. ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT MUST BE PROVIDED BY THE CONTRACTOR OR DEVELOPER, AND SUFFICIENT REFERENCE STAKING MUST BE IN ACCORDANCE WITH THE REQUEST OF THE OCPW INSPECTOR.
9. ALL REINFORCED CONCRETE PIPE MUST BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER OCPW STANDARD PLAN 1319.
10. CONTRACTOR WILL NOTIFY OCPW MATERIALS LAB (714) 567–7856 48–HOURS TO D–LOAD TESTING OF R.C.P. FOR VERIFICATION OF RESULTS.
11. PRIOR TO THE PLACEMENT OF CHANNEL IMPROVEMENTS, THE DEVELOPER'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE RDMD INSPECTOR THAT THE STORM DRAINS SUBGRADE IS OF ADEQUATE STRENGTH TO SUPPORT THE STRUCTURES AND ANY ANTICIPATED LOADS.
12. PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, THE DEVELOPER'S CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY. A COPY OF THE PERMIT SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.
13. WHENEVER APPLICABLE, THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE STATE DEPARTMENT OF FISH AND GAME IN ACCORDANCE WITH SECTION 1602 OF THE CALIFORNIA FISH AND GAME CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
14. ALL STEEL TO BE CONTINUOUS SHALL BE LAPPED IN A MINIMUM OF 45 BAR DIAMETERS.
15. ALL MATERIALS TESTING FOR THE DRAINAGE FACILITIES SHALL BE PROVIDED BY THE DEVELOPER OR CONTRACTOR IN ACCORDANCE WITH THE NUMBER, LOCATION, AND FREQUENCY REQUESTED BY THE OCPW INSPECTOR.
16. CHAMFER ALL EXPOSED EDGES OF CONCRETE 3/4" MINIMUM.
17. A PERMIT FOR WORK WITHIN EXISTING STREET RIGHT OF WAY IS REQUIRED FROM THE RDMD FOR ANY ENCROACHMENT NECESSARY FOR CONSTRUCTION IN PUBLIC RIGHT OF WAY.
18. ALL REINFORCING BARS MUST BE SECURELY HELD IN PLACE IN THE FORMS. TWO–WAY MATS OF STEEL MUST BE WIRED TOGETHER BOTH WAYS AT ALTERNATE INTERSECTIONS.
19. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN PUBLIC RIGHT OF WAY IS TO BE PLACED AND COMPACTED UNDER RDMD INSPECTION AND MUST MEET OR EXCEED RDMD MINIMUM STANDARDS AND PER RECOMMENDATION OF THE SOILS ENGINEER.
20. ALL PIPE TO BE BANDED AND GROUTED.
21. RCP SHALL COMPLY WITH ALL GREENBOOK APPLICABLE STANDARDS.
22. WORKING WITHIN ORANGE COUNTY FLOOD CONTROL FACILITIES IS RESTRICTED TO THE PERIOD OF APRIL 30 TO OCTOBER 1.
23. THE CONTRACTOR SHALL CONDUCT CONSTRUCTION OPERATIONS IN SUCH A MANNER THAT STORM AND OTHER WATERS MAY PROCEED UNINTERRUPTED ALONG THEIR DRAINAGE COURSES.
24. IN THE COURSE OF WATER CONTROL, THE CONTRACTOR SHALL CONDUCT CONSTRUCTION OPERATIONS TO PROTECT WATERS FROM POLLUTION WITH FUELS, OILS, BITUMENS, OR HARMFUL MATERIALS.
25. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR UNLESS OTHERWISE SHOWN.
26. A SOILS INVESTIGATION REPORT ENTITLED "PRELIMINARY GEOTECHNICAL INVESTIGATION", BY PACIFIC SOILS ENGINEERING, INC. DATED MARCH 26, 2008, SHALL BE MADE AVAILABLE FOR USE BY THE CONTRACTOR.
27. THE CONTRACTOR SHALL RESTORE OR REPLACE IN KIND (OR BETTER) ALL EXISTING IMPROVEMENTS INTENDED TO REMAIN UNDISTURBED DURING CONSTRUCTION, INCLUDING, BUT NOT LIMITED TO STREETS, LANDSCAPING, FENCES AND SIGNS.
28. THE INFORMATION SHOWN ON THOSE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITES IS NOT GUARANTEED TO BE ACCURATE OR ALL–INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION, AS MAY BE NECESSSARY, AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO. CONTRACTOR SHALL POTHOLE AND LOCATE THE EXISTING UNDERGROUND LINES TO DETERMINE ELEVATIONS PRIOR TO COMMENCEMENT OF THE WORK.
29. EXCAVATION DEPTH MAY CHANGE DURING THE CONSTRUCTION AS DETERMINED BY THE GEOTECHNICAL ENGINEER AND APPROVED BY THE ENGINEER.
30. THE CONTRACTOR SHALL CALL IN A LOCATION REQUEST TO UNDERGROUND SERVICE ALERT PHONE NUMBER 1–800–422–4133 TWO WORKING DAYS IN ADVANCE BEFORE DIGGING. NO INSPECTION WILL BE PROVIDED BY THE ENGINEER.
31. ALL REINFORCED CONCRETE STRUCTURES SHALL BE CONSTRUCTED WITH SULFATE RESISTANT TYPE V CEMENT, UNLESS OTHERWISE APPROVED BY OCPW MATERIALS LABORATORY.
32. ALL CONCRETE SHALL CONTAIN FLY ASH AS SET FORTH IN GREENBOOK SECTION 201–1.1.3, "CONCRETE SPECIFIED BY SPECIAL EXPOSURE", IN A MANNER MEETING THE APPROVAL OF THE OCPW LABORATORY.

R.C. BOX GENERAL NOTES (CONT'D)

33. ALL STRUCTURAL BACKFILL SHALL BE PER GREENBOOK SECTION 300–3.5, AND RECOMMENDATION OF THE SOILS ENGINEER. SELECT BACKFILL SHOULD BE GRANULAR, STRUCTURAL QUALITY BACKFILL WITH A SAND EQUIVALENT OF 30 OR BETTER, AND AN ASCE EXPANSION INDEX OF 20 OR LESS.
34. GRADING CONTRACTOR SHALL NOTIFY GEOTECHNICAL ENGINEER NO LESS THAN 72 HOURS IN ADVANCE OF THE LOCATIONS FOR ANY SOILS PROPOSED FOR IMPORT. PROPOSED IMPORT SOURCE SHALL BE SAMPLED, TESTED AND APPROVED PRIOR TO DELIVERY OF SOILS FOR USE ON SITE.
35. ALL CONSTRUCTION JOINTS SHALL BE PER DETAILS ON SHEET 2 UNLESS OTHERWISE SHOWN.
36. NO LONGITUDINAL JOINTS SHALL BE PLACED IN FLOWLINE OR LOW FLOW.
37. SURPLUS LOOSE RIP–RAP TO BE CLEANED IN CONFORMANCE WITH CURRENT GREENBOOK, PART 2, CONSTRUCTION MATERIALS, 200–1.1 GENERAL SPECIFICATIONS, AND DELIVERED TO RDMD. ARRANGEMENTS FOR DELIVERY AND STOCKPILING OF THE SALVAGED RIP–RAP ARE TO BE COORDINATED WITH JIM HOSKINS, OCPW/O&M/PUBLIC FACILITIES SUPERVISOR AT 714–567–6279.
38. CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS AND SITE CONDITIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.
39. FOUNDATION EXCAVATIONS SHALL BE INSPECTED BY THE GEOTECHNICAL ENGINEER DURING EXCAVATION AND PRIOR TO PLACEMENT OF REINFORCING STEEL OR CONCRETE.
40. SOILS BENEATH FOOTINGS SHALL BE PRE–MOISTENED (IF NECESSARY) AND COMPACTED TO MINIMUM REQUIREMENTS PRIOR TO PLACING CONCRETE.
41. REINFORCING STEEL SHALL BE DEFORMED BARS, CONFORMING TO ASTM A615 GRADE 60.
42. DIMENSIONS LOCATING REINFORCING BARS ARE CLEAR AND DENOTE CONCRETE COVERAGE TO MAIN STEEL UNLESS NOTED OTHERWISE. COVERAGE SHALL BE AS FOLLOWS:

CONCRETE PLACED AGAINST EARTH (NOT FORMED)	3"
FORMED CONCRETE AGAINST EARTH	2"
WALLS, ABOVE GRADE, EXPOSED TO WEATHER	2"

43. SUPPORT REINFORCING OFF FORMS WITH STEEL CHAIRS. SUPPORT REINFORCING OFF GRADE WITH DENSE CONCRETE BLOCKS. NO BRICK OR POROUS CONCRETE WILL BE PERMITTED TO SUPPORT REINFORCING.
44. NO REVISION SHALL BE MADE WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER.
45. CONTRACTOR SHALL SUBMIT ALL PCC MIX DESIGNS TO COUNTY INSPECTOR AND BE APPROVED BY COUNTY MATERIALS LAB PRIOR TO USE.
46. CONTRACTOR SHALL HAVE PRECONSTRUCTION MEETING WITH OCPW PRIOR TO BEGINNING OF CONSTRUCTION.
47. CONTRACTOR SHALL TAKE MEASURES TO PROTECT CHANNEL AND PROPOSED IMPROVEMENTS FROM DAMAGES RESULTING FROM WATER DISCHARGES FROM LOCAL WATER DISTRICT(S) FACILITIES.
48. IN–PLACE DENSITY SHALL BE DETERMINED BY CALIFORNIA TEST METHOD 216 OR 231.
49. CONTRACTOR SHALL MAINTAIN STREET IN A NEAT, SAFE, CLEAN AND SANITARY CONDITION AT ALL TIMES AND TO THE SATISFACTION OF THE COUNTY'S INSPECTOR. THE ADJACENT STREET SHALL BE KEPT CLEAN OF DEBRIS, WITH DUST AND OTHER NUISANCE BEING CONTROLLED AT ALL TIMES. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CLEAN UP ON ADJACENT STREET AFFECTED BY HIS CONSTRUCTION. METHOD OF STREET CLEANING SHALL BE BY DRY SWEEPING OF ALL PAVED AREAS.
50. ANY EXISTING ASPHALT THAT IS DAMAGED OR REMOVED BY CONTRACTOR DURING COURSE OF CONSTRUCTION SHALL BE REPLACED IN KIND.
51. THERE WILL BE NO STOCKPILING OF DIRT OR DEBRIS IN THE CHANNEL BOTTOM DURING OR AFTER CONSTRUCTION.
52. THE PRIVATE LAB PROVIDING SOILS TESTING MUST CALL OCPW INDEPENDENT ASSURANCE AT 714–567–7878 FOR TESTING VERIFICATION.
53. ANY TEMPORARY, IN–CHANNEL FLOW DIVERSION (PUMPED OR GRAVITY FLOW) OR DISCHARGE FROM DEWATERING SHALL BE CONTAINED IN A PIPE OR FLUME. IN THE EVENT OF DEWATERING, A DESILTING BASIN IS REQUIRED IN AT LEAST ONE LOCATION.
54. CLEAR WATER DIVERSIONS AND DEWATERING OPERATIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH POLICIES AND GUIDELINES OUTLINED IN THE CALTRANS STORM WATER QUALITY HANDBOOK, "THE CONSTRUCTION SITE BEST MANAGEMENT PRACTICES MANUAL (CASQA) STORMWATER BEST MANAGEMENT PRACTICE HANDBOOK – CONSTRUCTION" (BMP FACT SHEETS, NS–2 AND NS–5).
55. ANY DIVERSION/DEWATERING SYSTEM CHOSEN SHALL RELIEVE SEEPAGE PRESSURE, DRAIN THE CHANNEL INVERT, AND KEEP THE SUBGRADE FREE FROM WATER.
56. THE CONTRACTOR/PERMITTEE SHALL SUBMIT A DIVERSION/DEWATERING PLAN TO THE COUNTY FOR REVIEW AND ACCEPTANCE PRIOR TO ANY CONSTRUCTION.

STORM DRAIN NOTES

1. RCP SHALL COMPLY WITH ALL GREENBOOK REQUIREMENTS, UNLESS OTHERWISE SHOWN.
2. ALL PIPE LENGTHS ARE HORIZONTAL PROJECTIONS, UNLESS OTHERWISE SHOWN.
3. ALL REINFORCED CONCRETE PIPE MUST BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER OCPW STANDARD PLAN 1319.
4. ALL PIPE TO BE BANDED AND GROUTED (LESS THAN 24" OUTSIDE ONLY, 24" AND GREATER INSIDE AND OUTSIDE).
5. CONTRACTOR WILL NOTIFY RDMD MATERIALS LAB (714–567–7805) 48 HOURS PRIOR TO D–LOAD TESTING OF RCP FOR VERIFICATION OF RESULTS.
6. ALL MATERIALS TESTING FOR THE DRAINAGE FACILITIES SHALL BE PROVIDED BY THE DEVELOPER OR CONTRACTOR IN ACCORDANCE WITH THE NUMBER, LOCATION AND FREQUENCY REQUESTED BY THE OCPW INSPECTOR.

STORM DRAIN NOTES (CONT'D)

7. PRIOR TO PLACEMENT OF STORM DRAIN IMPROVEMENTS, THE DEVELOPER'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE OCPW INSPECTOR THAT THE STORM DRAIN'S SUBGRADE IS FIRM AND UNYIELDING AND ABLE TO SUPPORT THE STRUCTURES AND ANY ANTICIPATED LOADS.
8. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN STREET RIGHT–OF–WAY IS TO BE PLACED AND COMPACTED UNDER RDMD INSPECTION AND MEET OR EXCEED RDMD MINIMUM STANDARD.
9. FOR TRENCH EXCAVATIONS, SHORING SHALL BE PROVIDED TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.
10. PIPE CONSTRUCTION IN FILL AREA MUST BE COORDINATED WITH THE GRADING TO INSURE THAT WHEN THE FILL OPERATION HAS COMPLETED AT GRADE THERE IS A MINIMUM OF 2 FEET OF FILL ABOVE THE TOP OF PIPE.
11. LENGTH OF MANHOLE STRUCTURES MAY BE INCREASED TO MEET PIPE ENDS AT OPTION OF CONTRACTOR AS LONG AS REINFORCING STEEL IS CONTINUED AS REQUIRED. ANY CHANGE IN SPUR LOCATION MUST BE APPROVED BY THE ENGINEER.
12. FLOOR OF MANHOLE STRUCTURE SHALL BE STEEL TROWELED TO SPRING LINE.
13. BODY OF MANHOLE STRUCTURE, INCLUDING SPUR, MUST BE PLACED IN ONE CONTINUOUS OPERATION, EXCEPT THAT CONSTRUCTION JOINT AT THE SPRING LINE WITH A LONGITUDINAL KEY WAY IS PERMITTED.
14. STATIONS SHOWN ON THIS 0+00 ARE STORM DRAIN STATIONS AND ARE INDEPENDENT OF ALL STREET CENTERLINE STATIONS.
15. A PERMIT FOR WORK WITHIN EXISTING STREET RIGHT–OF–WAY IS REQUIRED FROM THE CITY OF BREA AND A PERMIT FOR WORK WITHIN OCFCD RIGHT–OF–WAY IS REQUIRED FROM OCPW.

EROSION & SEDIMENT CONTROL NOTES

1. IN CASE OF EMERGENCY, CALL MARC HARRIS AT 714–990–5715 DURING AND/OR AFTER BUSINESS HOURS.
2. EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES DURING THE RAINY SEASON. NECESSARY MATERIALS SHALL BE AVAILABLE ON SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT.
3. EROSION CONTROL DEVICES SHALL NOT BE MOVED OR MODIFIED WITHOUT THE APPROVAL OF ORANGE COUNTY PUBLIC WORKS.
4. ALL REMOVABLE EROSION PROTECTIVE DEVICES SHALL BE IN PLACE AT THE END OT EACH WORKING DAY WHEN THE 5–DAY RAIN PROBABILITY FORECAST EXCEEDS 40%.
5. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM STREETS, CHECK BERMS AND BASINS.
6. GRADED AREAS ON THE CONSTRUCTION AREA PERIMITER MUST DRAIN AWAY FROM THE FACE OF SLOPES AT THE CONCLUSION OF EACH WORKING DAY. DRAINAGE IS TO BE DIRECTED TOWARD DESILTING FACILITIES.
7. THE CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
8. THE CONTRACTOR SHALL INSPECT THE EROSION CONTROL WORK AND INSURE THAT THE WORK IS IN ACCORDANCE WITH THE APPROVED PLANS.
9. A 24–HOUR EMERGENCY PHONE # WILL BE PROVIDED TO THE CONTRACTOR AT THE PROJECT PRE–CONSTRUCTION MEETING.

ENVIRONMENTAL RESOURCES NOTES

1. ANY SPILLAGE OF FUEL, OIL OR HAZARDOUS MATERIALS FROM CONSTRUCTION EQUIPMENT OR VEHICLES OR SIGNIFICANT RELEASES OF SEDIMENT DUE TO CONSTRUCTION ACTIVITIES OR BMP FAILURES IMPACTING DOWNSTREAM STORM DRAIN AREAS MUST IMMEDIATELY AND PROPERLY CLEANED UP AND REMOVED FROM THE OCFCD'S RIGHT–OF–WAY. FOR SPILLS OF SIGNIFICANT VOLUME, NOTIFICATIONS MUST BE IMMEDIATELY MADE TO RDMD/ENVIRONMENTAL RESOURCES FOR ASSESSMENT OF BEST CORRECTIVE ACTION. CONTAMINATED WATER, SOIL, SANDD OR MATERIAL AND HAZARDOUS WASTES GENERATED FROM THE CLEANUP MUST BE DISPOSED BY APPROVED METHODS. PERMITTEE ASSUMES FULL RESPONSIBILITY FOR COSTS TO INVESTIGATE EXTENT OF CONTAMINATION, CLEANUP, WASTE REMOVAL AND IMPLEMENTATION OF AN APPROVED REMEDIAL ACTION PLAN FOR THE RELEASE OF ANY WASTES OR HAZARDOUS MATERIALS THAT RESULT IN SOIL AND GROUNDWATER CONTAMINATION. NOTIFICATIONS OD SPILLS AND SIGNIFICANT RELEASES OF SEDIMENT DUE TO CONSTRUCTION ACTIVITIES OR BMP FAILURES IMPACTING DOWNSTREAM AREAS OF STORM DRAINS MUST BE IMMEDIATELY MADE TO RDMD/ENVIRONMENTAL RESOURCES, ATTENTION DUC NGUYEN 714–973–6690. AFTER HOURS SPILL NOTIFICATION SHOULD BE MADE TO ORANGE COUNTY SHERIFFS COMMUNICATION CONTROL 1 BY DIALING 911.
2. SEDIMENT FROM AREAS DISTURBED BY CONSTRUCTION SHALL BE RETAINED ON SITE USING STRUCTURAL CONTROLS TO THE MAXIMUM EXTENT POSSIBLE.
3. STOCKPILES OF SOIL SHALL BE PROPERLY CONTAINED TO ELIMINATE OR REDUCE SEDIMENT TRANSPORT FROM THE SITE TO THE STREETS, DRAINAGE OF FACILITIES OR ADJACENT PROPERTIES VIA RUNOFF, VEHICLE TRACKING, OR WIND.
4. APPROPRIATE BMP'S FOR CONSTRUCTION–RELATED MATERIALS, WASTES, SPILLS OR RESIDUES SHALL BE IMPLEMENTED TO MINIMUZE TRANSPORT FROM THE SITE TO THE STREETS, DRAINAGE FACILITIES, OR ADJOINING PROPERTIES BY WIND OR RUNOFF.
5. ALL CONSTRUCTION CONTRACTOR AND SUBCONTRACTOR PERSONNEL ARE TO BE MADE AWARE OF THE REQUIRED BEST MANAGEMENT PRACTICES AND GOOD HOUSEKEEPING MEASURES FOR THE PROJECT SITE AND ANY ASSOCIATED CONSTRUCTION STAGING AREAS.
6. AT THE END OF THE DAY OF CONSTRUCTION ACTIVITY, ALL CONSTRUCTION DEBIRS AND WASTE MATERIALS SHALL BE COLLECTED AND PROPERLY DISPOSED IN TRASH OR RECYCLE BINS.
7. CONSTRUCTION SITES SHALL BE MAINTAINED IN SUCH A CONDITION THAT A STORM DOES NOT CARRY WASTES OR POLLUTANTS OFF THE SITE. DISCHARGES OTHER THAN STORMWATER (NON–STORMWATER DISCHARGES) ARE AUTHORIZED UNDER CALIFORNIA'S GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY ONLY WHERE THEY DO NOT CAUSE OR CONTRIBUTE TO A VIOLATION OF ANY WATER QUALITY STANDARD AND ARE CONTROLLED THROUGH IMPLEMENTATION OF APPROPRIATE BMP'S FOR ELIMINATION OR REDUCTION OF POLLUTANTS. NON–STORMWATER DISCHARGES MIST BE ELIMINATED OR REDUCED TO THE EXTENT FEASIBLE.

   POTENTIAL POLLUTANTS INCLUDE, BUT ARE NOT LIMITED TO: SOLID OR LIQUID CHEMICAL SPILLS; WASTES FROM PAINTS, STAINS, SEALANTS, SOLVENTS, DETERGENTS, GLUES, LIME, PESTICIDES, HERBICIDES, FERTILIZERS, WOOD PRESERVATIVES, AND ASBESTOS FIBERS, PAINT FLAKES OR STUCCO FRAGMENTS; FUELS, OILS, LUBRICANTS AND HYDRAULIC, RADIATOR OR BATTERY FLUIDS; CONCRETE AND RELATED CUTTING OR CURING RESIDUES; FLOATABLE WASTES FROM ANY ENGINES/EQUIPMENT STEAM CLEANING OR CHEMICAL DEGREASING; WASTES FROM STREET CLEANING; AND SUPERCHLORINATED POTABLE WATER LINE FLUSHING AND TESTING. DURING CONSTRUCTION, DISPOSAL OF SUCH MATERIALS SHOULD OCCUR IN A SPECIFIED AND CONTROLLED TEMPORARY AREA ON–SITE PHUSICALLY SEPARATED FROM POTENTIAL STORMWATER RUNOFF, WITH ULTIMATE DISPOSAL IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REQUIREMENTS.
8. DISCHARGING CONTAMINATED GROUNDWATER PRODUCED BY DEWATERING GROUNDWATER THAT HAS INFILTRATED INTO CONSTRUCTION SITE IS PROHIBITED. DISCHARGING OF CONTAMINATED SOILS VIA SURFACE EROSION IS ALSO PROHIBITED. DISCHARGING OF NON–CONTAMINATED GROUDWATER PRODUCED BY DEWATERING ACTIVITIES REQUIRES A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FROM THE SANTA ANA REGIONAL WATER QUALITY CONTROL BOARD.

FACILITY TO BE MAINTAINED BY ORANGE COUNTY FLOOD CONTROL DISTRICT (O.C.F.C.D.)

KATCHALL FILTERS TO BE MAINTAINED BY DEVELOPER PER ENCROACHMENT PERMIT #2008-01230

NOTE:
PERMITTEE SHALL MAINTAIN ALL IMPROVEMENTS WITH THE EXCLUSION OF THE MAIN CHANNEL AND MANHOLES

ORANGE COUNTY PROPERTY PERMITS
ENCROACHMENT PERMIT NO. **2008-00284**

CHANNEL FACILITY TO BE MAINTAINED UNDER AGREEMENT NO. **D07-024**

BASIS OF BEARING:

THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN O.C.S. HORIZONTAL CONTROL STATION GPS NO. GPS"SACY" AND STATION GPS"CCCS", BEING N12°58'34"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

BENCH MARK: 2H–11–90

3 3/4" OCS ALUMINUM BENCHMARK DISK STAMPED "2H-11-90", SET IN THE NORTHEASTERLY EDGE OF A ROUNDED CONCRETE CATCH BASIN. MONUMENT IS LOCATED IN THE NORTHEASTERLY CORNER OF KRAEMER BOULEVARD AND THE ENTRANCE TO 2601 KRAEMER (A PRIVATE DRIVEWAY), 0.1 MILES SOUTHERLY ALONG KRAEMER FROM THE CENTERLINE OF IMPERIAL HIGHWAY AND 42 FT. EASTERLY OF THE CENTERLINE OF KRAEMER. MONUMENT IS SET LEVEL WITH THE SIDEWALK.

1995 O.C.S. ADJ. **ELEV. 362.353 (NAVD88)**

GEOTECHNICAL ENGINEER

PACIFIC SOILS ENGINEERING, INC.
710 E. PARKRIDGE AVENUE, SUITE 105
CORONA, CA 92879
(951) 582–0176

DEVELOPER

CALIFORNIA BREA PARTNERS, LP
719 GRISWOLD STREET, SUITE 530
DETROIT, MI 48226
(313) 965–8204

ORANGE COUNTY PUBLIC WORKS

THIS PLAN IS SIGNED BY THE ORANGE COUNTY PUBLIC WORKS FOR CONCEPT AND ADHERENCE TO COUNTY STANDARDS AND REQUIREMENTS ONLY. ORANGE COUNTY PUBLIC WORKS IS NOT RESPONSIBLE FOR THE DESIGN, ASSUMPTIONS OR ACCURACY.

APPROVED__________ R.C.E. DATE

PREPARED BY

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

UNDER THE SUPERVISION OF:

PATRICK L. PAGADUAN DATE
R.C.E. 56820
EXP. 6/30/09

REGISTERED PROFESSIONAL ENGINEER PATRICK PAUL LAMADRID PAGADUAN NO. 56820 Exp. 6/30/09 CIVIL STATE OF CALIFORNIA

INDEX OF SHEETS

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SHEET 2	RCB DETAILS
SHEET 3	PIER DETAILS
SHEET 4	MISCELLANEOUS DETAILS
SHEET 5	DEMOLITION PLANS
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SHEET 10	RETAINING WALL DETAILS AND NOTES ACCESS RAMP, ACCESS ROAD

UTILITY COMPANIES

	COMPANY	CONTACT	PHONE NO.
WATER	CITY OF BREA	JERRY MESA	714–990–7697
SEWER	CITY OF BREA	JERRY MESA	714–990–7697
STORM DRAIN	CITY OF BREA	JERRY MESA	714–990–7697
ELECTRIC	SOUTHERN CALIFORNIA EDISON	LORI ZUNIGA	714–973–5608
GAS	SOUTHERN CALIFORNIA GAS CO.	RYAN THOMAS	714–666–5718

NOTICE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES, PIPES, AND/OR STRUCTURES ETC. SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF AVAILABLE PUBLIC RECORDS. THOSE SHOWN ON THE RECORDS EXAMINED, ARE INDICATED WITH THEIR APPROXIMATE LOCATION AND EXTENT. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION AND SIZE OF ANY UNDERGROUND UTILITIES TO BE USED AND SHALL BE RESPONSIBLE FOR DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.

THE CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, THE ENGINEER, THE COUNTY OF ORANGE AND THE CITY OF IRVINE HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM SOLE NEGLIGENCE OF OWNER, ENGINEER, THE COUNTY OF ORANGE OR THE CITY OF IRVINE.

THE CONTRACTOR AND ALL ITS SUBCONTRACTORS PERFORMING WORK SHOWN ON OR RELATED TO THESE PLANS SHALL CONDUCT THEIR OPERATIONS SO THAT ALL EMPLOYEES ARE PROVIDED A SAFE PLACE TO WORK AND THE PUBLIC IS PROTECTED. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL COMPLY WITH THE "OCCUPATIONAL SAFETY AND HEALTH REGULATIONS" OF THE U.S. DEPARTMENT OF LABOR, AND THE STATE OF CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS' "CONSTRUCTION SAFETY ORDERS".

THE CONTRACTOR SHALL MAINTAIN AT THE JOB SITE ALL APPLICABLE PERMITS, INCLUDING THOSE REQUIRED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, REGIONAL WATER QUALITY CONTROL BOARD, U.S. ARMY CORPS OF ENGINEERS, AND STATE DIVISION OF INDUSTRIAL SAFETY.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES OR STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER AND OWNERS OF ANY DISCOVERED UNMAPPED UTILITIES OR STRUCTURES CONCERNED BEFORE STARTING WORK. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

NO.	DESCRIPTION	QUANTITY	UNIT
70	RETAINING WALL "A" TYPE 1 PER DETAIL ON SHT. 9	114	L.F.
71	RETAINING WALL "A" TYPE 2 PER DETAIL ON SHT. 9	52	L.F.
72	WALL V–DITCH PER DETAIL ON SHEET 10	93	L.F.
73	WALL DITCH TO PIPE INLET PER DETAIL ON SHT. 10	2	EACH
74	8" SDR 35 PVC RETAINING WALL DRAIN LINE	80	L.F.
75	OUTLET RETAINING WALL DRAIN LINE TO CHANNEL	1	EACH
76	SPLASH WALL PER DETAIL ON SHEET 10	17	L.F.
79	12" P.V.C. N–12 BY ADS OR EQUIVALENT	54	L.F.
80	18" R.C.P. (D–LOAD PER PROFILE)	202	L.F.
81	24" R.C.P. (D–LOAD PER PROFILE)	30	L.F.
100	4–CELL REINFORCED CONCRETE BOX	773	L.F.
101	TRANSITION STRUCTURE PER APWA 343–1 (MODIFIED)	1	EACH
102	BOX CULVERT WARPED WINGWALL PER CALTRANS D86A	2	EACH
103	R.C.B. WINDOW DETAIL PER APWA 382–1	6	EACH
104	JUNCTION STRUCTURE PER OCPW 1314	7	EACH
105	CULVERT PIER EXTENSION	3	EACH
106	RIP–RAP	480	C.Y.
107	6' HIGH CHAIN LINK FENCE PER APWA 600–1–OC	120	L.F.
108	REINFORCED CONCRETE BOX MANHOLE PER OCPW 1506	8	EACH
109	KATCHALL FILTER WEIRS **(PER PERMIT #2008–01230)**	1	L.S.
110	P.C.C. ACCESS RAMP	1300	S.F.
111	P.M.B. ACCESS ROAD	730	S.F.
112	P.C.C. LANDING APRON	1663	S.F.
113	CHAIN LINK GATE PER OCPW 600–1–OC	16	L.F.
114	JUNCTION STRUCTURE PER OCPW STD. PLAN 1313	2	EACH
115	PIPE INLET PER DETAIL ON SHT 10	1	EACH
116	LONGITUDINAL CONTROL JOINT PER DETAIL ON SHT. 10	166	L.F.
117	6' HIGH WROUGHT IRON FENCE PER DETAIL ON SHT. 8	190	L.F.

CONSTRUCTION QUANTITY ESTIMATES

THESE QUANTITY ESTIMATES ARE BASED ON PLANS DATED **09/30/08** FOR PERMIT PURPOSES ONLY. CONTRACTOR IS TO VERIFY ALL QUANTITIES FOR BID PURPOSES AND TO NOTIFY THE ENGINEER OF ANY DISCREPANCIES.

DEVIATION REQUESTED

DESCRIPTION	APPROVED	DATE

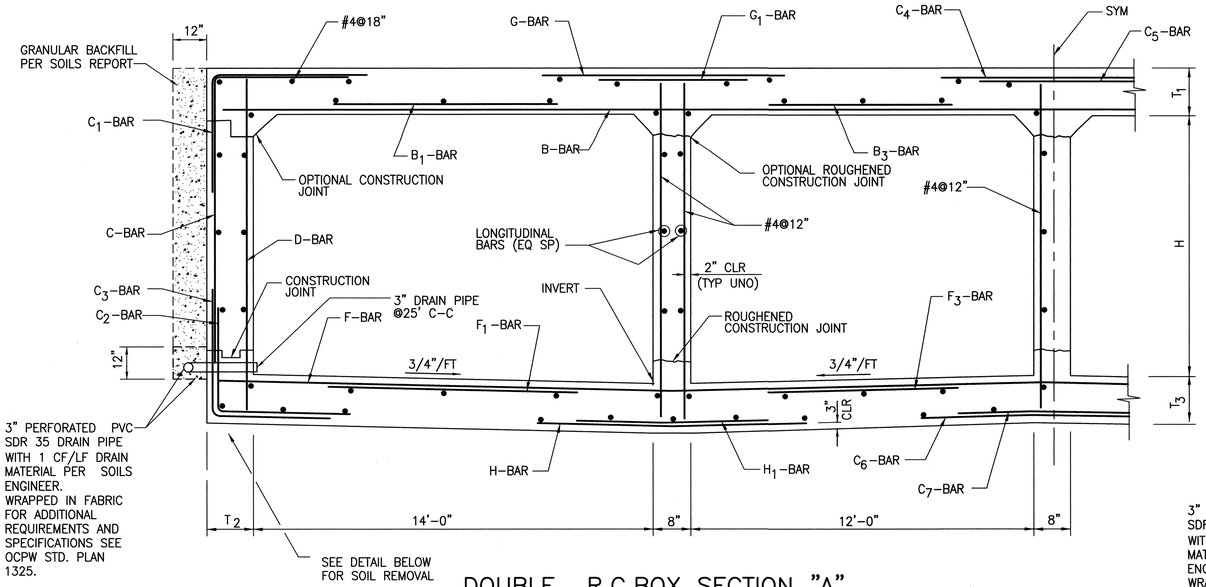
REVISIONS

NO.	DESCRIPTION	SHT.	APPROVED	DATE

W.O. NO.__________
DWG. NO. A06–701–6

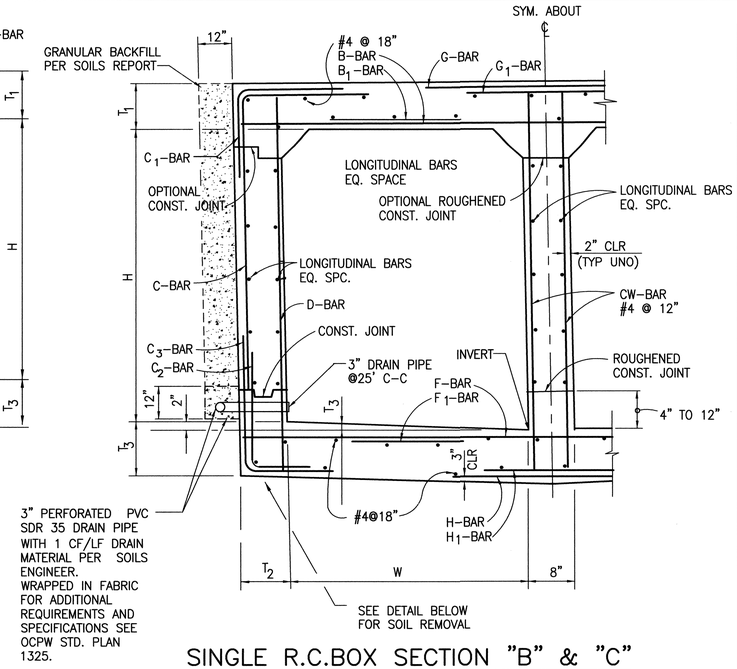
MAP DATE IDENTIFIER 09/30/08 DATE OF LATEST CHANGE TO THIS MAP BY:P.P. 07/24/09 DATE OF THIS PLOT

WO: 3210–2 BIN: XXXX RM: XXX DOC: XXXXX
STORM DRAIN IMPROVEMENTS FOR LOFTUS DIVERSION CHANNEL – CITY OF BREA



DOUBLE R.C.BOX SECTION "A"

NOT TO SCALE



SINGLE R.C.BOX SECTION "B" & "C"

NOT TO SCALE

BOX SECTION		A	B	C
Design Cover		7'	7'	4'
Width	W	SEE SECTION	12'-0"	26'-8"
Height	H	10'-0"	10'-0"	10'-0"
LIVE LOAD		HS 20-44	HS 20-44	HS 20-44
Top Slab Thickness	T_1	14"	12"	24"
Side Wall Thickness	T_2	10"	9"	15"
Bottom Slab Thickness	T_3	15"	13"	24"
B Bars	Bar No & Spacing	#4@12"	#4@12"	#5@12"
	Length	CONT	CONT	CONT
B_1 Bars	Bar No & Spacing	#7@12"	#6@12"	#8@12"
	Length	CONT	CONT	CONT
B_3 Bars	Bar No & Spacing	#6@12"	–	–
	Length	CONT	–	–
C Bars	Bar No & Spacing	#4@12"	#5@12"	#5@12"
	Horiz. Length	5'-0"	5'-7"	5'-8"
	Vert. Length	11'-2"	10'-11"	10'-7"
C_1 Bars	Bar No & Spacing	#6@12"	#6@12"	#7@12"
	Horiz. Length	6'-4"	6'-3"	8'-2"
	Vert. Length	8'-1"	6'-9"	13'-1"
C_2 Bars	Bar No & Spacing	#5@12"	#5@12"	#5@12"
	Horiz. Length	5'-6"	5'-10"	6'-2"
	Vert. Length	7'-6"	4'-0"	8'-1"
C_3 Bars	Bar No & Spacing	#6@12"	#6@12"	#6@12"
	Horiz. Length	6'-2"	6'-2"	6'-10"
	Vert. Length	8'-2"	7'-2"	9'-0"
C_4 Bars	Bar No & Spacing	#6@12"	–	–
	Length	16'-2"	–	–
C_5 Bars	Bar No & Spacing	#7@12"	–	–
	Length	10'-2"	–	–
C_6 Bars	Bar No & Spacing	#6@12"	–	–
	Length	11'-6"	–	–
C_7 Bars	Bar No & Spacing	#7@12"	–	–
	Length	12'-8"	–	–
D Bars	Bar No & Spacing	#4@12"	#4@12"	#5@12"
	Length	CONT	CONT	CONT
F Bars	Bar No & Spacing	#4@12"	#4@12"	#5@12"
	Length	CONT	CONT	CONT
F_1 Bars	Bar No & Spacing	#7@12"	#6@12"	#8@12"
	Length	18'-0"	CONT	CONT
F_3 Bars	Bar No & Spacing	#6@12"	–	–
	Length	14'-8"	–	–
G Bars	Bar No & Spacing	#6@12"	#5@12"	#8@12"
	Length	13'-6"	12'-6"	CONT
G_1 Bars	Bar No & Spacing	#7@12"	#6@12"	#8@12"
	Length	18'-8"	13'-8"	29'-0"
H Bars	Bar No & Spacing	#6@12"	#5@12"	#9@12"
	Length	14'-10"	12'-0"	36'-0"
H_1 Bars	Bar No & Spacing	#7@12"	#7@12"	#9@12"
	Length	13'-4"	17'-0"	28'-6"
NUMBER OF LONGITUDINAL REINFORCEMENT #4 BARS				
TOP SLAB (INCLUDES DISTRIB.)		80	38	80
EXT. WALL		24	24	24
INT. WALL		36	12	12
INV. SLAB		80	38	80
TOTAL		220	112	196
QUANTITIES				
CONCRETE CU. YDS./LIN. FT		6.4	2.8	8.9
STEEL LBS/LIN. FT		900	400	1350

STRUCTURAL NOTES

GENERAL

1. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR UNLESS OTHERWISE SHOWN.
2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
3. DELETED.
4. LONGITUDINAL STEEL SHALL BE LAPPED 45 BAR DIAMETERS AT SPLICES. TRANSVERSE STEEL SHALL BE LAPPED 45 BAR DIAMETERS AT SPLICES.
5. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 4 FEET OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
6. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.
7. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE-HALF INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.
8. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED, BEVELED, OR CHAMFERED
9. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF ENGINEER. NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS. SPLICES SHALL BE STAGGERED, AND STAGGERS SHALL NOT BE IN THE SAME PLANE.
10. SEE GRADING PLAN FOR OVEREXCAVATION REQUIREMENTS BELOW RCB.
11. ELEVATION OF WEEPHOLES ABOVE INVERT SHALL BE UNIFORM THROUGH ENTIRE REACH.
12. FILL AND BACKFILL SHALL COMPLY WITH GENERAL NOTES ON SHEET 1, AND GEOTECHNICAL INVESTIGATION REPORT REQUIRING CALIFORNIA TEST METHOD 216.
13. STRUCTURAL BACKFILL SHALL BE PER GREENBOOK SECTION 300-3, INCLUDING SECTION 300-3.5. STRUCTURAL BACKFILL SHALL ALSO CONFORM TO THE REQUIREMENTS OF THE SOILS REPORT, AND BACKFILLED TO AT LEAST 90% OF MAXIMUM DRY DENSITY AS DETERMINED BY CALIFORNIA TEST METHOD NO. 216 AND NO. 231.
14. SHORED CONSTRUCTION SHALL NOT BE USED UNLESS PROPOSED METHOD AND SPECIFICATIONS ARE REVIEWED AND APPROVED BY THE ENGINEER AND COUNTY OF ORANGE.

ADDITIONAL NOTES FOR BOX SECTIONS

1. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL CONSTRUCTION JOINTS.
2. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE JOINT KEYWAYS (IN BOTH SLABS AND WALLS), AS DETAILED, SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET. ALL CONSTRUCTION JOINTS IN BOTTOM SLAB, TOP SLAB, AND SIDE WALLS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED.
3. UNLESS OTHERWISE SHOWN ON THE DETAILS, IN CURVED SECTIONS TRANSVERSE BARS SHALL BE PLACED RADIAL TO CENTERLINE WITH SPACING NOT TO EXCEED THAT SHOWN ON SCHEDULE. STRAIGHT BARS AND L-BARS IN WALLS SHALL BE SPACED AS SHOWN ON THE TYPICAL SECTIONS, WITH THE SPACING MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
4. AT THE BEGINNING AND ENDING OF ALL POURS, A CURTAIN OF REINFORCEMENT COMPOSED OF B, C, C2, D, F, G, AND H BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT. MAINTAIN 1.5" CLEARANCE FROM KEY OF CONSTRUCTION JOINT.
5. THE VERTICAL WALL STEEL IN THE INTERIOR FACE OF WALLS MAY BE SPLICED AT THE CONSTRUCTION JOINT AT THE BASE OF THE WALL. THE SPLICE SHALL BE 45 BAR DIAMETERS IN LENGTH.
6. IN ALL SECTIONS LAP C AND C2 BARS. THE VERTICAL LENGTH OF C AND C2 BARS HAS BEEN CALCULATED FOR A FOUR INCH STARTER WALL. IF THE HEIGHT OF THE STARTER WALL IS VARIED, THE VERTICAL LENGTH OF THE C AND C2 BARS SHALL BE VARIED CORRESPONDINGLY SO AS TO MAINTAIN A 45 BAR DIAMETER LAP BETWEEN THE TWO BARS. THE LAPS SHALL BE BASED ON THE SMALLER BAR.
7. CONCRETE QUANTITIES ARE BASED ON A SIX-BY-SIX-INCH FILLET AND THE STEEL QUANTITIES DO NOT INCLUDE ANY OPTIONAL SPLICES.
8. INVERT FINISH: CHANNEL INVERT SURFACE SHALL BE GIVEN A STEEL TROWEL FINISH.

DESIGN DATA

LIVE LOAD

HS20-44 UNLESS OTHERWISE NOTED.

DEAD LOAD

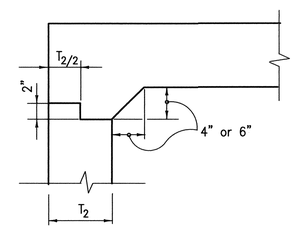
EARTH LOAD PER MARSTON'S FORMULA W=125 pcf
KU=KU'=0.150
BD=OUTSIDE WIDTH OF BOX PLUS 3 FEET
SIDE EARTH 82 EFP PER FOOT OF DEPTH
WEIGHT OF CONCRETE 150 pcf

ALLOWABLE STRESSES

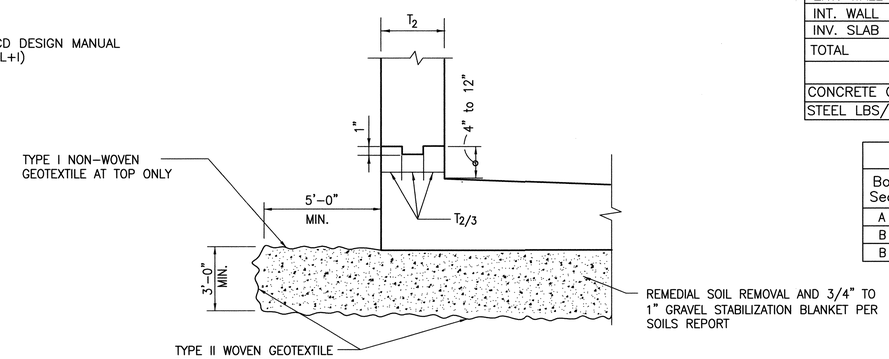
f_c' =4000 psi at 28 days
f_y = 60000 psi

DESIGN

STRENGTH DESIGN PER OCFCD DESIGN MANUAL
LOAD FACTORS: 1.5D + 1.8(L+I)
WHERE D = DEAD LOADS
L = LIVE LOADS
I = IMPACT



TOP OF WALL



BASE OF WALL

CONSTRUCTION JOINT DETAILS

NOT TO SCALE

R.C. BOX LOCATION SCHEDULE		
Box Sect.	Station From	Station To
A	11+87.20	19+60.00
B	10+82.00	10+84.00
B	11+85.20	11+87.20

40 20 0 40 80

GRAPHIC SCALE 1"=40'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

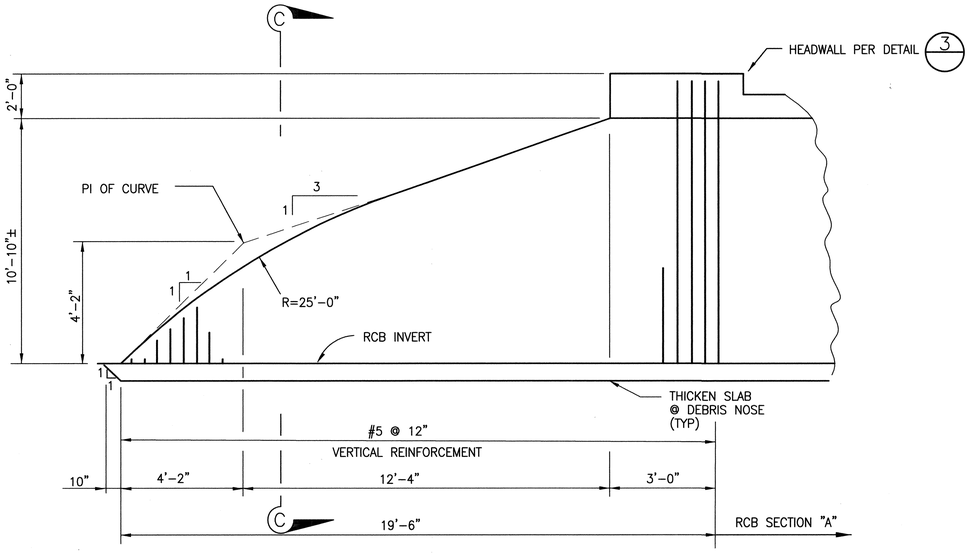
REVISIONS

REGISTERED PROFESSIONAL ENGINEER WILBERT Y. CHO NO. C36266 EXP. 6-30-10 CIVIL STATE OF CALIFORNIA

11-6-08

SHEET 2 OF 10
RCB DETAILS

LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

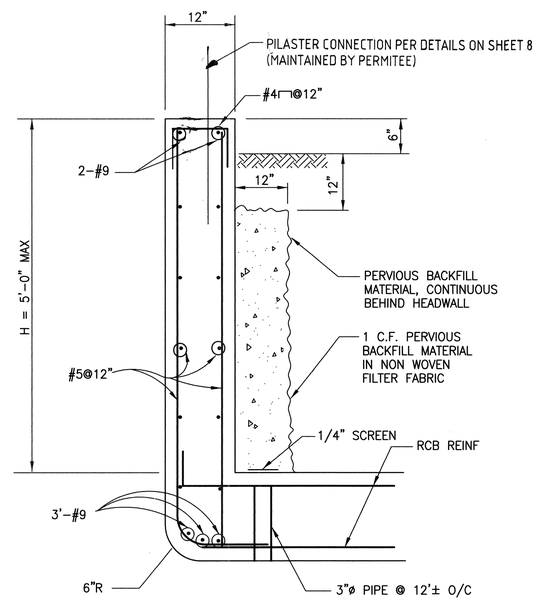


NOTE: FOR DETAILS AND NOTES NOT SHOWN, SEE OCPW STD PLAN 1324.

ELEVATION 1

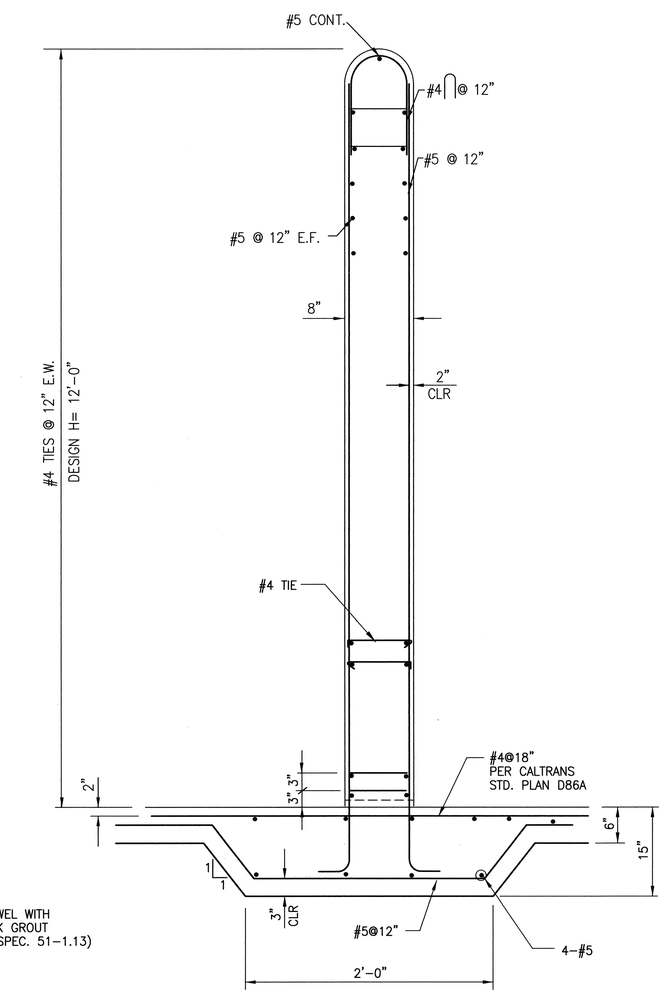
N.T.S.

NOTE: SEE SHEET 6 FOR DEBRIS NOSE PLAN VIEW



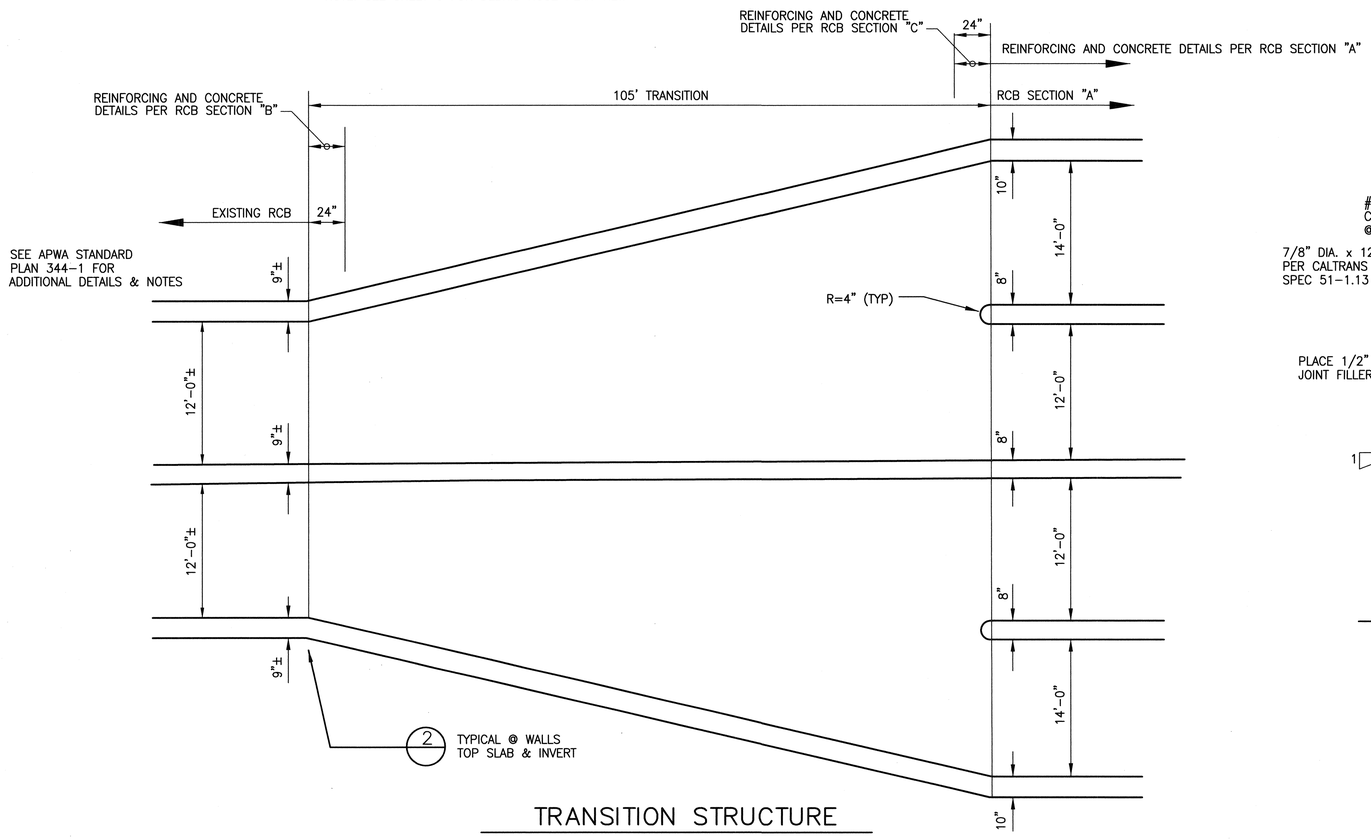
HEADWALL DETAIL 3

N.T.S.



SECTION C-C

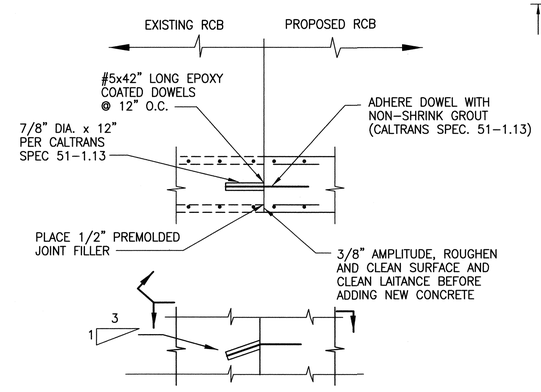
N.T.S.



TRANSITION STRUCTURE

4 CELL RCB TO EXISTING 2 CELL RCB

N.T.S.



EXISTING RCB/PROPOSED RCB

CONNECTION DETAIL 2

N.T.S.

40 20 0 40 80

GRAPHIC SCALE 1"=40'

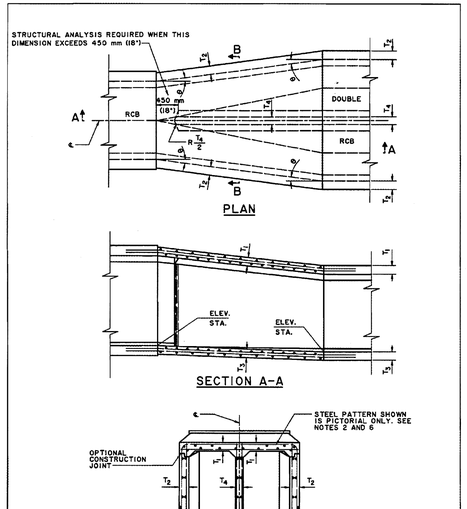
NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
WILBERT Y. CHO
NO. C36266
EXP. 6-30-10
CIVIL
STATE OF CALIFORNIA
11-6-08

SHEET 3 OF 10
PIER DETAILS

LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA



AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER

PROMULGATED BY THE PUBLIC WORKS STANDARDS INC., GREENBOOK COMMITTEE 1992 REV. 1996

TRANSITION STRUCTURE
SINGLE RCB TO DOUBLE RCB

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN METRIC 343 - 1 SHEET 1 OF 2

NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, θ, SHALL NOT EXCEED 5°45'.
2. REINFORCING STEEL BAR SIZE, SPACING AND OUTSIDE COVER SHALL BE THAT OF DOUBLE RCB SECTION. FOR CURVED TRANSITIONS, SPACE BARS ON CENTER LINE AND PLACE TRANSVERSE STEEL RADIALLY. THE BAR LENGTHS AND DIMENSIONS SHALL VARY UNIFORMLY THROUGHOUT TRANSITION. LONGITUDINAL BARS SHALL BE CONTINUED THROUGH THE JOINTS WITH THE TRANSITION STRUCTURE.
3. THE CONCRETE THICKNESS SHALL BE THAT OF THE DOUBLE RCB SECTION.
4. PLAN AS SHOWN IS FOR DOUBLE RCB SECTION DOWNSTREAM. WHEN DOUBLE RCB SECTION IS UPSTREAM TAPER THE LAST 600 mm (24") OF CENTER WALL TO END IN 40 mm (1 1/2") RADIUS.
5. f'_c = 28 MPa (4000 PSI) AT 28 DAYS AND THE CONCRETE SHALL BE THE SAME MIX AS THE ADJACENT RCB.
6. ALL STEEL, EXCEPT LONGITUDINAL STEEL, SHALL BE GRADE 400 (60) BILLET STEEL CONFORMING TO ASTM A 615 M (A 615) AND SHALL TERMINATE 40 mm (1 1/2") CLEAR OF CONCRETE SURFACES UNLESS OTHERWISE SHOWN.
7. TRANSVERSE JOINT KEYWAYS, AS DETAILED FOR LONGITUDINAL JOINT KEYWAYS AT BASE OF OUTER WALLS ON THE PROJECT DRAWINGS, SHALL BE PLACED IN BOTH SLABS AND WALLS AT THE END OF EACH POUR.
8. THE TRANSITION STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STRUCTURAL NOTES APPLYING TO RCB STRUCTURES SHOWN ON THE PROJECT DRAWINGS.
9. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES, EXCEPT REINFORCING BAR SIZES IN ENGLISH UNITS MAY BE SUBSTITUTED FOR METRIC BAR SIZES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

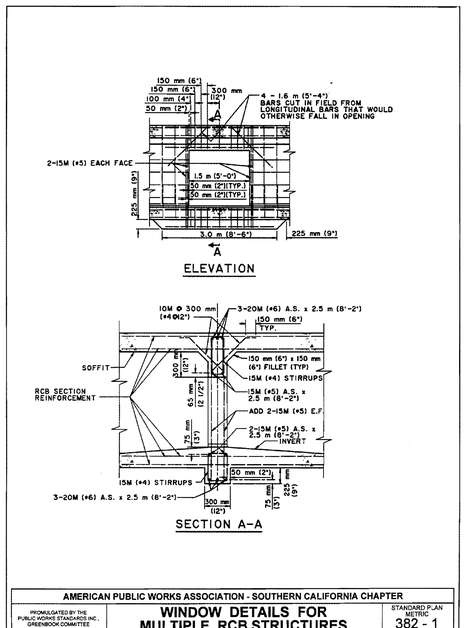
AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER

TRANSITION STRUCTURE
SINGLE RCB TO DOUBLE RCB

STANDARD PLAN METRIC 343 - 1 SHEET 2 OF 2

(10) R.C.B. TRANSITION STRUCTURE

SEE SHEET 3 FOR ADDITIONAL DETAILS
USE U.S. STANDARDS
NOT TO SCALE



AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER

PROMULGATED BY THE PUBLIC WORKS STANDARDS INC., GREENBOOK COMMITTEE 1994 REV. 1996

WINDOW DETAILS FOR
MULTIPLE RCB STRUCTURES

USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

STANDARD PLAN METRIC 382 - 1 SHEET 1 OF 2

NOTES

1. THIS STRUCTURE TO BE USED WHERE:
   a. DEPTH OF COVER DOES NOT EXCEED 3.0 m (10').
   b. CLEAR SPAN OF ONE BARREL DOES NOT EXCEED 3.6 m (12'). WHEN THESE LIMITS ARE EXCEEDED, WINDOW OPENING DETAILS SHALL BE AS SHOWN ON PROJECT DRAWINGS.
2. LONGITUDINAL BARS TO BE CUT IN THE FIELD 50 mm (2") FROM OPENING.
3. ROUND ALL EDGES TO 50 mm (2") RADIUS.
4. NO TRANSVERSE CONSTRUCTION JOINT TO BE PLACED WITHIN 1.5 m (5'-0") OF WINDOW.
5. DIMENSIONS SHOWN ON THIS PLAN FOR METRIC AND ENGLISH UNITS ARE NOT EXACT EQUAL VALUES. IF METRIC VALUES ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE METRIC VALUES, EXCEPT REINFORCING BARS SIZES IN ENGLISH UNITS MAY BE SUBSTITUTED FOR METRIC BAR SIZES. IF ENGLISH UNITS ARE USED, ALL VALUES USED FOR CONSTRUCTION SHALL BE ENGLISH UNITS.

AMERICAN PUBLIC WORKS ASSOCIATION - SOUTHERN CALIFORNIA CHAPTER

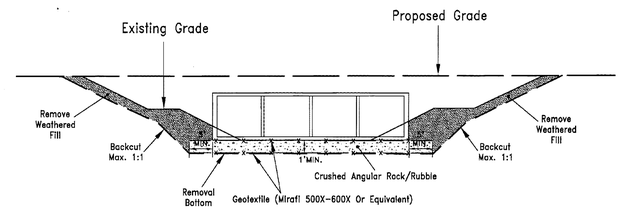
WINDOW DETAILS FOR
MULTIPLE RCB STRUCTURES

STANDARD PLAN METRIC 382 - 1 SHEET 2 OF 2

(103) R.C.B. WINDOW DETAILS

USE U.S. STANDARDS
NOT TO SCALE

REMEDIAL GRADING DETAIL
PROPOSED LOFTUS DIVERSION CHANNEL



*See report text for discussion of settlement of potential versus removal depths.

LEGEND

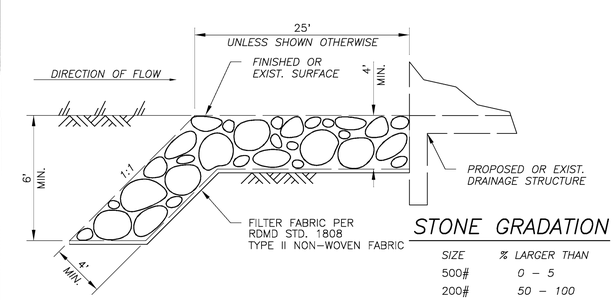
Approximate limits of removal and recompaction

N.T.S.

FIGURE 3

PACIFIC SOILS ENGINEERING, INC.
710 E PARKRIDGE AVENUE, SUITE 105, CORONA, CA 92879
TELEPHONE: (951) 582-0170, FAX: (951) 582-0176
W.O. 500690 DATE: 3/26/08

NOTE:
SHORING SHALL NOT BE USED AS OUTSIDE FORMS FOR CONSTRUCTION OF THE R.C.B.

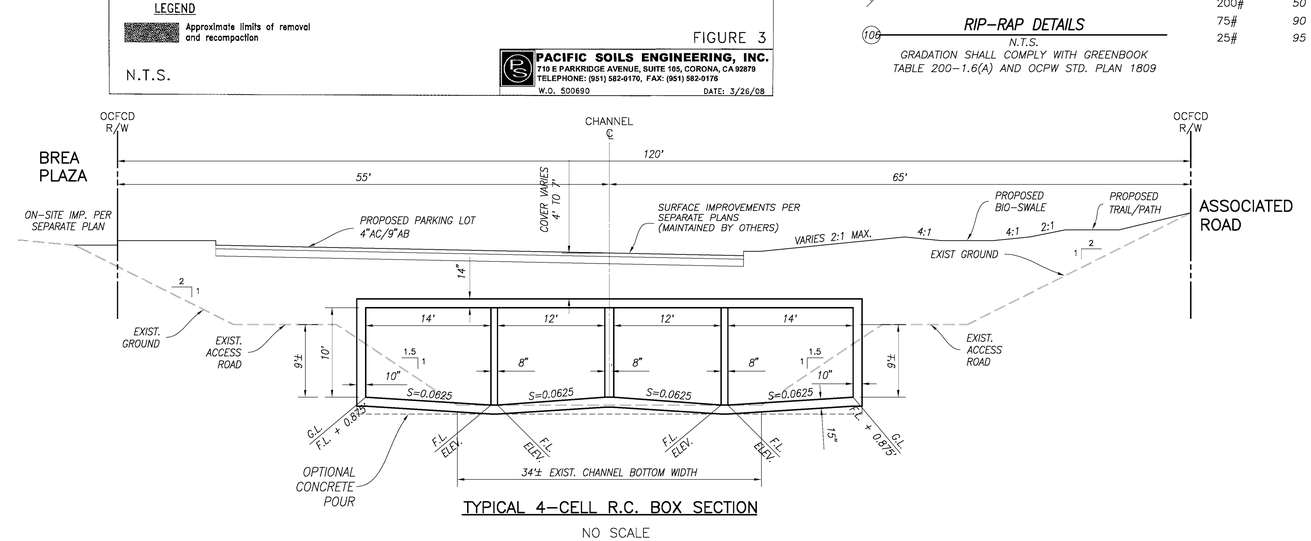


STONE GRADATION

SIZE	% LARGER THAN
500#	0 – 5
200#	50 – 100
75#	90 – 100
25#	95 – 100

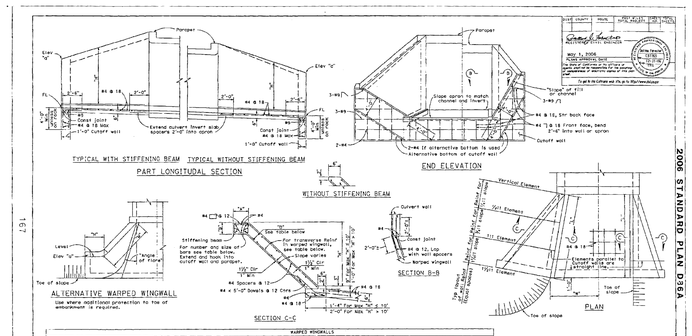
(108) RIP-RAP DETAILS

N.T.S.
GRADATION SHALL COMPLY WITH GREENBOOK TABLE 200-1.6(A) AND OCPW STD. PLAN 1809



TYPICAL 4-CELL R.C. BOX SECTION

NO SCALE



(102) R.C.B. WINGWALL

NOT TO SCALE

GRAPHIC SCALE 1"=40'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER JAMES PAUL LAMARRO RAMONAS NO. 56820 Exp. 6/30/09 CIVIL STATE OF CALIFORNIA

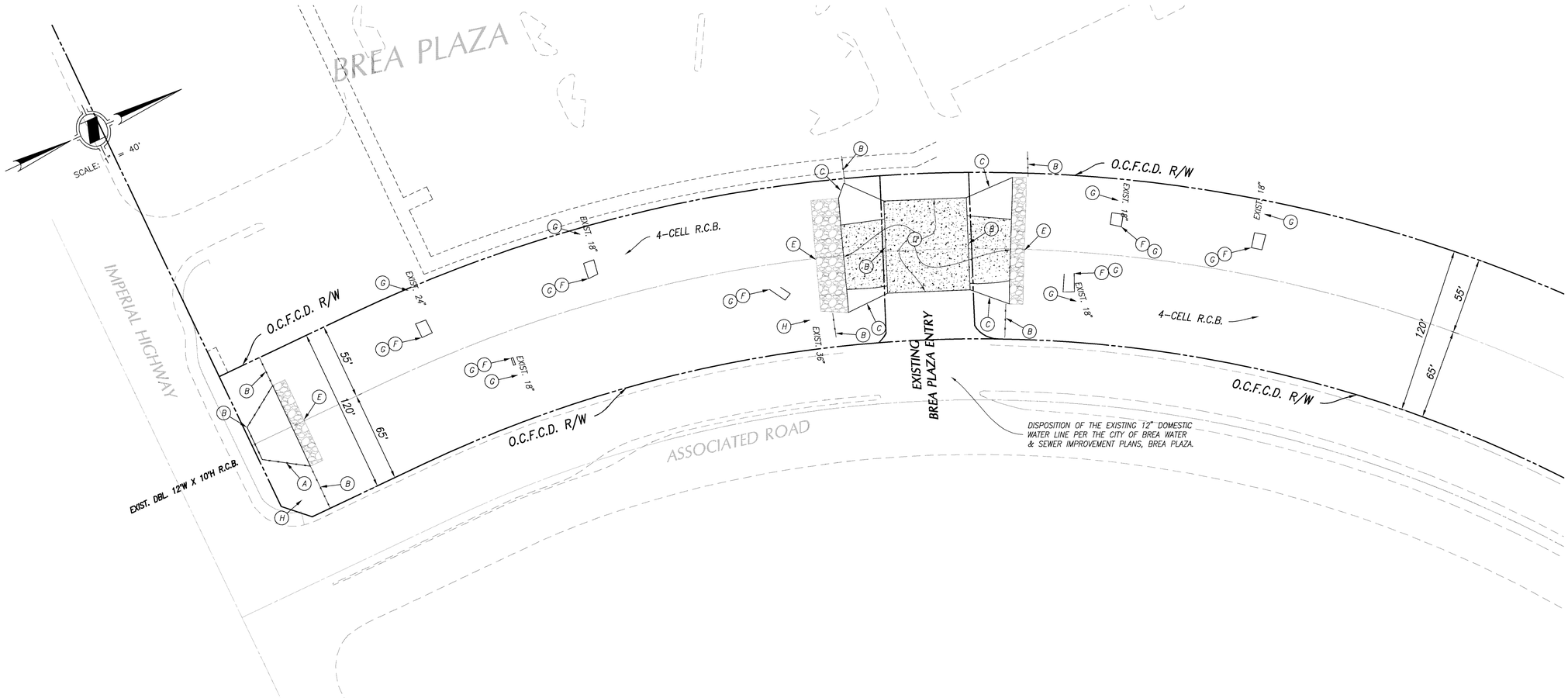
SHEET 4 OF 10
MISCELLANEOUS DETAILS
LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

MAP DATE IDENTIFIER | 09/30/08 | BY:P.P. | 01/23/09 DATE OF THIS PLOT

DATE OF LATEST CHANGE TO THIS MAP

WO: 3210-2 BIN: XXXX RM: XXX DOC: XXXXX
STORM DRAIN IMPROVEMENTS FOR LOFTUS DIVERSION CHANNEL - CITY OF BREA

F:\0381\Engineering\SY_Channel\SHT04.dwg



KATCHALL ANTIMICROBIAL FILTRATION WEIRS
1 – 951 – 769 – 0099

2-INCH U-CHANNEL ACROSS ENTIRE WIDTH OF DRAINAGE CULVERT (BOTTOM)
2-inch U-Channel (vertical supports) placed every 4' – 2' for additional support during heavy-flow events

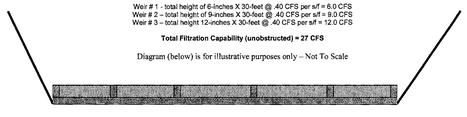
4-FOOT (REMOVABLE) SECTIONS OF ANTIMICROBIAL FILTRATION MEDIA
Media is "Pillow-Cased" around a supporting structure of 1 ½" reinforced open fiberglass grating and secured within U-Channels

SECTIONS – FLOW RATES

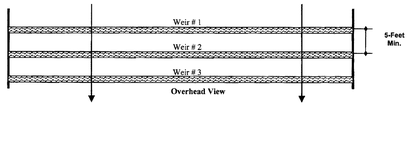
Weir # 1 - total height of 6-inches X 30-feet @ .40 CFS per s/f = 6.0 CFS
Weir # 2 – total height of 9-inches X 30-feet @ .40 CFS per s/f = 9.0 CFS
Weir # 3 – total height 12-inches X 30-feet @ .40 CFS per s/f = 12.0 CFS

Total Filtration Capability (unobstructed) = 27 CFS

Diagram (below) is for illustrative purposes only – Not To Scale



Cross Section



Overhead View

KATCHALL FILTRATION DEVICES / BREA DRAINAGE CHANNEL

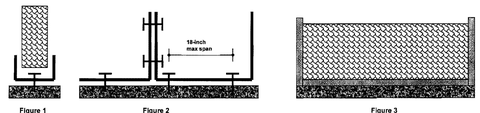


Figure 1
C-Channel Mounting

Figure 2
Skeletal Framing Composition

Figure 3
Frontal View Installed Frames & Filters

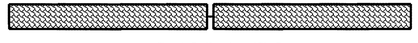


Figure 4 – Top View – Inserted Filter Trays

Aluminum C-Channel (2" x 2") is used to provide both horizontal & vertical support for the insert filter trays

C-channels are installed on the concrete floor of the drainage channel and held in place with ¼" diameter X 2 ½" length 306 - SS "Lok-Tite" pins, set no further than 18-inches apart, (See figure 1)

Two sections of vertical support channels (@ 49" O/C) are joined together using 3/8" aluminum rivets - two places, (See Figure 2)

Removable (reinforced fiberglass structure) filtration trays are inserted (vertically) into the open channel areas (See Figures 3 & 4)

Each filtration tray is 48" in width and can be easily exchanged, one area to another, providing for ease of maintenance, cleaning, or replacement of the individual tray's filtration media(s).

KATCHALL FILTRATION SYSTEMS, LLC 1 – 866 – 528 - 2425

NOTE:

EXCAVATION AND REMEDIAL GRADING SHALL BE PER THE RECOMMENDATION OF THE GEOTECHNICAL ENGINEER, AND AS SPECIFIED IN THE REPORT ENTITLED "PRELIMINARY GEOTECHNICAL INVESTIGATION" BY PACIFIC SOILS ENGINEERING, INC., DATED FEBRUARY 18, 2008. EXCAVATION DEPTH MAY CHANGE DURING CONSTRUCTION AS DETERMINED BY THE GEOTECHNICAL ENGINEER.

109 KATCHALL FILTER WEIR DETAILS
CONTACT MANUFACTURER FOR ADDT'L. INFO
NOT TO SCALE
(TO BE INSTALLED & MAINTAINED BY DEVELOPER PER PERMIT #2008-01230)

DEMOLITION NOTES

- (A) REMOVE EXIST. HEADWALL
- (B) REMOVE EXIST. GATE/FENCE
- (C) REMOVE EXIST. TRANSITION WALL
- (D) REMOVE EXIST. BOX CULVERT/ROADWAY
- (E) REMOVE EXIST. RIP-RAP, TO BE CLEANED AND SALVAGED PER INSPECTOR'S RECOMMENDATION, SEE GENERAL NOTE 37
- (F) REMOVE EXIST. INLET STRUCTURE
- (G) REMOVE INTERFERING PORTIONS OF EXIST. PIPE ABANDON/PLUG TO THE SATISFACTION OF THE INSPECTOR
- (H) PROTECT EXIST. PIPE

40 20 0 40 80
GRAPHIC SCALE 1"=40'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER
PATRICK PAUL LAMAGNO FRANCHINI
NO. 56820
Exp. 6/30/09
CIVIL
STATE OF CALIFORNIA

SHEET 5 OF 10
DEMOLITION PLAN
LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

MAP	DATE	IDENTIFIER	09/30/08	BY:P.P.
			DATE OF LATEST CHANGE TO THIS MAP	
	01/22/09		DATE OF THIS PLOT	

WO: 3210-2 BIN: XXXX RM: XXX DOC: XXXXX
STORM DRAIN IMPROVEMENTS FOR LOFTUS DIVERSION CHANNEL – CITY OF BREA

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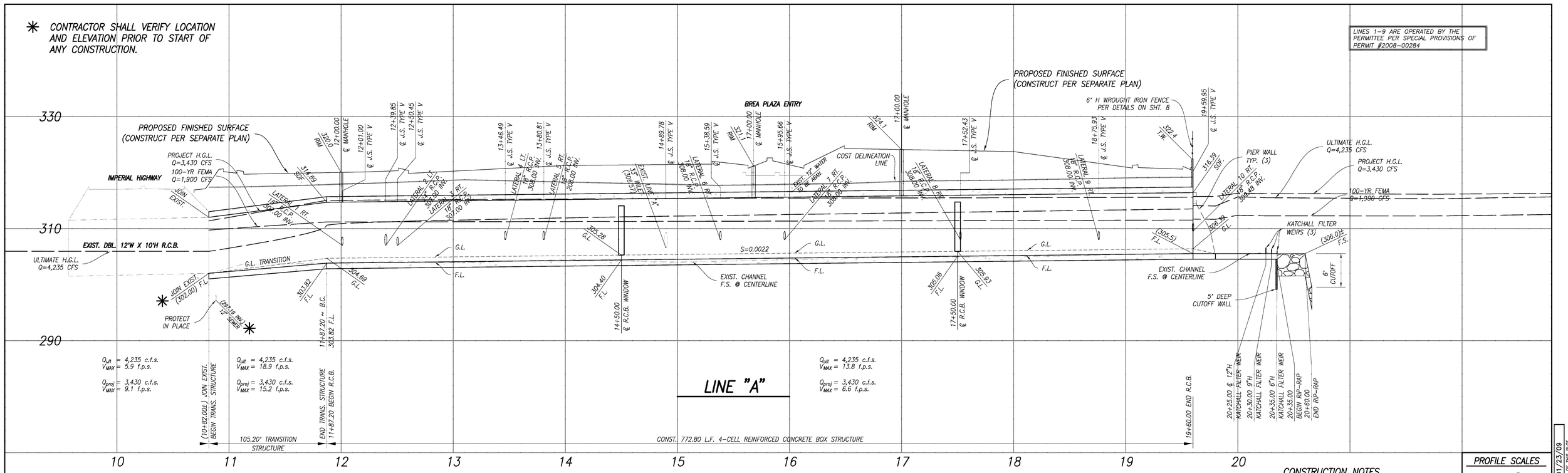
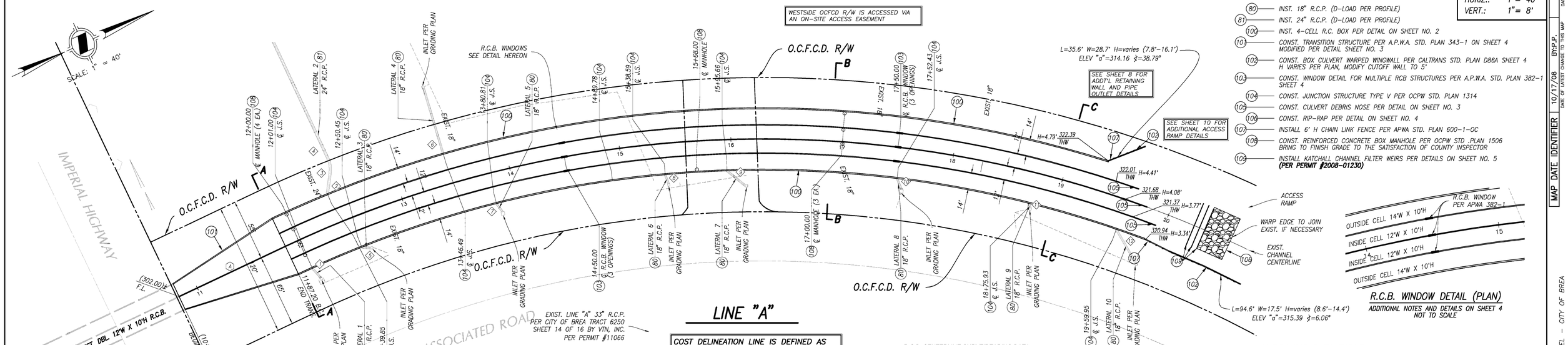
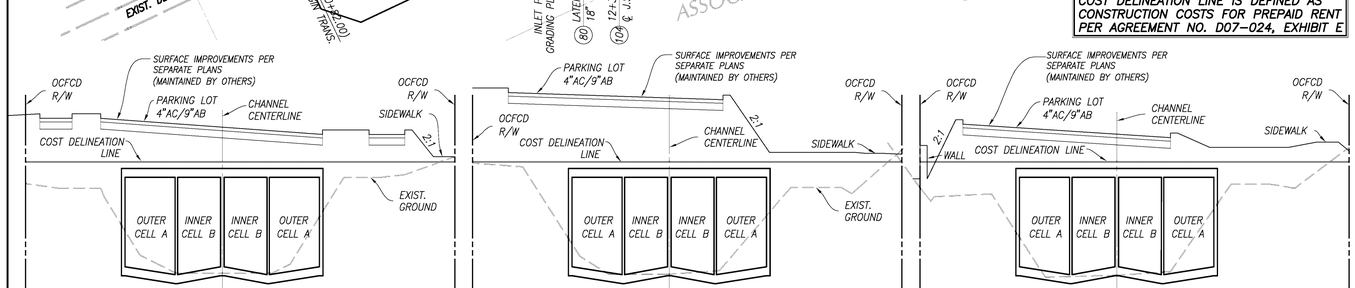
✱ CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION PRIOR TO START OF ANY CONSTRUCTION.

LINES 1–9 ARE OPERATED BY THE PERMITTEE PER SPECIAL PROVISIONS OF PERMIT #2008–00284







R.C.B. CENTERLINE CURVE/BEARING DATA

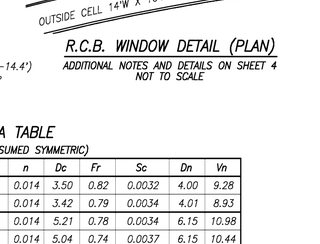
	BEARING/DELTA	RADIUS	LENGTH	TANGENT
4	N 00°18'37" W	–	105.20'	–
8	4.3°11'22"	1000.00'	753.80'	395.82'

LATERAL CURVE DATA

	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	N 73°26'54" E	–	11.35'	–
2	S 57°17'38" E	–	13.55'	–
3	32°41'26"	22.50'	12.84'	6.60'
4	N 89°59'04" W	–	145.63'	–
5	N 30°22'11" E	–	8.09'	–
6	N 81°36'58" W	–	60.77'	–
7	N 78°31'30" E	–	9.19'	–
8	S 85°38'48" E	–	8.58'	–
9	S 64°12'44" W	–	21.29'	–
10	N 87°59'10" W	–	10.80'	–
11	S 84°20'55" E	–	4.42'	–
12	N 84°53'48" E	–	35.02'	–

CONSTRUCTION NOTES

(80) INST. 18" R.C.P. (D–LOAD PER PROFILE)
(81) INST. 24" R.C.P. (D–LOAD PER PROFILE)
(100) INST. 4–CELL R.C. BOX PER DETAIL ON SHEET NO. 2
(101) CONST. TRANSITION STRUCTURE PER A.P.W.A. STD. PLAN 343–1 ON SHEET 4 MODIFIED PER DETAIL SHEET NO. 3
(102) CONST. BOX CULVERT WARPED WINGWALL PER CALTRANS STD. PLAN D86A SHEET 4 H VARIES PER PLAN, MODIFY CUTOFF WALL TO 5'
(103) CONST. WINDOW DETAIL FOR MULTIPLE RCB STRUCTURES PER A.P.W.A. STD. PLAN 382–1 SHEET 4
(104) CONST. JUNCTION STRUCTURE TYPE V PER OCPW STD. PLAN 1314
(105) CONST. CULVERT DEBRIS NOSE PER DETAIL ON SHEET NO. 3
(106) CONST. RIP–RAP PER DETAIL ON SHEET NO. 4
(107) INSTALL 6' H CHAIN LINK FENCE PER APWA STD. PLAN 600–1–OC
(108) CONST. REINFORCED CONCRETE BOX MANHOLE PER OCPW STD .PLAN 1506 BRING TO FINISH GRADE TO THE SATISFACTION OF COUNTY INSPECTOR
(109) INSTALL KATCHALL CHANNEL FILTER WEIRS PER DETAILS ON SHEET NO. 5 **(PER PERMIT #2008–01230)**



R.C.B. WINDOW DETAIL (PLAN)
ADDITIONAL NOTES AND DETAILS ON SHEET 4
NOT TO SCALE

HYDRAULIC DATA TABLE
(FLOWS & NORMAL DEPTH ASSUMED SYMMETRIC)

	CELL	STA to STA	Q_{DESIGN}	WIDTH	So	n	Dc	Fr	Sc	Dn	Vn
FEMA DISCHARGE	OUTER	10+82.00 19+60.00	520	14'	0.0022	0.014	3.50	0.82	0.0032	4.00	9.28
	INNER	10+82.00 19+60.00	430	12'	0.0022	0.014	3.42	0.79	0.0034	4.01	8.93
PROJECT DISCHARGE	OUTER	10+82.00 19+60.00	945	14'	0.0022	0.014	5.21	0.78	0.0034	6.15	10.98
	INNER	10+82.00 19+60.00	770	12'	0.0022	0.014	5.04	0.74	0.0037	6.15	10.44
ULTIMATE DISCHARGE	OUTER	10+82.00 19+60.00	1168.5	14'	0.0022	0.014	6.00	0.76	0.0036	7.20	11.59
	INNER	10+82.00 19+60.00	949	12'	0.0022	0.014	5.79	0.72	0.0039	7.21	10.98

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06–701–6

REGISTERED PROFESSIONAL ENGINEER PAUL LAMADRID PRADDAN NO. 56820 Exp. 6/30/09 CIVIL STATE OF CALIFORNIA

SHEET 6 OF 10
STA. 10+82 TO STA. 19+80
LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

MAP DATE IDENTIFIER	10/17/08	BY:P.P.	01/23/09
	DATE OF LATEST CHANGE TO THIS MAP		DATE OF THIS PLOT

PROFILE SCALES
HORIZ.: 1"= 40'
VERT.: 1"= 8'

WO: 3210–2 BIN: XXXX RM: XXX DOC: XXXXX
STORM DRAIN IMPROVEMENTS FOR LOFTUS DIVERSION CHANNEL – CITY OF BREA

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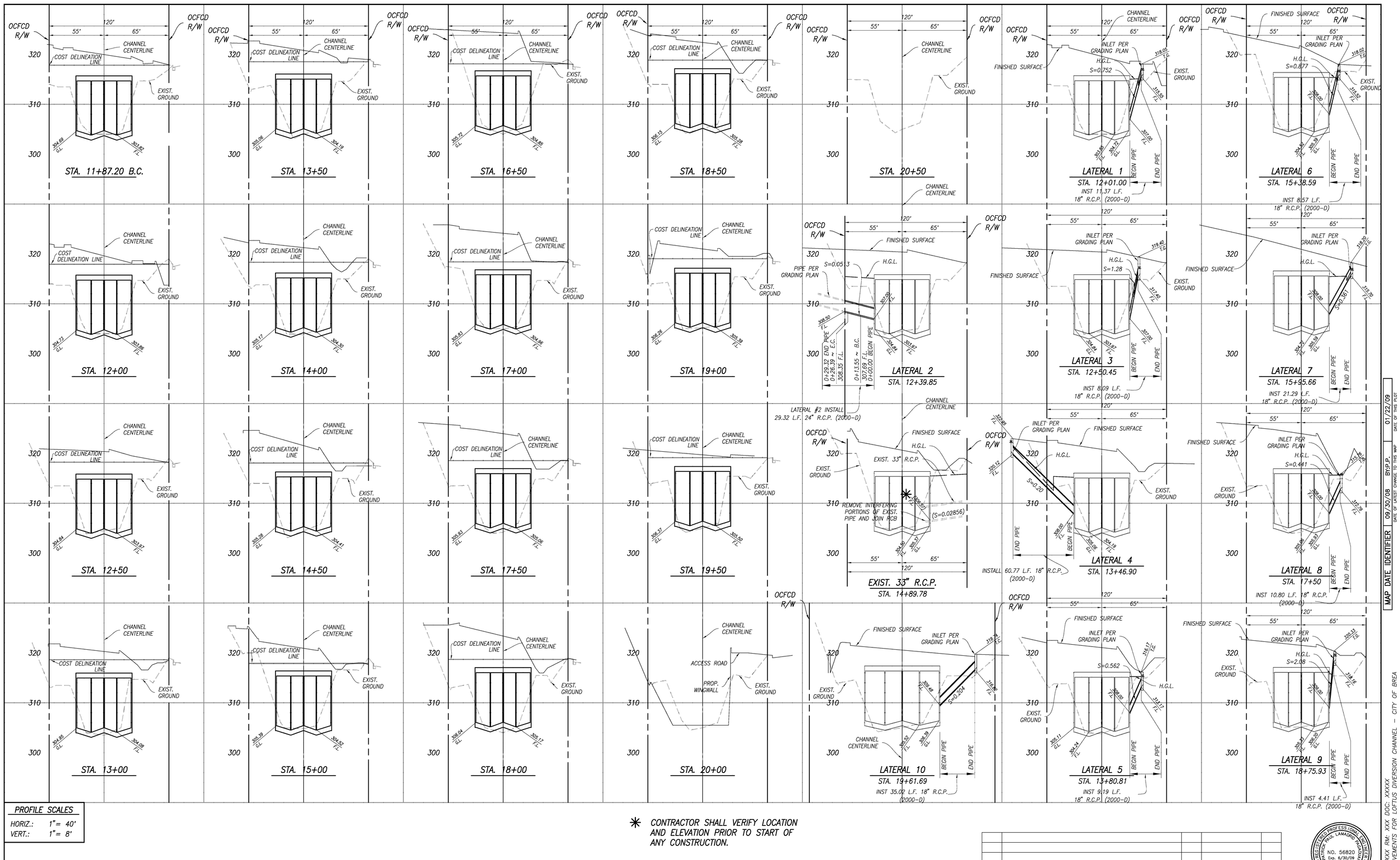


PROFILE SCALES

HORIZ.: 1"= 40'
VERT.: 1"= 8'

✳ CONTRACTOR SHALL VERIFY LOCATION AND ELEVATION PRIOR TO START OF ANY CONSTRUCTION.

40 20 0 40 80

GRAPHIC SCALE 1"=40'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER PATRICK PAUL LAMADRID PAGADUAN NO. 56820 Exp. 6/30/09 CIVIL STATE OF CALIFORNIA

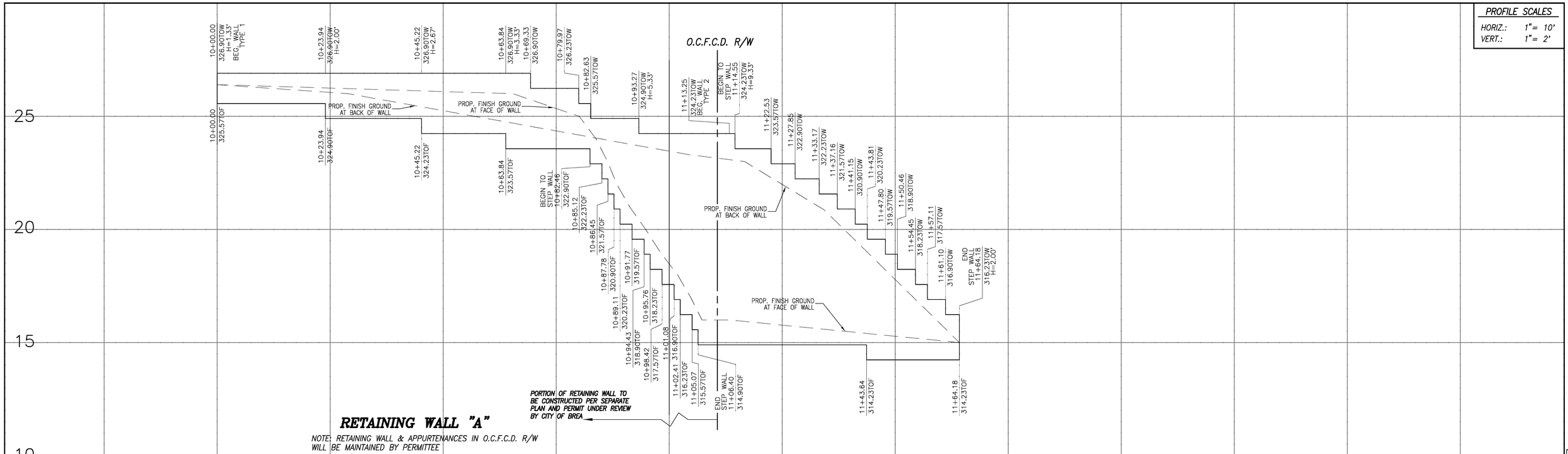
SHEET 7 OF 10
CROSS SECTIONS & LATERALS
LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

MAP DATE IDENTIFIER 09/30/08 BY:P.P. 01/22/09
DATE OF LATEST CHANGE TO THIS MAP DATE OF THIS PLOT

WO: 3210-2 BIN: XXXX RM: XXX DOC: XXXXX
STORM DRAIN IMPROVEMENTS FOR LOFTUS DIVERSION CHANNEL - CITY OF BREA

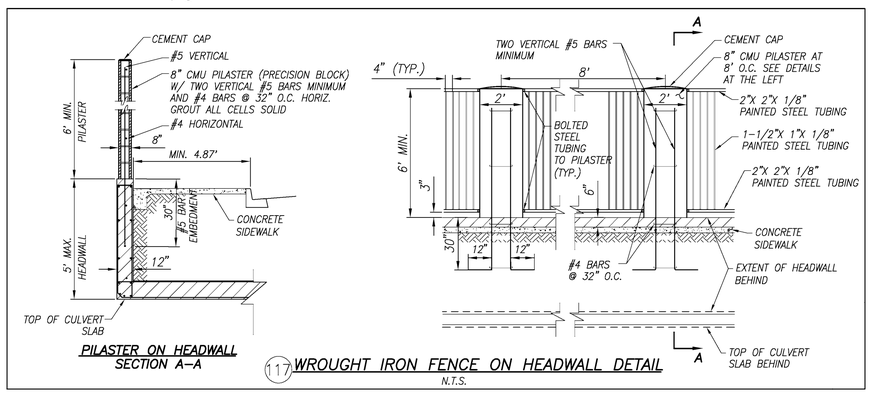
F:\0381\Engineering\SY_Channel\SHT07.dwg

PROFILE SCALES	
HORIZ.:	1"= 10'
VERT.:	1"= 2'



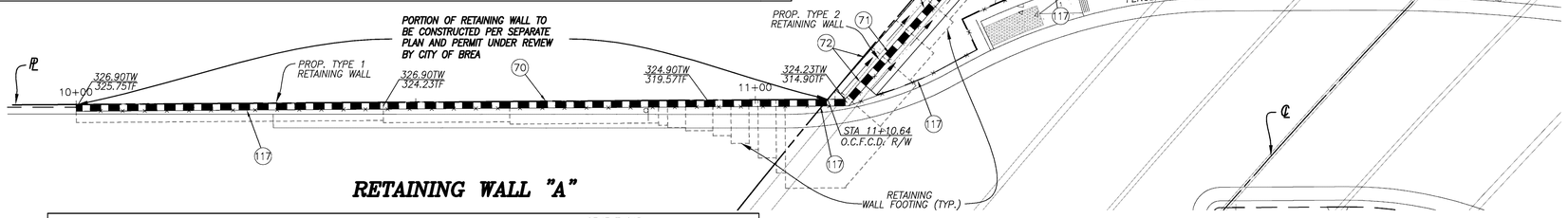
RETAINING WALL "A"

NOTE: RETAINING WALL & APPURTENANCES IN O.C.F.C.D. R/W WILL BE MAINTAINED BY PERMITTEE

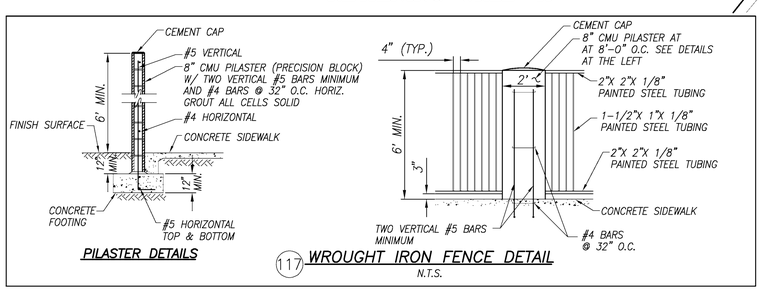


PILASTER ON HEADWALL
SECTION A–A

(117) WROUGHT IRON FENCE ON HEADWALL DETAIL
N.T.S.



RETAINING WALL "A"



PILASTER DETAILS

(117) WROUGHT IRON FENCE DETAIL
N.T.S.

RETAINING WALL NOTES

- (70) CONST. RETAINING WALL "A" TYPE 1 PER DETAIL ON SHEET 9
- (71) CONST. RETAINING WALL "A" TYPE 2 PER DETAIL ON SHEET 9
- (72) CONST. WALL V-DITCH PER DETAIL ON SHEET 10
- (73) CONST. WALL DITCH TO PIPE INLET PER DETAIL ON SHEET 10
- (76) CONST. SPLASH WALL PER DETAIL ON SHEET 10
- (80) INST. 18" R.C.P. (2000 D)
- (104) CONST. JUNCTION STRUCTURE TYPE V PER OCPW STD. PLAN 1314
- (107) CONST. 6' HIGH CHAIN LINK FENCE PER APWA 600-1-OC
- (114) CONST. JUNCTION STRUCTURE PER OCPW STD. PLAN 1313
- (115) CONST. PIPE INLET PER DETAIL ON SHT 10
- (117) CONST. 6' HIGH WROUGHT IRON FENCE PER DETAIL ON SHEET 8 (MAINTAINED BY PERMITTEE)

REINFORCED CONCRETE PIPE CURVE DATA

⬡	BEARING/DELTA	RADIUS	LENGTH	TANGENT
1	N 42°17'03" E	–	6.69'	–
2	75°45'25"	22.50'	29.75'	17.50'
3	N 61°57'32" W	–	6.81'	–
4	N 64°28'53" E	–	29.75'	–
5	N 70°31'07" W	–	4.64'	–

10 5 0 10 30
SCALE 1"=10'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER JONATHAN HOBART PETKE No. 67585 Exp.06/30/09 CIVIL STATE OF CALIFORNIA

SHEET 8 OF 10
RETAINING WALL PLAN & PROFILE
LOFTUS DIVERSION CHANNEL
FACILITY A06
CITY OF BREA

MAP	DATE	IDENTIFIER	09/30/08	BY:P.P.	01/23/09
			DATE OF LATEST CHANGE TO THIS MAP		DATE OF THIS PLOT

W.O. 2210-4 BIN RM DOC. NO. PRECISE GRADING/EROSION CONTROL PLAN FOR BREA PLAZA COMMERCIAL DEVELOPMENT

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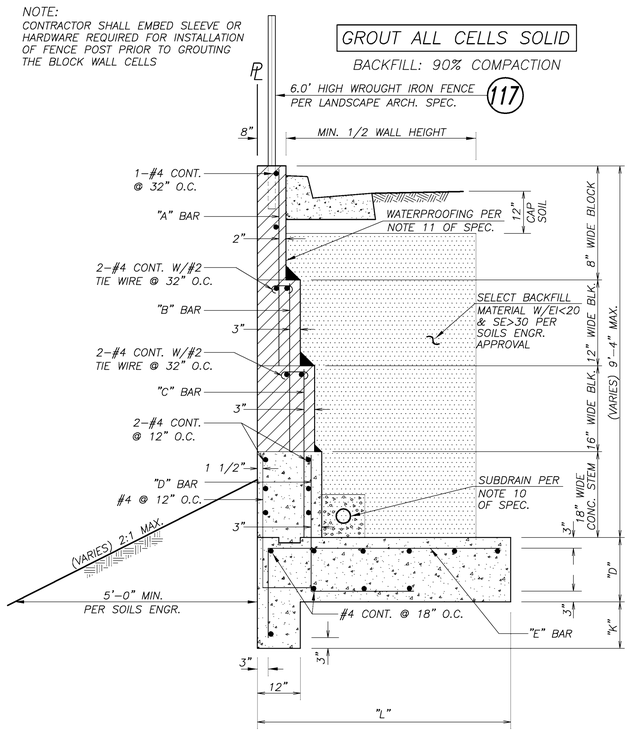
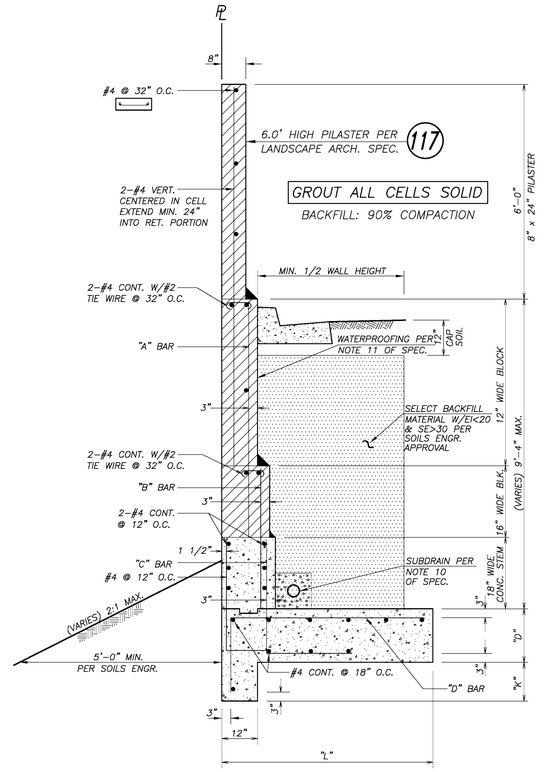


70 RETAINING WALL "A" TYPE 1

W/LEVEL BACKFILL

N.T.S.

NOTE:
1- FOR WALL HT. 3'-4" & LOWER HOOK THE "A" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR
2- FOR WALL HT. 4'-0" TO 6'-0" HOOK THE "B" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR
3- FOR WALL HT. 6'-8" TO 8'-0" HOOK THE "C" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR

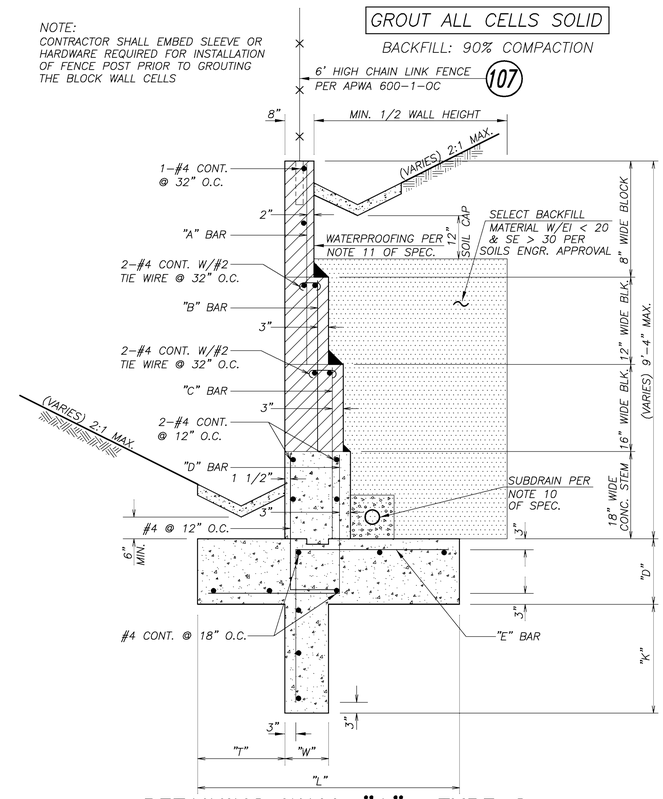


70 RETAINING WALL "A" TYPE 1

W/LEVEL BACKFILL @ PILASTER SPACING

N.T.S.

NOTE:
1- FOR WALL HT. 5'-4" & LOWER HOOK THE "A" BAR INTO FTG. IN THE SAME CONFIGURATION AS "C" BAR
2- FOR WALL HT. 6'-0" TO 7'-4" HOOK THE "B" BAR INTO FTG. IN THE SAME CONFIGURATION AS "C" BAR



71 RETAINING WALL "A" TYPE 2

W/2:1 BACKFILL

N.T.S.

NOTE:
1- FOR WALL HT. 4'-0" & LOWER HOOK THE "A" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR
2- FOR WALL HT. 4'-8" TO 6'-0" HOOK THE "B" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR
3- FOR WALL HT. 6'-8" TO 7'-4" HOOK THE "C" BAR INTO FTG. IN THE SAME CONFIGURATION AS "D" BAR

RETAINING WALL "A" TYPE 1 W/LEVEL BACKFILL SCHEDULE

WALL HT.	8" BLOCK	12" BLOCK	16" BLOCK	18" CONC.	"A" BAR	"B" BAR	"C" BAR	"D" BAR	"E" BAR	"L"	"D"	"K"
2'-0"	2'-0"	–	–	–	#4@32"	–	–	–	#4@16"	2'-8"	12"	3"
2'-8"	2'-8"	–	–	–	#4@16"	–	–	–	#4@16"	3'-0"	12"	5"
3'-4"	3'-4"	–	–	–	#4@8"	–	–	–	#4@16"	3'-4"	12"	7"
4'-0"	2'-0"	2'-0"	–	–	#4@32"	#4@16"	–	–	#4@16"	3'-8"	12"	10"
4'-8"	2'-0"	2'-8"	–	–	#4@32"	#5@16"	–	–	#4@16"	4'-0"	12"	12"
5'-4"	2'-8"	2'-8"	–	–	#4@16"	#5@8"	–	–	#5@16"	4'-6"	12"	1'-1"
6'-0"	2'-8"	3'-4"	–	–	#4@16"	#7@8"	–	–	#5@8"	4'-9"	12"	1'-4"
6'-8"	2'-0"	2'-0"	2'-8"	–	#4@32"	#4@16"	#5@8"	–	#5@8"	5'-3"	16"	1'-3"
7'-4"	2'-0"	2'-0"	3'-4"	–	#4@32"	#4@16"	#6@8"	–	#5@8"	6'-0"	16"	1'-2"
8'-0"	2'-0"	2'-0"	4'-0"	–	#4@32"	#4@16"	#8@8"	–	#5@8"	6'-9"	16"	1'-1"
8'-8"	2'-0"	2'-0"	2'-0"	2'-8"	#4@32"	#4@16"	#4@8"	#5@16"	#5@8"	7'-9"	18"	7"
9'-4"	2'-0"	2'-0"	2'-8"	2'-8"	#4@32"	#4@16"	#4@8"	#5@8"	#5@8"	8'-9"	18"	5"

RETAINING WALL "A" TYPE 1 W/LEVEL BACKFILL SCHEDULE @ PILASTER SPACING

WALL HT.	12" BLOCK	16" BLOCK	18" CONC.	"A" BAR	"B" BAR	"C" BAR	"D" BAR	"L"	"D"	"K"
2'-0"	2'-0"	–	–	#4@16"	–	–	#4@16"	3'-2"	12"	–
2'-8"	2'-8"	–	–	#4@16"	–	–	#4@16"	3'-9"	12"	–
3'-4"	3'-4"	–	–	#4@16"	–	–	#4@16"	4'-3"	12"	–
4'-0"	4'-0"	–	–	#5@16"	–	–	#5@16"	4'-7"	12"	3"
4'-8"	4'-8"	–	–	#5@8"	–	–	#5@16"	4'-10"	12"	5"
5'-4"	5'-4"	–	–	#6@8"	–	–	#5@8"	5'-3"	12"	8"
6'-0"	3'-4"	2'-8"	–	#4@16"	#5@8"	–	#5@8"	5'-7"	16"	8"
6'-8"	3'-4"	3'-4"	–	#4@16"	#6@8"	–	#5@8"	6'-2"	16"	8"
7'-4"	3'-4"	4'-0"	–	#4@16"	#7@8"	–	#5@8"	7'-0"	16"	6"
8'-0"	3'-4"	2'-8"	2'-0"	#4@16"	#4@8"	#5@8"	#5@8"	8'-0"	18"	–
8'-8"	3'-4"	2'-8"	2'-8"	#4@16"	#4@8"	#5@8"	#5@8"	9'-0"	18"	–
9'-4"	3'-4"	2'-8"	3'-4"	#4@16"	#4@8"	#5@8"	#5@8"	10'-3"	18"	–

RETAINING WALL "A" TYPE 2 W/2:1 BACKFILL SCHEDULE

WALL HT.	8" BLOCK	12" BLOCK	16" BLOCK	18" CONC.	"A" BAR	"B" BAR	"C" BAR	"D" BAR	"E" BAR	"T"	"L"	"D"	"W"	"K"
2'-0"	2'-0"	–	–	–	#4@32"	–	–	–	#4@16"	12"	2'-9"	12"	8"	6"
2'-8"	2'-8"	–	–	–	#4@32"	–	–	–	#4@16"	12"	3'-0"	12"	8"	10"
3'-4"	3'-4"	–	–	–	#4@16"	–	–	–	#4@16"	12"	3'-5"	12"	8"	1'-2"
4'-0"	4'-0"	–	–	–	#5@16"	–	–	–	#4@16"	12"	3'-9"	12"	8"	1'-7"
4'-8"	2'-8"	2'-0"	–	–	#4@32"	#4@16"	–	–	#4@16"	12"	4'-2"	12"	8"	1'-9"
5'-4"	2'-8"	2'-8"	–	–	#4@32"	#5@16"	–	–	#5@16"	1'-6"	4'-2"	12"	12"	2'-1"
6'-0"	3'-4"	2'-8"	–	–	#4@16"	#5@8"	–	–	#5@16"	1'-6"	4'-8"	12"	12"	2'-5"
6'-8"	2'-0"	2'-0"	2'-8"	–	#4@32"	#4@16"	#5@16"	–	#5@16"	1'-6"	5'-4"	16"	12"	2'-6"
7'-4"	1'-4"	2'-0"	4'-0"	–	#4@32"	#4@16"	#8@8"	–	#5@8"	2'-0"	6'-6"	16"	12"	2'-11"
8'-0"	2'-4"	2'-0"	2'-0"	2'-0"	#4@16"	#4@16"	#4@8"	#5@8"	#5@8"	2'-0"	7'-4"	18"	12"	3'-2"
8'-8"	2'-0"	2'-0"	2'-0"	2'-8"	#4@16"	#4@16"	#4@8"	#5@8"	#6@8"	2'-0"	8'-6"	18"	12"	3'-6"
9'-4"	2'-0"	2'-0"	2'-0"	3'-4"	#4@16"	#4@16"	#4@8"	#5@8"	#6@8"	2'-0"	10'-6"	18"	12"	3'-10"

NOTE:

ALL WORK MUST BE IN CONFORMANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION ("GREEN BOOK") AND THE LATEST EDITION OF OCPW STANDARD PLANS. THE "GREEN BOOK" AND THE LATEST EDITION OF OCPW STANDARD PLANS MUST BE KEPT ON THE JOB SITE AT ALL TIMES.

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER JONATHAN HOBART PETKE No. 67585 Exp.06/30/09 CIVIL STATE OF CALIFORNIA

SHEET 9 OF 10
RETAINING WALL DETAILS
LOFTUS DIVERSION CHANNEL
FACILITY A05
CITY OF BREA

MAP DATE IDENTIFIER 09/30/08 BY:P.P. 01/22/09
DATE OF THIS PLOT
DATE OF LATEST CHANGE TO THIS MAP

W.O. 3210-4 BIN RM DOC NO.
PRECISE GRADING/EROSION CONTROL PLAN FOR BREA PLAZA COMMERCIAL DEVELOPMENT

F:\0381\Engineering\SY_Channel\SHT09.dwg

RETAINING WALL SPECIFICATIONS

CONCRETE:

PORTLAND CEMENT PER ASTM C 150
CONCRETE AGGREGATE PER ASTM C 33
f'c = 2500 PSI AT 28 DAYS.
CEMENT TYPE PER SOILS ENGINEER'S RECOMMENDATION

REINF. STEEL:

DEFORMED BILLET STEEL BARS PER ASTM A 615 AS FOLLOWS:
#4 OR SMALLER GRADE 40
#5 OR LARGER GRADE 60

CONCRETE BLOCK:

f'm = 1500 PSI AT 28 DAYS
GRADE "N" HOLLOW UNIT BLOCK PER ASTM C 90, BLOCK TYPE, COLOR AND /OR ARCHITECTURAL FINISH PER LANDSCAPE PLANS
"NO SPECIAL INSPECTION"

MORTAR:

TYPE "S" PER ASTM C 270
1 PART CEMENT
1/2 PART LIME PUTTY
4 1/2 PARTS SAND

GROUT:

CONFORMING TO ASTM C 476
1 PART CEMENT
3 PARTS SAND
2 PARTS PEA GRAVEL

f'c = 2000 PSI
GROUT SHALL BE OF FLUID CONSISTENCY

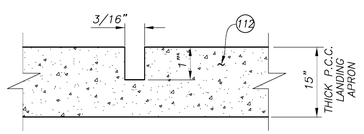
NOTES

1. GROUT ALL CELLS SOLID.
2. ALL FOOTINGS SHALL BE POURED ON UNDISTURBED GROUND OR UNDISTURBED ENGINEERED COMPACTED FILL.
3. WALL SHALL BE LAID TRUE AND PLUMB.
4. PROVISIONS SHALL BE MADE FOR ADJOINING CONSTRUCTION.
5. ALL SPLICES SHALL BE 48 BAR DIAMETERS.
6. ALL CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH APPLICABLE SECTIONS OF THE 2007 CALIFORNIA BUILDING CODE
7. ALL BARS SHALL BE BENT COLD.
8. CONTRACTOR SHALL VERIFY COMPATIBILITY OF DESIGN WITH EXISTING CONDITIONS PRIOR TO PLACEMENT OF FOOTING STEEL.
9. BACKFILL SHALL BE PER SOILS ENGINEER'S RECOMMENDATIONS.
10. SUBDRAIN SHALL BE 4" PERFORATED PVC SCHEDULE 40 PIPE PLACE 1.0 CF/LF OF 3/4" GRAVEL MATRIX AROUND PIPE WRAPPED IN FILTER FABRIC. OUTLET SUBDRAIN VIA 4" PVC SCH. 40 SOLID WALL PIPE TO THE ALLOWABLE & APPROPRIATE DRAINAGE DEVICE.
11. WATERPROOF BACK OF ALL THE RETAINING WALLS W/2 COATS OF ASPHALTIC EMULSION PER MANUFACTURER'S SPECIFICATIONS.
12. BACKFILLING SHALL NOT BE PERMITTED UNTIL AT LEAST 7 DAYS AFTER THE WALLS ARE BUILT.
13. CONTROL JOINTS SHALL BE PLACED AT ALL ANGLE POINTS, BC, EC AND AT A MAXIMUM 24' O.C. ON STRAIGHT PORTIONS.
14. OUTLET OF ANY SURFACE DRAINAGE PIPE INTO THE SUBDRAIN SYSTEM IS ABSOLUTELY PROHIBITED.

SOILS DATA:

BY Pacific Soils Engineering, Inc.
DATED February 18 & June 4, 2008

BEARING = 2000 PSF
(LEVEL BACKFILL) EFP = 36 PCF (SELECT BACKFILL)
(2:1 BACKFILL) EFP = 52 PCF (SELECT BACKFILL)
PFP = 250 PCF
u = 0.30
DENSITY = 125 PCF
SOLUBLE SULFATE EXPOSURE = NEGLIGIBLE



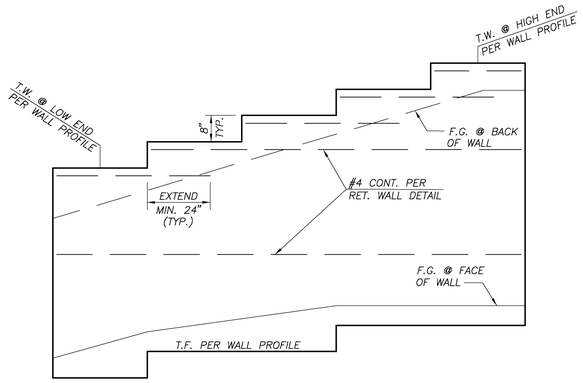
(116) LONGITUDINAL CONTROL JOINT DETAIL

N.T.S.

CONSTRUCTION NOTES

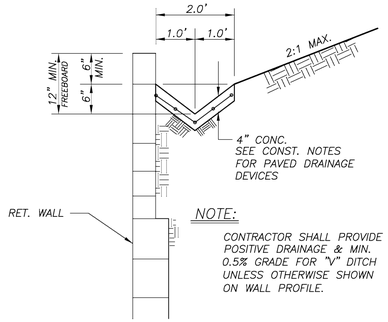
(109) CONST. RIP-RAP PER DETAIL ON SHEET NO. 4
(107) CONST. 6' HIGH CHAIN LINK FENCE PER APWA 600-1-0C
(110) CONST. 6" P.C.C./6" A.B. ACCESS RAMP PER O.C.F.C.D. ADDENDUM NO. 4 (TRANSVERSE RAKED FINISH)
(111) CONST. 6" THICK P.M.B. ACCESS ROAD PER O.C.F.C.D. ADDENDUM NO. 4
(112) CONST. P.C.C. LANDING APRON PER O.C.F.C.D. ADDENDUM NO. 4 (STRUCTURAL INVERT SAME AS R.C.B. SECTION A PER SHEET NO. 2, STEEL TROWEL FINISH)
(113) CONST. CHAIN LINK GATE PER OCPW STANDARD PLAN 600-1-0C
(118) CONST. LONGITUDINAL CONTROL JOINT PER DETAIL HEREON
(117) CONST. 6' HIGH WROUGHT IRON FENCE PER DETAIL ON SHEET 8 (MAINTAINED BY PERMITTEE)

NOTE:
ALL WORK MUST BE IN CONFORMANCE WITH THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION ("GREEN BOOK") AND THE LATEST EDITION OF OCPW STANDARD PLANS. THE "GREEN BOOK" AND THE LATEST EDITION OF OCPW STANDARD PLANS MUST BE KEPT ON THE JOB SITE AT ALL TIMES.



HORIZONTAL REINFORCEMENT LAYOUT (TYP.)

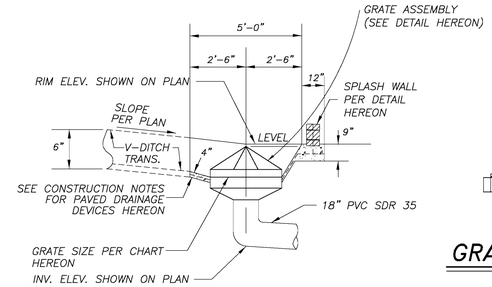
N.T.S.



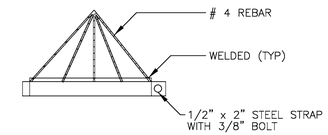
NOTE:
CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE & MIN. 0.5% GRADE FOR "V" DITCH UNLESS OTHERWISE SHOWN ON WALL PROFILE.

(72) BACK OF WALL DITCH

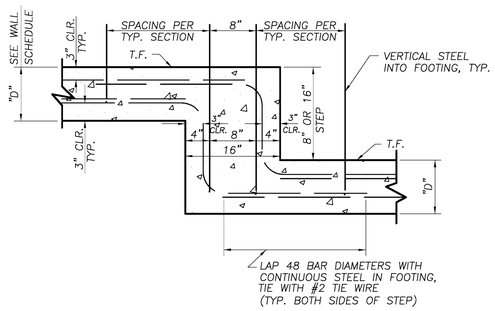
NOT TO SCALE



SECTION A-A

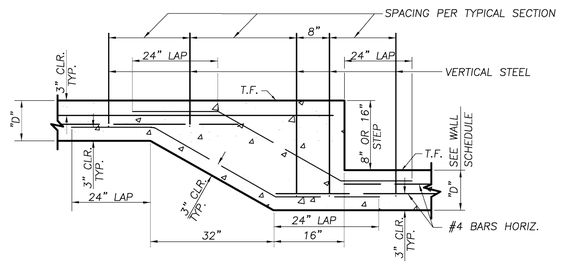


GRATE ASSEMBLY DETAIL



STEPPED FOOTING DETAIL

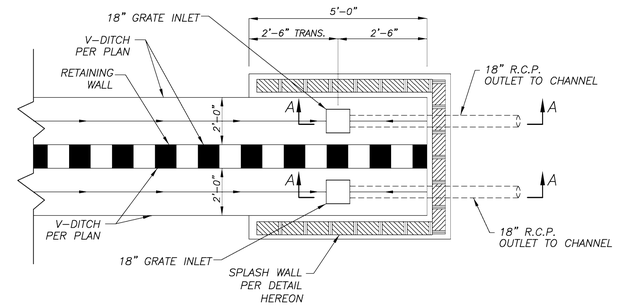
ALT. #1 N.T.S.



STEPPED FOOTING DETAIL

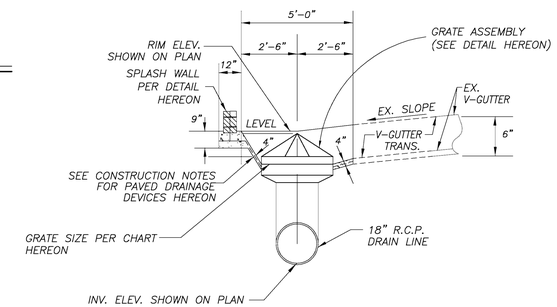
ALT. #2 N.T.S.

NOTE: TIE WITH #2 TIE WIRE AT ALL LAPS



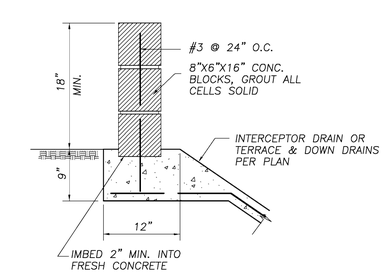
(73) BACK OF WALL DITCH TO PIPE INLET

NOT TO SCALE



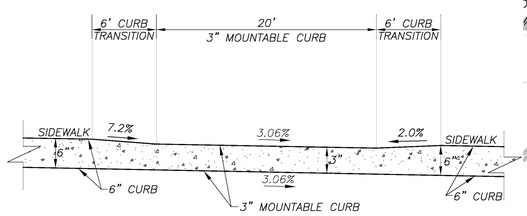
(115) PIPE INLET DETAILS

NOT TO SCALE

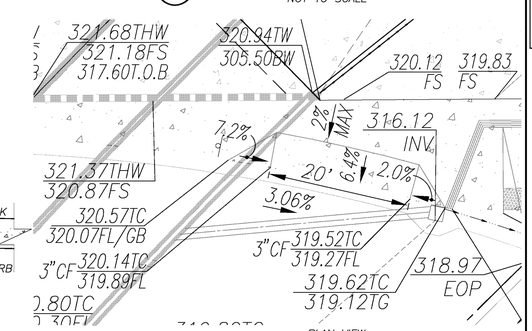


(76) SPLASH WALL

NOT TO SCALE



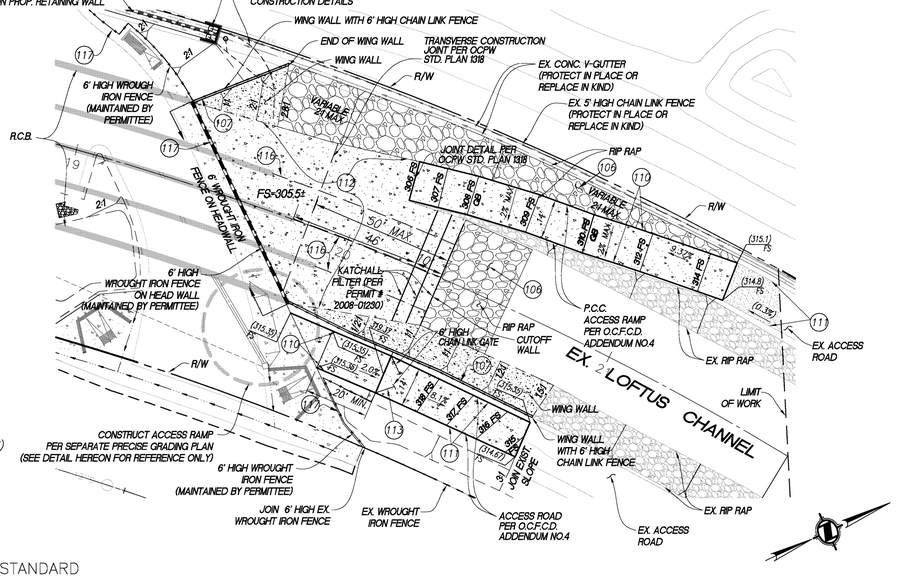
CROSS SECTION VIEW



PLAN VIEW
SCALE: 1"=10'

ACCESS RAMP DETAILS

N.T.S.



DETAIL OF ACCESS RAMP PER O.C.F.C.D. ADDENDUM NO.4

SCALE: 1"=25'

NO.	DESCRIPTION	SHT.	APPROVED	DATE

REVISIONS

DWG. NO. A06-701-6

REGISTERED PROFESSIONAL ENGINEER JONATHAN HOBART PETKE No. 67585 Exp.06/30/09 CIVIL STATE OF CALIFORNIA

SHEET 10 OF 10
RETAINING WALL DETAILS & NOTES
ACCESS RAMP DETAILS
LOFTUS DIVERSION CHANNEL
FACILITY A05
CITY OF BREA

MAP DATE IDENTIFIER	09/30/08	BY:P.P.	01/22/09
	DATE OF LATEST CHANGE TO THIS MAP		DATE OF THIS PLOT

W.O. 3210-4 BIN RM DOC NO. PRECISE GRADING/EROSION CONTROL PLAN FOR BREA PLAZA COMMERCIAL DEVELOPMENT

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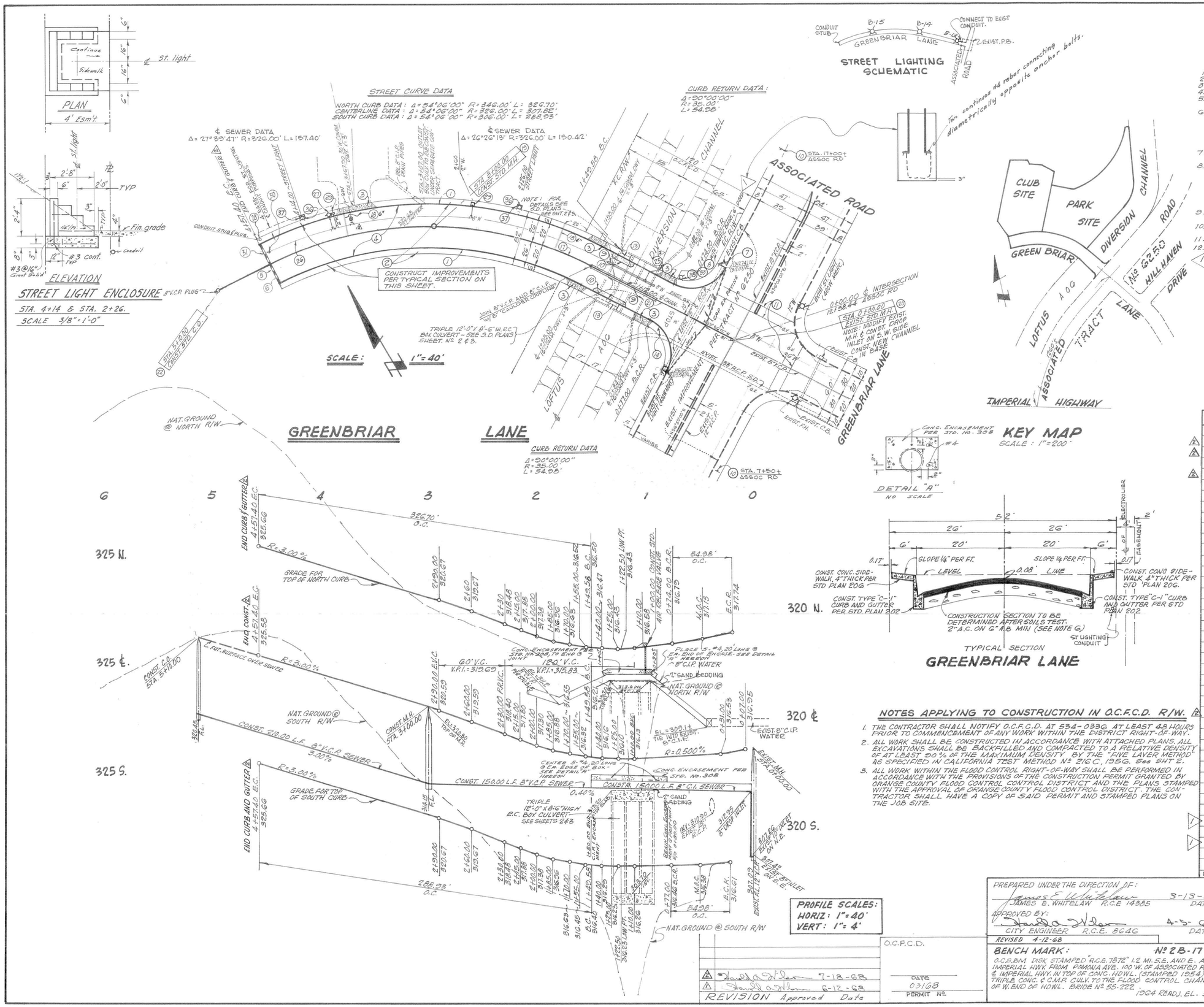
C. LOFTUS CHANNEL RCB CULVERT AT GREENBRIAR LANE

1253-01



GENERAL NOTES

1. SEE STANDARD 104 FOR TYPICAL SECTION OF LOCAL
2. SEE STANDARD 902.
3. ONE PARKWAY TREE SHALL BE PLANTED AT APPR
4. STREET LIGHTING SPECIFICATIONS ~ SEE STANDARD
5. NO JOINT PIPE MAY BE SUBSTITUTED FOR R.C.P. WH STANDARD PLAN 515.
6. UPON COMPLETION OF THE ROUGH GRADING, THE CI HAVE THE ORANGE COUNTY ROAD DEPARTMENT MA TESTS AND DETERMINE THE CONSTRUCTION SECTI AND BASE THICKNESS SHOWN ON THESE PLANS THE ENGINEER AND DO NOT INDICATE FINAL SECTIO TO BE INCLUDED IN CONTRACT.
7. THE CITY OF BREA WILL DO ALL NECESSARY ST DEVELOPER FOR COSTS THEREOF.
8. THE EXISTENCE AND LOCATION OF ANY UNDERGROU STRUCTURES SHOWN ON THESE PLANS ARE OBTAIN OF THE AVAILABLE RECORDS. TO THE BEST OF OUR ARE NO EXISTING UTILITIES OTHER THAN SHOWN THE CONTRACTOR IS REQUIRED TO TAKE ALL PRE URES TO PROTECT THE UTILITY LINES AND ANY O RECORD OR NOT SHOWN ON THESE PLANS.
9. TYPE I BEDDING PER STD. 308 SHALL BE USED ATIONS UNLESS OTHERWISE NOTED ON THESE PLA
10. DRIVEWAYS TO BE CONSTRUCTED PER CITY OF BRE UNLESS OTHERWISE NOTED ON THESE PLANS.
11. ALL LOCAL STREETS TO HAVE SOLID WHITE CENTER
12. ELECTROLIER (38) SHALL BE FURNISHED WITHOU BUT, WITH: PLATE OVER ARM SOCKET, HAND OPPOSITE TRAFFIC, PLUGGED HOLES FO PEDESTRIAN BUTTON - SIGNAL HEADS AN WALK SIGNALS.

STREET NAME SIGN (7)			
NO. COR.	ASSOCIATED RD.	400 S.	GREENB

NOTES APPLYING TO CONSTRUCTION IN O.C.F.C.D. R/W.

1. THE CONTRACTOR SHALL NOTIFY O.C.F.C.D. AT 534-0336 AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE DISTRICT RIGHT-OF-WAY.
2. ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH ATTACHED PLANS. ALL EXCAVATIONS SHALL BE BACKFILLED AND COMPACTED TO A RELATIVE DENSITY OF AT LEAST 90 % OF THE MAXIMUM DENSITY BY THE "FIVE LAYER METHOD" AS SPECIFIED IN CALIFORNIA TEST METHOD Nº 216 C, 1956. See SHT. 2.
3. ALL WORK WITHIN THE FLOOD CONTROL RIGHT-OF-WAY SHALL BE PERFORMED IN ACCORDANCE WITH THE PROVISIONS OF THE CONSTRUCTION PERMIT GRANTED BY ORANGE COUNTY FLOOD CONTROL CONTROL DISTRICT AND THE PLANS STAMPED WITH THE APPROVAL OF ORANGE COUNTY FLOOD CONTROL DISTRICT. THE CONTRACTOR SHALL HAVE A COPY OF SAID PERMIT AND STAMPED PLANS ON THE JOB SITE.

ESTIMATE OF QUANTIT

		STREETS	
	1	CURB & GUTTER TYPE "C-1"	
	2	P.C.C. SIDEWALK 4" THICK	206
	3	P.C.C. COMMERCIAL DRIVEWAY	2
	4	2" A.C. W/SC.250 P.C. ON 6" A.B. (SEE NOTE 6)	214
	5	BARRICADE	6
	6	2" x 6" REDWOOD HEADER	6
	7	STREET NAME SIGN	6
	8	TRAFFIC SIGN W53'R (TEMR)	6
	9	CONCRETE ENCASEMENT	3
	10	"GREENBRIAR LANE" ADVANCE SIGN 8" U.C. GTR W/BACK FRAME 6" L.C.	6
	11	CROSSWALK	6
	13	INLET - VARIABLE LENGTH PER SHT. 3	
	14	TRAFFIC SIGN R1R	
		SEWERS	
	17	8" V.C.P. MAINLINE SEWER	4
	18	4&6" V.C.P. HOUSE LATERAL	4
	19	STD. MANHOLE	4
	20	CONST. DROP INTO EXIST STD. MANHOLE	4
	21	8" C.I.P. MAINLINE SEWER	301,
	22	STD. CLEAN-OUT	4
		WATER	
	25	AIR RELEASE VALVE ASSEMBLY	3
	26	4&8" C.I.P. WATER	5
	27	FIRE HYDRANT ASSEMBLIES, A 24015	3
	28	BLOW-OFF ASSEMBLY	3
	29	WATER SERVICE - 2"	3
	30	8" G.V. & 6" GV	3,2
	31	8" C.I.P. PLUG	3
		STREET LIGHTS	
	35	EXTERNAL SHIELDS 35-100947-02	6
	34	SHIELDS (STREET) 35-103413-01	6
	35	SHIELDS (HOUSE) 35-104562-02	6
1	36	D7425120 175W II Pf. & Kendall ELECTROLIER	
	37	STREET LIGHT ENCLOSURE	
1	38	WR-15-J-309-5-0, 400W II Pf. & Kendall ELECTROLIER	822
ITEM	DESCRIPTION		PER B

PREPARED UNDER THE DIRECTION OF:
JAMES E. WHITELAW R.C.E. 14385 — DATE 3-13-68
APPROVED BY:
CITY ENGINEER R.C.E. 8646 — DATE 4-5-68
REVISED 4-12-68

BENCH MARK: Nº 2B-17-58
O.C.B.M. DISK STAMPED "R.C.E. 7872" 1.2 MI. S.E. AND E. ALONG IMPERIAL HWY. FROM PIMENTA AVE. 100' W. OF ASSOCIATED RD. 18' S. ℄ IMPERIAL HWY. IN TOP OF CONC. HDWL. (STAMPED 1954) OF A TRIPLE CONC. ℄ C.M.P. CULV. TO THE FLOOD CONTROL CHANNEL 1' E. OF W. END OF HDWL. BRIDGE Nº 55-222
1964 READJ. EL. 308.483.

REVISION	Approved	Date
2	Donald A. Wilson	7-18-68
1	Donald A. Wilson	6-12-68

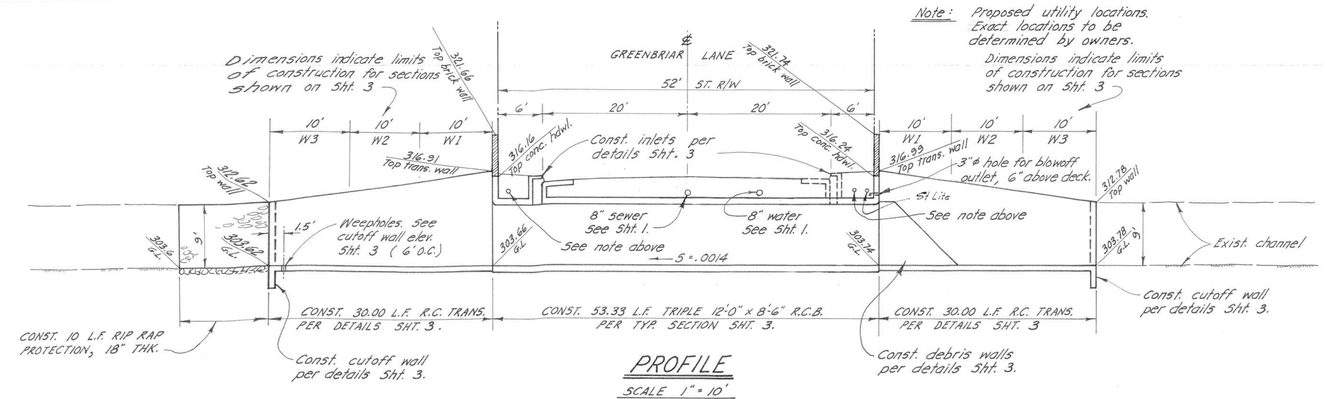
O.C.F.C.D.
DATE 031168
PERMIT Nº

CITY OF BRE
IMPROVEMENT
FOR
GREENBRIAR

PREPARED IN THE OFFICE OF
Voorheis-Trindle & Nelson, Inc.
13794 Beach Blvd
Westminster, Calif

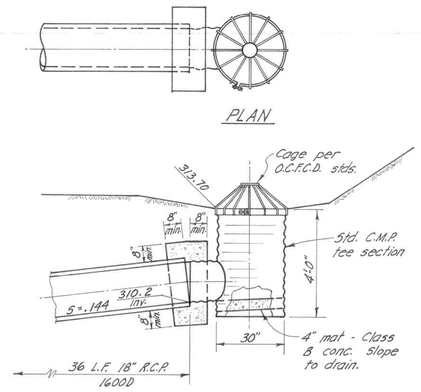
Date: 3-5-68 J.N. G-3015

1253-02



PROFILE

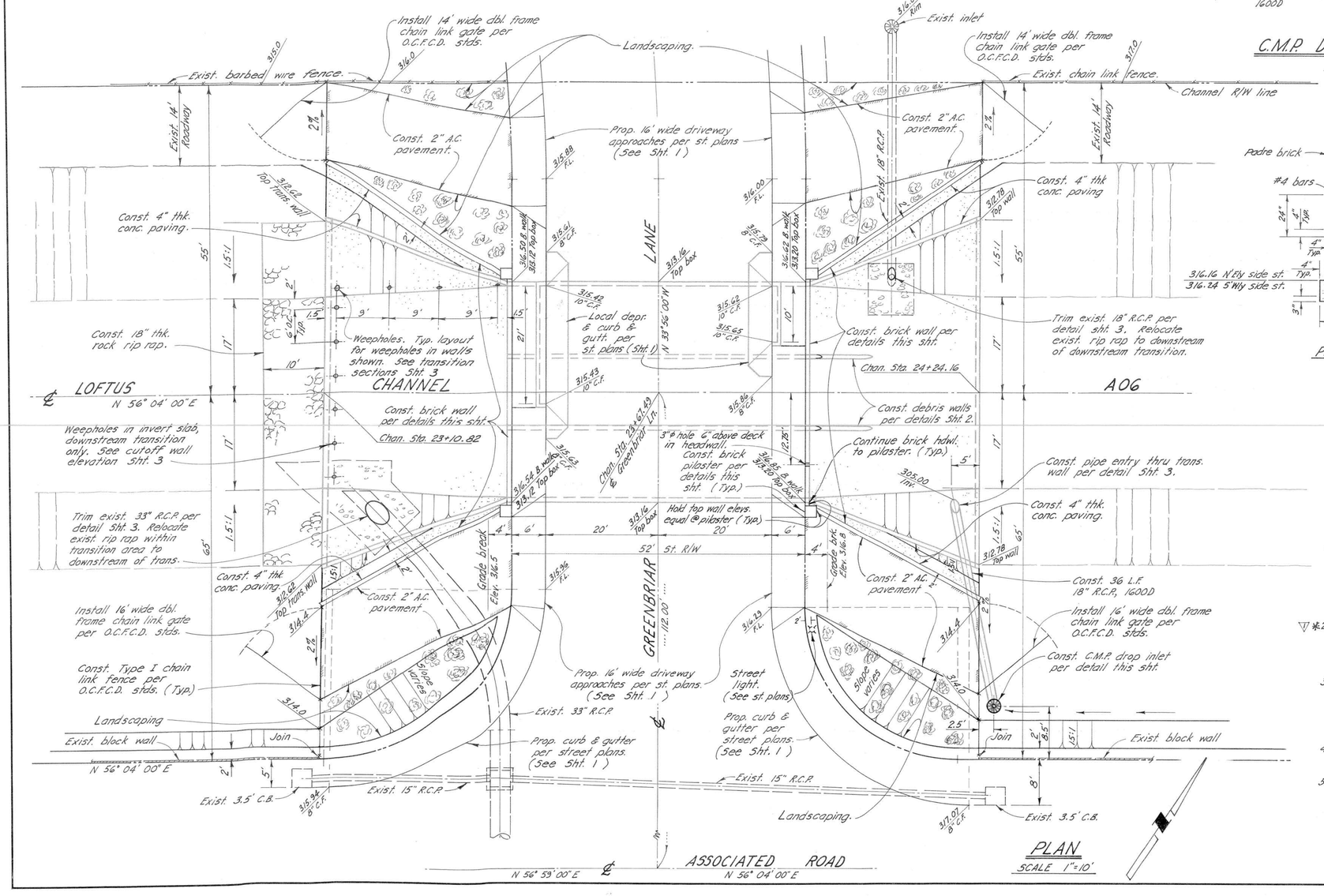
SCALE 1" = 10'



ELEVATION

C.M.P. DROP INLET DETAILS

SCALE 3/8" = 1'-0"



PLAN

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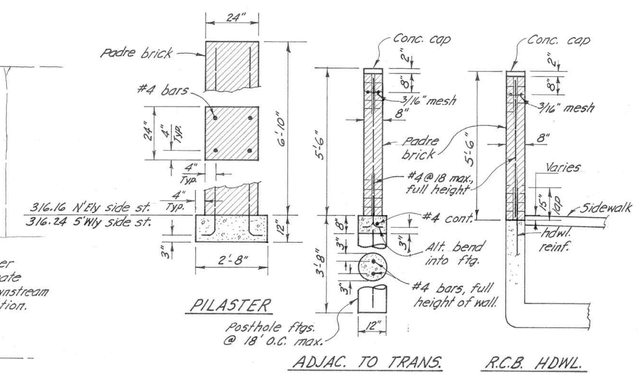
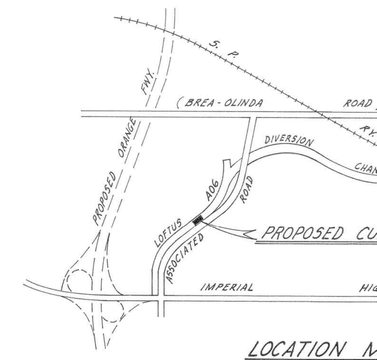


PILASTER

ADJAC. TO TRANS. R.C.B. HDWL.

BRICK WALL DETAILS

SCALE 3/8" = 1'-0"



LOCATION M

SCALE 1" = 1000

FLOOD CONTROL NOTE

All materials used and work district right of way shall co standard specifications and w construction permit granted u shall maintain a copy of sam and stamped plans on the p property and conformance w subject to inspection and duly assigned inspector who decisions shall be final.

ORANGE COUNTY FLOOD CO

PERMIT Nº 03168

GENERAL NOTES

1. Locations of public utilities shown have been determined from available information. However it shall be the responsibility of the contractor to determine the true location of any existing utilities and to exercise proper precautions to avoid injury or damage thereto.
2. ▽ *All excavations shall be backfilled & compacted to a relative density of at least 90% of the maximum density by the "Five Layer Method," as specified in California Test Method Nº 216; except as noted in Typical Section.
3. All materials and construction, including forms and minimum strength requirements for reinforced concrete before form removal, shall be in accordance with Orange County Flood Control District Specifications.
4. Lap all splices 30 bar diameters unless otherwise shown on plans.
5. All concrete in reinforced concrete structures shall be 3000 pounds per square inch Portland cement concrete.

▽ REV 4-22-68

REVISED 4-12-68

PREPARED UNDER THE DIRECTION O

Jack Mahoney RCE 14325

APPROVED FOR STREET IMPROVEM

City Engineer

BENCH MARK:

O.C.S. B.M. DISK STAMPED "RCE 7872 IMPERIAL HWY. FROM POMONA AVE. 18' S. E IMPERIAL HWY. IN THE TOP O 1954) OF A TRIPLE CONC. & C.M.P. CULV 1' E. OF THE W. END OF THE HDW'L. 1964 READJ.

O.C.F.C.D. BENCH MARK: Chis. "+" o Hwy. struct. Sta. 10+40 Loftus Chn Add 0.87 to elevs. shown hereon

CITY OF L

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LOFTUS CHANNEL AT

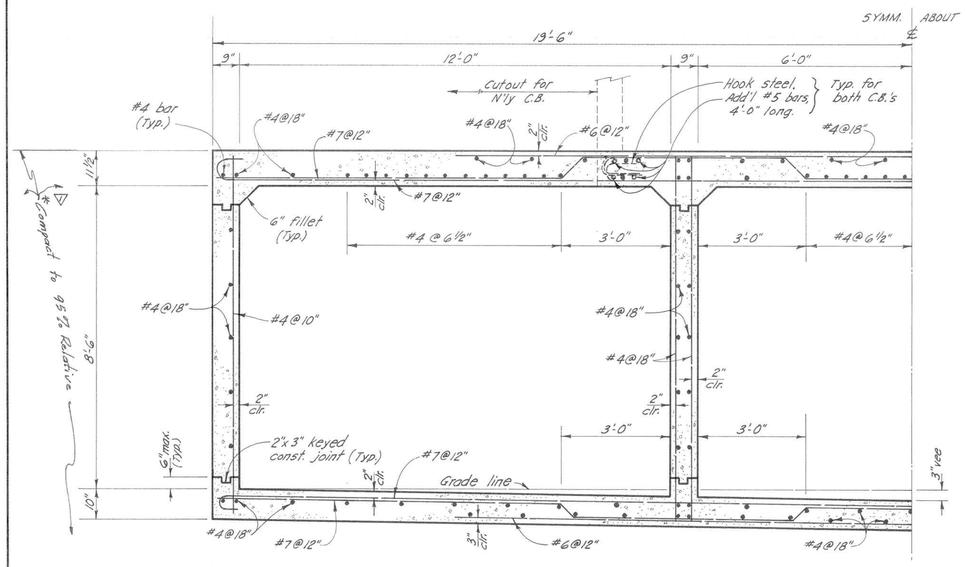
Prepared in the office of:

VOORHEIS TRINDLE NELSON, INC.

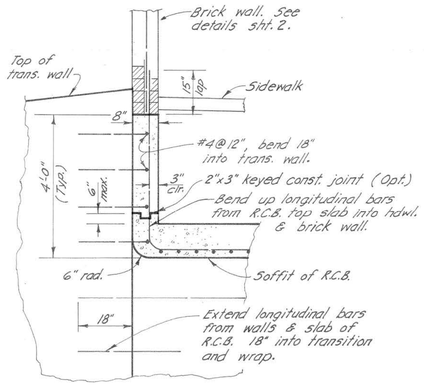
13794 BEACH BLVD.

WESTMINSTER, CALIF.

DATE: MARCH, 1968



TYPICAL SECTION
TRIPLE 12'-0" x 8'-6" R.C.B.
SCALE 1/2" = 1'-0"



HEADWALL DETAIL
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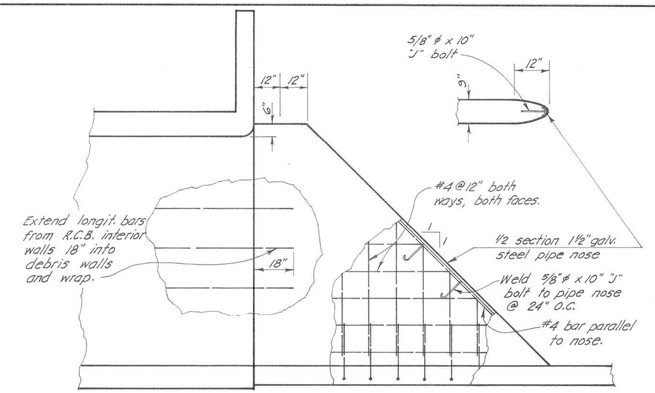
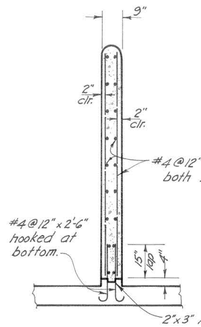
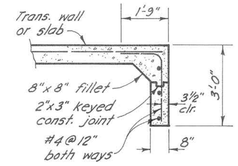


ELEVATION



SECTION

DEBRIS WALL DETAILS
SCALE 3/8" = 1'-0"



TYPICAL SECTION
CUTOFF WALL
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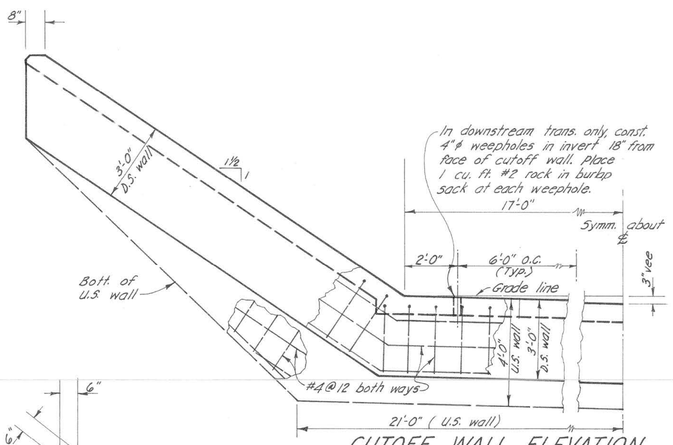
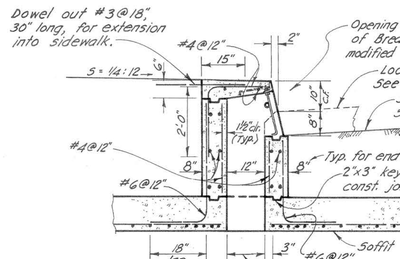
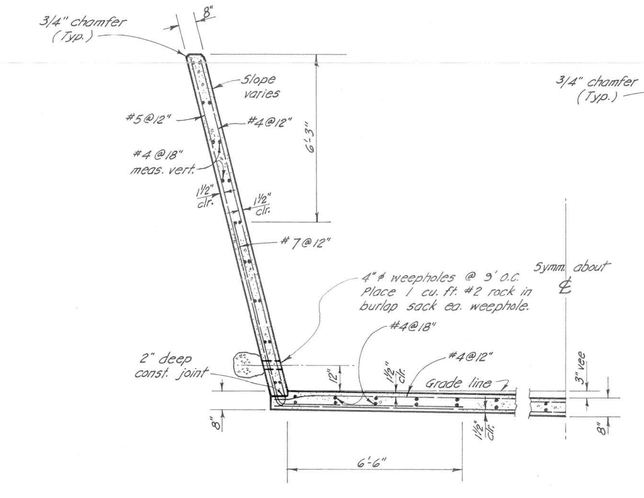


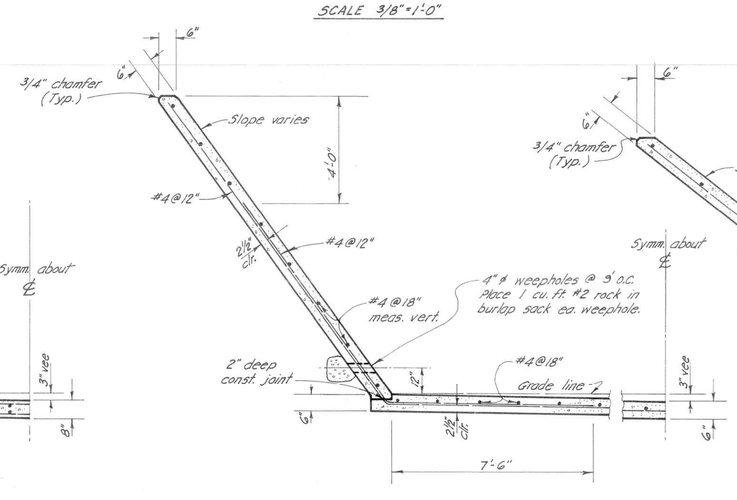
CUTOFF WALL ELEVATION
SCALE 3/8" = 1'-0"



(13) INLET DETAIL
SCALE 1/2" = 1'-0"



TRANS. SECTION W1
(SEE PROFILE SHT. 2.)
SCALE 3/8" = 1'-0"



TRANS. SECTION W2
(SEE PROFILE SHT. 2.)
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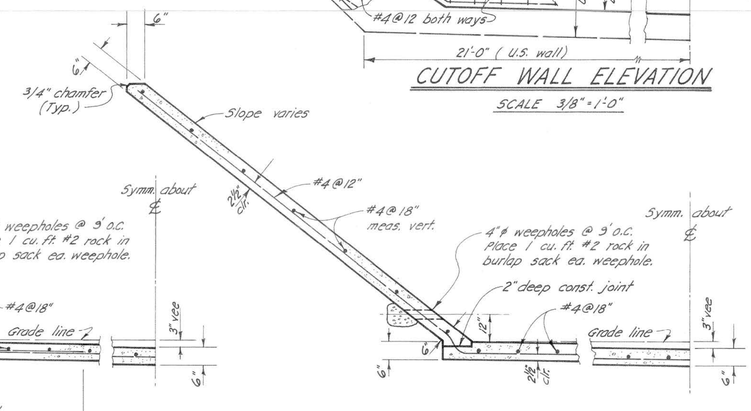

TRANS. SECTION W3
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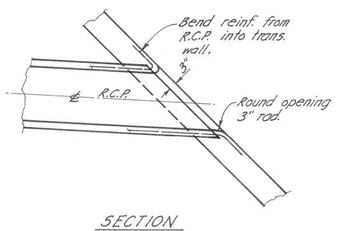

SECTION

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CITY OF BREA

STRUCTURAL DETA

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ON
LOFTUS CHANNEL AT GREE

Prepared in the office of:
VOORHEIS TRINDLE NELSON, INC.
13794 BEACH BLVD.
WESTMINSTER, CALIF.

DATE: MARCH, 1968

Appendix E. Updated Preliminary/Conceptual Water Quality Management Plan

Appendix

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PRELIMINARY/CONCEPTUAL WATER QUALITY MANAGEMENT PLAN

VESTING TENTATIVE TRACT MAP NO. 19394 "GREENBRIAR"

Project Address:
West of Greenbriar Lane and South Associated Road
City of Brea, CA

Prepared For:
LENNAR
2000 Fivepoint, 3rd Floor
Irvine, CA 92618
949.349.8000

Prepared By:
Hunsaker & Associates Irvine, Inc.
157 Technology
Irvine, CA 92618
949.583.1010

WQMP Preparation Date:
March 18, 2024
(Rev. March 3, 2025)

PRELIMINARY/CONCEPTUAL WATER QUALITY MANAGEMENT PLAN

VTTM No. 19394 – "Greenbriar"

West of Greenbriar Lane and South Associated Road

City of Brea, California

PRELIMINARY/CONCEPTUAL WATER QUALITY MANAGEMENT PLAN (WQMP)

Project Name:

VESTING TENTATIVE TRACT MAP NO. 19394 "GREENBRIAR"

West of Greenbriar Lane and South Associated Road

Brea, California

Prepared for:

LENNAR

2000 Fivepoint, 3rd Floor

Irvine, CA 92618

949.349.8000

Prepared by:

Hunsaker and Associates Irvine, Inc.

Engineer: Sean Swanson Registration No.: 95596

157 Technology

Irvine, CA 92618

949.583.1010

Prepared:

March 18, 2024

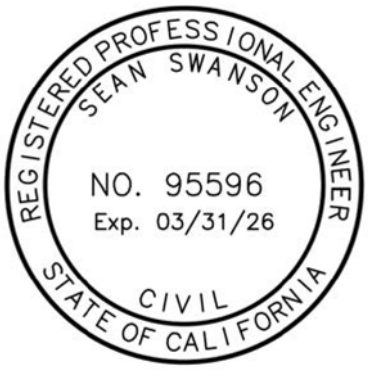
(Revised: July 9, 2024; January 29, 2025; March 3, 2025)

Project Owner's Certification			
Permit/Planning Application No.	PLN-2024-00020	Grading Permit No.	N/A
Tract/Parcel Map No.	VTTM No. 19394	Building Permit No.	N/A
CUP, SUP and/or APN (Specify Lot Numbers if Portions of Tract)			APN No. 319-102-34

This Water Quality Management Plan (WQMP) has been prepared for Lennar by Hunsaker and Associates Irvine, Inc. The WQMP is intended to comply with the requirements of the local NPDES Stormwater Program requiring the preparation of the plan.

The undersigned, while it owns the subject property, is responsible for the implementation of the provisions of this plan and will ensure that this plan is amended as appropriate to reflect up-to-date conditions on the site consistent with the current Orange County Drainage Area Management Plan (DAMP) and the intent of the non-point source NPDES Permit for Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the incorporated Cities of Orange County within the Santa Ana Region. Once the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement and amend the WQMP. An appropriate number of approved and signed copies of this document shall be available on the subject site in perpetuity.

Owner Representative: Lennar			
Name/Title	Gary Jones, Vice President – Land Acquisition		
Company	Lennar		
Address	2000 Fivepoint, 3rd Floor Irvine, CA 92618		
Email	gary.jones@lennar.com		
Telephone #	949.349.8000		
I understand my responsibility to implement the provisions of this WQMP including the ongoing operation and maintenance of the best management practices (BMPs) described herein.			
Signature	Gary Jones	Date	3-3-25

Preparer (Engineer): Sean Swanson			
Title	Project Manager	PE Registration #	95596
Company	Hunsaker & Associates Irvine, Inc.		
Address	157 Technology Irvine, CA 92618		
Email	sswanson@hunsaker.com		
Telephone #	949.583.1010		
I hereby certify that this Water Quality Management Plan is in compliance with, and meets the requirements set forth in, Order No. R8-2009-0030/NPDES No. CAS618030, of the Santa Ana Regional Water Quality Control Board.			
Preparer Signature		Date	03/03/2025
Place Stamp Here			

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Attachment A ..... Educational Materials
Attachment B ..... BMP Worksheets/Calculations & BMP Details
Attachment C ..... Hydromodification Analysis
Attachment D ..... Supporting Project Information
Attachment E ..... City Plan Check Correspondence
Attachment F ..... BMP Maintenance Self-Certification Form
Attachment G ..... Project Specific WQMP Summary Report

SECTION I DISCRETIONARY PERMIT(S) AND WATER QUALITY CONDITIONS

The project's discretionary permit and water quality information are provided in the following:

PROJECT INFORMATION			
Permit/Application No.	PLN-2024-00020	Tract/Parcel Map No.	TBD
Additional Information/ Comments:	This Preliminary Water Quality Management Plan has been developed in accordance with Section 7.II-1.5 of the Model Water Quality Management Plan and provides the basic framework to address the water quality component for the Greenbriar project.		
WATER QUALITY CONDITIONS			
Water Quality Conditions (list verbatim.)	The project is considered a priority project under the City of Brea Local Implementation Plan and Water Quality Ordinance (City Code Section 13.32.030). Therefore, the project is subject to the requirements of a Water Quality Management Plan (WQMP) to minimize the adverse effects of urbanization on site hydrology, runoff flow rates and pollutant loads. The project is in the preliminary planning phase of development, with this preliminary document prepared to support entitlement for the project. There are currently no site-specific water quality conditions of approval for the project.		
WATERSHED-BASED PLAN CONDITIONS			
Provide applicable conditions from watershed-based plans including WIHMPs and TMDLs	The project resides within the San Gabriel River – Coyote Creek Watershed. 303(d) and TMDL (in italic) Listed impairments for the project's receiving waters are as follows: San Gabriel River – Coyote Creek Watershed: Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – *Copper*, *Indicator Bacteria,* Iron, Malathion, pH, Toxicity San Gabriel River Reach 1 – pH, Temperature San Gabriel River Estuary – *Copper*, Dioxin, *Indicator Bacteria*, Nickel, Dissolved Oxygen There is currently no approved WIHMP for the watershed.		

SECTION II PROJECT DESCRIPTION

II.1 PROJECT DESCRIPTION

<table>
<tr><th colspan="3">DESCRIPTION OF PROPOSED PROJECT</th></tr>
<tr><td>Development Category (Verbatim from WQMP):</td><td colspan="2">This project is considered a priority project under the following categories:

Priority Project, Category 6 – Parking lots 5,000 square feet or more including associated drive aisle, and potentially exposed to urban storm water runoff. A parking lot is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce.

Priority Project, Category 8 – All significant redevelopment projects, where significant redevelopment is defined as the addition or replacement of 5,000 or more square feet of impervious surface on an already developed site. Redevelopment does not include routine maintenance activities that are conducted to maintain original line and grade, hydraulic capacity, original purpose of the facility, or emergency redevelopment activity required to protect public health and safety.</td></tr>
<tr><td>Project Area (ft^2):
422,478 ft^2
(9.69 Ac.)</td><td>Number of Dwelling Units: 179 residential units</td><td>SIC Code: No facilities subject to Standard Industrial Classification anticipated. Residential related improvements only.</td></tr>
<tr><td>Narrative Project Description:</td><td colspan="2">The proposed "Greenbriar" project (the Project) consists of an irregularly shaped, 9.7-acre parcel of land located just west of the intersection of Greenbriar Lane and South Associated Road, in the City of Brea, California. Specifically, the project site is bound to the north by Greenbriar Lane and existing residential beyond; to the east by existing Loftus Drainage Channel and Associated Road beyond; to the south by existing "Brea Plaza" shopping center; and to the west by State Route 57 (SR-57).

The project proposes 67 building structures to accommodate 179 multi-family residential units, wet and dry utilities, streets, parking areas, storm drain improvements, walkways, open space and parkway improvements. Land use for the project is as follows:
<table>
<tr><th colspan="3">LAND USE SUMMARY</th></tr>
<tr><td>Lot No.</td><td>Acres</td><td>Land Use</td></tr>
<tr><td>1</td><td>9.70</td><td>Future Residential, Access and Public Utilities</td></tr>
<tr><td>Total</td><td>9.70</td><td>--</td></tr>
</table></td></tr>
</table>

DESCRIPTION OF PROPOSED PROJECT

Proposed residential units consist of multi-level building structures with five (5) plan types that range from 944 ft^2 to 1,946 ft^2 of living area. Unit mix summary is as follows:

UNIT MIX SUMMARY		
Unit	Buildings	No. of Units
The Courts	16	80
The Yards	12	24
The Yards – Half Building	2	2
The Rooftops	36	72
The Rooftops – Half Building	1	1
Total	**67**	**179**

Parking is provided via 358 garage spaces, 51 uncovered parking stalls, and 4 ADA parking spaces for a total of 413 spaces. Project parking shall be consistent with the City's parking requirements for its density type.

There are no community facilities, such as park, tot lot or community center, proposed for the project.

Proposed open space/landscaping will consist of parkway and walkway landscaping, common landscaping located in between residential buildings and other open space areas. Total landscaping is anticipated to consist of approximately 20% of the project site, or 1.94 acres.

Paved and other impervious areas of the site include the project's private streets, walkways, parkway, drive approaches and gutter improvements, building structures and other exposed paved surfaces. Total impervious area is anticipated to consist of approximately 80% of the project site, or 7.76 acres.

Activities typical of residential developments are anticipated for the project. These include day-to-day activities such as recreation, lounging, commuting, exercising and other residential related activities.

The project does not propose any outdoor storage areas, loading areas, car wash areas or other commercial activities.

Typical wastes from households are anticipated to be generated daily from the project. These include food wastes, paper products and recyclable materials. These materials shall be kept within the private areas of each residential unit and be removed for disposal on a weekly basis by the local private waste management company.

All proposed improvements are shown in the WQMP Site Plan in Section VI of this WQMP. Areas currently not identified will be provided as project planning progresses.

DESCRIPTION OF PROPOSED PROJECT				
Project Area	Pervious Surface		Impervious Surface	
	Area (acres or sq ft)	Percentage	Area (acres or sq ft)	Percentage
Pre-Project Conditions	0.97	10	8.73	90
Post-Project Conditions	1.94	20	7.76	80
Drainage Patterns/Connections (Existing/Pre-Project)	The project is located north of the Loftus Diversion Channel (Orange County Flood Control Facility No. A06). All runoff from the project area, including off-site tributary areas drain into Loftus Diversion Channel to the east. The Loftus Diversion Channel is an engineered channel located 2/3 miles south of Lambert Road and runs east to west from Voyager to Associated Road and then runs southwest until crosses 57 Freeway and drains into U.S. Army Corps of Engineers Fullerton Creek Reservoir at Craig Regional Park. Loftus There is an existing triple 12'w x 8.5'h RCB culvert under Greenbriar Lane with an existing 10-ft catch basin on the north and a 21-ft catch basin on the south of Greenbriar Lane. Those catch basins are located right above the RCB culverts. There is an existing 4-cell RCB channel approximately 400' downstream of Greenbriar Lane. In the pre-project condition, onsite drainage is divided into four (4) drainage areas (Refer to Hydrology Maps in Attachment C). Drainage Area "A" contains the majority of the project site. The northern half of the project sheet flows to the northeast corner with an existing catch basin. There is also an existing 18" RCP collecting the off-site areas. Drainage Area "A" discharges into the existing 18" pipe to Loftus Diversion Channel. Drainage Area "B" contains the off-site areas along Greenbriar Lane and drains to the existing 10-ft catch basin on top of the triple RCB culvert. Drainage Area "C" contains the areas to the existing 21-ft catch basins on top of the triple RCB culvert. Drainage Area "D" contains the southern half the project site, sheet flows to the existing catch basin and to Loftus Diversion Channel via existing 18" pipe.			

II.2 POTENTIAL STORMWATER POLLUTANTS

Table 2.1, Anticipated and Potential Pollutants Generated by Land Use Type, from the Technical Guidance Document (December 2013) lists the following Pollutants of Concern (POC's) associated with the proposed development:

POLLUTANTS OF CONCERN			
Pollutant	Check One: E=Expected to be of concern N=Not Expected to be of concern		Additional Information and Comments
Suspended Solids/Sediment	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of sediment include disturbed or unstabilized landscaping areas and disturbed earth surfaces.
Nutrients	E ☒	N ☐	Pollutant is Primary POC as downstream water is impaired for Nutrients. Potential sources of nutrients include fertilizers, sediment and trash/debris.
Heavy Metals	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles and uncovered parking areas.
Pathogens (Bacteria/Virus)	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include food wastes, pet wastes, sediment and landscaping areas.
Pesticides	E ☒	N ☐	Pollutant is a Primary POC. Potential sources of pesticides include landscaping and open space areas.
Oil and Grease	E ☒	N ☐	Potential sources include project streets and parked vehicles.
Toxic Organic Compounds	E ☒	N ☐	Pollutant is a Primary POC. Potential sources for the project include automobiles and uncovered parking areas.
Trash and Debris	E ☒	N ☐	Potential sources of trash and debris include landscaping activities, food wrappers and food wastes.

II.3 HYDROLOGIC CONDITIONS OF CONCERN

The purpose of this section is to identify any hydrologic conditions of concern (HCOC) with respect to downstream flooding, erosion potential of natural channels downstream, impacts of increased flows on natural habitat, etc. that may occur as the result of project implementation. As specified in Section 2.3.3 of the Model WQMP, projects must identify and mitigate any HCOCs. An HCOC is a combination of upland hydrologic conditions and stream biological and physical conditions that present a condition of concern for physical and/or biological degradation of streams.

The project resides within the jurisdiction of the Santa Ana RWQCB and is subject to the requirements of the North Orange County WQMP TGD, in which HCOCs are considered to exist if the volume for the 2-year runoff event for post-development condition exceeds pre-development condition by more than 5% or the time of concentration is less than the pre-development condition by greater than 5%.

Is the proposed project potentially susceptible to hydromodification impacts?

☐ No – Show map and/or describe and reference supporting documentation in the space below

☒ Yes – Describe applicable hydrologic conditions of concern in the space below.

The proposed project is located within a HCOC susceptible area. However, in comparison to pre-project conditions, project development will not increase the amount of impervious area located within the project site nor time of concentration and peak runoff flow.

A summary of the analysis for the project is provided in the following table:

HCOC Analysis Summary (2-year event)												
Sub-Drainage Area	Existing Condition				Proposed Condition				Δ Acres	Δ Q_2 (cfs)	Δ Tc (min)	Δ V (ac-ft)
	Acres	Q_2 (cfs)	Tc (min)	Volume (ac-ft)	Acres[(1)]	Q_2 (cfs)	Tc (min)	Volume (ac-ft)				
A	9.1	9.6	14.86	1.0093	14.3	16.6	9.66	1.3582	0.6	2.4	-5.2	0.3489
B	8.5	8.8	14.72	0.8492	8.1	8.3	14.72	0.7905	3.3	3.3	0	-0.059
C	0.5	0.9	6.49	0.071	0.2	0.4	6.31	0.0316	0.6	0.2	-0.18	-0.039
D	4.5	6.5	8.81	0.587	--	--	--	--	-4.5	-6.5	--	-0.587
Overall	22.40	26.70	--	2.5165	22.40	26.10	--	2.18	**0**	**-0.60**	**--**	**-0.336**

(1) Existing Area "D" combined into A, B, C in developed condition.

Based on the hydromodification analysis prepared for the project, the developed condition 2-year runoff volume and peak discharge is less than pre-project conditions. Therefore, the project does not have hydromodification impacts to downstream receiving waters.

Supporting documentation is provided in Attachment C of this report.

II.4 POST DEVELOPMENT DRAINAGE CHARACTERISTICS

The project's post-development drainage characteristics are described as follows:

In the developed condition, runoff from the project is conveyed as gutter flow to project catch basins prior to discharging to the backbone storm drain system. Runoff is then conveyed easterly and discharged to the Loftus Diversion Channel, as in pre-project conditions.

Low Impact Development

To satisfy the project's requirements for Low Impact Development (LID) requirements and water quality treatment, water qualify runoff the project's single Drainage Management Area (DMA) is addressed via three proprietary biotreatment BMPs (Modular Wetland System or City approved equivalent) prior to discharging offsite.

DMA 1 (9.46 acres) – Runoff is conveyed in the project's backbone storm drain system to a series of Modular Wetland System (MWS) units located at the northeastern corner of the project site for treatment prior to discharging offsite.

To meet the trash capture requirements of the Ocean Plan, full trash capture screens will be employed at each of the the project's catch basins that are sized to accommodate the 1-year storm event.

II.5 PROPERTY OWNERSHIP/MANAGEMENT

The project proponent, Lennar, shall assume all onsite BMP maintenance, inspection and funding responsibilities until such time, these activities have been turned over to the Homeowners Association (HOA). Inspection and maintenance activities are in Section V of this WQMP.

SECTION III SITE DESCRIPTION

III.1 PHYSICAL SETTING

General descriptions of the project area are provided below:

PHYSICAL SETTING	
Planning Area/ Community Name	Planning Area – Currently not located within Planning Area. Community Name – "Greenbriar".
Location/Address	1698 Greebriar Lane, Brea, CA. West of Greenbriar Lane and South Associated Road.
Land Use	Existing: Office/Commercial Proposed: Residential
Zoning	Existing: C-G (General Commercial) Proposed: MU II (Mixed Use II)
Acreage	9.70 Acres
Predominant Soil Type	Hydrologic Soil Type D

III.2 SITE CHARACTERISTICS

The following table summarizes general characteristics of the project site:

SITE CHARACTERISTICS	
Precipitation Zone	0.90 in
Topography	The site is currently a commercial development with several buildings clustered at the west half and a 4-level parking garage within the east half. Parking lots and drive aisles exist throughout the site. A series of small slopes and a maintenance road at the eastern boundary of the property descends from the existing parking lot towards the existing channel bottom that is approximately 20 vertical feet lower than the existing parking lot. Elevations range from the highest in the northwest at 403 feet above mean sea level (MSL) to approximately 320 feet above MSL at the northeast.
Drainage Patterns/Connections	In the pre-project condition, onsite drainage is divided into four (4) drainage areas. Drainage Area "A" contains the majority of the project site. The northern half of the project sheet flows to the northeast corner with an existing catch basin. There is also an existing 18" RCP collecting the off-site areas. Drainage Area "A" discharges into the existing 18" pipe to Loftus Diversion Channel. Drainage Area "B" contains the off-site areas along Greenbriar Lane and drains to the existing 10-ft catch basin on top of the triple RCB culvert.

SITE CHARACTERISTICS	
	Drainage Area "C" contains the areas to the existing 21-ft catch basins on top of the triple RCB culvert. Drainage Area "D" contains the southern half the project site, sheet flows to the existing catch basin and to Loftus Diversion Channel via existing 18" pipe.
Soil Type, Geology, and Infiltration Properties	The site is located easterly of the Los Angeles Basin on the southwestern flank of the Puente Hills that form the western to northwestern margin of the Peninsular Ranges Geomorphic Province. The Puente Hills are bracketed by the Whittier and Chino Fault Zones and have been created by uplift along these faults. Approximately 13,000 feet of Miocene-aged marine clastic sedimentary rock underlies the Puente Hills. These sediments overlie approximately 16,000 feet of Tertiary aged rock, which are underlain by Mesozoic plutonic basement rocks. The site is underlain by Quaternary-aged alluvium and terrace deposits. Based on regional geologic mapping, the subject site is generally underlain Quaternary Older Alluvium (Map Symbol – Qoa) and relatively limited amounts of older artificial fill placed by others as part of the existing development.[1] Based on the County of Orange Technical Guidance Document (TGD) for Preparation of WQMPs and the geotechnical investigation, onsite soils consist primarily of Hydrologic Group D Soils, characterized as having slow to very slow infiltration rates when thoroughly wet. These soils are not favorable for infiltration. See WQMP Attachment D for soils information.
Hydrogeologic (Groundwater) Conditions	Project site is not located within a shallow groundwater zone, as defined by the TGD. Groundwater was encountered during the project's geotechnical investigation at a depth of 20' below existing surface at the eastern side of the site and at approximately 25' below existing surface at the western side of the site. Historic high groundwater is estimated at approximately 15' below existing grade.
Geotechnical Conditions (relevant to infiltration)	Based on the TGD, underlying soils consist Hydrologic Group "D" soils, which are not favorable for infiltration. This is supported by infiltration tests conducted onsite, which resulted in observed (no factor of safety) infiltration rates ranging from 0.1 in/hr to 0.2 in/hr.

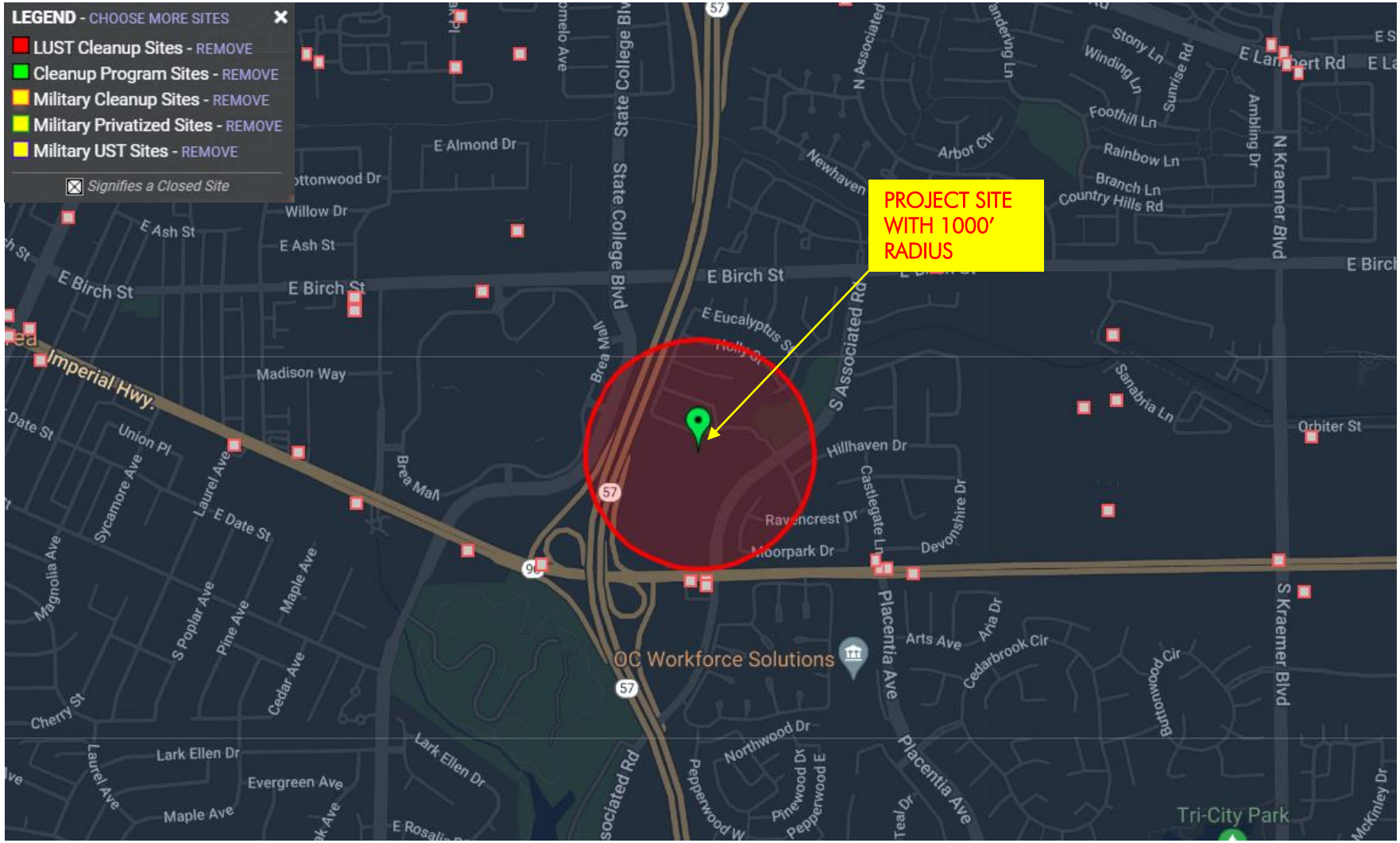
[1] LGC Geotechnical, inc. (November 17, 2023). *Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Residential Development of 1698 and 1700 Greenbriar Lane, City of Brea, Orange County, California.*

SITE CHARACTERISTICS	
Off-Site Drainage	The project site does not receive run-off from upstream areas or adjacent properties.
Utility and Infrastructure Information	Wet and dry utilities are proposed for this project and will connect to existing facilities located in Greenbriar Lane.

III.3 WATERSHED DESCRIPTION

The following table provides descriptions of the project's receiving waters.

WATERSHED DESCRIPTION	
Receiving Waters	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06), Fullerton Creek Channel (Facility A03), Coyote Creek Channel (Facility A01), San Gabriel River (Reach 1), San Gabriel River (Estuary)
303(d) Listed Impairments	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – Copper, Indicator Bacteria, Iron, Malathion, pH, Toxicity San Gabriel River Reach 1 – pH, Temperature San Gabriel River Estuary – Copper, Dioxin, Indicator Bacteria, Nickel, Dissolved Oxygen
Applicable TMDLs	**San Gabriel River – Coyote Creek Watershed:** Loftus Diversion Channel (Facility A06) – None Fullerton Creek Channel (Facility A03) – None Coyote Creek Channel (Facility A01) – *Copper*, *Indicator Bacteria* San Gabriel River Reach 1 – None San Gabriel River Estuary – *Copper*, *Indicator Bacteria*
Pollutants of Concern for the Project	Pollutants of Concern for the project include: Suspended Solids/Sediment, Nutrients, Metals, Pathogens, Pesticides, Oil & Grease, Toxic Organic Compounds and Trash & Debris. Primary Pollutants of Concern for the project include: Metals, Pathogens, Pesticides and Toxic Organic Compounds.
Environmentally Sensitive and Special Biological Significant Areas	The project site is not located within 200' of a 303(d) listed water body (which is defined as an Environmentally Sensitive Area (ESA) under Section 2.3.3.4 of the Technical Guidance Document). Additionally, project is not located within 1000' of any active or inactive clean up sites per GeoTracker data.



Source: https://geotracker.waterboards.ca.gov/

SECTION IV BEST MANAGEMENT PRACTICES (BMPS)

IV. 1 PROJECT PERFORMANCE CRITERIA

The project's performance criteria for HCOCs and LID BMPs are provided in the following table:

PROJECT PERFORMANCE CRITERIA		
Is there an approved WIHMP or equivalent for the project area that includes more stringent LID feasibility criteria or if there are opportunities identified for implanting LID on regional or sub-regional basis?	YES ☐	NO ☒
If yes, describe WIHMP feasibility criteria or regional/sub-regional LID opportunities.	There is currently no approved WIHMP for the project's receiving waters.	
If HCOC exists, list applicable hydromodification control performance criteria (Section 7.II-2.4.2.2 in MWQMP)	HCOC does not exist for the project.	
List applicable LID performance criteria (Section 7.II-2.4.3 from MWQMP)	• LID BMPs must be designed to retain, on-site, (infiltrate, harvest and use, or evapotranspire) storm water runoff up to 80 percent average annual capture efficiency. • LID BMPs must be designed to: - Retain, onsite, (infiltrate, harvest and use, or evapotranspire) stormwater runoff as feasible up to the Design Capture Volume, and - Recover (i.e., draw down) the storage volume as soon as possible after a storm event, and if necessary - **Biotreat, on-site, additional runoff, as feasible, up to 80 percent average annual capture efficiency (cumulative, retention plus biotreatment), and, if necessary** - Retain or biotreat, in a regional facility, the remaining runoff up to 80 percent annual capture efficiency (cumulative, retention plus biotreatment, onsite plus offsite), and, if necessary - Fulfill alternative compliance obligations for runoff volume not retained or biotreated up to 80 percent average annual capture efficiency using treatment controls or other alternative approaches as described in Section 7.II-3.	

PROJECT PERFORMANCE CRITERIA	
List applicable treatment control BMP performance criteria (Section 7.II-3.2.2 from MWQMP)	Ocean Plan Trash Amendments – Full Capture System to trap particles 5mm or greater, and has a design treatment capacity that is either (the project's selected performance criteria is provided in bold): • **Equal to or greater than peak flow rate for the one-year, one-hour storm in the sub-drainage area; or** • Appropriately sized to, and designed to, carry at least the same flows as, the corresponding storm drain.
Calculate LID design storm capture volume for Project.	See Section IV.2.2 for the project's required DCV for each of the project's Drainage Management Areas (DMA). In general, DCV = C x D x A x 43560 sf/ac x 1ft/12in Where: DCV = design storm capture volume, cu-ft C = runoff coefficient = (0.75 x imp + 0.15) Imp = impervious fraction of drainage area (ranges from 0 to 1) D = storm depth (inches) A = tributary area (acres)

IV.2 SITE DESIGN AND DRAINAGE PLAN

The primary goal of site design principles and techniques is to reduce land development impacts on water quality and downstream hydrologic conditions. Benefits of site design include reductions in the size of downstream BMPs, conveyance systems, pollutant loading and hydromodification impacts.

IV.2.1 Site Design BMPs

The following section describes the site design BMPs that have been incorporated into this project.

Minimize Impervious Area

The project will minimize impervious area by providing all multi-level structures and incorporating landscaping within the project's opens space areas, parkways, areas between residential buildings and other suitable landscaping areas to minimize the project's impervious footprint, thereby reducing runoff generated during rain events.

Maximize Natural Infiltration Capacity

The project site consists primarily of HSG D soil, which is not feasible for infiltration. Infiltration testing conducted onsite resulted in very low values (0.1 in/hr to 0.2 in/hr). Where feasible, runoff may be directed to landscaping areas for absorption by soil or vegetation.

Preserve Existing Drainage Patterns and Time of Concentration

In the developed condition, runoff from the project will be collected and discharged to the Loftus Diversion Channel to the east, as in pre-project conditions. Time of concentration would not be increased as the project's impervious area is decreased from existing conditions.

Disconnect Impervious Areas

Landscaping will be provided within the project's development areas to minimize the amount of directly connected impervious areas.

Protect Existing Vegetation and Sensitive Areas, and Revegetate Disturbed Areas

The pre-project site consists of a paved out commercial office development. There are no vegetation and sensitive areas to preserve. All disturbed areas will be paved or landscaped.

Revegetate Disturbed Areas and Xeriscape Landscaping

Native and/or tolerant landscaping will be incorporated into site design, consistent with City guidelines, in proposed landscaping areas.

IV.2.2 Drainage Management Areas (DMAs)

Per the TGD, the project site has been divided into Drainage Management Areas (DMAs) to be utilized for defining drainage areas tributary to the project's BMPs. DMA limits have been delineated based on the tributary drainage area for each BMP.

The design capture volume (DCV) and design flow rate utilizing the "Simple Method" and the "Capture Efficiency Method" described in the TGD Section III.3.1 and III.3.3 are provided below. Locations of DMAs and associated treatment BMPs are provided on the exhibits in Section VI. Additional calculations and TGD Worksheets are provided in Attachment B of this WQMP.

DMA	Area (Ac.)	Imp.	C-value	Design Storm Depth (in)	DCV_{SIMPLE} (cu-ft)	Tc (min)	Intensity (in/hr)	Q_{BMP} (cfs)
1	9.46	0.8	0.75	0.90	23,179	14.72	0.22	1.56

IV.3 LID BMP Selection and Project Conformance Analysis

Per the TGD, Low Impact Development (LID) BMPs must be incorporated into design features and source controls to reduce project related storm water pollutants. The incorporation of LID BMPs into project design requires evaluation of LID measures in the following treatment hierarchy: infiltration, evapotranspiration, harvest/reuse and biotreatment.

IV.3.1 Hydrologic Source Controls (HSC)

Hydrologic source controls (HSCs) can be considered to be an integration of site design practices and LID BMPs. The goal of HSCs is to reduce runoff volume for a given drainage area without reducing the site's true impervious area.

Name	Included?
Localized on-lot infiltration	☐
Impervious area dispersion (e.g. roof top disconnection)	☐
Street trees (canopy interception)	☐
Residential rain barrels (not actively managed)	☐

Name	Included?
Green roofs/Brown roofs	☐
Blue roofs	☐
Impervious area reduction (e.g. permeable pavers, site design)	☐

At current, potential DCV reduction credits have not been determined for project areas as the project is in the planning phase of development. As such their benefits are considered incidental and no credits have been applied. The project's proposed LID BMP will be sized to accommodate the project's required BMP volume/flow.

IV.3.2 Infiltration BMPs

Infiltration BMPs are LID BMPs that capture, store and infiltrate storm water runoff. These BMPs are engineered to store a specified volume of water and have no design surface discharge (underdrain or outlet structure) until this volume is exceeded. Examples of infiltration BMPs include infiltration trenches, bioretention without underdrains, drywells, permeable pavement, and underground infiltration galleries.

Name	Included?
Bioretention without underdrains	☐
Rain gardens	☐
Porous landscaping	☐
Infiltration planters	☐
Retention swales	☐
Infiltration trenches	☐
Infiltration basins	☐
Drywells	☐
Subsurface infiltration galleries	☐
French drains	☐
Permeable asphalt	☐
Permeable concrete	☐
Permeable concrete pavers	☐
Other:	☐

Due to the presence of unfavorable soil types (HSG Type D) and infiltration testing results of 0.2 in/hr or less, infiltration as the primary mechanism for pollutant removal is not feasible.

IV.3.3 Evapotranspiration, Rainwater Harvesting BMPs

Name	Included?
EVAPOTRANSPIRATION	
All HSCs; *See Section IV.3.1*	☐
Surface-based infiltration BMPs	☐
Biotreatment BMPs	☐
HARVEST & REUSE/ RAINWATER HARVESTING	
Above-ground cisterns and basins	☐
Underground detention	☐

Evapotranspiration

Evapotranspiration BMPs are a class of retention BMPs that discharges stored volume predominately to ET, through some infiltration may occur. ET includes both evaporation and transpiration, and ET BMPs may incorporate one or more of these processes. BMPs must be designed to achieve the maximum feasible ET, where required to demonstrate that the maximum amount of water has been retained on-site. Since ET is not the sole process in these BMPs, specific design and sizing criteria have not been developed for ET-based BMPs.

Harvest and Reuse

Harvest and Reuse (aka. Rainwater Harvesting) BMPs are LID BMPs that capture and store storm water runoff for later use. These BMPs are engineered to store a specified volume of water and have no design surface discharge until this volume is exceeded. Harvest and use BMPs include both above-ground and below-ground cisterns. Examples of uses for harvested water include irrigation, toilet and urinal flushing, vehicle washing, evaporative cooling, industrial processes and other non-potable uses.

The project does not propose the use of harvesting BMPs, as harvesting runoff exclusively for landscape irrigation was determined to be infeasible since the project's minimum required use would exceed the project's estimated uses (See Worksheet J in Attachment B).

Consideration was also given to multiples uses (both irrigation and toilet flushing) and exclusively toilet use. However, harvesting runoff for multiple uses and toilet use were determined to be infeasible due to the difficulty in conveying harvested runoff from a focal collection point to each residential unit and also proposed irrigated landscaping areas. Harvesting runoff from these types of uses are more feasible/suitable for high rise structures or cluster developments.

At the current phase of the project, biofiltration BMPs will be the primary LID BMPs employed to address low flow (irrigation and other non-storm water runoff) and storm water runoff from project areas.

IV.3.4 Biotreatment BMPs

Biotreatment BMPs are a class of structural LID BMPs that treat suspended solids and dissolved pollutants in storm water using mechanisms characteristic of biologically active systems. These BMPs are considered treat and release facilities and include treatment mechanisms that employ soil microbes and plants. Additional benefits of these BMPs may include aesthetic enjoyment, recreational use, wildlife habitat and reduction in storm water volume.

BIOTREATMENT	
Name	Included?
Bioretention with underdrains	☐
Stormwater planter boxes with underdrains	☐
Rain gardens with underdrains	☐
Constructed wetlands	☐
Vegetated swales	☐
Vegetated filter strips	☐
Proprietary vegetated biotreatment systems	☒
Wet extended detention basin	☐
Dry extended detention basins	☐
Other:	☐

The project proposes the use of biotreatment BMPs to address the project's pollutants of concern from. Proposed BMPs within this category consist of proprietary biotreatment BMPs.

Proprietary biotreatment BMPs (Modular Wetland System or City approved equivalent) will be sized to address the water quality volume for its tributary area and designed with a flow-based configuration. Proprietary biotreatment BMPs have been selected based on their proven pollutant removal efficiencies, as well as site constraints from proposed land use areas.

BIOTREATMENT BMP DESIGN SUMMARY									
DMA	Area (Ac.)	Imp.	C-value	Tc (min)	I_{DESIGN} (in/hr)	Q_{BMP} (cfs)	BMP Unit/Model (capacity)[1]	BMP No.	BMP Lat/Long (DD)
1	9.46	0.8	0.75	14.72	0.22	1.56	3 units MWS-8-24-V (0.693 cfs/unit)	MWS #1	33.91402°, -117.87895°
								MWS #2	33.91400°, -117.87893°
								MWS #3	33.91399°, -117.87890°

(1) Preliminary BMP sizing. Will be revised as needed to ensure adequate treatment of runoff.

IV.3.5 Hydromodification Control BMPs

As discussed in Section II.3, the project's developed condition runoff volume and peak flow are less than pre-project conditions. Therefore, the project does not have hydromodification impacts to downstream receiving waters.

IV.3.6 Regional/Sub-Regional LID BMPs

Not applicable to project. Project is not part of any regional or sub-regional BMP programs. Project will employ use of onsite LID BMPs to address project runoff.

IV.3.7 Treatment Control BMPs

The project is able to meet LID requirements onsite. Treatment control BMPs for this project applies to the treatment BMP employed to meet current full trash capture requirements per the Ocean Plan.

To address this requirement, the project proposes the use of a hydrodynamic separator (e.g. Aqua-Swirl unit by AquaShield) that has been approved by the SWRCB and meet the sizing requirement for Full Trash Capture BMPs per the Ocean Plan (Equal to or greater than peak flow rate for the one-year, one-hour storm in the sub-drainage area). Actual manufacturer and model unit is subject to change and will be identified in final engineering.

BIOTREATMENT BMP DESIGN SUMMARY							
DMA	Area (Ac.)	Imp.	C-value	$I_{1\text{-YEAR}}$ (in/hr)	Q_{BMP} (cfs)	BMP No.	BMP Lat/Long (DD)
1	9.46	0.8	0.75	0.457	3.24	#5	33.91391°, -117.87901°

Source Control BMPs

In accordance with the County DAMP and City of Brea Local Implementation Plan (LIP), both structural and non-structural source control BMPs are required for all priority projects unless deemed not applicable based on project characteristics. The following tables summarize the source control BMPs (Non-Structural and Structural) specified in the County DAMP and City's LIP.

The following tables show source control BMPs (routine non-structural and routine structural) included in this project and those that were not included.

IV.3.8 Non-Structural Source Control BMPs

The table below indicates all Non-Structural Source Control BMPs to be utilized in the project. Additional discussions of the selected BMPs are provided in the BMP Inspection and Maintenance Responsibility Matrix provided in Section V of this WQMP.

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N1	Education for Property Owners, Tenants and Occupants	☒	☐	
N2	Activity Restrictions	☒	☐	

NON-STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
N3	Common Area Landscape Management	☒	☐	
N4	BMP Maintenance	☒	☐	
N5	Title 22 CCR Compliance (How development will comply)	☐	☒	Proposed facility will not generate waste subject to Title 22 CCR compliance.
N6	Local Industrial Permit Compliance	☐	☒	Project is not subject to industrial permit.
N7	Spill Contingency Plan	☐	☒	Proposed facility will not generate waste or store materials subject to the requirements of Chapter 6.95 of the CA Health and Safety Code.
N8	Underground Storage Tank Compliance	☐	☒	No underground storage tanks proposed for the project.
N9	Hazardous Materials Disclosure Compliance	☐	☒	Proposed facility will not store or generate hazardous materials subject to agency requirements.
N10	Uniform Fire Code Implementation	☐	☒	Proposed facility does not propose to store toxic or highly toxic compressed gases.
N11	Common Area Litter Control	☒	☐	
N12	Employee Training	☒	☐	
N13	Housekeeping of Loading Docks	☐	☒	Not in project scope.
N14	Common Area Catch Basin Inspection	☒	☐	
N15	Street Sweeping Public Streets and Parking Lots	☒	☐	
N16	Retail Gasoline Outlets	☐	☒	Not in project scope.

N1 – Education for Property Owners

Educational materials will be provided to homeowners at close of escrow by owner/developer and periodically thereafter by the HOA to inform them of their actions and the potential impacts to downstream water quality. Materials include those described in Section VII of this WQMP and any updates to educational materials.

N2 – Activity Restrictions

Activity restrictions to minimize potential impacts to water quality and with the purpose of protecting water quality will be prescribed by the project's Covenant, Conditions and Restrictions (CC&Rs), or other equally effective measure.

N3 – Common Area Landscape Management

Maintenance activities for landscape areas shall be consistent with City and manufacturer guidelines for fertilizer and pesticide use (OC DAMP Section 5.5). Maintenance includes trimming, weeding and debris removal and vegetation planting and replacement and shall be consistent with the City's Landscape Ordinance. Stockpiled materials during maintenance activities shall be placed away from drain inlets and runoff conveyance devices. Wastes shall be properly disposed of or recycled.

N4 – BMP Maintenance

The project proponent shall be responsible for implementation of each applicable non-structural, structural and LID BMPs as well as scheduling inspection and maintenance cleaning of all applicable structural BMP facilities. The proponent shall be responsible for inspection and maintenance activities in landscape areas (see WQMP Site Plan).

N11 – Common Area Litter Control

Litter control onsite will include the use of litter patrols, violation reporting and clean up during landscaping maintenance activities and as needed to ensure good housekeeping of the project's common areas.

N12 – Employee Training

All employees and any contractors of the HOA will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.

N14 – Common Area Catch Basin Inspection

As required by the TGD, at least 80% of all drainage facilities shall be inspected each year and, if necessary, cleaned and maintained prior to the storm season, no later than October 15th each year; with 100% of all drainage facilities inspected, cleaned and maintained within a two-year period. Drainage facilities include catch basins and inlets, detention vaults and the project's LID BMPs.

N15 – Street Sweeping Public Streets and Parking Lots

All project streets shall be vacuum swept on a weekly basis, consistent with City's sweeping schedule.

Refer to Section V for implementation frequency and maintenance responsibilities.

IV.3.9 Structural Source Control BMPs

The source control BMPs have been selected in the following table to address the anticipated pollutants generated by the proposed project. These BMPs are designed to work in conjunction with the project's LID BMPs to minimize potential impacts to the site's receiving waters.

STRUCTURAL SOURCE CONTROL BMPS				
Identifier	Name	Check One		If not applicable, state brief reason
		Included	Not Applicable	
S1	Provide storm drain system stenciling and signage	☒	☐	
S2	Design and construct outdoor material storage areas to reduce pollution introduction	☐	☒	No outdoor storage areas proposed for park.
S3	Design and construct trash and waste storage areas to reduce pollution introduction	☐	☒	No designated trash enclosures proposed. All receptacles kept in private residences.
S4	Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	☒	☐	
S5	Protect slopes and channels and provide energy dissipation	☐	☒	No slopes onsite. Project does not discharge to natural areas.
	Incorporate requirements applicable to individual priority project categories (from SDRWQCB NPDES Permit)	☐	☒	Not applicable to project area.
S6	Dock areas	☐	☒	
S7	Maintenance bays	☐	☒	No maintenance bays proposed for project.
S8	Vehicle wash areas	☐	☒	No vehicle washing allowed onsite.
S9	Outdoor processing areas	☐	☒	No outdoor processing of goods required for project.
S10	Equipment wash areas	☐	☒	No wash areas onsite.
S11	Fueling areas	☐	☒	No fueling areas in project scope.
S12	Hillside landscaping	☐	☒	Project is not hillside development with large slopes.
S13	Wash water control for food preparation areas	☐	☒	
S14	Community car wash racks	☐	☒	Not in project scope.

S1 – Provide Storm Drain System Stenciling and Signage (CASQA SD-13)

Storm drain stenciling with a brief message or graphical icons with symbols, prohibiting the dumping of improper materials into the storm drain system shall be placed in highly visible areas adjacent to all storm drain inlets. The BMP is designed to alert and educate homeowners and guests of the destination of pollutants discharged into storm drain systems. Legibility of stencils and signs shall be maintained.

S4 – Efficient Irrigation System & Landscape Design (CASQA SD-10 & SD-12)

Landscaping will be designed to consist of native species or drought tolerant, water conserving landscaping. Irrigation system will be designed, constructed and adjusted to eliminate overspray to hardscape areas, with timing and cycle lengths adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.

IV.4 ALTERNATIVE COMPLIANCE PLAN (IF APPLICABLE)

The project is able to fully address the design capture volume via onsite LID BMPs. Therefore, an alternative compliance plan is not applicable to this project.

IV.4.1 Water Quality Credits

Not applicable to project. Project will utilize LID BMPs onsite to address storm water.

DESCRIPTION OF PROPOSED PROJECT		
Project Types that Qualify for Water Quality Credits (Select all that apply):		
☐ Redevelopment projects that reduce the overall impervious footprint of the project site.	☐ Brownfield redevelopment, meaning redevelopment, expansion, or reuse of real property which may be complicated by the presence or potential presence of hazardous substances, pollutants or contaminants, and which have the potential to contribute to adverse ground or surface WQ if not redeveloped.	☐ Higher density development projects which include two distinct categories (credits can only be taken for one category): those with more than seven units per acre of development (lower credit allowance); vertical density developments, for example, those with a Floor to Area Ratio (FAR) of 2 or those having more than 18 units per acre (greater credit allowance).

DESCRIPTION OF PROPOSED PROJECT				
Project Types that Qualify for Water Quality Credits (Select all that apply):				
☐ Mixed use development, such as a combination of residential, commercial, industrial, office, institutional, or other land uses which incorporate design principles that can demonstrate environmental benefits that would not be realized through single use projects (e.g. reduced vehicle trip traffic with the potential to reduce sources of water or air pollution).		☐ Transit-oriented developments, such as a mixed use residential or commercial area designed to maximize access to public transportation; similar to above criterion, but where the development center is within one half mile of a mass transit center (e.g. bus, rail, light rail or commuter train station). Such projects would not be able to take credit for both categories, but may have greater credit assigned		☐ Redevelopment projects in an established historic district, historic preservation area, or similar significant city area including core City Center areas (to be defined through mapping).
☐ Developments with dedication of undeveloped portions to parks, preservation areas and other pervious uses.	☐ Developments in a city center area.	☐ Developments in historic districts or historic preservation areas.	☐ Live-work developments, a variety of developments designed to support residential and vocational needs together – similar to criteria to mixed use development; would not be able to take credit for both categories.	☐ In-fill projects, the conversion of empty lots and other underused spaces into more beneficially used spaces, such as residential or commercial areas.
Calculation of Water Quality Credits (if applicable)	N/A			

IV.4.2 Alternative Compliance Plan Information

Not applicable to project. Project will utilize LID BMPs onsite to address storm water pollutants.

SECTION V INSPECTION/MAINTENANCE RESPONSIBILITY FOR BMPS

It has been determined that the Owner shall assume all BMP funding, inspection and maintenance responsibilities for the Greenbriar project, until such time, site ownership, maintenance and funding responsibilities have been transferred to the HOA and the City of Brea, as appropriate.

Contact/Title	Gary Jones, VP of Land Acquisition
Company	Lennar
Address	2000 Fivepoint, 3rd Floor Irvine, CA 92618
Email	gary.jones@lennar.com
Telephone #	949.349.8000

Until the HOA's acceptance of onsite improvements and BMPs pertaining to the WQMP, the Owner shall verify BMP implementation and ongoing maintenance through inspection, self-certification or other equally effective measures. The certification shall verify that the inspection and maintenance of all BMPs are performed in accordance with the requirements of this WQMP.

The BMP Inspection and Maintenance Responsibility Matrix is provided in the following table. An Operations and Maintenance (O&M) Plan is also included as an attachment to this WQMP.

BMP INSPECTION/MAINTENANCE			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
BIOTREATMENT BMPs			
BIO-7 Proprietary Biotreatment (MWS Unit)	Owner/HOA	Inspect unit for accumulated debris and sediment and plant health; remove trash from screening device and separation chamber; trim vegetation. Remove sediment from pre-chamber, replace pre-filter cartridge media and drain down filter media. Replace wetland media.	Inspect every 6-12 months, remove accumulated material & maintain filters as needed based in inspection. 20 years
GROSS SOLIDS REMOVAL BMPs			
PRE-1 Hydrodynamic Separator (Aqua-Swirl by AquaShield)	Owner/HOA	Inspect unit for accumulated debris and sediment. Remove when accumulated material reaches ½ height of screen.	Inspect quarterly during first year of operation, annually thereafter. Clean unit annually (minimum) and as needed.

BMP INSPECTION/MAINTENANCE			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
NON-STRUCTURAL SOURCE CONTROL BMPs			
N1 Education for Property Owners, Tenants and Occupants	Owner/HOA	Educational materials will be provided to homeowners at close of escrow by the developer and thereafter on an annual basis by the HOA. Materials shall include those shown in Section VII of this WQMP.	At close of escrow and Annually
N2 Activity Restrictions	Owner/HOA	Owner will prescribe activity restrictions to protect surface water quality, through a Covenant, Conditions and Restrictions (CC&Rs) agreement, or other equally effective measure, for the property. Upon takeover of site responsibilities by the HOA. The HOA shall be responsible for ensuring residents compliance.	Ongoing
N3 Common Area Landscape Management	Owner/HOA	Maintenance shall be consistent with City requirements; any fertilizer and/or pesticide usages shall be consistent with City and manufacturer guidelines for use of fertilizers and pesticides. Maintenance includes mowing, weeding, and debris removal on a weekly basis. Trimming, replanting and replacement of mulch shall be performed on an as-needed basis. Trimmings, clippings, and other waste shall be properly disposed of off-site in accordance with local regulations. Materials temporarily stockpiled during maintenance activities shall be placed away from water courses and drain inlets.	Monthly and as needed
N4 BMP Maintenance	Owner/HOA	Maintenance of BMPs implemented at the project site shall be performed at the frequency prescribed in this WQMP. Records of inspections and BMP maintenance shall be maintained by the City and documented with the WQMP.	Ongoing

BMP INSPECTION/MAINTENANCE			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
N11 Common Area Litter control	Owner/HOA	Litter patrol, violations investigation, reporting and other litter control activities shall be performed by the owner/HOA as needed and in conjunction with maintenance activities for common areas.	Ongoing
N12 Employee Training	Owner/HOA	All employees and any contractors will require training to ensure that employees are aware of maintenance activities that may result in pollutants reaching the storm drain. Training will include, but not limited to, spoil clean up procedures, proper waste disposal, housekeeping practices, etc.	Upon hire and annually thereafter
N14 Common Area Catch Basin Inspection	Owner/HOA and City, as appropriate	Catch basin inlets, area drains, curb-and-gutter systems and other drainage systems, including the project's water quality diversion structure, shall be inspected prior to October 1st of each year and after large storm events. If necessary, drains shall be cleaned prior to any succeeding rain events. 80% of private facilities shall be inspected and cleaned annually, with 100% of facilities inspected and maintained within a 2-year period.	Annually
N15 Street Sweeping	Owner/HOA and City, as appropriate	Project streets and parking areas shall be vacuum swept at a minimum, weekly basis, consistent with City schedules.	Weekly

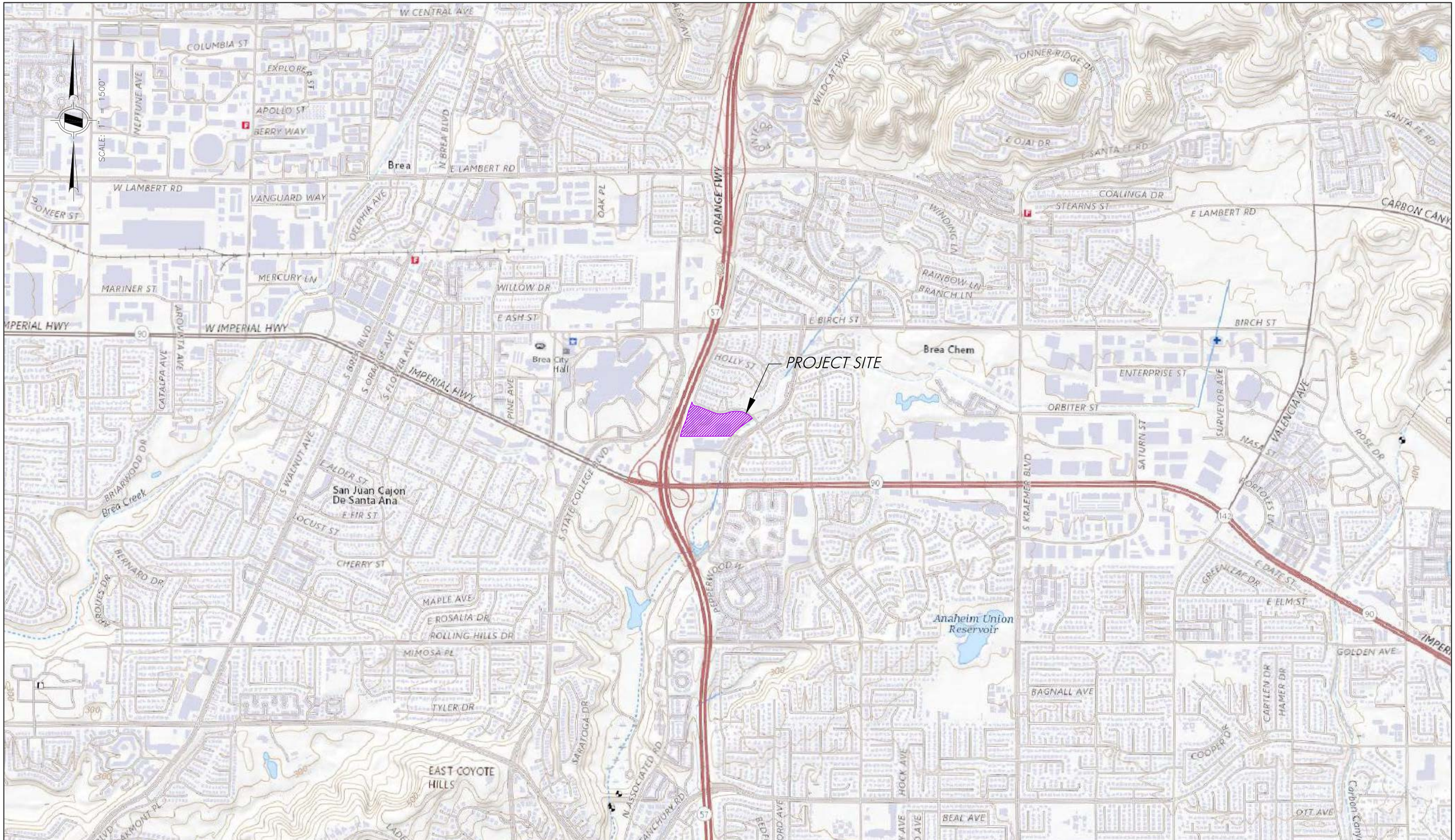
BMP INSPECTION/MAINTENANCE			
BMP	Responsible Party(s)	Inspection/ Maintenance Activities Required	Minimum Frequency of Activities
STRUCTURAL SOURCE CONTROL BMPs			
S1 Provide storm drain system stencilling and signage	Owner/HOA and City, as appropriate	As a part of the Preliminary civil engineering drawings, it will be required by the Developer to stencil on all of the project's catch basins, where applicable in paved areas, the words, "No Dumping - Drains to Ocean." Storm drain stencils shall be inspected for legibility, at minimum, once prior to the storm season, no later than October 1st each year. Those determined to be illegible will be re-stenciled as soon as possible.	Annually
S4 Use efficient irrigation systems & landscape design, water conservation, smart controllers, and source control	Owner/HOA	In conjunction with routine maintenance activities, verify that landscape design continues to function properly by adjusting properly to eliminate overspray to hardscape areas, and to verify that irrigation timing and cycle lengths are adjusted in accordance with water demands, given time of year, weather, day or night time temperatures based on system specifications and local climate patterns.	Monthly

SECTION VI SITE PLAN AND DRAINAGE PLAN

The exhibits provided in this section are to illustrate the post construction BMPs prescribed within this WQMP. Drainage flow information of the proposed project, such as general surface flow lines, concrete or other surface drainage conveyances, and storm drain facilities are also depicted. All structural source control and LID BMPs are shown as well.

Exhibits

- Vicinity Map
- WQMP Site Plan Exhibit



DRAWN BY: TIH	PREPARED BY:	PREPARED FOR:	"GREENBRIAR" - VTTM 19394
DATE: 03.04.2024	HUNSAKER & ASSOCIATES IRVINE, INC.	LENNAR	WEST OF GREENBRIAR LANE AND
W.O.: 3916.89X	PLANNING ▪ ENGINEERING ▪ SURVEYING	2000 FIVEPOINT, 3RD FLOOR	SOUTH ASSOCIATED ROAD
	157 Technology, Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759	IRVINE, CA92618	CITY OF BREA, CALIFORNIA
		949.349.8000	

PWQMP VICINITY MAP

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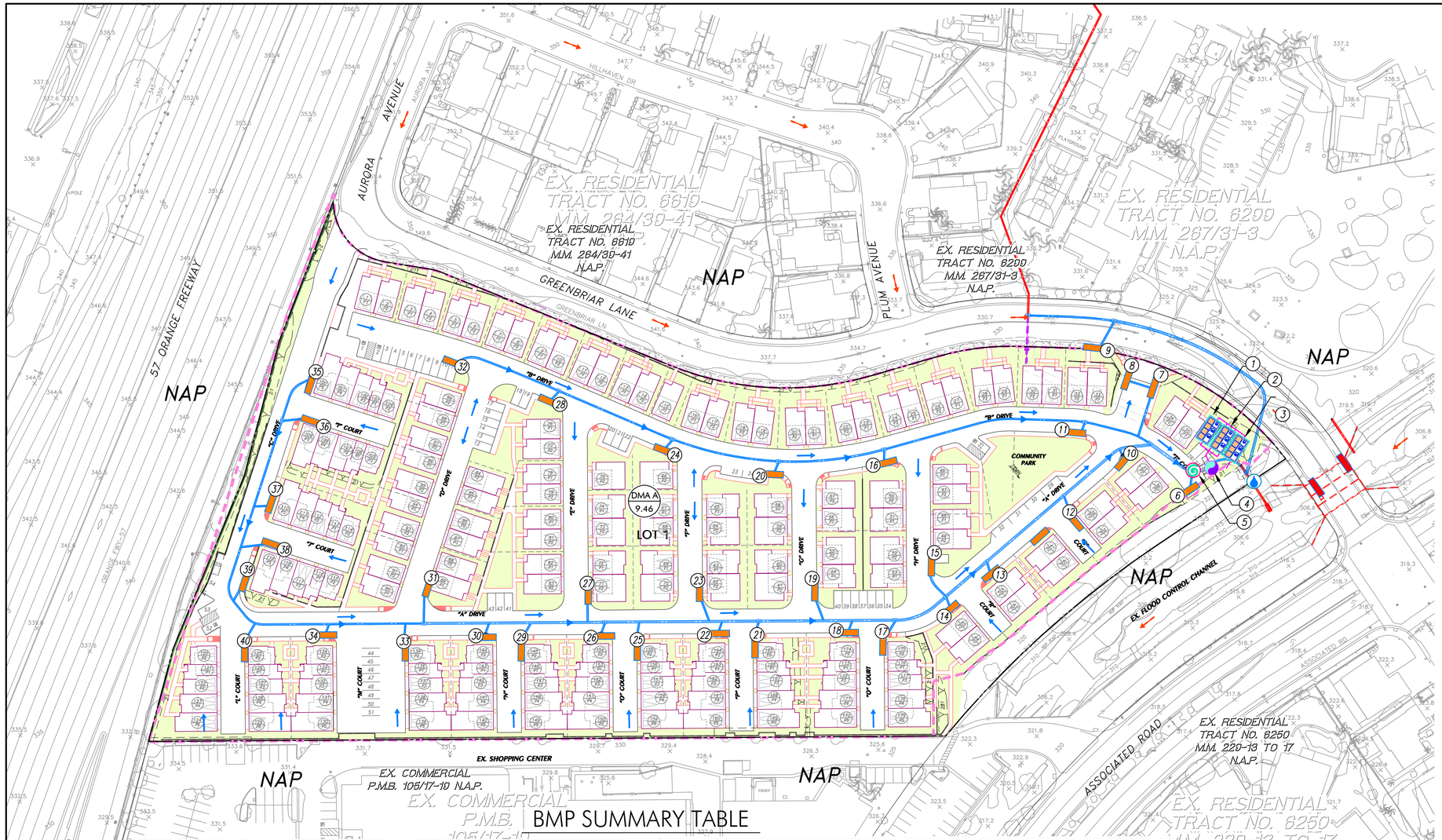
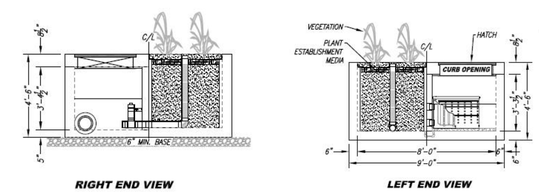


LEGEND

- PROJECT LIMITS
- NAP — NOT A PART
- DRAINAGE MANAGEMENT AREA (DMA) LIMITS
- DMA / ACRE — DMA DESIGNATION AND ACREAGE
- SURFACE FLOW (ONSITE)
- SURFACE FLOW (OFFSITE)
- EXISTING DRAINAGE SYSTEM
- PROPOSED STORM DRAIN SYSTEM (PRIVATE) MAINTAINED BY HOA
- PROPOSED WATER QUALITY DRAINAGE SYSTEM (PRIVATE) MAINTAINED BY HOA
- EXISTING CATCH BASIN
- PROJECT CATCH BASIN WITH BMPS (PRIVATE)
  S1 STORM DRAIN SIGNAGE AND STENCILING
  PRE-2 CATCH BASIN INSERT (CONNECTOR PIPE SCREEN)
  N14 COMMON AREA CATCH BASIN INSPECTION
  MAINTAINED BY HOA
- PROJECT LANDSCAPE AREA WITH BMPS (PRIVATE)
  N3 COMMON AREA LANDSCAPE MANAGEMENT
  S4 EFFICIENT IRRIGATION SYSTEM & LANDSCAPE DESIGN
- PROPOSED BUILDING FOOTPRINT
- WATER QUALITY DIVERSION STRUCTURE (PRIVATE) MAINTAINED BY HOA
- BIO-7 PROPRIETARY BIOTREATMENT (PRIVATE) MODULAR WETLAND SYSTEM MAINTAINED BY HOA
- PRE-1 HYDRODYNAMIC SEPARATOR (AQUA-SWIRL BY AQUASHIELD) MAINTAINED BY HOA
- DISCHARGE POINT
- BMP IDENTIFICATION NUMBER



BIO-7 PROPRIETARY BIOTREATMENT
TYPICAL SECTION DETAIL (MWS UNIT SHOWN)
N.T.S.

DMA SUMMARY

BIOTREATMENT BMP DESIGN SUMMARY									
DMA	Area (Ac.)	Imp.	C-value	Tc (min)	I_{DESIGN} (in/hr)	Q_{BMP} (cfs)	BMP Unit/Model (capacity)[1]	BMP No.	BMP Lat/Long (DD)
1	9.46	0.8	0.75	14.72	0.22	1.56	3 units MWS-8-24-V (0.693 cfs/unit)	MWS #1	33.914025°, -117.878958°
								MWS #2	33.914008°, -117.878937°
								MWS #3	33.913991°, -117.878909°

(1) Preliminary BMP sizing. Will be revised as needed to ensure adequate treatment of runoff.

GENERAL NOTES:
SELF-CERTIFICATION FROM A STATE LICENSED PROFESSIONAL ENGINEER OR THIRD-PARTY CERTIFICATIONS ARE REQUIRED FOR ALL BMP'S CONSTRUCTED ON THIS PLAN AND ALL BMP'S SHALL BE CLEANED AND IN WORKING CONDITION AS PRESCRIBED BY THE MANUFACTURER TO OBTAIN CERTIFICATE OF OCCUPANCY FROM THE CITY OF BREA.

BMP SUMMARY TABLE

LID BMP/ BMP TYPE	BMP ID	X COORDINATE	Y COORDIANTE
1. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 1	33.91402°	-117.87895°
2. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 2	33.91400°	-117.87893°
3. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 3	33.91399°	-117.87890°
4. Water Quality Diversion Structure	BMP No. 4	33.91392°	-117.87894°
5. PRE-1 Hydrodynamic Separator (Aqua-Swirl)	BMP No. 5	33.91391°	-117.87901°
6. S1 Catch Basin Stenciling	BMP No. 6	33.91385°	-117.87302°
7. S1 Catch Basin Stenciling	BMP No. 7	33.91415°	-117.87915°
8. S1 Catch Basin Stenciling	BMP No. 8	33.91417°	-117.87925°
9. S1 Catch Basin Stenciling	BMP No. 9	33.91427°	-117.87934°
10. S1 Catch Basin Stenciling	BMP No. 10	33.91395°	-117.87926°
11. S1 Catch Basin Stenciling	BMP No. 11	33.91401°	-117.87940°
12. S1 Catch Basin Stenciling	BMP No. 12	33.91376°	-117.87944°
13. S1 Catch Basin Stenciling	BMP No. 13	33.91359°	-117.87971°
`14. S1 Catch Basin Stenciling	BMP No. 14	33.91349°	-117.87986°
15. S1 Catch Basin Stenciling	BMP No. 15	33.91364°	-117.87994°
16. S1 Catch Basin Stenciling	BMP No. 16	33.91393°	-117.88010°
17. S1 Catch Basin Stenciling	BMP No. 17	33.91340°	-117.88010°
18. S1 Catch Basin Stenciling	BMP No. 18	33.91342°	-117.88022°
19. S1 Catch Basin Stenciling	BMP No. 19	33.91351°	-117.88033°
20. S1 Catch Basin Stenciling	BMP No. 20	33.91388°	-117.88048°

LID BMP/ BMP TYPE	BMP ID	X COORDINATE	Y COORDIANTE
21. S1 Catch Basin Stenciling	BMP No. 21	33.91338°	-117.88055°
22. S1 Catch Basin Stenciling	BMP No. 22	33.91340°	-117.88067°
23. S1 Catch Basin Stenciling	BMP No. 23	33.91350°	-117.88074°
24. S1 Catch Basin Stenciling	BMP No. 24	33.91395°	-117.88087°
25. S1 Catch Basin Stenciling	BMP No. 25	33.91337°	-117.88097°
26. S1 Catch Basin Stenciling	BMP No. 26	33.91340°	-117.88109°
27. S1 Catch Basin Stenciling	BMP No. 27	33.91351°	-117.88114°
28. S1 Catch Basin Stenciling	BMP No. 28	33.91408°	-117.88128°
29. S1 Catch Basin Stenciling	BMP No. 29	33.91336°	-117.88137°
30. S1 Catch Basin Stenciling	BMP No. 30	33.91339°	-117.88149°
31. S1 Catch Basin Stenciling	BMP No. 31	33.91352°	-117.88170°
32. S1 Catch Basin Stenciling	BMP No. 32	33.91418°	-117.88162°
33. S1 Catch Basin Stenciling	BMP No. 33	33.91336°	-117.88178°
34. S1 Catch Basin Stenciling	BMP No. 34	33.91338°	-117.88206°
35. S1 Catch Basin Stenciling	BMP No. 35	33.91413°	-117.88213°
36. S1 Catch Basin Stenciling	BMP No. 36	33.91402°	-117.88215°
37. S1 Catch Basin Stenciling	BMP No. 37	33.91376°	-117.88227°
38. S1 Catch Basin Stenciling	BMP No. 38	33.91365°	-117.88227
39. S1 Catch Basin Stenciling	BMP No. 39	33.91354°	-117.88234°
40. S1 Catch Basin Stenciling	BMP No. 40	33.91336°	-117.88235°

N

GRAPHIC SCALE
0 30 60 120
(IN FEET)
1 INCH = 60 FT.

PRELIMINARY
WATER QUALITY MANAGEMENT PLAN
BMP SITE PLAN

APPLICANT:
LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92618
949.349.8000

PREPARED BY:
HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
157 Technology ▪ Irvine, CA 92618 ▪ PH: 949.583.1010 ▪ FX: 949.583.0759

"GREENBRIAR" - VESTING TENTATIVE TRACT MAP No. 19394
WEST OF GREENBRIAR LANE AND
SOUTH ASSOCIATED ROAD
CITY OF BREA, ORANGE COUNTY, CA

DRAFTED BY: TIH	DATE: 03.03.2025	W.O. NO: 3916.89X	SHEET NO: 1 OF 1

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SECTION VII EDUCATIONAL MATERIALS INCLUDED

The list below consists of educational materials that are applicable to this project and can be found at https://h2oc.org/resources/

EDUCATION MATERIALS			
Residential Material	Check If Applicable	Business Material	Check If Applicable
The Ocean Begins at Your Front Door	☒	Tips for the Automotive Industry	☐
Tips for Car Wash Fund-raisers	☒	Tips for Using Concrete and Mortar	☐
Tips for the Home Mechanic	☒	Tips for the Food Service Industry	☐
Homeowners Guide for Sustainable Water Use	☒	Proper Maintenance Practices for Your Business	☒
Household Tips	☒	Other Material	Check If Attached
Proper Disposal of Household Hazardous Waste	☒		
Recycle at Your Local Used Oil Collection Center (North County)	☐		☐
Recycle at Your Local Used Oil Collection Center (Central County)	☒		☐
Recycle at Your Local Used Oil Collection Center (South County)	☐		☐
Tips for Maintaining a Septic Tank System	☐		☐
Responsible Pest Control	☒		☐
Sewer Spill	☒		☐
Tips for the Home Improvement Projects	☒		☐
Tips for Horse Care	☐		☐
Tips for Landscaping and Gardening	☒		☐
Tips for Pet Care	☒		☐
Tips for Pool Maintenance	☒		☐
Tips for Residential Pool, Landscape and Hardscape Drains	☒		☐
Tips for Projects Using Paint	☒		☐

Attachment A – Educational Materials

(Provided at Final WQMP)

Attachment B – BMP Worksheets, Calculations & BMP Details

BMP Worksheets and Calculations

Table 2.7: Infiltration BMP Feasibility Worksheet

	Infeasibility Criteria	*Yes*	*No*
1	**Would Infiltration BMPs pose significant risk for groundwater related concerns?** Refer to Appendix VII (Worksheet I) for guidance on groundwater-related infiltration feasibility criteria.		X
Provide basis: Per GeoTracker, no previous or current contamination issues onsite.			
2	Would Infiltration BMPs **pose significant risk of increasing risk of geotechnical hazards that cannot be mitigated to an acceptable level**? (Yes if the answer to any of the following questions is yes, as established by a geotechnical expert):		X
Provide basis: Per TGD, project does not reside in any slide or expansion area.			
3	Would infiltration of the DCV from drainage area **violate downstream water rights**?		X
Provide basis: Per County TGD Maps, no restrictions on infiltration due to water rights.			

Table 2.7: Infiltration BMP Feasibility Worksheet (continued)

	Partial Infeasibility Criteria	*Yes*	*No*
4	Is proposed infiltration facility **located on HSG D soils** or the site geotechnical investigation identifies presence of soil characteristics which support categorization as D soils?	X	
Provide basis: Based on TGD maps, site is located on HSG D soil. Confirmed by borings and infiltration testing conducted onsite.			
5	Is **measured infiltration rate below proposed facility less than 0.3 inches per hour**? This calculation shall be based on the methods described in Appendix VII.	X	
Provide basis: Infiltration testing resulted in 0.1 to 0.2 in/hr observed rates.			
6	Would **reduction of over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Project discharges to storm channel that is not ephemeral.			
7	Would **an increase in infiltration over pre-developed conditions cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes or increased discharge of contaminated groundwater to surface waters?**		X
Provide citation to applicable study and summarize findings relative to the amount of infiltration that is permissible: Based on TGD and County GIS records, no restrictions on infiltration due to ephemeral washes or groundwater concerns.			
Infiltration Screening Results (check box corresponding to result):			
8	Is there substantial evidence that infiltration from the project would result in a significant increase in I&I to the sanitary sewer that cannot be sufficiently mitigated? (See Appendix XVII)? Provide narrative discussion and supporting evidence: Per TGD and County of Orange GIS data, project is not located in an area where increase in I&I to the sanitary sewer is of concern.	No	
9	If any answer from row 1-3 is yes: infiltration of any volume is **not feasible** within the DMA or equivalent. Provide basis: See project soils report.	1-3 is no	

10	If any answer from row 4-7 is yes, infiltration is **permissible but is not presumed to be feasible for the entire DCV.** Criteria for designing biotreatment BMPs to achieve the maximum feasible infiltration and ET shall apply. Provide basis: See project soils report	4-5 are yes
11	If all answers to rows 1 through 11 are no, infiltration of the full DCV is potentially feasible, BMPs must be designed to infiltrate the full DCV to the maximum extent practicable.	N/A

Worksheet J: Summary of Harvested Water Demand and Feasibility – Overall Project Site

1	What demands for harvested water exist in the tributary area (check all that apply):			
2	Toilet and urinal flushing		☒	
3	Landscape irrigation		☒	
4	Other:		☐	
5	What is the design capture storm depth? (Figure III.1)	d	0.90	inches
6	What is the project size?	A	9.46	ac
7	What is the acreage of impervious area?	IA	7.57	ac
	For projects with multiple types of demand (toilet flushing, irrigation demand, and/or other demand)			
8	What is the minimum use required for partial capture? (Table X.6)	N/A		gpd
9	What is the project estimated wet season total daily use (Section X.2)?	N/A		gpd
10	Is partial capture potentially feasible? (Line 9 > Line 8?)	N/A		
	For projects with only toilet flushing demand			
11	What is the minimum TUTIA for partial capture? (Table X.7)	N/A		users
12	What is the project estimated TUTIA?	N/A		users
13	Is partial capture potentially feasible? (Line 12 > Line 11?)	N/A		
	For projects with only irrigation demand			
14	What is the minimum irrigation area required based on conservation landscape design? (Table X.8)	7.65		ac
15	What is the proposed project irrigated area? (multiply conservation landscaping by 1; multiply active turf by 2)	1.89		ac
16	Is partial capture potentially feasible? (Line 15 > Line 14?)	No		

Provide supporting assumptions and citations for controlling demand calculation:
em 9 – 9.3 x (180 units x 2 residents min) = **3348 gpd**
Item 14 – Min. irrigation area for conservation landscape (K_L= 0.35) = 1.01 x 7.57 ac = **7.65 ac**
Item 15 – Proposed irrigated area = 1.89 ac x 1 = **1.89 ac** (HOA).

Worksheet B: Simple Design Capture Volume Sizing Method – DMA 1

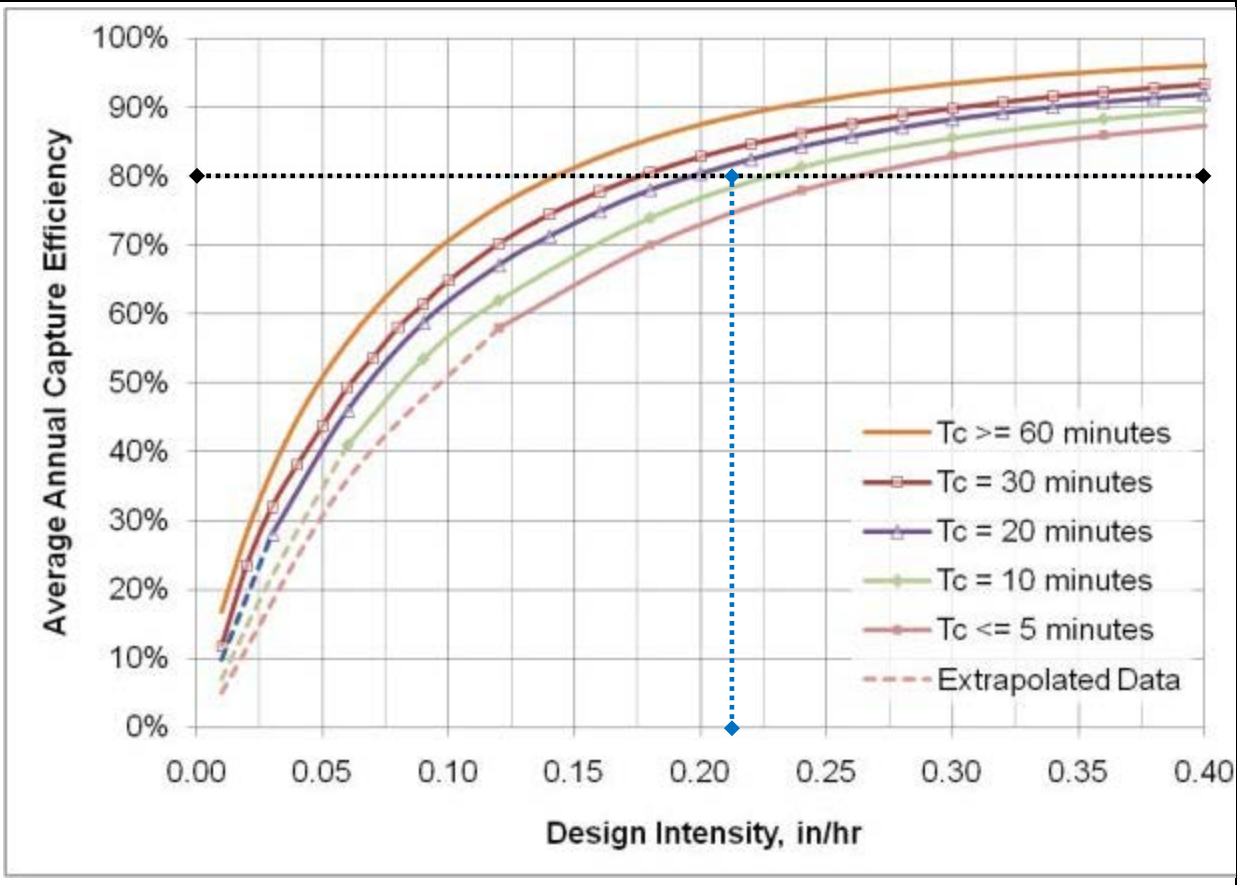
Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter design capture storm depth from Figure III.1, *d* (inches)	d=	0.90	inches
2	Enter the effect of provided HSCs, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
3	Calculate the remainder of the design capture storm depth, $d_{remainder}$ (inches) (Line 1 – Line 2)	$d_{remainder}$=	0.90	inches
Step 2: Calculate the DCV				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	9.46	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.80	
3	Calculate runoff coefficient, $C= (0.75 \times imp) + 0.15$	C=	0.75	
4	Calculate runoff volume, $V_{design}= (C \times d_{remainder} \times A \times 43560 \times (1/12))$	V_{design}=	23,179	cu-ft
Step 3: Design BMPs to ensure full retention of the DCV				
Step 3a: Determine design infiltration rate				
1	Enter measured infiltration rate, $K_{measured}$ (in/hr) (Appendix VII)	$K_{measured}$=	N/A	In/hr
2	Enter combined safety factor from Worksheet H, $S_{Preliminary}$ (unitless)	$S_{Preliminary}$=	N/A	
3	Calculate design infiltration rate, $K_{design} = K_{measured} / S_{Preliminary}$	K_{design}=	N/A	In/hr
Step 3b: Determine minimum BMP footprint				
4	Enter drawdown time, *T* (max 48 hours)	T=	N/A	Hours
5	Calculate max retention depth that can be drawn down within the drawdown time (feet), $D_{max} = K_{design} \times T \times (1/12)$	D_{max}=	N/A	feet
6	Calculate minimum area required for BMP (sq-ft), $A_{min} = V_{design} / d_{max}$	A_{min}=	N/A	sq-ft
Calculations				
DCV = 0.75 X 0.90in X 9.46 acres X 43560 sf/12 ft = 23,179 cu-ft.				

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 1

Step 1: Determine the design capture storm depth used for calculating volume				
1	Enter the time of concentration, T_c (min) (See Appendix IV.2)	T_c=	14.72	
2	Using Figure III.4, determine the design intensity at which the estimated time of concentration (T_c) achieves 80% capture efficiency, I_1	I_1=	0.22	in/hr
3	Enter the effect depth of provided HSCs upstream, d_{HSC} (inches) (Worksheet A)	d_{HSC}=	0	inches
4	Enter capture efficiency corresponding to d_{HSC}, Y_2 (Worksheet A)	Y_2=	0	%
5	Using Figure III.4, determine the design intensity at which the time of concentration (T_c) achieves the upstream capture efficiency(Y_2), I_2	I_2=	0	
6	Determine the design intensity that must be provided by BMP $I_{design} = I_1 - I_2$	I_{design}=	0.22	
Step 2: Calculate the design flowrate				
1	Enter Project area tributary to BMP (s), *A* (acres)	A=	9.46	acres
2	Enter Project Imperviousness, *imp* (unitless)	imp=	0.80	
3	Calculate runoff coefficient, $C = (0.75 \times imp) + 0.15$	C=	0.75	
4	Calculate design flow rate, $Q_{design} = (C \times i_{design} \times A)$	Q_{design}=	1.56	cfs
Supporting Calculations				
Describe system: Runoff collected via project backbone storm drain system and conveyed easterly to a proprietary BMP system consisting of three (3) Modular Wetland System units (MWS-L-8-24-V) capable to treating 0.692 cfs per unit. Number of units will be revised as needed to ensure that the project's Q_{BMP} is fully treated.				
Provide time of concentration assumptions: Tc of 14.27 mins is based off of the 2-year event for the project.				

Worksheet D: Capture Efficiency Method for Flow-Based BMPs – DMA 1

Graphical Operations



BMP Details

BIO-7 Proprietary Biotreatment

BIO-7: Proprietary Biotreatment

Proprietary biotreatment devices are devices that are manufactured to mimic natural systems such as bioretention areas by incorporating plants, soil, and microbes engineered to provide treatment at higher flow rates or volumes and with smaller footprints than their natural counterparts. Incoming flows are typically filtered through a planting media (mulch, compost, soil, plants, microbes, etc.) and either infiltrated or collected by an underdrain and delivered to the storm water conveyance system. Tree box filters are an increasingly common type of proprietary biotreatment device that are installed at curb level and filled with a bioretention type soil. For low to moderate flows they operate similarly to bioretention systems and are bypassed during high flows. Tree box filters are highly adaptable solutions that can be used in all types of development and in all types of soils but are especially applicable to dense urban parking lots, street, and roadways.

Also known as:

- *Catch basin planter box*
- *Bioretention vault*
- *Tree box filter*

Proprietary biotreatment
Source: http://www.americastusa.com /index.php/filterra/

Feasibility Screening Considerations

- Proprietary biotreatment devices that are unlined may cause incidental infiltration. Therefore, an evaluation of site conditions should be conducted to evaluate whether the BMP should include an impermeable liner to avoid infiltration into the subsurface.

Opportunity Criteria

- Drainage areas of 0.25 to 1.0 acres.
- Land use may include commercial, residential, mixed use, institutional, and subdivisions. Proprietary biotreatment facilities may also be applied in parking lot islands, traffic circles, road shoulders, and road medians.
- Must not adversely affect the level of flood protection provided by the drainage system.

OC-Specific Design Criteria and Considerations

- ☐ Frequent maintenance and the use of screens and grates to keep trash out may decrease the likelihood of clogging and prevent obstruction and bypass of incoming flows.
- ☐ Consult proprietors for specific criteria concerning the design and performance.
- ☐ Proprietary biotreatment may include specific media to address pollutants of concern. However, for proprietary device to be considered a biotreatment device the media must be capable of supporting rigorous growth of vegetation.
- ☐ Proprietary systems must be acceptable to the reviewing agency. Reviewing agencies shall have the discretion to request performance information. Reviewing agencies shall have the discretion to deny the use of a proprietary BMP on the grounds of performance, maintenance considerations, or other relevant factors.

☐ In right of way areas, plant selection should not impair traffic lines of site. Local jurisdictions may also limit plant selection in keeping with landscaping themes.

Computing Sizing Criteria for Proprietary Biotreatment Device

- Proprietary biotreatment devices can be volume based or flow-based BMPs.
- Volume-based proprietary devices should be sized using the Simple Design Capture Volume Sizing Method described in **Appendix III.3.1** or the Capture Efficiency Method for Volume-Based, Constant Drawdown BMPs described in **Appendix III.3.2**.
- The required design flowrate for flow-based proprietary devices should be computed using the Capture Efficiency Method for Flow-based BMPs described in **Appendix III.3.3**).

Additional References for Design Guidance

- Los Angeles Unified School District (LAUSD) Stormwater Technical Manual, Chapter 4: http://www.laschools.org/employee/design/fs-studies-and-reports/download/white_paper_report_material/Storm_Water_Technical_Manual_2009-opt-red.pdf?version_id=76975850
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf
- Santa Barbara BMP Guidance Manual, Chapter 6: http://www.santabarbaraca.gov/NR/rdonlyres/91D1FA75-C185-491E-A882-49EE17789DF8/0/Manual_071008_Final.pdf

MODULAR WETLANDS™

*Advanced **Stormwater** Biofiltration*

MWS Linear

Contents

1 Introduction

2 Applications

3 Configurations

4 Advantages

5 Operation

6 Orientations | Bypass

7 Performance | Approvals

8 Sizing

9 Installation | Maintenance | Plants

The Urban Impact

For hundreds of years natural wetlands surrounding our shores have played an integral role as nature's stormwater treatment system. But as our cities grow and develop, these natural wetlands have perished under countless roads, rooftops, and parking lots.

Plant A Wetland

Without natural wetlands our cities are deprived of water purification, flood control, and land stability. Modular Wetlands and the MWS Linear re-establish nature's presence and rejuvenate water ways in urban areas.

MWS Linear

The Modular Wetland System Linear represents a pioneering breakthrough in stormwater technology as the only biofiltration system to utilize patented horizontal flow, allowing for a smaller footprint and higher treatment capacity. While most biofilters use little or no pre-treatment, the MWS Linear incorporates an advanced pre-treatment chamber that includes separation and pre-filter cartridges. In this chamber sediment and hydrocarbons are removed from runoff before it enters the biofiltration chamber, in turn reducing maintenance costs and improving performance.

Applications

The MWS Linear has been successfully used on numerous new construction and retrofit projects. The system's superior versatility makes it beneficial for a wide range of stormwater and waste water applications - treating rooftops, streetscapes, parking lots, and industrial sites.

Industrial

Many states enforce strict regulations for discharges from industrial sites. The MWS Linear has helped various sites meet difficult EPA mandated effluent limits for dissolved metals and other pollutants.

Residential

Low to high density developments can benefit from the versatile design of the MWS Linear. The system can be used in both decentralized LID design and cost-effective end-of-the-line configurations.

Streets

Street applications can be challenging due to limited space. The MWS Linear is very adaptable, and offers the smallest footprint to work around the constraints of existing utilities on retrofit projects.

Parking Lots

Parking lots are designed to maximize space and the MWS Linear's 4 ft. standard planter width allows for easy integration into parking lot islands and other landscape medians.

Commercial

Compared to bioretention systems, the MWS Linear can treat far more area in less space - meeting treatment and volume control requirements.

Mixed Use

The MWS Linear can be installed as a raised planter to treat runoff from rooftops or patios, making it perfect for sustainable "live-work" spaces.

More applications are available on our website: www.ModularWetlands.com/Applications

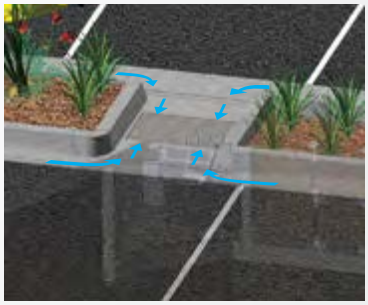
- Agriculture
- Reuse
- Low Impact Development
- Waste Water

Configurations

The MWS Linear is the preferred biofiltration system of Civil Engineers across the country due to its versatile design. This highly versatile system has available "pipe-in" options on most models, along with built-in curb or grated inlets for simple integration into your stormdrain design.

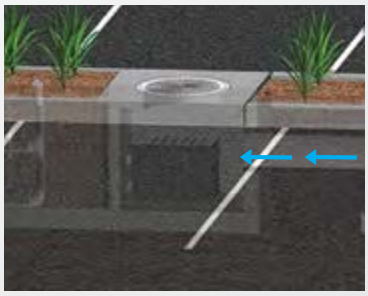
Curb Type

The *Curb Type* configuration accepts sheet flow through a curb opening and is commonly used along road ways and parking lots. It can be used in sump or flow by conditions. Length of curb opening varies based on model and size.



Grate Type

The *Grate Type* configuration offers the same features and benefits as the *Curb Type* but with a grated/drop inlet above the systems pre-treatment chamber. It has the added benefit of allowing for pedestrian access over the inlet. ADA compliant grates are available to assure easy and safe access. The *Grate Type* can also be used in scenarios where runoff needs to be intercepted on both sides of landscape islands.



Vault Type

The system's patented horizontal flow biofilter is able to accept inflow pipes directly into the pre-treatment chamber, meaning the MWS Linear can be used in end-of-the-line installations. This greatly improves feasibility over typical decentralized designs that are required with other biofiltration/bioretention systems. Another benefit of the "pipe in" design is the ability to install the system downstream of underground detention systems to meet water quality volume requirements.

Downspout Type

The *Downspout Type* is a variation of the *Vault Type* and is designed to accept a vertical downspout pipe from roof top and podium areas. Some models have the option of utilizing an internal bypass, simplifying the overall design. The system can be installed as a raised planter and the exterior can be stuccoed or covered with other finishes to match the look of adjacent buildings.

Advantages & Operation

The MWS Linear is the most efficient and versatile biofiltration system on the market, and the only system with horizontal flow which improves performance, reduces footprint, and minimizes maintenance. Figure-1 and Figure-2 illustrate the invaluable benefits of horizontal flow and the multiple treatment stages.

Featured Advantages

- Horizontal Flow Biofiltration
- Greater Filter Surface Area
- Pre-Treatment Chamber
- Patented Perimeter Void Area
- Flow Control
- No Depressed Planter Area

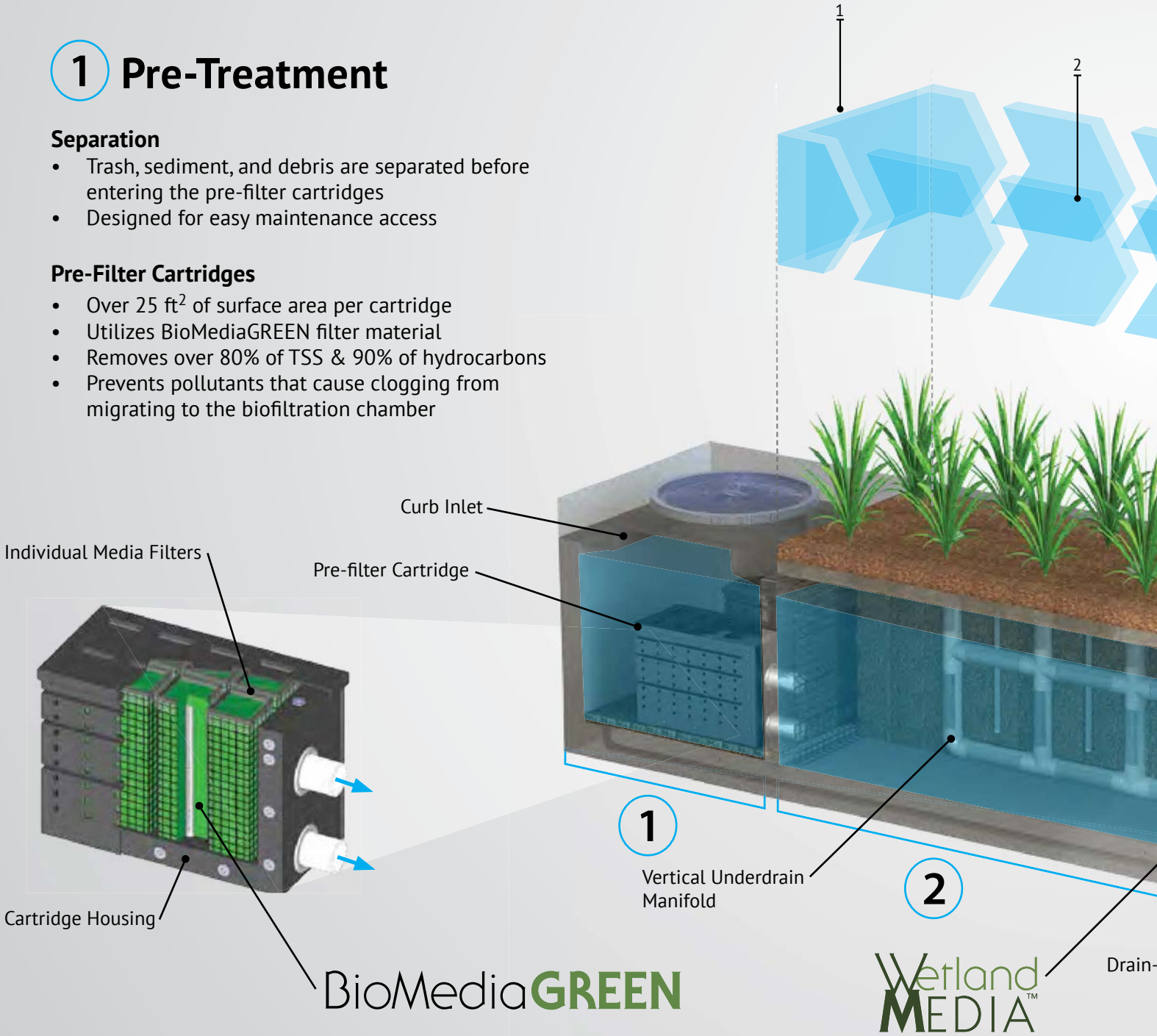
1 Pre-Treatment

Separation

- Trash, sediment, and debris are separated before entering the pre-filter cartridges
- Designed for easy maintenance access

Pre-Filter Cartridges

- Over 25 ft^2 of surface area per cartridge
- Utilizes BioMediaGREEN filter material
- Removes over 80% of TSS & 90% of hydrocarbons
- Prevents pollutants that cause clogging from migrating to the biofiltration chamber



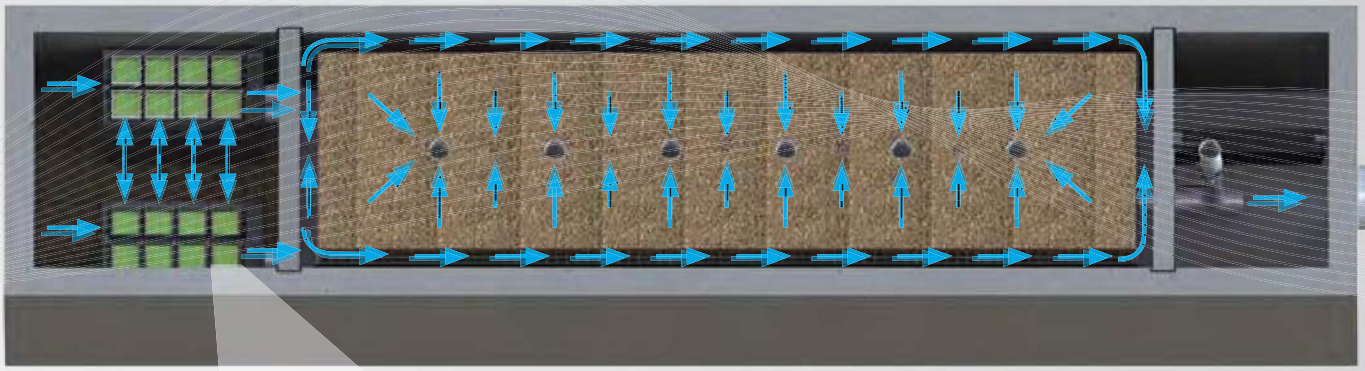


Fig. 2 - Top View

2x to 3x More Surface Area Than Traditional Downward Flow Bioretention Systems.

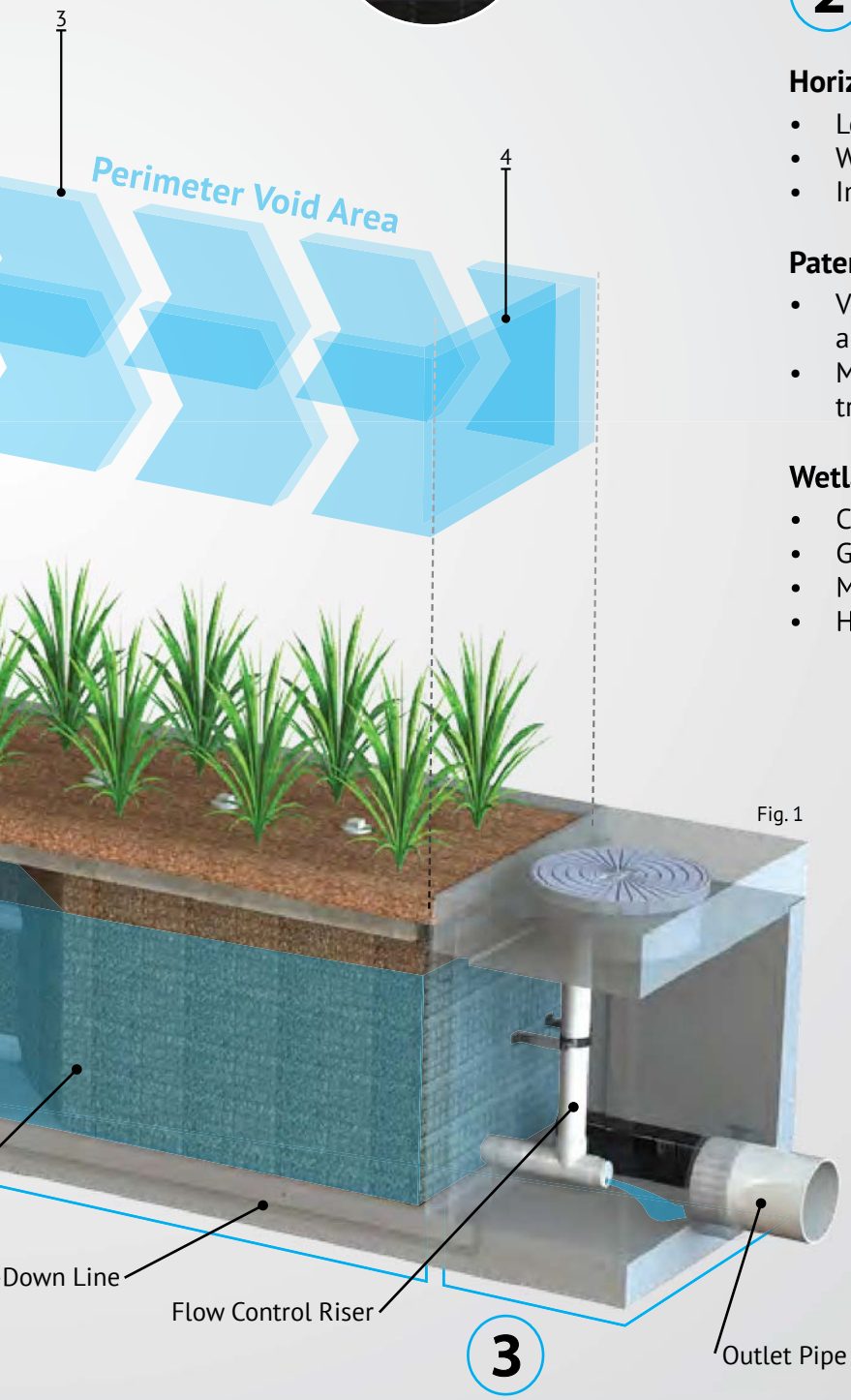


Fig. 1

2 Biofiltration

Horizontal Flow

- Less clogging than downward flow biofilters
- Water flow is subsurface
- Improves biological filtration

Patented Perimeter Void Area

- Vertically extends void area between the walls and the WetlandMEDIA on all four sides.
- Maximizes surface area of the media for higher treatment capacity

WetlandMEDIA

- Contains no organics and removes phosphorus
- Greater surface area and 48% void space
- Maximum evapotranspiration
- High ion exchange capacity and light weight

3 Discharge

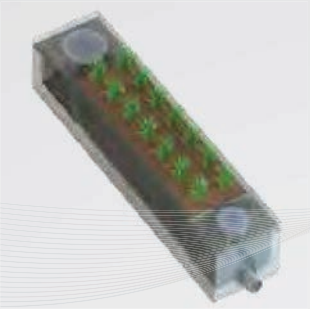
Flow Control

- Orifice plate controls flow of water through WetlandMEDIA to a level lower than the media's capacity.
- Extends the life of the media and improves performance

Drain-Down Filter

- The Drain-Down is an optional feature that completely drains the pre-treatment chamber
- Water that drains from the pre-treatment chamber between storm events will be treated

Orientations



Side-By-Side

The *Side-By-Side* orientation places the pre-treatment and discharge chamber adjacent to one another with the biofiltration chamber running parallel on either side. This minimizes the system length, providing a highly compact footprint. It has been proven useful in situations such as streets with directly adjacent sidewalks, as half of the system can be placed under that sidewalk. This orientation also offers internal bypass options as discussed below.

End-To-End

The *End-To-End* orientation places the pre-treatment and discharge chambers on opposite ends of the biofiltration chamber therefore minimizing the width of the system to 5 ft (outside dimension). This orientation is perfect for linear projects and street retrofits where existing utilities and sidewalks limit the amount of space available for installation. One limitation of this orientation is bypass must be external.

Bypass

Internal Bypass Weir (Side-by-Side Only)

The *Side-By-Side* orientation places the pre-treatment and discharge chambers adjacent to one another allowing for integration of internal bypass. The wall between these chambers can act as a bypass weir when flows exceed the system's treatment capacity, thus allowing bypass from the pre-treatment chamber directly to the discharge chamber.

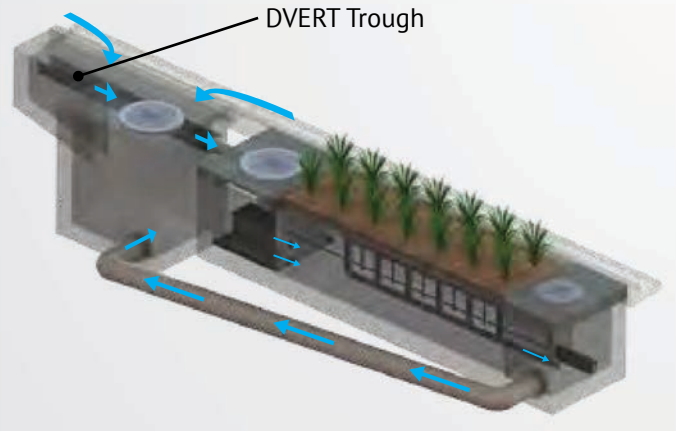
External Diversion Weir Structure

This traditional offline diversion method can be used with the MWS Linear in scenarios where runoff is being piped to the system. These simple and effective structures are generally configured with two outflow pipes. The first is a smaller pipe on the upstream side of the diversion weir - to divert low flows over to the MWS Linear for treatment. The second is the main pipe that receives water once the system has exceeded treatment capacity and water flows over the weir.

Flow By Design

This method is one in which the system is placed just upstream of a standard curb or grate inlet to intercept the first flush. Higher flows simply pass by the MWS Linear and into the standard inlet downstream.

DVERT Low Flow Diversion



This simple yet innovative diversion trough can be installed in existing or new curb and grate inlets to divert the first flush to the MWS Linear via pipe. It works similar to a rain gutter and is installed just below the opening into the inlet. It captures the low flows and channels them over to a connecting pipe exiting out the wall of the inlet and leading to the MWS Linear. The DVERT is perfect for retrofit and green street applications that allows the MWS Linear to be installed anywhere space is available.

Performance

The MWS Linear continues to outperform other treatment methods with superior pollutant removal for TSS, heavy metals, nutrients, hydrocarbons and bacteria. Since 2007 the MWS Linear has been field tested on numerous sites across the country. With it's advanced pre-treatment chamber and innovative horizontal flow biofilter, the system is able to effectively remove pollutants through a combination of physical, chemical, and biological filtration processes. With the same biological processes found in natural wetlands, the MWS Linear harnesses natures ability to process, transform, and remove even the most harmful pollutants.

Approvals

The MWS Linear has successfully met years of challenging technical reviews and testing from some of the most prestigious and demanding agencies in the nation, and perhaps the world.

Washington State DOE Approved

The MWS Linear is approved for General Use Level Designation (GULD) for Basic, Enhanced, and Phosphorus treatment at 1 gpm/ft^2 loading rate. The highest performing BMP on the market for all main pollutant categories.

TSS	Total Phosphorus	Ortho Phosphorus	Nitrogen	Dissolved Zinc	Dissolved Copper	Total Zinc	Total Copper	Motor Oil
85%	64%	67%	45%	66%	38%	69%	50%	95%

DEQ Assignment

The Virginia Department of Environmental Quality assigned the MWS Linear, the highest phosphorus removal rating for manufactured treatment devices to meet the new Virginia Stormwater Management Program (VSMP) Technical Criteria.

MASTEP Evaluation

The University of Massachusetts at Amherst – Water Resources Research Center, issued a technical evaluation report noting removal rates up to 84% TSS, 70% Total Phosphorus, 68.5% Total Zinc, and more.

Rhode Island DEM Approved

Approved as an authorized BMP and noted to achieve the following minimum removal efficiencies: 85% TSS, 60% Pathogens, 30% Total Phosphorus for discharges to freshwater systems, and 30% Total Nitrogen for discharges to saltwater or tidal systems.

Flow Based Sizing

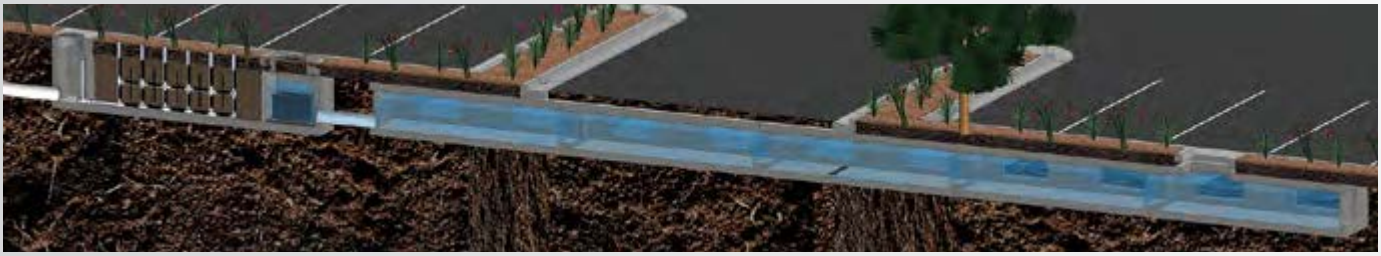
The MWS Linear can be used in stand alone applications to meet treatment flow requirements. Since the MWS Linear is the only biofiltration system that can accept inflow pipes several feet below the surface it can be used not only in decentralized design applications but also as a large central end-of-the-line application for maximum feasibility.

Treatment Flow Sizing Table

Model #		Dimensions	WetlandMedia Surface Area	Treatment Flow Rate (cfs)	
MWS-L-4-4	16	4' x 4'	23 ft^2	0.052	0.0033
MWS-L-4-6	24	4' x 6'	32 ft^2	0.073	0.0030
MWS-L-4-8	32	4' x 8'	50 ft^2	0.115	0.0036
MWS-L-4-13	52	4' x 13'	63 ft^2	0.144	0.0028
MWS-L-4-15	60	4' x 15'	76 ft^2	0.175	0.0029
MWS-L-4-17	68	4' x 17'	90 ft^2	0.206	0.0030
MWS-L-4-19	76	4' x 19'	103 ft^2	0.237	0.0032
MWS-L-4-21	84	4' x 21'	117 ft^2	0.268	0.0032
MWS-L-8-8	64	8' x 8'	100 ft^2	0.230	0.0036
MWS-L-8-12	96	8' x 12'	151 ft^2	0.346	0.0036
MWS-L-8-16	128	8' x 16'	201 ft^2	0.462	0.0036
MWS-L-10-20	200	10'x20'			

Volume Based Sizing

Many states require treatment of a water quality volume and do not offer the option of flow based design. The MWS Linear and its unique horizontal flow makes it the only biofilter that can be used in volume based design installed downstream of ponds, detention basins, and underground storage systems.



Treatment Volume Sizing Table

Model #		Treatment Capacity (cu. ft.) @ 24-Hour Drain Down	Treatment Capacity (cu. ft.) @ 48-Hour Drain Down		
MWS-L-4-4	16	1140	2280	0.0132	0.254
MWS-L-4-6	24	1600	3200	0.0185	0.253
MWS-L-4-8	32	2518	5036	0.0291	0.258
MWS-L-4-13	52	3131	6261	0.0362	
MWS-L-4-15	60	3811	7623	0.0441	
MWS-L-4-17	68	4492	8984	0.0520	
MWS-L-4-19	76	5172	10345	0.0599	
MWS-L-4-21	84	5853	11706	0.0677	
MWS-L-8-8	64	5036	10072	0.0583	
MWS-L-8-12	96	7554	15109	0.0784	
MWS-L-8-16	128	10073	20145	0.1166	

Installation

The MWS Linear is simple, easy to install, and has a space efficient design that offers lower excavation and installation costs compared to traditional tree-box type systems. The structure of the system resembles pre-cast catch basin or utility vaults and is installed in a similar fashion.

The system is delivered fully assembled for quick installation. Generally, the structure can be unloaded and set in place in 15 minutes. Our experienced team of field technicians are available to supervise installations and provide technical support.

Maintenance

Reduce your maintenance costs, man hours, and materials with the MWS Linear. Unlike other biofiltration systems that provide no pre-treatment, the MWS Linear is a self-contained treatment train which incorporates simple and effective pre-treatment.

Maintenance requirements for the biofilter itself are almost completely eliminated, as the pre-treatment chamber removes and isolates trash, sediments, and hydrocarbons. What's left is the simple maintenance of an easily accessible pre-treatment chamber that can be cleaned by hand or with a standard vac truck. Only periodic replacement of low-cost media in the pre-filter cartridges is required for long term operation and there is absolutely no need to replace expensive biofiltration media.

Plant Selection

Abundant plants, trees, and grasses bring value and an aesthetic benefit to any urban setting, but those in the MWS Linear do even more - they increase pollutant removal. What's not seen, but very important, is that below grade the stormwater runoff/flow is being subjected to nature's secret weapon: a dynamic physical, chemical, and biological process working to break down and remove non-point source pollutants. The flow rate is controlled in the MWS Linear, giving the plants more "contact time" so that pollutants are more successfully decomposed, volatilized and incorporated into the biomass of The MWS Linear's micro/macro flora and fauna.

A wide range of plants are suitable for use in the MWS Linear, but selections vary by location and climate. View suitable plants by selecting the list relative to your project location's hardy zone.

Please visit www.ModularWetlands.com/Plants for more information and various plant lists.

PRE-1 Hydrodynamic Separator

XIV.7. Pretreatment/Gross Solids Removal BMP Fact Sheets (PRE)

PRE-1: Hydrodynamic Separation Device

Also known as:

- *Vortex Separators*
- *Swirl Concentrators*
- *Gross solids removal devices (GSRDs)*

Hydrodynamic Separation Device
Source: Contech Stormwater Solution, Inc.

Hydrodynamic separation devices are inline pretreatment units designed to remove trash, debris, and coarse sediment using screening, gravity settling, and centrifugal forces generated by forcing the influent into a circular motion. Several companies manufacture units with a variety of design components including separate chambers, baffles, sorbent media, screens, and flow control orifices. Therefore, additional constituents may be targeted depending on the design; however, the short residence time and potential for captured materials to be released during high flows limits the acceptable use of this BMP type as a standalone treatment control BMP.

Opportunity Criteria

- Hydrodynamic separation devices are effective for the removal of coarse sediment, trash, and debris, and are useful as pretreatment in combination with other BMP types that target smaller particle sizes. They are most effective in urban areas where coarse sediment, trash, and debris are pollutants of concern.
- Hydrodynamic devices represent a wide range of device types that have different unit processes and design elements (e.g., storage versus flow-through designs, inclusion of media filtration, etc.) that vary significantly within the category. These design features likely have significant effects on BMP performance; therefore, generalized performance data for hydrodynamic devices is not practical.

OC-Specific Design Criteria and Considerations

☐ Proprietary hydrodynamic device BMP vendors are constantly updating and expanding their product lines so refer to the latest design guidance from each of the vendors. General guidelines on the performance, operations and maintenance of proprietary devices are provided by the vendors.

☐ Operations and maintenance requirements include: clearing trash, debris, and sediment around insert grate and inside chamber, and repairing screens and media if damaged or severely clogged.

Computing Sizing Criteria for Hydrodynamic Devices

- Hydrodynamic separation devices should be adequately sized to pretreat the entire design volume or design flow rate of the downstream BMP.
- The required design flowrate should be calculated based on the Capture Efficiency Method for Flow-based BMPs (See **Appendix** III) to achieve 80 percent capture of the average annual stormwater runoff volume.

Proprietary Hydrodynamic Device Manufacturer Websites

- Table XIV.1 is a list of manufacturers that provide hydrodynamic separation devices. The inclusion of these manufacturers does not represent an endorse of their products. Other devices and manufacturers may be acceptable for pretreatment.

Table XIV.1: Proprietary Hydrodynamic Device Manufacturer Websites

Device	Manufacturer	Website
Rinker In-Line Stormceptor®	Rinker Materials™	www.rinkerstormceptor.com
FloGard® Dual-Vortex Hydrodynamic Separator	KriStar Enterprises Inc.	www.kristar.com
Contech® CDS[a]™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vortechs™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vorsentry™	Contech® Construction Products Inc.	www.contech-cpi.com
Contech® Vorsentry™ HS	Contech® Construction Products Inc.	www.contech-cpi.com
BaySaver BaySeparator	Baysaver Technologies Inc.	www.baysaver.com

Additional References for Design Guidance

- CASQA BMP Handbook for New and Redevelopment: http://www.cabmphandbooks.com/Documents/Development/MP-51.pdf
- Los Angeles County Stormwater BMP Design and Maintenance Manual, Chapter 9: http://dpw.lacounty.gov/DES/design_manuals/StormwaterBMPDesignandMaintenance.pdf

AquaShield™

INNOVATING GOOD CLEAN WATER

AQUA-SWIRL® TRASH CAPTURE

HYDRODYNAMIC SEPARATOR
FEATURES

1. The Aqua-Swirl® Trash Capture is constructed of durable, lightweight, high performance materials to withstand up to HS-25 loads.
2. Floatable trash, debris and coarse sediments enter tangentially into the unit.
3. Vortex separation removes coarse particles of TSS, floatable debris, and free oil.
4. Stainless steel screen removes trash larger than 5 mm.
5. Independent testing & validation for 100% trash removal larger than 5 mm before discharging into sensitive receiving waters.

Water Boards

AQUA-SWIRL® TRASH CAPTURE

Aqua-Swirl® TRASH CAPTURE System

- Provides customized solutions for project specific requirements.
- Systems designed for specific water quality treatment flow rates.
- Modular sizes from 2.5 – 13 ft diameters with attached riser(s) to finish grade.
- Online project and system design tool at http://pda.aquashieldinc.com.

Vortex Separation Technology

- Utilizes hydrodynamic and gravitational forces incorporating a stainless steel screen to remove trash/debris greater than 5mm, coarse sediment (TSS), and free oil.
- Extensive full-scale laboratory testing with independent 3rd parties.
- Certified Full Trash Capture device by CA State Water Resources Control Board.

Bypass Designs

- Systems are designed to treat water quality flow rates and bypass peak storm events.
- Internal and external bypass configurations are available and tailored to site-specific needs.

Pipe Connections

- Systems are designed with custom inlet/outlet diameters at various configuration angles.
- Inlet/outlet stub outs are provided for easy coupling to storm drain lines.
- Easily plumbed to RCP, CMP, PVC, and HDPE piping with dissimilar pipe diameters.

Installation Benefits

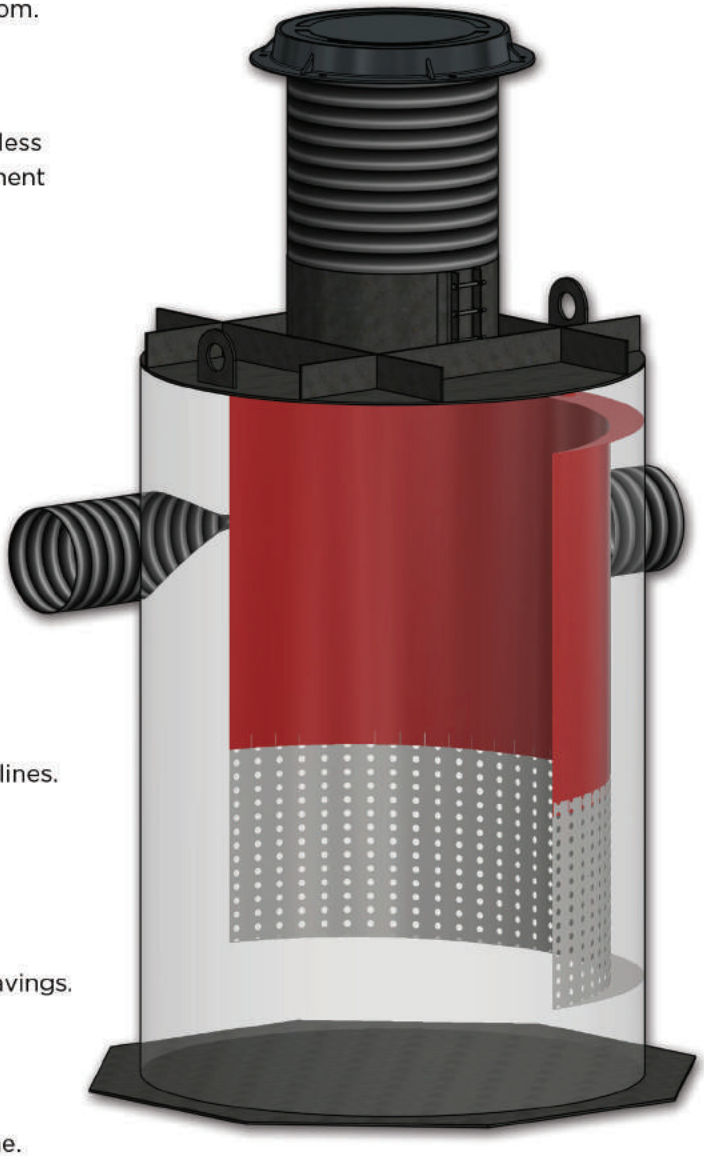
- Quick and simple installation, resulting in measurable project cost savings.
- Designed to withstand HS-25 loadings with capabilities of heavier loads available.
- Small footprint design reduces excavation costs.
- Lightweight and durable construction eliminating the need of a crane.
- Lifting lugs attached for easy maneuverability on site.

Storage Capacities

- Large storage capacities for sediment, debris and free oil to extend maintenance frequency.
- Screened trash capture storage capacities up to 122 ft3.
- Sediment storage capacities up to 310 ft3.

Inspection & Maintenance

- AquaShield™ offers an extensive network of local service providers across the country to ensure system performance efficiency.
- I&M manuals are available to download at www.aquashieldinc.com.



AquaShield™
WATER TREATMENT SOLUTIONS

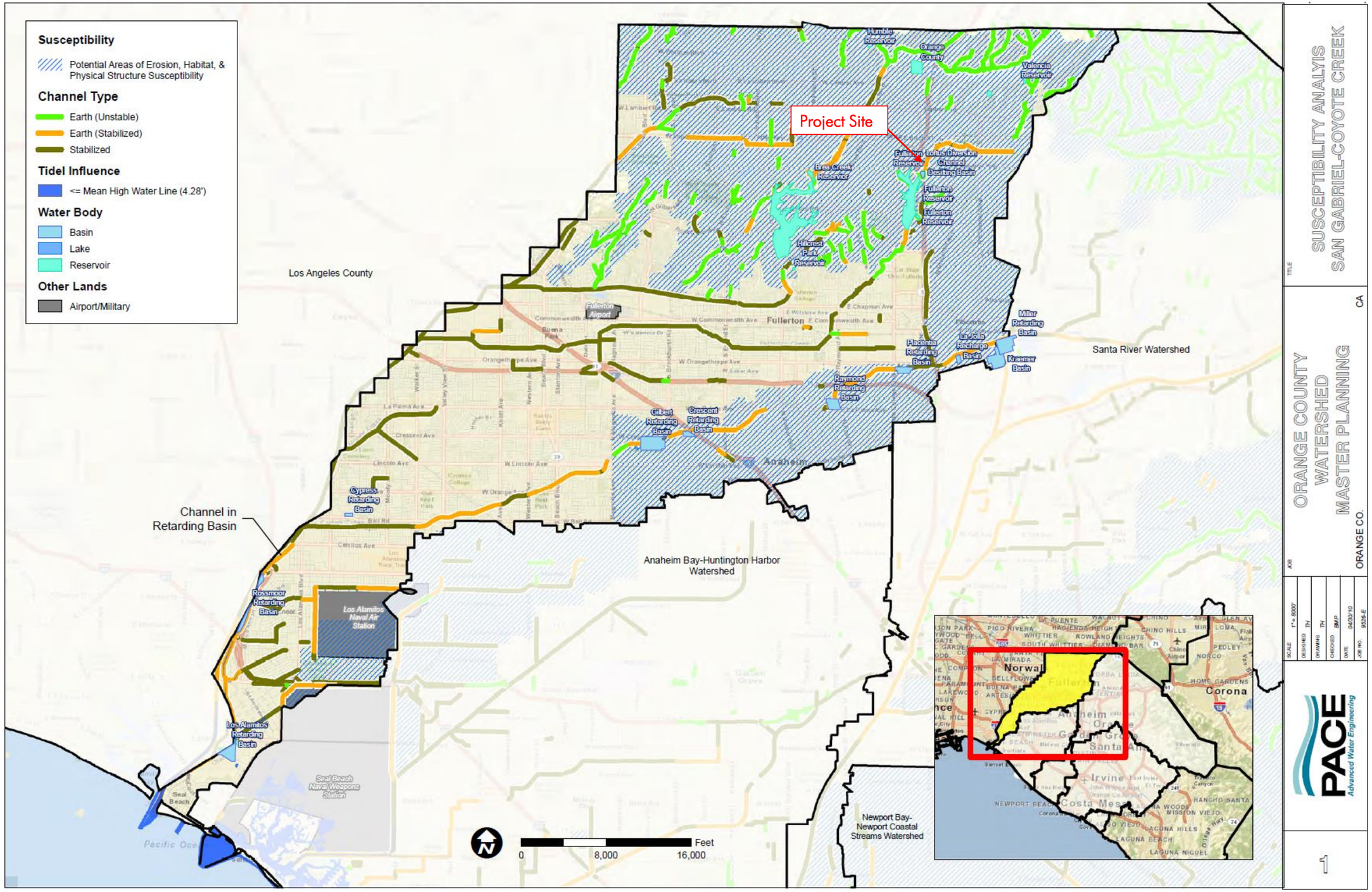
www.aquashieldinc.com

2733 Kanasita Dr., Ste 111
Chattanooga, TN 37343

888.344.9044
423.870.8888
423.826.2112 (fax)

Attachment C – Hydromodification Analysis

(Excerpt provided. See project Hydrology Report for full analysis)


Susceptibility
Potential Areas of Erosion, Habitat, & Physical Structure Susceptibility
Channel Type
Earth (Unstable)
Earth (Stabilized)
Stabilized
Tidel Influence
<= Mean High Water Line (4.28')
Water Body
Basin
Lake
Reservoir
Other Lands
Airport/Military
Project Site
Los Angeles County
Santa River Watershed
Anaheim Bay-Huntington Harbor Watershed
Newport Bay-Newport Coastal Streams Watershed
Channel in Retarding Basin
Humble Reservoir
Orange County
Valencia Reservoir
Brea Creek Reservoir
Fullerton Reservoir
Lohias Diversion Channel Desilting Basin
Hillcrest Park Reservoir
Fullerton Airport
Fullerton
Placentia Retarding Basin
La Jolla Recharge Basin
Miller Retarding Basin
Kraemer Basin
Raymond Retarding Basin
Gilbert Retarding Basin
Crescent Retarding Basin
Anaheim
Cypress Retarding Basin
Rossmoor Retarding Basin
Los Alamitos Naval Air Station
Los Alamitos Retarding Basin
Seal Beach Naval Weapons Station
Seal Beach
Pacific Ocean
Feet
0
8,000
16,000
Norwalk
Corona
Irvine
SUSCEPTIBILITY ANALYIS
SAN GABRIEL-COYOTE CREEK
ORANGE COUNTY
WATERSHED
MASTER PLANNING
ORANGE CO.
CA
PACE
Advanced Water Engineering
1

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*****************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
=============================================================================
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

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-----------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Existing Condition Drainage Area "A"
=============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1          3.93       50.00       75.(AMC II)     0.200       0.454
         2          5.20       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      9.13

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.054

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.348
=============================================================================
```

```
******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Existing Condition Drainage Area "B"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         5.59       50.00       75.(AMC II)     0.200       0.454
         2         2.91       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      8.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.073

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.427
==============================================================================
```

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******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
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******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Existing Condition Drainage Area "C"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         0.54       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      0.54

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.020

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.197
==============================================================================
```

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******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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                            Analysis prepared by:

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******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Existing Condition Drainage Area "D"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1          4.46       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      4.46

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.020

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.197
==============================================================================
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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
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****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Existing Condition Drainage Area "A"
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    9.13
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.054
    LOW LOSS FRACTION = 0.348
    TIME OF CONCENTRATION(MIN.) = 14.86
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.01
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.55

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.15      0.0000      0.00  Q         .         .         .         .
  0.40      0.0018      0.17  Q         .         .         .         .
  0.64      0.0053      0.17  Q         .         .         .         .
  0.89      0.0089      0.18  Q         .         .         .         .
  1.14      0.0125      0.18  Q         .         .         .         .
  1.39      0.0162      0.18  Q         .         .         .         .
  1.64      0.0199      0.18  Q         .         .         .         .
  1.88      0.0236      0.18  Q         .         .         .         .
  2.13      0.0274      0.19  Q         .         .         .         .
  2.38      0.0312      0.19  Q         .         .         .         .
  2.63      0.0351      0.19  Q         .         .         .         .
  2.87      0.0390      0.19  Q         .         .         .         .
  3.12      0.0429      0.19  Q         .         .         .         .
  3.37      0.0470      0.20  Q         .         .         .         .
  3.62      0.0510      0.20  Q         .         .         .         .
  3.86      0.0551      0.20  Q         .         .         .         .
  4.11      0.0593      0.20  Q         .         .         .         .
  4.36      0.0635      0.21  Q         .         .         .         .
  4.61      0.0677      0.21  Q         .         .         .         .
```

4.86	0.0720	0.21	Q
5.10	0.0764	0.21	Q
5.35	0.0808	0.22	Q
5.60	0.0854	0.22	Q
5.85	0.0899	0.23	Q
6.09	0.0946	0.23	Q
6.34	0.0993	0.23	Q
6.59	0.1040	0.23	Q
6.84	0.1089	0.24	Q
7.08	0.1139	0.24	Q
7.33	0.1189	0.25	Q
7.58	0.1240	0.25	.Q
7.83	0.1292	0.26	.Q
8.07	0.1345	0.26	.Q
8.32	0.1399	0.27	.Q
8.57	0.1454	0.27	.Q
8.82	0.1511	0.28	.Q
9.07	0.1568	0.28	.Q
9.31	0.1627	0.29	.Q
9.56	0.1687	0.30	.Q
9.81	0.1748	0.31	.Q
10.06	0.1811	0.31	.Q
10.30	0.1876	0.32	.Q
10.55	0.1942	0.33	.Q
10.80	0.2011	0.34	.Q
11.05	0.2081	0.35	.Q
11.29	0.2153	0.36	.Q
11.54	0.2228	0.37	.Q
11.79	0.2305	0.39	.Q
12.04	0.2385	0.39	.Q
12.28	0.2477	0.50	. Q
12.53	0.2581	0.52	. Q
12.78	0.2689	0.54	. Q
13.03	0.2802	0.56	. Q
13.28	0.2920	0.59	. Q
13.52	0.3043	0.61	. Q
13.77	0.3173	0.66	. Q
14.02	0.3309	0.68	. Q
14.27	0.3458	0.77	. Q
14.51	0.3620	0.81	. Q
14.76	0.3799	0.94	. Q
15.01	0.4002	1.04	. Q
15.26	0.4242	1.30	. Q
15.50	0.4528	1.49	. Q
15.75	0.4877	1.92	. Q
16.00	0.5367	2.86	.Q
16.25	0.6629	9.47	.
16.50	0.7750	1.49	. Q
16.74	0.8020	1.16	. Q
16.99	0.8227	0.86	. Q
17.24	0.8389	0.71	. Q
17.49	0.8526	0.63	. Q
17.73	0.8650	0.57	. Q
17.98	0.8763	0.53	. Q
18.23	0.8860	0.42	.Q
18.48	0.8943	0.38	.Q
18.72	0.9017	0.35	.Q
18.97	0.9087	0.33	.Q
19.22	0.9154	0.32	.Q
19.47	0.9217	0.30	.Q
19.72	0.9277	0.29	.Q
19.96	0.9334	0.27	.Q
20.21	0.9390	0.26	.Q
20.46	0.9443	0.25	.Q
20.71	0.9494	0.25	Q
20.95	0.9543	0.24	Q
21.20	0.9591	0.23	Q

```
 21.45      0.9638      0.22  Q         .         .         .         .
 21.70      0.9683      0.22  Q         .         .         .         .
 21.94      0.9726      0.21  Q         .         .         .         .
 22.19      0.9769      0.21  Q         .         .         .         .
 22.44      0.9810      0.20  Q         .         .         .         .
 22.69      0.9851      0.20  Q         .         .         .         .
 22.93      0.9891      0.19  Q         .         .         .         .
 23.18      0.9929      0.19  Q         .         .         .         .
 23.43      0.9967      0.18  Q         .         .         .         .
 23.68      1.0004      0.18  Q         .         .         .         .
 23.93      1.0040      0.18  Q         .         .         .         .
 24.17      1.0076      0.17  Q         .         .         .         .
 24.42      1.0093      0.00  Q         .         .         .         .
 ------------------------------------------------------------------------
-----------------------------------------------------------------------------
--
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    ======================                  =========
               0%                            1441.4
              10%                             118.9
              20%                              44.6
              30%                              29.7
              40%                              14.9
              50%                              14.9
              60%                              14.9
              70%                              14.9
              80%                              14.9
              90%                              14.9
```

```
******************************************************************************
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          Three Hughes * Irvine, California 92618 * (949)583-1010

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Existing Condition Drainage Area "B"
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    8.50
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.073
    LOW LOSS FRACTION = 0.427
    TIME OF CONCENTRATION(MIN.) = 14.72
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.85
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.60

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.05      0.0000      0.00  Q         .         .         .         .
  0.30      0.0014      0.14  Q         .         .         .         .
  0.54      0.0043      0.14  Q         .         .         .         .
  0.79      0.0072      0.14  Q         .         .         .         .
  1.03      0.0101      0.15  Q         .         .         .         .
  1.28      0.0131      0.15  Q         .         .         .         .
  1.53      0.0160      0.15  Q         .         .         .         .
  1.77      0.0191      0.15  Q         .         .         .         .
  2.02      0.0221      0.15  Q         .         .         .         .
  2.26      0.0252      0.15  Q         .         .         .         .
  2.51      0.0283      0.15  Q         .         .         .         .
  2.75      0.0315      0.16  Q         .         .         .         .
  3.00      0.0346      0.16  Q         .         .         .         .
  3.24      0.0379      0.16  Q         .         .         .         .
  3.49      0.0411      0.16  Q         .         .         .         .
  3.73      0.0444      0.16  Q         .         .         .         .
  3.98      0.0478      0.17  Q         .         .         .         .
  4.22      0.0512      0.17  Q         .         .         .         .
  4.47      0.0546      0.17  Q         .         .         .         .
```

4.71	0.0581	0.17	Q
4.96	0.0616	0.18	Q
5.21	0.0651	0.18	Q
5.45	0.0688	0.18	Q
5.70	0.0724	0.18	Q
5.94	0.0762	0.19	Q
6.19	0.0799	0.19	Q
6.43	0.0838	0.19	Q
6.68	0.0877	0.19	Q
6.92	0.0916	0.20	Q
7.17	0.0957	0.20	Q
7.41	0.0998	0.20	Q
7.66	0.1039	0.21	Q
7.90	0.1082	0.21	Q
8.15	0.1125	0.21	Q
8.39	0.1169	0.22	Q
8.64	0.1214	0.22	Q
8.89	0.1260	0.23	Q
9.13	0.1307	0.23	Q
9.38	0.1355	0.24	Q
9.62	0.1404	0.24	Q
9.87	0.1454	0.25	.Q
10.11	0.1505	0.26	.Q
10.36	0.1558	0.26	.Q
10.60	0.1612	0.27	.Q
10.85	0.1668	0.28	.Q
11.09	0.1725	0.28	.Q
11.34	0.1784	0.30	.Q
11.58	0.1845	0.30	.Q
11.83	0.1908	0.32	.Q
12.07	0.1973	0.33	.Q
12.32	0.2048	0.41	.Q
12.57	0.2133	0.42	.Q
12.81	0.2221	0.45	.Q
13.06	0.2313	0.46	.Q
13.30	0.2409	0.49	.Q
13.55	0.2509	0.50	. Q
13.79	0.2615	0.54	. Q
14.04	0.2726	0.56	. Q
14.28	0.2847	0.63	. Q
14.53	0.2979	0.67	. Q
14.77	0.3122	0.74	. Q
15.02	0.3281	0.83	. Q
15.26	0.3474	1.08	. Q
15.51	0.3709	1.24	. Q
15.75	0.4003	1.66	. Q
16.00	0.4428	2.54	. Q
16.25	0.5570	8.72	. Q
16.49	0.6581	1.25	. Q
16.74	0.6802	0.94	. Q
16.98	0.6968	0.70	. Q
17.23	0.7099	0.59	. Q
17.47	0.7212	0.52	. Q
17.72	0.7312	0.47	.Q
17.96	0.7404	0.44	.Q
18.21	0.7486	0.37	.Q
18.45	0.7554	0.31	.Q
18.70	0.7615	0.29	.Q
18.94	0.7672	0.27	.Q
19.19	0.7726	0.26	.Q
19.43	0.7778	0.25	Q
19.68	0.7827	0.24	Q
19.93	0.7874	0.23	Q
20.17	0.7919	0.22	Q
20.42	0.7962	0.21	Q
20.66	0.8004	0.20	Q
20.91	0.8044	0.20	Q

```
 21.15      0.8083      0.19  Q         .         .         .         .
 21.40      0.8121      0.18  Q         .         .         .         .
 21.64      0.8158      0.18  Q         .         .         .         .
 21.89      0.8193      0.17  Q         .         .         .         .
 22.13      0.8228      0.17  Q         .         .         .         .
 22.38      0.8262      0.16  Q         .         .         .         .
 22.62      0.8295      0.16  Q         .         .         .         .
 22.87      0.8327      0.16  Q         .         .         .         .
 23.11      0.8359      0.15  Q         .         .         .         .
 23.36      0.8389      0.15  Q         .         .         .         .
 23.61      0.8420      0.15  Q         .         .         .         .
 23.85      0.8449      0.14  Q         .         .         .         .
 24.10      0.8478      0.14  Q         .         .         .         .
 24.34      0.8492      0.00  Q         .         .         .         .
 ---------------------------------------------------------------------------
-----------------------------------------------------------------------------
--
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    ======================                  =========
               0%                            1442.6
              10%                             103.0
              20%                              29.4
              30%                              14.7
              40%                              14.7
              50%                              14.7
              60%                              14.7
              70%                              14.7
              80%                              14.7
              90%                              14.7
```

```
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                                 Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Existing Condition Drainage Area "C"
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    0.54
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.020
    LOW LOSS FRACTION = 0.197
    TIME OF CONCENTRATION(MIN.) =  6.49
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.07
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.02

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.10      0.0001      0.01  Q         .         .         .         .
  0.21      0.0002      0.01  Q         .         .         .         .
  0.32      0.0003      0.01  Q         .         .         .         .
  0.42      0.0004      0.01  Q         .         .         .         .
  0.53      0.0005      0.01  Q         .         .         .         .
  0.64      0.0006      0.01  Q         .         .         .         .
  0.75      0.0007      0.01  Q         .         .         .         .
  0.86      0.0008      0.01  Q         .         .         .         .
  0.96      0.0010      0.01  Q         .         .         .         .
  1.07      0.0011      0.01  Q         .         .         .         .
  1.18      0.0012      0.01  Q         .         .         .         .
  1.29      0.0013      0.01  Q         .         .         .         .
  1.40      0.0014      0.01  Q         .         .         .         .
  1.51      0.0015      0.01  Q         .         .         .         .
  1.61      0.0017      0.01  Q         .         .         .         .
  1.72      0.0018      0.01  Q         .         .         .         .
  1.83      0.0019      0.01  Q         .         .         .         .
  1.94      0.0020      0.01  Q         .         .         .         .
  2.05      0.0021      0.01  Q         .         .         .         .
```

2.15	0.0023	0.01	Q	.	.	.	.
2.26	0.0024	0.01	Q	.	.	.	.
2.37	0.0025	0.01	Q	.	.	.	.
2.48	0.0026	0.01	Q	.	.	.	.
2.59	0.0028	0.01	Q	.	.	.	.
2.70	0.0029	0.01	Q	.	.	.	.
2.80	0.0030	0.01	Q	.	.	.	.
2.91	0.0031	0.01	Q	.	.	.	.
3.02	0.0033	0.01	Q	.	.	.	.
3.13	0.0034	0.01	Q	.	.	.	.
3.24	0.0035	0.01	Q	.	.	.	.
3.34	0.0036	0.01	Q	.	.	.	.
3.45	0.0038	0.01	Q	.	.	.	.
3.56	0.0039	0.01	Q	.	.	.	.
3.67	0.0040	0.01	Q	.	.	.	.
3.78	0.0042	0.01	Q	.	.	.	.
3.89	0.0043	0.01	Q	.	.	.	.
3.99	0.0044	0.01	Q	.	.	.	.
4.10	0.0046	0.01	Q	.	.	.	.
4.21	0.0047	0.02	Q	.	.	.	.
4.32	0.0048	0.02	Q	.	.	.	.
4.43	0.0050	0.02	Q	.	.	.	.
4.53	0.0051	0.02	Q	.	.	.	.
4.64	0.0052	0.02	Q	.	.	.	.
4.75	0.0054	0.02	Q	.	.	.	.
4.86	0.0055	0.02	Q	.	.	.	.
4.97	0.0057	0.02	Q	.	.	.	.
5.08	0.0058	0.02	Q	.	.	.	.
5.18	0.0059	0.02	Q	.	.	.	.
5.29	0.0061	0.02	Q	.	.	.	.
5.40	0.0062	0.02	Q	.	.	.	.
5.51	0.0064	0.02	Q	.	.	.	.
5.62	0.0065	0.02	Q	.	.	.	.
5.72	0.0067	0.02	Q	.	.	.	.
5.83	0.0068	0.02	Q	.	.	.	.
5.94	0.0069	0.02	Q	.	.	.	.
6.05	0.0071	0.02	Q	.	.	.	.
6.16	0.0072	0.02	Q	.	.	.	.
6.27	0.0074	0.02	Q	.	.	.	.
6.37	0.0075	0.02	Q	.	.	.	.
6.48	0.0077	0.02	Q	.	.	.	.
6.59	0.0079	0.02	Q	.	.	.	.
6.70	0.0080	0.02	Q	.	.	.	.
6.81	0.0082	0.02	Q	.	.	.	.
6.91	0.0083	0.02	Q	.	.	.	.
7.02	0.0085	0.02	Q	.	.	.	.
7.13	0.0086	0.02	Q	.	.	.	.
7.24	0.0088	0.02	Q	.	.	.	.
7.35	0.0090	0.02	Q	.	.	.	.
7.45	0.0091	0.02	Q	.	.	.	.
7.56	0.0093	0.02	Q	.	.	.	.
7.67	0.0095	0.02	Q	.	.	.	.
7.78	0.0096	0.02	Q	.	.	.	.
7.89	0.0098	0.02	Q	.	.	.	.
8.00	0.0100	0.02	Q	.	.	.	.
8.10	0.0101	0.02	Q	.	.	.	.
8.21	0.0103	0.02	Q	.	.	.	.
8.32	0.0105	0.02	Q	.	.	.	.
8.43	0.0107	0.02	Q	.	.	.	.
8.54	0.0108	0.02	Q	.	.	.	.
8.64	0.0110	0.02	Q	.	.	.	.
8.75	0.0112	0.02	Q	.	.	.	.
8.86	0.0114	0.02	Q	.	.	.	.
8.97	0.0116	0.02	Q	.	.	.	.
9.08	0.0118	0.02	Q	.	.	.	.
9.19	0.0119	0.02	Q	.	.	.	.
9.29	0.0121	0.02	Q	.	.	.	.

9.40	0.0123	0.02	Q	.	.	.	.
9.51	0.0125	0.02	Q	.	.	.	.
9.62	0.0127	0.02	Q	.	.	.	.
9.73	0.0129	0.02	Q	.	.	.	.
9.83	0.0131	0.02	Q	.	.	.	.
9.94	0.0133	0.02	Q	.	.	.	.
10.05	0.0135	0.02	Q	.	.	.	.
10.16	0.0137	0.02	Q	.	.	.	.
10.27	0.0139	0.02	Q	.	.	.	.
10.38	0.0141	0.02	Q	.	.	.	.
10.48	0.0144	0.02	Q	.	.	.	.
10.59	0.0146	0.02	Q	.	.	.	.
10.70	0.0148	0.02	Q	.	.	.	.
10.81	0.0150	0.02	Q	.	.	.	.
10.92	0.0152	0.03	Q	.	.	.	.
11.02	0.0155	0.03	Q	.	.	.	.
11.13	0.0157	0.03	Q	.	.	.	.
11.24	0.0159	0.03	Q	.	.	.	.
11.35	0.0162	0.03	Q	.	.	.	.
11.46	0.0164	0.03	Q	.	.	.	.
11.57	0.0166	0.03	Q	.	.	.	.
11.67	0.0169	0.03	Q	.	.	.	.
11.78	0.0171	0.03	Q	.	.	.	.
11.89	0.0174	0.03	Q	.	.	.	.
12.00	0.0177	0.03	Q	.	.	.	.
12.11	0.0179	0.03	Q	.	.	.	.
12.21	0.0183	0.04	Q	.	.	.	.
12.32	0.0186	0.04	Q	.	.	.	.
12.43	0.0189	0.04	Q	.	.	.	.
12.54	0.0193	0.04	Q	.	.	.	.
12.65	0.0196	0.04	Q	.	.	.	.
12.76	0.0200	0.04	Q	.	.	.	.
12.86	0.0203	0.04	Q	.	.	.	.
12.97	0.0207	0.04	Q	.	.	.	.
13.08	0.0211	0.04	Q	.	.	.	.
13.19	0.0215	0.04	Q	.	.	.	.
13.30	0.0219	0.05	Q	.	.	.	.
13.40	0.0223	0.05	Q	.	.	.	.
13.51	0.0227	0.05	Q	.	.	.	.
13.62	0.0231	0.05	Q	.	.	.	.
13.73	0.0236	0.05	Q	.	.	.	.
13.84	0.0240	0.05	Q	.	.	.	.
13.94	0.0245	0.05	Q	.	.	.	.
14.05	0.0250	0.05	Q	.	.	.	.
14.16	0.0255	0.06	Q	.	.	.	.
14.27	0.0260	0.06	Q	.	.	.	.
14.38	0.0266	0.06	Q	.	.	.	.
14.49	0.0272	0.07	Q	.	.	.	.
14.59	0.0278	0.07	Q	.	.	.	.
14.70	0.0284	0.07	Q	.	.	.	.
14.81	0.0291	0.08	Q	.	.	.	.
14.92	0.0298	0.08	Q	.	.	.	.
15.03	0.0305	0.09	Q	.	.	.	.
15.13	0.0313	0.09	Q	.	.	.	.
15.24	0.0321	0.10	Q	.	.	.	.
15.35	0.0331	0.10	Q	.	.	.	.
15.46	0.0340	0.10	Q	.	.	.	.
15.57	0.0349	0.11	Q	.	.	.	.
15.68	0.0360	0.13	Q	.	.	.	.
15.78	0.0373	0.15	Q	.	.	.	.
15.89	0.0389	0.22	Q	.	.	.	.
16.00	0.0413	0.31	.Q	.	.	.	.
16.11	0.0469	0.94	. Q	.	.	.	.
16.22	0.0519	0.18	Q	.	.	.	.
16.32	0.0533	0.12	Q	.	.	.	.
16.43	0.0543	0.11	Q	.	.	.	.
16.54	0.0552	0.09	Q	.	.	.	.

16.65	0.0560	0.08	Q	.	.	.	.
16.76	0.0567	0.07	Q	.	.	.	.
16.87	0.0573	0.07	Q	.	.	.	.
16.97	0.0579	0.06	Q	.	.	.	.
17.08	0.0584	0.06	Q	.	.	.	.
17.19	0.0589	0.05	Q	.	.	.	.
17.30	0.0594	0.05	Q	.	.	.	.
17.41	0.0598	0.05	Q	.	.	.	.
17.51	0.0602	0.04	Q	.	.	.	.
17.62	0.0606	0.04	Q	.	.	.	.
17.73	0.0610	0.04	Q	.	.	.	.
17.84	0.0613	0.04	Q	.	.	.	.
17.95	0.0617	0.04	Q	.	.	.	.
18.06	0.0620	0.04	Q	.	.	.	.
18.16	0.0623	0.03	Q	.	.	.	.
18.27	0.0625	0.03	Q	.	.	.	.
18.38	0.0628	0.03	Q	.	.	.	.
18.49	0.0630	0.03	Q	.	.	.	.
18.60	0.0633	0.03	Q	.	.	.	.
18.70	0.0635	0.03	Q	.	.	.	.
18.81	0.0637	0.02	Q	.	.	.	.
18.92	0.0639	0.02	Q	.	.	.	.
19.03	0.0641	0.02	Q	.	.	.	.
19.14	0.0643	0.02	Q	.	.	.	.
19.24	0.0645	0.02	Q	.	.	.	.
19.35	0.0647	0.02	Q	.	.	.	.
19.46	0.0649	0.02	Q	.	.	.	.
19.57	0.0651	0.02	Q	.	.	.	.
19.68	0.0653	0.02	Q	.	.	.	.
19.79	0.0655	0.02	Q	.	.	.	.
19.89	0.0657	0.02	Q	.	.	.	.
20.00	0.0658	0.02	Q	.	.	.	.
20.11	0.0660	0.02	Q	.	.	.	.
20.22	0.0662	0.02	Q	.	.	.	.
20.33	0.0664	0.02	Q	.	.	.	.
20.43	0.0665	0.02	Q	.	.	.	.
20.54	0.0667	0.02	Q	.	.	.	.
20.65	0.0668	0.02	Q	.	.	.	.
20.76	0.0670	0.02	Q	.	.	.	.
20.87	0.0672	0.02	Q	.	.	.	.
20.98	0.0673	0.02	Q	.	.	.	.
21.08	0.0675	0.02	Q	.	.	.	.
21.19	0.0676	0.02	Q	.	.	.	.
21.30	0.0678	0.02	Q	.	.	.	.
21.41	0.0679	0.02	Q	.	.	.	.
21.52	0.0680	0.02	Q	.	.	.	.
21.62	0.0682	0.02	Q	.	.	.	.
21.73	0.0683	0.02	Q	.	.	.	.
21.84	0.0685	0.02	Q	.	.	.	.
21.95	0.0686	0.02	Q	.	.	.	.
22.06	0.0687	0.01	Q	.	.	.	.
22.17	0.0689	0.01	Q	.	.	.	.
22.27	0.0690	0.01	Q	.	.	.	.
22.38	0.0691	0.01	Q	.	.	.	.
22.49	0.0693	0.01	Q	.	.	.	.
22.60	0.0694	0.01	Q	.	.	.	.
22.71	0.0695	0.01	Q	.	.	.	.
22.81	0.0696	0.01	Q	.	.	.	.
22.92	0.0698	0.01	Q	.	.	.	.
23.03	0.0699	0.01	Q	.	.	.	.
23.14	0.0700	0.01	Q	.	.	.	.
23.25	0.0701	0.01	Q	.	.	.	.
23.36	0.0702	0.01	Q	.	.	.	.
23.46	0.0704	0.01	Q	.	.	.	.
23.57	0.0705	0.01	Q	.	.	.	.
23.68	0.0706	0.01	Q	.	.	.	.
23.79	0.0707	0.01	Q	.	.	.	.

```
  23.90      0.0708      0.01  Q         .         .         .         .
  24.00      0.0709      0.01  Q         .         .         .         .
  24.11      0.0710      0.00  Q         .         .         .         .
 ---------------------------------------------------------------------------
-----------------------------------------------------------------------------
--
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)
```

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.8
10%	77.9
20%	19.5
30%	13.0
40%	6.5
50%	6.5
60%	6.5
70%	6.5
80%	6.5
90%	6.5

```
****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

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----------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Existing Condition Drainage Area "D"
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    4.46
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.020
    LOW LOSS FRACTION = 0.197
    TIME OF CONCENTRATION(MIN.) =  8.81
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.59
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.17

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.14      0.0006      0.10  Q         .         .         .         .
  0.29      0.0019      0.10  Q         .         .         .         .
  0.44      0.0031      0.10  Q         .         .         .         .
  0.58      0.0044      0.11  Q         .         .         .         .
  0.73      0.0057      0.11  Q         .         .         .         .
  0.88      0.0070      0.11  Q         .         .         .         .
  1.02      0.0083      0.11  Q         .         .         .         .
  1.17      0.0096      0.11  Q         .         .         .         .
  1.32      0.0109      0.11  Q         .         .         .         .
  1.46      0.0122      0.11  Q         .         .         .         .
  1.61      0.0135      0.11  Q         .         .         .         .
  1.76      0.0149      0.11  Q         .         .         .         .
  1.90      0.0162      0.11  Q         .         .         .         .
  2.05      0.0176      0.11  Q         .         .         .         .
  2.20      0.0189      0.11  Q         .         .         .         .
  2.34      0.0203      0.11  Q         .         .         .         .
  2.49      0.0217      0.11  Q         .         .         .         .
  2.64      0.0230      0.11  Q         .         .         .         .
  2.78      0.0244      0.12  Q         .         .         .         .
```

2.93	0.0258	0.12	Q	.	.	.	.
3.08	0.0273	0.12	Q	.	.	.	.
3.23	0.0287	0.12	Q	.	.	.	.
3.37	0.0301	0.12	Q	.	.	.	.
3.52	0.0316	0.12	Q	.	.	.	.
3.67	0.0330	0.12	Q	.	.	.	.
3.81	0.0345	0.12	Q	.	.	.	.
3.96	0.0360	0.12	Q	.	.	.	.
4.11	0.0375	0.12	Q	.	.	.	.
4.25	0.0390	0.12	Q	.	.	.	.
4.40	0.0405	0.13	Q	.	.	.	.
4.55	0.0420	0.13	Q	.	.	.	.
4.69	0.0435	0.13	Q	.	.	.	.
4.84	0.0451	0.13	Q	.	.	.	.
4.99	0.0467	0.13	Q	.	.	.	.
5.13	0.0482	0.13	Q	.	.	.	.
5.28	0.0498	0.13	Q	.	.	.	.
5.43	0.0514	0.13	Q	.	.	.	.
5.57	0.0530	0.13	Q	.	.	.	.
5.72	0.0547	0.13	Q	.	.	.	.
5.87	0.0563	0.14	Q	.	.	.	.
6.02	0.0580	0.14	Q	.	.	.	.
6.16	0.0597	0.14	Q	.	.	.	.
6.31	0.0613	0.14	Q	.	.	.	.
6.46	0.0631	0.14	Q	.	.	.	.
6.60	0.0648	0.14	Q	.	.	.	.
6.75	0.0665	0.14	Q	.	.	.	.
6.90	0.0683	0.15	Q	.	.	.	.
7.04	0.0700	0.15	Q	.	.	.	.
7.19	0.0718	0.15	Q	.	.	.	.
7.34	0.0736	0.15	Q	.	.	.	.
7.48	0.0755	0.15	Q	.	.	.	.
7.63	0.0773	0.15	Q	.	.	.	.
7.78	0.0792	0.15	Q	.	.	.	.
7.92	0.0811	0.16	Q	.	.	.	.
8.07	0.0830	0.16	Q	.	.	.	.
8.22	0.0849	0.16	Q	.	.	.	.
8.36	0.0869	0.16	Q	.	.	.	.
8.51	0.0889	0.16	Q	.	.	.	.
8.66	0.0909	0.17	Q	.	.	.	.
8.81	0.0929	0.17	Q	.	.	.	.
8.95	0.0949	0.17	Q	.	.	.	.
9.10	0.0970	0.17	Q	.	.	.	.
9.25	0.0991	0.17	Q	.	.	.	.
9.39	0.1013	0.18	Q	.	.	.	.
9.54	0.1034	0.18	Q	.	.	.	.
9.69	0.1056	0.18	Q	.	.	.	.
9.83	0.1079	0.18	Q	.	.	.	.
9.98	0.1101	0.19	Q	.	.	.	.
10.13	0.1124	0.19	Q	.	.	.	.
10.27	0.1147	0.19	Q	.	.	.	.
10.42	0.1171	0.20	Q	.	.	.	.
10.57	0.1195	0.20	Q	.	.	.	.
10.71	0.1220	0.20	Q	.	.	.	.
10.86	0.1244	0.21	Q	.	.	.	.
11.01	0.1270	0.21	Q	.	.	.	.
11.15	0.1296	0.21	Q	.	.	.	.
11.30	0.1322	0.22	Q	.	.	.	.
11.45	0.1349	0.22	Q	.	.	.	.
11.60	0.1376	0.23	Q	.	.	.	.
11.74	0.1404	0.23	Q	.	.	.	.
11.89	0.1432	0.24	Q	.	.	.	.
12.04	0.1461	0.24	Q	.	.	.	.
12.18	0.1494	0.29	.Q	.	.	.	.
12.33	0.1530	0.31	.Q	.	.	.	.
12.48	0.1568	0.31	.Q	.	.	.	.
12.62	0.1606	0.32	.Q	.	.	.	.

12.77	0.1646	0.33	.Q . . . .
12.92	0.1686	0.34	.Q . . . .
13.06	0.1728	0.35	.Q . . . .
13.21	0.1771	0.36	.Q . . . .
13.36	0.1816	0.37	.Q . . . .
13.50	0.1862	0.39	.Q . . . .
13.65	0.1910	0.40	.Q . . . .
13.80	0.1960	0.42	.Q . . . .
13.94	0.2012	0.43	.Q . . . .
14.09	0.2066	0.47	.Q . . . .
14.24	0.2125	0.50	.Q . . . .
14.38	0.2187	0.53	. Q . . . .
14.53	0.2252	0.55	. Q . . . .
14.68	0.2322	0.59	. Q . . . .
14.83	0.2395	0.62	. Q . . . .
14.97	0.2474	0.68	. Q . . . .
15.12	0.2559	0.72	. Q . . . .
15.27	0.2652	0.81	. Q . . . .
15.41	0.2754	0.87	. Q . . . .
15.56	0.2862	0.90	. Q . . . .
15.71	0.2979	1.03	. Q . . . .
15.85	0.3134	1.53	. Q . . . .
16.00	0.3355	2.11	. Q . . . .
16.15	0.3877	6.49	. . . Q . .
16.29	0.4345	1.22	. Q . . . .
16.44	0.4470	0.84	. Q . . . .
16.59	0.4567	0.76	. Q . . . .
16.73	0.4652	0.65	. Q . . . .
16.88	0.4726	0.57	. Q . . . .
17.03	0.4792	0.51	. Q . . . .
17.17	0.4850	0.45	.Q . . . .
17.32	0.4902	0.41	.Q . . . .
17.47	0.4950	0.38	.Q . . . .
17.62	0.4995	0.36	.Q . . . .
17.76	0.5036	0.33	.Q . . . .
17.91	0.5076	0.32	.Q . . . .
18.06	0.5114	0.30	.Q . . . .
18.20	0.5146	0.24	Q . . . .
18.35	0.5175	0.23	Q . . . .
18.50	0.5202	0.22	Q . . . .
18.64	0.5228	0.21	Q . . . .
18.79	0.5254	0.20	Q . . . .
18.94	0.5278	0.20	Q . . . .
19.08	0.5302	0.19	Q . . . .
19.23	0.5325	0.19	Q . . . .
19.38	0.5347	0.18	Q . . . .
19.52	0.5369	0.18	Q . . . .
19.67	0.5390	0.17	Q . . . .
19.82	0.5410	0.17	Q . . . .
19.96	0.5430	0.16	Q . . . .
20.11	0.5450	0.16	Q . . . .
20.26	0.5469	0.16	Q . . . .
20.41	0.5488	0.15	Q . . . .
20.55	0.5506	0.15	Q . . . .
20.70	0.5524	0.15	Q . . . .
20.85	0.5542	0.14	Q . . . .
20.99	0.5559	0.14	Q . . . .
21.14	0.5576	0.14	Q . . . .
21.29	0.5592	0.14	Q . . . .
21.43	0.5609	0.13	Q . . . .
21.58	0.5625	0.13	Q . . . .
21.73	0.5640	0.13	Q . . . .
21.87	0.5656	0.13	Q . . . .
22.02	0.5671	0.12	Q . . . .
22.17	0.5686	0.12	Q . . . .
22.31	0.5701	0.12	Q . . . .
22.46	0.5716	0.12	Q . . . .

22.61	0.5730	0.12	Q	.	.	.	.
22.75	0.5744	0.12	Q	.	.	.	.
22.90	0.5758	0.11	Q	.	.	.	.
23.05	0.5772	0.11	Q	.	.	.	.
23.19	0.5785	0.11	Q	.	.	.	.
23.34	0.5799	0.11	Q	.	.	.	.
23.49	0.5812	0.11	Q	.	.	.	.
23.64	0.5825	0.11	Q	.	.	.	.
23.78	0.5838	0.11	Q	.	.	.	.
23.93	0.5851	0.10	Q	.	.	.	.
24.08	0.5864	0.10	Q	.	.	.	.
24.22	0.5870	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1444.8
10%	105.7
20%	26.4
30%	17.6
40%	8.8
50%	8.8
60%	8.8
70%	8.8
80%	8.8
90%	8.8

```
******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                      AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Proposed Condition Drainage Area "A"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         3.93       50.00       75.(AMC II)     0.200       0.454
         2         9.35       20.00       75.(AMC II)     0.200       0.715
         3         1.02       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =     14.30

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.055

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.350
==============================================================================
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******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                      AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Proposed Condition Drainage Area "B"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         5.59       50.00       75.(AMC II)     0.200       0.454
         2         2.46       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      8.05

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.076

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.440
==============================================================================
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******************************************************************************
           NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                     AND LOW LOSS FRACTION ESTIMATIONS
==============================================================================
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******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Soil Loss Calculations for 2-year Storm
  Proposed Condition Drainage Area "C"
==============================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1          0.24       10.00       75.(AMC II)     0.200       0.803

    TOTAL AREA (Acres) =      0.24

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.020

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.197
==============================================================================
```

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
============================================================================
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****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Proposed Condition Drainage Area "A"
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.77
    TOTAL CATCHMENT AREA(ACRES) =   14.30
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.055
    LOW LOSS FRACTION = 0.350
    TIME OF CONCENTRATION(MIN.) =  9.66
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.36
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.08

****************************************************************************
  TIME     VOLUME       Q    0.        5.0      10.0      15.0      20.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.06      0.0006      0.23  Q         .         .         .         .
  0.22      0.0036      0.23  Q         .         .         .         .
  0.38      0.0067      0.23  Q         .         .         .         .
  0.54      0.0098      0.23  Q         .         .         .         .
  0.71      0.0130      0.24  Q         .         .         .         .
  0.87      0.0161      0.24  Q         .         .         .         .
  1.03      0.0193      0.24  Q         .         .         .         .
  1.19      0.0225      0.24  Q         .         .         .         .
  1.35      0.0257      0.24  Q         .         .         .         .
  1.51      0.0289      0.24  Q         .         .         .         .
  1.67      0.0322      0.25  Q         .         .         .         .
  1.83      0.0354      0.25  Q         .         .         .         .
  1.99      0.0387      0.25  Q         .         .         .         .
  2.15      0.0421      0.25  Q         .         .         .         .
  2.32      0.0454      0.25  Q         .         .         .         .
  2.48      0.0488      0.25  Q         .         .         .         .
  2.64      0.0522      0.26  Q         .         .         .         .
  2.80      0.0556      0.26  Q         .         .         .         .
  2.96      0.0590      0.26  Q         .         .         .         .
```

3.12	0.0625	0.26	Q	.	.	.	.
3.28	0.0660	0.26	Q	.	.	.	.
3.44	0.0696	0.27	Q	.	.	.	.
3.60	0.0731	0.27	Q	.	.	.	.
3.76	0.0767	0.27	Q	.	.	.	.
3.93	0.0803	0.27	Q	.	.	.	.
4.09	0.0840	0.27	Q	.	.	.	.
4.25	0.0876	0.28	Q	.	.	.	.
4.41	0.0913	0.28	Q	.	.	.	.
4.57	0.0951	0.28	Q	.	.	.	.
4.73	0.0988	0.28	Q	.	.	.	.
4.89	0.1027	0.29	Q	.	.	.	.
5.05	0.1065	0.29	Q	.	.	.	.
5.21	0.1104	0.29	Q	.	.	.	.
5.37	0.1143	0.29	Q	.	.	.	.
5.54	0.1182	0.30	Q	.	.	.	.
5.70	0.1222	0.30	Q	.	.	.	.
5.86	0.1262	0.30	Q	.	.	.	.
6.02	0.1303	0.31	Q	.	.	.	.
6.18	0.1344	0.31	Q	.	.	.	.
6.34	0.1385	0.31	Q	.	.	.	.
6.50	0.1427	0.32	Q	.	.	.	.
6.66	0.1470	0.32	Q	.	.	.	.
6.82	0.1512	0.32	Q	.	.	.	.
6.98	0.1556	0.33	Q	.	.	.	.
7.14	0.1599	0.33	Q	.	.	.	.
7.31	0.1644	0.33	Q	.	.	.	.
7.47	0.1688	0.34	Q	.	.	.	.
7.63	0.1734	0.34	Q	.	.	.	.
7.79	0.1779	0.35	Q	.	.	.	.
7.95	0.1826	0.35	Q	.	.	.	.
8.11	0.1873	0.36	Q	.	.	.	.
8.27	0.1920	0.36	Q	.	.	.	.
8.43	0.1968	0.36	Q	.	.	.	.
8.59	0.2017	0.37	Q	.	.	.	.
8.76	0.2066	0.37	Q	.	.	.	.
8.92	0.2116	0.38	Q	.	.	.	.
9.08	0.2167	0.39	Q	.	.	.	.
9.24	0.2219	0.39	Q	.	.	.	.
9.40	0.2271	0.40	Q	.	.	.	.
9.56	0.2324	0.40	Q	.	.	.	.
9.72	0.2378	0.41	Q	.	.	.	.
9.88	0.2433	0.41	Q	.	.	.	.
10.04	0.2488	0.42	Q	.	.	.	.
10.20	0.2545	0.43	Q	.	.	.	.
10.37	0.2603	0.44	Q	.	.	.	.
10.53	0.2661	0.44	Q	.	.	.	.
10.69	0.2721	0.45	Q	.	.	.	.
10.85	0.2781	0.46	Q	.	.	.	.
11.01	0.2843	0.47	Q	.	.	.	.
11.17	0.2906	0.48	Q	.	.	.	.
11.33	0.2971	0.49	Q	.	.	.	.
11.49	0.3037	0.50	Q	.	.	.	.
11.65	0.3104	0.51	.Q	.	.	.	.
11.81	0.3173	0.52	.Q	.	.	.	.
11.98	0.3243	0.54	.Q	.	.	.	.
12.14	0.3317	0.58	.Q	.	.	.	.
12.30	0.3401	0.68	.Q	.	.	.	.
12.46	0.3493	0.70	.Q	.	.	.	.
12.62	0.3587	0.72	.Q	.	.	.	.
12.78	0.3683	0.73	.Q	.	.	.	.
12.94	0.3782	0.76	.Q	.	.	.	.
13.10	0.3884	0.77	.Q	.	.	.	.
13.26	0.3989	0.80	.Q	.	.	.	.
13.42	0.4097	0.82	.Q	.	.	.	.
13.59	0.4208	0.86	.Q	.	.	.	.
13.75	0.4323	0.88	.Q	.	.	.	.

```
 13.91      0.4443      0.92  .Q        .         .         .         .
 14.07      0.4568      0.95  .Q        .         .         .         .
 14.23      0.4700      1.04  . Q       .         .         .         .
 14.39      0.4841      1.08  . Q       .         .         .         .
 14.55      0.4990      1.16  . Q       .         .         .         .
 14.71      0.5149      1.23  . Q       .         .         .         .
 14.87      0.5324      1.39  . Q       .         .         .         .
 15.03      0.5515      1.49  . Q       .         .         .         .
 15.20      0.5730      1.74  .  Q      .         .         .         .
 15.36      0.5973      1.90  .  Q      .         .         .         .
 15.52      0.6229      1.96  .  Q      .         .         .         .
 15.68      0.6511      2.28  .   Q     .         .         .         .
 15.84      0.6903      3.60  .      Q  .         .         .         .
 16.00      0.7483      5.13  .         Q         .         .         .
 16.16      0.8928     16.59  .         .         .         .  Q      .
 16.32      1.0215      2.76  .    Q    .         .         .         .
 16.48      1.0533      2.02  .   Q     .         .         .         .
 16.64      1.0774      1.61  .  Q      .         .         .         .
 16.81      1.0968      1.31  . Q       .         .         .         .
 16.97      1.1129      1.11  . Q       .         .         .         .
 17.13      1.1269      1.00  .Q        .         .         .         .
 17.29      1.1395      0.90  .Q        .         .         .         .
 17.45      1.1511      0.84  .Q        .         .         .         .
 17.61      1.1619      0.79  .Q        .         .         .         .
 17.77      1.1721      0.74  .Q        .         .         .         .
 17.93      1.1817      0.71  .Q        .         .         .         .
 18.09      1.1909      0.67  .Q        .         .         .         .
 18.25      1.1989      0.53  .Q        .         .         .         .
 18.42      1.2058      0.51  .Q        .         .         .         .
 18.58      1.2124      0.48  Q         .         .         .         .
 18.74      1.2187      0.47  Q         .         .         .         .
 18.90      1.2248      0.45  Q         .         .         .         .
 19.06      1.2306      0.43  Q         .         .         .         .
 19.22      1.2363      0.42  Q         .         .         .         .
 19.38      1.2417      0.40  Q         .         .         .         .
 19.54      1.2471      0.39  Q         .         .         .         .
 19.70      1.2522      0.38  Q         .         .         .         .
 19.86      1.2572      0.37  Q         .         .         .         .
 20.02      1.2621      0.36  Q         .         .         .         .
 20.19      1.2668      0.35  Q         .         .         .         .
 20.35      1.2715      0.34  Q         .         .         .         .
 20.51      1.2760      0.34  Q         .         .         .         .
 20.67      1.2804      0.33  Q         .         .         .         .
 20.83      1.2847      0.32  Q         .         .         .         .
 20.99      1.2890      0.31  Q         .         .         .         .
 21.15      1.2931      0.31  Q         .         .         .         .
 21.31      1.2972      0.30  Q         .         .         .         .
 21.47      1.3012      0.30  Q         .         .         .         .
 21.64      1.3051      0.29  Q         .         .         .         .
 21.80      1.3089      0.29  Q         .         .         .         .
 21.96      1.3127      0.28  Q         .         .         .         .
 22.12      1.3164      0.28  Q         .         .         .         .
 22.28      1.3201      0.27  Q         .         .         .         .
 22.44      1.3236      0.27  Q         .         .         .         .
 22.60      1.3272      0.26  Q         .         .         .         .
 22.76      1.3306      0.26  Q         .         .         .         .
 22.92      1.3341      0.26  Q         .         .         .         .
 23.08      1.3374      0.25  Q         .         .         .         .
 23.24      1.3408      0.25  Q         .         .         .         .
 23.41      1.3440      0.24  Q         .         .         .         .
 23.57      1.3473      0.24  Q         .         .         .         .
 23.73      1.3505      0.24  Q         .         .         .         .
 23.89      1.3536      0.23  Q         .         .         .         .
 24.05      1.3567      0.23  Q         .         .         .         .
 24.21      1.3582      0.00  Q         .         .         .         .
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---------------------------------------------------------------------------
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TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1449.0
10%	86.9
20%	29.0
30%	19.3
40%	9.7
50%	9.7
60%	9.7
70%	9.7
80%	9.7
90%	9.7

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****************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
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****************************************************************************
----------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Proposed Condition Drainage Area "B"
----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    8.05
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.076
    LOW LOSS FRACTION = 0.440
    TIME OF CONCENTRATION(MIN.) = 14.72
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

----------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.79
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.58

****************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.05      0.0000      0.00  Q         .         .         .         .
  0.30      0.0013      0.13  Q         .         .         .         .
  0.54      0.0040      0.13  Q         .         .         .         .
  0.79      0.0067      0.13  Q         .         .         .         .
  1.03      0.0094      0.13  Q         .         .         .         .
  1.28      0.0121      0.14  Q         .         .         .         .
  1.53      0.0149      0.14  Q         .         .         .         .
  1.77      0.0176      0.14  Q         .         .         .         .
  2.02      0.0205      0.14  Q         .         .         .         .
  2.26      0.0233      0.14  Q         .         .         .         .
  2.51      0.0262      0.14  Q         .         .         .         .
  2.75      0.0291      0.14  Q         .         .         .         .
  3.00      0.0321      0.15  Q         .         .         .         .
  3.24      0.0350      0.15  Q         .         .         .         .
  3.49      0.0381      0.15  Q         .         .         .         .
  3.73      0.0411      0.15  Q         .         .         .         .
  3.98      0.0442      0.15  Q         .         .         .         .
  4.22      0.0473      0.16  Q         .         .         .         .
  4.47      0.0505      0.16  Q         .         .         .         .
```

4.71	0.0537	0.16	Q
4.96	0.0570	0.16	Q
5.21	0.0603	0.16	Q
5.45	0.0636	0.17	Q
5.70	0.0670	0.17	Q
5.94	0.0705	0.17	Q
6.19	0.0740	0.17	Q
6.43	0.0775	0.18	Q
6.68	0.0812	0.18	Q
6.92	0.0848	0.18	Q
7.17	0.0886	0.18	Q
7.41	0.0923	0.19	Q
7.66	0.0962	0.19	Q
7.90	0.1001	0.20	Q
8.15	0.1041	0.20	Q
8.39	0.1082	0.20	Q
8.64	0.1124	0.21	Q
8.89	0.1166	0.21	Q
9.13	0.1210	0.22	Q
9.38	0.1254	0.22	Q
9.62	0.1299	0.23	Q
9.87	0.1346	0.23	Q
10.11	0.1393	0.24	Q
10.36	0.1442	0.24	Q
10.60	0.1492	0.25	Q
10.85	0.1544	0.26	.Q
11.09	0.1596	0.26	.Q
11.34	0.1651	0.27	.Q
11.58	0.1707	0.28	.Q
11.83	0.1766	0.29	.Q
12.07	0.1826	0.30	.Q
12.32	0.1895	0.38	.Q
12.57	0.1974	0.39	.Q
12.81	0.2056	0.41	.Q
13.06	0.2141	0.42	.Q
13.30	0.2229	0.45	.Q
13.55	0.2322	0.47	.Q
13.79	0.2420	0.50	.Q
14.04	0.2523	0.52	. Q
14.28	0.2635	0.59	. Q
14.53	0.2757	0.62	. Q
14.77	0.2889	0.69	. Q
15.02	0.3037	0.76	. Q
15.26	0.3215	1.00	. Q
15.51	0.3433	1.15	. Q
15.75	0.3707	1.55	. Q
16.00	0.4105	2.38	. Q.
16.25	0.5182	8.24	.
16.49	0.6135	1.16	. Q
16.74	0.6340	0.87	. Q
16.98	0.6494	0.65	. Q
17.23	0.6615	0.55	. Q
17.47	0.6719	0.48	.Q
17.72	0.6812	0.44	.Q
17.96	0.6898	0.40	.Q
18.21	0.6973	0.34	.Q
18.45	0.7036	0.29	.Q
18.70	0.7093	0.27	.Q
18.94	0.7146	0.25	.Q
19.19	0.7196	0.24	Q
19.43	0.7243	0.23	Q
19.68	0.7289	0.22	Q
19.93	0.7332	0.21	Q
20.17	0.7374	0.20	Q
20.42	0.7414	0.19	Q
20.66	0.7452	0.19	Q
20.91	0.7490	0.18	Q

```
 21.15      0.7526      0.18  Q         .         .         .         .
 21.40      0.7561      0.17  Q         .         .         .         .
 21.64      0.7595      0.17  Q         .         .         .         .
 21.89      0.7628      0.16  Q         .         .         .         .
 22.13      0.7660      0.16  Q         .         .         .         .
 22.38      0.7691      0.15  Q         .         .         .         .
 22.62      0.7722      0.15  Q         .         .         .         .
 22.87      0.7752      0.15  Q         .         .         .         .
 23.11      0.7781      0.14  Q         .         .         .         .
 23.36      0.7809      0.14  Q         .         .         .         .
 23.61      0.7837      0.14  Q         .         .         .         .
 23.85      0.7865      0.13  Q         .         .         .         .
 24.10      0.7891      0.13  Q         .         .         .         .
 24.34      0.7905      0.00  Q         .         .         .         .
 ------------------------------------------------------------------------
-----------------------------------------------------------------------------
--
    TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
    (Note: 100% of Peak Flow Rate estimate assumed to have
    an instantaneous time duration)

    Percentile of Estimated                 Duration
        Peak Flow Rate                      (minutes)
    =======================                 =========
               0%                            1442.6
              10%                             103.0
              20%                              29.4
              30%                              14.7
              40%                              14.7
              50%                              14.7
              60%                              14.7
              70%                              14.7
              80%                              14.7
              90%                              14.7
```

```
******************************************************************************
                      SMALL AREA UNIT HYDROGRAPH MODEL
==============================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

******************************************************************************
------------------------------------------------------------------------------

 Problem Descriptions:
  Greenbriar Project in City of Brea
  Unit Hydrograph Calculations for 2-year Storm
  Proposed Condition Drainage Area "C"
------------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
    TOTAL CATCHMENT AREA(ACRES) =    0.24
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.020
    LOW LOSS FRACTION = 0.197
    TIME OF CONCENTRATION(MIN.) =  6.31
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =   2
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.19
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  0.53
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  0.89
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  1.22
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  2.05

------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.03
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.01

******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.01      0.0000      0.00  Q         .         .         .         .
  0.12      0.0000      0.01  Q         .         .         .         .
  0.23      0.0001      0.01  Q         .         .         .         .
  0.33      0.0001      0.01  Q         .         .         .         .
  0.44      0.0002      0.01  Q         .         .         .         .
  0.54      0.0002      0.01  Q         .         .         .         .
  0.65      0.0003      0.01  Q         .         .         .         .
  0.75      0.0003      0.01  Q         .         .         .         .
  0.86      0.0004      0.01  Q         .         .         .         .
  0.96      0.0004      0.01  Q         .         .         .         .
  1.07      0.0005      0.01  Q         .         .         .         .
  1.17      0.0005      0.01  Q         .         .         .         .
  1.28      0.0006      0.01  Q         .         .         .         .
  1.38      0.0006      0.01  Q         .         .         .         .
  1.49      0.0007      0.01  Q         .         .         .         .
  1.59      0.0007      0.01  Q         .         .         .         .
  1.70      0.0008      0.01  Q         .         .         .         .
  1.80      0.0008      0.01  Q         .         .         .         .
  1.91      0.0009      0.01  Q         .         .         .         .
```

2.01	0.0009	0.01	Q	.	.	.	.
2.12	0.0010	0.01	Q	.	.	.	.
2.22	0.0010	0.01	Q	.	.	.	.
2.33	0.0011	0.01	Q	.	.	.	.
2.43	0.0011	0.01	Q	.	.	.	.
2.54	0.0012	0.01	Q	.	.	.	.
2.64	0.0012	0.01	Q	.	.	.	.
2.75	0.0013	0.01	Q	.	.	.	.
2.85	0.0014	0.01	Q	.	.	.	.
2.96	0.0014	0.01	Q	.	.	.	.
3.06	0.0015	0.01	Q	.	.	.	.
3.17	0.0015	0.01	Q	.	.	.	.
3.27	0.0016	0.01	Q	.	.	.	.
3.38	0.0016	0.01	Q	.	.	.	.
3.49	0.0017	0.01	Q	.	.	.	.
3.59	0.0017	0.01	Q	.	.	.	.
3.70	0.0018	0.01	Q	.	.	.	.
3.80	0.0019	0.01	Q	.	.	.	.
3.91	0.0019	0.01	Q	.	.	.	.
4.01	0.0020	0.01	Q	.	.	.	.
4.12	0.0020	0.01	Q	.	.	.	.
4.22	0.0021	0.01	Q	.	.	.	.
4.33	0.0021	0.01	Q	.	.	.	.
4.43	0.0022	0.01	Q	.	.	.	.
4.54	0.0023	0.01	Q	.	.	.	.
4.64	0.0023	0.01	Q	.	.	.	.
4.75	0.0024	0.01	Q	.	.	.	.
4.85	0.0024	0.01	Q	.	.	.	.
4.96	0.0025	0.01	Q	.	.	.	.
5.06	0.0026	0.01	Q	.	.	.	.
5.17	0.0026	0.01	Q	.	.	.	.
5.27	0.0027	0.01	Q	.	.	.	.
5.38	0.0027	0.01	Q	.	.	.	.
5.48	0.0028	0.01	Q	.	.	.	.
5.59	0.0029	0.01	Q	.	.	.	.
5.69	0.0029	0.01	Q	.	.	.	.
5.80	0.0030	0.01	Q	.	.	.	.
5.90	0.0031	0.01	Q	.	.	.	.
6.01	0.0031	0.01	Q	.	.	.	.
6.11	0.0032	0.01	Q	.	.	.	.
6.22	0.0033	0.01	Q	.	.	.	.
6.32	0.0033	0.01	Q	.	.	.	.
6.43	0.0034	0.01	Q	.	.	.	.
6.54	0.0034	0.01	Q	.	.	.	.
6.64	0.0035	0.01	Q	.	.	.	.
6.75	0.0036	0.01	Q	.	.	.	.
6.85	0.0037	0.01	Q	.	.	.	.
6.96	0.0037	0.01	Q	.	.	.	.
7.06	0.0038	0.01	Q	.	.	.	.
7.17	0.0039	0.01	Q	.	.	.	.
7.27	0.0039	0.01	Q	.	.	.	.
7.38	0.0040	0.01	Q	.	.	.	.
7.48	0.0041	0.01	Q	.	.	.	.
7.59	0.0041	0.01	Q	.	.	.	.
7.69	0.0042	0.01	Q	.	.	.	.
7.80	0.0043	0.01	Q	.	.	.	.
7.90	0.0044	0.01	Q	.	.	.	.
8.01	0.0044	0.01	Q	.	.	.	.
8.11	0.0045	0.01	Q	.	.	.	.
8.22	0.0046	0.01	Q	.	.	.	.
8.32	0.0047	0.01	Q	.	.	.	.
8.43	0.0047	0.01	Q	.	.	.	.
8.53	0.0048	0.01	Q	.	.	.	.
8.64	0.0049	0.01	Q	.	.	.	.
8.74	0.0050	0.01	Q	.	.	.	.
8.85	0.0050	0.01	Q	.	.	.	.
8.95	0.0051	0.01	Q	.	.	.	.

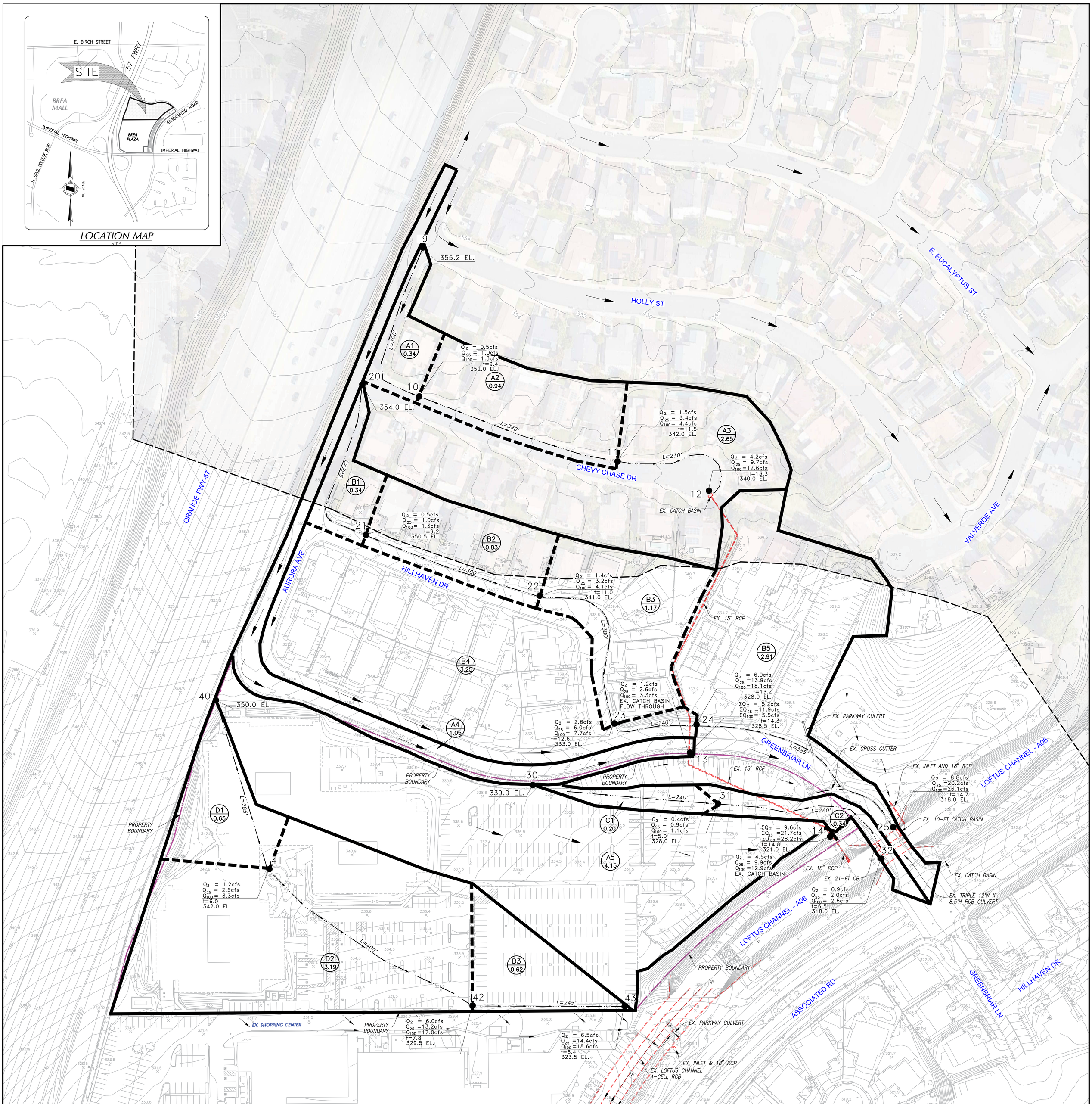
9.06	0.0052	0.01	Q	.	.	.	.
9.16	0.0053	0.01	Q	.	.	.	.
9.27	0.0054	0.01	Q	.	.	.	.
9.37	0.0054	0.01	Q	.	.	.	.
9.48	0.0055	0.01	Q	.	.	.	.
9.58	0.0056	0.01	Q	.	.	.	.
9.69	0.0057	0.01	Q	.	.	.	.
9.80	0.0058	0.01	Q	.	.	.	.
9.90	0.0059	0.01	Q	.	.	.	.
10.01	0.0060	0.01	Q	.	.	.	.
10.11	0.0060	0.01	Q	.	.	.	.
10.22	0.0061	0.01	Q	.	.	.	.
10.32	0.0062	0.01	Q	.	.	.	.
10.43	0.0063	0.01	Q	.	.	.	.
10.53	0.0064	0.01	Q	.	.	.	.
10.64	0.0065	0.01	Q	.	.	.	.
10.74	0.0066	0.01	Q	.	.	.	.
10.85	0.0067	0.01	Q	.	.	.	.
10.95	0.0068	0.01	Q	.	.	.	.
11.06	0.0069	0.01	Q	.	.	.	.
11.16	0.0070	0.01	Q	.	.	.	.
11.27	0.0071	0.01	Q	.	.	.	.
11.37	0.0072	0.01	Q	.	.	.	.
11.48	0.0073	0.01	Q	.	.	.	.
11.58	0.0074	0.01	Q	.	.	.	.
11.69	0.0075	0.01	Q	.	.	.	.
11.79	0.0076	0.01	Q	.	.	.	.
11.90	0.0077	0.01	Q	.	.	.	.
12.00	0.0079	0.01	Q	.	.	.	.
12.11	0.0080	0.02	Q	.	.	.	.
12.21	0.0081	0.02	Q	.	.	.	.
12.32	0.0083	0.02	Q	.	.	.	.
12.42	0.0084	0.02	Q	.	.	.	.
12.53	0.0086	0.02	Q	.	.	.	.
12.63	0.0087	0.02	Q	.	.	.	.
12.74	0.0089	0.02	Q	.	.	.	.
12.85	0.0090	0.02	Q	.	.	.	.
12.95	0.0092	0.02	Q	.	.	.	.
13.06	0.0093	0.02	Q	.	.	.	.
13.16	0.0095	0.02	Q	.	.	.	.
13.27	0.0097	0.02	Q	.	.	.	.
13.37	0.0098	0.02	Q	.	.	.	.
13.48	0.0100	0.02	Q	.	.	.	.
13.58	0.0102	0.02	Q	.	.	.	.
13.69	0.0104	0.02	Q	.	.	.	.
13.79	0.0106	0.02	Q	.	.	.	.
13.90	0.0108	0.02	Q	.	.	.	.
14.00	0.0110	0.02	Q	.	.	.	.
14.11	0.0112	0.03	Q	.	.	.	.
14.21	0.0114	0.03	Q	.	.	.	.
14.32	0.0117	0.03	Q	.	.	.	.
14.42	0.0119	0.03	Q	.	.	.	.
14.53	0.0122	0.03	Q	.	.	.	.
14.63	0.0125	0.03	Q	.	.	.	.
14.74	0.0127	0.03	Q	.	.	.	.
14.84	0.0130	0.03	Q	.	.	.	.
14.95	0.0133	0.04	Q	.	.	.	.
15.05	0.0137	0.04	Q	.	.	.	.
15.16	0.0140	0.04	Q	.	.	.	.
15.26	0.0144	0.04	Q	.	.	.	.
15.37	0.0148	0.05	Q	.	.	.	.
15.47	0.0152	0.05	Q	.	.	.	.
15.58	0.0156	0.05	Q	.	.	.	.
15.68	0.0161	0.06	Q	.	.	.	.
15.79	0.0166	0.07	Q	.	.	.	.
15.89	0.0174	0.10	Q	.	.	.	.
16.00	0.0184	0.14	Q	.	.	.	.

16.11	0.0209	0.43	.Q	.	.	.	.
16.21	0.0231	0.08	Q	.	.	.	.
16.32	0.0237	0.05	Q	.	.	.	.
16.42	0.0241	0.05	Q	.	.	.	.
16.53	0.0245	0.04	Q	.	.	.	.
16.63	0.0248	0.04	Q	.	.	.	.
16.74	0.0251	0.03	Q	.	.	.	.
16.84	0.0254	0.03	Q	.	.	.	.
16.95	0.0257	0.03	Q	.	.	.	.
17.05	0.0259	0.03	Q	.	.	.	.
17.16	0.0261	0.02	Q	.	.	.	.
17.26	0.0263	0.02	Q	.	.	.	.
17.37	0.0265	0.02	Q	.	.	.	.
17.47	0.0267	0.02	Q	.	.	.	.
17.58	0.0269	0.02	Q	.	.	.	.
17.68	0.0270	0.02	Q	.	.	.	.
17.79	0.0272	0.02	Q	.	.	.	.
17.89	0.0273	0.02	Q	.	.	.	.
18.00	0.0275	0.02	Q	.	.	.	.
18.10	0.0276	0.01	Q	.	.	.	.
18.21	0.0277	0.01	Q	.	.	.	.
18.31	0.0278	0.01	Q	.	.	.	.
18.42	0.0279	0.01	Q	.	.	.	.
18.52	0.0280	0.01	Q	.	.	.	.
18.63	0.0281	0.01	Q	.	.	.	.
18.73	0.0282	0.01	Q	.	.	.	.
18.84	0.0283	0.01	Q	.	.	.	.
18.94	0.0284	0.01	Q	.	.	.	.
19.05	0.0285	0.01	Q	.	.	.	.
19.16	0.0286	0.01	Q	.	.	.	.
19.26	0.0287	0.01	Q	.	.	.	.
19.37	0.0288	0.01	Q	.	.	.	.
19.47	0.0289	0.01	Q	.	.	.	.
19.58	0.0289	0.01	Q	.	.	.	.
19.68	0.0290	0.01	Q	.	.	.	.
19.79	0.0291	0.01	Q	.	.	.	.
19.89	0.0292	0.01	Q	.	.	.	.
20.00	0.0293	0.01	Q	.	.	.	.
20.10	0.0293	0.01	Q	.	.	.	.
20.21	0.0294	0.01	Q	.	.	.	.
20.31	0.0295	0.01	Q	.	.	.	.
20.42	0.0295	0.01	Q	.	.	.	.
20.52	0.0296	0.01	Q	.	.	.	.
20.63	0.0297	0.01	Q	.	.	.	.
20.73	0.0298	0.01	Q	.	.	.	.
20.84	0.0298	0.01	Q	.	.	.	.
20.94	0.0299	0.01	Q	.	.	.	.
21.05	0.0300	0.01	Q	.	.	.	.
21.15	0.0300	0.01	Q	.	.	.	.
21.26	0.0301	0.01	Q	.	.	.	.
21.36	0.0301	0.01	Q	.	.	.	.
21.47	0.0302	0.01	Q	.	.	.	.
21.57	0.0303	0.01	Q	.	.	.	.
21.68	0.0303	0.01	Q	.	.	.	.
21.78	0.0304	0.01	Q	.	.	.	.
21.89	0.0304	0.01	Q	.	.	.	.
21.99	0.0305	0.01	Q	.	.	.	.
22.10	0.0306	0.01	Q	.	.	.	.
22.20	0.0306	0.01	Q	.	.	.	.
22.31	0.0307	0.01	Q	.	.	.	.
22.42	0.0307	0.01	Q	.	.	.	.
22.52	0.0308	0.01	Q	.	.	.	.
22.63	0.0308	0.01	Q	.	.	.	.
22.73	0.0309	0.01	Q	.	.	.	.
22.84	0.0310	0.01	Q	.	.	.	.
22.94	0.0310	0.01	Q	.	.	.	.
23.05	0.0311	0.01	Q	.	.	.	.

23.15	0.0311	0.01	Q	.	.	.	.
23.26	0.0312	0.01	Q	.	.	.	.
23.36	0.0312	0.01	Q	.	.	.	.
23.47	0.0313	0.01	Q	.	.	.	.
23.57	0.0313	0.01	Q	.	.	.	.
23.68	0.0314	0.01	Q	.	.	.	.
23.78	0.0314	0.01	Q	.	.	.	.
23.89	0.0315	0.01	Q	.	.	.	.
23.99	0.0315	0.01	Q	.	.	.	.
24.10	0.0316	0.01	Q	.	.	.	.
24.20	0.0316	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.0
10%	75.7
20%	18.9
30%	12.6
40%	6.3
50%	6.3
60%	6.3
70%	6.3
80%	6.3
90%	6.3



SCALE: 1"=50'

50 25 0 50 150

LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 100 — NODE NUMBER
- A 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q100=8.0cfs / t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ100=10.0cfs / t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN
- D — SOIL GROUP

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
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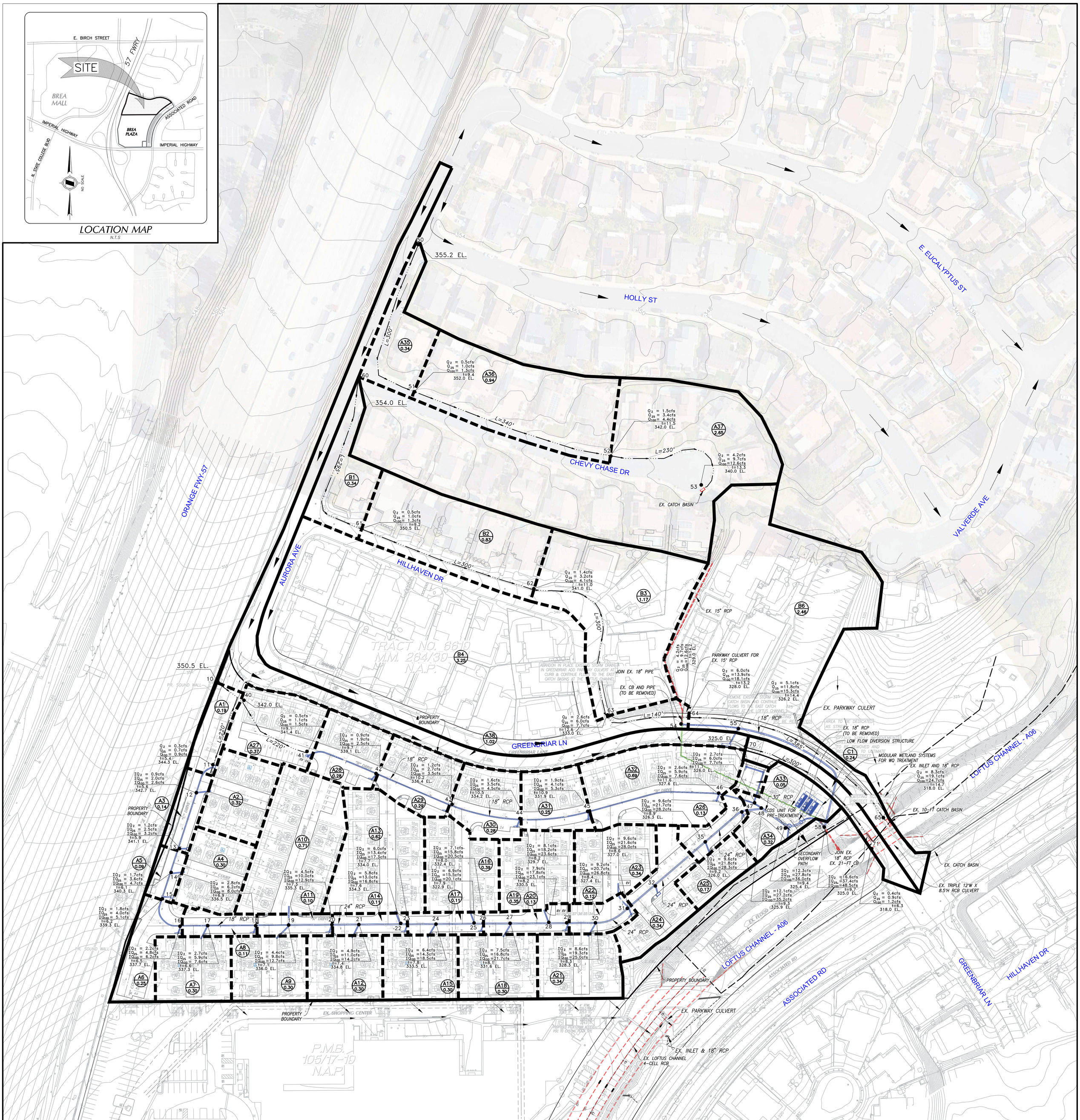
PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92618
(949) 349-8000

HYDROLOGY MAP
GREENBRIAR - BREA
EXISTING CONDITION
CITY OF BREA

WO: 3916-280
HYDROLOGY MAP FOR GREENBRIAR - BREA

DATE: Jul. 02, 2024 07:43:02 PM FILE: F:\1285\Engineering\SY_Hydrology\Greenbriar Existing Hydrology.dwg



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- PEAK FLOW RATE / TIME OF CONCENTRATION
- PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- EXISTING STORM DRAIN (TO BE REMOVED)
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- SOIL GROUP

SCALE: 1"=50'

NOTE: THE PROPOSED STORM DRAIN PIPE SIZES ARE APPROXIMATE AND SUBJECT TO CHANGE DURING THE FINAL DESIGN

PREPARED BY:

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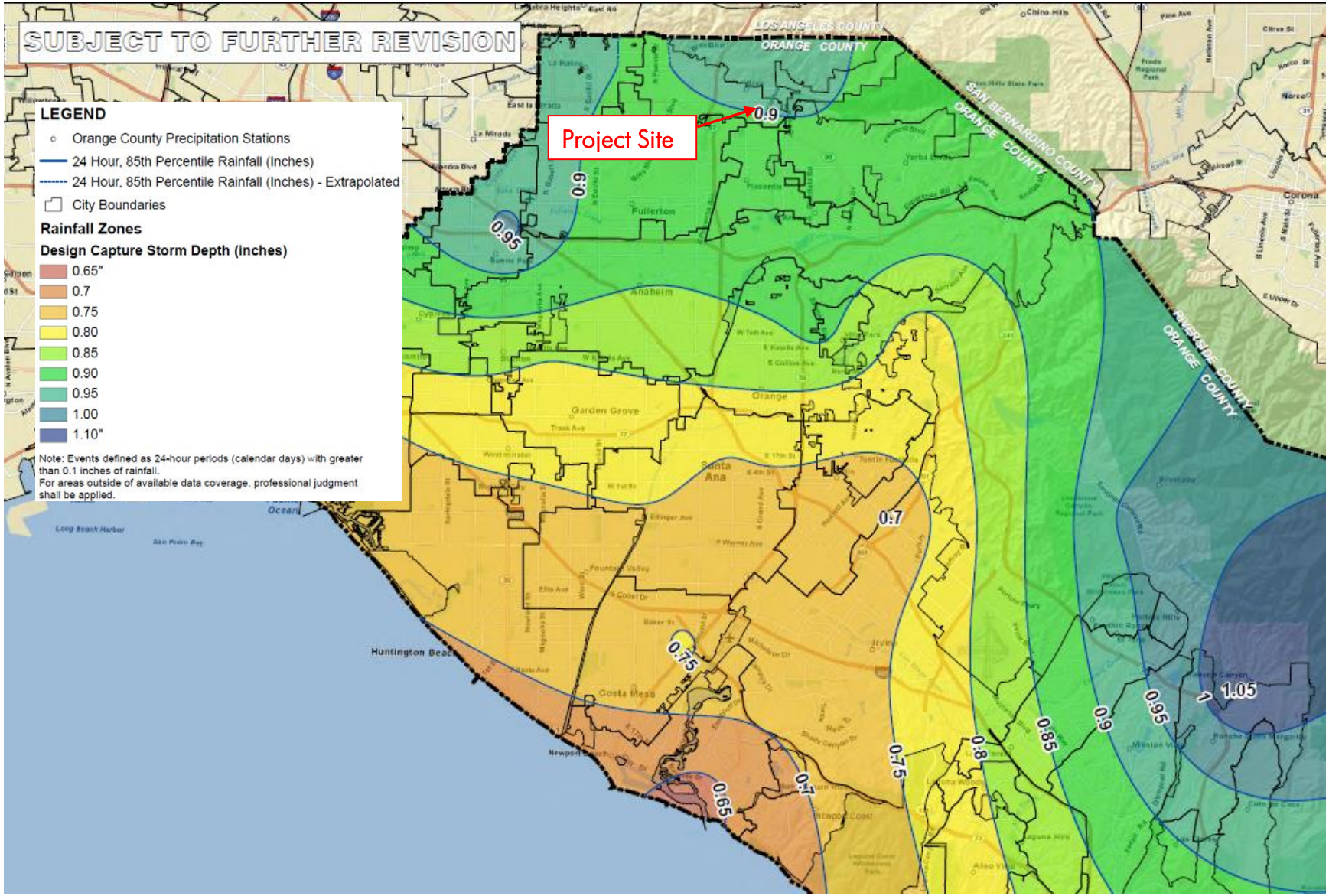
HYDROLOGY MAP
GREENBRIAR - BREA
PROPOSED CONDITION
CITY OF BREA

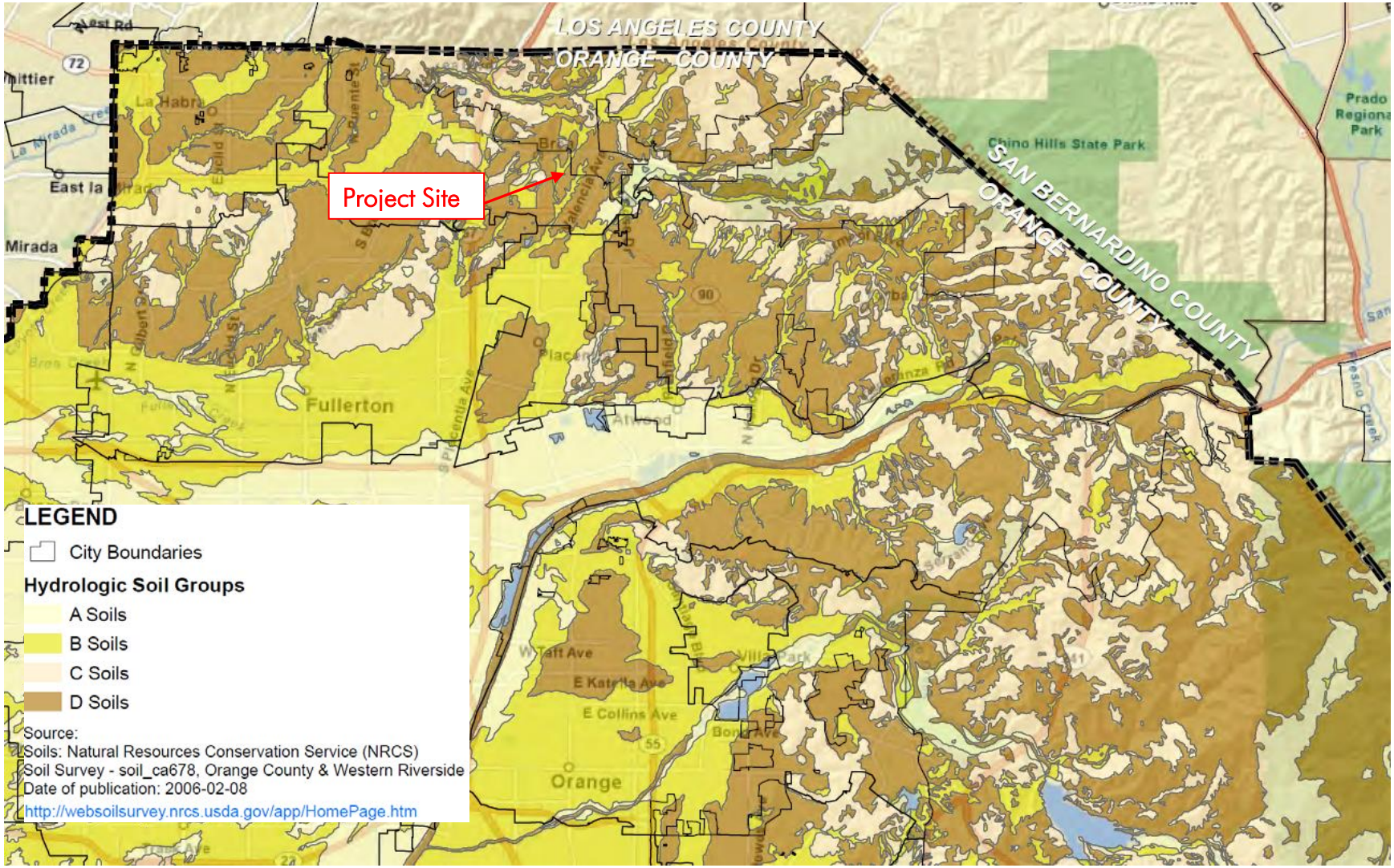
WO: 3916-89X
HYDROLOGY MAP FOR GREENBRIAR - BREA

DATE: Jul. 03, 2024 07:40:55 AM FILE: F:\1285\Engineering\SY_Hydrology\Greenbriar Proposed Hydrology.dwg

Attachment D – Supporting Project Information

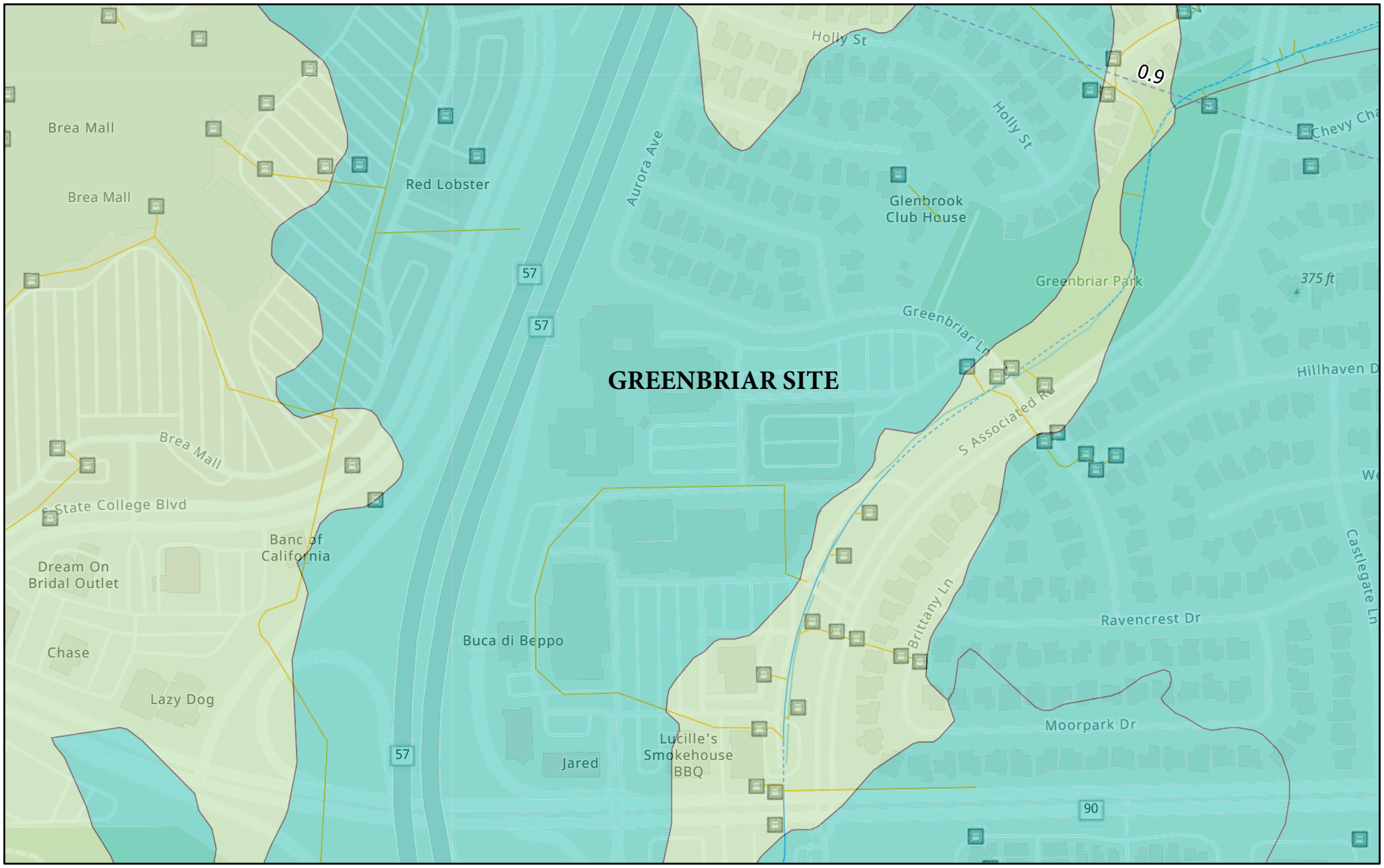


Source: County of Orange TGD – Figure XVI-1 Rainfall Zones



Source: County of Orange TGD – Figure XVI-2a NRCS Hydrologic Soils Group Map

Greenbriar Soil Map



3/18/2024

1:5,184

0 0.04 0.07 0.14 mi

0 0.05 0.1 0.2 km

Rainfall 85th Percentile

Soil

C

D

Inlets

Local Drainage

Closed Conveyance

Regional Channels

Open Conveyance

Closed Conveyance

Esri Community Maps Contributors, City of Fullerton, County of Los Angeles, California State Parks, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin,

November 17, 2023 Project No. 23169-01

Mr. Gary Jones
Lennar
2000 FivePoint Suite 365
Irvine, CA 92618

Subject: ***Preliminary Geotechnical Evaluation and Design Recommendations for the Proposed Residential Development of 1698 and 1700 Greenbriar Lane, City of Brea, Orange County, California***

In accordance with your request and authorization, LGC Geotechnical, Inc. has performed a preliminary geotechnical evaluation and has provided design recommendations for the proposed residential re-development of the property at 1698 and 1700 Greenbriar Lane, in the City of Brea, Orange County, California. The purpose of our study was to evaluate the existing onsite geotechnical conditions and to provide preliminary geotechnical recommendations relative to the proposed re-development of the property.

Should you have any questions regarding this report, please do not hesitate to contact our office. We appreciate this opportunity to be of service.

Respectfully Submitted,

LGC Geotechnical, Inc.

Ryan Douglas, PE, GE 3147
Project Engineer

Katie Maes, CEG 2216
Project Geologist

RLD/BPP/KTM/amm

Distribution: (1) Addressee (electronic copy)

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1.0 INTRODUCTION

1.1 Purpose and Scope of Services

This report presents the results of our preliminary geotechnical evaluation for the proposed approximately 9.7-acre residential development located at 1698 and 1700 Greenbriar Lane in the City of Brea, Orange County, California. Refer to the Site Location Map (Figure 1).

The purpose of our study was to provide a preliminary geotechnical evaluation relative to the proposed residential development. As part of our scope of work, we have: 1) reviewed available geotechnical background information including existing geotechnical reports, in-house regional geologic maps, and published geotechnical literature pertinent to the site (Appendix A); 2) performed a limited subsurface geotechnical evaluation of the site consisting of the excavation of seven small-diameter borings ranging in depth from approximately 10 to 51.5 feet below existing ground surface; 3) performed infiltration testing of subsurface soils at three locations; 4) performed laboratory testing of select soil samples obtained during our subsurface evaluation; and 5) prepared this preliminary geotechnical summary report presenting our findings, preliminary conclusions and recommendations for the development of the proposed project.

1.2 Project Description

The site is bound to the north by Greenbriar Lane, to the east by Fullerton Creek (aka "Loftus Diversion Channel"), to the south by a commercial development, and to the west by the 57 Freeway. The site is currently a commercial development with several buildings clustered at the west half and a 4-level parking garage within the east half. Parking lots and drive aisles exist throughout the site. A series of small slopes and a maintenance road at the eastern boundary of the property descends from the existing parking lot towards the existing channel bottom that is approximately 20 vertical feet lower than the existing parking lot.

Based on the conceptual site plan by Hunsaker & Associates (Hunsaker, 2023), the proposed improvements include the construction of 183 residential units, interior streets, and associated improvements. A plan that shows the proposed cuts and fills is not available at this time but is assumed to be relatively minor. The proposed residential building structures are anticipated to be relatively light-weight at-grade structures with maximum column and wall loads of approximately 30 kips and 2 kips per linear foot, respectively.

The recommendations given in this report are based upon the estimated structural loading, grading and layout information above. We understand that project plans are being developed or are yet to be developed; LGC Geotechnical should be provided with updated project plans and any changes to structural loads when they become available, in order to either confirm or modify the recommendations provided herein.

1.3 Background

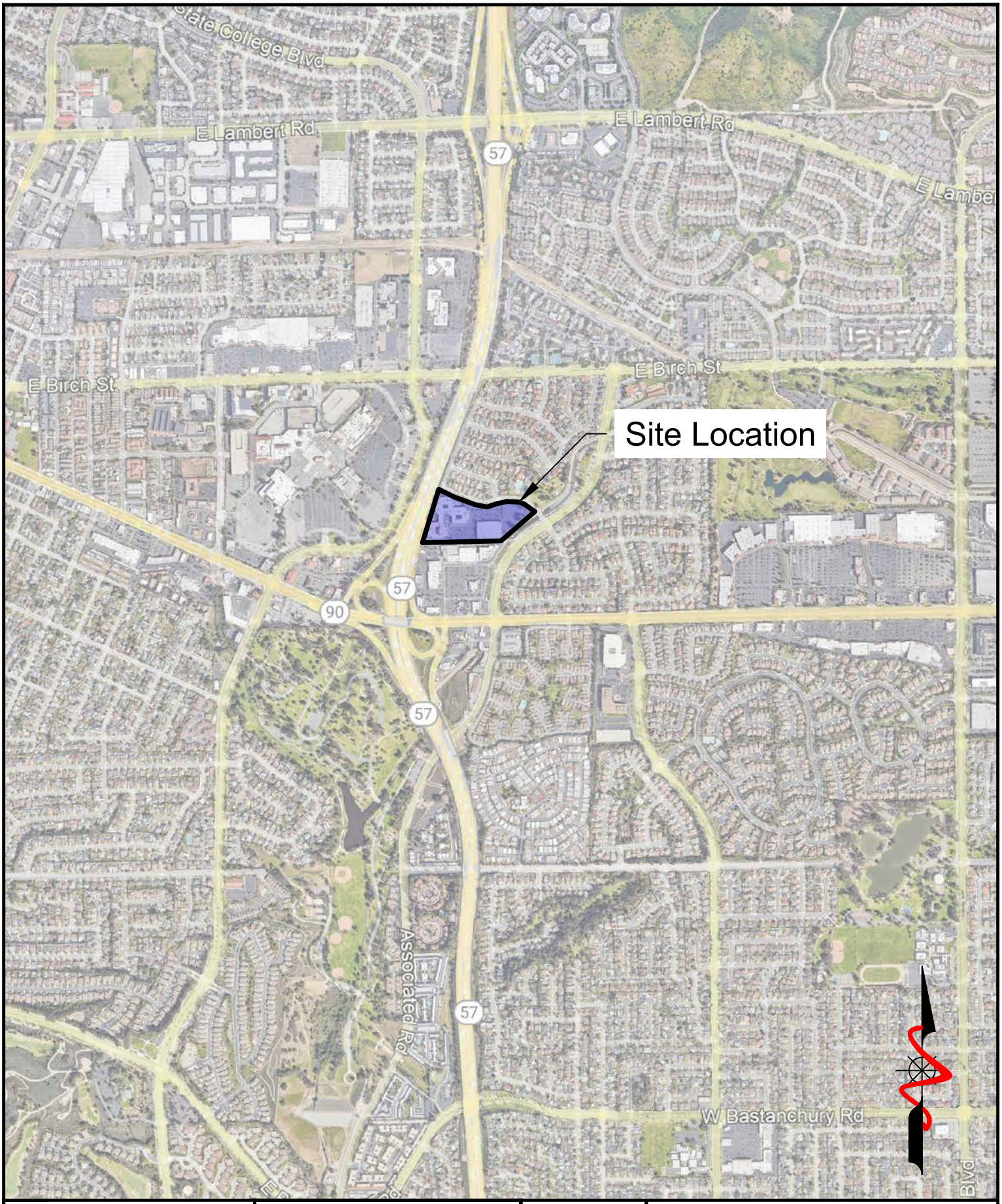
Review of historical aerials indicates that prior to 1952 until 1965 the site consisted of undeveloped rolling hills. By 1972 the shape of the site was formed by adjacent streets, it had trails throughout, and a small south flowing tributary drainage to Fullerton Creek dissected the eastern-most portion of the site. By 1980, the main structures and a parking lot were developed across the entire site to what is seen today. Construction of the large parking structure replaced a portion of the parking lot within the eastern half of the property, the addition occurred between 2006 and 2009.

1.4 Subsurface Geotechnical Evaluation

LGC Geotechnical performed a subsurface geotechnical evaluation of the site consisting of the excavation of hollow-stem auger borings to evaluate onsite geotechnical conditions.

Seven hollow-stem borings (HS-1 through HS-4 and I-1 through I-3) were drilled to depths ranging from approximately 10 to 51.5 feet below existing grade. An LGC Geotechnical staff engineer observed the drilling operations, logged the borings, and collected soil samples for laboratory testing. The borings were excavated by 2R Drilling, Inc. under subcontract to LGC Geotechnical using a truck-mounted drill rig equipped with 8-inch-diameter hollow-stem augers. Driven soil samples were collected by means of the Modified California Drive (MCD) sampler generally obtained at 2.5 to 5-foot vertical increments. The MCD is a split-barrel sampler with a tapered cutting tip and lined with a series of 1-inch-tall brass rings. The MCD sampler (2.4-inch ID, 3.0-inch OD) was driven using a 140-pound automatic hammer falling 30 inches to advance the sampler a total depth of 18 inches. The raw blow counts for each 6-inch increment of penetration were recorded on the boring logs. Bulk samples of the near-surface soils were also collected and logged at select borings for laboratory testing. At the completion of drilling, the borings were backfilled with the native soil cuttings, tamped, and capped with asphalt cold patch. Some settlement of the backfill soils may occur over time.

The approximate locations of our subsurface explorations are provided on the Geotechnical Map (Sheet 1). The boring logs are provided in Appendix B.



LGC Geotechnical, Inc.

FIGURE 1
Site Location Map

PROJECT NAME	Lennar - Greenbriar, Brea
PROJECT NO.	23169-01
ENG. / GEOL.	RLD / KTM
SCALE	Not to Scale
DATE	November 2023

1.5 Laboratory Testing

Representative bulk and driven (relatively undisturbed) samples were obtained for laboratory testing during our field evaluation. Laboratory testing included in-situ moisture content and in-situ dry density, Atterberg Limits, fines content, laboratory compaction, expansion index, consolidation, direct shear, and corrosion (sulfate, chloride, pH, and minimum resistivity).

The following is a summary of the laboratory test results:

- Dry density of the samples collected ranged from approximately 90 pounds per cubic foot (pcf) to 120 pcf, with an average of 107 pcf. Field moisture contents ranged from approximately 4 to 31 percent, with an average of 16 percent.
- Five fines content tests were performed and indicated a fines content (passing No. 200 sieve) ranging from approximately 19 to 95 percent. Based on the Unified Soils Classification System (USCS), the tested samples would be classified as both "coarse and fine-grained."
- Four Atterberg Limit (liquid limit and plastic limit) tests were performed. Results indicated Plasticity Index (PI) values ranging from 'Non-Plastic' to 24.
- One consolidation test was performed. The load versus deformation plot is provided in Appendix C.
- One direct shear test was performed. The plot is provided in Appendix C.
- Expansion potential testing indicated an expansion index value of 55, corresponding to "Medium" expansion potential.
- One laboratory compaction test of a near surface sample indicated a maximum dry density of 118.5 pcf with an optimum moisture content of 11.5 percent.
- Corrosion testing indicated soluble sulfate contents of approximately 0.014 percent, a chloride content of 260 parts per million (ppm), pH of 8.06, and a minimum resistivity of 5,000 ohm-centimeters.

A summary of the laboratory test results is presented in Appendix C. The moisture and dry density results are presented on the boring logs in Appendix B.

2.0 GEOTECHNICAL CONDITIONS

2.1 Geologic Conditions

The subject site is generally located within the eastern-most edge of the Los Angeles sedimentary basin, within the Peninsular Ranges Geomorphic Province of California. The site is more specifically in the area of Brea Canyon, located south of the Whittier Fault and adjacent east-west trending Puente Hills, and east of the Coyote Hills. The Puente Hills to the north have been dissected with a series of drainages that drain across the canyon bottom, and locally combine to form the upper reaches of the San Gabriel River basin. The site is located within the gently to moderately sloping plain starting from the base of the Puente Hills, consisting of older alluvial fan deposits. The older alluvium was further dissected by the main drainages seen today, most of those have been channelized, including the Brea, Fullerton, and Coyote Creeks. The site is located on older alluvial deposits that originally formed the west bank of the Fullerton Creek that runs in a southerly direction adjacent to the eastern end of the subject site. Based on review of historic photographs, the original drainage was formerly naturally flowing southeast along a small, incised tributary to Fullerton Creek that appears to have been filled in as part of development of the subject property.

2.2 Generalized Subsurface Conditions

Based on regional geologic mapping (Dibblee, 2001), the subject site is generally underlain Quaternary Older Alluvium (Map Symbol – Qoa), and relatively limited amounts of older artificial fill placed by others as part of the existing development (Map Symbol – afo). Limits of artificial fill as presented on the Geotechnical Map (Sheet 1) were generally estimated from old topographic maps (Historic Aerials, 2023) and limited observations within on-site borings. Based on review of samples and comparison of historic topography, we estimate that artificial fill was placed in a small north-trending tributary drainage that originally transected the site at the approximate location presented on the Geotechnical Map.

No reports of previous rough grading activities onsite were available for review at this time; however, review of aerial photographs indicates the site was rough graded in the mid to late 1970's. An existing, asphalt-covered parking lot is currently at the top of the eastern slope that gradually descends outside of the subject property to the bottom of the (partially-lined) channel, as much as 20 feet total. A portion of the slope (or all of it) likely consists of artificial fill placed by others.

As indicated in our field exploration logs, the Quaternary Older Alluvium generally consists of silty sand, sandy clay, sand, and silt with clay, medium dense to very dense/very stiff to hard, to the maximum explored depth of approximately 51.5 feet below existing grade. Surficial units including artificial fill placed by others and remnant topsoil were observed to consist of sandy clay, medium stiff to stiff. Materials were generally moist to very moist, becoming wet with depth.

It should be noted that borings are only representative of the location and time where/when they are performed and varying subsurface conditions may exist outside of the performed location. In addition, subsurface conditions can change over time. The soil descriptions provided above should not be construed to mean that the subsurface profile is uniform, and that soil is

homogeneous within the project area. For details on the stratigraphy at the exploration locations, refer to Appendix B.

2.3 Groundwater

Groundwater was encountered during our recent investigation at a depth of approximately 20 feet below existing ground surface at the eastern side of the site, and approximately 25 feet below ground on the western side of the site. A historic high groundwater depth has not been mapped at the subject site; however, on the eastern portion of the site, we conservatively estimate the groundwater could rise to a depth of approximately 15 feet below existing grade.

Seasonal fluctuations of groundwater elevations should be expected over time. In general, groundwater levels fluctuate with the seasons and local zones of perched groundwater may be present due to local seepage caused by irrigation and/or recent precipitation. Local perched groundwater conditions or surface seepage may develop once site development is completed.

2.4 Field Infiltration Testing

Three field percolation tests were performed at site per the direction of the project civil engineer, the locations are depicted on Sheet 1 – Geotechnical Map. Test well installation consisted of placing a 3-inch diameter perforated PVC pipe in the excavated 8-inch diameter borehole and backfilling the annulus with crushed rock including the placement of approximately 2 inches of crushed rock at the bottom of the borehole. The infiltration test wells were presoaked the day of installation and testing took place within 24 hours of presoaking. During the pre-test, the water levels in the borings were observed to drop less than 6 inches in 25 minutes for two consecutive readings. Therefore, the test procedure for fine-grained soils or "slow test" was followed. Test well installation and the estimation of infiltration rates were accomplished in general accordance with the guidelines set forth by County of Orange (2013). In general, three-dimensional flow out of the test well (*percolation*), as observed in the field, is mathematically reduced to one-dimensional flow out of the bottom of the test well (*infiltration*). Infiltration tests are performed using relatively clean water, free of particulates, silt, etc. The results of our recent field infiltration testing are presented in Appendix D and summarized in Table 1 below.

TABLE 1

Summary of Field Infiltration Testing

Infiltration Test Identification	Approx. Depth Below Existing Grade (ft)	Observed Infiltration Rate* (in./hr.)
I-1	10	0.2
I-2	10	0.2
I-3	10	0.1

*Observed Infiltration Rates Do Not Include Factor of Safety.

The tested infiltration rates provided in this report are considered a general representation of the infiltration rates at the location of the proposed infiltration boring. Please note, the testing of

infiltration rates is highly dependent upon the materials encountered at the point of testing (i.e., location and depth of testing). Varying subsurface conditions may exist outside of the test location which could alter the calculated infiltration rate. Please refer to Section 4.8 for subsurface water infiltration recommendations.

2.5 Seismic Design Criteria

The site seismic characteristics were evaluated per the guidelines set forth in Chapter 16, Section 1613 of the 2022 California Building Code (C.B.C) and applicable portions of ASCE 7-16 which has been adopted by the CBC Please note that the following seismic parameters are only applicable for code-based acceleration response spectra and are not applicable for where site-specific ground motion procedures are required by ASCE 7-16. Representative site coordinates of latitude 33.9141 degrees north and longitude -117.8791 degrees west were utilized in our analyses. The maximum considered earthquake (MCE) spectral response accelerations (S_{MS} and S_{M1}) and adjusted design spectral response acceleration parameters (S_{DS} and S_{D1}) for Site Class D are provided in Table 2 on the following page. The structural designer should contact the geotechnical consultant if structural conditions (e.g., number of stories, seismically isolated structures, etc.) require site-specific ground motions.

A deaggregation of the PGA based on a 2,475-year average return period (MCE) indicates that an earthquake magnitude of 6.70 at a distance of approximately 8.10 km from the site would contribute the most to this ground motion. A deaggregation of the PGA based on a 475-year average return period (Design Earthquake) indicates that an earthquake magnitude of 6.62 at a distance of approximately 13.42 km from the site would contribute the most to this ground motion (USGS, 2014).

Section 1803.5.12 of the 2022 C.B.C (per Section 11.8.3 of ASCE 7) states that the maximum considered earthquake geometric mean (MCE_G) Peak Ground Acceleration (PGA) should be used for liquefaction potential. The PGA_M for the site is equal to 0.864 (SEAOC, 2023). The design PGA is equal to 0.576g (2/3 of PGA_M).

TABLE 2

Seismic Design Parameters

Selected Parameters from 2022 CBC, Section 1613 - Earthquake Loads	**Seismic Design Values**	**Notes/Exceptions**
Distance to applicable faults classifies the site as a "Near-Fault" site.		Section 11.4.1 of ASCE 7
Site Class	D*	Chapter 20 of ASCE 7
Ss (Risk-Targeted Spectral Acceleration for Short Periods)	1.812g	From SEAOC, 2023
S_1 (Risk-Targeted Spectral Accelerations for 1-Second Periods)	0.637g	From SEAOC, 2023
F_a (per Table 1613.2.3(1))	1.000	For Simplified Design Procedure of Section 12.14 of ASCE 7, F_a shall be taken as 1.4 (Section 12.14.8.1)
F_v (per Table 1613.2.3(2))	1.700	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{MS} for Site Class D [Note: $S_{MS} = F_aS_S$]	1.812g	-
S_{M1} for Site Class D [Note: $S_{M1} = F_vS_1$]	1.083g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
S_{DS} for Site Class D [Note: $S_{DS} = (^2/_3)S_{MS}$]	1.208g	-
S_{D1} for Site Class D [Note: $S_{D1} = (^2/_3)S_{M1}$]	0.722g	Value is only applicable per requirements/exceptions per Section 11.4.8 of ASCE 7
C_{RS} (Mapped Risk Coefficient at 0.2 sec)	0.901	ASCE 7 Chapter 22
C_{R1} (Mapped Risk Coefficient at 1 sec)	0.903	ASCE 7 Chapter 22
*Since site soils are Site Class D and S_1 is greater than or equal to 0.2, the seismic response coefficient Cs is determined by Eq. 12.8-2 for values of $T \leq 1.5T_s$ and taken equal to 1.5 times the value calculated in accordance with either Eq. 12.8-3 for $T_L \geq T > T_s$, or Eq. 12.8-4 for $T > T_L$. Refer to ASCE 7-16.		

2.6 Faulting

Prompted by damaging earthquakes in Northern and Southern California, State legislation and policies concerning the classification and land-use criteria associated with faults have been developed. Their purpose was to prevent the construction of urban developments across the trace of active faults, resulting in the Alquist-Priolo Earthquake Fault Zoning Act. Earthquake Fault Zones have been delineated along the traces of active faults within California. Where developments for human occupation are proposed within these zones, the state requires detailed fault evaluations be performed so that engineering geologists can mitigate the hazards

associated with active faulting by identifying the location of active faults and allowing for a setback from the zone of previous ground rupture.

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone and no faults were identified on the site during our site evaluation. The possibility of damage due to ground rupture is considered low since no active faults are known to cross the site.

Secondary effects of seismic shaking resulting from large earthquakes on the major faults in the Southern California region, which may affect the site, include ground lurching, shallow ground rupture, soil liquefaction and dynamic settlement. These secondary effects of seismic shaking are a possibility throughout the Southern California region and are dependent on the distance between the site and causative fault and the onsite geology. Some of the major active nearby faults that could produce these secondary effects include the Whittier, Puente Hills, and San Andreas Faults, among others (CGS, 2018). A discussion of these secondary effects is provided in the following sections.

2.6.1 Liquefaction and Dynamic Settlement

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions coexist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential. In general, cohesive soils are not considered susceptible to liquefaction, depending on their plasticity and moisture content (Bray & Sancio, 2006). Effects of liquefaction on level ground include settlement, sand boils, and bearing capacity failures below structures. Dynamic settlement of dry loose sands can occur as the sand particles tend to settle and densify as a result of a seismic event.

Based on our review of the State of California Seismic Hazard Zone for liquefaction potential (CDMG, 1998), the subject site is not within a liquefaction hazard zone. Based on our evaluation, site soils are generally not susceptible to liquefaction due to the fine-grained nature of some of the on-site soils and the relatively dense nature of the coarse-grained soils. Therefore, liquefaction potential is considered low.

2.6.2 Lateral Spreading

Lateral spreading is a type of liquefaction-induced ground failure associated with the lateral displacement of surficial blocks of sediment resulting from liquefaction in a subsurface layer. Once liquefaction transforms the subsurface layer into a fluid mass, gravity plus the earthquake inertial forces may cause the mass to move downslope towards a free face (such as a river channel or an embankment). Lateral spreading may cause large horizontal displacements and such movement typically damages pipelines, utilities, bridges, and structures.

Due to the low potential for shallow liquefaction the potential for lateral spreading is also considered low.

2.7 Oversized Material

Oversized material (material larger than 8 inches in maximum dimension) may be encountered during site grading. Recommendations are provided for appropriate handling of oversized materials in Appendix E. If feasible, crushing oversized materials onsite or exporting oversized materials may be considered. Incorporating oversized materials into "rock fills" (windrows, rock blankets or individual rock burial) may be feasible in some of the deeper remedial grading areas if applicable. Special handling recommendations should be provided on a case-by-case basis, if necessary.

2.8 Expansion Potential

Based on the results of previous laboratory testing by others and our recent laboratory testing, site soils have a "Medium" expansion potential. Final expansion potential of site soils should be determined at the completion of grading. Results of expansion testing at finish grades will be utilized to confirm final foundation design.

3.0 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the following conclusions and recommendations are implemented.

The following is a summary of the primary geotechnical factors that may affect future development of the site:

- In general, our borings indicate the site is underlain by primarily by silty sand, sandy clay, sand, and silt with clay, medium dense to very dense/very stiff to hard, to the maximum explored depth of approximately 51.5 feet below existing grade. Surficial units including artificial fill placed by others and remnant topsoil were observed to consist of sandy clay, medium stiff to stiff. The upper approximately 5 to 10 feet of near-surface soils are generally compressible and are not suitable for the planned improvements in their present condition (refer to Section 4.1).
- Groundwater was encountered during our recent investigation at depths of approximately 20 and 25 feet below existing ground surface. We conservatively estimate the historic high groundwater depth to be approximately 15 feet below existing grade which would be above the bottom of the existing channel on the eastern portion of the site.
- The subject site is not located within the State of California Earthquake Fault Zone (Alquist-Priolo). The main seismic hazard that may affect the site is ground shaking from one of the active regional faults. The subject site will likely experience strong seismic ground shaking during its design life.
- The is not located in a State of California Seismic Hazard Zone for liquefaction. Site soils are considered not susceptible to liquefaction due to the fine-grained nature of some of the on-site soils and the relatively dense nature of the coarse-grained soils. Therefore, liquefaction potential is considered low.
- Based on the results of preliminary laboratory testing, site soils are anticipated to have "Medium" expansion potential. Mitigation measures are required for foundations and site improvements like concrete flatwork to minimize the impacts of expansive site soils. Final design expansion potential must be determined at the completion of grading.
- Pre-soaking of the subgrade for building slabs will be required due to site expansive soils. The duration of this process varies greatly based on the chosen method and is also dependent on factors such as soil type and weather conditions. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 1 to 2 weeks).
- The site contains soils that are not suitable for retaining wall backfill due to their fines content and expansion potential, therefore import of sandy soils will be required by the contractor for obtaining suitable backfill soil for planned site retaining walls.
- Excavations into the existing site soils should be feasible with heavy construction equipment in good working order. We anticipate that the on-site earth materials generated from the excavations will be generally suitable for re-use as compacted fill, provided they are relatively free of rocks larger than 8 inches in dimension, construction debris, and significant organic material.

4.0 PRELIMINARY RECOMMENDATIONS

The following recommendations are to be considered preliminary and should be confirmed upon completion of grading and earthwork operations. In addition, they should be considered minimal from a geotechnical viewpoint, as there may be more restrictive requirements from the architect, structural engineer, building codes, governing agencies, or the owner.

It should be noted that the following geotechnical recommendations are intended to provide sufficient information to develop the site in general accordance with the 2022 CBC requirements. With regard to the potential occurrence of potentially catastrophic geotechnical hazards such as fault rupture, earthquake-induced landslides, liquefaction, etc. the following geotechnical recommendations should provide adequate protection for the proposed development to the extent required to reduce seismic risk to an "acceptable level." The "acceptable level" of risk is defined by the California Code of Regulations as "that level that provides reasonable protection of the public safety, though it does not necessarily ensure continued structural integrity and functionality of the project" [Section 3721(a)]. Therefore, repair and remedial work of the proposed improvements may be required after a significant seismic event. With regards to the potential for less significant geologic hazards to the proposed development, the recommendations contained herein are intended as a reasonable protection against the potential damaging effects of geotechnical phenomena such as expansive soils, fill settlement, groundwater seepage, etc. It should be understood, however, that although our recommendations are intended to maintain the structural integrity of the proposed development and structures given the site geotechnical conditions, they cannot preclude the potential for some cosmetic distress or nuisance issues to develop as a result of the site geotechnical conditions.

The geotechnical recommendations contained herein must be confirmed to be suitable or modified based on the actual as-graded conditions.

4.1 Site Earthwork

We anticipate that earthwork at the site will consist of demolition of the existing site improvements, required earthwork removals, subgrade preparation, precise grading and construction of the proposed new improvements, including residential structures, neighborhood amenities, subsurface utilities, interior streets, etc.

We recommend that earthwork onsite be performed in accordance with the following recommendations, future grading plan review report(s), the 2022 CBC/City of Brea grading requirements, and the General Earthwork and Grading Specifications included in Appendix E. In case of conflict, the following recommendations shall supersede those included in Appendix E. The following recommendations should be considered preliminary and may be revised based upon future evaluation and review of the project plans and/or based on the actual conditions encountered during site grading/construction.

4.1.1 Site Preparation

Prior to grading of areas to receive structural fill or engineered improvements, the areas should be cleared of existing building structures, asphalt, surface obstructions, and

demolition debris. Vegetation and debris should be removed and properly disposed of off-site. Holes resulting from the removal of buried obstructions, which extend below proposed finish grades, should be replaced with suitable compacted fill material. Any abandoned sewer or storm drain lines should be completely removed and replaced with properly placed compacted fill. Deeper demolition may be required in order to remove existing foundations. We recommend the trenches associated with demolition which extend below the remedial grading depth be backfilled and properly compacted prior to the demolition contractor leaving the site.

If cesspools or septic systems are encountered, they should be removed in their entirety. The resulting excavation should be backfilled with properly compacted fill soils. As an alternative, cesspools can be backfilled with lean sand-cement slurry. Any encountered wells should be properly abandoned in accordance with regulatory requirements. At the conclusion of the clearing operations, a representative of LGC Geotechnical should observe and accept the site prior to further grading.

4.1.2 ***Removal Depths and Limits***

In order to provide a relatively uniform bearing condition for the planned improvements, we recommend the near-surface potentially compressible site soils be removed and recompacted. Approximate anticipated removal below existing grades have been estimated and presented on the Geotechnical Map, Sheet 1. Existing older artificial fill within the influence of the proposed building pads should be removed to competent native materials.

We recommend that soils within building pads be removed and recompacted to a minimum of 5 feet below existing grade or to the approximate depths presented on the Geotechnical Map (Sheet 1), whichever is deeper. The envelope for removal and recompaction should extend laterally a minimum distance of 5 feet beyond the edges of the proposed improvements, where possible. Removals along the northern property boundary should be performed efficiently and immediately replaced with properly compacted fill in order to limit the time left open. The contractor should protect the existing property line improvements during grading (e.g., trees, retaining walls, block walls, etc.). In order to promote soil uniformity in areas of design cut, over-excavation shall extend a minimum of 4 feet below finished grade or to the minimum anticipated remedial depths presented on the Geotechnical Map (Sheet 1), whichever is deeper.

For minor site structures such as free-standing and screen walls, the removals should extend at least 3 feet beneath the existing grade or 2 feet beneath the base of foundations, whichever is deeper. Within pavement and hardscape areas, removals should extend to a depth of at least 2 feet below the existing grade. Pavement area over-excavation (design cut areas) may be reduced by the depth of the design cut but should not be less than 1-foot below the finished subgrade (i.e., below planned aggregate base/asphalt concrete). In general, the envelope for over-excavation should extend laterally a minimum distance of 2 feet beyond the edges of the proposed improvements mentioned above.

Local conditions may be encountered during excavation that could require additional over-excavation beyond the above noted minimum in order to obtain an acceptable

subgrade. The actual depths and lateral extents of grading will be determined by the geotechnical consultant, based on subsurface conditions encountered during grading. Removal areas and areas to be over-excavated should be accurately staked in the field by the Project Surveyor.

4.1.3 Temporary Excavations

Temporary excavations should be performed in accordance with project plans, specifications, and all Occupational Safety and Health Administration (OSHA) requirements. Excavations should be laid back or shored in accordance with OSHA requirements before personnel or equipment are allowed to enter. Based on our field investigation, the majority of site soils are anticipated to be OSHA Type "B" soils (refer to the attached boring logs). Sandy soils are present and should be considered susceptible to caving. Soil conditions should be regularly evaluated during construction to verify conditions are as anticipated. The contractor shall be responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination with the geotechnical consultant should be maintained to facilitate construction while providing safe excavations. Excavation safety is the sole responsibility of the contractor.

Where proposed building structures will be adjacent to property lines, the potential for impacting existing offsite improvements may be reduced by performing "ABC" slot cuts. Slot cuts should be backfilled immediately with properly placed compacted fill to finish grade prior to excavation of adjacent slots. Sandy soils are present and should be considered susceptible to caving. Recommendations for ABC slot cuts including dimensions should be provided during grading based on the conditions encountered. Protection of the existing offsite improvements during grading is the responsibility of the contractor.

Vehicular traffic, stockpiles, and equipment storage should be set back from the perimeter of excavations a minimum distance equivalent to a 1:1 projection from the bottom of the excavation or 5 feet, whichever is greater. Once an excavation has been initiated, it should be backfilled as soon as practical. Prolonged exposure of temporary excavations may result in some localized instability. Excavations should be planned so that they are not initiated without sufficient time to shore/fill them prior to weekends, holidays, or forecasted rain.

It should be noted that any excavation that extends below a 1:1 (horizontal to vertical) projection of an existing foundation will remove existing support of the structure foundation. If requested, temporary shoring parameters will be provided.

4.1.4 Removal Bottoms and Subgrade Preparation

In general, removal bottoms, over-excavation bottoms and areas to receive compacted fill should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition (generally within optimum and 2 percent above optimum moisture content), and re-compacted per project recommendations.

Removal bottoms, over-excavation bottoms and areas to receive fill should be observed and accepted by the geotechnical consultant prior to subsequent fill placement.

4.1.5 Material for Fill

From a geotechnical perspective, the onsite soils are generally considered suitable for use as general compacted fill, provided they are screened of organic materials, construction debris and oversized material (8 inches in greatest dimension).

From a geotechnical viewpoint, any required import soils for general fill (i.e., non-retaining wall backfill) should consist of soils of "Low" expansion potential (expansion index 50 or less based on American Society for Testing and Materials [ASTM] D 4829), and free of organic materials, construction debris and any material greater than 3 inches in maximum dimension. Import for any required retaining wall backfill should meet the criteria outlined in the following paragraph. Source samples should be provided to the geotechnical consultant for laboratory testing a minimum of four working days prior to any planned importation.

Retaining wall backfill should consist of imported sandy soils with a maximum of 35 percent fines (passing the No. 200 sieve) per ASTM Test Method D1140 (or ASTM D6913/D422) and a "Very Low" expansion potential (EI of 20 or less per ASTM D4829). Soils should also be screened of organic materials, construction debris, and any material greater than 3 inches in maximum dimension. The site contains soils that are not suitable for retaining wall backfill due to their fines content and expansion potential; therefore, import of soils will be required by the contractor for obtaining suitable retaining wall backfill soil.

Aggregate base (crushed aggregate base or crushed miscellaneous base) should conform to the requirements of Section 200-2 of the most recent version of the Standard Specifications for Public Works Construction ("Greenbook") for untreated base materials (except processed miscellaneous base) and/or City of Brea requirements.

The placement of demolition materials in compacted fill is acceptable from a geotechnical viewpoint provided the demolition material is broken up into pieces not larger than typically used for aggregate base (approximately 1 to 3-inches in maximum dimension) and well blended into fill soils with essentially no resulting voids. Demolition material placed in fills must be free of construction debris and reinforcing steel. If asphalt concrete fragments will be incorporated into the demolition materials, approval from an environmental viewpoint may be required and is not the purview of the geotechnical consultant. From our previous experience, we recommend that asphalt concrete fragments be limited to fill areas within planned street areas (i.e., not within building pad areas).

4.1.6 Placement and Compaction of Fills

Material to be placed as fill should be brought to near-optimum moisture content (generally within optimum and 2 percent above optimum moisture content) and

recompacted to at least 90 percent relative compaction (per ASTM D1557). Moisture conditioning of site soils will be required in order to achieve adequate compaction. Drying and or mixing of very moist soils will be required prior to reusing the materials in compacted fills. Soils are also present that will require additional moisture in order to achieve the required compaction.

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts not exceeding 8 inches in compacted thickness. Each lift should be thoroughly compacted and accepted prior to subsequent lifts. Generally, placement and compaction of fill should be performed in accordance with local grading ordinances and with observation and testing performed by the geotechnical consultant. Oversized material as previously defined should be removed from site fills.

During backfill of excavations, the fill should be properly benched into firm and competent soils of temporary backcut slopes as it is placed in lifts.

Aggregate base material should be compacted to at least 95 percent relative compaction at or slightly above optimum moisture content per ASTM D1557. Subgrade below aggregate base should be compacted to at least 90 percent relative compaction per ASTM D1557 at near-optimum moisture content (generally within optimum and 2 percent above optimum moisture content).

If gap-graded ¾-inch rock is used for backfill (around storm drain storage chambers, retaining wall backfill, etc.) it will require compaction. Rock shall be placed in thin lifts (typically not exceeding 6 inches) and mechanically compacted with observation by geotechnical consultant. Backfill rock shall meet the requirements of ASTM D2321. Gap-graded rock is required to be wrapped in filter fabric to prevent the migration of fines into the rock backfill.

4.1.7 <u>Trench and Retaining Wall Backfill and Compaction</u>

Bedding material used within the pipe zone should conform to the requirements of the current Greenbook and the pipe manufacturer. Where applicable, sand having a sand equivalent (SE) of 20 or greater (per Caltrans Test Method [CTM] 217) may be used to bed and shade the pipes within the bedding zone. Sand backfill should be densified by jetting or flooding and then tamped to ensure adequate compaction. Bedding sand should be from a natural source, manufactured sand from recycled material is not suitable for jetting. The onsite soils may generally be considered suitable as trench backfill (zone defined as 12 inches above the pipe to subgrade), provided the soils are screened of rocks greater than 6 inches in maximum dimension, construction debris and organic material. Trench backfill should be compacted in uniform lifts (as outlined above in Section "Material for Fill") by mechanical means to at least 90 percent relative compaction (per ASTM D1557). If gap-graded rock is used for trench backfill, refer to the above Section.

Retaining wall backfill should consist of sandy soils as outlined in preceding Section 4.1.5. The limits of select sandy backfill should extend at minimum ½ the height of the retaining wall or the width of the heel (if applicable), whichever is greater (Figure 2). Retaining

wall backfill soils should be compacted in relatively uniform thin lifts to at least 90 percent relative compaction (per ASTM D1557). Jetting or flooding of retaining wall backfill materials should not be permitted.

In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, typically sand-cement slurry may be substituted for compacted backfill. The slurry should contain about one sack of cement per cubic yard. When set, such a mix typically has the consistency of compacted soil. Sand cement slurry placed near the surface within landscape areas should be evaluated for potential impacts on planned improvements.

A representative from LGC Geotechnical should observe, probe, and test the backfill to verify compliance with the project recommendations.

4.1.8 Shrinkage and Subsidence

Volumetric changes in earth quantities will occur when excavated onsite earth materials are replaced as properly compacted fill. The following is an estimate of shrinkage and bulking factors for the various geologic units found onsite. These estimates are based on in-place densities of the various materials and on the estimated average degree of relative compaction achieved during grading.

TABLE 3

Estimated Shrinkage and Bulking

Soil Type	Allowance	Estimated Range
Older Artificial Fill	Shrinkage	5% to 15%
Quaternary Older Alluvium	Shrinkage	0% to 10%

Subsidence due to earthwork equipment is expected to be on the order of 0.1 to 0.2 feet. It should be stressed that these values are only estimates and that actual shrinkage factors are extremely difficult to predict. The effective shrinkage of onsite soils will depend primarily on the type of compaction equipment and method of compaction used onsite by the contractor. Additionally, the onsite geology is variable; the above estimates are generalized groupings of similar lithologies and should be expected to vary across the site and with depth.

The above shrinkage estimates are intended as an aid for others in determining preliminary earthwork quantities. However, these estimates should be used with some caution since they are not absolute values. Contingencies should be made for balancing earthwork quantities based on actual shrinkage and subsidence that occurs during grading. Shrinkage and bulking are also expected to vary with accuracy of the topographic survey and survey accuracy during rough grading.

Due to the combined variability in topographic surveys, inability to precisely model the removals and variability in on-site near-surface conditions, it is our opinion that the site will not balance at the end of grading. If importing/exporting a large volume of soils is not considered feasible or economical, we recommend a balance area be designated onsite that can fluctuate up or down based on the actual volume of soil.

4.2 Slopes

Existing slopes up to a maximum height of approximately 20 feet are anticipated to be both grossly and surficially stable, as long as they are constructed and maintained in accordance with the recommendations herein and the Standard Earthwork and Grading Specifications included in Appendix E.

Slopes should be constructed with a maximum slope ratio of 2:1 (horizontal to vertical). Slope faces should also be compacted to minimum project specifications. This may require overbuilding of the slope face and trimming back to design grades. To improve surficial stability, vegetation specified by the landscape architect should be established on the slope face as soon as it is practical. Slopes may be prone to surficial instabilities during periods of heavy rain.

4.2.1 Slope Maintenance Guidelines

It is recommended that any graded slopes be planted with ground cover vegetation as soon as practical to reduce the potential for erosion by reducing runoff velocity. Deep-rooted vegetation that requires little water and is able to survive local climate conditions should also be established to protect against surficial slumping. Under no circumstances should slopes be allowed to be bare of vegetation. Landscape vegetation must not be "trimmed" to root structures leaving no protection of the slopes. Irrigation levels should be kept to the minimum level necessary to establish healthy plant growth. Slopes must not be overwatered. If automatic sprinklers are used, they must be adjusted during periods of rainfall. A landscape professional should be consulted for specific landscape recommendations.

A program for the elimination of burrowing animals in both native and graded slope areas must be established to protect slope stability by reducing the potential for surface water to penetrate into the slope face. Continuous erosion control, rodent control, and maintenance are essential to the long-term stability of all slopes. Trenches excavated on a slope face for utility or irrigation lines and/or for any purpose must be properly backfilled and compacted to project recommendations (refer to Section 4.1.7) to the slope face. Observation/testing and acceptance by the geotechnical consultant during trench backfill are recommended. V-ditches should be inspected and cleared of loose soil and/or debris on a routine basis, especially prior to and during the rainy season.

4.3 Preliminary Foundation Recommendations

Provided that the remedial grading recommendations provided herein are implemented, the site may be considered suitable for the support of the residential structures using a conventional or

post-tensioned foundation system designed to resist the impacts of expansive soils. Site soils are anticipated to be "Medium" expansion potential (EI of 90 or less per ASTM D4829) and special design considerations from a geotechnical perspective are required. Please note that the following foundation recommendations are preliminary and must be confirmed by LGC Geotechnical at the completion of grading.

Preliminary foundation recommendations are provided in the following sections. Recommended soil bearing and estimated settlement due to structural loads are provided in Section 4.4.

4.3.1 Provisional Conventional Foundation Design Parameters

Conventional foundations may be designed in accordance with the Wire Reinforcement Institute (WRI) procedure for slab-on-ground foundations per Section 1808 of the 2022 CBC to resist expansive soils. The following preliminary soil parameters may be used:

- Effective Plasticity Index: 25
- Climatic Rating: Cw = 15
- Reinforcement: Per structural designer
- Minimum Footing Depth: 18 inches below lowest adjacent grade.
- Moisture-condition (presoak) slab subgrade to 120% of optimum moisture content to a minimum depth of 18 inches prior to trenching.

The recommended moisture content should be maintained up to the time of concrete placement.

4.3.2 Provisional Post-Tensioned Foundation Design Parameters

The geotechnical parameters provided herein may be used for post-tensioned slab foundations. These parameters have been determined in general accordance with the Post-Tensioning Institute (PTI, 2012) Standard Requirements (PTI DC 10.5), referenced in Chapter 18 of the 2022 CBC. In utilizing these parameters, the foundation engineer should design the foundation system in accordance with the allowable deflection criteria of applicable codes and the requirements of the structural designer/architect. Other types of stiff slabs may be used in place of the CBC post-tensioned slab design provided that, in the opinion of the foundation structural designer, the alternative type of slab is at least as stiff and strong as that designed by the CBC/PTI method to resist expansive soils.

Our design parameters are based on our experience with similar residential projects and the anticipated nature of the soil (with respect to expansion potential). Please note that implementation of our recommendations will not eliminate foundation movement (and related distress) should the moisture content of the subgrade soils fluctuate. It is the intent of these recommendations to help maintain the integrity of the proposed structures and reduce (not eliminate) movement, based upon the anticipated site soil conditions. Should future owners not properly maintain the areas surrounding the foundation, for example by overwatering, then we anticipate for highly expansive soils the maximum differential movement of the perimeter of the foundation to the center of

the foundation to be on the order of a couple of inches. Soils of lower expansion potential are anticipated to show less movement.

TABLE 4

Provisional Geotechnical Parameters for Post-Tensioned Foundation Slab Design

Parameter	PT Slab with Perimeter Footing	PT Mat with Thickened Edge
Expansion Index	Medium[1]	Medium[1]
Thornthwaite Moisture Index	-20	-20
Constant Soil Suction	PF 3.9	PF 3.9
Center Lift Edge moisture variation distance, e_m Center lift, y_m	 9.0 feet 0.5 inch	 9.0 feet 0.6 inch
Edge Lift Edge moisture variation distance, e_m Edge lift, y_m	 4.7 feet 1.1 inch	 4.7 feet 1.3 inch
Modulus of Subgrade Reaction, k (assuming presoaking as indicated below)	150 pci	150 pci
Minimum perimeter footing/thickened edge embedment below finish grade	18 inches	6 inches
Perimeter foundation reinforcement	N/A[2]	N/A[2]
Minimum slab thickness	5 inches[2]	8 inches[2]
Presoak (moisture conditioning)	120% of Optimum to 18 inches	120% of Optimum to 18 inches

1. Assumed for preliminary design purposes. Further evaluation is needed at the completion of grading.
2. Recommendations for foundation reinforcement and slab thickness are ultimately the purview of the foundation engineer/structural engineer based upon geotechnical criteria and structural engineering considerations.
3. Recommendations for sand below slabs have traditionally been included with geotechnical foundation recommendations, although they are not the purview of the geotechnical consultant. The sand layer requirements are the purview of the foundation engineer/structural engineer and should be provided in accordance with ACI Publication 302 "Guide for Concrete Floor and Slab Construction".
4. Recommendations for vapor retarders below slabs are also the purview of the foundation engineer/structural engineer and should be provided in accordance with applicable code requirements.

4.3.3 Post-Tensioned Foundation Subgrade Preparation and Maintenance

Moisture conditioning of the subgrade soils is recommended prior to trenching the foundation. The duration of this process varies greatly based on the chosen method and

is also dependent on factors such as soil type and weather conditions. Time duration for presoaking from completion of rough grading to trenching of foundations should be accounted for in the construction schedule (typically 1 to 2 weeks). The recommendations specific to the anticipated site soil conditions, including recommended presoak, are presented in Table 4. The subgrade moisture condition of the building pad soils should be maintained at near-optimum moisture content up to the time of concrete placement. This moisture content should be maintained around the immediate perimeter of the slab during construction and up to occupancy of the homes.

The geotechnical parameters provided herein assume that if the areas adjacent to the foundation are planted and irrigated, these areas will be designed with proper drainage and adequately maintained so that ponding, which causes significant moisture changes below the foundation, does not occur. Our recommendations do not account for excessive irrigation and/or incorrect landscape design. Plants should only be provided with sufficient irrigation for life and not overwatered to saturate subgrade soils. Sunken planters placed adjacent to the foundation should either be designed with an efficient drainage system or liners to prevent moisture infiltration below the foundation. Some lifting of the perimeter foundation beam should be expected even with properly constructed planters.

In addition to the factors mentioned above, future homeowners should be made aware of the potential negative influences of trees and/or other large vegetation. Roots that extend near the vicinity of foundations can cause distress to foundations. Future homeowners (and the owner's landscape architect) should not plant trees/large shrubs closer to the foundations than a distance equal to half the mature height of the tree or 20 feet, whichever is more conservative unless specifically provided with root barriers to prevent root growth below the house foundation.

It is the homeowner's responsibility to perform periodic maintenance during hot and dry periods to ensure that adequate watering has been provided to keep soils from separating or pulling back from the foundation. Future homeowners should be informed and educated regarding the importance of maintaining a constant level of soil-moisture. The homeowners should be made aware of the potential negative consequences of both excessive watering, as well as allowing potentially expansive soils to become too dry. Expansive soils can undergo shrinkage during drying and swelling during the rainy winter season or when irrigation is resumed. This can result in distress to building structures and hardscape improvements. The builder should provide these recommendations to future homeowners.

4.3.4 ***Slab Underlayment Guidelines***

The following is for informational purposes only since slab underlayment (e.g., moisture retarder, sand or gravel layers for concrete curing and/or capillary break) is unrelated to the geotechnical performance of the foundation and thereby not the purview of the geotechnical consultant. Post-construction moisture migration should be expected below the foundation. The foundation engineer/architect should determine whether the use of a capillary break (sand or gravel layer), in conjunction with the vapor retarder, is necessary or required by code. Sand layer thickness and location (above and/or below

vapor retarder) should also be determined by the foundation engineer/architect.

4.3.5 Foundation Setback from Top-of-Slope and Bottom-of-Slope

Foundations should be set back from the top and bottom of slopes in accordance with the California Building Code (CBC) and the City of Brea. Per the 2022 CBC, the minimum top-of-slope setback is H/3, with a maximum required setback of 40 feet, where H is the total height of the slope. The minimum bottom-of-slope setback is H/2, with a maximum required setback of 15 feet. Refer to Chapter 18 of the 2022 CBC for additional information. It is the purview of the project civil engineer to implement the appropriate foundation setbacks.

4.4 Soil Bearing and Lateral Resistance

Provided our earthwork recommendations are implemented, an allowable soil bearing pressure of 2,000 pounds per square foot (psf) may be used for the design of footings having a minimum width of 12 inches and minimum embedment of 18 inches below lowest adjacent ground surface. This value may be increased by 400 psf for each additional foot of embedment and 200 psf for each additional foot of foundation width to a maximum value of 3,000 psf. A post-tensioned mat foundation a minimum of 6 inches below lowest adjacent grade may be designed for an allowable soil bearing pressure of 1,200 psf. These allowable bearing pressures are applicable for level (ground slope equal to or flatter than 5H:1V) conditions only. Bearing values indicated are for total dead loads and frequently applied live loads and may be increased by ⅓ for short duration loading (i.e., wind or seismic loads).

In utilizing the above-mentioned allowable bearing capacity and provided our earthwork recommendations are implemented, foundation settlement due to structural loads is anticipated to be 1-inch or less. Differential static settlement may be taken as half of the static settlement (i.e., ½-inch over a horizontal span of 40 feet).

Resistance to lateral loads can be provided by friction acting at the base of foundations and by passive earth pressure. For concrete/soil frictional resistance, an allowable coefficient of friction of 0.3 may be assumed with dead-load forces. For slabs constructed over a moisture retarder, the allowable friction coefficient should be provided by the manufacturer. An allowable passive lateral earth pressure of 225 psf per foot of depth (or pcf) to a maximum of 2,250 psf may be used for the sides of footings poured against properly compacted fill. Allowable passive pressure may be increased to 300 pcf (maximum of 3,000 psf) for short duration seismic loading. This passive pressure is applicable for level (ground slope equal to or flatter than 5H:1V) conditions. Frictional resistance and passive pressure may be used in combination without reduction. We recommend that the upper foot of passive resistance be neglected if finished grade will not be covered with concrete or asphalt. The provided allowable passive pressures are based on a factor of safety of 1.5 and 1.1 for static and seismic loading conditions, respectively.

4.5 Lateral Earth Pressures for Retaining Walls

Lateral earth pressures for import soils (sandy soils) meeting indicated project

recommendations (Section 4.1.5) are provided below. Lateral earth pressures are provided as equivalent fluid unit weights, in psf per foot of depth (or pcf). These values do not contain an appreciable factor of safety, so the retaining wall designer should apply the applicable factors of safety and/or load factors during design. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of soil over the wall footing.

The following lateral earth pressures are presented on Table 5 are for backfilled retaining walls using approved select granular soils with a maximum of 35 percent fines (passing the No. 200 sieve per ASTM D-421/422) and a maximum Expansion Index of 20 (per ASTM D-4829). The site contains soils that are not suitable for retaining wall backfill due to their fines content and expansion potential, therefore import of sandy soils will be required by the contractor for obtaining suitable backfill soil for planned site retaining walls using the parameters provided in Table 5 below. The retaining wall designer should clearly indicate on the retaining wall plans the required sandy soil backfill criteria.

TABLE 5

<u>Lateral Earth Pressures – Imported Sandy Soils</u>

Conditions	**Equivalent Fluid Weight (pcf)**	**Equivalent Fluid Weight (pcf)**
	Level Backfill	**2:1 Sloped Backfill**
	Approved Sandy Soils	**Approved Sandy Soils**
Active	35	55
At-Rest	55	70

If the wall can yield enough to mobilize the full shear strength of the soil, it can be designed for "active" pressure. If the wall cannot yield under the applied load, the earth pressure will be higher. This would include 90-degree corners of retaining walls. Such walls should be designed for "at-rest." The equivalent fluid pressure values assume free-draining conditions. If conditions other than those assumed above are anticipated, the equivalent fluid pressure values should be provided on an individual-case basis by the geotechnical engineer.

Surcharge loading effects from any adjacent structures should be evaluated by the retaining wall designer. In general, structural loads within a 1:1 (horizontal to vertical) upward projection from the bottom of the proposed retaining wall footing will surcharge the proposed retaining wall. In addition to the recommended earth pressure, retaining walls adjacent to streets should be designed to resist a uniform lateral pressure of 85 pounds per square foot (psf) due to normal street vehicle traffic, if applicable. The retaining wall designer should contact the geotechnical consultant for any required geotechnical input in estimating surcharge loads.

Retaining wall structures should be provided with appropriate drainage and appropriately waterproofed. To reduce, but not eliminate, saturation of near-surface (upper approximate 1-foot) soils in front of the retaining walls, the perforated subdrain pipe should be located as low as possible behind the retaining wall. The outlet pipe should be sloped to drain to a suitable

outlet. In general, we do not recommend retaining wall outlet pipes be connected to area drains. If subdrains are connected to area drains, special care and information should be provided to homeowners to maintain these drains. Typical retaining wall drainage is illustrated in Figure 2. It should be noted that the recommended subdrain does not provide protection against seepage through the face of the wall and/or efflorescence. Efflorescence is generally a white crystalline powder (discoloration) that results when water containing soluble salts migrates over a period of time through the face of a retaining wall and evaporates. If such seepage or efflorescence is undesirable, retaining walls should be waterproofed to reduce this potential.

If retaining walls greater than 6 feet in height are proposed, the retaining wall designer should contact the geotechnical engineer for specific lateral earth pressure increments based on the configuration of the planned retaining wall structures.

Soil bearing and lateral resistance (friction coefficient and passive resistance) are provided in Section 4.4. Earthwork considerations (temporary backcuts, backfill, compaction, etc.) for retaining walls are provided in Section 4.1 (Site Earthwork) and the subsequent earthwork related sub-sections.

4.6 Soil Corrosivity

Although not corrosion engineers (LGC Geotechnical is not a corrosion consultant), several governing agencies in Southern California require the geotechnical consultant to determine the corrosion potential of soils to buried concrete and metal facilities. We therefore present the results of our testing with regard to corrosion for the use of the client and other consultants, as they determine necessary.

Corrosion testing of near-surface bulk samples indicated a soluble sulfate content of approximately 0.014 percent, chloride content of 260 parts per million (ppm), pH of 8.1, and minimum resistivity of 5,000 ohm-centimeters. Based on Caltrans Corrosion Guidelines (Caltrans, 2021), soils are considered corrosive to structural elements if the pH is 5.5 or less, or the chloride concentration is 500 ppm or greater, or the sulfate concentration is 2,000 ppm (0.2 percent) or greater. Based on test results, soils are not considered corrosive using Caltrans criteria. Note that based on minimum resistivity the soils are considered moderately corrosive to metallic improvements. If improvements that may be susceptible to corrosion are proposed, it is recommended that further evaluation by a corrosion engineer be performed.

Based on laboratory sulfate test results, the near surface soils are designated to a class “S0” per ACI 318, Table 19.3.1.1 with respect to sulfates. Concrete in direct contact with the onsite soils can be designed according to ACI 318, Table 19.3.2.1 using the “S0” sulfate classification.

Laboratory testing may need to be performed at the completion of grading by the project corrosion engineer to further evaluate the as-graded soil corrosivity characteristics. Accordingly, revision of the corrosion potential may be needed, should future test results differ substantially from the conditions reported herein. The client and/or other members of the development team should consider this during the design and planning phase of the project and formulate an appropriate course of action.

4.7 Control of Surface Water and Drainage Control

From a geotechnical perspective, we recommend that compacted finished grade soils adjacent to proposed residences be sloped away from the proposed residence and towards an approved drainage device or unobstructed swale. Drainage swales, wherever feasible, should not be constructed within 5 feet of buildings. Where lot and building geometry necessitates that the side yard drainage swales be routed closer than 5 feet to structural foundations, we recommend the use of area drains together with drainage swales. Drainage swales used in conjunction with area drains should be designed by the project civil engineer so that a properly constructed and maintained system will prevent ponding within 5 feet of the foundation. Code compliance of grades is not the purview of the geotechnical consultant.

Planters with open bottoms adjacent to buildings should be avoided. Planters should not be designed adjacent to buildings unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Overwatering must be avoided.

4.8 Subsurface Water Infiltration

Recent regulatory changes have occurred that mandate that storm water be infiltrated below grade rather than collected in a conventional storm drain system. Typically, a combination of methods are implemented to reduce surface water runoff and increase infiltration including; permeable pavements/pavers for roadways and walkways, directing surface water runoff to grass-lined swales, retention areas, and/or drywells, etc.

It should be noted that collecting and concentrating surface water for the purpose of intentionally infiltrating below grade, conflicts with the geotechnical engineering objective of directing surface water away from slopes, structures, and other improvements. The geotechnical stability and integrity of a site is reliant upon appropriately handling surface water. In general, the vast majority of geotechnical distress issues are directly related to improper drainage. In general, distress in the form of movement of improvements could occur as a result of soil saturation and loss of soil support, expansion, internal soil erosion, collapse and/or settlement.

Per the County of Orange Guidelines (2013), infiltration of stormwater is not required when the factored infiltration rate (observed infiltration rate with safety factor applied) is less than 0.3 inches per hour. The infiltration rates presented in Table 1, with or without the safety factor applied, are lower than the minimum infiltration rate requirements from the County.

Based on results of field infiltration testing indicating low infiltration rates, very stiff clays and dense silty sands and sands encountered at depth, and shallow groundwater levels, we strongly recommend against the intentional infiltration of stormwater into the subsurface soils.

4.9 Preliminary Asphalt Concrete Pavement Sections

The following provisional minimum asphalt concrete (AC) street sections are provided in Table 6 on the following page for Traffic Indices (TI) of 5.0, and 6.0. These sections are based on an assumed R-value of 10. These recommendations must be confirmed with R-value testing of representative near-surface soils at the completion of grading and after underground utilities

have been installed and backfilled. Final pavement sections should be confirmed by the project civil engineer based upon the final design Traffic Index. The City of Brea requires a minimum pavement section of 4 inches asphalt concrete over 6 inches aggregate base for alleys and local streets. Refer to the minimum pavement section recommendations below in accordance with the City of Brea. The final Traffic Index is determined by the Civil Engineer or City Engineer. We are not responsible for selecting a design Traffic Index. If requested, LGC Geotechnical will provide sections for alternate TI values.

TABLE 6

Preliminary Asphalt Concrete Pavement Section Options

Assumed Traffic Index	5.0 (or less)	6.0
R -Value Subgrade	10	10
AC Thickness	4.0 inches	5.0 inches
Aggregate Base Thickness	7.5 inches	9.5 inches

Due to anticipated heavy construction traffic during installation of utilities and home construction, we recommend that the total thickness (base course and capping course) of AC be placed at essentially the same time. Allowing heavy construction traffic loading on only the base course of the AC will increase the potential for pavement distress. It should be noted that construction traffic such as concrete trucks will likely exceed traffic loading after completion of construction.

The pavement section thicknesses provided above are considered minimum thicknesses. Increasing the thickness of any of the above layers will reduce the likelihood of the pavement experiencing distress during its service life. The above recommendations assume that proper maintenance and irrigation of the areas adjacent to the roadway will occur throughout the design life of the pavement. Failure to maintain a proper maintenance and/or irrigation program may jeopardize the integrity of the pavement.

Earthwork recommendations regarding aggregate base and subgrade are provided in the previous Section "Site Earthwork" and the related sub-sections of this report.

4.10 Nonstructural Concrete Flatwork

Nonstructural concrete flatwork (such as walkways, private drives, patio slabs, etc.) has a potential for cracking due to changes in soil volume related to soil-moisture fluctuations. To reduce the potential for excessive cracking and lifting, concrete may be designed in accordance with the minimum guidelines outlined in Table 7. These guidelines will reduce the potential for irregular cracking and promote cracking along construction joints but will not eliminate all cracking or lifting. Thickening the concrete and/or adding additional reinforcement will further reduce cosmetic distress.

TABLE 7

Preliminary Geotechnical Parameters for Nonstructural Concrete Flatwork Placed on Medium Expansion Potential Subgrade

	Community Sidewalks (≤6 feet wide)	**Private Drives**	**Patios/Walkways** (adjacent to homes or flatwork >6 feet wide)	**City Sidewalk Curb and Gutters**
Minimum Thickness (in.)	4 (nominal)	5 (full)	5 (full)	City/Agency Standard
Presoaking	Wet down	Presoak to 12 inches	Presoak to 12 inches	City/Agency Standard
Reinforcement	—	No. 3 at 24 inches on centers	No. 3 at 24 inches on centers	City/Agency Standard
Thickened Edge (in.)	—	8 x 8	—	City/Agency Standard
Crack Control Joints	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	Saw cut or deep open tool joint to a minimum of $^1/_3$ the concrete thickness	City/Agency Standard
Maximum Joint Spacing	5 feet	10 feet or quarter cut whichever is closer	6 feet	City/Agency Standard
Aggregate Base Thickness (in.)	—	—	—	City/Agency Standard

To reduce the potential for driveways to separate from the garage slab, the builder may elect to install dowels to tie these two elements together. Similarly, future homeowners should consider the use of dowels to connect flatwork to the foundation.

4.11 Geotechnical Plan Review

When available, grading, retaining wall and foundation plans should be reviewed by LGC Geotechnical in order to verify our geotechnical recommendations are implemented. Updated recommendations and/or additional fieldwork may be necessary.

4.12 Geotechnical Observation and Testing During Construction

The recommendations provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field

during construction by a representative of LGC Geotechnical. Geotechnical observation and testing is required per Section 1705 of the 2022 California Building Code (CBC).

Geotechnical observation and/or testing should be performed by LGC Geotechnical at the following stages:

- During grading (removal bottoms, fill placement, etc.);
- During retaining wall backfill and compaction;
- During utility trench backfill and compaction;
- After presoaking building pads and other concrete-flatwork subgrades, and prior to placement of aggregate base or concrete;
- Preparation of pavement subgrade and placement of aggregate base;
- After building and wall footing excavation and prior to placing steel reinforcement and/or concrete; and
- When any unusual soil conditions are encountered during any construction operation subsequent to issuance of this report.

5.0 LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

This report is based on data obtained from limited observations of the site, which have been extrapolated to characterize the site. While the scope of services performed is considered suitable to adequately characterize the site geotechnical conditions relative to the proposed development, no practical evaluation can completely eliminate uncertainty regarding the anticipated geotechnical conditions in connection with a subject site. Variations may exist and conditions not observed or described in this report may be encountered during grading and construction.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and recommendations contained herein are brought to the attention of the other consultants (at a minimum the civil engineer, structural engineer, landscape architect) and incorporated into their plans. The contractor should properly implement the recommendations during construction and notify the owner if they consider any of the recommendations presented herein to be unsafe, or unsuitable.

The findings of this report are valid as of the present date. However, changes in the conditions of a site can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. The findings, conclusions, and recommendations presented in this report can be relied upon only if LGC Geotechnical has the opportunity to observe the subsurface conditions during grading and construction of the project, in order to confirm that our preliminary findings are representative for the site. This report is intended exclusively for use by the client, any use of or reliance on this report by a third party shall be at such party's sole risk.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside our control. Therefore, this report is subject to review and modification.

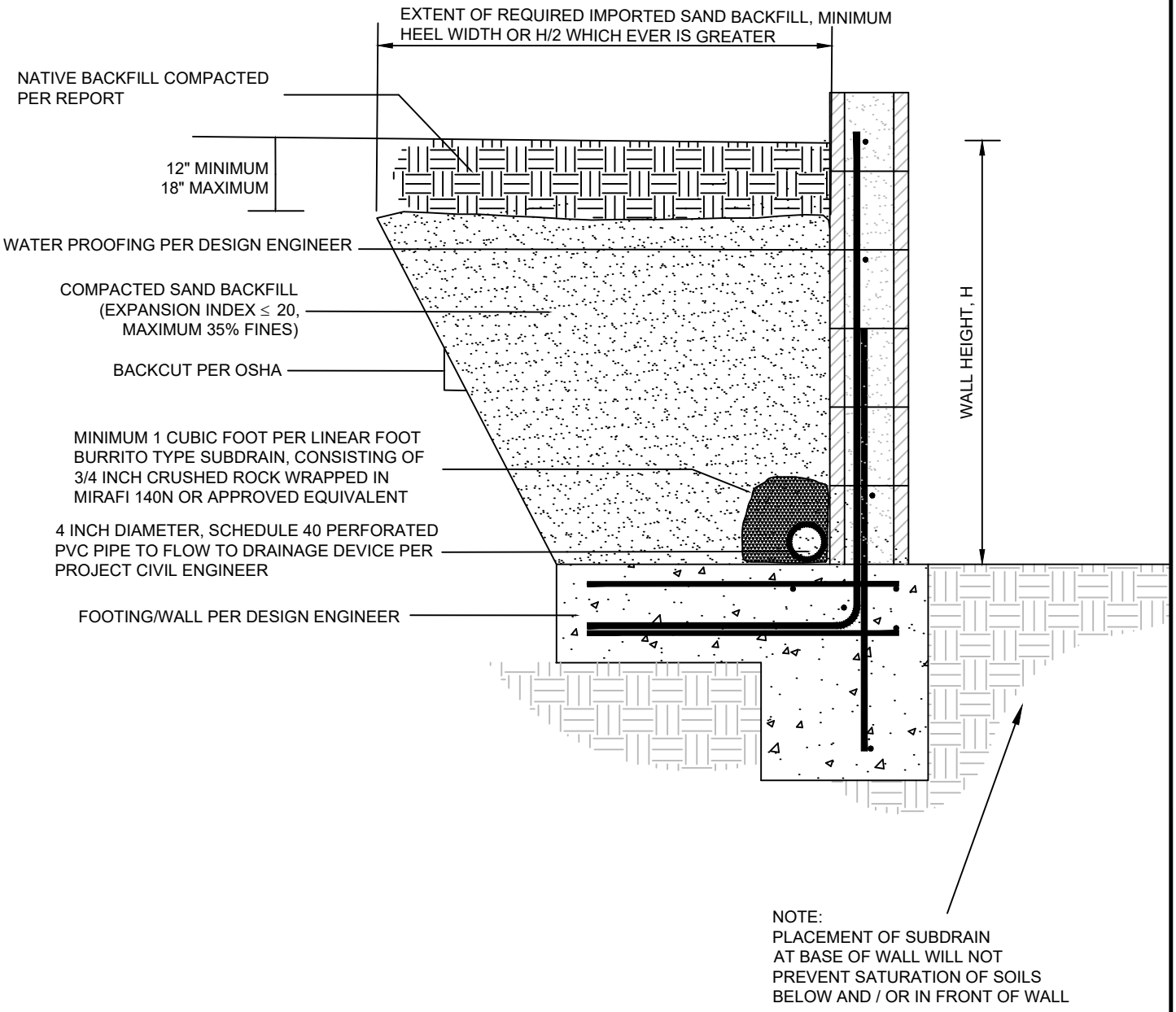


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FIGURE 2
Retaining Wall Backfill Detail

PROJECT NAME	Lennar - Greenbriar, Brea
PROJECT NO.	23169-01
ENG. / GEOL.	RLD / KTM
SCALE	Not to Scale
DATE	November 2023

Appendix A
References

APPENDIX A

References

American Society of Civil Engineers (ASCE), 2017, Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-16, Third Printing, 2017.

American Society for Testing and Materials (ASTM), Volume 04.08 Soil and Rock (I): D420 – D5876.

Bray, J.D., and Sancio, R. B., 2006, Assessment of Liquefaction Susceptibility of Fine-Grained Soils, *Journal of Geotechnical and Geoenvironmental Engineering*, ASCE, pp. 1165-1177, dated September 2006.

California Building Standards Commission, 2022, California Building Code, California Code of Regulations Title 24, Volumes 1 and 2, dated July 2022.

California Department of Transportation (Caltrans), 2021, Corrosion Guidelines, Version 3.2, dated May 2021.

California Division of Mines and Geology (CDMG), 1998, State of California Seismic Hazard Zones, La Habra Quadrangle, Official Map, scale: 1:24,000, Release Date: April 15, 1998.

_____, 2001, State of California Seismic Hazard Zone Report for the La Habra 7.5-Minute Quadrangle, Los Angeles and Orange Counties, California, Seismic Hazard Zone Report 009, Revised 2001.

California Geological Survey [CGS], 2008, California Geological Society Special Publication 117A: Guidelines for Evaluating and Mitigating Seismic Hazards in California.

_____, 2018, California Geological Survey website, Interactive Fault Map: http://www.quake.ca.gov/gmaps/FAM/faultactivitymap.html.

County of Orange, 2013, Technical Guidance Document (TGD) for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Plans (WQMPs), dated December 20, 2013.

Dibblee, 2001, Geologic Map of Whittier and La Habra Quadrangles (Western Puente Hills), Los Angeles and Orange Counties, California, by Thomas Dibblee, Jr.

Historic Aerials, 2023, viewed November 7, 2023, Aerials viewed from: 1952 through 2020, https://www.historicaerials.com/.

Hunsaker & Associates, Inc., 2023, Greenbriar - Conceptual Grading Plan, 183 Unit, Brea, CA, dated November 13, 2023.

NCEER, 1997, "Proceeding of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils", T. L. Youd and I. M. Idriss Editors, Technical Report NCEER-97-0022, NCEER, Buffalo, NY.

Post-Tensioning Institute (PTI), 2012, Standard Requirements for Design and Analysis of Shallow Post-Tensioned Concrete Foundations on Expansive Soils, PTI DC10.5-12.

Southern California Earthquake Center (SCEC), 1999, "Recommended Procedure for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigation Liquefaction Hazards in California", Edited by Martin, G.R., and Lew, M., dated March 1999.

Structural Engineers Association of California (SEAOC), 2023, Seismic Design Maps, Retrieved November 3, 2023, from https://seismicmaps.org/.

United States Geological Survey (USGS), 2014, Unified Hazard Tool, Dynamic: Conterminous U.S. 2014 (update) (v4.2.0), Retrieved November 3, 2023, from: https://earthquake.usgs.gov/hazards/interactive/.

Woodley Architectural Group, Inc., 2023, Concept Site Plan, Option "A", Mercury Site, Lennar, dated August 14, 2023.

Appendix B
Field Exploration Logs & Infiltration Data

Geotechnical Boring Log Borehole HS-1

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~339' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 2

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3.5" Asphalt over 5" Base	
								Quaternary Older Alluvium (Qoa)	
			R-1	14 25 26	122.1	11.3	CL	@ 2.5' - Sandy CLAY: brown, slightly moist, hard, trace of gravel	
335	5	B-1	R-2	16 20 25	116.0	15.4		@ 5' - Sandy CLAY: brown, moist, hard, trace of gravel	
			SPT-1	5 11 14		14.3		@ 7.5' - Sandy CLAY: brown, moist, hard	
330	10		R-3	16 24 36	113.7	11.8		@ 10' - Sandy CLAY: brown, moist, hard	
325	15		R-4	9 26 45	110.1	10.2	SM to ML	@ 15' - Silty SAND to Sandy SILT: light brown, moist, very dense to hard, fine to medium grained sand	
320	20		SPT-2	9 15 25		7.8	SM	@ 20' - Silty SAND: light brown, moist, very dense, fine	-#200
315	25	▽		8 21 40				@ 25' - No Recovery: Groundwater Encountered	
310	30								

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole HS-1

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~339' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 2 of 2

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	30		R-5	8 18 25	96.3	29.0	SM	@ 30' - Silty SAND: brown, wet, dense	AL -#200
305	35								
300	40		R-6	7 16 21	90.1	31.4	CL	@ 40' - CLAY: light brown, wet, hard, trace of gravel	AL -#200
295	45								
290	50		R-7	5 21 24	91.8	30.6		@ 50' - CLAY: brown, wet, hard, few gravel	-#200
285	55							Total Depth = 51.5' Groundwater Encountered @ 25 feet Backfilled with Cuttings on 10/11/2022 and patched with asphalt	
280	60								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Geotechnical Boring Log Borehole HS-2

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~332' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 2.5" Asphalt over 5" Base	
330								**Quaternary Older Alluvium (Qoa)**	
			SPT-1	2 3 4		18.3	CL	@ 2.5' - Sandy CLAY: dark brown, very moist, stiff	AL
	5		R-1	6 14 20	115.4	15.4		@ 5' - Sandy CLAY: dark brown, moist, very stiff	
325			SPT-2	4 4 6		16.9		@ 7.5' - Sandy CLAY: brown, moist, stiff	
	10		R-2	3 14 19	105.7	14.5	ML	@ 10' - SILT with Sand: light brown, moist, very stiff, trace of gravel	
320									
	15		SPT-3	5 12 15		4.5	SM	@ 15' - Silty SAND: light brown, slightly moist, dense	
315									
	20		R-3	14 21 24	95.5	10.4		@ 20' - Silty SAND: reddish brown, moist, dense	
310								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 10/11/2022 and patched with asphalt	
	25								
305									
	30								
295									

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:
- B BULK SAMPLE
- R RING SAMPLE (CA Modified Sampler)
- G GRAB SAMPLE
- SPT STANDARD PENETRATION TEST SAMPLE
- GROUNDWATER TABLE

TEST TYPES:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- SA SIEVE ANALYSIS
- S&H SIEVE AND HYDROMETER
- EI EXPANSION INDEX
- CN CONSOLIDATION
- CR CORROSION
- AL ATTERBERG LIMITS
- CO COLLAPSE/SWELL
- RV R-VALUE
- -#200 % PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole HS-3

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~333' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3" Asphalt over 6" Base	
								Quaternary Older Alluvium (Qoa)	
330			SPT-1	7 17 22		15.0	CL	@ 2.5' - Sandy CLAY: reddish brown, moist, hard	
	5	B-1	R-1	14 27 43	113.6	10.5	SM	@ 5' - Silty SAND: reddish brown, moist, very dense, trace of gravel	
325			SPT-2	6 14 8		16.5		@ 7.5' - Silty SAND: light brown, very moist, medium dense	
	10		R-2	11 30 45	106.1	4.4		@ 10' - Silty SAND: yellowish brown, dry, very dense, trace of gravel	
320									
	15		SPT-3	14 17 27		8.6		@ 15' - Silty SAND: light brown, moist, very dense, trace of gravel	
315									
	20		R-3	11 20 40	98.1	21.6	SP-SC to SM	@ 20' - SAND with Clay to Silty SAND: light brown, very moist, dense	
310								Total Depth = 21.5' Groundwater Not Encountered Backfilled with Cuttings on 10/11/2022 and patched with asphalt	
	25								
305									
	30								

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SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole HS-4

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~327' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3.5" Asphalt over 5" Base	MD EI DS CR -#200 CN
325								**Artificial Fill Placed by Other (afo)**	
			SPT-1	3 4 4		15.6	CL	@ 2.5' - Sandy CLAY: reddish brown, stiff, trace of gravel	
	5	B-1	R-1	4 7 13	111.0	15.1		@ 5' - CLAY: yellowish brown, moist, very stiff	
320								**Quaternary Older Alluvium (Qoa)**	
			SPT-2	4 6 8		16.3	CL	@ 7.5' - Sandy CLAY: brown, moist, very stiff	
	10		R-2	5 11 15	114.5	15.0		@ 10' - Sandy CLAY: mottled dark and reddish brown, moist, very stiff	
315									
	15		SPT-3	4 7 7		21.1		@ 15' - Sandy CLAY: brown, very moist, very stiff	
310									
	20	▽	R-3	8 12 18	105.8	22.1		@ 20' - CLAY: light brown, very moist, very stiff groundwater encountered at 20 feet	
305								Total Depth = 21.5' Groundwater Encountered at 20 feet Backfilled with Cuttings on 10/11/2022 and patched with asphalt	
	25								
300									
	30								

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:
- B BULK SAMPLE
- R RING SAMPLE (CA Modified Sampler)
- G GRAB SAMPLE
- SPT STANDARD PENETRATION TEST SAMPLE
- ▽ GROUNDWATER TABLE

TEST TYPES:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- SA SIEVE ANALYSIS
- S&H SIEVE AND HYDROMETER
- EI EXPANSION INDEX
- CN CONSOLIDATION
- CR CORROSION
- AL ATTERBERG LIMITS
- CO COLLAPSE/SWELL
- RV R-VALUE
- -#200 % PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole I-1

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~325' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3.5" Asphalt over 5" Base	
								Quaternary Older Alluvium (Qoa)	
			SPT-1	7 7 7		9.7	SM	@ 2.5' - Silty SAND: light brown, moist, medium dense	
320	5		SPT-2	8 12 16		16.6	CL	@ 5' - Sandy CLAY: brown, moist, hard	
			SPT-3	4 7 10		17.1		@ 7.5' - CLAY with Sand: light brown, moist, very stiff	
315	10		R-1	8 21 25	111.0	18.0		@ 10' - Sandy CLAY: light brown, very moist, hard	
310	15							Total Depth = 10' No Groundwater Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 10/12/2023	
305	20								
300	25								
295	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole I-2

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~333' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3.5" Asphalt over 5" Base	
								Artificial Fill Placed by Others (afo)	
330			SPT-1	2 3 3		18.1	CL	@ 2.5' - Sandy CLAY: brown, very moist, medium stiff	AL
	5		SPT-2	4 7 8		17.3		@ 5' - Sandy CLAY: dark brown, moist, very stiff	
								Quaternary Older Alluvium (Qoa)	
325			SPT-3	2 4 8		17.3	CL	@ 7.5' - Sandy CLAY: brown, moist, very stiff	
	10		R-1	4 6 13	108.6	20.3		@ 10' - Sandy CLAY: mottled brown and reddish brown, very moist, very stiff	
320								Total Depth = 10' No Groundwater Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 10/12/2023	
	15								
315									
	20								
310									
	25								
305									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/20/2022

Geotechnical Boring Log Borehole I-3

Date: 10/11/2023	**Drilling Company:** 2R Drilling
Project Name: Lennar - Greenbriar, Brea	**Type of Rig:** Truck Mounted
Project Number: 23169-01	**Drop:** 30" **Hole Diameter:** 6"
Elevation of Top of Hole: ~328' MSL	**Drive Weight:** 140 pounds
Hole Location: See Geotechnical Map	Page 1 of 1

Logged By RNP
Sampled By RNP
Checked By KTM

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0							@0' - 3.5" Asphalt over 5" Base	
								Artificial Fill Placed by Others (afo)	
325			SPT-1	3 3 4		18.5	CL	@ 2.5' - Sandy CLAY: brown, very moist, stiff	
								Quaternary Older Alluvium (Qoa)	
	5		SPT-2	3 3 6		20.6	CL	@ 5' - Sandy CLAY: brown, very moist, stiff, trace of small gravel	
320			R-1	4 6 10	105.6	22.2		@ 7.5' - Sandy CLAY: dark gray, very moist, stiff, rootlets	
	10		R-2	5 8 12	110.9	17.9		@ 10' - Sandy CLAY: dark brown, moist, very stiff	
315								Total Depth = 10' No Groundwater Encountered 3" Perforated Pipe with Filter Sock and Gravel installed Pipe Removed and Backfilled with Cuttings on 10/12/2023	
	15								
310									
	20								
305									
	25								
300									
	30								

LGC Geotechnical, Inc.

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED. THE DESCRIPTIONS PROVIDED ARE QUALITATIVE FIELD DESCRIPTIONS AND ARE NOT BASED ON QUANTITATIVE ENGINEERING ANALYSIS.

SAMPLE TYPES:

B	BULK SAMPLE
R	RING SAMPLE (CA Modified Sampler)
G	GRAB SAMPLE
SPT	STANDARD PENETRATION TEST SAMPLE
▽	GROUNDWATER TABLE

TEST TYPES:

DS	DIRECT SHEAR
MD	MAXIMUM DENSITY
SA	SIEVE ANALYSIS
S&H	SIEVE AND HYDROMETER
EI	EXPANSION INDEX
CN	CONSOLIDATION
CR	CORROSION
AL	ATTERBERG LIMITS
CO	COLLAPSE/SWELL
RV	R-VALUE
-#200	% PASSING # 200 SIEVE

Last Edited: 10/20/2022

Appendix C
Laboratory Test Results

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was formulated towards providing data relating to the relevant engineering properties of the soils with respect to residential construction. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test borings and/or trenches. The results of these tests are presented in the boring logs. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Expansion Index: The expansion potential of selected samples was evaluated by the Expansion Index Test, Standard ASTM D4829. Specimens are molded under a given compactive energy to approximately the optimum moisture content and approximately 50 percent saturation or approximately 90 percent relative compaction. The prepared 1-inch-thick by 4-inch-diameter specimens are loaded to an equivalent 144 psf surcharge and are inundated with tap water until volumetric equilibrium is reached. The results of these tests are presented in the table below.

Sample Location	Expansion Index	Expansion Potential*
HS-4 @ 1-5 feet	55	Medium

* ASTM D4829

Grain Size Distribution/Fines Content: Representative samples were dried, weighed and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve (ASTM D1140). Where applicable, the portion retained on the No. 200 sieve and dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D6913 (sieve).

Sample Location	Description	% Passing # 200 Sieve
HS-1 @ 20 feet	Silty Sand	24
HS-1 @ 30 feet	Silty Sand	19
HS-1 @ 40 feet	Clay	95
HS-1 @ 50 feet	Clay	87
HS-4 @ 1-5 feet	Sandy Clay	53

Laboratory Testing Procedures and Test Results

Atterberg Limits: The liquid and plastic limits ("Atterberg Limits") were determined in accordance with ASTM Test Method D4318 for engineering classification of fine-grained material and presented in the table below. The USCS soil classification indicated in the table below is based on the portion of sample passing the No. 40 sieve and may not necessarily be representative of the entire sample. The plot is provided in this Appendix.

Sample Location	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	USCS Soil Classification
HS-1, R-5 @ 30 ft	NP	NP	NP	NP
HS-1, R-6 @ 40 ft	48	26	22	CL
HS-2, SPT-1 @ 2.5 ft	40	16	24	CL
I-2, SPT-1 @ 2.5 ft	36	18	18	CL

Direct Shear: One direct shear test was performed on a remolded sample, which was soaked for a minimum of 24 hours prior to testing. The samples were tested under various normal loads using a motor-driven, strain-controlled, direct-shear testing apparatus (ASTM D3080). The plot is provided in this Appendix.

Consolidation: One consolidation test was performed per ASTM D2435. A sample (2.4 inches in diameter and 1 inch in height) was placed in a consolidometer and increasing loads were applied. The sample was allowed to consolidate under "double drainage" and total deformation for each loading step was recorded. The percent consolidation for each load step was recorded as the ration of the amount of vertical compression to the original sample height. The consolidation pressure curves are provided in this Appendix.

Maximum Density Tests: The maximum dry density and optimum moisture content of typical materials were determined in accordance with ASTM D1557. The results of these tests are presented in the table below:

Sample Location	Sample Description	Maximum Dry Density (pcf)	Optimum Moisture Content (%)
HS-4 @ 1-5 feet	Light Brown Sandy Clay	118.5	11.5

Laboratory Testing Procedures and Test Results

Chloride Content: Chloride content was tested in accordance with Caltrans Test Method (CTM) 422. The results are presented below.

Sample Location	Chloride Content, ppm
HS-4 @ 1-5 feet	260

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geochemical methods (CTM 417). The soluble sulfate content is used to determine the appropriate cement type and maximum water-cement ratios. The test results are presented in the table below.

Sample Location	Sulfate Content (ppm)	Sulfate Exposure Class *
HS-4 @ 1-5 feet	136	S0

*Based on ACI 318R-14, Table 19.3.1.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed in general accordance with CTM 643 and standard geochemical methods. The results are presented in the table below.

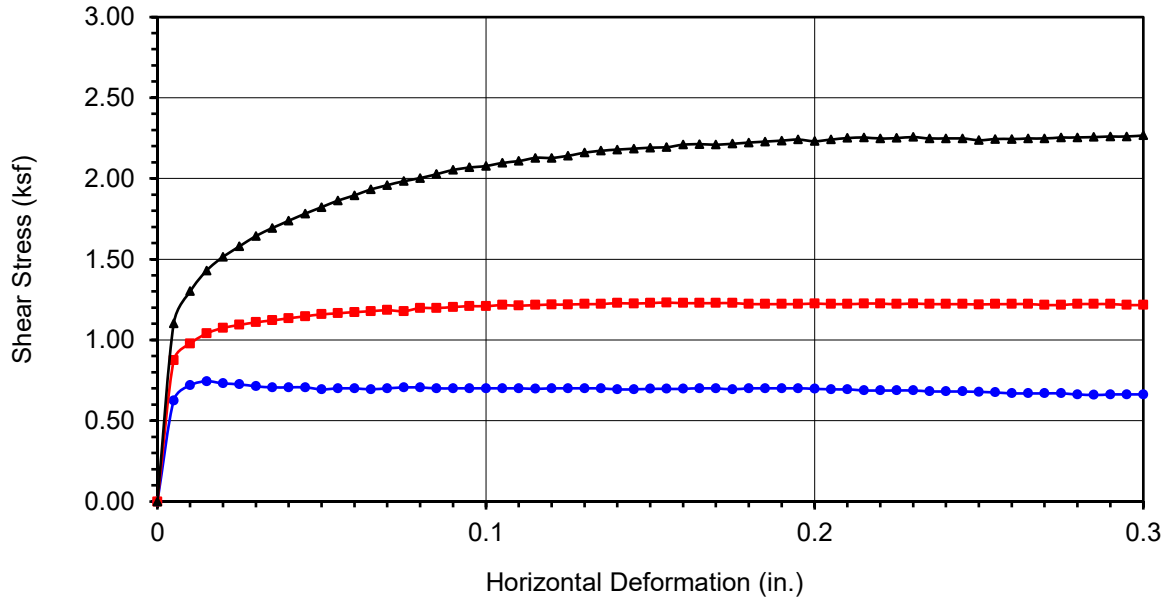
Sample Location	pH	Minimum Resistivity (ohms-cm)
HS-4 @ 1-5 feet	8.06	5000

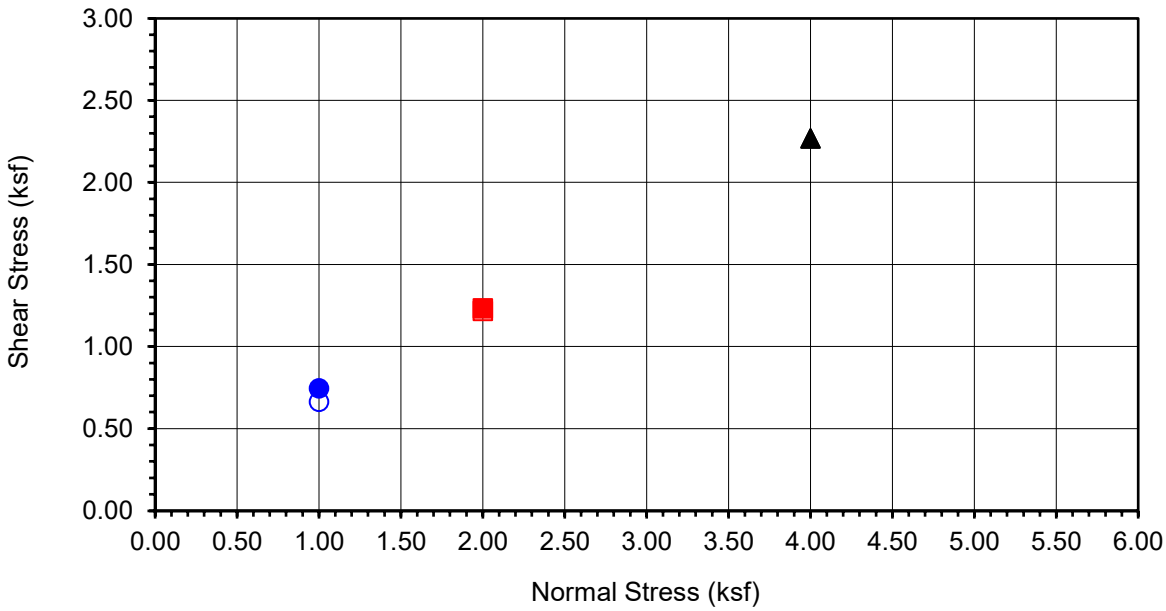
DIRECT SHEAR TEST

Consolidated Drained - ASTM D 3080

Project Name:	Lennar - Greenbriar Lane	Tested By:	G. Bathala	Date:	10/23/23
Project No.:	23169-01	Checked By:	J. Ward	Date:	10/30/23
Boring No.:	HS-4	Sample Type:	90% Remold		
Sample No.:	B-1	Depth (ft.):	1-5		
Soil Identification:	Light brown sandy lean clay s(CL)				

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	189.19	188.82	189.70
Weight of Ring(gm):	45.46	44.52	45.30
Before Shearing			
Weight of Wet Sample+Cont.(gm):	160.48	160.48	160.48
Weight of Dry Sample+Cont.(gm):	149.52	149.52	149.52
Weight of Container(gm):	55.48	55.48	55.48
Vertical Rdg.(in): Initial	0.0000	0.2541	0.2483
Vertical Rdg.(in): Final	0.0024	0.2535	0.2683
After Shearing			
Weight of Wet Sample+Cont.(gm):	215.18	205.82	205.80
Weight of Dry Sample+Cont.(gm):	190.32	182.80	184.64
Weight of Container(gm):	62.62	55.54	57.44
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**HS-4**
Sample No.	**B-1**
Depth (ft)	**1-5**

Sample Type:

90% Remold

Soil Identification:
Light brown sandy lean clay s(CL)

Normal Stress (kip/ft²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft²)	● 0.745	■ 1.232	▲ 2.267
Shear Stress @ End of Test (ksf)	○ 0.663	□ 1.217	△ 2.267
Deformation Rate (in./min.)	0.0017	0.0017	0.0017
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	11.65	11.65	11.65
Dry Density (pcf)	107.1	107.5	107.6
Saturation (%)	54.8	55.4	55.5
Soil Height Before Shearing (in.)	1.0024	1.0006	0.9800
Final Moisture Content (%)	19.5	18.1	16.6

DIRECT SHEAR TEST RESULTS

Consolidated Drained - ASTM D 3080

Project No.: 23169-01

Lennar - Greenbriar Lane

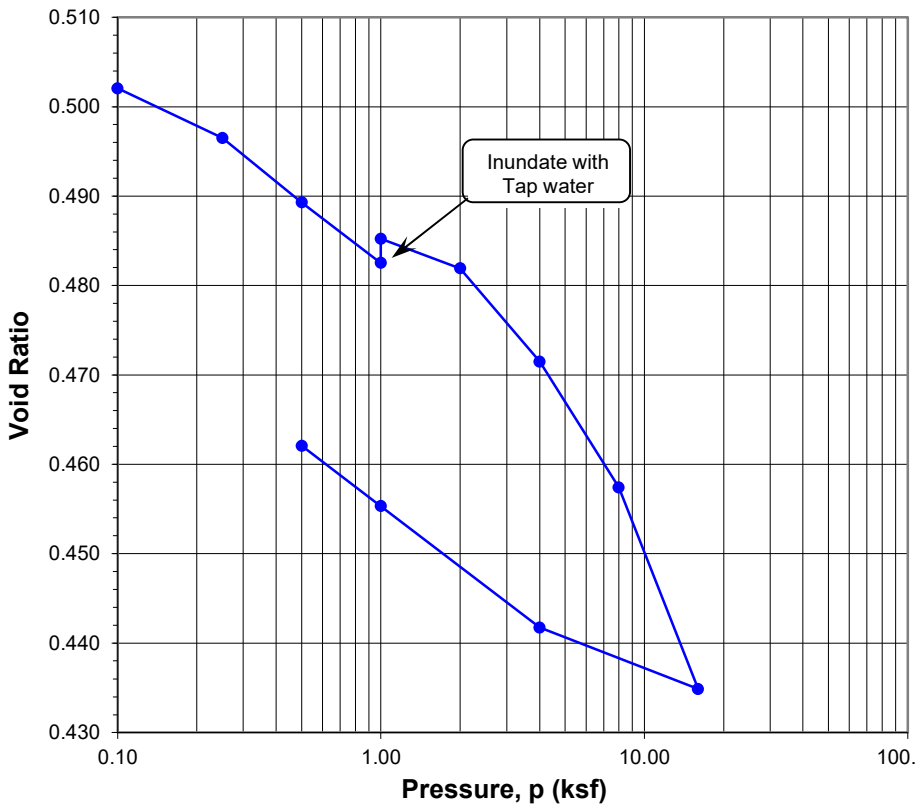
10-23

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS

ASTM D 2435

Project Name:	Lennar - Greenbriar Lane	Tested By:	GB/JD	Date:	10/19/23
Project No.:	23169-01	Checked By:	J. Ward	Date:	10/30/23
Boring No.:	HS-4	Depth (ft.):	5.0		
Sample No.:	R-1	Sample Type:	Ring		
Soil Identification:	Yellowish brown lean clay (CL)				

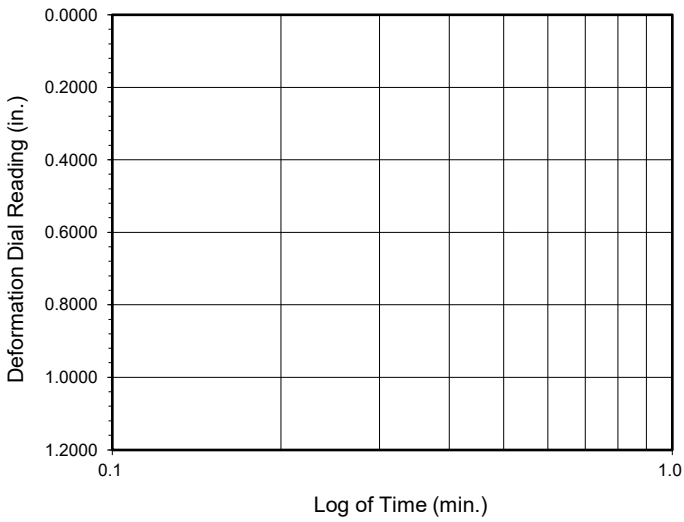
Sample Diameter (in.):	2.415
Sample Thickness (in.):	1.000
Weight of Sample + ring (g):	199.81
Weight of Ring (g):	44.98
Height after consol. (in.):	0.9729
Before Test	
Wt. of Wet Sample+Cont. (g):	229.65
Wt. of Dry Sample+Cont. (g):	208.82
Weight of Container (g):	68.09
Initial Moisture Content (%)	14.801
Initial Dry Density (pcf)	112.2
Initial Saturation (%):	79
Initial Vertical Reading (in.)	0.0714
After Test	
Wt. of Wet Sample+Cont. (g):	240.79
Wt. of Dry Sample+Cont. (g):	219.56
Weight of Container (g):	39.71
Final Moisture Content (%)	15.74
Final Dry Density (pcf):	115.3
Final Saturation (%):	92
Final Vertical Reading (in.)	0.1022
Specific Gravity (assumed):	2.70
Water Density (pcf):	62.43

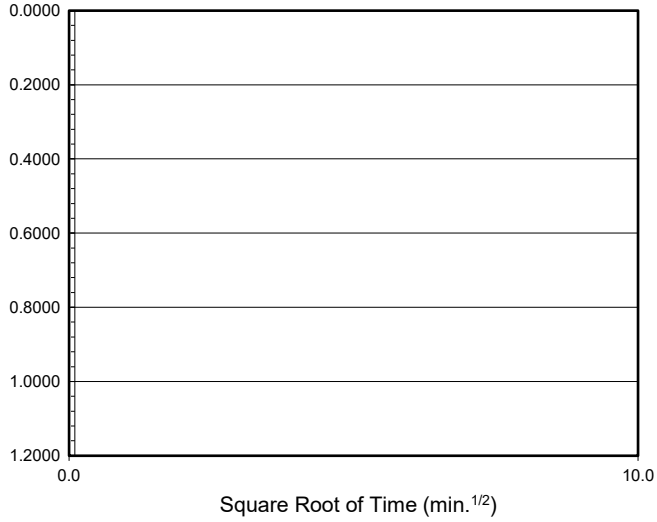


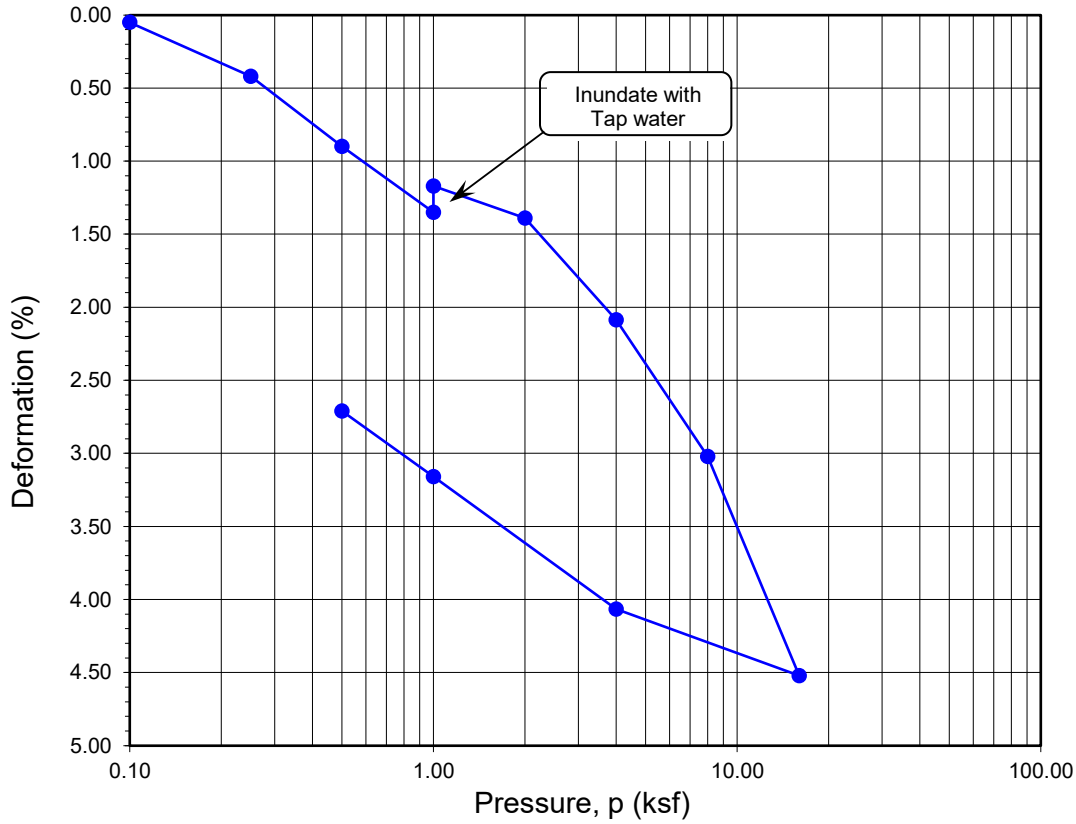
Pressure (p) (ksf)	Final Reading (in.)	Apparent Thickness (in.)	Load Compliance (%)	Deformation % of Sample Thickness	Void Ratio	Corrected Deforma-tion (%)
0.10	0.0719	0.9995	0.00	0.05	0.502	0.05
0.25	0.0760	0.9954	0.04	0.46	0.496	0.42
0.50	0.0813	0.9901	0.09	0.99	0.489	0.90
1.00	0.0865	0.9849	0.16	1.51	0.483	1.35
1.00	0.0847	0.9867	0.16	1.33	0.485	1.17
2.00	0.0877	0.9837	0.24	1.63	0.482	1.39
4.00	0.0956	0.9759	0.33	2.42	0.471	2.09
8.00	0.1061	0.9653	0.45	3.47	0.457	3.02
16.00	0.1223	0.9491	0.57	5.09	0.435	4.52
4.00	0.1168	0.9547	0.47	4.54	0.442	4.07
1.00	0.1070	0.9644	0.40	3.56	0.455	3.16
0.50	0.1022	0.9692	0.37	3.08	0.462	2.71

Time Readings				
Date	Time	Elapsed Time (min)	Square Root of Time	Dial Rdgs. (in.)

Time Readings







Boring No.	Sample No.	Depth (ft.)	Moisture Content (%)		Dry Density (pcf)		Void Ratio		Degree of Saturation (%)	
			Initial	Final	Initial	Final	Initial	Final	Initial	Final
HS-4	**R-1**	**5**	**14.8**	**15.7**	**112.2**	**115.3**	**0.503**	**0.462**	**79**	**92**

Soil Identification: Yellowish brown lean clay (CL)

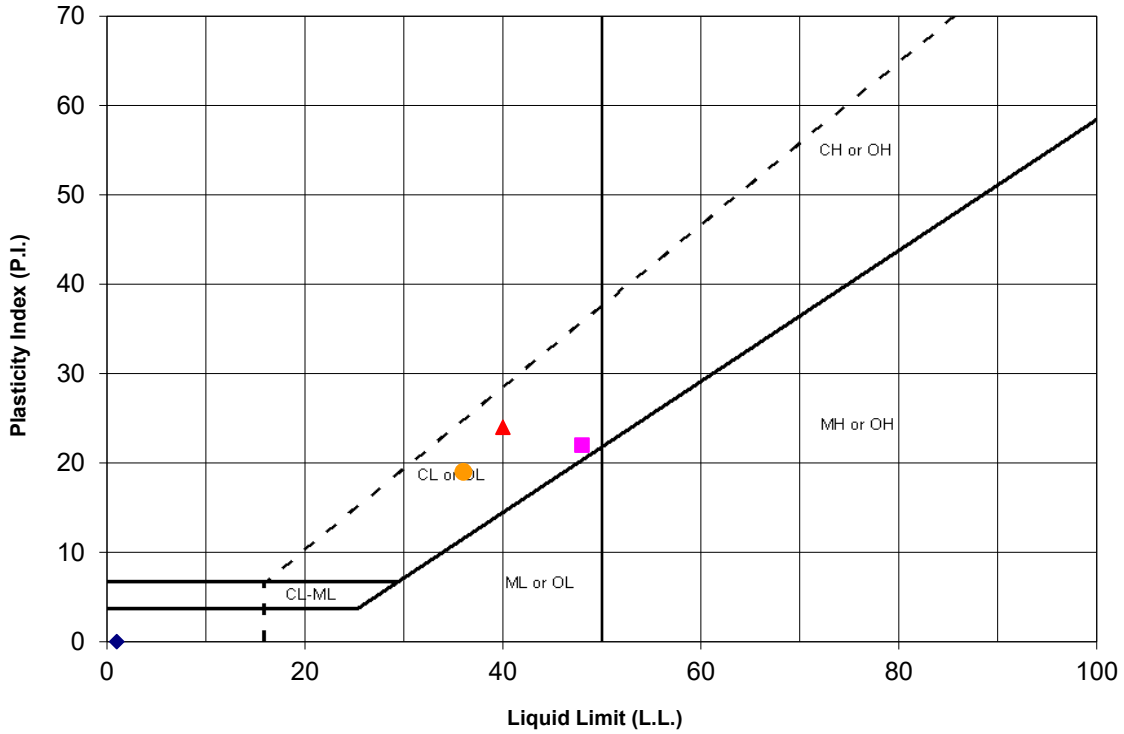
ONE-DIMENSIONAL CONSOLIDATION PROPERTIES of SOILS
ASTM D 2435

Project No.: 23169-01

Lennar - Greenbriar Lane

10-23

PLASTICITY CHART - CLASSIFICATION OF FINE-GRAINED SOILS



Symbol	Location.:	Sample No.:	Depth (ft)	Passing No. 200 Sieve (%)	Liquid Limit (%) LL	Plastic Limit (%) PL	Plasticity Index (%) PI	USCS
◆	HS-1	R-5	30'	19	NP	NP	NP	NP
■	HS-1	R-6	40'	95	48	26	22	CL
▲	HS-2	SPT-1	2.5'	-	40	16	24	CL
●	I-2	SPT-1	2.5'	-	36	18	18	CL

LGC Geotechnical, Inc.

ATTERBERG LIMITS
(ASTM D 4318)

Project Number: 23169-01
Date: Oct-23

Greenbriar Lane

Appendix D
Infiltration Testing Results

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Lennar - Greenbriar Lane
Project Number: 23169-01
Date: 10/12/2023
Boring Number: I-1

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Minimum test Head (D_o):

(What the sounder tape should read) Boring Depth - (5 x Boring Radius) 8.4 ft

(Shallow) The value on the sounder tape should be close to this value during testing for **DEEP** testing fill to 4 feet below top of hole

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:18	8:43	25.0	8.25	8.38	0.13	No
2	8:44	9:09	25.0	8.31	8.44	0.13	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Calculated Infiltration Rate(in/hr)
1	9:10	9:40	30.0	8.20	8.30	0.1	0.2
2	9:41	10:11	30.0	8.20	8.30	0.1	0.2
3	10:12	10:42	30.0	8.25	8.36	0.1	0.2
4	10:43	11:13	30.0	8.26	8.36	0.1	0.2
5	11:14	11:44	30.0	8.24	8.35	0.1	0.2
6	11:45	12:15	30.0	8.25	8.36	0.1	0.2
7	12:16	12:46	30.0	8.19	8.30	0.1	0.2
8	12:47	13:17	30.0	8.21	8.30	0.1	0.2
9	13:18	13:48	30.0	8.17	8.29	0.1	0.2
10	13:49	14:19	30.0	8.22	8.31	0.1	0.2
11	14:20	14:50	30.0	8.20	8.29	0.1	0.2
12	14:51	15:21	30.0	8.21	8.30	0.1	0.2

Calculated Infiltration Rate (No factors of safety)	**0.2**
Factor of Safety	**2.0**
Calculated Infiltration Rate (With Factor of Safety)	**0.1**

Sketch:

Notes:

Based on Guidelines from: Orange County 12/20/2013

Spreadsheet Revised on: 10/26/2016

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Lennar - Greenbriar Lane
Project Number: 23169-01
Date: 10/12/2023
Boring Number: I-2

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Minimum test Head (D_o):

(What the sounder tape should read) Boring Depth - (5 x Boring Radius) 8.4 ft

(Shallow) The value on the sounder tape should be close to this value during testing for **DEEP** testing fill to 4 feet below top of hole

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:21	8:46	25.0	7.98	8.21	0.23	No
2	8:47	9:12	25.0	7.91	8.13	0.22	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Calculated Infiltration Rate(in/hr)
1	9:13	9:43	30.0	7.84	8.03	0.2	0.3
2	9:44	10:14	30.0	7.82	8.00	0.2	0.3
3	10:15	10:45	30.0	7.87	8.06	0.2	0.3
4	10:46	11:16	30.0	7.98	8.13	0.2	0.3
5	11:17	11:47	30.0	7.92	8.05	0.1	0.2
6	11:48	12:18	30.0	7.86	8.01	0.1	0.3
7	12:19	12:49	30.0	7.74	7.90	0.2	0.3
8	12:50	13:20	30.0	7.90	8.04	0.1	0.3
9	13:21	13:51	30.0	7.92	8.06	0.1	0.3
10	13:52	14:22	30.0	7.87	8.00	0.1	0.2
11	14:23	14:53	30.0	7.89	8.02	0.1	0.2
12	14:54	15:24	30.0	7.93	8.06	0.1	0.2

Calculated Infiltration Rate (No factors of safety)	**0.2**
Factor of Safety	**2.0**
Calculated Infiltration Rate (With Factor of Safety)	**0.1**

Sketch:

Notes:

Based on Guidelines from: Orange County 12/20/2013

Spreadsheet Revised on: 10/26/2016

LGC Geotechnical, Inc.

Infiltration Test Data Sheet

LGC Geotechnical, Inc

131 Calle Iglesia Suite 200, San Clemente, CA 92672 tel. (949) 369-6141

Project Name: Lennar - Greenbriar Lane
Project Number: 23169-01
Date: 10/12/2023
Boring Number: I-3

Test hole dimensions (if circular)	
Boring Depth (feet)*:	10
Boring Diameter (inches):	8
Pipe Diameter (inches):	3

*measured at time of test

Test pit dimensions (if rectangular)	
Pit Depth (feet):	
Pit Length (feet):	
Pit Breadth (feet):	

Minimum test Head (D_o):

(What the sounder tape should read) Boring Depth - (5 x Boring Radius) 8.4 ft

(Shallow) The value on the sounder tape should be close to this value during testing for **DEEP** testing fill to 4 feet below top of hole

*Pre-Test (Sandy Soil Criteria)**

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval (min)	Initial Depth to Water (feet)	Final Depth to Water (feet)	Total Change in Water Level (feet)	Greater Than or Equal to 0.5 feet (yes/no)
1	8:25	8:50	25.0	7.32	7.46	0.14	No
2	8:51	9:16	25.0	7.28	7.39	0.11	No

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Otherwise, pre-soak (fill) overnight, and then obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25 inches

Main Test Data

Trial No.	Start Time (24:HR)	Stop Time (24:HR)	Time Interval, Δt (min)	Initial Depth to Water, D_o (feet)	Final Depth to Water, D_f (feet)	Change in Water Level, ΔD (feet)	Calculated Infiltration Rate(in/hr)
1	9:17	9:47	30.0	7.40	7.49	0.1	0.1
2	9:48	10:18	30.0	7.35	7.43	0.1	0.1
3	10:19	10:49	30.0	7.35	7.46	0.1	0.2
4	10:50	11:20	30.0	7.33	7.38	0.0	0.1
5	11:21	11:51	30.0	7.23	7.34	0.1	0.2
6	11:52	12:22	30.0	7.14	7.23	0.1	0.1
7	12:23	12:53	30.0	7.14	7.23	0.1	0.1
8	12:54	13:24	30.0	7.19	7.29	0.1	0.1
9	13:25	13:55	30.0	7.21	7.30	0.1	0.1
10	13:56	14:26	30.0	7.22	7.30	0.1	0.1
11	14:27	14:57	30.0	7.25	7.33	0.1	0.1
12	14:58	15:28	30.0	7.28	7.36	0.1	0.1
						Calculated Infiltration Rate (No factors of safety)	**0.1**
						Factor of Safety	**2.0**
						Calculated Infiltration Rate (With Factor of Safety)	**0.1**

Sketch:

Notes:

Based on Guidelines from: Orange County 12/20/2013

Spreadsheet Revised on: 10/26/2016

LGC Geotechnical, Inc.

Appendix E
General Earthwork and Grading Specifications

General Earthwork and Grading Specifications for Rough Grading

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ a qualified Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultant shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to confirm that the attained level of compaction is being accomplished as specified. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the project plans and specifications. The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of “equipment” of work and the estimated quantities of daily earthwork

contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the
Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate personnel will be available for observation and testing. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified. It is the contractor's sole responsibility to provide proper fill compaction.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed. The contractor is responsible for all hazardous waste relating to his work. The Geotechnical Consultant does not have expertise in this area. If hazardous waste is a concern, then the Client should acquire the services of a qualified environmental assessor.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be over-excavated as specified in the following section. Scarification shall continue until soils are broken down and free of oversize material and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Over-excavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of the geotechnical consultant. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 ***Frequency of Compaction Testing***

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 ***Compaction Test Locations***

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than
5 feet apart from potential test locations shall be provided.

5.0 ***Subdrain Installation***

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 ***Excavation***

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 ***Trench Backfills***

7.1 The Contractor shall follow all OHSA and Cal/OSHA requirements for safety of trench excavations.

7.2 All bedding and backfill of utility trenches shall be done in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over

the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of maximum from 1 foot above the top of the conduit to the surface.

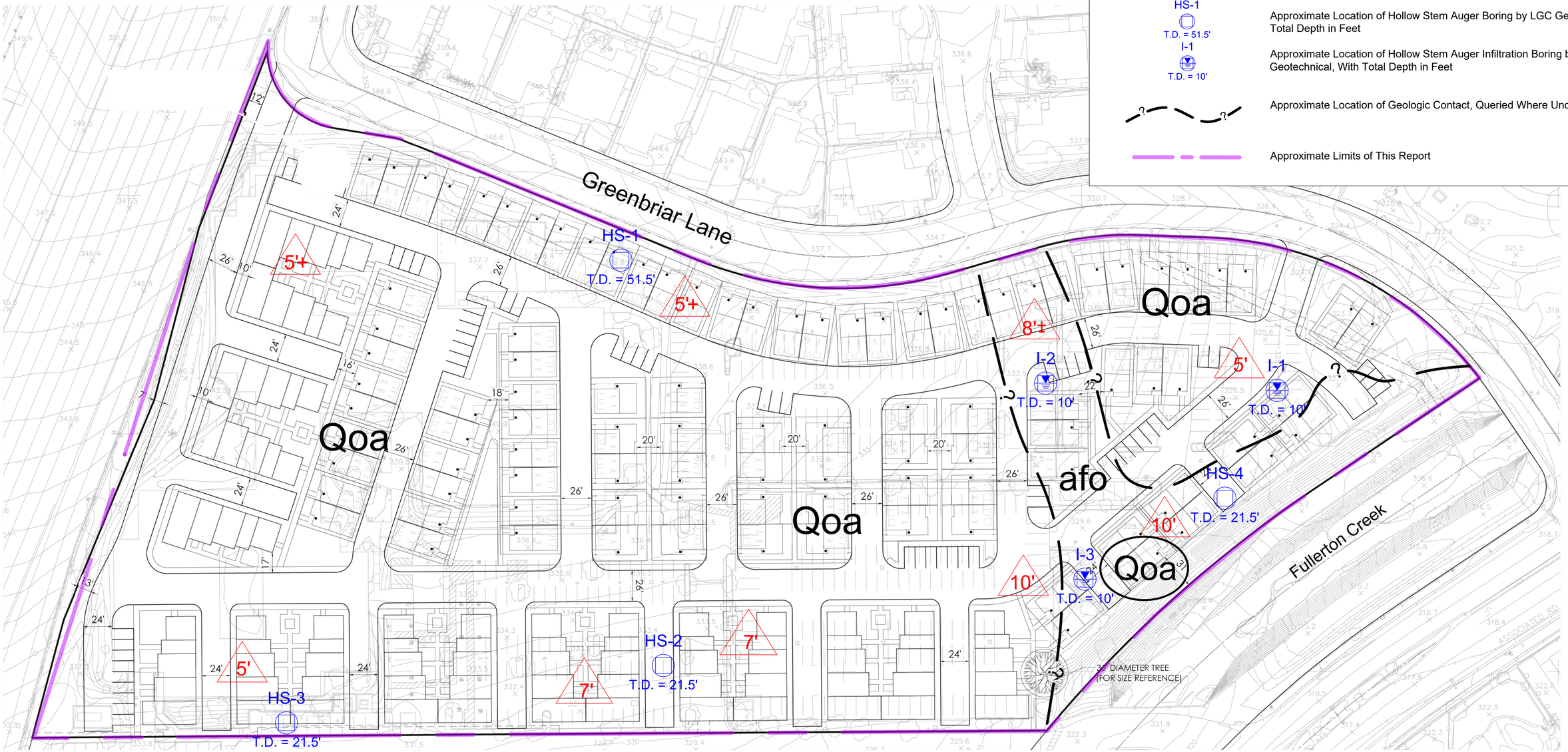
7.3 The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

7.4 The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

7.5 Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

LEGEND

afo	Artificial Fill Placed by Others
Qoa	Quaternary Older Alluvium, Circled Where Buried
10'	Estimated Remedial Grading Depth in Feet
HS-1 T.D. = 51.5'	Approximate Location of Hollow Stem Auger Boring by LGC Geotechnical, With Total Depth in Feet
I-1 T.D. = 10'	Approximate Location of Hollow Stem Auger Infiltration Boring by LGC Geotechnical, With Total Depth in Feet
?	Approximate Location of Geologic Contact, Queried Where Uncertain
	Approximate Limits of This Report



*Conceptual Plan by Hunsaker, 2023

SCALE: 1"=40'

40' 0 40' 80'

LGC Geotechnical, Inc.

LGC Geotechnical, Inc.
131 Calle Iglesia, Ste. 200
San Clemente, CA 92672
TEL (949) 369-6141 FAX (949) 369-6142

Sheet 1
Geotechnical Map

PROJECT NAME	Lennar - Greenbriar, Brea	
PROJECT NO.	23169-01	
ENG. / GEOL.	RLD/KTM	**SHEET 1**
SCALE	1" = 40'	
DATE	November 2023	

Attachment E – City Plan Check Correspondence

MEMORANDUM

TO: **Rebecca Pennington, Senior Planner**

FROM: Ryan Chapman, PE, Acting City Engineer

DATE: February 24, 2025

SUBJECT: **1700 Greenbriar Lane (PLN-2024-00020)**
3rd Review Comments – Entitlement Submittal

The Public Works Department has reviewed the provided submittal and has comments as noted below. Please note that additional comments may be provided upon review of subsequent submittal documents and technical studies. **Applicant shall provide a comment response letter upon resubmittal**.

Tentative Tract Map Comments

1) Upon resubmittal, address all comments included within the redlined Tentative Tract Map provided as attached herein.

Preliminary Water Quality Management Plan (P-WQMP) Comments

2) Upon resubmittal, revise the provided P-WQMP to address all comments as provided in the attached Water Quality Plan Checklist. OK

3) Upon resubmittal, the applicant shall complete the BMP Maintenance Self-Certification Form and incorporate this document into the P-WQMP. Note that a Word Document version of this document has been provided to aid in the completion of the document. Ok.

4) Upon resubmittal, the provided P-WQMP shall be revised to update all references to Vesting Tentative Tract Map No. XXXXX, to identify the VTTM No. that is assigned by the Orange County Surveyor's Office. Refer to comments to the Tentative Tract Map for reference. OK

5) Upon resubmittal, the provided P-WQMP shall be signed and stamped by the registered Civil Engineer in responsible charge of the preparation of the document.
OK

END

Water Quality Management Plan Checklist

City of Brea

The purpose of this checklist is to provide a format for uniform, comprehensive, and well-documented reviews of the Water Quality Management Plans (WQMPs) submitted by project applicants. The completed checklist should be transmitted to the project applicant with the project WQMP. A copy of the completed checklist should be retained with the project planning/permitting file. Upon acceptance of the project's Final WQMP, the property owner shall record a "Covenant and Agreement" with the County-Clerk Recorder or other instrument acceptable to the City to inform future property owners of the requirement to implement the approved project-specific WQMP. The recordation must be incorporated into the WQMP as an appendix prior to final approval.

WQMP (select one): ☒ Preliminary ☐ Final

City Planning Project Number (CD #): PLN-2024-00020

Project Name: Greenbriar

Project Address: West of Greenbriar Lane and South Associated Road, City of Brea, CA

First Review

WQMP Received on: 4/9/2024

Review Completed on: 4/19/2024

Second Review

WQMP Received on: 8/8/2024

Review Completed on: 8/19/2024

Third Review

WQMP Received on: 2/13/2025

Review Completed on: 2/18/2025

Signature of Reviewer: Serena Ausili Date: 2/18/2025

REQUIRED FOR ALL SUBMITTALS AND RESUBMITTALS:
Submit an electronic copy to building@cityofbrea.gov.
Electronic submittals must be original-quality PDFs submitted as an attachment (**Max 10MB**) or through a file transfer service. *Scans of hard copies will not be accepted*.

FINAL APPROVAL PROCESS, submitted to City Hall At 1 Civic Center Circle, Brea CA 92821, attention Brian Ingallinera, Environmental Services or electronic documentation - sent via file transfer service to briani@cityofbrea.gov **AS PRESCRIBED BELOW:**

- One hard bound copy of approved WQMP that contains tabs/labels for each section
- Electronic submittals (PDF format) of the following documents:
    - Fully approved WQMP
    - Exhibit & Details of BMPs
    - City of Brea-Specific WQMP Summary Report
    - Section V Inspection & Maintenance

Prior to the field verification process from Environmental Services to obtain any form of occupancy the following items must be submitted/completed:

- Electronic copies (PDF format) of the Self-Certification from the State Licensed Professional Engineer that prepared the WQMP or Third-Party Certifications are required of all BMPs are constructed per the approved plan and in working condition as prescribed by the manufacturer- sent via file transfer service to briani@cityofbrea.gov
- All BMPs are accessible to conduct visual inspection and take photos
- All BMPs are clean and in working condition as prescribed by the manufacturer

Prior to sign off from Environmental Services to obtain the final Certificate of Occupancy the following items must be completed:

- Electronic copy (PDF format) of the recorded documents - sent via file transfer service to briani@cityofbrea.gov
    - Title Page
    - Signed Owner's Certification Page
    - Signed Engineer's Certification Page
    - The City of Brea-Specific WQMP Summary Report
    - Exhibit & Details of BMPs
    - Section V Inspection & Maintenance

One hard copy will be returned to the owner upon City-stamped approval. Grading Permit will be approved upon submittal of the hard copy WQMPs. An electronic copy (PDF) is also required.

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Title Page	☒		
Name of project			☒
Application and/or Tract Number Provided Repeat Comment (2nd Request): Include.		☒	
Lot number(s) if site is a portion of a Tract.			☒
Site address (or addresses) and planning area number	☒		
Owner/Developer name	☒		
Owner/Developer address & telephone number	☒		
Consulting/Engineering firm that prepared WQMP	☒		
Consulting/Engineering firm address & phone number	☒		
Date WQMP was prepared/revised	☒		
Owner's Certification			
A signed certification statement, in which the project owner acknowledges and accepts the provisions of the WQMP, follows the title page.			☒
Table of Contents			
A Table of Contents, including a list of all figures and attachments is included.	☒		
Section 1.0, Permit Numbers and Conditions of Approval			
Lists the Discretionary Permit(s).			☒
The lot & tract/parcel map number describing the subject property.			☒
Lists, verbatim, the Water Quality Conditions, including condition requiring preparation of WQMP, if applicable.	☒		
Provides applicable conditions from watershed-based plans including WIHMPs and TMDLs.	☒		
Final Resolution of Approval, Conditional Use Permit, etc. is included as an Attachment to the WQMP.			☒
Section 2.0, Project Description			
For All Projects:			
Identifies planning area or community name.	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Does the project description completely and accurately describe where facilities will be located, what activities will be conducted and where on the site, what kinds of materials and products will be used, how and where materials will be received and stored, and what kinds of wastes will be generated?	☒		
Describes all paved areas, including the type of parking areas.	☒		
Describes all landscaped areas.	☒		
Describes ownership of all portions of project and site. – Will any infrastructure transfer to public agencies (City, County, Caltrans, etc.)? – Will a homeowners or property owners association will be formed? – Will the association be involved in long term maintenance?	☒		
Identifies the potential stormwater or urban runoff pollutants reasonably expected to be associated with the project.	☒		
Identifies potential HCOCs.	☒		
Identifies post development drainage characteristics.	☒		
For Commercial and Industrial Projects:			☒
– Provides Standard Industrial Classification (SIC) Code which best describes the facilities operations?			☒
– Describes the type of use (or uses) for each building or tenant space			☒
– Does project include food preparation, cooking, and eating areas (specify location and type of area)			☒
– Describes delivery areas and loading docks (specify location and design and if below grade and types of materials expected to be stored			☒
– Describes outdoor materials storage areas (describe and depict location(s), specify type(s) of materials expected to be stored)			☒
– Describes activities that will be routinely conducted outdoors			☒
– Describes any activities associated with equipment or vehicle maintenance and repair, including washing or cleaning. Indicates number of service bays or number of fueling islands/fuel pumps, if applicable.			☒
Residential Projects	☒		
– Range of lot and home sizes;	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
– Describes all community facilities such as, laundry, car wash, swimming pools, jacuzzi, parks, open spaces, tot lots, etc.	☒		
Section 3.0, Site Description			
Describes project area and surrounding planning areas in sufficient detail to allow project location to be plotted on a base map.	☒		
Provides site address and site size to nearest tenth acre.	☒		
Identifies the zoning or land use designation.	☒		
Identifies soil types and the quantity and percentage of pervious and impervious surface for pre-project and project conditions.	☒		
Describes pre-project site drainage and how it ties into drainage of surrounding or adjacent areas and describes how planned project drainage and how it will tie into drainage of surrounding or adjacent areas.	☒		
Identifies the watershed in which the project is located and the : – downstream receiving waters – known water quality impairments as included in the 303(d) List – applicable Total Maximum Daily Loads (TMDLs) – hydrologic conditions of concern, if any.	☒		
Identifies known Environmentally Sensitive Areas (ESAs) and Areas of Special Biological Significance (ASBSs) within the vicinity and their proximity to the project.	☒		
Section 4.0, Best Management Practices			
Includes applicable performance criteria for the following: hydromodification control, LID criteria, and treatment control BMPs.	☒		
Do on-site BMPs include full capture certification or does a separate BMP address the full capture of trash (Connector Pipe Screen, Catch Basin Screen, or equivalent)?	☒		
Includes narrative describing how site design concepts were considered and incorporated into project plans.	☒		
Lists and describes all Routine Source Control BMPs (Non-structural and Structural).	☒		
Describes the implementation frequency and identifies the entity or party responsible for implementation of each Non-Structural BMP.	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
If applicable Routine Source Control BMPs were not included, was a reasonable explanation provided?	☒		
Lists and describes appropriate Treatment Control BMPs and identifies the design basis (SQDF or SQDV) for the Treatment Control BMPs.	☒		
For Routine Non-Structural BMPs N1 (Education for Property Owners, Tenants, and Occupants) and N12 (Employee Training), does the WQMP describe the concepts that will be addressed by the education and training? Is a list of educational materials that will be used provided? Are copies of the educational materials included in an Attachment to the WQMP?	☒		
Lists and describes appropriate LID and Hydromodification BMPs and identifies the design basis (SQDF or SQDV) for the LID BMPs. Include the rational method calculations for the 2-year storm event in Attachment C - Hydromodification Analysis in the Final WQMP. OK. Will be provided in FWQMP/final engineering as requested.		☒	
Describes any regional/sub-regional BMPs that will be utilized (NOC).			☒
Lists and appropriately calculates any Credits that the Project may qualify for.			☒
Lists and describes alternative compliance measures (Treatment Control BMPs, regional programs, Urban Runoff Fund/Mitigation Program participation described if LID BMPs do not fulfill LID and Hydromodification requirements.			☒
If applicable, Waiver Request and proof of submittal to the Regional Board Executive Officer included.			☒
Section 5.0, Inspection and Maintenance Responsibility for BMPs			
Identifies the entity (or entities) responsible for the long-term inspection and maintenance of all structural source control BMPs and all Treatment Control BMPs, including name, title, company, address, and phone number.	☒		
Describes the minimum frequency for inspection and maintenance to ensure the effectiveness of each structural source control BMP and each Treatment Control BMP.	☒		
If ownership of the Treatment Control BMPs will be transferred to a public agency, does the WQMP include an Attachment indicating the public agency's intent to accept the Treatment Control BMPs as designed?			☒

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Is an appropriate mechanism for the long-term operation and maintenance, including funding, in place?	☒		
Section 6.0, Location Map and Plot Plan			
Has an 11" by 17" plot plan been included?	☒		
Do all figures, maps, plot plans, etc. have a legend, including a North arrow and scale?	☒		
Are all facilities labeled for the intended function?	☒		
Are all areas of outdoor activity labeled?			☒
Are all structural BMPs indicated (including GIS coordinates for LID BMPs in decimal degrees)? Provide a BMP Summary Table that includes all BMPs that will be inspected (MWS, catch basin inserts/stencils, and water quality diversion structure). Assign an identification number to each BMP with a callout on the plan view. Provide GPS coordinates for each feature. Table provided as requested.		☒	
Is drainage flow information, including general surface flow lines, concrete or other surface ditches or channels, as well as storm drain facilities such as catch basins and underground storm drain pipes depicted?	☒		
Depicts where and how on-site drainage ties into the off-site drainage system.	☒		
All BMPs proposed/shown on the WQMP exhibit are reflected in the Grading Plans.	☒		
The following self-certification statement is provided on the WQMP exhibit: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea.	☒		
Other			

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Grading Plans have been provided and include the following statement in the construction notes of the Grading Plans: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea. Include.		☒	
City of Brea "Project Specific WQMP Summary Report" form and Project WQMP Summary Exhibit included? The BMP Summary Table on the WQMP Summary Report should also include all catch basin inserts/stencils and the water quality diversion structure with the respective identifying number that matches the WQMP Exhibit. Include in appendix in future submittals. Ok. Provided as requested.		☒	
Has an electronic copy (i.e. PDF) of the WQMP been provided? A scan of the hard copy WQMP is not acceptable. The PDF shall be created from the original electronic source files to minimize file size, provide better quality, and allow for keyword search. The PDF copy shall be submitted via email or via a file transfer service to both hwen@fuscoe.com and briani@cityofbrea.net	☒		
Is an Appendix for County recordation of the WQMP included? Recordation of Title Page, Owner Certification Page, Engineer Certification Page, and City of Brea WQMP Summary Page must be recorded before approval can be issued.			☒
Has an Appendix been provided for WQMP-related correspondence been provided? Please include email pertaining to the WQMP, previous plan check comments, or any specific instructions from plan checkers or City staff • For Final WQMP submittals, the stamped cover page of the approved Preliminary WQMP must be included in this Appendix.	☒		
Is the BMP Maintenance Self-Certification Form included in the Appendix? Include. Provied as requested.		☒	
Are the WQMP plan check checklists from previous rounds of reviews included in the Appendix with WQMP Summary?			☒

Water Quality Management Plan Checklist

City of Brea

The purpose of this checklist is to provide a format for uniform, comprehensive, and well-documented reviews of the Water Quality Management Plans (WQMPs) submitted by project applicants. The completed checklist should be transmitted to the project applicant with the project WQMP. A copy of the completed checklist should be retained with the project planning/permitting file. Upon acceptance of the project's Final WQMP, the property owner shall record a "Covenant and Agreement" with the County-Clerk Recorder or other instrument acceptable to the City to inform future property owners of the requirement to implement the approved project-specific WQMP. The recordation must be incorporated into the WQMP as an appendix prior to final approval.

WQMP (select one): ☒ Preliminary ☐ Final

City Planning Project Number (CD #): PLN-2024-00020

Project Name: Greenbriar

Project Address: West of Greenbriar Lane and South Associated Road, City of Brea, CA

First Review

WQMP Received on: 4/9/2024

Review Completed on: 4/19/2024

Second Review

WQMP Received on: 8/8/2024

Review Completed on: 8/19/2024

Third Review

WQMP Received on: _____

Review Completed on: _____

Signature of Reviewer: _____ Date: _____

REQUIRED FOR ALL SUBMITTALS AND RESUBMITTALS:
Submit an electronic copy to building@cityofbrea.net
Electronic submittals must be original-quality PDFs submitted as an attachment* (Max 10MB) or through a file transfer service. *Scans of hard copies will not be accepted*.

FINAL APPROVAL PROCESS, submitted to City Hall At 1 Civic Center Circle, Brea Ca 92821, attention Brian Ingallinera, Environmental Services or electronic documentation - sent via file transfer service to Briani@cityofbrea.net AS PRESCRIBED BELOW:

- One hard bound copy of approved WQMP that contains tabs/labels for each section
- Electronic submittals (PDF format) of the following documents -Labeled as indicated below
- Full approved WQMP
- Exhibit Sheet(s) & Detail Sheets for each bmp
- City of Brea-Project Specific WQMP Summary Report
- Section V-Inspection & Maintenance

Prior to the field verification process from Environmental Services the following items must be submitted/completed:

- Electronic copies (PDF format) of the Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed - Sent via file transfer service to Briani@cityofbrea.net
- Electronic copy (PDF format) of the recorded documents - Sent via file transfer service to Briani@cityofbrea.net
    - Title Page
    - Signed Owners Certification Page
    - Engineers Certification Page
    - The City of Brea-Specific WQMP Summary Report
    - Exhibit & Details of BMPs
    - Section V-Inspection & Maintenance

Prior to sign off from Environmental Services to obtain the Certificate of Occupancy the following items must be completed:

- All BMP's are accessible to conduct visual inspection and take photos
- All the BMP's are clean and in working condition as prescribed by the manufacturer

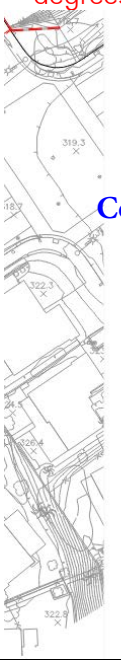
One hard copy will be returned to the owner upon City-stamped approval. Grading Permit will be approved upon submittal of the hard copy WQMPs. An electronic copy (PDF) is also required. Electronic submittals must be original-quality PDFs submitted as an attachment* (Max 10MB) or through a file transfer service. *Scans of hard copies will not be accepted*.

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Title Page	☒		
Name of project			☒
Application and/or Tract Number Include. **Awaiting VTTM number. PLN numer provided.**		☒	
Lot number(s) if site is a portion of a Tract.			☒
Site address (or addresses) and planning area number	☒		
Owner/Developer name	☒		
Owner/Developer address & telephone number	☒		
Consulting/Engineering firm that prepared WQMP	☒		
Consulting/Engineering firm address & phone number	☒		
Date WQMP was prepared/revised	☒		
Owner's Certification			
A signed certification statement, in which the project owner acknowledges and accepts the provisions of the WQMP, follows the title page. Provide owner's signature. **Will be provided prior to approval of PWQMP, once confirmation that no more changes are needed to PWQMP.**		☒	
Table of Contents			
A Table of Contents, including a list of all figures and attachments is included.	☒		
Section 1.0, Permit Numbers and Conditions of Approval			
Lists the Discretionary Permit(s).			☒
The lot & tract/parcel map number describing the subject property. Include. **Still waiting for VTTM assignment from City**		☒	
Lists, verbatim, the Water Quality Conditions, including condition requiring preparation of WQMP, if applicable.	☒		
Provides applicable conditions from watershed-based plans including WIHMPs and TMDLs.	☒		
Final Resolution of Approval, Conditional Use Permit, etc. is included as an Attachment to the WQMP.			☒
Section 2.0, Project Description			
For All Projects:			
Identifies planning area or community name.	☒		
Does the project description completely and accurately describe where facilities will be located, what activities will be conducted and where on the site, what kinds of materials and products will be used, how and where materials will be received and stored, and what kinds of wastes will be generated?	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes all paved areas, including the type of parking areas.	☒		
Describes all landscaped areas.	☒		
Describes ownership of all portions of project and site. – Will any infrastructure transfer to public agencies (City, County, Caltrans, etc.)? – Will a homeowners or property owners association will be formed? – Will the association be involved in long term maintenance?	☒		
Identifies the potential stormwater or urban runoff pollutants reasonably expected to be associated with the project.	☒		
Identifies potential HCOCs.	☒		
Identifies post development drainage characteristics.	☒		
For Commercial and Industrial Projects:			☒
– Provides Standard Industrial Classification (SIC) Code which best describes the facilities operations?			☒
– Describes the type of use (or uses) for each building or tenant space			☒
– Does project include food preparation, cooking, and eating areas (specify location and type of area)			☒
– Describes delivery areas and loading docks (specify location and design and if below grade and types of materials expected to be stored			☒
– Describes outdoor materials storage areas (describe and depict location(s), specify type(s) of materials expected to be stored)			☒
– Describes activities that will be routinely conducted outdoors			☒
– Describes any activities associated with equipment or vehicle maintenance and repair, including washing or cleaning. Indicates number of service bays or number of fueling islands/fuel pumps, if applicable.			☒
Residential Projects	☒		
– Range of lot and home sizes;	☒		
– Describes all community facilities such as, laundry, car wash, swimming pools, jacuzzi, parks, open spaces, tot lots, etc.	☒		
Section 3.0, Site Description			
Describes project area and surrounding planning areas in sufficient detail to allow project location to be plotted on a base map.	☒		
Provides site address and site size to nearest tenth acre.	☒		
Identifies the zoning or land use designation.	☒		
Identifies soil types and the quantity and percentage of pervious and impervious surface for pre-project and project conditions.	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes pre-project site drainage and how it ties into drainage of surrounding or adjacent areas and describes how planned project drainage and how it will tie into drainage of surrounding or adjacent areas.	☒		
Identifies the watershed in which the project is located and the : – downstream receiving waters – known water quality impairments as included in the 303(d) List – applicable Total Maximum Daily Loads (TMDLs) – hydrologic conditions of concern, if any.	☒		
Identifies known Environmentally Sensitive Areas (ESAs) and Areas of Special Biological Significance (ASBSs) within the vicinity and their proximity to the project.	☒		
Section 4.0, Best Management Practices			
Includes applicable performance criteria for the following: hydromodification control, LID criteria, and treatment control BMPs.	☒		
Do on-site BMPs include full capture certification or does a separate BMP address the full capture of trash (Connector Pipe Screen, Catch Basin Screen, or equivalent)?	☒		
Includes narrative describing how site design concepts were considered and incorporated into project plans.	☒		
Lists and describes all Routine Source Control BMPs (Non-structural and Structural).	☒		
Describes the implementation frequency and identifies the entity or party responsible for implementation of each Non-Structural BMP.	☒		
If applicable Routine Source Control BMPs were not included, was a reasonable explanation provided?	☒		
Lists and describes appropriate Treatment Control BMPs and identifies the design basis (SQDF or SQDV) for the Treatment Control BMPs.	☒		
For Routine Non-Structural BMPs N1 (Education for Property Owners, Tenants, and Occupants) and N12 (Employee Training), does the WQMP describe the concepts that will be addressed by the education and training? Is a list of educational materials that will be used provided? Are copies of the educational materials included in an Attachment to the WQMP?	☒		
Lists and describes appropriate LID and Hydromodification BMPs and identifies the design basis (SQDF or SQDV) for the LID BMPs. Repeat Comment (2nd Request): In Worksheet D, the Q design calculation appears to be incorrect and is inconsistent with the report (0.22 cfs in Worksheet D and 1.56 cfs elsewhere).	**Comment addressed. Value revised.**	☒	
Describes any regional/sub-regional BMPs that will be utilized (NOC).			☒

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Lists and appropriately calculates any Credits that the Project may qualify for.			☒
Lists and describes alternative compliance measures (Treatment Control BMPs, regional programs, Urban Runoff Fund/Mitigation Program participation described if LID BMPs do not fulfill LID and Hydromodification requirements.			☒
If applicable, Waiver Request and proof of submittal to the Regional Board Executive Officer included.			☒
Section 5.0, Inspection and Maintenance Responsibility for BMPs			
Identifies the entity (or entities) responsible for the long-term inspection and maintenance of all structural source control BMPs and all Treatment Control BMPs, including name, title, company, address, and phone number.	☒		
Describes the minimum frequency for inspection and maintenance to ensure the effectiveness of each structural source control BMP and each Treatment Control BMP.	☒		
If ownership of the Treatment Control BMPs will be transferred to a public agency, does the WQMP include an Attachment indicating the public agency's intent to accept the Treatment Control BMPs as designed?			☒
Is an appropriate mechanism for the long-term operation and maintenance, including funding, in place?	☒		
Section 6.0, Location Map and Plot Plan			
Has an 11" by 17" plot plan been included?	☒		
Do all figures, maps, plot plans, etc. have a legend, including a North arrow and scale?	☒		
Are all facilities labeled for the intended function?	☒		
Are all areas of outdoor activity labeled?			☒

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Are all structural BMPs indicated (including GIS coordinates for LID BMPs in decimal degrees)? Repeat Comment (2nd Request): Provide a BMP summary table identifying each BMP (MWS #1, MWS #2, etc.), GIS coordinates in decimal degrees, and BMP details/size.  BIO–7 PROPRIETARY BIOTREATMENT TYPICAL SECTION DETAIL (MWS UNIT SHOWN) N.T.S. DMA SUMMARY **Comment addressed. Table included with requested information** PRELIMINARY WATER QUALITY MANAGEMENT PLAN		☒	
Is drainage flow information, including general surface flow lines, concrete or other surface ditches or channels, as well as storm drain facilities such as catch basins and underground storm drain pipes depicted?	☒		
Depicts where and how on-site drainage ties into the off-site drainage system.	☒		
All BMPs proposed/shown on the WQMP exhibit are reflected in the Grading Plans.	☒		
The following self-certification statement is provided on the WQMP exhibit: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea. Repeat Comment (2nd Request): Include. **Statement included in bottom right of BMP Site Plan**		☒	
Other			

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Grading Plans have been provided and include the following statement in the construction notes of the Grading Plans: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea. Include. **This will be included in the grading plan (future submittal).**		☒	
City of Brea "Project Specific WQMP Summary Report" form and Project WQMP Summary Exhibit included? Include in report. **Provided in front of PWQMP report.**		☒	
Has an electronic copy (i.e. PDF) of the WQMP been provided? A scan of the hard copy WQMP is not acceptable. The PDF shall be created from the original electronic source files to minimize file size, provide better quality, and allow for keyword search. The PDF copy shall be submitted via email or via a file transfer service to both hwen@fuscoe.com and briani@cityofbrea.net	☒		
Is an Appendix for County recordation of the WQMP included? Recordation of Title Page, Owner Certification Page, Engineer Certification Page, and City of Brea WQMP Summary Page must be recorded before approval can be issued.			☒
Has an Appendix been provided for WQMP-related correspondence been provided? Please include email pertaining to the WQMP, previous plan check comments, or any specific instructions from plan checkers or City staff • For Final WQMP submittals, the stamped cover page of the approved Preliminary WQMP must be included in this Appendix.	☒		
Is the BMP Maintenance Self-Certification Form included in the Appendix? Include.		☒	
Are the WQMP plan check checklists from previous rounds of reviews included in the Appendix with WQMP Summary?			☒

Please provided requested form. Could not find on City's website. Also, shouldn't this be part of O&M Plan required for Final WQMP.

Water Quality Management Plan Checklist

City of Brea

The purpose of this checklist is to provide a format for uniform, comprehensive, and well-documented reviews of the Water Quality Management Plans (WQMPs) submitted by project applicants. The completed checklist should be transmitted to the project applicant with the project WQMP. A copy of the completed checklist should be retained with the project planning/permitting file. Upon acceptance of the project's Final WQMP, the property owner shall record a "Covenant and Agreement" with the County-Clerk Recorder or other instrument acceptable to the City to inform future property owners of the requirement to implement the approved project-specific WQMP. The recordation must be incorporated into the WQMP as an appendix prior to final approval.

WQMP (select one): ☒ Preliminary ☐ Final

City Planning Project Number (CD #): TBD

Project Name: Greenbriar

Project Address: West of Greenbriar Lane and South Associated Road, City of Brea, CA

First Review

WQMP Received on: 04/09/2024

Review Completed on: 04/19/2024

Second Review

WQMP Received on: _____

Review Completed on: _____

Third Review

WQMP Received on: _____

Review Completed on: _____

Signature of Reviewer: _____ Date: _____

REQUIRED FOR ALL SUBMITTALS AND RESUBMITTALS:
Submit an electronic copy to building@cityofbrea.net
Electronic submittals must be original-quality PDFs submitted as an attachment* (Max 10MB) or through a file transfer service. *Scans of hard copies will not be accepted*.

FINAL APPROVAL PROCESS, submitted to City Hall At 1 Civic Center Circle, Brea Ca 92821, attention Brian Ingallinera, Environmental Services or electronic documentation - sent via file transfer service to Briani@cityofbrea.net AS PRESCRIBED BELOW:

- One hard bound copy of approved WQMP that contains tabs/labels for each section
- Electronic submittals (PDF format) of the following documents -Labeled as indicated below
- Full approved WQMP
- Exhibit Sheet(s) & Detail Sheets for each bmp
- City of Brea-Project Specific WQMP Summary Report
- Section V-Inspection & Maintenance

Prior to the field verification process from Environmental Services the following items must be submitted/completed:

- Electronic copies (PDF format) of the Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed - Sent via file transfer service to Briani@cityofbrea.net
- Electronic copy (PDF format) of the recorded documents - Sent via file transfer service to Briani@cityofbrea.net
    - Title Page
    - Signed Owners Certification Page
    - Engineers Certification Page
    - The City of Brea-Specific WQMP Summary Report
    - Exhibit & Details of BMPs
    - Section V-Inspection & Maintenance

Prior to sign off from Environmental Services to obtain the Certificate of Occupancy the following items must be completed:

- All BMP's are accessible to conduct visual inspection and take photos
- All the BMP's are clean and in working condition as prescribed by the manufacturer

One hard copy will be returned to the owner upon City-stamped approval. Grading Permit will be approved upon submittal of the hard copy WQMPs. An electronic copy (PDF) is also required. Electronic submittals must be original-quality PDFs submitted as an attachment* (Max 10MB) or through a file transfer service. *Scans of hard copies will not be accepted*.

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Title Page	☒		
Name of project			☒
Application and/or Tract Number Include. Waiting for Sean		☒	
Lot number(s) if site is a portion of a Tract.			☒
Site address (or addresses) and planning area number	☒		
Owner/Developer name	☒		
Owner/Developer address & telephone number	☒		
Consulting/Engineering firm that prepared WQMP	☒		
Consulting/Engineering firm address & phone number	☒		
Date WQMP was prepared/revised	☒		
Owner's Certification			
A signed certification statement, in which the pro Will provide prior to final Approval. and accepts the provisions of the WQMP, follow Provide owner's signature.		☒	
Table of Contents			
A Table of Contents, including a list of all figures and attachments is included.	☒		
Section 1.0, Permit Numbers and Conditions of Approval			
Lists the Discretionary Permit(s).			☒
The lot & tract/parcel map number describing the subject property. Include. Waiting for Sean		☒	
Lists, verbatim, the Water Quality Conditions, including condition requiring preparation of WQMP, if applicable.	☒		
Provides applicable conditions from watershed-based plans including WIHMPs and TMDLs.	☒		
Final Resolution of Approval, Conditional Use Permit, etc. is included as an Attachment to the WQMP.			☒
Section 2.0, Project Description			
For All Projects:			
Identifies planning area or community name.	☒		
Does the project description completely and accurately describe where facilities will be located, what activities will be conducted and where on the site, what kinds of materials and products will be used, how and where materials will be received and stored, and what kinds of wastes will be generated?	☒		

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes all paved areas, including the type of parking areas.	☒		
Describes all landscaped areas.	☒		
Describes ownership of all portions of project and site. – Will any infrastructure transfer to public agencies (City, County, Caltrans, etc.)? – Will a homeowners or property owners association will be formed? – Will the association be involved in long term maintenance?	☒		
Identifies the potential stormwater or urban runoff pollutants reasonably expected to be associated with the project.	☒		
Identifies potential HCOCs. Check "Yes" the project is potentially susceptible to hydromodification impacts for section II.3 because the project is within a HCOC susceptible region for the San Gabriel-Coyote Creek Watershed refer to TGD (Figure XVI.3: North Orange County Hydromodification Susceptibility Maps) Provide calculations for the 2-year volume in order to ensure that peak flow mitigation is required. If the volume for the 2-year storm event post development condition is 105% of the pre-development condition then the calculations provided are pertinent. Update the project performance criteria in section IV to say that HCOCs do exist for the project.			
Identifies post development drainage characteristics.			
For Commercial and Industrial Projects:			
– Provides Standard Industrial Classification (SIC) Code which best describes the facilities operations?			☒
– Describes the type of use (or uses) for each building or tenant space			☒
– Does project include food preparation, cooking, and eating areas (specify location and type of area)			☒
– Describes delivery areas and loading docks (specify location and design and if below grade and types of materials expected to be stored			☒
– Describes outdoor materials storage areas (describe and depict location(s), specify type(s) of materials expected to be stored)			☒
– Describes activities that will be routinely conducted outdoors			☒
– Describes any activities associated with equipment or vehicle maintenance and repair, including washing or cleaning. Indicates number of service bays or number of fueling islands/fuel pumps, if applicable.			☒
Residential Projects	☒		
– Range of lot and home sizes;	☒		

Ok. Provided.

Analysis shows project doesn't have HCOCs. So should this still say it has HCOC and to provide controls for it? Per HM analysis, no controls are needed.

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
– Describes all community facilities such as, laundry, car wash, swimming pools, jacuzzi, parks, open spaces, tot lots, etc.	☒		
Section 3.0, Site Description			
Describes project area and surrounding planning areas in sufficient detail to allow project location to be plotted on a base map.	☒		
Provides site address and site size to nearest tenth acre.	☒		
Identifies the zoning or land use designation.	☒		
Identifies soil types and the quantity and percentage of pervious and impervious surface for pre-project and project conditions.	☒		
Describes pre-project site drainage and how it ties into drainage of surrounding or adjacent areas and describes how planned project drainage and how it will tie into drainage of surrounding or adjacent areas.	☒		
Identifies the watershed in which the project is located and the : – downstream receiving waters – known water quality impairments as included in the 303(d) List – applicable Total Maximum Daily Loads (TMDLs) – hydrologic conditions of concern, if any.	☒		
Identifies known Environmentally Sensitive Areas (ESAs) and Areas of Special Biological Significance (ASBSs) within the vicinity and their proximity to the project.	☒		
Section 4.0, Best Management Practices			
Includes applicable performance criteria for the following: hydromodification control, LID criteria, and treatment control BMPs. In section IV.3.1, unselect the included categories for impervious area dispersion and street trees, HSCs do not appear to be used on this project. If HSCs are used, please provide calculations detailing the volume retained (Refer to TGD Worksheet A: Hydrologic Source Control Calculation Form) and identify them on the BMP site plan. Remove descriptions about the HSC BMPs from section IV.3.1 and section V BMP inspection maintenance.		☒	
Do on-site BMPs include full capture certification or does a separate BMP address the full capture of trash (Connector Pipe Screen, Catch Basin Screen, or equivalent)?	☒		
Includes narrative describing how site design concepts were considered and incorporated into project plans.	☒		
Lists and describes all Routine Source Control BMPs (Non-structural and Structural).	☒		

will unselect as we are already using MWS

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
Describes the implementation frequency and identifies the entity or party responsible for implementation of each Non-Structural BMP.	☒		
If applicable Routine Source Control BMPs were not included, was a reasonable explanation provided?	☒		
Lists and describes appropriate Treatment Control BMPs and identifies the design basis (SQDF or SQDV) for the Treatment Control BMPs.	☒		
For Routine Non-Structural BMPs N1 (Education for Property Owners, Tenants, and Occupants) and N12 (Employee Training), does the WQMP describe the concepts that will be addressed by the education and training? Is a list of educational materials that will be used provided? will revise copies of the educational materials included in an Attachment to the WQMP?			
Lists and describes appropriate LID and Hydromodification BMPs and identifies the design basis (SQDF or SQDV) for the LID BMPs. In section IV.3.4 and in Worksheet D the Q design calculation appears to be incorrect, check and revise calculations.		☒	
Describes any regional/sub-regional BMPs that will be utilized (NOC).			☒
Lists and appropriately calculates any Credits that the Project may qualify for.			☒
Lists and describes alternative compliance measures (Treatment Control BMPs, regional programs, Urban Runoff Fund/Mitigation Program participation described if LID BMPs do not fulfill LID and Hydromodification requirements.			☒
If applicable, Waiver Request and proof of submittal to the Regional Board Executive Officer included.			☒
Section 5.0, Inspection and Maintenance Responsibility for BMPs			
Identifies the entity (or entities) responsible for th revise and maintenance of all structural source control BMPs and all Treatment Control BMPs, including name, title, company, address, and phone number.	☒		
Describes the minimum frequency for inspection and maintenance to ensure the effectiveness of each structural source control BMP and each Treatment Control BMP. In section V revise the minimum frequency of activities for BIO-7 Proprietary Biotreatment (MWS Unit) per the manufacturer's operations and maintenance manual.		☒	
If ownership of the Treatment Control BMPs will be transferred to a public agency, does the WQMP include an Attachment indicating the public agency's intent to accept the Treatment Control BMPs as designed?			☒

WQMP REQUIREMENT	Requirement Satisfied?		
	es	No	N/A
Is an appropriate mechanism for the long-term operation and maintenance, including funding, in place?	☒		
Section 6.0, Location Map and Plot Plan			
Has an 11" by 17" plot plan been included?	☒		
Do all figures, maps, plot plans, etc. have a legend, including a North arrow and scale?	☒		
Are all facilities labeled for the intended function? Include a legend symbol for the BIO-7 MWS units within the BMP site plan.		☒	
Are all areas of outdoor activity labeled?			
Are all structural BMPs indicated (including GIS coordinates for LID BMPs in decimal degrees)? Provide a BMP summary table identifying each BMP (MWS #1, MWS #2, etc.), GIS coordinates in decimal degrees, and BMP details/size.		☒	
Is drainage flow information, including general surface flow lines, concrete or other surface ditches or channels, as well as storm drain facilities such as catch basins and underground storm drain pipes depicted?	☒		
Depicts where and how on-site drainage ties into the off-site drainage system.	☒		
All BMPs proposed/shown on the WQMP exhibit are reflected in the Grading Plans. Grading plans were not provided. There may be additional comments once they are ready for review.		☒	
The following self-certification statement is provided on the WQMP exhibit: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea. Include.		☒	
Other			
Grading Plans have been provided and include the following statement in the construction notes of the Grading Plans: • Self-Certification from a State Licensed Professional Engineer or Third-Party Certifications are required of all BMP's constructed on this plan and all BMP's shall be cleaned and in working condition as prescribed by the manufacturer to obtain Certificate of Occupancy from the City of Brea. Include.		☒	

Was included in previous submittal. Revised for clarity.

Was included in previous submittal. Coordinates for each unit now provided.

No grading plans. project is in TTM Phase.

This is PWQMP for VTTM approval. Defer to FWQMP and final engineering?

This is PWQMP for VTTM approval. Defer to FWQMP and final engineering?

OK

WQMP REQUIREMENT	Requirement Satisfied?		
	Yes	No	N/A
City of Brea "Project Specific WQMP Summary Report" form and Project WQMP Summary Exhibit included? Include.		☒	
Has an electronic copy (i.e. PDF) of the WQMP been provided? A scan of the hard copy WQMP is not acceptable. The PDF shall be created from the original electronic source files to minimize file size, provide better quality, and allow for keyword search. The PDF copy shall be submitted via email or via a file transfer service to both hwen@fuscoe.com and briani@cityofbrea.net	☒		
Is an Appendix for County recordation of the WQMP included? Recordation of Title Page, Owner Certification Page, Engineer Certification Page, and City of Brea WQMP S recorded before approval can be issued. Include.		☒	
Has an Appendix been provided for WQMP-related correspondence been provided? Please include email pertaining to the WQMP, previous plan check comments, or any specific instructions from plan checkers or City staff • For Final WQMP submittals, the stamped cover page of the approved Preliminary WQMP must be included in this Appendix.	☒		
Is the BMP Maintenance Self-Certification Form included in the Appendix? Include.		☒	
Are the WQMP plan check checklists from previous rounds of revie included in the Appendix with WQMP Summary?			☒

This is PWQMP for VTTM approval. Isn't this a FWQMP requirement?

This is PWQMP for VTTM approval. Isn't this a FWQMP requirement?

WQMP concerns not noted in the checklist above that needs to be addressed:

- In section II, remove "Priority Project, Category 1" from report it is not applicable because the project plans to redevelop a pre-existing site. Add the TGD description for "Priority Project, Category 8" to the narrative. This project is applicable to category 8 because it is a redevelopment project where more than 5,000 square feet of the existing project site is being replaced/redeveloped. Ok will change to 8 as requested.

Attachment F – BMP Maintenance Self-Certification Form

BMP Maintenance Self-Certification Form for the City of Brea

In addition to routine annual inspections conducted by the City for proper maintenance of post-construction stormwater control measures or Best Management Practices (BMPs) on the property, the City of Brea requires that the party responsible for maintenance of these BMPs receive proper orientation and training on their operations and maintenance. This form is to be completed by the owner representative and shall be made available to the City Authorized Inspector upon request. Should the maintenance provider or facility maintenance representative change at any time, the owner representative shall complete this form with the new responsible party for BMP maintenance.

Property Information	BMP O&M
Project Name: GREEN BRIAR	**Responsible Party:** (Owner, management company or HOA/POA) LENNAR
Legal Owner of Record: GREEN BRIAR LANE LLC	**Contact Name:** BRETT HAMADA
Address: 330 W BIRCH STREET SUITE 201, BREA CA 92821	**Address:** 2000 FIVE PARK IRVINE, CA 92618
Telephone: 714-990-8748	**Telephone:** 949-371-7890
Email: SUSAN DETRICH@GMAIL.COM	**Email:** BRETT.HAMADA@LENNAR.COM

As the party responsible for operation and maintenance of the BMPs specified in the approved Water Quality Management Plan (WQMP) for the subject property, I hereby certify under penalty of law that I, or persons under my supervision, are qualified and competent to carry out the inspection and maintenance the BMPs in a manner consistent with the approved WQMP Operation and Maintenance (O&M) Plan.

Maintenance Representative Signature

3-4-25

Date

As the owner representative of the **[insert project name]** for which a Water Quality Management Plan (WQMP) was approved by the City, I hereby certify under penalty of law that all BMPs contained within the approved Project WQMP have been maintained and inspected in accordance with the schedule and frequency outlined in the approved WQMP Operation and Maintenance (O&M) Plan. The maintenance activities and inspections conducted have been performed by qualified and knowledgeable individuals listed above. To the best of my knowledge, the information submitted is true

Attachment G – Project Specific WQMP Summary Report

City of Brea
Project Specific WQMP Summary Report

INSTRUCTION: Project applicant, please fill out and check all that apply.

Project Name: Greenbriar	Address: 1700 Greenbriar Lane
APN: 319-102-34	X Coordinate: 33.913627
New Development or Redevelopment: New Development	Y Coordinate: -117.880843
Type: Residential	Project Size (Acres): 9.69
Watershed: San Gabriel River/Coyote Creek Watershed	Construction Completion Date: TBD

☒ Preliminary Plan Check Status: _____

☐ Final Plan Check Status: _____ Date Approved: _____

Non-Structural Source Control BMP's:

- ☒ N1 Owner, Tenant, Occupant Education
- ☒ N2 Activity Restrictions
- ☒ N3 Common Area Landscape Mgmt
- ☒ N4 BMP Maintenance
- ☐ N5 Title 22 CCR Compliance
- ☐ N6 Local Water Quality Permit
- ☐ N7 Spill Contingency Plan
- ☐ N8 Underground Storage Tank
- ☐ N9 Hazardous Materials Disclosure
- ☐ N10 Uniform Fire Code
- ☒ N11 Common Area Litter Control
- ☒ N12 Employee Training
- ☐ N13 Loading Dock Good Housekeeping
- ☒ N14 Common Area Catch Basin Inspection
- ☒ N15 Street Sweeping Private Streets & Parking Lots
- ☐ N16 Retail Gasoline Outlets

Site Design BMP's:

- ☒ Minimize Impervious Area
- ☒ Minimize DCIAs
- ☐ Create Reduced or Zero Discharge Areas
- ☐ Conserve Natural Areas

Structural Source Control BMP's:	
☒	Storm Drain System Stenciling/Signage
☐	Outdoor Material Storage Areas
☐	Trash Storage Areas
☒	Efficient Irrigation Systems & Landscape Design
☐	Protect Slopes & Channels
☐	Loading Dock Areas
☐	Maintenance Bays
☐	Vehicle Wash Areas
☐	Outdoor Process Areas
☐	Equipment Wash Areas
☐	Fueling Areas
☐	Hillside Landscaping
☐	Wash Water Controls for Food Prep Areas
☐	Community Car Wash Racks

Selected LID BMP's:		Quantity
☐	HSC-1: Localized On-Lot Infiltration	____
☐	HSC-2: Impervious Area Dispersion	____
☐	HSC-3: Street Trees	____
☐	HSC-4: Residential Rain Barrels	____
☐	HSC-5: Green Roof/Brown Roof	____
☐	HSC-6: Blue Roof	____
☐	INF-1: Infiltration Basin	____
☐	INF-2: Infiltration Trench	____
☐	INF-3: Bioretention w/no Underdrain	____
☐	INF-4: Bioinfiltration	____
☐	INF-5: Drywell	____
☐	INF-6: Permeable Pavement	____
☐	INF-7: Underground Infiltration	____

		Quantity
☐	HU-1: Above-ground Cisterns	____
☐	HU-2: Underground Detention	____
☐	BIO-1: Bioretention with Underdrain	____
☐	BIO-2: Vegetated Swale	____
☐	BIO-3: Vegetated Filter Strip	____
☐	BIO-4: Wet Detention Basin	____
☐	BIO-5: Constructed Wetland	____
☐	BIO-6: Dry Extended Detention Basin	____
☒	BIO-7: Proprietary Biotreatment	3
☐	TRT-1: Sand Filters	____
☐	TRT-2: Cartridge Media Filter	____
☒	PRE-1: Hydrodynamic Separators	1
☐	PRE-2: Catch Basin Insert	____

LID BMP/ BMP SUMMARY TABLE

Provide an itemized list of each LID BMP proposed on the project. Expand table as needed.

LID BMP/ BMP Type (include manufacturer model no. if applicable)	BMP ID (as noted on BMP Plot Plan)	X Coordinate	Y Coordinate
1. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 1	33.91402°	-117.87895°
2. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 2	33.91400°	-117.87893°
3. BIO-7 Proprietary Biotreatment Modular Wetland System (MWS-L-8-24-V)	BMP No. 3	33.91399°	-117.87890°
4. Water Quality Diversion Structure	BMP No. 4	33.91392°	-117.87894°
5. PRE-2 Hydrodynamic Separator (Aqua-Swirl)	BMP No. 5	33.91391°	-117.87901°
6. S1 Catch Basin Stenciling	BMP No. 6	33.91385°	-117.87302°
7. S1 Catch Basin Stenciling	BMP No. 7	33.91415°	-117.87915°
8. S1 Catch Basin Stenciling	BMP No. 8	33.91417°	-117.87925°
9. S1 Catch Basin Stenciling	BMP No. 9	33.91427°	-117.87934°
10. S1 Catch Basin Stenciling	BMP No. 10	33.91395°	-117.87926°
11. S1 Catch Basin Stenciling	BMP No. 11	33.91401°	-117.87940°
12. S1 Catch Basin Stenciling	BMP No. 12	33.91376°	-117.87944°
13. S1 Catch Basin Stenciling	BMP No. 13	33.91359°	-117.87971°
14. S1 Catch Basin Stenciling	BMP No. 14	33.91349°	-117.87986°
15. S1 Catch Basin Stenciling	BMP No. 15	33.91364°	-117.87994°
16. S1 Catch Basin Stenciling	BMP No. 16	33.91393°	-117.88010°
17. S1 Catch Basin Stenciling	BMP No. 17	33.91340°	-117.88010°
18. S1 Catch Basin Stenciling	BMP No. 18	33.91342°	-117.88022°
19. S1 Catch Basin Stenciling	BMP No. 19	33.91351°	-117.88033°
20. S1 Catch Basin Stenciling	BMP No. 20	33.91388°	-117.88048°
21. S1 Catch Basin Stenciling	BMP No. 21	33.91338°	-117.88055°
22. S1 Catch Basin Stenciling	BMP No. 22	33.91340°	-117.88067°

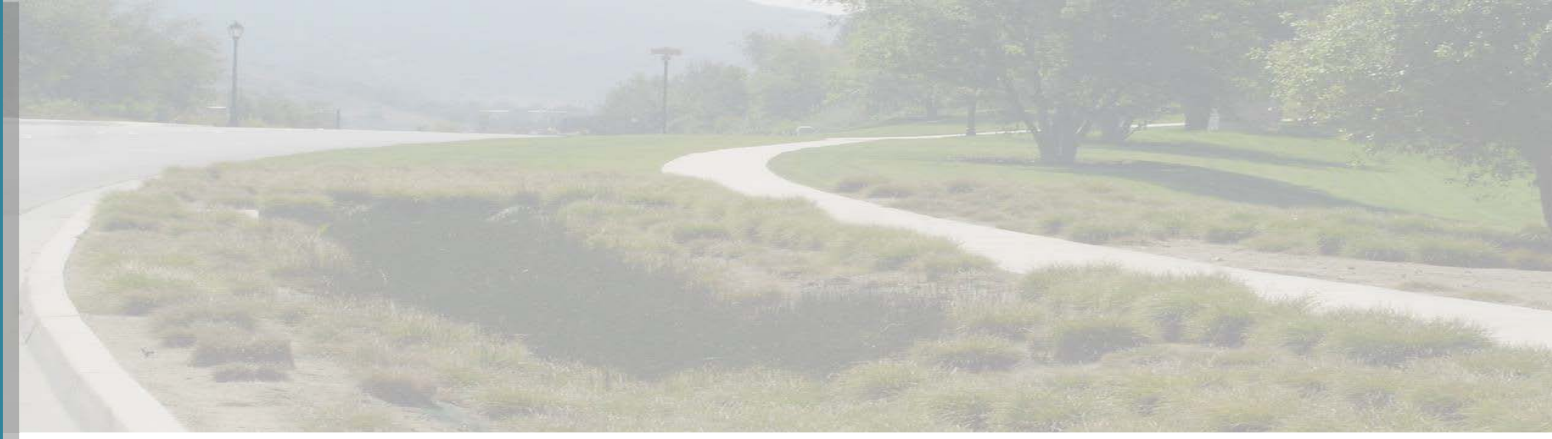
LID BMP/ BMP SUMMARY TABLE

Provide an itemized list of each LID BMP proposed on the project. Expand table as needed.

LID BMP/ BMP Type (include manufacturer model no. if applicable)	BMP ID (as noted on BMP Plot Plan)	X Coordinate	Y Coordinate
23. S1 Catch Basin Stenciling	BMP No. 23	33.91350°	-117.88074°
24. S1 Catch Basin Stenciling	BMP No. 24	33.91395°	-117.88087°
25. S1 Catch Basin Stenciling	BMP No. 25	33.91337°	-117.88097°
26. S1 Catch Basin Stenciling	BMP No. 26	33.91340°	-117.88109°
27. S1 Catch Basin Stenciling	BMP No. 27	33.91351°	-117.88114°
28. S1 Catch Basin Stenciling	BMP No. 28	33.91408°	-117.88128°
29. S1 Catch Basin Stenciling	BMP No. 29	33.91336°	-117.88137°
30. S1 Catch Basin Stenciling	BMP No. 30	33.91339°	-117.88149°
31. S1 Catch Basin Stenciling	BMP No. 31	33.91352°	-117.88170°
32. S1 Catch Basin Stenciling	BMP No. 32	33.91418°	-117.88162°
33. S1 Catch Basin Stenciling	BMP No. 33	33.91336°	-117.88178°
34. S1 Catch Basin Stenciling	BMP No. 34	33.91338°	-117.88206°
35. S1 Catch Basin Stenciling	BMP No. 35	33.91413°	-117.88213°
36. S1 Catch Basin Stenciling	BMP No. 36	33.91402°	-117.88215°
37. S1 Catch Basin Stenciling	BMP No. 37	33.91376°	-117.88227°
38. S1 Catch Basin Stenciling	BMP No. 38	33.91365°	-117.88227
39. S1 Catch Basin Stenciling	BMP No. 39	33.91354°	-117.88234°
40. S1 Catch Basin Stenciling	BMP No. 40	33.91336°	-117.88235°

Owner Information:

Owner Name	Contact Name:	Phone:	Owner Address:	Comments:	Entry Date:
Lennar	Gary Jones	(949) 349-8000	2000 Fivepoint, 3rd Floor, Irvine, CA 92618		



Appendix F. Updated Preliminary Water System Hydraulic Analysis

Appendix

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HUNSAKER
& ASSOCIATES
IRVINE, INC.

PLANNING
ENGINEERING
SURVEYING
GOVERNMENT RELATIONS

IRVINE
LOS ANGELES
RIVERSIDE
SAN DIEGO

REGISTERED PROFESSIONAL ENGINEER
KATHRYN LEE O'CONNOR
No. 60440
CIVIL
STATE OF CALIFORNIA

Preliminary Water System Hydraulic Analysis

Date: January 13, 2025

For: City of Brea
Water Division

By: Katie O'Connor, P.E.
Hunsaker & Associates Irvine, Inc.

Project: **Greenbriar**

Hunsaker & Associates Irvine, Inc. (H&A) is pleased to submit the Preliminary Water System Hydraulic Analysis for the Greenbriar project. This analysis has been prepared to describe the proposed water system for the aforementioned multifamily and high-density residential development project in the City of Brea. The project lies within the jurisdiction of the City of Brea and their standards have been used for this report. Hydraulic models were prepared using Haestad Methods software to model various flows during steady state conditions.

THE PRELIMINARY PROPOSED WATER SYSTEM FOR THE GREENBRIAR PROJECT MEETS THE DESIGN STANDARDS SPECIFIED BY THE CITY OF BREA. This evaluation is based on existing and known conditions and should be re-evaluated if these conditions change or new information becomes available. Any interpretation of the information presented in this report should be referred to H&A to ensure the integrity of the results.

FOUNDING PARTNERS:
RICHARD HUNSAKER
TOM R. McGANNON
JOHN A. MICHLER
DOUGLAS G. SNYDER

PRINCIPALS:
FRED GRAYLEE
BRADLEY HAY
PAUL HUDDLESTON
KAMAL H. KARAM
DOUGLAS L. STALEY
KRIS WEBER
JOSEPH E. WIGHTMAN

Project Location

The Greenbriar project is located south of Greenbriar Lane and west of Associated Road in the City of Brea. The project location is shown on exhibit entitled, “Domestic Water Model Exhibit– Figure 1.”

Summary of Findings

1. The development will include 99 multifamily residential units and 80 high density residential units on approximately 9.5 acres.

2. Water supply is provided by the City of Brea through an existing water system. The Static Hydraulic grade was assumed to be 522 feet based on a fire hydrant flow test on Greenbriar Lane, included in the Appendix.

3. The proposed onsite private water system consists of 4 and 8-inch diameter water mains and includes four connections to the City of Brea water mains surrounding the project. The four points of connection are located on Greenbriar Lane. Each entrance to the site has a domestic water connection with a 4-inch water meter and reduced pressure zone backflow assembly for domestic flows and a fire water connection with a 8-inch double check detector assembly. Proposed and existing water mains are identified on the attach water system schematic exhibit entitled “Domestic Water Model Exhibit– Figure 1.”

Three Hughes
Irvine, California
92618-2021
(949) 583-1010 PH
(949) 583-0759 FX
www.hunsaker.com

4. Although the proposed water system is a private system, at the direction of the City of Brea Water Department, public demands and criteria were used to design the water system.

5. At the direction of the City Engineer, the existing onsite 12-inch water main that extends from Greenbriar Lane to Brea Plaza is to be relocated and the connection to Brea Plaza through the site will be restored. This 12-inch water main will not provide any connections into the Greenbriar development.

6. H&A estimated the flow constant "K" using Affinity Laws to determine the HGL of the water supply at static, peak hour demands, maximum day, and maximum day demands plus fire flow events. The flow constant for this water system is $K = Q / H_f^{0.54}$ where H_f is the difference (in feet) of the measured static and residual pressure at the test flow. The "K" value for the water system is estimated to be **291** based on the fire flow test on Greenbriar Lane. The fire flow test performed on 31 October 2024 had an observed flow of 1300 gpm with a residual pressure of 74 psi. Fire flow test and calculations are included in the Appendix.

7. In order to calculate the pipe sizes, velocities and available pressure of the proposed water system for Greenbriar, we have prepared a hydraulic model using WaterCad by Haestad Methods. The summary of outputs from the model runs are included in the Appendix of this report.

8. The City of Brea 2021 Water Master Plan (May 2021) states in section 1.5.2 System Pressures that the water system shall be capable of providing at least 40 psi for average daily demands, maximum daily demands, and peak hour demands. Additionally, the Water Master Plan indicates that the maximum pressure at any connection should be limited to 125 psi, where practicable. Excerpts from the Water Master Plan are included in the Appendix.

9. The proposed water system provides pressures greater than 40 psi for all nodes during peak hour demands. The minimum in-track peak hour pressure experienced was **64 psi** with an estimated HGL of 522 feet at the fire flow test hydrant on Greenbriar Lane. The following table summarizes the peak hour model run:

Table 1 – Summary of Peak Hour Model Run

Total Flow (gpm)	Minimum in-tract Residual Pressure	
	(node)	(psi)
49.12	J-57	**64**

10. Fire flow requirement was taken from 2022 California Fire Code (CFC), Brea Fire Department requirement, and the Orange County Fire Authority (OCFA) Fire Master Plans for commercial and Residential Developments. Fire flow requirement is based on the largest building size and construction type. The CFC, Brea Fire Department, and OCFA allows a 50% reduction for automatic sprinkler systems. The adjusted fire flow requirement is shown below:

Table 2 – Fire Flows Used for Model

Construction Type	Fire Flow
Type V-B – with automatic sprinkler system	2000 gpm

11. The proposed water system provides pressures greater than 20 psi during maximum day demands plus 2000 gpm fire flow events as required by the CFC, Brea Fire Department, and OCFA. The minimum residual pressure experience for the worst-case 2000 gpm fire flow event was **32 psi** with an estimated HGL of 486 feet at the fire flow test hydrant on Greenbriar Land. The following table summarizes the MDD plus Fire Flow events:

Table 3 - Summary of Worst Case Fire Flow Model Runs

Fire Flow Node	Node Elevation	MDD+FF at Node	Node HGL	Residual Pressure
Max Day Demand + 2000 gpm Fire Flow				
J-73	342 ft	1500 gpm	416 ft	**32 psi**
J-92	343 ft	500 gpm	419 ft	**33 psi**

We sincerely trust these calculations will provide sufficient evidence that the proposed water system is adequate for the proposed Greenbriar development. Please contact me at (949) 458-5437 if you have any questions.

KO
Enclosures
xc: Gary Jones, Lennar
Peter Carlson, CSLS
Kamal Karam, H&A
Sean Sanson, H&A

W.O. 3916-89x
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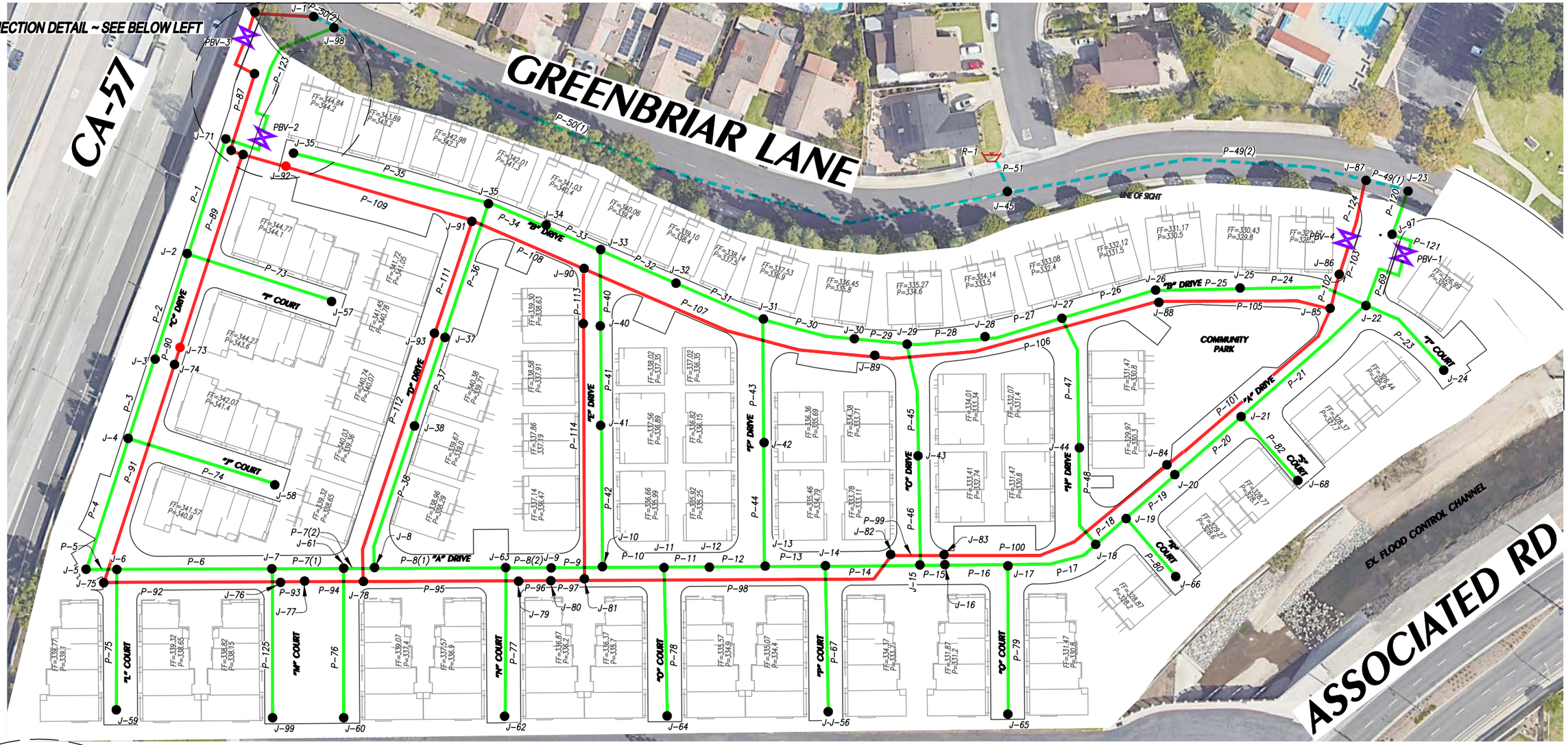

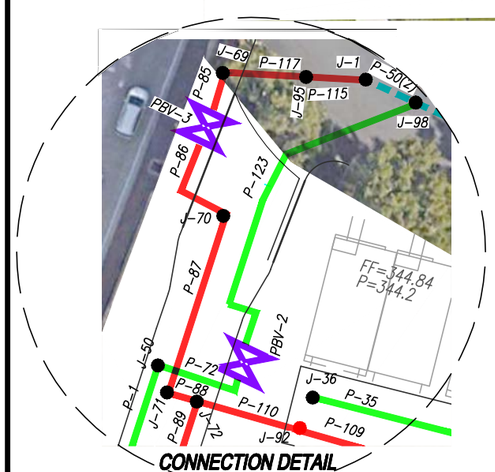

LEGEND

J-# ●	LOCATION OF MODELED PROPOSED FIRE FLOW
▽	MODELED RESERVOIR
J-# ●	MODEL NODE/ JUNCTION
PBV-#	MODELED METER & BACKFLOW ASSEMBLY
P-#	PROPOSED 4" PRIVATE DOMESTIC WATER MAINS & PIPE NUMBER
P-#	PROPOSED 8" PRIVATE FIRE WATER MAINS & PIPE NUMBER
P-#	EXISTING 8" PUBLIC DOMESTIC WATER MAINS & PIPE NUMBER

PREPARED FOR:

LENNAR
2000 FIVEPOINT, 3RD FLOOR
IRVINE, CA 92618

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949)583-1010 ▪ FX: (949)583-0759

GREENBRIAR DOMESTIC WATER MODEL EXHIBIT

WO NO. 3916-89X | DATE: 13 JAN 2025

FIGURE 1

PLOTTED BY: katieo DATE: Jan. 13, 2025 TIME: 09:49 AM F:\1285\Engineering\WS STUDIES\WATER\Greenbriar DW_MODEL EXHIBIT.dwg

APPENDIX

GREENBRIAR WATER DEMAND SUMMARY

LAND USE		AREA (acres)	DUTY FACTOR (gpm/acre)	ADD (gpm)	MDD = 1.59*add (gpm)	PHD = 3*ADD (gpm)	NUMBER OF UNITS/ BUILDINGS*	ADD gpm/unit	MDD gpm/unit	PHD gpm/unit
Multi-family	**(MF)**	5.66	1.44	8.15	12.96	24.45	99	0.08	0.13	0.25
High Density*	**(HD)**	3.84	2.14	8.22	13.07	24.65	16	0.51	0.82	1.54
TOTAL		9.5		16.37	26.03	49.10				

*High Density Residential is classified by buildings

WATER DEMAND

DOMESTIC WATER NODE	NUMBER OF UNITS/ BUILDINGS	LAND USE	Duty Factor	ADD gpm	MDD gpm	PHD gpm
J- 1						
J- 2						
J- 3						
J- 4						
J- 5						
J- 6						
J- 7						
J- 8						
J- 9						
J- 10						
J- 11						
J- 12						
J- 13						
J- 14						
J- 15						
J- 16						
J- 17						
J- 18						
J- 19						
J- 20						
J- 21						
J- 22						
J- 23						
J- 24	4	MF	0.08	0.33	0.52	0.99
J- 25	9	MF	0.08	0.74	1.18	2.22
J- 26						
J- 27	4	MF	0.08	0.33	0.52	0.99
J- 28	4	MF	0.08	0.33	0.52	0.99
J- 29						
J- 30	4	MF	0.08	0.33	0.52	0.99
J- 31						
J- 32	4	MF	0.08	0.33	0.52	0.99
J- 33						
J- 34	3	MF	0.08	0.25	0.39	0.74
J- 35	4	MF	0.08	0.33	0.52	0.99
J- 36	4	MF	0.08	0.33	0.52	0.99
J- 37	5	MF	0.08	0.41	0.65	1.23
J- 38	10	MF	0.08	0.82	1.31	2.47
J- 40	4	MF	0.08	0.33	0.52	0.99
J- 41	9	MF	0.08	0.74	1.18	2.22
J- 42	9	MF	0.08	0.74	1.18	2.22
J- 43	8	MF	0.08	0.66	1.05	1.98
J- 44	7	MF	0.08	0.58	0.92	1.73
J- 45						
J- 49						
J- 50						
J- 51						
J- 52						
J- 53						
J- 54						
J- 55						
J- 56	2	HD	0.51	1.03	1.63	3.08
J- 57	2	HD	0.51	1.03	1.63	3.08
J- 58	2	HD	0.51	1.03	1.63	3.08
J- 59	2	HD	0.51	1.03	1.63	3.08
J- 60	1	HD	0.51	0.51	0.82	1.54
J- 61						
J- 62	2	HD	0.51	1.03	1.63	3.08
J- 63						
J- 64	2	HD	0.51	1.03	1.63	3.08
J- 65	2	HD	0.51	1.03	1.63	3.08
J- 66	4	MF	0.08	0.33	0.52	0.99
J- 68	4	MF	0.08	0.33	0.52	0.99
J- 99	1	HD	0.51	0.51	0.82	1.54

Greenbriar
Scenario: Static
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	351	0.00	522	74
J-2	344	0.00	492	64
J-3	342	0.00	492	65
J-4	340	0.00	492	66
J-5	339	0.00	492	66
J-6	337	0.00	492	67
J-7	337	0.00	492	67
J-8	336	0.00	492	67
J-9	335	0.00	492	68
J-10	334	0.00	492	68
J-11	334	0.00	492	68
J-12	334	0.00	492	69
J-13	331	0.00	492	69
J-14	332	0.00	492	69
J-15	332	0.00	492	69
J-16	331	0.00	492	70
J-17	330	0.00	492	70
J-18	328	0.00	492	71
J-19	328	0.00	492	71
J-20	327	0.00	492	71
J-21	327	0.00	492	71
J-22	326	0.00	492	72
J-23	324	0.00	522	85
J-24	326	0.00	492	72
J-25	328	0.00	492	71
J-26	330	0.00	492	70
J-27	332	0.00	492	69
J-28	333	0.00	492	69
J-29	334	0.00	492	69
J-30	334	0.00	492	68
J-31	336	0.00	492	67
J-32	338	0.00	492	67
J-33	339	0.00	492	66
J-34	340	0.00	492	66

Greenbriar
Scenario: Static
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-35	341	0.00	492	66
J-36	343	0.00	492	65
J-37	340	0.00	492	66
J-38	339	0.00	492	66
J-40	338	0.00	492	67
J-41	337	0.00	492	67
J-42	335	0.00	492	68
J-43	333	0.00	492	69
J-44	330	0.00	492	70
J-45	335	0.00	522	81
J-50	347	0.00	492	63
J-56	334	0.00	492	69
J-57	343	0.00	492	64
J-58	341	0.00	492	65
J-59	339	0.00	492	66
J-60	337	0.00	492	67
J-61	336	0.00	492	67
J-62	336	0.00	492	67
J-63	335	0.00	492	68
J-64	335	0.00	492	68
J-65	331	0.00	492	70
J-66	328	0.00	492	71
J-68	328	0.00	492	71
J-69	351	0.00	522	74
J-70	351	0.00	506	67
J-71	351	0.00	506	67
J-72	347	0.00	506	69
J-73	342	0.00	506	71
J-74	342	0.00	506	71
J-75	338	0.00	506	73
J-76	338	0.00	506	73
J-77	338	0.00	506	73
J-78	336	0.00	506	73
J-79	336	0.00	506	74

Greenbriar
Scenario: Static
FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-80	336	0.00	506	74
J-81	335	0.00	506	74
J-82	332	0.00	506	75
J-83	332	0.00	506	75
J-84	327	0.00	506	77
J-85	327	0.00	506	78
J-86	326	0.00	506	78
J-87	325	0.00	522	85
J-88	330	0.00	506	76
J-89	334	0.00	506	74
J-90	338	0.00	506	73
J-91	340	0.00	506	72
J-92	343	0.00	506	71
J-93	340	0.00	506	72
J-94	338	0.00	506	73
J-95	351	0.00	522	74
J-97	326	0.00	522	85
J-98	350	0.00	522	74
J-99	337	0.00	492	67

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	351	0.00	522	74
J-2	344	0.00	492	64
J-3	342	0.00	492	65
J-4	340	0.00	492	66
J-5	339	0.00	492	66
J-6	337	0.00	492	67
J-7	337	0.00	492	67
J-8	336	0.00	492	67
J-9	335	0.00	492	68
J-10	334	0.00	492	68
J-11	334	0.00	492	68
J-12	334	0.00	492	69
J-13	331	0.00	492	69
J-14	332	0.00	492	69
J-15	332	0.00	492	69
J-16	331	0.00	492	70
J-17	330	0.00	492	70
J-18	328	0.00	492	71
J-19	328	0.00	492	71
J-20	327	0.00	492	71
J-21	327	0.00	492	71
J-22	326	0.00	492	72
J-23	324	0.00	522	85
J-24	326	0.52	492	72
J-25	328	1.17	492	71
J-26	330	0.00	492	70
J-27	332	0.52	492	69
J-28	333	0.52	492	69
J-29	334	0.00	492	69
J-30	334	0.52	492	68
J-31	336	0.00	492	67
J-32	338	0.52	492	67
J-33	339	0.00	492	66
J-34	340	0.39	492	66

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-35	341	0.52	492	66
J-36	343	0.52	492	65
J-37	340	0.65	492	66
J-38	339	1.30	492	66
J-40	338	0.52	492	67
J-41	337	1.17	492	67
J-42	335	1.17	492	68
J-43	333	1.04	492	69
J-44	330	0.91	492	70
J-45	335	0.00	522	81
J-50	347	0.00	492	63
J-56	334	1.63	492	69
J-57	343	1.63	492	64
J-58	341	1.63	492	65
J-59	339	1.63	492	66
J-60	337	0.82	492	67
J-61	336	0.00	492	67
J-62	336	1.63	492	67
J-63	335	0.00	492	68
J-64	335	1.63	492	68
J-65	331	1.63	492	70
J-66	328	0.52	492	71
J-68	328	0.52	492	71
J-69	351	0.00	522	74
J-70	351	0.00	506	67
J-71	351	0.00	506	67
J-72	347	0.00	506	69
J-73	342	0.00	506	71
J-74	342	0.00	506	71
J-75	338	0.00	506	73
J-76	338	0.00	506	73
J-77	338	0.00	506	73
J-78	336	0.00	506	73
J-79	336	0.00	506	74

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-80	336	0.00	506	74
J-81	335	0.00	506	74
J-82	332	0.00	506	75
J-83	332	0.00	506	75
J-84	327	0.00	506	77
J-85	327	0.00	506	78
J-86	326	0.00	506	78
J-87	325	0.00	522	85
J-88	330	0.00	506	76
J-89	334	0.00	506	74
J-90	338	0.00	506	73
J-91	340	0.00	506	72
J-92	343	0.00	506	71
J-93	340	0.00	506	72
J-94	338	0.00	506	73
J-95	351	0.00	522	74
J-97	326	0.00	522	85
J-98	350	0.00	522	74
J-99	337	0.82	492	67

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-1	4	102	J-50	J-2	130	10.36	0.26	0.0100
P-2	4	64	J-2	J-3	130	8.73	0.22	0.0050
P-3	4	77	J-3	J-4	130	8.73	0.22	0.0060
P-4	4	98	J-4	J-5	130	7.10	0.18	0.0050
P-5	4	9	J-5	J-6	130	7.10	0.18	0.0030
P-6	4	125	J-6	J-7	130	5.47	0.14	0.0030
P-7(1)	4	46	J-7	J-61	130	4.65	0.12	0.0010
P-7(2)	4	21	J-61	J-8	130	3.83	0.10	0.0000
P-8(1)	4	103	J-8	J-63	130	1.73	0.04	0.0000
P-8(2)	4	50	J-63	J-9	130	0.10	0.00	0.0000
P-9	4	22	J-9	J-10	130	0.10	0.00	0.0000
P-10	4	53	J-10	J-11	130	0.89	0.02	0.0000
P-11	4	41	J-11	J-12	130	2.52	0.06	0.0000
P-12	4	29	J-12	J-13	130	2.52	0.06	0.0000
P-13	4	54	J-13	J-14	130	2.76	0.07	0.0010
P-14	4	68	J-14	J-15	130	4.39	0.11	0.0020
P-15	4	22	J-15	J-16	130	4.25	0.11	0.0000
P-16	4	49	J-16	J-17	130	4.25	0.11	0.0010
P-17	4	57	J-17	J-18	130	5.88	0.15	0.0030
P-18	4	57	J-18	J-19	130	6.07	0.15	0.0010
P-19	4	48	J-19	J-20	130	6.59	0.17	0.0030
P-20	4	68	J-20	J-21	130	6.59	0.17	0.0040
P-21	4	115	J-21	J-22	130	7.11	0.18	0.0070
P-23	4	78	J-24	J-22	130	0.52	0.01	0.0000
P-24	4	99	J-22	J-25	130	8.07	0.21	0.0080
P-25	4	61	J-25	J-26	130	6.90	0.18	0.0030
P-26	4	79	J-26	J-27	130	6.90	0.18	0.0040
P-27	4	56	J-27	J-28	130	5.65	0.14	0.0030
P-28	4	53	J-28	J-29	130	5.13	0.13	0.0020
P-29	4	56	J-29	J-30	130	3.95	0.10	0.0010
P-30	4	75	J-30	J-31	130	3.43	0.09	0.0010

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-31	4	70	J-31	J-32	130	2.51	0.06	0.0010
P-32	4	53	J-32	J-33	130	1.99	0.05	0.0000
P-33	4	58	J-33	J-34	130	1.28	0.03	0.0000
P-34	4	57	J-34	J-35	130	0.89	0.02	0.0000
P-35	4	145	J-35	J-36	130	0.52	0.01	0.0000
P-36	4	92	J-35	J-37	130	0.15	0.00	0.0000
P-37	4	70	J-37	J-38	130	0.80	0.02	0.0000
P-38	4	114	J-38	J-8	130	2.10	0.05	0.0010
P-40	4	40	J-33	J-40	130	0.71	0.02	0.0000
P-41	4	76	J-40	J-41	130	0.19	0.00	0.0000
P-42	4	108	J-41	J-10	130	0.98	0.03	0.0000
P-43	4	83	J-31	J-42	130	0.92	0.02	0.0000
P-44	4	93	J-42	J-13	130	0.25	0.01	0.0000
P-45	4	76	J-29	J-43	130	1.19	0.03	0.0000
P-46	4	82	J-43	J-15	130	0.15	0.00	0.0000
P-47	4	90	J-27	J-44	130	0.72	0.02	0.0000
P-48	4	83	J-44	J-18	130	0.19	0.00	0.0000
P-49(1)	8	31	J-23	J-87	130	15.70	0.10	0.0000
P-49(2)	8	291	J-87	J-45	130	15.05	0.10	0.0000
P-50(1)	8	518	J-45	J-98	130	11.00	0.07	0.0000
P-50(2)	8	34	J-98	J-1	130	0.64	0.00	0.0000
P-51	8	18	R-1	J-45	130	26.05	0.17	0.0030
P-67	4	110	J-14	J-56	130	1.63	0.04	0.0020
P-69	4	65	PBV-1	J-22	130	15.69	0.40	0.0000
P-72	4	48	PBV-2	J-50	130	10.36	0.26	0.0000
P-73	4	100	J-57	J-2	130	1.63	0.04	0.0000
P-74	4	103	J-58	J-4	130	1.63	0.04	0.0010
P-75	4	114	J-59	J-6	130	1.63	0.04	0.0020
P-76	4	126	J-60	J-61	130	0.82	0.02	0.0030
P-77	4	112	J-62	J-63	130	1.63	0.04	0.0000
P-78	4	110	J-64	J-11	130	1.63	0.04	0.0170

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-79	4	112	J-65	J-17	130	1.63	0.04	0.0050
P-80	4	62	J-66	J-19	130	0.52	0.01	0.0000
P-82	4	68	J-68	J-21	130	0.52	0.01	0.0000
P-85	8	31	J-69	PBV-3	130	0.64	0.00	0.0000
P-86	8	20	PBV-3	J-70	130	0.64	0.00	0.0000
P-87	8	47	J-70	J-71	130	0.64	0.00	0.0000
P-88	8	64	J-71	J-72	130	0.64	0.00	0.0000
P-89	8	156	J-72	J-73	130	0.23	0.00	0.0000
P-90	8	9	J-73	J-74	130	0.23	0.00	0.0000
P-91	8	173	J-74	J-75	130	0.23	0.00	0.0000
P-92	8	115	J-75	J-76	130	0.23	0.00	0.0000
P-93	8	26	J-76	J-77	130	0.23	0.00	0.0000
P-94	8	27	J-77	J-78	130	0.23	0.00	0.0000
P-95	8	128	J-78	J-79	130	0.27	0.00	0.0000
P-96	8	25	J-79	J-80	130	0.27	0.00	0.0000
P-97	8	28	J-80	J-81	130	0.27	0.00	0.0000
P-98	8	261	J-81	J-82	130	0.31	0.00	0.0000
P-99	8	15	J-82	J-83	130	0.31	0.00	0.0000
P-100	8	194	J-83	J-84	130	0.31	0.00	0.0000
P-101	8	166	J-84	J-85	130	0.31	0.00	0.0000
P-102	8	32	J-85	J-86	130	0.64	0.00	0.0000
P-103	8	37	J-86	PBV-4	130	0.64	0.00	0.0000
P-105	8	126	J-85	J-88	130	0.33	0.00	0.0000
P-106	8	228	J-88	J-89	130	0.33	0.00	0.0000
P-107	8	237	J-89	J-90	130	0.33	0.00	0.0000
P-108	8	104	J-90	J-91	130	0.37	0.00	0.0000
P-109	8	138	J-91	J-92	130	0.41	0.00	0.0000
P-110	8	25	J-92	J-72	130	0.41	0.00	0.0000
P-111	8	87	J-91	J-93	130	0.04	0.00	0.0000
P-112	8	203	J-93	J-78	130	0.04	0.00	0.0000
P-113	8	43	J-90	J-94	130	0.04	0.00	0.0000

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-114	8	199	J-94	J-81	130	0.04	0.00	0.0000
P-115	8	12	J-1	J-95	130	0.64	0.00	0.0000
P-117	8	25	J-95	J-69	130	0.64	0.00	0.0000
P-120	4	35	J-23	J-97	130	15.70	0.40	0.0000
P-121	4	13	J-97	PBV-1	130	15.70	0.40	0.0000
P-123	4	70	J-98	PBV-2	130	10.36	0.26	0.0000
P-124	8	38	J-87	PBV-4	130	0.65	0.00	0.0000
P-125	8	117	J-7	J-99	130	0.82	0.01	0.0000

Label	Elevation (ft)	Valve Diam (in)	Pressure Setting (psi)	Flow (gpm)	Headloss (ft)
PBV-1	326	4	13	15.70	30.05
PBV-2	351	4	13	10.36	30.05
PBV-3	351	8	7	0.00	16.18
PBV-4	326	8	7	0.00	16.18

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	522	26	522

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	351	0.00	448	42
J-2	344	0.00	455	48
J-3	342	0.00	455	49
J-4	340	0.00	455	49
J-5	339	0.00	455	50
J-6	337	0.00	455	51
J-7	337	0.00	455	51
J-8	336	0.00	455	51
J-9	335	0.00	455	52
J-10	334	0.00	455	52
J-11	334	0.00	455	52
J-12	334	0.00	455	52
J-13	331	0.00	455	53
J-14	332	0.00	455	53
J-15	332	0.00	455	53
J-16	331	0.00	455	53
J-17	330	0.00	455	54
J-18	328	0.00	455	55
J-19	328	0.00	455	55
J-20	327	0.00	455	55
J-21	327	0.00	455	55
J-22	326	0.00	455	56
J-23	324	0.00	485	69
J-24	326	0.52	455	56
J-25	328	1.17	455	55
J-26	330	0.00	455	54
J-27	332	0.52	455	53
J-28	333	0.52	455	53
J-29	334	0.00	455	52
J-30	334	0.52	455	52
J-31	336	0.00	455	51
J-32	338	0.52	455	50
J-33	339	0.00	455	50
J-34	340	0.39	455	50

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-35	341	0.52	455	49
J-36	343	0.52	455	49
J-37	340	0.65	455	50
J-38	339	1.30	455	50
J-40	338	0.52	455	50
J-41	337	1.17	455	51
J-42	335	1.17	455	52
J-43	333	1.04	455	53
J-44	330	0.91	455	54
J-45	335	0.00	485	65
J-50	347	0.00	455	46
J-56	334	1.63	455	52
J-57	343	1.63	455	48
J-58	341	1.63	455	49
J-59	339	1.63	455	50
J-60	337	0.82	455	51
J-61	336	0.00	455	51
J-62	336	1.63	455	51
J-63	335	0.00	455	52
J-64	335	1.63	455	52
J-65	331	1.63	455	54
J-66	328	0.52	455	55
J-68	328	0.52	455	55
J-69	351	0.00	446	41
J-70	351	0.00	426	33
J-71	351	0.00	423	31
J-72	347	0.00	419	31
J-73	342	1500.00	416	32
J-74	342	0.00	416	32
J-75	338	0.00	417	34
J-76	338	0.00	417	35
J-77	338	0.00	418	35
J-78	336	0.00	418	35
J-79	336	0.00	418	35

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-80	336	0.00	418	36
J-81	335	0.00	418	36
J-82	332	0.00	418	37
J-83	332	0.00	418	37
J-84	327	0.00	418	39
J-85	327	0.00	418	40
J-86	326	0.00	418	40
J-87	325	0.00	485	69
J-88	330	0.00	418	38
J-89	334	0.00	418	36
J-90	338	0.00	418	35
J-91	340	0.00	418	34
J-92	343	500.00	419	33
J-93	340	0.00	418	34
J-94	338	0.00	418	35
J-95	351	0.00	448	42
J-97	326	0.00	485	69
J-98	350	0.00	451	44
J-99	337	0.82	455	51

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-1	4	102	J-50	J-2	130	0.00	0.00	0.0000
P-2	4	64	J-2	J-3	130	1.63	0.04	0.0000
P-3	4	77	J-3	J-4	130	1.63	0.04	0.0000
P-4	4	98	J-4	J-5	130	3.26	0.08	0.0020
P-5	4	9	J-5	J-6	130	3.26	0.08	0.0010
P-6	4	125	J-6	J-7	130	4.89	0.12	0.0030
P-7(1)	4	46	J-7	J-61	130	5.71	0.15	0.0010
P-7(2)	4	21	J-61	J-8	130	6.53	0.17	0.0010
P-8(1)	4	103	J-8	J-63	130	4.72	0.12	0.0030
P-8(2)	4	50	J-63	J-9	130	6.35	0.16	0.0020
P-9	4	22	J-9	J-10	130	6.35	0.16	0.0020
P-10	4	53	J-10	J-11	130	6.33	0.16	0.0020
P-11	4	41	J-11	J-12	130	7.96	0.20	0.0020
P-12	4	29	J-12	J-13	130	7.96	0.20	0.0030
P-13	4	54	J-13	J-14	130	8.06	0.21	0.0030
P-14	4	68	J-14	J-15	130	9.69	0.25	0.0070
P-15	4	22	J-15	J-16	130	9.22	0.24	0.0010
P-16	4	49	J-16	J-17	130	9.22	0.24	0.0040
P-17	4	57	J-17	J-18	130	10.85	0.28	0.0100
P-18	4	57	J-18	J-19	130	10.98	0.28	0.0040
P-19	4	48	J-19	J-20	130	11.50	0.29	0.0070
P-20	4	68	J-20	J-21	130	11.50	0.29	0.0110
P-21	4	115	J-21	J-22	130	12.02	0.31	0.0170
P-23	4	78	J-24	J-22	130	0.52	0.01	0.0000
P-24	4	99	J-22	J-25	130	13.51	0.35	0.0180
P-25	4	61	J-25	J-26	130	12.34	0.32	0.0090
P-26	4	79	J-26	J-27	130	12.34	0.32	0.0100
P-27	4	56	J-27	J-28	130	11.04	0.28	0.0090
P-28	4	53	J-28	J-29	130	10.52	0.27	0.0060
P-29	4	56	J-29	J-30	130	9.01	0.23	0.0050
P-30	4	75	J-30	J-31	130	8.49	0.22	0.0050

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-31	4	70	J-31	J-32	130	7.42	0.19	0.0050
P-32	4	53	J-32	J-33	130	6.90	0.18	0.0030
P-33	4	58	J-33	J-34	130	5.19	0.13	0.0020
P-34	4	57	J-34	J-35	130	4.80	0.12	0.0010
P-35	4	145	J-35	J-36	130	0.52	0.01	0.0000
P-36	4	92	J-35	J-37	130	3.76	0.10	0.0020
P-37	4	70	J-37	J-38	130	3.11	0.08	0.0010
P-38	4	114	J-38	J-8	130	1.81	0.05	0.0010
P-40	4	40	J-33	J-40	130	1.71	0.04	0.0000
P-41	4	76	J-40	J-41	130	1.19	0.03	0.0000
P-42	4	108	J-41	J-10	130	0.02	0.00	0.0000
P-43	4	83	J-31	J-42	130	1.07	0.03	0.0000
P-44	4	93	J-42	J-13	130	0.10	0.00	0.0000
P-45	4	76	J-29	J-43	130	1.51	0.04	0.0000
P-46	4	82	J-43	J-15	130	0.47	0.01	0.0000
P-47	4	90	J-27	J-44	130	0.79	0.02	0.0000
P-48	4	83	J-44	J-18	130	0.12	0.00	0.0000
P-49(1)	8	31	J-23	J-87	130	26.05	0.17	0.0900
P-49(2)	8	291	J-87	J-45	130	26.06	0.17	0.8590
P-50(1)	8	518	J-45	J-98	130	2000.00	12.77	1.6260
P-50(2)	8	34	J-98	J-1	130	2000.00	12.77	0.0000
P-51	8	18	R-1	J-45	130	2026.06	12.93	10.5500
P-67	4	110	J-14	J-56	130	1.63	0.04	6.7610
P-69	4	65	PBV-1	J-22	130	26.05	0.67	0.4130
P-72	4	48	PBV-2	J-50	130	0.00	0.00	0.5620
P-73	4	100	J-57	J-2	130	1.63	0.04	0.8490
P-74	4	103	J-58	J-4	130	0.00	0.04	4.5560
P-75	4	114	J-59	J-6	130	1.63	0.04	5.4090
P-76	4	126	J-60	J-61	130	0.82	0.02	8.5110
P-77	4	112	J-62	J-63	130	1.63	0.04	0.0000
P-78	4	110	J-64	J-11	130	1.63	0.04	0.0400

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-79	4	112	J-65	J-17	130	1.63	0.04	0.0000
P-80	4	62	J-66	J-19	130	0.52	0.01	0.0000
P-82	4	68	J-68	J-21	130	0.52	0.01	0.0000
P-85	8	31	J-69	PBV-3	130	2000.00	12.77	0.0000
P-86	8	20	PBV-3	J-70	130	2000.00	12.77	0.0000
P-87	8	47	J-70	J-71	130	2000.00	12.77	0.0000
P-88	8	64	J-71	J-72	130	2000.00	12.77	0.0000
P-89	8	156	J-72	J-73	130	1033.53	6.60	0.0000
P-90	8	9	J-73	J-74	130	466.47	2.98	0.0000
P-91	8	173	J-74	J-75	130	466.47	2.98	0.0000
P-92	8	115	J-75	J-76	130	466.47	2.98	0.6070
P-93	8	26	J-76	J-77	130	466.47	2.98	0.3940
P-94	8	27	J-77	J-78	130	466.47	2.98	0.9090
P-95	8	128	J-78	J-79	130	211.18	1.35	1.2280
P-96	8	25	J-79	J-80	130	211.18	1.35	2.3990
P-97	8	28	J-80	J-81	130	211.18	1.35	0.0630
P-98	8	261	J-81	J-82	130	62.12	0.40	1.2800
P-99	8	15	J-82	J-83	130	62.12	0.40	0.9180
P-100	8	194	J-83	J-84	130	62.12	0.40	0.1180
P-101	8	166	J-84	J-85	130	62.12	0.40	0.3850
P-102	8	32	J-85	J-86	130	0.00	0.00	0.4450
P-103	8	37	J-86	PBV-4	130	0.00	0.00	0.1140
P-105	8	126	J-85	J-88	130	62.12	0.40	0.1870
P-106	8	228	J-88	J-89	130	62.12	0.40	1.0670
P-107	8	237	J-89	J-90	130	62.12	0.40	0.0880
P-108	8	104	J-90	J-91	130	211.18	1.35	0.9550
P-109	8	138	J-91	J-92	130	466.47	2.98	0.7310
P-110	8	25	J-92	J-72	130	966.47	6.17	0.6990
P-111	8	87	J-91	J-93	130	255.29	1.63	0.6400
P-112	8	203	J-93	J-78	130	255.29	1.63	0.6540
P-113	8	43	J-90	J-94	130	149.06	0.95	1.1630

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-114	8	199	J-94	J-81	130	149.06	0.95	1.0260
P-115	8	12	J-1	J-95	130	2000.00	12.77	0.6060
P-117	8	25	J-95	J-69	130	2000.00	12.77	0.5100
P-120	4	35	J-23	J-97	130	26.05	0.67	0.0090
P-121	4	13	J-97	PBV-1	130	26.05	0.67	0.0390
P-123	4	70	J-98	PBV-2	130	0.00	0.00	0.0980
P-124	8	38	J-87	PBV-4	130	0.00	0.00	0.0000
P-125	8	117	J-7	J-99	130	0.82	0.01	0.0000

Label	Elevation (ft)	Valve Diam (in)	Pressure Setting (psi)	Flow (gpm)	Headloss (ft)
PBV-1	326	4	13	26.05	30.05
PBV-2	351	4	13	0.00	30.05
PBV-3	351	8	7	2000.00	16.18
PBV-4	326	8	7	0.00	16.18

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	486	2026.06	486

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-1	351	0.00	522	74
J-2	344	0.00	492	64
J-3	342	0.00	492	65
J-4	340	0.00	492	66
J-5	339	0.00	492	66
J-6	337	0.00	492	67
J-7	337	0.00	492	67
J-8	336	0.00	492	67
J-9	335	0.00	492	68
J-10	334	0.00	492	68
J-11	334	0.00	492	68
J-12	334	0.00	492	68
J-13	331	0.00	492	69
J-14	332	0.00	492	69
J-15	332	0.00	492	69
J-16	331	0.00	492	70
J-17	330	0.00	492	70
J-18	328	0.00	492	71
J-19	328	0.00	492	71
J-20	327	0.00	492	71
J-21	327	0.00	492	71
J-22	326	0.00	492	72
J-23	324	0.00	522	85
J-24	326	0.98	492	72
J-25	328	2.20	492	71
J-26	330	0.00	492	70
J-27	332	0.98	492	69
J-28	333	0.98	492	69
J-29	334	0.00	492	68
J-30	334	0.98	492	68
J-31	336	0.00	492	67
J-32	338	0.98	492	67
J-33	339	0.00	492	66
J-34	340	0.73	492	66

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-35	341	0.98	492	65
J-36	343	0.98	492	65
J-37	340	1.22	492	66
J-38	339	2.45	492	66
J-40	338	0.98	492	66
J-41	337	2.20	492	67
J-42	335	2.20	492	68
J-43	333	1.96	492	69
J-44	330	1.71	492	70
J-45	335	0.00	522	81
J-50	347	0.00	492	63
J-56	334	3.08	492	68
J-57	343	3.08	492	64
J-58	341	3.08	492	65
J-59	339	3.08	492	66
J-60	337	1.54	492	67
J-61	336	0.00	492	67
J-62	336	3.08	492	67
J-63	335	0.00	492	68
J-64	335	3.08	492	68
J-65	331	3.08	492	70
J-66	328	0.98	492	71
J-68	328	0.98	492	71
J-69	351	0.00	522	74
J-70	351	0.00	506	67
J-71	351	0.00	506	67
J-72	347	0.00	506	69
J-73	342	0.00	506	71
J-74	342	0.00	506	71
J-75	338	0.00	506	73
J-76	338	0.00	506	73
J-77	338	0.00	506	73
J-78	336	0.00	506	73
J-79	336	0.00	506	74

Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
J-80	336	0.00	506	74
J-81	335	0.00	506	74
J-82	332	0.00	506	75
J-83	332	0.00	506	75
J-84	327	0.00	506	77
J-85	327	0.00	506	78
J-86	326	0.00	506	78
J-87	325	0.00	522	85
J-88	330	0.00	506	76
J-89	334	0.00	506	74
J-90	338	0.00	506	73
J-91	340	0.00	506	72
J-92	343	0.00	506	71
J-93	340	0.00	506	72
J-94	338	0.00	506	73
J-95	351	0.00	522	74
J-97	326	0.00	522	85
J-98	350	0.00	522	74
J-99	337	1.54	492	67

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-1(2)	4	102	J-50	J-2	130	19.57	0.50	0.0340
P-2	4	64	J-2	J-3	130	16.49	0.42	0.0150
P-3	4	77	J-3	J-4	130	16.49	0.42	0.0180
P-4	4	98	J-4	J-5	130	13.41	0.34	0.0180
P-5	4	9	J-5	J-6	130	13.41	0.34	0.0100
P-6	4	125	J-6	J-7	130	10.33	0.26	0.0090
P-7(1)	4	46	J-7	J-61	130	8.79	0.22	0.0030
P-7(2)	4	21	J-61	J-8	130	7.25	0.19	0.0010
P-8(1)	4	103	J-8	J-63	130	3.28	0.08	0.0010
P-8(2)	4	50	J-63	J-9	130	0.20	0.01	0.0000
P-9	4	22	J-9	J-10	130	0.20	0.01	0.0000
P-10	4	53	J-10	J-11	130	1.64	0.04	0.0000
P-11	4	41	J-11	J-12	130	4.72	0.12	0.0010
P-12	4	29	J-12	J-13	130	4.72	0.12	0.0010
P-13	4	54	J-13	J-14	130	5.18	0.13	0.0020
P-14	4	68	J-14	J-15	130	8.26	0.21	0.0060
P-15	4	22	J-15	J-16	130	7.99	0.20	0.0010
P-16	4	49	J-16	J-17	130	7.99	0.20	0.0040
P-17	4	57	J-17	J-18	130	11.07	0.28	0.0110
P-18	4	57	J-18	J-19	130	11.41	0.29	0.0050
P-19	4	48	J-19	J-20	130	12.39	0.32	0.0080
P-20	4	68	J-20	J-21	130	12.39	0.32	0.0130
P-21	4	115	J-21	J-22	130	13.37	0.34	0.0220
P-23	4	78	J-24	J-22	130	0.98	0.03	0.0000
P-24	4	99	J-22	J-25	130	15.18	0.39	0.0240
P-25	4	61	J-25	J-26	130	12.98	0.33	0.0110
P-26	4	79	J-26	J-27	130	12.98	0.33	0.0120
P-27	4	56	J-27	J-28	130	10.64	0.27	0.0090
P-28	4	53	J-28	J-29	130	9.66	0.25	0.0060
P-29	4	56	J-29	J-30	130	7.42	0.19	0.0040
P-30	4	75	J-30	J-31	130	6.44	0.16	0.0040
P-31	4	70	J-31	J-32	130	4.71	0.12	0.0030

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-32	4	53	J-32	J-33	130	3.73	0.10	0.0010
P-33	4	58	J-33	J-34	130	2.39	0.06	0.0010
P-34	4	57	J-34	J-35	130	1.66	0.04	0.0000
P-35	4	145	J-35	J-36	130	0.98	0.03	0.0000
P-36	4	92	J-35	J-37	130	0.30	0.01	0.0000
P-37	4	70	J-37	J-38	130	1.52	0.04	0.0000
P-38	4	114	J-38	J-8	130	3.97	0.10	0.0020
P-40	4	40	J-33	J-40	130	1.33	0.03	0.0000
P-41	4	76	J-40	J-41	130	0.35	0.01	0.0000
P-42	4	108	J-41	J-10	130	1.85	0.05	0.0000
P-43	4	83	J-31	J-42	130	1.74	0.04	0.0000
P-44	4	93	J-42	J-13	130	0.46	0.01	0.0000
P-45	4	76	J-29	J-43	130	2.24	0.06	0.0010
P-46	4	82	J-43	J-15	130	0.28	0.01	0.0000
P-47	4	90	J-27	J-44	130	1.36	0.03	0.0000
P-48	4	83	J-44	J-18	130	0.35	0.01	0.0000
P-49(1)	8	31	J-23	J-87	130	29.54	0.19	0.0000
P-49(2)	8	291	J-87	J-45	130	29.54	0.19	0.0000
P-50(1)	8	518	J-45	J-98	130	19.57	0.12	0.0000
P-50(2)	8	34	J-98	J-1	130	0.00	0.00	0.0000
P-51	8	18	R-1	J-45	130	49.12	0.31	0.0110
P-67	4	110	J-14	J-56	130	3.08	0.08	0.0070
P-69	4	65	PBV-1	J-22	130	29.54	0.75	0.0000
P-72	4	48	PBV-2	J-50	130	19.57	0.50	0.0010
P-73	4	100	J-57	J-2	130	3.08	0.08	0.0010
P-74	4	103	J-58	J-4	130	3.08	0.08	0.0040
P-75	4	114	J-59	J-6	130	3.08	0.08	0.0050
P-76	4	126	J-60	J-61	130	1.54	0.04	0.0080
P-77	4	112	J-62	J-63	130	3.08	0.08	0.0010
P-78	4	110	J-64	J-11	130	3.08	0.08	0.0540
P-79	4	112	J-65	J-17	130	3.08	0.08	0.0160
P-80	4	62	J-66	J-19	130	0.98	0.03	0.0010

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-82	4	68	J-68	J-21	130	0.98	0.03	0.0010
P-85	8	31	J-69	PBV-3	130	0.00	0.00	0.0010
P-86	8	20	PBV-3	J-70	130	0.00	0.00	0.0010
P-87	8	47	J-70	J-71	130	0.00	0.00	0.0010
P-88	8	64	J-71	J-72	130	0.00	0.00	0.0010
P-89	8	156	J-72	J-73	130	0.01	0.00	0.0010
P-90	8	9	J-73	J-74	130	0.01	0.00	0.0000
P-91	8	173	J-74	J-75	130	0.01	0.00	0.0000
P-92	8	115	J-75	J-76	130	0.01	0.00	0.0000
P-93	8	26	J-76	J-77	130	0.01	0.00	0.0000
P-94	8	27	J-77	J-78	130	0.01	0.00	0.0000
P-95	8	128	J-78	J-79	130	0.01	0.00	0.0000
P-96	8	25	J-79	J-80	130	0.01	0.00	0.0000
P-97	8	28	J-80	J-81	130	0.01	0.00	0.0000
P-98	8	261	J-81	J-82	130	0.02	0.00	0.0000
P-99	8	15	J-82	J-83	130	0.02	0.00	0.0000
P-100	8	194	J-83	J-84	130	0.02	0.00	0.0000
P-101	8	166	J-84	J-85	130	0.02	0.00	0.0000
P-102	8	32	J-85	J-86	130	0.00	0.00	0.0000
P-103	8	37	J-86	PBV-4	130	0.00	0.00	0.0000
P-105	8	126	J-85	J-88	130	0.02	0.00	0.0000
P-106	8	228	J-88	J-89	130	0.02	0.00	0.0000
P-107	8	237	J-89	J-90	130	0.02	0.00	0.0000
P-108	8	104	J-90	J-91	130	0.02	0.00	0.0000
P-109	8	138	J-91	J-92	130	0.01	0.00	0.0000
P-110	8	25	J-92	J-72	130	0.01	0.00	0.0000
P-111	8	87	J-91	J-93	130	0.00	0.00	0.0000
P-112	8	203	J-93	J-78	130	0.00	0.00	0.0000
P-113	8	43	J-90	J-94	130	0.00	0.00	0.0000
P-114	8	199	J-94	J-81	130	0.00	0.00	0.0000
P-115	8	12	J-1	J-95	130	0.00	0.00	0.0000
P-117	8	25	J-95	J-69	130	0.00	0.00	0.0000

Label	Diam. (in)	Length (ft)	Start Node	Stop Node	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss (Friction) (ft)
P-120	4	35	J-23	J-97	130	29.54	0.75	0.0000
P-121	4	13	J-97	PBV-1	130	29.54	0.75	0.0000
P-123	4	70	J-98	PBV-2	130	19.58	0.50	0.0000
P-124	8	38	J-87	PBV-4	130	0.00	0.00	0.0000
P-125	8	117	J-7	J-99	130	1.54	0.01	0.0000

Label	Elevation (ft)	Valve Diam (in)	Pressure Setting (psi)	Flow (gpm)	Headloss (ft)
PBV-1	326	4	13	29.54	30.05
PBV-2	351	4	13	19.57	30.05
PBV-3	351	8	7	0.00	16.18
PBV-4	326	8	7	0.00	16.18

Label	Elevation (ft)	Flow (Out net) (gpm)	Hydraulic Grade (ft)
R-1	522	49.12	522

SoCal Flow Testing
3741 Rose Dr, Yorba Linda, CA 92886
714-261-5716
email: info@socalflowtest.com

Hydrant Flow Test Report

Project	**Glenbrook Tract**	Test date	**10/31/24**
Address	**Greenbriar Ln**	Test time	**13:30**
City	**Brea** State **CA**	File no.	

Test hydrant location **1st hydrant west of Associated Rd on south side of Greenbriar Ln**
Hydr # Elev (ft +/-) **Grade**

Flow hydrant location **1st hydrant west of Associated Rd on north side of Greenbriar Ln**
Hydr # Elev (ft +/-) **Grade**

Static Pressure **81** PSI Report Date **10/31/24**

Outlet	C-value	Diam	Pitot		Volume	
A	0.9	2.0	**0**	PSI	**0**	GPM
B	0.9	2.5	**60**	PSI	**1300**	GPM
C	0.9	3.0	**0**	PSI	**0**	GPM
D	0.83	4.0	**0**	PSI	**0**	GPM

Residual Pressure **74** PSI at an observed volume of **1300** GPM

Projected Pressure 20 PSI calculates to a volume of **4184** GPM

Although the results are accurate for the date and time given, they may not accurately reflect higher or lower readings which vary due to seasonal conditions and time of day.

Per NFPA 24-10, Table C.4.10.1(a), note 1, $Q=29.84 \times c(d)^2 (p)^{0.5}$

Per NFPA 24-10, Paragraph C.4.10.1.2, $Q_r = Q_f \times (h_r/h_f)^{0.54}$

Symbols
(T) = Test hydrant
(F) = Flow hydrant

North

Test by: Dan Hildebrandt

Witness Kevin Haines
Brea Fire Department
(714) 287-5692

Client Sean Swanson
Hunsaker & Associates

cc: KevinH@cityofbrea.net
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KOConnor@hunsaker.com
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HUNSAKER
& ASSOCIATES
IRVINE, INC.

HGL Calculation Based on Hydrant Test on Greenbriar Lane 31 October 2024

Description	Desired Flow Q_F (gpm)	Dynamic Loss H_F (feet)*	Available HGL_F (feet)**	Test Run
Static	0	0.00	522	1
Peak Hour	49	0.04	522	2
MDD	26	0.01	522	3
MDD+ 2000 FF	2,026	36.26	486	4

* H_F is Static minus Residual (in feet) at Desired Flow

** HGL_F = Test Elevation + Static Pressure - H_F

Hydrant Test Data:

Orifice Dia	2.5	in.		
Static Pressure	81	psi	*187*	feet
Residual Pressure	74	psi	*171*	feet
Pitot Reading	60	psi		
Observed Flow	1,300	gpm		
Test Elevation	335	feet		

Affinity Equations:

$$K = \frac{Q_R}{H_R^{0.54}}$$

- K is Affinity Constant
- Q_R is Test Flow
- Q_F is Desired Flow
- H_R is Static minus Residual (in feet) at Test Flow

$$H_F = \left(\frac{Q_F}{K}\right)^{1.85}$$

Affinity Constant: (Using Flow Test Values)

K = 291

ATTACHMENT 23

CFC TABLE B105.1(2): Minimum Required Fire Flow and Flow Duration for Buildings in OCFA Jurisdiction

FIRE FLOW CALCULATION AREA (square feet)					DETACHED SINGLE-FAMILY RESIDENCE/DUPLEX			OTHER BUILDINGS		
					FIRE FLOW (gallons per minute at 20 psi residual)		DURATION (hours)	FIRE FLOW (gallons per minute at 20 psi residual)		DURATION (hours)
Type IA/IB	Type IIA/IIIA	Type IV/VA	Type IIB/IIIB	Type VB	NS	S		NS	S	
0-22700	0-12700	0-8200	0-5900	0-3600	1000	1000	1	1500	1500	2
22701-30200	12701-17000	8201-10900	5901-7900	3601-4800	1750	1000	NS: 2 S: 1	1750	1500	
30201-38700	17001-21800	10901-12900	7901-9800	4801-6200	2000	1000		2000	1500	
38701-48300	21801-24200	12901-17400	9801-12600	6201-7700	2250	1125		2250	1500	
48301-59000	24201-33200	17401-21300	12601-15400	7701-9400	2500	1250		2500	1500	
59001-70900	33201-39700	21301-25500	15401-18400	9401-11300	2750	1375		2750	1500	
70901-83700	39701-47100	25501-30100	18401-21800	11301-13400	3000	1500	NS: 3 S: 1	3000	1500	3
83701-97700	47101-54900	30101-35200	21801-25900	13401-15600	3250	1625		3250	1625	
97701-112700	54901-63400	35201-40600	25901-29300	15601-18000	3500	1750		3500	1750	
112701-128700	63401-72400	40601-46400	29301-33500	18001-20600	3750	1875		3750	1875	
128701-145900	72401-82100	46401-52500	33501-37900	20601-23300	4000	2000	NS: 4 S: 1	4000	2000	4
145901-164200	82101-92400	52501-59100	37901-42700	23301-26300	4250	2125		4250	2125	
164201-183400	92401-103100	59101-66000	42701-47700	26301-29300	4500	2250		4500	2250	
183401-203700	103101-114600	66001-73300	47701-53000	29301-32600	4750	2375		4750	2375	
203701-225200	114601-126700	73301-81100	53001-58600	32601-36000	5000	2500		5000	2500	
225201-247700	126701-139400	81101-89200	58601-65400	36001-39600	5250	2625		5250	2625	
247701-271200	139401-152600	89201-97700	65401-70600	39601-43400	5500	2750		5500	2750	
271201-295900	152601-166500	97701-106500	70601-77000	43401-47400	5750	2875		5750	2875	
295901+	166501+	106501-115800	77001-83700	47401-51500	6000	3000		6000	3000	
		115801-125500	83701-90600	51501-55700	6250	3125		6250	3125	
		125501-135500	90601-97900	55701-60200	6500	3250		6500	3250	
		135501-145800	97901-106800	60201-64800	6750	3375		6750	3375	
		145801-156700	106801-113200	64801-69600	7000	3500		7000	3500	
		156701-167900	113201-121300	69601-74600	7250	3625		7250	3625	
		167901-179400	121301-129600	74601-79800	7500	3750		7500	3750	
		179401-191400	129601-138300	79801-85100	7750	3875		7750	3875	
		191401+	138301+	85101+	8000	4000		8000	4000	

S: Provided with an approved sprinkler system throughout the structure NS: No fire sprinklers or partially protected with a sprinkler system

ATTACHMENT 24

CFC TABLE C102.1:
Hydrant Quantity and Spacing in OCFA Jurisdiction

DETACHED SINGLE FAMILY RESIDENCES/DUPLEXES *with* SPRINKLERS

Flow Requirement from Table B105.1(2)	Minimum Number of Hydrants	Maximum Distance to a Hydrant		Maximum Distance between Hydrants [1]		Average Distance between Hydrants[1]	
		Thru road	*Dead-end*	Thru road	*Dead-end*	Thru road	*Dead-end*
1000 - 1750	1	300	*250*	600	*500*	600	*500*
1751+	Use the table below						

ALL OTHER STRUCTURES

Flow Requirement from Table B105.1(2)	Minimum Number of Hydrants	Maximum Distance to a Hydrant		Maximum Distance between Hydrants [1,2]		Average Distance between Hydrants[1,2]	
		Thru road	*Dead-end*	Thru road	*Dead-end*	Thru road	*Dead-end*
1000 - 1750	1	250	*200*	500	*400*	500	*400*
1751 - 2250	2	225	*175*	450	*350*	450	*350*
2251 - 2500	3	225	*175*	450	*350*	450	*350*
2501 - 3000	3	225	*175*	450	*350*	400	*300*
3001 - 4000	4	210	*160*	420	*320*	350	*250*
4001 - 5000	5	180	*130*	360	*260*	300	*200*
5001 - 5500	6	180	*130*	360	*260*	300	*200*
5501 - 6000	6	150	*100*	300	*200*	250	*150*
6001 - 7000	7	150	*100*	300	*200*	250	*150*
7001+	1 per 1000 gpm or fraction thereof	120	*70*	240	*140*	200	*100*

All distances are in feet.

[1] Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

[2] Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

WATER METER

MUELLER

500 SERIES (BRONZE)

Magnetic Drive Positive Displacement Disc Meters Sizes 1 ½" & 2"

FEATURES

Applications: Measurement of cold water for residential, commercial and industrial applications where water volumes are low, and low flow sensitivity is important.

Conformance to Standards: Mueller Series 500 Water Meters comply with ANSI / AWWA Standard C700, NSF-61 372 and the Safe Water Drinking Act. Each meter is tested to ensure compliance.

Construction: Mueller Series 500 Water Meters consist of three basic parts: maincase; measuring chamber; and permanently sealed register. The maincase and topcase are made of bronze. The measuring chamber, nutating disc and strainer are made of thermoplastic, which is dimensionally stable and will not corrode. A test port in the body permits in-line testing. Register box and lid are available in plastic or bronze for visual read registers

The meter is designed so that the register, measuring chamber and strainer can be replaced without removing the meter from the line.

Register: The permanently sealed register has a unique seal and heat-treated glass to eliminate dirt, moisture infiltration and lens fogging. An integral tamper-proof locking feature is provided to resist tampering with the register. The totalizing register has a straight-reading odometer type display, a 360º test circle with center sweep hand and a low flow (leak) detector. Standard gearing is used, making registers interchangeable by size.

All Mueller Meter Models have electronic meter reading systems available for increased reading efficiency (see Meter Reading Systems.)

Operation: Water flows through the meter's strainer where any debris that could adversely affect meter accuracy or free operation is screened out. As the water enters, it fills a known volume of the measuring chamber on one or the other side of a movable disc that separates the chamber into two sections. As water enters it moves the disc (nutates), forcing a known volume of water out of the meter from the opposite side of the disc. The process repeats as the sections refill and empty in turn. The nutating action of the disc is coupled magnetically to the register to indicate the volume of water that passes through the meter. The large measuring chamber requires fewer nutations of the disc for each gallon measured, which helps to limit wear, reduce pressure loss and extend the life of the meter.

Maintenance: The Mueller Series 500 Water Meters are designed and manufactured to provide long service life with virtually no maintenance required.

Connections: Available with integral two-bolt oval flanges.

562 PD METER WITH VISUAL REGISTER

MATERIALS AND SPECIFICATIONS

Model Number	562 and 572
Sizes	1 ½" and 2"
Standards	Manufactured and tested to meet or exceed all applicable parts of ANSI / AWWA C700 Standard. NSF-61 372 and the Safe Water Drinking Act
Operating Flow Range	Cold water measurement with flow in only one direction
Accuracy	See chart on following page
Pressure Loss	See chart on following page
Maximum Working Pressure	150 psi
Temperature Range	33ºF to 100ºF water temperature
Measuring Element	Nutating disc
Disc Nutations (Per Gallon)	562: 6.47, 572: 3.92
Register Type	Straight reading, permanently sealed,magnetic drive with low flow indicator. Remote reading units optional. 2 Bolt Oval Flange
Materials	Maincase – No Lead Bronze; Measuring Chamber – Thermoplastic; Magnets – ceramic; Strainer – Thermoplastic; Casing bolts – stainless steel ANSI B18; Register box and lid – thermoplastic.
Options	Register box and lid – bronze UNSC85700; AMR / AMI Reading Systems.

500 SERIES

Magnetic Drive Positive Displacement Disc Meters Sizes 1 ½″ & 2″

METER REGISTRATION

METER SIZE	INITIAL DIAL*	CAPACITY	INITIAL DIAL*	CAPACITY
1 ½″	100 Gallons	100 Million	10 Cubic Feet	10 Million
2″	100 Gallons	100 Million	10 Cubic Feet	10 Million

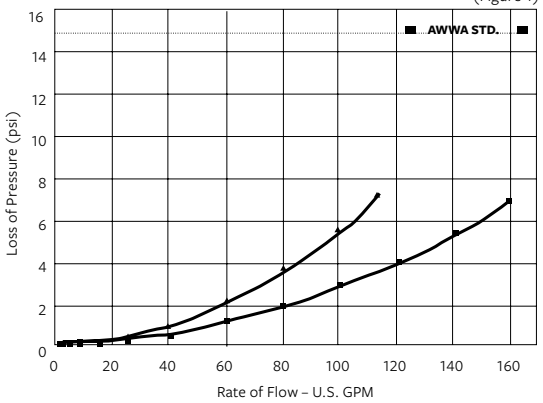
*Registration equal to one full revolution of the sweep hand.

FLOW CHARACTERISTICS

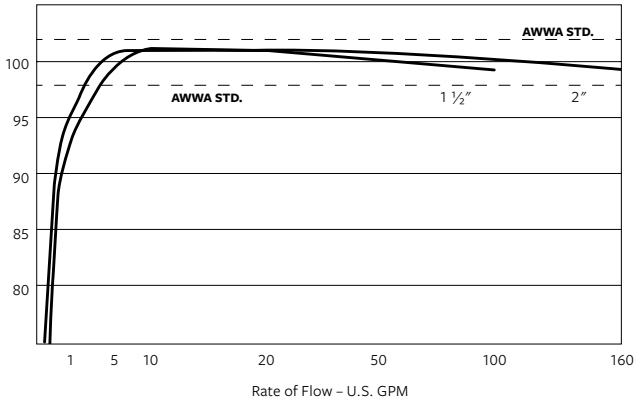
METER SIZE	TYPICAL LOW FLOW (95% MINIMUM)	TYPICAL OPERATING RANGE (100% ± 1.5%)	MAXIMUM CONTINUOUS OPERATION
1 ½″	1 ½ GPM	5 to 100 GPM	50
2″	2 GPM	8 to 160 GPM	80

PERFORMANCE

Head Loss - 1 ½″ and 2″ (Figure 1)

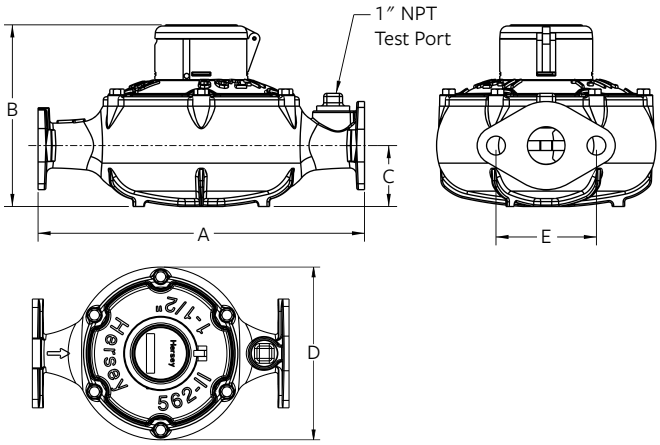


Accuracy – 1 ½″ AND 2″ (Figure 2)



Note: Performance curves are typical only and NOT a guarantee of performance.

DIMENSIONS AND WEIGHTS



METER SIZE	1 ½″	2″
ENDS	TWO BOLT FLANGED	
MODEL	562	572
DIMENSION		
A	13″	17″
B Visual Reg	7.250″	8.125″
B SSR Reg	7″	
B ME-8 Reg	7.75″	
C	2.437″	3.00″
D	8.750″	10.437″
E	4.00″	4.50″
W	9.25″	10.5″
Net Weight	18	28

Note: Meter couplings are optional and must be ordered separately. Weights are in pounds and are approximate.

500 SERIES

Magnetic Drive Positive Displacement Disc Meters Sizes 1 ½" & 2" Parts

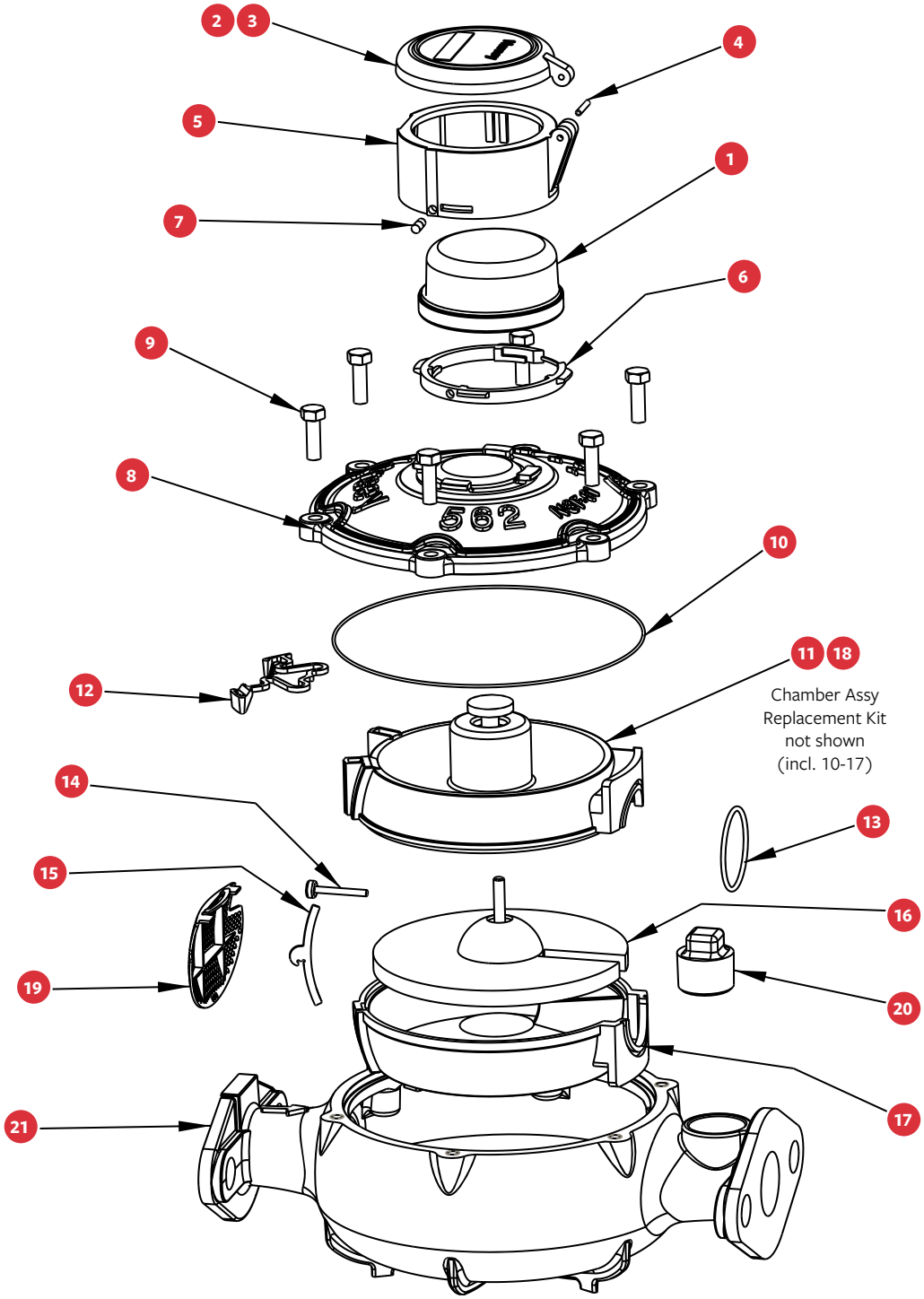
REF NO.	DESCRIPTION	MATERIAL	562 1 ½" MODEL	572 2" MODEL
1	Visual Register	US Gallons Glass / Brass	D357715	D358115
		CF Glass / Brass	D357725	D358125
	ME-8 and SSR Register*	US Gallons Plastic / Brass / Glass	GWESGxxxx562	GWESGxxxx572
		CF Plastic / Brass / Glass	GWECFxxxx562	GWECFxxxx572
	Specify Electronic Reading Value			
2	Complete Register Housing Assembly Includes parts 3-7	Plastic	B7856	B7856
		Bronze	B7857	B7857
3	Visual Register Cover	Plastic	C5768	C5768
		Bronze	C5774	C5774
4	Visual Spiral Pin	Plastic cover: SST	AS41122	AS41122
		Bronze Cover: SST	AS41123	AS41123
5	Visual Register Housing Base	Plastic	C5769	C5769
		Bronze	C5772	C5772
6	Register Housing Insert	Plastic	C5770	C5770
7	Register Locking Pin	Blue Colored Plastic	A12658	A12658
		Brass Colored Plastic	A126581	A126581
8**	Top Case 2 Bolt Flange	Low Lead Bronze	D3546SI	D3550SI
9**	Case Bolts for 2 Bolt Flange Units	SST	90026 (qty 6)	90010 (qty 8)
10	O-ring Case Seal	Rubber	A130206	A130207
11	Top Chamber Assembly		D3275ASSY	D3277ASSY
12	Chamber Retainer	Plastic	C5466	C5466
13	O-ring Chamber Seal	Rubber	A130204	A130205
14	Thrust Roller	SST	A12781	B8024
15	Wear Plate	SST	B8026	B8025
16	Disk Assembly	Plastic / SST	B8067	B8068
17	Bottom Chamber	Plastic	D3274	D3276
18	Chamber Assy Replacement Kit (incl. 10-17)		D3575	D3576
19	Strainer	Plastic	C6576	C6577
20	Test Plug	SST	59013	59013
21	Bottom Case 2 Bolt Flange	Low Lead Bronze – test port	D35481SI	D35521SI

Call Mueller Customer Service for Appropriate ME-8 or SSR Register and AMR/AMI Device part number *Not shown.

ME-8 and SSR register component parts are available on the appropriate data sheets.

500 SERIES

Magnetic Drive Positive Displacement Disc Meters Models 562 and 572



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F 14212 5/21

MUELLER

REDUCED PRESSURE ZONE BACKFLOW ASSEMBLY

For Non-Health Hazard Applications

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE*

MasterSeries® LF860

Reduced Pressure Zone Backflow Prevention Assemblies

Size: 2½" - 10" (65mm - 250mm)

The FEBCO MasterSeries LF860 Reduced Pressure Zone Assembly is specifically designed to protect against possible backpressure and backsiphonage conditions for high hazard [i.e., toxic] application in accordance with Local Governing Water Utility Code. This Backflow Prevention Assembly is primarily used on potable drinking water systems where Local Governing Code mandates protection from non-potable water being pumped or siphoned back into the potable water system.

The LF860 features Lead Free* construction to comply with low lead installation requirements. The Lead Free* Reduced Pressure Zone Assemblies shall comply with state codes and standards, where applicable, requiring reduced lead content.

Features

- Inline Serviceable Assembly
- No Special Tools Required for Servicing
- Captured Modular Spring Assembly
- Reversible & Replaceable Discs
- Field Replaceable Seats
- Ductile Iron Valve Body Design
- Stainless Steel Check Components
- Modular Pressure Differential Relief Valve
- Repairable Pressure Differential Relief Valve
- Clapper Check Assembly
- Captured O-ring Design

Series LF860 Reduced Pressure Zone Assembly

Specifications

The FEBCO MasterSeries LF860 Reduced Pressure Zone Assembly shall be installed on the potable water supply and at each point of cross-connection to protect against possible back-pressure and backsiphonage conditions for high hazard [i.e., toxic] applications. The assembly shall consist of a main line valve body composed of a pressure differential relief valve located in a zone between two (2) independently acting approved clapper style check modules with replaceable seats and disc rubbers. Servicing of the pressure differential relief valve and both check modules does not require any special tools; both check modules are accessed through independently top entry covers. This assembly shall be fitted with AWWA Compliant inlet/outlet resilient seated shutoff valves; when used on a Fire-Sprinkler application, the assembly shall be fitted with approved UL/FM inlet/outlet resilient seated shutoff valves and contain four (4) properly located resilient seated test cocks as specified by AWWA Standard C511. Flow and pressure loss performance parameters shall meet the requirements of AWWA Standard C511.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

FEBCO product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact FEBCO Technical Service. FEBCO reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on FEBCO products previously or subsequently sold.

A WATTS Brand

Options - Suffix

OSY: UL/FM Approved OS&Y Gate Valves (ANSI/AWWA C515 Compliant)

NRS: Non-Rising Stem Gate Valves (ANSI/AWWA C509 Compliant)

LG: Less Shut-off valves; This is NOT an APPROVED ASSEMBLY

Example Ordering Descriptions:

4" LF860-OSY - Valve Assembly fitted with OS&Y Shutoff Valves

4" LF860-NRS - Valve Assembly fitted with NRS Shutoff Valves

Assembly Flow Orientation:

- Horizontal (2½" – 10") - Approved by FCCCHR-USC, ASSE, cULus, FM, IAPMO and CSA

Approvals - Standards

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California (FCCCHR-USC)
- ASSE 1013 Listed
- **UL Classified (US & Canada)
- **FM Approved
- IAPMO
- AWWA Standard C511 Compliant
- End Connections: Compliant to ASME B16.1 Class 125 & AWWA Class D Flange

**Assembly configured with UL/FM Approved OS&Y RW Gate Valves. Less gate valve assemblies are not UL/FM approved configurations.

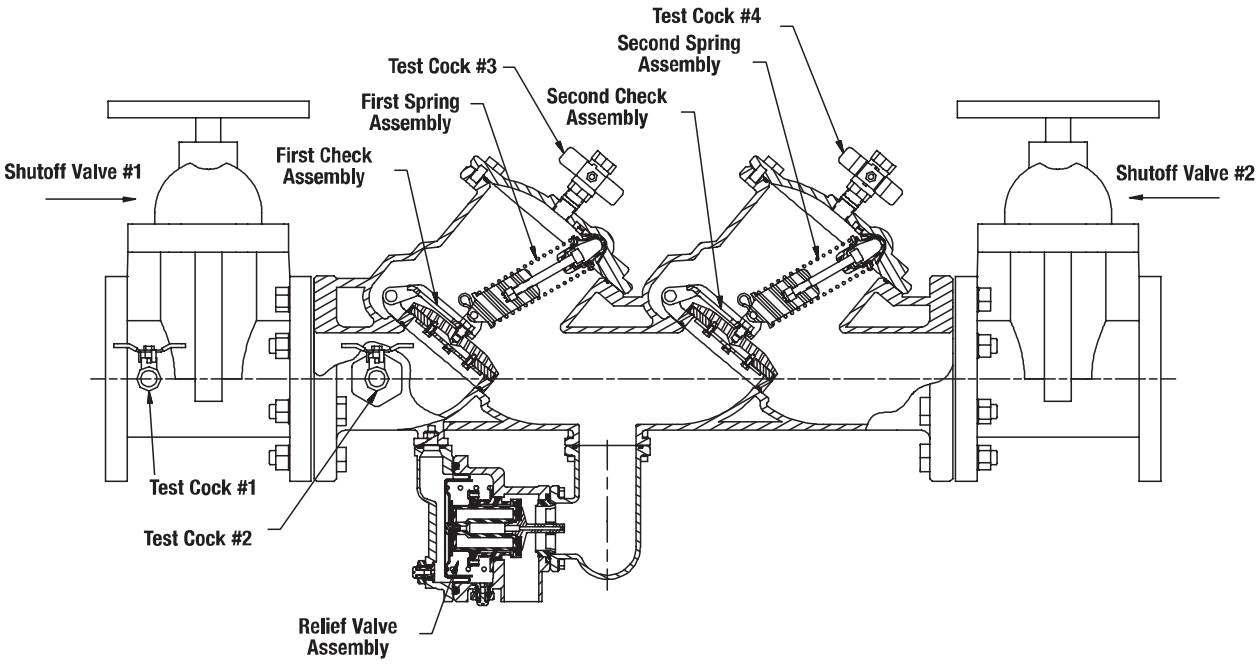
Materials

Below is a general materials list of the Series LF860. All assemblies size 2½" through 10" is similar in materials and construction. Please contact your local FEBCO Representative if you require further information.

Main Valve Body:	Ductile iron Grade 65-45-12
Relief Valve Body:	Ductile iron Grade 65-45-12
Coating:	Fusion epoxy coated internal and external AWWA C550
Shutoff Valves:	NRS resilient wedge gate valve AWWA C509 (Standard) OSY resilient wedge gate valve AWWA C515 (UL/FM)
Check Seats:	Stainless Steel
Disc Holder:	Stainless Steel
Elastomer Disc:	Silicone
Spring:	Stainless Steel
Clamp:	AWWA C606 (10" Only)

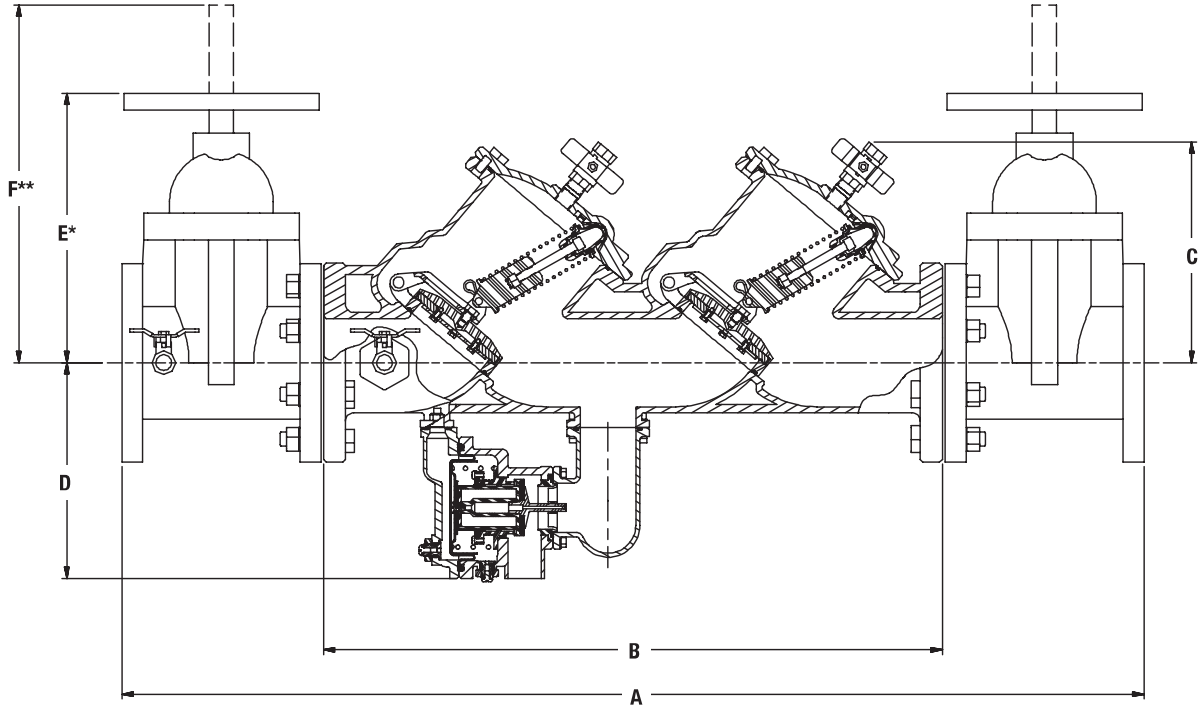
Pressure - Temperature

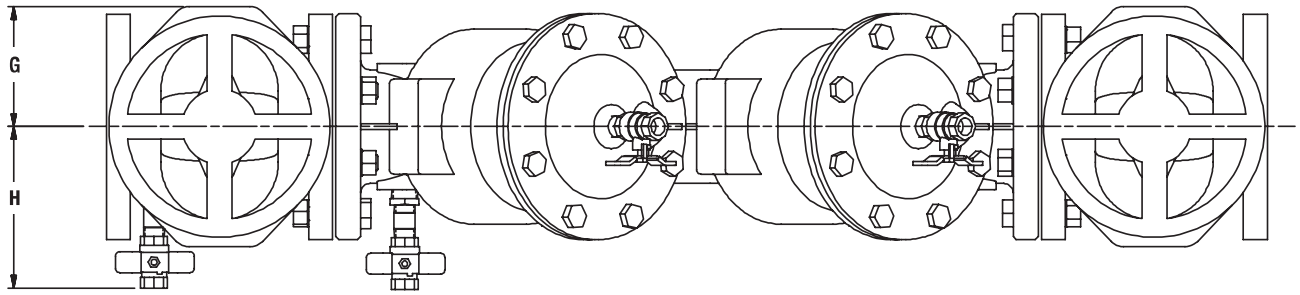
Max. Working Pressure:	175 psi (12.1 bar)
Min. Working Pressure:	20 psi (1.4 bar)
Hydrostatic Test Pressure:	350 psi (24.1 bar)
Hydrostatic Safety Pressure:	700 psi (48.3 bar)
Temperature Range:	33°F - 140°F (0.5°C - 60°C) Continuous



Dimensions & Weights

Below are the nominal dimensions and physical weights for the Series LF860 size 2½" through 10". Allowances must be made for normal manufacturing tolerances. Please visit our website to download a copy of this product's installation instructions, or contact your local FEBCO Representative for more information.





LF860

SIZE (DN)		DIMENSIONS																WEIGHT***			
		A		B		C		D		E*		F**		G		H		NRS		OSY	
in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg.	lbs.	kg.
2½	65	40¾	1035	25½	648	10	254	10	254	12⅝	321	16⅜	416	4½	114	7⅛	181	250	113	254	115
3	80	41⅞	1064	25⅝	651	10	254	10	254	12⅞	327	22¼	565	4½	114	7⅜	187	276	125	280	127
4	100	46¼	1175	28	711	10⅛	257	10⅛	257	14⅜	365	23¼	591	5½	140	8⅛	206	335	152	347	157
6	150	56	1422	34¾	883	12¾	324	11⅛	283	18⅞	479	30⅛	765	6½	165	9⅞	251	503	228	523	237
8	200	65	1651	41¾	1061	15⅝	397	12¼	311	23½	597	37¾	959	7	178	11⅛	283	807	366	835	379
10	250	72⅝	1845	46⅜	1178	15⅝	397	12⅜	314	27½	699	48	1219	9	229	12⅜	314	1205	547	1243	564

* Indicates nominal dimensions with NRS Gate Valves
** Indicates nominal dimensions with OSY Gate Valves (Full Open Position)
*** Indicates weight of complete Backflow Assemblies with specified Gate Valves

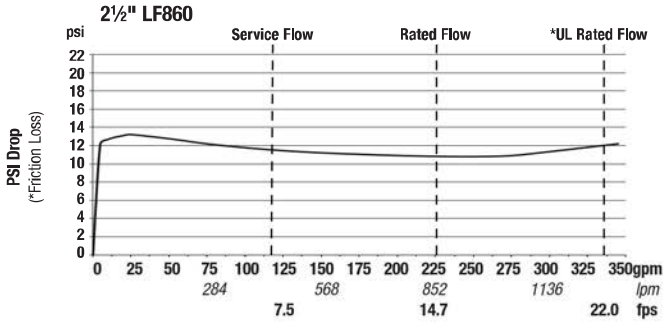
The gap drain is not designed to catch the maximum discharge possible from the relief valve. The installation of the FEBCO air gap with the drain line terminating above a floor drain will handle any normal discharge or nuisance spitting through the relief valve. However, floor drain size may need to be designed to prevent water damage caused by a catastrophic failure condition. Do not reduce the size of the drain line from the air gap fitting.

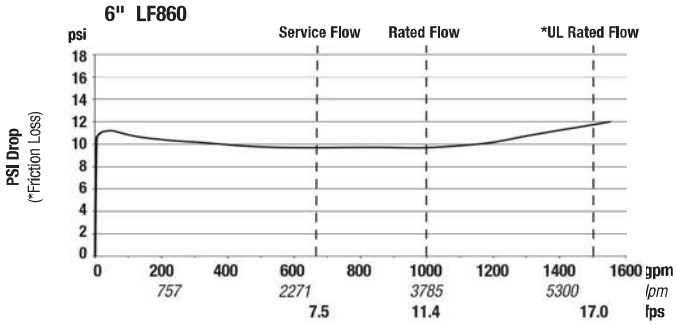
Performance

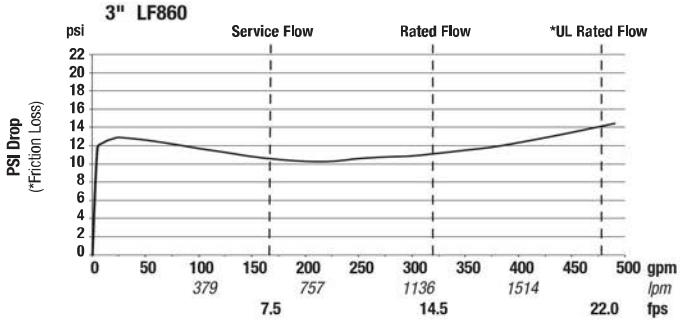
Flow capacity chart identifies valve performance based upon rated water Velocity up to 20fps

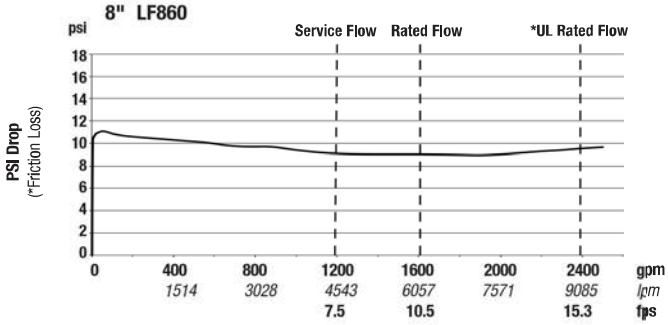
- Maximum service flow rate is determined by maximum rated Velocity of 7.5fps.
- AWWA Manual M-22 (Appendix C) recommends that the maximum water Velocity in the services be not more than 10fps.
- UL flow rate is determined by typically rated Velocity of 15 feet/sec.

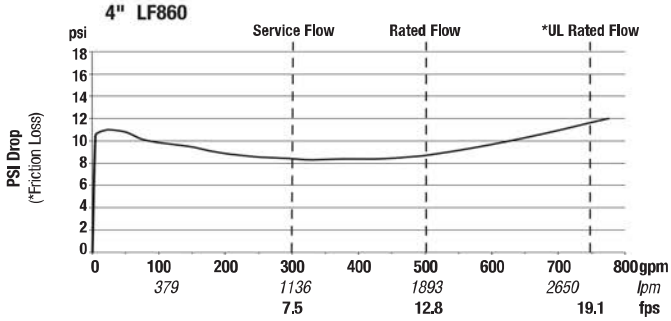
Capacity

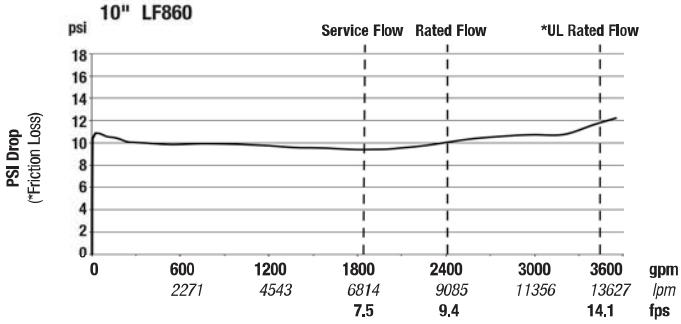












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DOUBLE CHECK DETECTOR ASSEMBLY

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

Approval _____ Representative _____

LEAD FREE*

MasterSeries® LF876V

Double Check Detector Backflow Prevention Assemblies (Type II)

Size: 2½" - 10"

The FEBCO MasterSeries LF876V Double Check Detector Assembly is specifically designed to protect against possible backpressure and backsiphonage conditions for non-health hazard (i.e., pollutant) application in accordance with Local Governing Water Utility Code.

The coating on this backflow assembly uses ArmorTek™ technology to resist corrosion due to microbial induced corrosion (MIC) or exposed metal substrate. This Backflow Assembly is primarily used on potable drinking water systems and fire sprinkler systems, where Local Governing Code mandates protection from non-potable quality water being pumped or siphoned back into the potable water system.

Features

Main Valve:

- Inline Serviceable Assembly
- Horizontal "N-Pattern" Installations
- Vertical-Up "Z-Pattern" Installations
- No Special Tools Required for Servicing
- Captured Modular Spring Assembly
- Reversible & Replaceable Discs
- Field Replaceable Seats
- Ductile Iron Valve Body Design
- Stainless Steel Check Components
- Utilizes advanced ArmorTek™ coating technology to resist corrosion of internals
- Winterization feature with disc retainers and valve body drain ports
- Clapper Check Assembly
- Commonality between 1st & 2nd Check Components
- Captured O-ring Design

Auxiliary Bypass:

- Compact Bypass Design; Remains within Main Valve Assembly Profile
- Inline Serviceable ¾" Check Assembly
- No Special Tools Required for Servicing
- Field Replaceable Seat & Disc
- Detect Potential Underground Water Leaks
- Detect Unauthorized Water Usage

***The wetted surface of this product contacted by consumable water contains less than 0.25% of lead by weight.**

Model LF876V Double Check Detector Assembly

Specifications

The FEBCO MasterSeries LF876V Double Check Detector Valve Assembly shall be installed on the potable water supply and at each point of cross-connection to protect against possible backpressure and backsiphonage conditions for non-health hazard (i.e., pollutant) applications. The assembly shall consist of a main line valve body composed of two (2) independently acting approved clapper style check modules with replaceable seats and disc rubbers. Servicing of both check modules does not require any special tools and are accessed through independent top entry covers. This assembly shall be fitted with approved UL/FM inlet/outlet resilient seated shutoff valves and contain four (4) properly located resilient seated test cocks as specified by AWWA Standard C510. The auxiliary bypass line contains a ⅝"x¾" Water Meter that complies with ANSI/AWWA Standard C700 coupled with an approved check assembly. The bypass line is designed to detect leaks or unauthorized water usage of the water system while protecting against possible backpressure and backsiphonage conditions for non-health hazard (i.e., pollutant) application. The valve body shall utilize a coating system with built-in electrochemical corrosion inhibitor and microbial inhibitor. The assembly shall be approved for horizontal and/or vertical-up installations while meeting the requirements of AWWA Standard C510 flow and pressure loss performance parameters.

NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

NOTICE

Inquire with governing authorities for local installation requirements

FEBCO product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact FEBCO Technical Service. FEBCO reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on FEBCO products previously or subsequently sold.

FEBCO®

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Options - Suffix

OSY: UL/FM Approved OS&Y Gate Valves [ANSI/AWWA C515 Compliant]

DNRS: Domestic Non-Rising Stem Gate Valves [ANSI/AWWA C509 Compliant]

CFM: Totalizing Cubic feet/min ⅝"x ¾" Water Meter [ANSI/AWWA C700 Compliant]

GPM: Totalizing Gallons/min ⅝"x ¾" Water Meter [ANSI/AWWA C700 Compliant]

LG: Less Shutoff valves; This is NOT an APPROVED ASSEMBLY

Example Ordering Description:

4" LF876V-OSY-GPM - Valve Assembly fitted with OS&Y Shutoff Valves & Gallons per Minute Water Meter

4" LF876V-OSY-CFM - Valve Assembly fitted with OS&Y Shutoff Valves & Cubic Feet per Minute Water Meter

Available Components

Wye Strainer: FDA Approved [ASME B16.1 Class 125 & AWWA Class D Flange]

Series 611 Valve Setter: MJ x MJ - Mechanical Joint x Mechanical Joint [AWWA C111/A21.11]

MJ x FL - Mechanical Joint x Flange [AWWA C111/A21.11; ASME B16.1 Class 125/AWWA Class D Flange]

FL x FL – Flange x Flange [ASME B16.1 Class 125 & AWWA Class D Flange]

Materials

Below is a general materials list of the Model LF876V. All assemblies size 2½" through 10" is similar in materials and construction. Please contact your local FEBCO Representative if you require further information.

Main Valve Body:	Ductile iron Grade 65-45-12
Coating:	Fusion epoxy coated internal and external AWWA C550-90
Shutoff Valves:	OSY resilient wedge gate valve AWWA C515 (UL/FM)
Check Seats:	Stainless Steel
Disc Holder:	Stainless Steel
Elastomer Disc:	Silicone
Spring:	Stainless Steel
Clamp:	AWWA C606

Approvals – Standards:

- Approved by the Foundation for Cross-Connection Control and Hydraulic Research at The University of Southern California [FCCCHR-USC]
- ASSE 1048 Listed
- **UL Classified [US & Canada]
- **FM Approved
- IAPMO/cUPC
- AWWA Standard C510 Compliant
- End Connections: Compliant to ASME B16.1 Class 125 & AWWA Class D Flange

**Assembly configured with UL/FM Approved OS&Y RW Gate Valves. Less gate valve assemblies are not UL/FM approved configurations.

Assembly Flow Orientation:

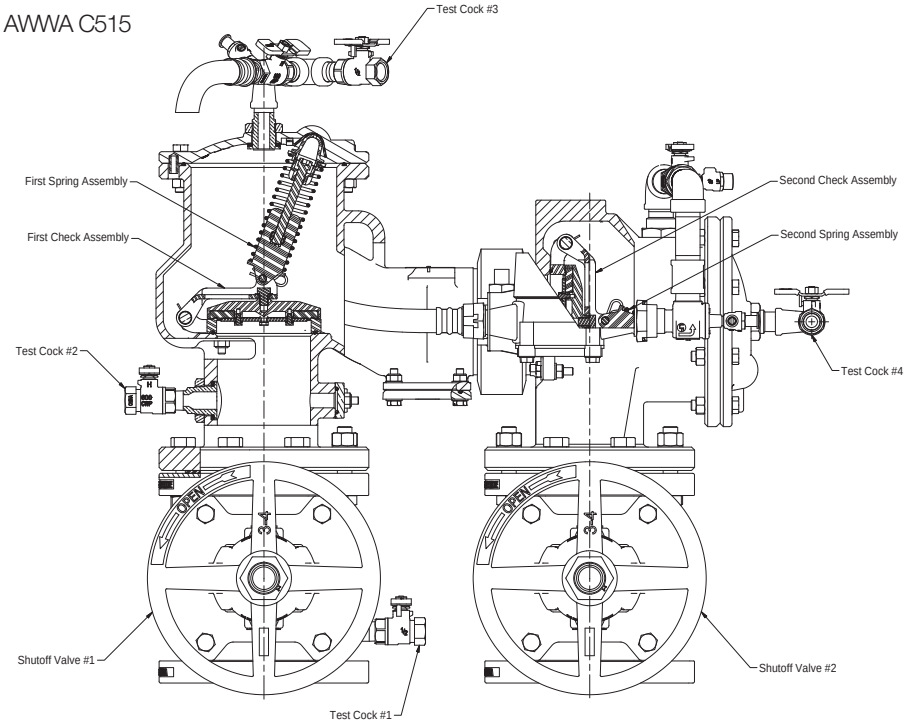
Horizontal (N-Pattern 2½" – 10") - Approved by FCCCHR-USC, ASSE, cULus, FM, IAPMO/cUPC

Vertical Up (Z-Pattern 2½" – 10") - Approved by FCCCHR-USC, ASSE, cULus, FM, IAPMO/cUPC

1048 B64.5

Pressure - Temperature

Max. Working Pressure:	175psi (12.1 bar)
Min. Working Pressure:	10psi (0.7 bar)
Hydrostatic Test Pressure:	350psi (24.1 bar)
Hydrostatic Safety Pressure:	700psi (48.3 bar)
Temperature Range:	33°F - 140°F [0.5°C- 60°C] Continuous

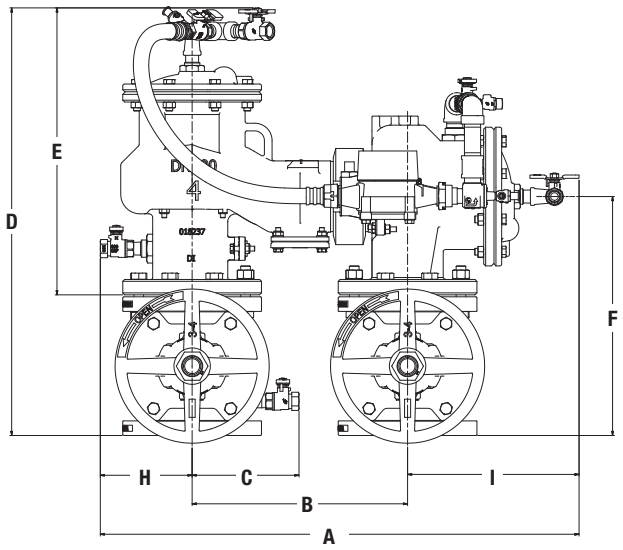


Dimensions – Weights

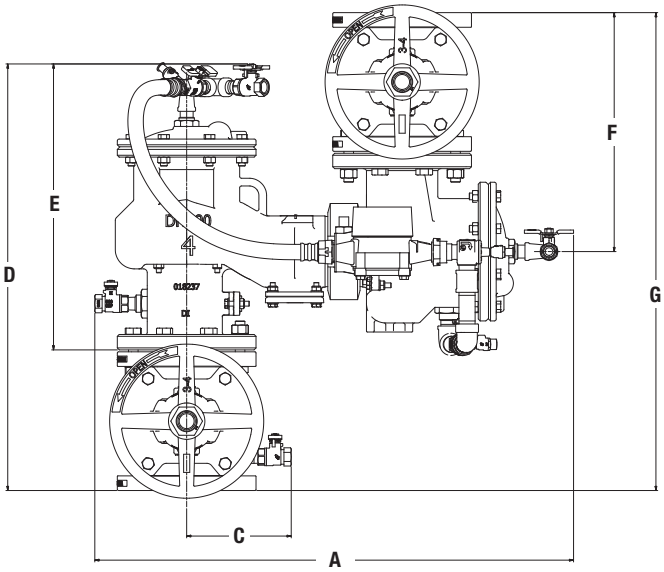
Size: 2½" - 10"

Below are the nominal dimensions and physical weights for the Model LF876V size 2½" through 10". Allowances must be made for normal manufacturing tolerances. Please visit our website to download a copy of this product's installation instructions, or contact your local FEBCO Representative for more information.

Model LF876V Standard Orientation (N-Pattern)



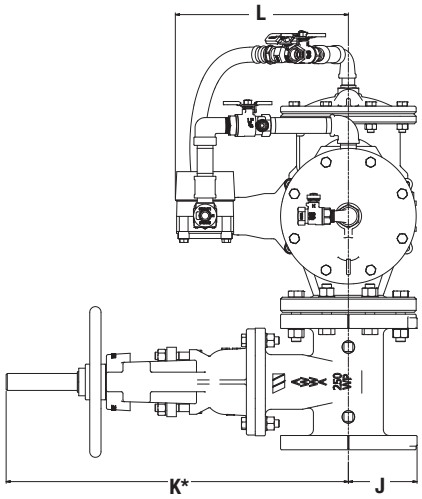
Model LF876V Vertical Orientation (Z-Pattern)



Note: The Series LF876V is shipped in the standard (N-Pattern) orientation as shown above.

Gate Valve Side View

Clearance



LF876V

SIZE	DIMENSIONS																										WEIGHT**	
	A		B		C		D		E		F		G		H		I		J		K*		L		OSY	
in.	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*in.*	*mm*	*lbs.*	*kg.*
2½	29⅛	740	12½	318	6¼	159	25¼	642	17½	445	13⅝	346	27¼	692	5½	140	11⅛	283	3½	89	16⅜	416	11½	292	216	98
3	29⅛	740	12½	318	6¼	159	25¾	654	17¾	451	14⅛	359	28¼	718	5½	140	11⅛	283	3¾	95	18⅞	479	11½	292	242	110
4	31⅛	791	14	356	7	178	27¾	705	18¾	476	15½	394	31	787	6	152	11⅛	283	4½	114	22¾	578	13	330	347	157
6	35¾	908	16	406	8	203	32¾	831	22⅛	562	18⅝	473	37¼	946	7¼	184	12½	316	5½	140	30⅛	765	13	330	529	240
8	40¾	1035	18½	470	9¼	235	36¾	933	25⅛	638	20¾	527	41½	1054	8½	216	14	356	6¾	172	37¾	959	14½	368	827	375
10	46¼	1175	21	533	10 7/16	264	41 3/16	1047	28⅛	714	23 11/16	601	47 3/8	1202	9 5/8	244	15 11/16	398	8	203	45¾	1162	13⅛	333	1335	606

Notes:

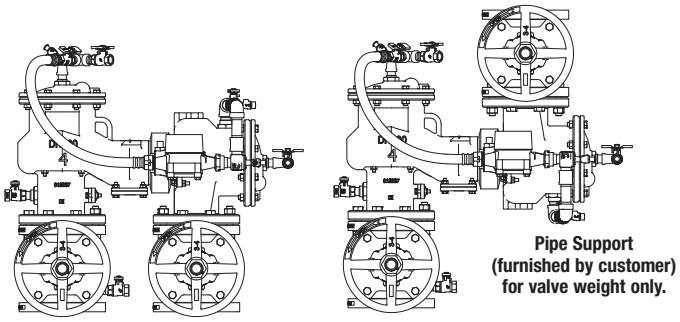
* Indicates nominal dimensions with OSY Gate Valves (Full Open Position)

** Indicates weight of complete Backflow Assemblies with specified Gate Valves

Performance

Flow capacity chart identifies valve performance based upon rated water Velocity up to 20fps

- Maximum service flow rate is determined by maximum rated Velocity of 7.5fps.
- AWWA Manual M-22 (Appendix C) recommends that the maximum water Velocity in the services be not more than 10fps.
- UL flow rate is determined by typically rated Velocity of 15 feet/sec.



Standard Orientation "N-Pattern"

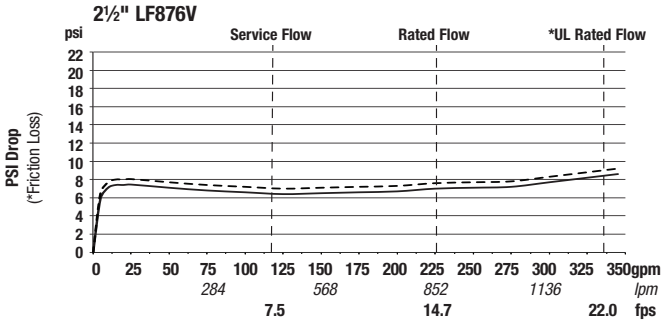
Flow Curve N

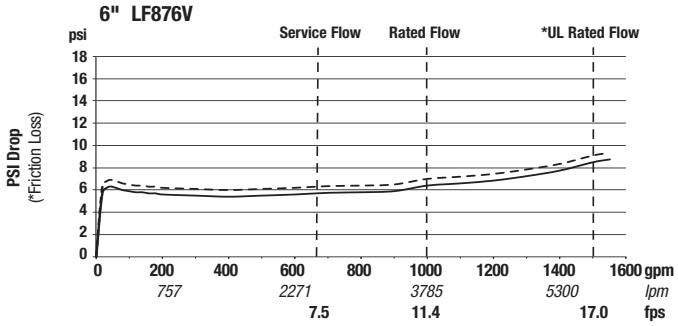
Vertical Orientation "Z-Pattern"

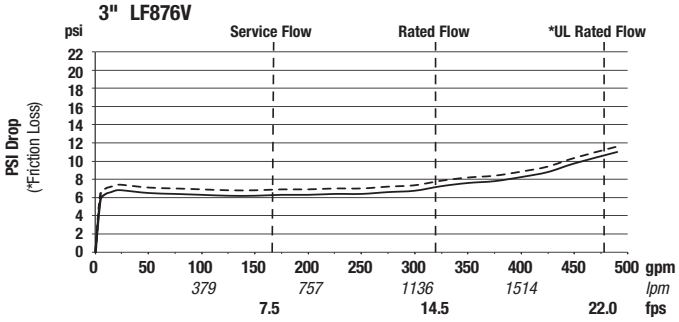
Flow Curve Z

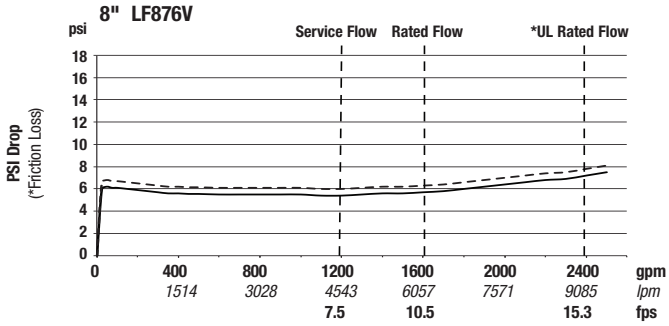
Capacity

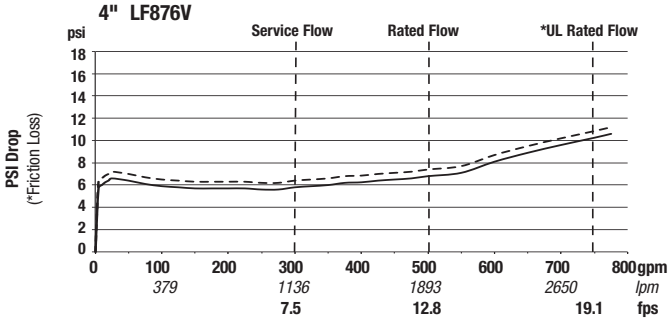
N-Pattern Z-Pattern

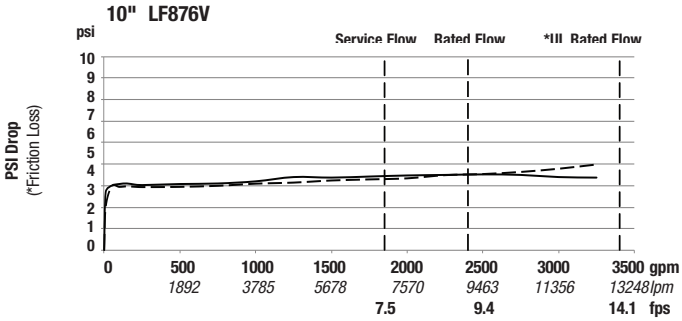












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2021 Water Master Plan

FINAL Submitted: May 2021

Prepared For:

City of Brea
One Civic Center Circle | Brea, CA 92821
Phone: 714.990.7600

Prepared By:

CIVILTEC engineering inc.
www.civiltec.com

Project No. 2020118.00

1.5 Design Criteria

Design and planning criteria are used as a benchmark for evaluating the capacity of the existing water distribution system and as a guide for recommending improvements to meet future conditions. Design criteria is used to evaluate the hydraulic capacity of the water distribution system. The City desires a public water system with adequate street widths for all new developments, to the review and approval of the Director of Public Works. Design details for water facilities can be found in the latest edition of the "City of Brea Public Works Standard Plans." The primary goal is to establish a minimum level of service to ensure a safe and dependable supply of water to the entire services area. This evaluation is quantitative and compares field measurements or engineering calculations (specifically the results generated by the hydraulic water model) with a series of benchmarks that reflect customer expectations, the regulatory environment, sustainable design, redundancy, reliability, functionality, emergency preparedness, efficiency, economics, and other issues of importance to the City.

Design criteria was developed and detailed, including the underlying driving forces, for the following:

1.5.1 Minimum Service Requirements for the Water System

The water provided to the consumers shall meet all federal, state and local regulations governing water quality for potable use.

The water system shall be capable of providing the minimum fire flow as determined in the water master plan with the minimal residual pressure of 20 pounds per square inch (psi) in the distribution system pipelines.

1.5.2 System Pressures

Goal for static system pressure range: 40 psi to 125 psi

The water system shall be capable of providing at least 40 psi for the following demand periods: average day, maximum day and peak hour. A maximum static pressure should be maintained at below 80 psi.

Where the maximum pressure exceeds 80 psi, individual pressure regulators should be equipped at connection in accordance with the Uniform Plumbing Code.

The maximum pressure at any connection should be limited to 125 psi, where practicable.

1.5.3 Fire Flow

Goal for minimum pressure during fire flow event: 20 psi.

Under fire flow conditions, residual pressures should not fall below 20 psi when delivering the required fire flow rate. The minimum residual pressure requirement is established by the California Dept. of Public Health. This threshold provides a buffer against the possibility of negative pressure in the distribution system which could result in contamination ingress.

An exception to the 20-psi minimum is allowed for fire hydrants that are located so close to reservoirs as to not be able to achieve the requirement for pressure residual. These hydrants shall be designated as "draft hydrants" and piping shall be sized from the reservoir to the hydrant to provide the fire flow requirement as close to the local static pressure as possible.

Fire Flow Requirements per Land Usage

For purposes of testing the adequacy of the existing system, the following fire flows are applied based on Land Use as shown in the table below. These apply to any structure that is being altered, as required by City, County, State, and Federal codes and ordinances. Existing structures that are not being altered are grandfathered in based on the regulations at the time of their construction.

Fire Flow Requirements per Land Usage

Land Use Description	Zoning Designation	Minimum Fire Flow (gpm)	Minimum Duration (hrs)
Single Family Residential	HR, R1-H, R-1, R-1(5000)	1,500	2
Multi-Family Residential	R-2, P-C	2,500	2
High Density Residential	R-3	4,000	4
Schools	N/A	3,500	4
Business/ Commercial	C-P, C-N, C-G, C-C, PF	2,500	2
Industrial	BISP, C-M, M-1, M-2, M-P	4,000	4
Mixed-use	MU-I, MU-II, MU-III	4,000	4

1.5.4 Pipeline Criteria

Distribution Mains

Distribution mains carry water to service connections and fire hydrants. Fire flow is typically the governing factor in sizing distribution mains, although normal operations under peak demand conditions should also be examined for efficiency.

Maximum velocity in any proposed pipeline should be in accordance with the following guidelines:

- For Average Day Analysis:
  - Desired Range: 0 to 5 feet per second (fps)
  - Questionable Range: 5 to 7 fps
  - Deficient Range: Over 7 fps
- For Maximum Day and Peak Hour Analysis:
  - Desired Range: 0 to 7 fps
  - Questionable Range: 7 to 10 fps
  - Deficient Range: Over 10 fps
- For Fire Flow Analysis:
  - Desired Range: 0 to 15 fps
  - Deficient Range: Over 15 fps

Pipes with velocities in the Questionable Range should be revied on an individual basis. Those with velocities in the deficient range should be considered for replacement or paralleling.

New Pipeline Criteria

To meet pressure and velocity objectives, the minimum diameter for new pipelines shall be 8 inch, except in short cul-de-sac streets where 6 inch pipe may be used beyond the last hydrant. In commercial and business areas the minimum diameter for new pipelines shall be 12 inch.

These diameters shall not preclude the use of larger diameters when needed to meet the minimum fire flows or other criteria. All pipelines shall be looped (excluding short cul-de-sac streets) to prevent one pipeline outage from disrupting service to an area.

1.5.5 Supply

The water system and each pressure zone shall have at least two independent supply sources as recommended by AWWA. Where water is pumped from another zone or from an imported supply source, the booster pumping station shall have a backup pump online and equal in size to the largest pump in the station. The station shall also have a backup (or secondary) power source. A portable generator can be considered acceptable as a backup power source for the booster station.

Where two sources of supply are not practicable, the zone should have sufficient storage to meet all emergency criteria with the supply out of service.

Primary Supply Design

The primary supply design criteria evaluates the system's combined production capacity with the largest single source of supply out of service.

This level of redundancy will allow the City to maintain normal deliveries with the temporary loss of a source of supply. Minimum production capacity is driven by the merits of redundancy and economics.

Secondary Supply Design

The secondary supply design criteria evaluates the pump station's ability to refill emergency and fire storage in 2 days (48 hours) under MDD conditions.

A depletion of emergency and fire storage creates a temporary vulnerability to immediate, ongoing or subsequent events that would otherwise be mitigated. This vulnerability can be minimized by rapid replenishment of storage.

1.5.6 Storage

Primary Storage Design

The primary storage design criteria evaluates the fire, emergency, and operational storage by pressure zone.

4.3 Peaking Factors

Demand peaking factors represent the fluctuation in demand on a daily or hourly basis. Peaking factors are used in the planning process to ensure the water system is capable of the maximum demands the system may encounter beyond the ADD. Common peaking factors used are MDD and peak hour demand (PHD). MDD represents the maximum volume of water delivered to the system in a single day which typically occurs in the middle of summer. PHD represents the maximum water used in one hour during the year. For planning purposes, the peaking factors were based on production and consumption data. The study period was from 2015 through 2019.

4.3.1 Average Day Demand (ADD)

ADD serves as a benchmark and planning tool for long-term issues at the system level, such as supply acquisition and integrated resource management. ADD is calculated by averaging consumption of each meter, which is taken from the historical water usage data for each year, as provided by the City. The ADD for the system in 2019 is calculated to be 7.80 MGD, 23.94 AF/day or 5,418 gpm.

4.3.2 Maximum Day Demand (MDD)

MDD is used in planning to ensure the system's infrastructure is capable of maintaining a high-level of service on the days of largest demand.

Daily consumption data was not available, but consumption data was recorded on a monthly basis. Daily operator logs were available that included reservoir levels and meter reads for imported water connections and booster pump stations. MDD was calculated from the difference between the daily total volume of water taken from the imported water connections and the daily total volume of water drawn down from all reservoirs. This calculation was applied for the months of June, July and August through each year of the study period. MDD in 2019 is 38.01 AF which occurred on August 13, 2019.

The maximum production day was compared to the average production on the year to calculate the MDD Peaking factor. Using this factor, 1,59, the MDD for the overall system in 2019 was calculated to be 12.39 MG, 38.01 AF/day or 8,615 gpm.

Table 4-3: Historical Water Demands and ADD/MDD Production

Year	Water Demand (AFY)	Average Daily Production (AF)	Max Day Production (AF)	Max Day Date	Max Day Factor MD:AD
2015	8,541	23.40	38.13	7/10/2015	1.63
2016	8,551	23.43	42.52	7/16/2016	1.81
2017	8,587	23.46	37.36	8/8/2017	1.59
2018	9,379	25.70	40.64	7/17/2018	1.58
2019	8,740	23.94	38.01	8/13/2019	1.59[1]
Average	**8,760**	**23.99**	**39.33**	**-**	**1.64**

[1] *Since the Representative year for the 2021 WMP is the year 2019, we determined 1.59 to be the Maximum Day Factor for analysis purposes within this WMP. This is derived by taking the maximum production day in that year over its average daily production in the same year.*

4.3.3 Representative Year and Peaking Factors

A representative year refers to the year within the study period that best reflects the demand of the system (total demand and MDD). 2019 was determined to be the representative year as being closest to the average of the 5-year period and includes the most recent data that was available.

The MDD peaking factor is expressed as a ratio of MDD to ADD, which calculated to be 1.59 for 2019.

The maximum flow rate delivered by the distribution system on any single hour during the year is defined as the PHD. The peaking factor is expressed as a ratio of PHD to ADD. PHD could not be determined due to the absence of hourly data, therefore a PHD peaking factor of 3.0 was used. California Code of Regulations allows for a PHD peaking factor of 1.5 times the MDD peaking factor, which comes to a value of 2.385. The peaking factor of 3.0 allows the City to stay conservative for future analysis. Table 4-4 below contains the summary of demands and its associated peaking factors.

Table 4-4: City Demands and Peaking Factors

Demand Type	2019 Demands (AFY)	2019 Demands (gpm)	Average Demands (AFY)	Average Demands (gpm)	Peaking Factor
ADD	8,740	5,418	8,760	5,431	1.00
MDD	13,895	8,615	13,928	8,635	1.59
PHD	-	16,254	-	16,293	3.00

4.4 Top Users

Top water system users within the City were determined from 2019 billing data provided. These users were identified and ranked by their annual water consumption. The top 15 users account for 16% of the water consumed. Table 4-5 summarizes each user and their associated water consumption in the year 2019.

Table 4-5: Top 15 Users

Rank	Acct Number	Water Meter Type	Water Demand (AF)	Water Demand (gpm)	% of Total Demand
1	222-1540/222-1903	Government Outside City	600.92	372.57	6.73%
2	222-1550	Other Government	120.62	74.78	1.35%
3	132-4810	Golf Courses	89.41	55.43	1.00%
4	221-6935	Multiple Residential	82.38	51.08	0.92%
5	221-7487	Commercial	78.19	48.48	0.88%
6	102-0011	Brea Golf Course	65.22	40.44	0.73%
7	210-6126	Other Government	62.20	38.56	0.70%
8	210-6128	Other Government	58.93	36.54	0.66%
9	216-1700	Multiple Residential	54.44	33.75	0.61%
10	221-6970	Other Government	54.27	33.65	0.61%
11	221-5520	Commercial	45.84	28.42	0.51%
12	221-6180	Industrial	40.28	24.97	0.45%
13	127-0001	Multiple Residential	37.08	22.99	0.42%
14	210-6143	Multiple Residential	34.26	21.24	0.38%
15	220-0491	Industrial	32.45	20.12	0.36%

4.5 Land Usage Analysis

The City provided geographic information system (GIS) database information containing different types of the land usage according to SCAG. The land usage in the City is divided into the following categories:

HR: Hillside Residential
R-1: Single Family Residential
R1-H: Single Family Residential – Hillside
R-1 (5000): Single Family Residential
R-2: Multiple Family
P-C: Planned Communities
R-3: Multiple Family
C-G: General Commercial
C-C: Major Shopping Center
C-P: Administrative and Professional Office
C-N: Neighborhood Commercial
BISP: Brea Industrial Specific Plan
C-M: Industrial Commercial
M-1: Light Industrial
M-2: General Industrial
M-P: Planned Industrial
MU-I: Mixed Use -I
MU-II: Mixed Use -II
MU-III: Mixed Use -III

4.6 Water Duty Factors

To understand and project water use for each type of land use, water duty factors were created. Water consumption established from customer meter readings were compared with specific parcel land use. If there were any discrepancies with the SCAG land use and billing database, the parcels were reviewed individually and classified based on inspection of Google aerial imagery and the provided consumption data.

The duty factor is a ratio of the water demand and the size of the parcel expressed as acre-feet per acre (AF/ac). The parcel sizes were determined using the City GIS database. Duty factors are also commonly expressed as acre-feet per dwelling unit or acre feet per square foot for residential lots. The City did not have the number of dwelling units available, so AF/ac was calculated for each land use.

4.6.1 Single Family Residential

Table 4-6 represents all four types of zone classifications designated from aerial imagery and the GIS databases for single family residential homes. The zone designations HR, R-1, R1-H, and R-1 (5000) are similar, so they were combined to create a water duty factor for all single-family homes. These areas are located throughout the City.

Table 4-6: Single Family Residential Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Single Family Residential	1563.30	969.25	760	2.06	1.28

4.6.2 Multi-Family Residential

The multi-family residential land usage includes residential complexes of four units or less and planned communities. These areas are generally located south of Lambert Road, east of Highway 57, and portions west of Puente Street. The zone designations included in this category are R-2 and P-C (see Table 4-7).

Table 4-7: Multi-family Residential Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Multi-Family Residential	216.45	134.20	93	2.33	1.44

4.6.3 High Density Residential

The high-density residential land usage is typically apartment complexes, senior complexes, and cluster condominiums homes. These areas are generally located west of Puente Street and Central Avenue, in areas south of the Tracks at Brea, and areas near Central Avenue and Brea Boulevard. The zone designation included in this category is R-3 (see Table 4-8).

Table 4-8: High Density Residential Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
High Density Residential	245.30	152.09	71	3.45	2.14

4.6.4 Schools

There are eight public schools within the City. They include six elementary, one junior high, and one high school with one school district transport (see Table 4-9). Only public schools were considered under this duty factor. Private schools are classified as residential (R-1) per the zoning designation areas.

Table 4-9: School Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Schools	143.40	88.90	107	1.34	0.83

4.6.5 Business / Commercial

Business/Commercial land usage area is along Imperial Highway and parts of Brea Boulevard. These areas contain locations such as the Brea Mall, Brea Mall Executive Plaza, and other shopping and business/professional plazas. The zone designations included in this category are C-G, C-C, C-P, and C-N (see Table 4-10).

Table 4-10: Business / Commercial Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Business / Commercial	164.35	101.90	172	0.96	0.59

4.6.6 Industrial

The Industrial land usage area is spread out in areas north and south of Lambert Road, west of Highway 57, and in areas south of Central Avenue, and north of Imperial Highway. These areas contain various manufacturing plants, distribution centers, public utilities, development facilities and warehouses. The zone designations included in this category are BISP, C-M, M-1, M-2, and M-P (see Table 4-11).

Table 4-11: Industrial Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Industrial	200.28	124.17	153	1.31	0.81

4.6.7 Mixed-use

Mixed Use land usage area is distributed in areas along Brea Boulevard, south of Lambert Road, and portions east of Valencia Avenue, north of Imperial Highway. These areas contain markets, local restaurants/taverns, coffee shops and new residential developments. The zone designations included in this category are MU-I, MU-II, and MU-III (see Table 4-12).

Table 4-12: Mixed-use Zone Designation Classifications

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Mixed-use	51.78	32.10	35	1.48	0.92

4.6.8 Water Duty Factor Summary

The water duty factors for each land use type shown in Table 4-6 through Table 4-12 are summarized below in Table 4-13.

Table 4-13: Water Duty Factor Summary

Water Duty Factor	AFY	gpm	Acre	AFY/ac	gpm/ac
Single Family Residential	1563.30	969.25	760	2.06	1.28
Multi-Family Residential	216.45	134.20	93	2.33	1.44
High Density Residential	245.30	152.09	71	3.45	2.14
Schools	143.40	88.90	107	1.34	0.83
Business / Commercial	164.35	101.90	172	0.96	0.59
Industrial	200.28	124.17	153	1.31	0.81
Mixed-use	51.78	32.10	35	1.48	0.92

4.7 Use of Water Duty Factors

Water duty factors can be used to estimate future demand for new proposed developments in the City. To identify the future demands for new developments, the water duty factors can be multiplied by the size of the development. In the case of redevelopment or densification, the existing demand needs to be subtracted from the estimated future demand to find the incremental increase in demand associated with the development.

4.8 Impact of Pending Developments

Table 4-14 lists the current project developments in the planning stage with the City. These proposed developments along with 2002 WMP outstanding development areas are shown in Appendix C as part of this WMP. The future demands are estimated based on the duty factors and land size of the development.

Table 4-14: Pending Project Developments – Projected Demands

Project Type	Project Name	Location	Land Usage	Area (AC)	Proposed Zone	Proposed Demand (GPY)	Proposed Demand (AFY)
Under Construction	Central Park Village – Trumark	400 West Central Avenue	M-P	4.61	605A	1,967,863	6.04
	La Floresta (PA 1)	East of Valencia Avenue, North of Imperial Highway	MU-II	2.70	605C	1,302,112	4.00
	Brea Place	NW corner of State College Boulevard and Birch Street	MU-I	5.79	515	2,792,306	8.57
	Brea Plumbing	340 North Orange Avenue	M-2	0.25	515	106,717	0.33
	295 Lilac Lane	295 Lilac Lane	R-1	5.24	1000	3,517,396	10.79
Approved for Entitlement	201 North Berry Street	201 North Berry Street	M-2	7.92	515	3,380,798	10.38
	Brandywine Homes	251 South Randolph Avenue	C-P	1.92	515	600,614	1.84
	Self-Storage	2700 East Imperial Highway	M-1	1.97	540	840,931	2.58
	Industrial Building	3075 East Imperial Highway	M-1	3.66	605C	1,562,338	4.79
	109 Lilac Lane	109 Lilac Lane	PF	8.66	1000	5,813,101	17.84
	240 North Madrona Avenue	240 North Madrona Avenue	R-3	0.18	515	202,355	0.62
	Brea Imperial Center (In-N-Out)	2500 East Imperial Highway	C-G	0.26	540	81,333	0.25
	Mercury Apartment	2110 West Mercury Lane, SE corner of North Berry Street and Mercury Lane	C-M	1.01	515	315,948	0.97

Project Type	Project Name	Location	Land Usage	Area (AC)	Proposed Zone	Proposed Demand (GPY)	Proposed Demand (AFY)
Under Entitlement Review	Raising Canes	255 East Imperial Highway	MU	0.81	515	390,633	1.20
	Brea Imperial Center – Fogo De Chao	SW corner of State College Boulevard and Imperial Highway	MU	0.26	515	125,389	0.38
	214 ½ Madrona Avenue	214 ½ Madrona Avenue	R-3	0.09	515	101,178	0.31
	Pacific Communities	Carbon Canyon Road and Brea Hills Avenue	R-1	0.48	750	322,204	0.99
	Brea Mall Expansion	1065 Brea Mall	C-C	2.28	515	713,229	2.19
	Brea 265 (AERA Energy)	East and west of Valencia Avenue, south of Lambert Road/Carbon Canyon Road	R-1	265	605C	177,883,562	545.90
	Hampton Inn (Tower Record Building)	220 South Brea Boulevard	C-G	0.38	515	118,871	0.36
					TOTAL	**202,138,877**	**620.34**

4.9 Fire Flow Requirements

Every water system must provide adequate supply for fire-fighting capabilities. To determine if the water system has adequate capacity to provide fire flows, it is necessary to establish the minimum fire flow requirements in the distribution system.

Under fire flow conditions, residual pressures cannot fall below 20 psi when delivering the required fire flows. The minimum residual pressure is established by the Title 22 of the California Code of Regulations, Division, Chapter 16, Article 8, Section 64602. This threshold provides a buffer from negative pressure in the distribution system that could result in an ingress of contaminants. Guidance on fire flow requirements for new construction is provided by the Orange County Fire Authority (OCFA) Fire Master Plans for Commercial and Residential Developments (Attachment 23 for Fire Flow Requirements, and Attachment 24 for Spacing Requirements).

Typically, the fire flow requirements are based on the type of land usage in the area of the fire flow. The criteria provided in the 2009 Brea WMPU are still current, as shown in Table 4-15 below.

Table 4-15: Fire Flow Requirements per Land Usage

Land Use Description	Zoning Designation	Minimum Fire Flow (gpm)	Minimum Duration (hrs)
Single Family Residential	HR, R1-H, R-1, R-1(5000)	1,500	2
Multi-Family Residential	R-2, P-C	2,500	2
High Density Residential	R-3	4,000	4
Schools	N/A	3,500	4
Business/ Commercial	C-P, C-N, C-G, C-C, PF	2,500	2
Industrial	BISP, C-M, M-1, M-2, M-P	4,000	4
Mixed-use	MU-I, MU-II, MU-III	4,000	4

ATTACHMENT 23

CFC TABLE B105.1(2): Minimum Required Fire Flow and Flow Duration for Buildings in OCFA Jurisdiction

FIRE FLOW CALCULATION AREA (square feet)					DETACHED SINGLE-FAMILY RESIDENCE/DUPLEX			OTHER BUILDINGS		
					FIRE FLOW (gallons per minute at 20 psi residual)		DURATION (hours)	FIRE FLOW (gallons per minute at 20 psi residual)		DURATION (hours)
Type IA/IB	Type IIA/IIIA	Type IV/VA	Type IIB/IIIB	Type VB	NS	S		NS	S	
0-22700	0-12700	0-8200	0-5900	0-3600	1000	1000	1	1500	1500	2
22701-30200	12701-17000	8201-10900	5901-7900	3601-4800	1750	1000	NS: 2 S: 1	1750	1500	
30201-38700	17001-21800	10901-12900	7901-9800	4801-6200	2000	1000		2000	1500	
38701-48300	21801-24200	12901-17400	9801-12600	6201-7700	2250	1125		2250	1500	
48301-59000	24201-33200	17401-21300	12601-15400	7701-9400	2500	1250		2500	1500	
59001-70900	33201-39700	21301-25500	15401-18400	9401-11300	2750	1375		2750	1500	
70901-83700	39701-47100	25501-30100	18401-21800	11301-13400	3000	1500	NS: 3 S: 1	3000	1500	3
83701-97700	47101-54900	30101-35200	21801-25900	13401-15600	3250	1625		3250	1625	
97701-112700	54901-63400	35201-40600	25901-29300	15601-18000	3500	1750		3500	1750	
112701-128700	63401-72400	40601-46400	29301-33500	18001-20600	3750	1875		3750	1875	
128701-145900	72401-82100	46401-52500	33501-37900	20601-23300	4000	2000	NS: 4 S: 1	4000	2000	4
145901-164200	82101-92400	52501-59100	37901-42700	23301-26300	4250	2125		4250	2125	
164201-183400	92401-103100	59101-66000	42701-47700	26301-29300	4500	2250		4500	2250	
183401-203700	103101-114600	66001-73300	47701-53000	29301-32600	4750	2375		4750	2375	
203701-225200	114601-126700	73301-81100	53001-58600	32601-36000	5000	2500		5000	2500	
225201-247700	126701-139400	81101-89200	58601-65400	36001-39600	5250	2625		5250	2625	
247701-271200	139401-152600	89201-97700	65401-70600	39601-43400	5500	2750		5500	2750	
271201-295900	152601-166500	97701-106500	70601-77000	43401-47400	5750	2875		5750	2875	
295901+	166501+	106501-115800	77001-83700	47401-51500	6000	3000		6000	3000	
		115801-125500	83701-90600	51501-55700	6250	3125		6250	3125	
		125501-135500	90601-97900	55701-60200	6500	3250		6500	3250	
		135501-145800	97901-106800	60201-64800	6750	3375		6750	3375	
		145801-156700	106801-113200	64801-69600	7000	3500		7000	3500	
		156701-167900	113201-121300	69601-74600	7250	3625		7250	3625	
		167901-179400	121301-129600	74601-79800	7500	3750		7500	3750	
		179401-191400	129601-138300	79801-85100	7750	3875		7750	3875	
		191401+	138301+	85101+	8000	4000		8000	4000	

S: Provided with an approved sprinkler system throughout the structure NS: No fire sprinklers or partially protected with a sprinkler system

ATTACHMENT 24

CFC TABLE C102.1:
Hydrant Quantity and Spacing in OCFA Jurisdiction

DETACHED SINGLE FAMILY RESIDENCES/DUPLEXES *with* SPRINKLERS

Flow Requirement from Table B105.1(2)	Minimum Number of Hydrants	Maximum Distance to a Hydrant		Maximum Distance between Hydrants [1]		Average Distance between Hydrants[1]	
		Thru road	*Dead-end*	Thru road	*Dead-end*	Thru road	*Dead-end*
1000 - 1750	1	300	*250*	600	*500*	600	*500*
1751+	Use the table below						

ALL OTHER STRUCTURES

Flow Requirement from Table B105.1(2)	Minimum Number of Hydrants	Maximum Distance to a Hydrant		Maximum Distance between Hydrants [1,2]		Average Distance between Hydrants[1,2]	
		Thru road	*Dead-end*	Thru road	*Dead-end*	Thru road	*Dead-end*
1000 - 1750	1	250	*200*	500	*400*	500	*400*
1751 - 2250	2	225	*175*	450	*350*	450	*350*
2251 - 2500	3	225	*175*	450	*350*	450	*350*
2501 - 3000	3	225	*175*	450	*350*	400	*300*
3001 - 4000	4	210	*160*	420	*320*	350	*250*
4001 - 5000	5	180	*130*	360	*260*	300	*200*
5001 - 5500	6	180	*130*	360	*260*	300	*200*
5501 - 6000	6	150	*100*	300	*200*	250	*150*
6001 - 7000	7	150	*100*	300	*200*	250	*150*
7001+	1 per 1000 gpm or fraction thereof	120	*70*	240	*140*	200	*100*

All distances are in feet.

[1] Where streets are provided with median dividers which cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

[2] Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.