Appendix J:
Transportation Supporting Information

THIS PAGE INTENTIONALLY LEFT BLANK

J.1 - Traffic Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

Barton Road Logistics Center

TRAFFIC ANALYSIS

CITY OF COLTON

PREPARED BY:

Aric Evatt, PTP
aevatt@urbanxroads.com

Charlene So, PE
cso@urbanxroads.com

Connor Paquin, PE
cpaquin@urbanxroads.com

SEPTEMBER 8, 2020

TABLE OF CONTENTS

TABLE OF CONTENTS I
APPENDICES III
LIST OF EXHIBITS V
LIST OF TABLES VII
LIST OF ABBREVIATED TERMS IX
1 SUMMARY OF FINDINGS 1
1.1 Summary of Findings 1
1.2 Project Overview 3
1.3 Analysis Scenarios 4
1.4 Study Area 5
1.5 Deficiencies 9
1.6 Recommendations 11
1.7 Truck Access and Circulation 17
1.8 Truck Queuing 21
1.9 Barton Road Bridge Operations 21
2 METHODOLOGIES 25
2.1 Level of Service 25
2.2 Intersection Capacity Analysis 25
2.3 Traffic Signal Warrant Analysis Methodology 27
2.4 Freeway Off-Ramp Queuing Analysis 29
2.5 Freeway Mainline Segment Analysis Methodology 29
2.6 Freeway Merge/Diverge Ramp Junction Analysis 30
2.7 Minimum Acceptable Levels of Service (LOS) 31
2.8 Deficiency Criteria 32
2.9 Project Fair Share Calculation Methodology 33
3 AREA CONDITIONS 35
3.1 Existing Circulation Network 35
3.2 City of Colton General Plan Circulation Element 35
3.3 City of Grand Terrace General Plan Circulation Element 35
3.4 Bicycle & Pedestrian Facilities 35
3.5 Transit Service 46
3.6 Truck Routes 46
3.7 Existing (2020) Traffic Counts 46
3.8 Intersection Operations Analysis 50
3.9 Traffic Signal Warrants Analysis 50
3.10 Off-Ramp Queuing Analysis 55
3.11 Freeway Facility Analysis 55
3.12 Deficiencies and Improvements 55
4 PROJECTED FUTURE TRAFFIC 61
4.1 Trip Generation 61
4.2 Project Trip Distribution 66
4.3 Modal Split 66
4.4 Project Trip Assignment 66
4.5 Background Traffic 66
4.6 Cumulative Development Traffic 73

4.7 Horizon Year (2040) Volume Development 80
5 E+P TRAFFIC CONDITIONS 83
5.1 Roadway Improvements 83
5.2 Existing plus Project Traffic Volume Forecasts 83
5.3 Intersection Operations Analysis 83
5.4 Traffic Signal Warrants Analysis 83
5.5 Off-Ramp Queuing Analysis 88
5.6 Freeway Facility Analysis 88
5.7 Deficiencies and Improvements 88
6 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS 93
6.1 Roadway Improvements 93
6.2 Opening Year Cumulative (2022) Without Project Traffic Volume Forecasts 93
6.3 Opening Year Cumulative (2022) With Project Traffic Volume Forecasts 93
6.4 Intersection Operations Analysis 98
6.5 Traffic Signal Warrants Analysis 98
6.6 Off-Ramp Queuing Analysis 102
6.7 Freeway Facility Analysis 102
6.8 Deficiencies and Improvements 102
7 HORIZON YEAR (2040) TRAFFIC CONDITIONS 109
7.1 Roadway Improvements 109
7.2 Horizon Year (2040) Without Project Traffic Volume Forecasts 109
7.3 Horizon Year (2040) With Project Traffic Volume Forecasts 109
7.4 Intersection Operations Analysis 114
7.5 Traffic Signal Warrants Analysis 114
7.6 Off-Ramp Queuing Analysis 118
7.7 Freeway Facility Analysis 118
7.8 Deficiencies and Improvements 118
8 LOCAL AND REGIONAL FUNDING MECHANISMS 125
8.1 City of Colton Development Impact Fee Program 125
8.2 Measure “I” Funds 125
8.3 Fair Share Contribution 126
9 REFERENCES 129

APPENDICES

APPENDIX 1.1: APPROVED TRAFFIC STUDY SCOPING AGREEMENT
APPENDIX 1.2: SITE ADJACENT QUEUES
APPENDIX 3.1: HISTORIC (2016, 2018, & 2019) TRAFFIC COUNTS
APPENDIX 3.2: EXISTING (2020) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 3.3: EXISTING (2020) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 3.4: EXISTING (2020) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS
APPENDIX 3.5: EXISTING (2020) CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 3.6: EXISTING (2020) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS
APPENDIX 4.1: POST-PROCESS WORKSHEETS
APPENDIX 5.1: E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 5.2: E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 5.3: E+P CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS
APPENDIX 5.4: E+P CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 5.5: E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS
APPENDIX 6.1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 6.2: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 6.3: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 6.4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 6.5: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS
APPENDIX 6.6: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS
APPENDIX 6.7: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 6.8: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 6.9: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS
APPENDIX 6.10: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS
APPENDIX 7.1: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 7.2: HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS
APPENDIX 7.3: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 7.4: HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS
APPENDIX 7.5: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

APPENDIX 7.6: HORIZON YEAR (2040) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS
APPENDIX 7.7: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 7.8: HORIZON YEAR (2040) WITH PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS
APPENDIX 7.9: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS
APPENDIX 7.10: HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

LIST OF EXHIBITS

EXHIBIT 1-1: PRELIMINARY SITE PLAN 2
EXHIBIT 1-2: LOCATION MAP 6
EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO 8
EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS 12
EXHIBIT 1-5: TRUCK ACCESS 18
EXHIBIT 1-6: I-215 SB RAMPS & BARTON ROAD TRUCK CIRCULATION 20
EXHIBIT 1-7: GUARD GATE TRUCK STACKING 22
EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS 36
EXHIBIT 3-2: CITY OF COLTON GENERAL PLAN CIRCULATION ELEMENT 38
EXHIBIT 3-3: CITY OF COLTON GENERAL PLAN ROADWAY CROSS-SECTIONS 39
EXHIBIT 3-4: CITY OF GRAND TERRACE GENERAL PLAN CIRCULATION ELEMENT 41
EXHIBIT 3-5: CITY OF GRAND TERRACE GENERAL PLAN ROADWAY CROSS-SECTIONS 42
EXHIBIT 3-6: CITY OF COLTON GENERAL PLAN BICYCLE PLAN 43
EXHIBIT 3-7: CITY OF GRAND TERRACE BIKEWAY PLAN 44
EXHIBIT 3-8: EXISTING PEDESTRIAN FACILITIES 45
EXHIBIT 3-9: CITY OF COLTON TRANSIT PLAN 47
EXHIBIT 3-10 EXISTING TRANSIT ROUTES 48
EXHIBIT 3-11: CITY OF COLTON TRUCK ROUTES 49
EXHIBIT 3-12: EXISTING (2020) AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 51
EXHIBIT 3-13: EXISTING (2020) TRAFFIC VOLUMES (IN PCE) 52
EXHIBIT 3-14: EXISTING (2020) SUMMARY OF LOS 53
EXHIBIT 3-15: EXISTING (2020) FREEWAY MAINLINE VOLUMES 59
EXHIBIT 4-1: PROJECT (TRUCK) TRIP DISTRIBUTION 67
EXHIBIT 4-2: PROJECT (PASSENGER CAR) TRIP DISTRIBUTION 69
EXHIBIT 4-3: PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 71
EXHIBIT 4-4: PROJECT ONLY TRAFFIC VOLUMES (IN PCE) 72
EXHIBIT 4-5: CUMULATIVE DEVELOPMENT LOCATION MAP 74
EXHIBIT 4-6: CUMULATIVE ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 75
EXHIBIT 4-7: CUMULATIVE ONLY TRAFFIC VOLUMES (IN PCE) 76
EXHIBIT 5-1: E+P AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 84
EXHIBIT 5-2: E+P TRAFFIC VOLUMES (IN PCE) 85
EXHIBIT 5-3: E+P CONDITIONS SUMMARY OF LOS 86
EXHIBIT 5-3: E+P FREEWAY MAINLINE VOLUMES 92
EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 94
EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE) 95
EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2022) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 96
EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE) 97
EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS SUMMARY OF LOS 100
EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS SUMMARY OF LOS 101
EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES 106
EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2022) WITH PROJECT FREEWAY MAINLINE VOLUMES 107
EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE) 110

EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)..... 111
EXHIBIT 7-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)..... 112
EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)..... 113
EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS SUMMARY OF LOS 116
EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT CONDITIONS SUMMARY OF LOS 117
EXHIBIT 7-7: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES..... 122
EXHIBIT 7-8: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES..... 123

LIST OF TABLES

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS 5
TABLE 1-2: FREEWAY FACILITY ANALYSIS LOCATIONS 7
TABLE 1-3: SUMMARY OF IMPROVEMENTS AND ROUGH ORDER OF MAGNITUDE COSTS 15
TABLE 1-4: ROADWAY SEGMENT CAPACITY ANALYSIS FOR BARTON ROAD OVERCROSSING 23
TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS 26
TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS 27
TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS 28
TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS 30
TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS 31
TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2020) CONDITIONS 54
TABLE 3-2: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR EXISTING (2020) CONDITIONS 56
TABLE 3-3: FREEWAY FACILITY ANALYSIS FOR EXISTING (2020) CONDITIONS 57
TABLE 3-4: INTERSECTION ANALYSIS FOR EXISTING (2020) CONDITIONS WITH IMPROVEMENTS 58
TABLE 4-1: PROJECT TRIP GENERATION SUMMARY 63
TABLE 4-2: ALTERNATIVE TRIP GENERATION SUMMARY 64
TABLE 4-3: CUMULATIVE DEVELOPMENT LAND USE SUMMARY 77
TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS 87
TABLE 5-2: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR E+P CONDITIONS 89
TABLE 5-3: FREEWAY FACILITY ANALYSIS FOR E+P CONDITIONS 90
TABLE 5-4: INTERSECTION ANALYSIS FOR E+P CONDITIONS WITH IMPROVEMENTS 91
TABLE 6-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2022) CONDITIONS 99
TABLE 6-2: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR OPENING YEAR CUMULATIVE (2022) CONDITIONS 103
TABLE 6-3: FREEWAY FACILITY ANALYSIS FOR OPENING YEAR CUMULATIVE (2022) CONDITIONS 104
TABLE 6-4: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2022) CONDITIONS WITH IMPROVEMENTS 105
TABLE 7-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS 115
TABLE 7-2: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR HORIZON YEAR (2040) CONDITIONS 119
TABLE 7-3: FREEWAY FACILITY ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS 120
TABLE 7-4: INTERSECTION ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS WITH IMPROVEMENTS 121
TABLE 8-1: PROJECT FAIR SHARE CALCULATIONS FOR INTERSECTIONS 127

This Page Intentionally Left Blank

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CCI	Construction Cost Index
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
PCE	Passenger Car Equivalents
PeMS	Performance Measurement System
PHF	Peak Hour Factor
Project	Barton Road Logistics Center
RTP	Regional Transportation Plan
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
sf	Square Feet
SHS	State Highway System
TA	Traffic Analysis
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane

This Page Intentionally Left Blank

1 SUMMARY OF FINDINGS

This report presents the results of the traffic analysis (TA) for the proposed Barton Road Logistics Center ("Project"), which is located east of Terrace Avenue at Barton Road in the City of Colton, as shown on Exhibit 1-1. A portion of the site is located west of S. Terrace Avenue, south of Barton Road, which will be vacated as part of the development of the Project.

The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with General Plan level of service goals and policies. This TA has been prepared in accordance with the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update), the County of San Bernardino Transportation Impact Study Guidelines (dated July 9, 2019), the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies (December 2002), and consultation with City staff during the TA scoping process. (1) (2) (3) The City approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

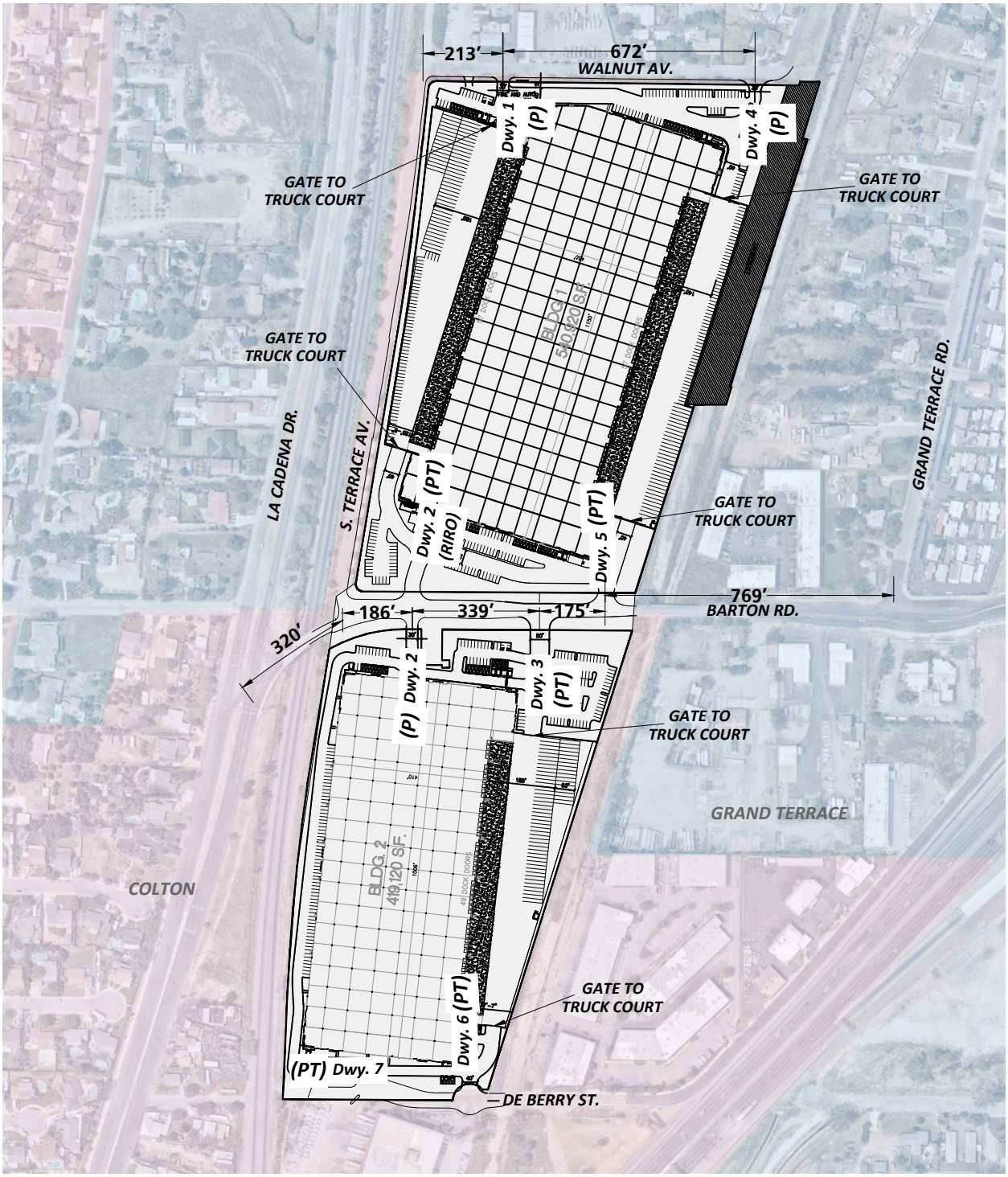
The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to construct Barton Road at its ultimate full-section width as a Major Arterial (100-foot right-of-way) from the Project's western boundary to the Project's eastern boundary consistent with the City's standards. The Project may not stripe the 2nd eastbound and westbound through lanes until such time in the future when there are additional receiving lanes to the east and west of the Project.
- According to the City of Colton General Plan, Walnut Avenue and S. Terrace Avenue (north of Barton Road) are currently built out to their ultimate General Plan roadway half-sections. As such, additional curb, gutter, and sidewalk improvements are recommended, as needed for site access, along the Project's frontage, consistent with the City's standards.
- S. Terrace Avenue (south of Barton Road) is to be vacated with the development of the Project.

Additional details and intersection lane geometrics are provided in Section 1.6 *Recommendations* of this report.

The development of the proposed Project is not anticipated to require the construction of any off-site improvements, however, there are improvement needs identified at off-site intersections for future traffic analysis scenarios where the Project would contribute traffic. As such, the Project Applicant's responsibility for the Project's contributions towards off-site intersection deficiencies is fulfilled through payment of fair share or participation in the pre-existing fee programs that would be assigned to construction of the identified recommended improvements. The Project Applicant would be required to pay requisite fair share contributions and fee payments consistent with the City' requirements (see Section 8 *Local and Regional Funding Mechanisms*).

EXHIBIT 1-1: PRELIMINARY SITE PLAN



LEGEND:

RIRO *= RIGHT-IN/RIGHT-OUT ONLY ACCESS*
P *= PASSENGER CARS ONLY*
T *= TRUCKS ONLY*
PT *= PASSENGER CARS AND TRUCKS*

NOTE: UNLESS NOTED, ALL DRIVEWAYS ARE ASSUMED TO BE FULL ACCESS.

N

12971 - siteplan.dwg

URBAN CROSSROADS

1.2 PROJECT OVERVIEW

Exhibit 1-1 illustrates the preliminary Project site plan. The Project is proposed to consist of 960,040 square feet of High-Cube Transload Short-Term Storage Warehouse use within two buildings. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. Access to the Project site will be provided via the following driveways:

- Driveway 1 & Walnut Avenue – full access for passenger cars only
- Driveway 2 (North Side) & Barton Road – right-in/right-out access only for both passenger cars and trucks
- Driveway 2 (South Side) & Barton Road – full access for passenger cars only
- Driveway 3 & Barton Road – full access for both passenger cars and trucks
- Driveway 4 & Walnut Avenue – full access for passenger cars only
- Driveway 5 & Barton Road – full access for both passenger cars and trucks
- Driveway 6 & De Berry Street – full access for both passenger cars and trucks
- Driveway 7 & De Berry Street – full access for both passenger cars and trucks

Regional access to the Project site is available from the I-215 Freeway via Barton Road and Iowa Avenue and the I-10 Freeway via Rancho Avenue interchanges.

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. Trip generation rates for the Project are based on the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition (2017), for High-Cube Transload and Short-Term Storage Warehouse (ITE Land Use Code 154). Passenger Car Equivalent (PCE) factors were applied to the trip generation rates to convert trips made by heavy trucks (large 2-axle, 3-axle, and 4+-axle trucks) to PCE values. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The proposed Project is anticipated to generate 1,348 actual trip ends per day, with 81 AM peak hour trips and 99 PM peak hour trips. For the purposes of the operations analysis, the PCE values have been utilized. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

For the purposes of this TA, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2020)
- Existing plus Project (E+P)
- Opening Year Cumulative (2022) Without Project
- Opening Year Cumulative (2022) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.3.1 EXISTING (2020) CONDITIONS

Information for Existing (2020) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. As such, historic (2016, 2018, and 2019) traffic counts were utilized in conjunction with a 2% per year growth rate (compounded annually) to reflect 2020 conditions (see Section 3.7 for additional discussion).

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (E+P) analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of Project traffic.

1.3.3 OPENING YEAR CUMULATIVE (2022) CONDITIONS

The Opening Year Cumulative conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 4.04% is included for Opening Year Cumulative (2022) traffic conditions. The ambient growth is consistent with the growth used by other projects in the area. This comprehensive list was compiled from information provided by the City of Colton and other near-by agencies.

1.3.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) modified to represent buildout of the City of Colton. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation fee programs, such as the City's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Colton (lead agency). Other improvements needed beyond the "funded" improvements (such as localized improvements to non-DIF facilities) are identified as such.

1.4 STUDY AREA

To ensure that this TA satisfies the City of Colton's requirements, Urban Crossroads, Inc. prepared a project TA scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The scoping agreement was also shared with the City of Grand Terrace and their comments have also been addressed as part of this TA. Other agencies such as the County of San Bernardino, County of Riverside, City of San Bernardino, and City of Riverside were also consulted to obtain a list of cumulative projects from each respective agency for consideration as part of this traffic analysis.

1.4.1 INTERSECTIONS

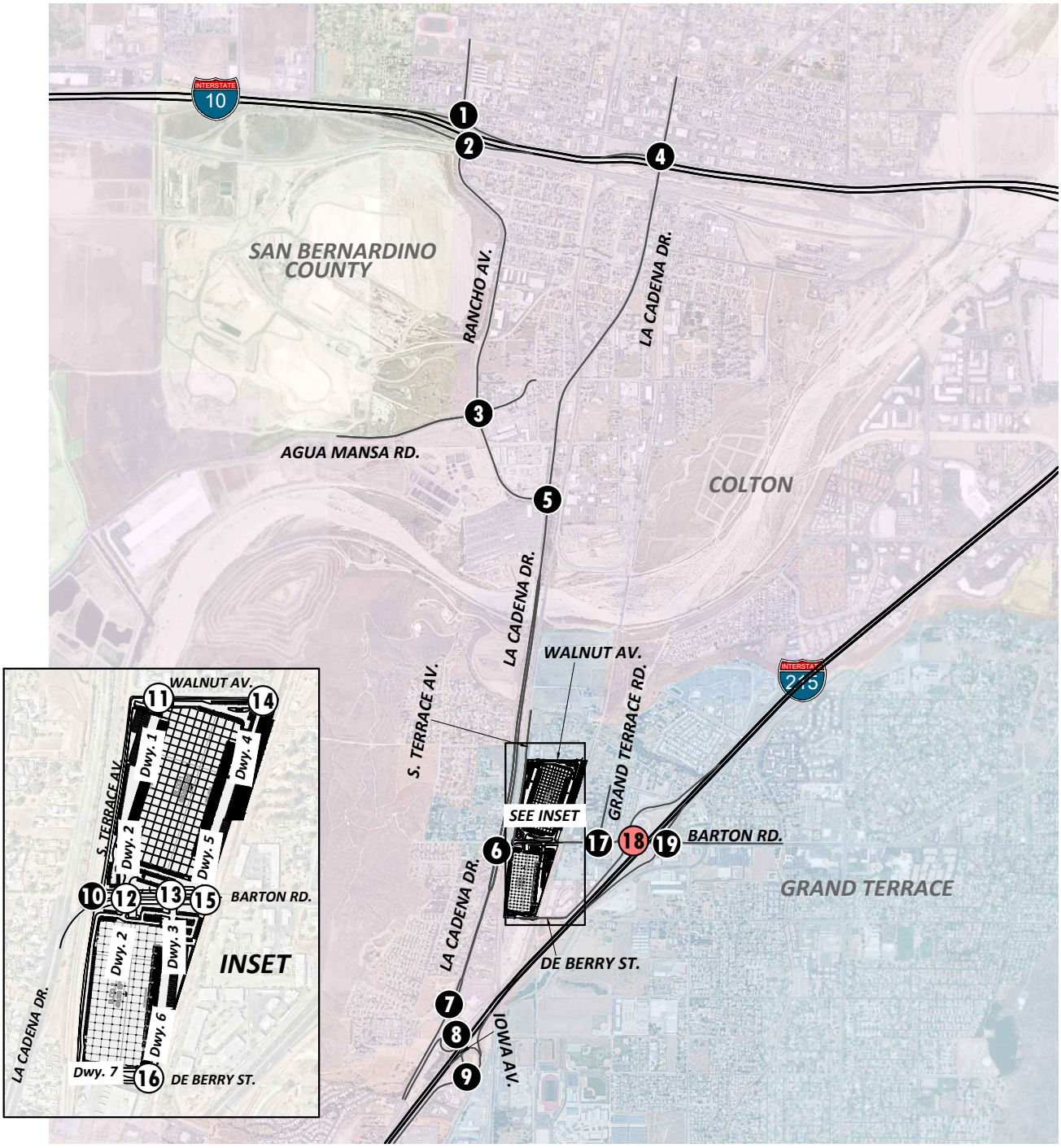
The following 19 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TA based on consultation with City of Colton staff. The "50 peak hour trip" criterion generally represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of influence (i.e., study area). Additional study area intersections wherein the Project is not anticipated to contribute more than 50 peak hour trips have been added at the request of City staff.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Rancho Av. & I-10 WB Ramps *	Colton, Caltrans	No
2	Rancho Av. & I-10 EB Ramps *	Colton, Caltrans	No
3	Rancho Av. & Agua Mansa Rd. *	Colton	No
4	La Cadena Dr. & I-10 WB Ramps *	Colton, Caltrans	No
5	La Cadena Dr. & Rancho Av. *	Colton	No
6	La Cadena Dr. & Barton Rd. *	Colton, Caltrans	No
7	La Cadena Dr. & Iowa Av. *	Colton	No
8	I-215 SB Ramps & Iowa Av. *	Colton, Caltrans	No
9	I-215 NB Ramps & Iowa Av. *	Colton, Caltrans	No
10	S. Terrace Av. & Barton Rd.	Colton	No
11	Dwy. 1 & Walnut Av. – Future Intersection	Colton	No
12	Dwy. 2 & Barton Rd. – Future Intersection	Colton	No
13	Dwy. 3 & Barton Rd. – Future Intersection	Colton	No
14	Dwy. 4 & Walnut Av. – Future Intersection	Colton	No
15	Dwy. 5 & Barton Rd. – Future Intersection	Colton	No
16	Dwy. 6 & Dwy. 7/De Berry St. – Future Intersection	Colton	No
17	Grand Terrace Rd. & Barton Rd.	Grand Terrace	No
18	I-215 SB Ramps & Barton Rd.	Grand Terrace, Caltrans	Yes
19	I-215 NB Ramps & Barton Rd. *	Grand Terrace, Caltrans	No

* Note: Project contributes fewer than 50 peak hour trips during one or both peak hours.

EXHIBIT 1-2: LOCATION MAP



LEGEND:

- 0 = EXISTING INTERSECTION ANALYSIS LOCATION
- 0 = FUTURE INTERSECTION ANALYSIS LOCATION
- 0 = CMP INTERSECTION

N

12971 - locmap-a.dwg

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated in Table 1-1. (1)

1.4.2 FREEWAY MAINLINE AND RAMP JUNCTION ANALYSIS

Study area freeway mainline analysis locations were selected based on Caltrans TA guidelines, which may require the analysis of State highway facilities. (3) Consistent with recent Caltrans guidance, and because deficiencies to freeway segments tend to dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry typically is not required. This study evaluates the following freeway facilities adjacent to the point of entry to the SHS at the I-215 Freeway and Barton Road (see Table 1-2):

TABLE 1-2: FREEWAY FACILITY ANALYSIS LOCATIONS

ID	Freeway Facilities
1	I-215 Freeway Southbound, North of Barton Rd.
2	I-215 Freeway Southbound, Off-Ramp at Barton Rd.
3	I-215 Freeway Southbound, Loop On-Ramp at Barton Rd.
4	I-215 Freeway Southbound, South of Barton Rd.
5	I-215 Freeway Northbound, North of Barton Rd.
6	I-215 Freeway Northbound, On-Ramp at Barton Rd.
7	I-215 Freeway Northbound, Off-Ramp at Barton Rd.
8	I-215 Freeway Northbound, South of Barton Rd.

The Project is anticipated to contribute fewer than 50 peak hour trips to all of the freeway facilities listed in Table 1-2. However, the facilities listed in Table 1-2 have been evaluated as it is the closest interchange to the proposed Project and would be the interchange location most of the freeway-bound Project trips would utilize to access the I-215 Freeway. Other freeway facilities along the I-10 Freeway or the I-215 Freeway at Iowa Avenue were not evaluated as part of this TA as the Project is anticipated to contribute fewer than 50 peak hour trips to these facilities.

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2020)	E+P	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
1	Rancho Av. & I-10 WB Ramps						
2	Rancho Av. & I-10 EB Ramps						
3	Rancho Av. & Agua Mansa Rd.						
4	La Cadena Dr. & I-10 WB Ramps						
5	La Cadena Dr. & Rancho Av.						
6	La Cadena Dr. & Barton Rd.						
7	La Cadena Dr. & Iowa Av.						
8	I-215 SB Ramps & Iowa Av.						
9	I-215 NB Ramps & Iowa Av.						
10	S. Terrace Av. & Barton Rd.						
11	Dwy. 1 & Walnut Av.	NA		NA		NA	
12	Dwy. 2 & Barton Rd.	NA		NA		NA	
13	Dwy. 3 & Barton Rd.	NA		NA		NA	
14	Dwy. 4 & Walnut Av.	NA		NA		NA	
15	Dwy. 5 & Barton Rd.	NA		NA		NA	
16	Dwy. 6 & Dwy. 7/De Berry St.	NA		NA		NA	
17	Grand Terrace Rd. & Barton Rd.						
18	I-215 SB Ramps & Barton Rd.						
19	I-215 NB Ramps & Barton Rd.						

LEGEND:

- = AM PEAK HOUR
- = PM PEAK HOUR
- = ACCEPTABLE LOS A-D
- = DEFICIENT LOS E
- = DEFICIENT LOS F
- NA = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO

1.5 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *E+P Traffic Conditions*, Section 6 *Opening Year Cumulative (2022) Traffic* Conditions, and Section 7 *Horizon Year (2040) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-3.

1.5.1 E+P CONDITIONS

Intersections

Consistent with Existing traffic conditions, the following study area intersection is anticipated to operate at unacceptable Level of Service (LOS) during the peak hours:

- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM peak hour; LOS E PM peak hour

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows, consistent with Existing (2020) traffic conditions.

Freeway Facilities

Consistent with Existing (2020) traffic conditions, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours with the addition of Project traffic.

1.5.2 OPENING YEAR CUMULATIVE (2022) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2022) Without Project traffic conditions:

- Rancho Avenue & Agua Mansa Road (#3) – LOS E PM peak hour only
- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM and PM peak hours
- S. Terrace Avenue & Barton Road (#10) – LOS F AM and PM peak hours

There are no additional intersections anticipated to operate at a deficient LOS during the peak hours with the addition of Project traffic.

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2022) traffic conditions, consistent with Existing (2020) traffic conditions.

Freeway Facilities

Consistent with Existing (2020) traffic conditions, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2022) traffic conditions.

1.5.3 HORIZON YEAR (2040) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions:

- Rancho Avenue & Agua Mansa Road (#3) – LOS E AM peak hour; LOS F PM peak hour
- La Cadena Drive & Rancho Avenue (#5) – LOS E PM peak hour only
- La Cadena Drive & Barton Road (#6) – LOS E AM peak hour only
- La Cadena Drive & Iowa Avenue (#7) – LOS F PM peak hour only
- I-215 SB Ramps & Iowa Avenue (#8) – LOS F AM peak hour; LOS E PM peak hour
- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM and PM peak hours
- S. Terrace Avenue & Barton Road (#10) – LOS F AM and PM peak hours

With the addition of Project traffic, the following additional study area intersections are anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions:

- Driveway 2 & Barton Road (#12) – LOS F AM peak hour; LOS E PM peak hour
- Driveway 3 & Barton Road (#13) – LOS F AM peak hour only
- Driveway 5 & Barton Road (#15) – LOS F AM and PM peak hours

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2040) traffic conditions, consistent with Existing (2020) traffic conditions.

Freeway Facilities

The study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours, consistent with Existing (2020) traffic conditions.

1.6 RECOMMENDATIONS

1.6.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

The following recommendations are based on the improvements needed to accommodate site access. The site adjacent recommendations are shown on Exhibit 1-4.

Recommendation 1 – ***S. Terrace Avenue & Barton Road (#10)*** – The following improvement is necessary to accommodate site access:

- Project to vacate the south leg of the intersection.

Recommendation 2 – ***Driveway 1 & Walnut Avenue (#11)*** – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and a shared left-right turn lane.

Recommendation 3 – ***Driveway 2 & Barton Road (#12)*** – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the northbound approach and a shared left-right turn lane.
- Project to install a stop control on the southbound approach and a right turn lane. The Project should construct the driveway (on the north side of Barton Road) to prohibit left turns in to and left turns out of the northern leg of Driveway 2.

Recommendation 4 – ***Driveway 3 & Barton Road (#13)*** – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and a shared left-right turn lane.

Recommendation 5 – ***Driveway 4 & Walnut Avenue (#14)*** – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the northbound approach and a shared left-right turn lane.

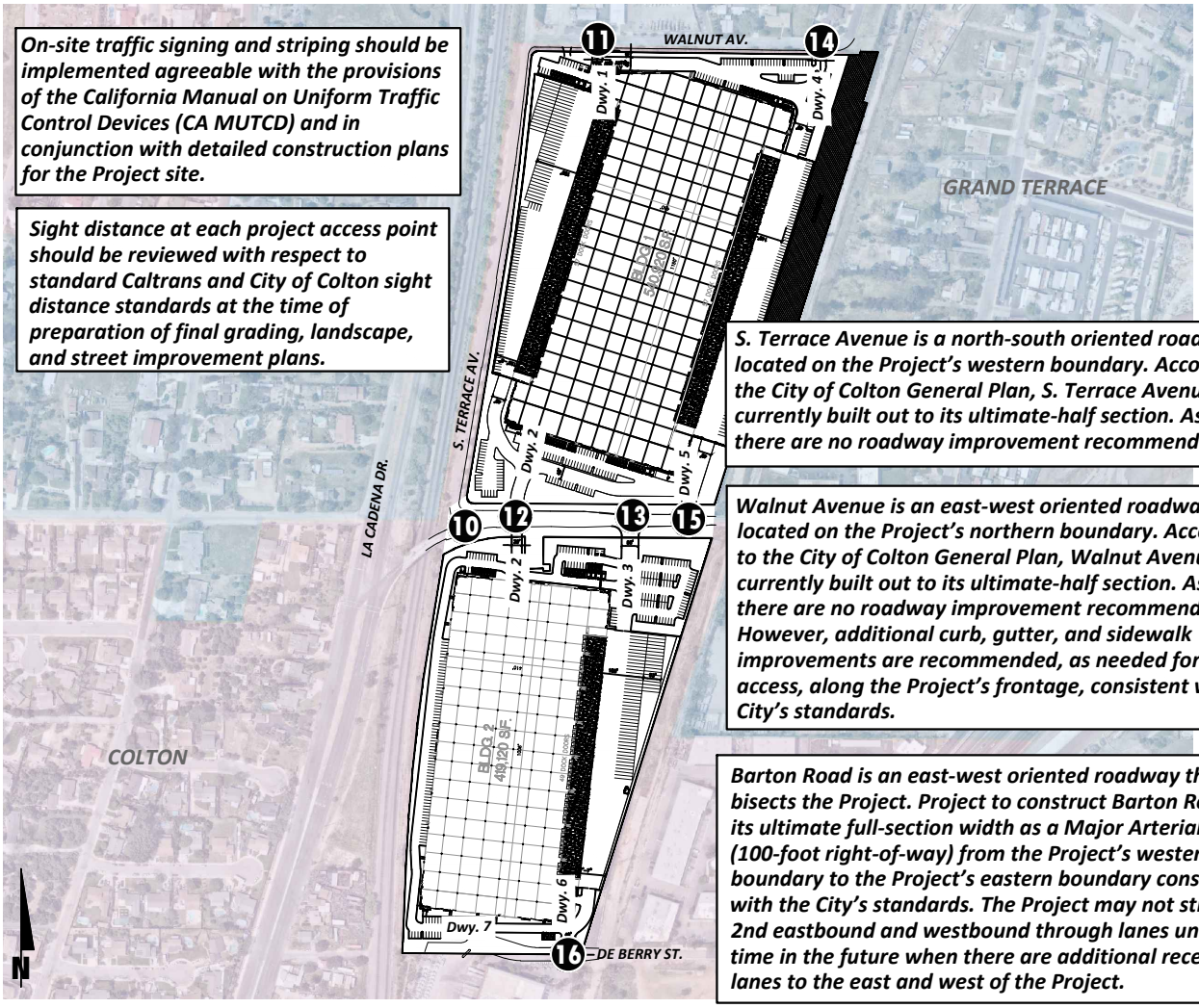
Recommendation 6 – ***Driveway 5 & Barton Road (#15)*** – The following improvement is necessary to accommodate site access:

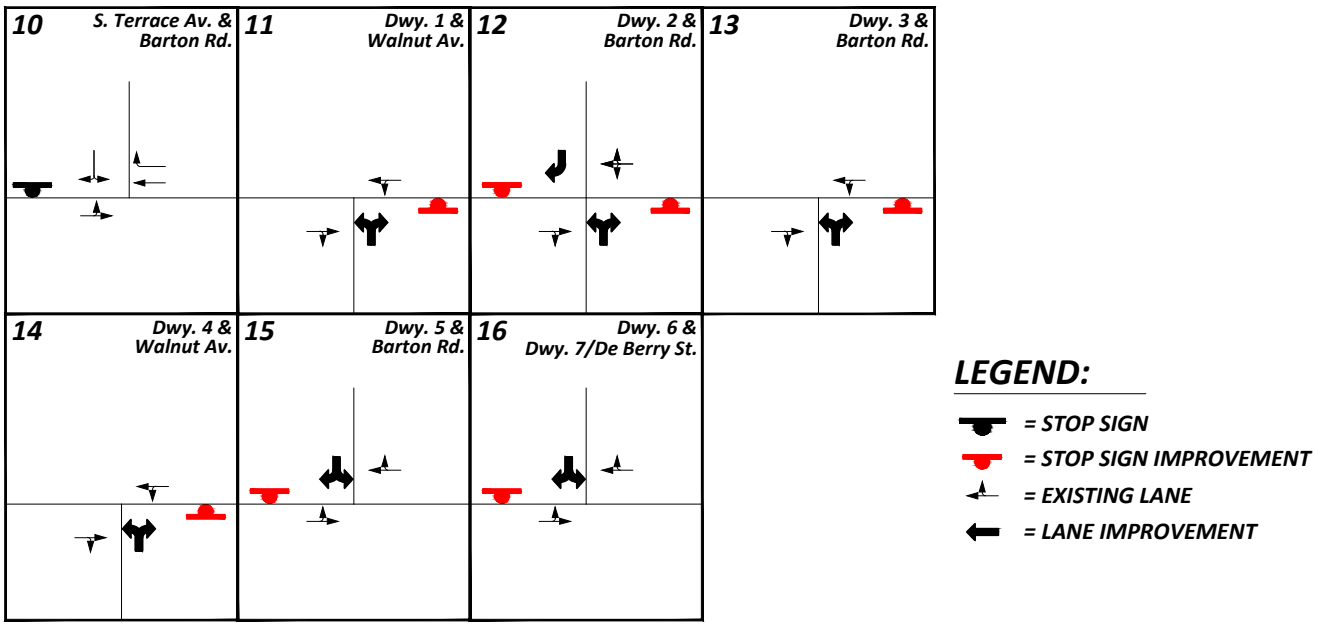
- Project to install a stop control on the southbound approach and a shared left-right turn lane.

Recommendation 7 – ***Driveway 6 & Driveway 7/De Berry Street (#16)*** – The following improvement is necessary to accommodate site access:

- Project to install a stop control on the southbound approach and a shared left-right turn lane.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS





Recommendation 8 – Barton Road is an east-west oriented roadway that bisects the Project. Project to construct Barton Road at its ultimate full-section width as a Major Arterial (100-foot right-of-way) from the Project's western boundary to the Project's eastern boundary consistent with the City's standards. The Project may not stripe the 2nd eastbound and westbound through lanes until such time in the future when there are additional receiving lanes to the east and west of the Project.

Recommendation 9 – Walnut Avenue is an east-west oriented roadway located on the Project's northern boundary. According to the City of Colton General Plan, Walnut Avenue is currently built out to its ultimate General Plan roadway half-section. As such, there are no roadway improvement recommendations. However, additional curb, gutter, and sidewalk improvements are recommended to accommodate site access along the Project's frontage, consistent with the City's standards.

Recommendation 10 – S. Terrace Avenue is a north-south oriented roadway located on the Project's western boundary (north of Barton Road). According to the City of Colton General Plan, S. Terrace Avenue is currently built out to its ultimate General Plan roadway half-section. As such, there are no roadway improvement recommendations. S. Terrace Avenue south of Barton Road is to be vacated with the development of the proposed Project.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Colton sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.6.2 OFF-SITE RECOMMENDATIONS

The recommended improvements needed to address the cumulative deficiencies identified under Existing (2020), E+P, Opening Year Cumulative (2022), and Horizon Year (2040) traffic conditions are summarized in Table 1-3. For those improvements listed in Table 1-3 and not constructed as part of the Project, the Project Applicant's responsibility for the Project's contributions towards deficient intersections is fulfilled through payment of fees or fair share that would be assigned to construction of the identified recommended improvements.

Table 1-3 also summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.612 to reflect current (2020) costs. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process. Based on the Project fair share percentages, the Project's fair share cost is estimated at $28,718. These estimates are a rough order of magnitude only as they are intended only for disclosure purposes and do not imply any legal responsibility or formula for contributions or mitigation.

This Page Intentionally Left Blank

Table 1-3

Summary of Improvements and Rough Order of Magnitude Costs

#	Intersection	Jurisdiction	Existing (2020)	E+P	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or SBCTA CMP?[1]	Project Responsibility[2]	Total Cost[3,4]	Fair Share %[5]	Fair Share Cost[6]
3	Rancho Av. & Agua Mansa Rd.	Colton	None	None	Add EB left turn lane	Same	Same	Same	No	Fair Share	$80,620	1.4%	$1,134
							Add SB right turn lane	Same	No	Fair Share	$80,620		$1,134
											$161,240		**$2,268**
5	La Cadena Dr. & Rancho Av.	Colton	None	None	None	None	Modify the traffic signal to implement overlap phasing for the EB right turn lane	Same	No	Fair Share	$120,930	2.4%	$2,930
											$120,930		**$2,930**
6	La Cadena Dr. & Barton Rd.	Colton	None	None	None	None	Add 2nd WB left turn lane	Same	No	Fair Share	$80,620	2.6%	$2,074
											$80,620		**$2,074**
7	La Cadena Dr. & Iowa Av.	Colton	None	None	None	None	Add 2nd NB through lane	Same	No	Fair Share	$290,232	1.4%	$4,157
							Add 2nd SB through lane	Same	No	Fair Share	$290,232		$4,157
											$580,464		**$8,313**
8	I-215 SB Ramps & Iowa Av.	Colton, Caltrans	None	None	None	None	Add 2nd EB through lane	Same	No	Fair Share	$290,232	0.9%	$2,690
							Add 2nd WB through lane	Same	No	Fair Share	$290,232		$2,690
											$580,464		**$5,380**
9	I-215 NB Ramps & Iowa Av.	Colton, Caltrans	Add EB right turn lane	Same	Same	Same	Same	Same	No	Fair Share	$80,620	0.7%	$584
					Add EB left turn lane	Same	Same	Same	No	Fair Share	$80,620		$584
					Add 2nd EB right turn lane	Same	Same	Same	No	Fair Share	$80,620		$584
							Add 2nd NB left turn lane	Same	No	Fair Share	$80,620		$584
							Add 2nd NB left turn lane	Same	No	Fair Share	$80,620		$584
							Modify the traffic signal to implement overlap phasing for the EB right turn lane	Same	No	Fair Share	$120,930		$876
											$443,410		**$3,213**
10	S. Terrace Av. & Barton Rd.	Colton	None	None	None	None	Add EB left turn lane	Same	No	Fair Share	$80,620	5.6%	$4,540
							Add 2nd EB through lane	Same	Yes (CMP)	Fees	$0		$0
							Add 2nd WB through lane	Same	Yes (CMP)	Fees	$0		$0
											$80,620		**$4,540**
12	Dwy. 2 & Barton Rd.	Colton	Does Not Exist	Install Stop Control on NB and SB approaches Add NB shared left-right turn lane Add SB right turn lane	Does Not Exist	Same as E+P	Does Not Exist	Same as E+P	No	Construct[7]	$0	--	$0
								Same as E+P	No	Construct[7]	$0		$0
								Same as E+P	No	Construct[7]	$0		$0
								Add WB left turn lane	No	Construct[7]	$0		$0
								Add 2nd EB through lane	Yes (CMP)	Construct[7]	$0		$0
								Add 2nd WB through lane	Yes (CMP)	Construct[7]	$0		$0
											$0		**$0**

Table 1-3
Page 2 of 2

Summary of Improvements and Rough Order of Magnitude Costs

#	Intersection	Jurisdiction	Existing (2020)	E+P	Opening Year Cumulative (2022) Without Project	Opening Year Cumulative (2022) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or SBCTA CMP?[1]	Project Responsibility[2]	Total Cost[3,4]	Fair Share %[5]	Fair Share Cost[6]
13	Dwy. 3 & Barton Rd.	Colton	Does Not Exist	Install Stop Control on NB approach	Does Not Exist	Same as E+P	Does Not Exist	Same as E+P	No	Construct[7]	$0	--	$0
				Add NB shared left-right turn lane		Same as E+P		Same as E+P	No	Construct[7]	$0		$0
								Add WB left turn lane	No	Construct[7]	$0		$0
								Add 2nd EB through lane	Yes (CMP)	Construct[7]	$0		$0
								Add 2nd WB through lane	Yes (CMP)	Construct[7]	$0		$0
											$0		**$0**
15	Dwy. 5 & Barton Rd.	Colton	Does Not Exist	Install Stop Control on SB approach	Does Not Exist	Same as E+P	Does Not Exist	Same as E+P	No	Construct[7]	$0	--	$0
				Add SB shared left-right turn lane				Same as E+P	No	Construct[7]	$0		$0
								Add WB left turn lane	No	Construct[7]	$0		$0
								Add 2nd EB through lane	Yes (CMP)	Construct[7]	$0		$0
								Add 2nd WB through lane	Yes (CMP)	Construct[7]	$0		$0
											$0		**$0**
Total Costs for Horizon Year (2040) Improvements											**$2,047,749**		**$28,718**
Total Project Fair Share Contribution to the City of Colton (non-DIF/other)[8]											**$24,421**		
Total Project Fair Share Contribution to Caltrans[9]											**$4,297**		

[1] Improvements included in City of Colton DIF program or SBCTA CMP programs for local and regional components.

[2] Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payment towards the implementation of the improvement shown.

[3] Costs have been estimated using the data provided in Appendix "G" of the CMP (2003 Update) for preliminary construction costs.

[4] Appendix "G" costs escalated by a factor of 1.568 except Traffic Signals.

[5] Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 8-1 for Fair Share Calculations.

[6] Rough order of magnitude cost estimate.

[7] Project will construct the improvement as part of the Project design features.

[8] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the City of Colton.

[9] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

Recommendation 11 – Prior to the issuance of building permits, the Project Applicant shall pay the Project's fair share amount of $24,421 for the improvements identified in Table 1-3 at intersections located within the City of Colton, or as agreed to by the City and Project Applicant.

Recommendation 12 – The Developer's fair-share amount for the intersections that either share a mutual border with or are wholly located within the jurisdiction of Caltrans that have recommended improvements which are not covered by a pre-existing fee program is $4,297. Developer shall be required to pay the amount shown above to the City of Colton prior to the issuance of building permits. The City of Colton shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the City of Colton and other agencies.

1.7 TRUCK ACCESS AND CIRCULATION

1.7.1 PROJECT DRIVEWAYS

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at the Project driveway anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers (see Exhibit 1-5). As shown on Exhibit 1-5, the following curb radius change is necessary in order to accommodate the ingress and egress of heavy trucks:

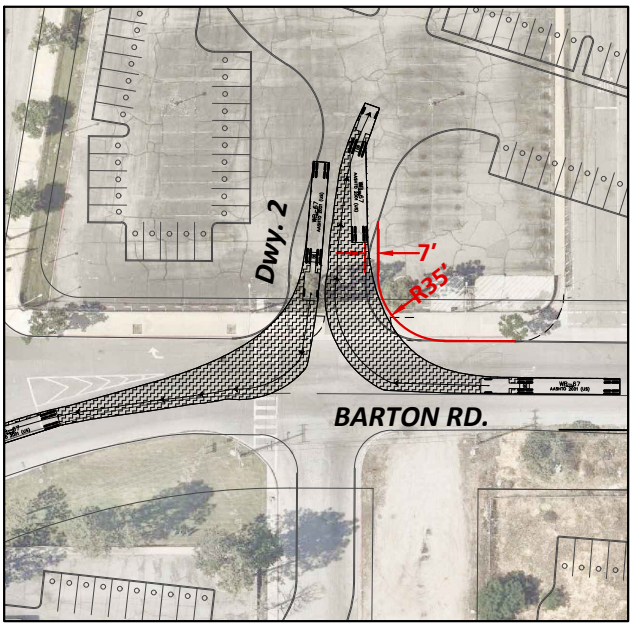
- Driveway 2 on Barton Road should be modified to relocate the eastern curb of the drive aisle 7-feet to the east and provide a 35-foot radius on the northeast curb.
- Driveway 3 on Barton Road should be modified to provide a 55-foot radius on the southwest curb and a 60-foot radius on the southeast curb.
- Driveway 5 on Barton Road should be modified to relocate the western curb of the drive aisle 20-feet to the west and provide a 50-foot radius on the northeast and northwest curbs.

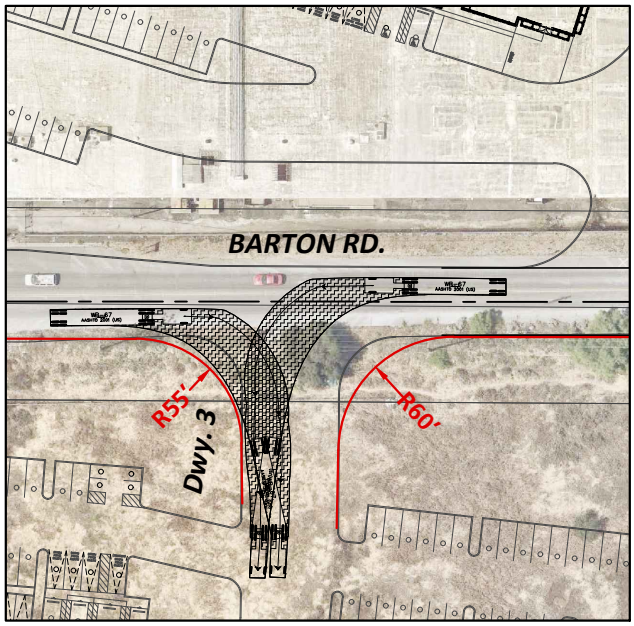
Driveway 6 is anticipated to accommodate the turning radius of heavy trucks as currently proposed. No changes are necessary.

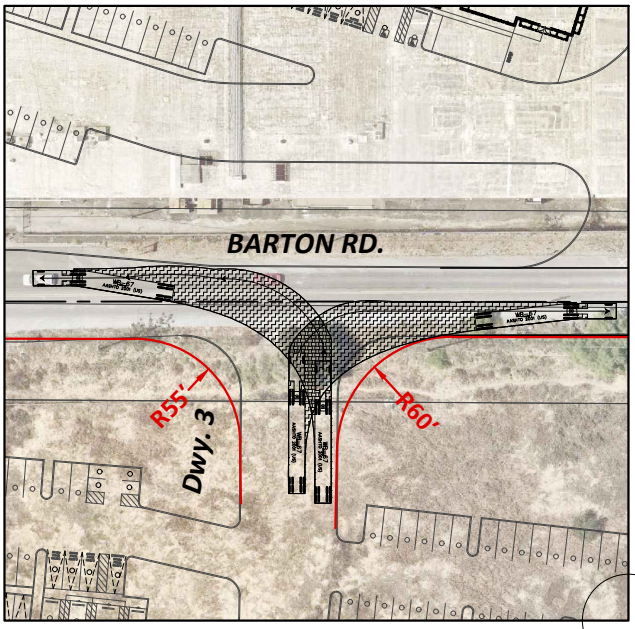
1.7.2 I-215 SOUTHBOUND RAMPS & BARTON ROAD

A truck turning template has been overlaid at the newly constructed roundabout at I-215 Southbound Ramps & Barton Road based on comments provided by City staff and local residents during the scoping process. A truck turning template has been overlaid for each movement anticipated to be utilized by the proposed Project (see Exhibit 1-6). As shown in Exhibit 1-6, the newly constructed roundabout at I-215 Southbound Ramps & Barton Road is anticipated to accommodate the turning radius of heavy trucks. The red pavement areas on the aerial is a skirt for the roundabout circle that is meant to accommodate the sweep of large, heavy trucks. As such, no modifications are necessary to the existing I-215 Southbound Ramps on Barton Road.

EXHIBIT 1-5 (1OF2): TRUCK ACCESS

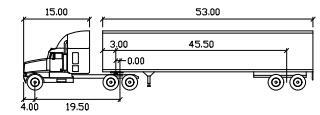






INBOUND ***OUTBOUND***

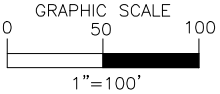
LEGEND:



WB-67

feet

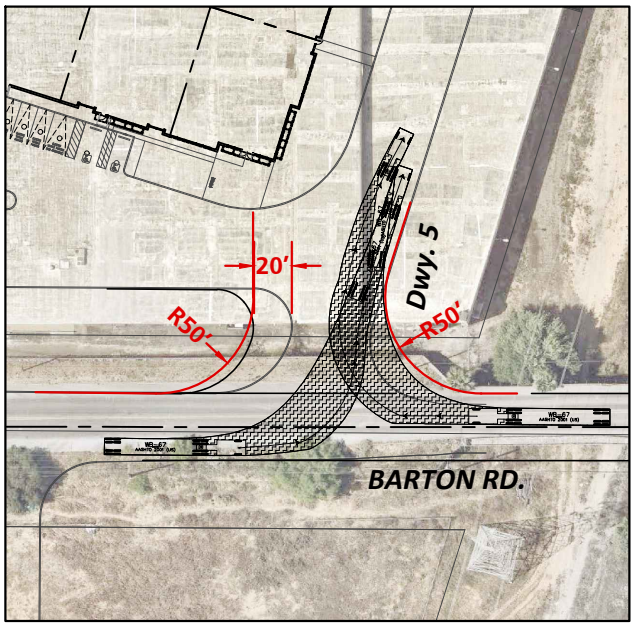
Tractor Width	8.00	Lock to Lock Time	6.0
Trailer Width	8.50	Steering Angle	28.4
Tractor Track	8.00	Articulating Angle	75.0
Trailer Track	8.50		



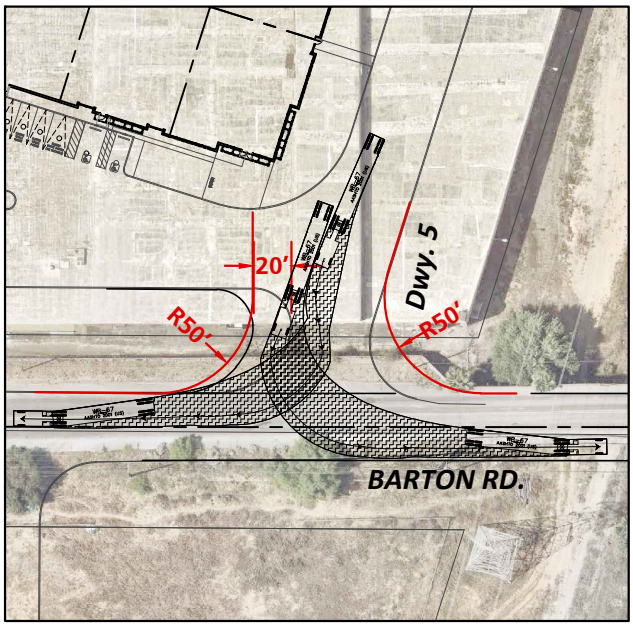


12971 - aturn.dwg

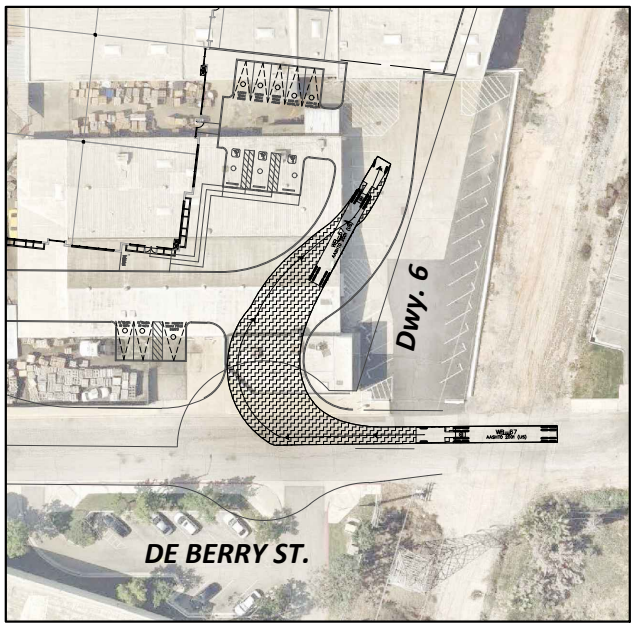
EXHIBIT 1-5 (2OF2): TRUCK ACCESS



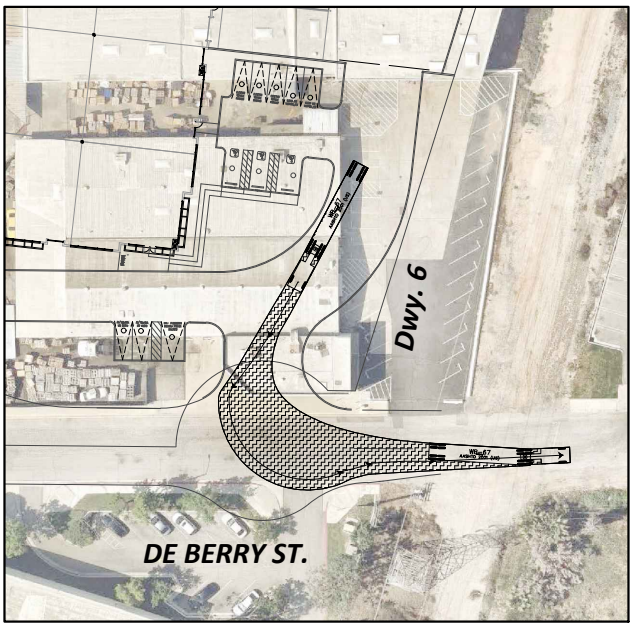
INBOUND



OUTBOUND

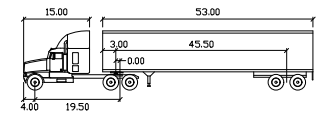


INBOUND



OUTBOUND

LEGEND:



WB-67

feet

Tractor Width	8.00	Lock to Lock Time	6.0
Trailer Width	8.50	Steering Angle	28.4
Tractor Track	8.00	Articulating Angle	75.0
Trailer Track	8.50		

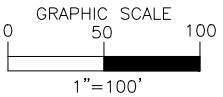


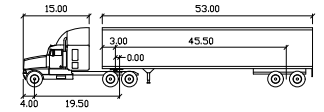


EXHIBIT 1-6: I-215 SB RAMPS & BARTON ROAD TRUCK CIRCULATION





LEGEND:



WB-67

feet

Tractor Width	8.00	Lock to Lock Time	6.0
Trailer Width	8.50	Steering Angle	28.4
Tractor Track	8.00	Articulating Angle	75.0
Trailer Track	8.50		

GRAPHIC SCALE
0 50 100
1"=100'

N

12971 - aturn.dwg

1.8 TRUCK QUEUING

A truck queuing evaluation has been conducted for the existing guard shack at 280 De Berry Street based on comments provided during City of Colton staff during the scoping process. The proposed Project is not anticipated to have guard shacks, however the existing industrial building located at 280 De Berry Street has an existing guard shack on the western driveway. The existing industrial building will relocate the existing guard shack in order to increase the distance from De Berry Street, providing more stacking distance for trucks.

Based on information provided by the operations team for the existing site, the existing industrial building at 280 De Berry Street has approximately 75-100 inbound trucks daily (over a 24-hour period). Trucks arrive on-site throughout the day as opposed to only a few hours during the day. Trucks are not required to stop at the guard shack. In the event a truck arrives while another truck is already at the guard shack, the truck may enter the site without queuing behind the guard shack. Since the trucks are not required to stop at the guard shack and since the existing industrial building at 280 De Berry Street proposes to relocate the guard shack to provide more stacking distance from De Berry Street, truck queues are not anticipated to spill back onto De Berry Street. As shown on Exhibit 1-7, there is sufficient stacking to accommodate up to 4 WB-67 trucks between the guard shack and the public street.

1.9 BARTON ROAD BRIDGE OPERATIONS

Pursuant to comments provided by City staff and local residents during the scoping process, existing roadway operations have been evaluated for the grade separated railroad crossing on Barton Road, west of the Project site. The existing bridge currently provides one travel lane in each direction (with no median). The bridge operations are based on a roadway segment capacity analysis of Barton Road. The roadway segment capacity is based on the City of Colton General Plan and is considered a "rule of thumb" estimate for planning purposes. Table 1-4 shows the roadway segment capacity analysis for the Barton Road overcrossing, which indicates that the overcrossing is currently operating at an acceptable LOS and is anticipated to continue to operate at an acceptable LOS with the addition of Project traffic. Barton Road, east of La Cadena Drive is anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2022) and Horizon Year (2040) traffic conditions.

Table 1-4 also shows the improvements necessary to bring the LOS back to acceptable levels for Horizon Year (2040) conditions. It should be noted, these improvements are consistent with the City of Colton's General Plan. Although Barton Road, east of La Cadena Drive is anticipated to operate at an unacceptable LOS E under Opening Year Cumulative (2022) traffic conditions, additional roadway segment widening does not appear necessary to address the deficiencies at the identified roadway segment based on the peak hour intersection operations analysis for Opening Year Cumulative (2022) traffic conditions, which demonstrates that the intersections (choke points along the roadway segment) are anticipated to process peak hour traffic flows. As such, roadway widening is not necessary. For a detailed discussion on the Opening Year Cumulative (2022) intersection operations analysis, see Section 6.4 *Opening Year Cumulative (2022) Traffic Conditions: Intersection Operations Analysis.*

EXHIBIT 1-7: GUARD GATE TRUCK STACKING

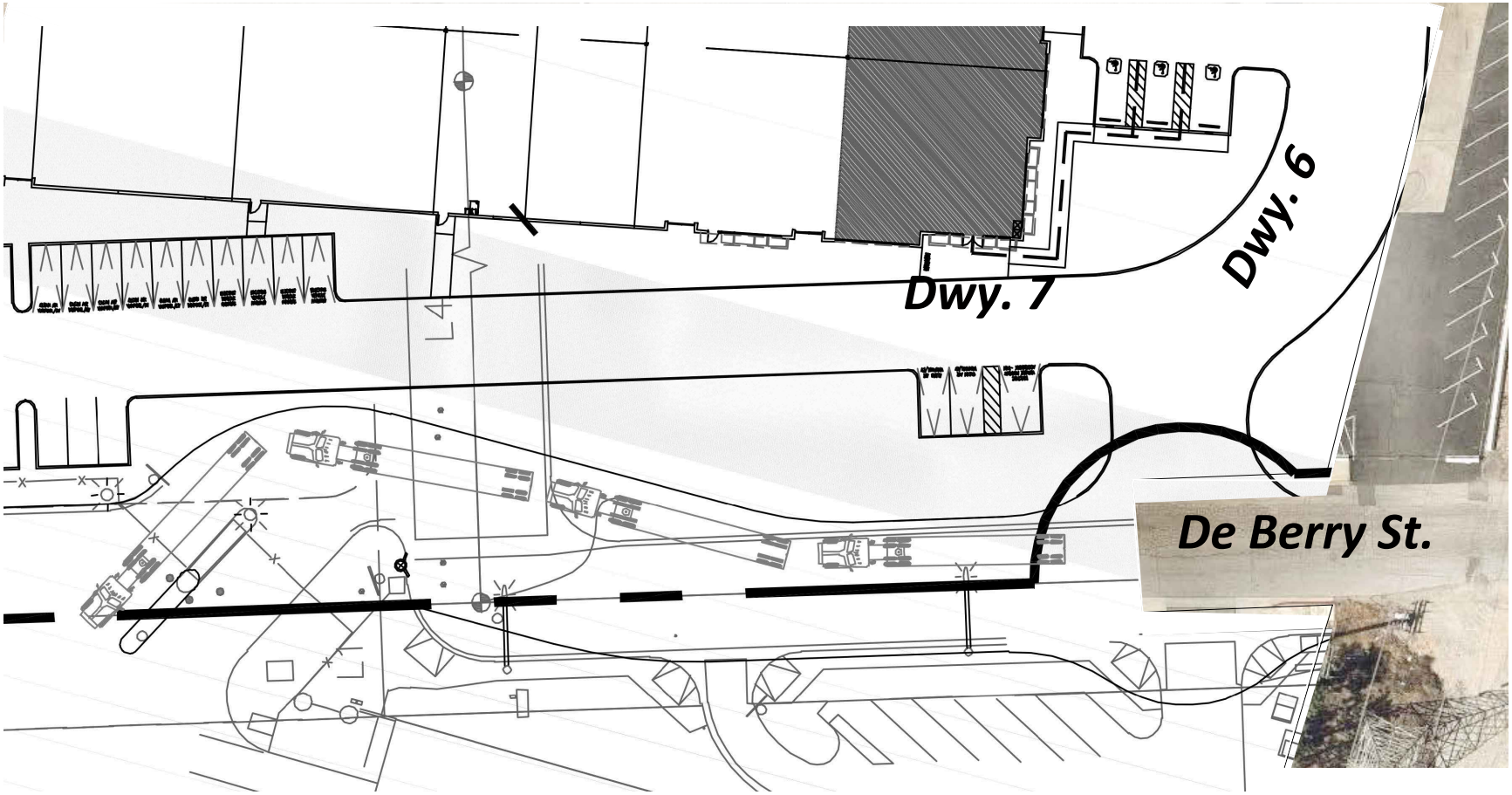


Table 1-4

Roadway Segment Capacity Analysis for Barton Road Overcrossing

#	Roadway	Segment Limits	Roadway Section[1]	LOS Capacity[2]	Average Daily Traffic (ADT)	V/C[3]	LOS[4]
1	Barton Rd.	East of La Cadena Dr.					
		-Existing (2020)	2U	18,000	7,733	0.43	A
		-E+P	2U	18,000	8,364	0.46	A
		-Opening Year Cumulative (2022) Without Project	2U	18,000	**16,933**	**0.94**	**E**
		-Opening Year Cumulative (2022) With Project	2U	18,000	**17,564**	**0.98**	**E**
		-Horizon Year (2040) Without Project	2U	18,000	**18,713**	**1.04**	**F**
		-With Improvements	**4D**	**33,000**	18,713	0.57	A
		-Horizon Year (2040) With Project	2U	18,000	**19,344**	**1.07**	**F**
		-With Improvements	**4D**	**33,000**	19,344	0.59	A

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] **4D** = Improvement

[2] These maximum roadway capacities have been obtained from the City of Colton General Plan Circulation Element.

33,000 = Improvement

[3] V/C = Volume to Capacity Ratio

[4] LOS = Level of Service

This Page Intentionally Left Blank

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with City of Colton's TA Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The City of Colton and City of Grand Terrace require signalized intersection operations analysis based on the methodology described in the HCM. (4) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

Existing and Opening Year Cumulative Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Horizon Year (2040) Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual right: 1800 vphgpl
- Exclusive triple left: 1600 vphgpl or less

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM (6th Edition)

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the City of Colton and City of Grand Terrace. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis

as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

California Department of Transportation (Caltrans)

Per the Caltrans Guide for the Preparation of Traffic Impact Studies, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e., I-215 Freeway ramps at Barton Road, etc.). (3)

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Colton and City of Grand Terrace require the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay Per Vehicle (Seconds)	Level of Service, V/C ≤ 1.0	Level of Service, V/C > 1.0
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM (6th Edition)

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (5)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed for the following study area intersection shown in Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	SBCTA CMP?
10	S. Terrace Av. & Barton Rd.	Colton	No
11	Dwy. 1 & Walnut Av. – Future Intersection	Colton	No
13	Dwy. 3 & Barton Rd. – Future Intersection	Colton	No
14	Dwy. 4 & Walnut Av. – Future Intersection	Colton	No
15	Dwy. 5 & Barton Rd. – Future Intersection	Colton	No
16	Dwy. 6 & Dwy. 7/De Berry St. – Future Intersection	Colton	No

Although unsignalized, the future intersection of Driveway 2 & Barton Road is proposed for restricted access. As such, traffic signal warrants have not been conducted for this intersection. The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Conditions,* Section 6 *Opening Year Cumulative (2022) Traffic Conditions,* and Section 7 *Horizon Year (2040) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TA includes the I-10 Freeway at Rancho Avenue interchange and the I-215 Freeway at Iowa Avenue and Barton Road interchanges. Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing deficiencies at the freeway ramp intersections at the interchanges identified above. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-10 Freeway and I-215 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential deficiencies/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95th percentile queue resulting from the Synchro progression analysis. There are two footnotes which appear on the Synchro outputs. One footnote indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The other footnote indicates whether or not the volume for the 95th percentile queue is metered by an upstream signal. If the upstream intersection is at or near capacity, the 50th percentile queue represents the maximum queue experienced.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour and is derived from the average (50th percentile) queue plus 1.65 standard deviations. The queue length reported is for the lane with the highest queue in the lane group. The 95th percentile queue is not necessarily ever observed it is simply based on statistical calculations.

2.5 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent Caltrans guidance, the TA has evaluated freeway segments where the Project is anticipated to contribute 50 or more peak hour one-way trips on either side of the Barton Road interchange, in an effort to conduct a conservative analysis and overstate as opposed to understand potential deficiencies. However, since the Project is anticipated to contribute less than 50 peak hour trips to all study area freeway facilities, only the I-215 Freeway at Barton Road has been evaluated based on proximity to the Project and percentage of Project traffic anticipated to utilize this interchange.

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using Highway Capacity Software (HCS) 7. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-4 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis.

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS

Level of Service	Description	Density Range (pc/mi/ln)[1]
A	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0 – 11.0
B	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1 – 18.0
C	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1 – 26.0
D	Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1 – 35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1 – 45.0
F	Breakdown in vehicle flow.	>45.0

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM, 6th Edition

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in July 2020. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative (2022), and Horizon Year (2040) conditions.

The I-215 Freeway mainline volume data was obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-215 Freeway interchanges at Barton Road. The data was obtained from February 2020. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. (6)

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in 4 existing on and off ramp locations (see Table 1-2) at the I-215 Freeway and Barton Road interchange. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this TA has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS7 software. The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-5 presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS

Level of Service	Density Range (pc/mi/ln)[1]
A	≤10.0
B	10.0 – 20.0
C	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM, 6th Edition

Similar to the basic freeway segment analysis, the I-215 Freeway mainline volume data were obtained from the Caltrans maintained PeMS website for the segments of the I-215 Freeway interchange at Barton Road. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining I-215 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from February 2020. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis. (6)

2.7 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions.

2.7.1 CITY OF COLTON

Per the County of San Bernardino traffic study guidelines and consistent with the City of Colton General Plan, the following LOS will be utilized for study area intersections: Require development to achieve a peak hour Level of Service (LOS) D or better at intersections. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

2.7.2 CITY OF GRAND TERRACE

Based on the City of Grand Terrace General Plan, all major intersections in the City should operate at LOS D or better. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

2.7.3 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on SHS facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. (3) If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways and intersections is LOS D. Consistent with the City of Colton LOS threshold of LOS D, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

2.7.4 SAN BERNARDINO COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, for the purposes of this analysis, LOS D has been utilized for all study area intersections.

2.8 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.8.1 INTERSECTIONS

To determine whether the addition of project traffic at a study intersection results in a project-related traffic deficiency, the following thresholds will be utilized:

- A traffic deficiency occurs at a study intersection if the addition of project-generated trips reduces the peak hour level of service of the study intersection to change from acceptable level of service (LOS “A”, “B”, “C” or “D”) to an unacceptable level of service (LOS “E” or “F”);
- A traffic deficiency occurs at a study intersection if the project-generated trips worsen the pre-project level of service grade at a deficiently operating (LOS “E” or “F”) intersection.

The proposed significance thresholds will be applied at study area intersections for the purposes of determining project-related deficiencies.

2.8.2 CALTRANS FACILITIES

To determine whether the addition of project traffic to the SHS freeway segments would result in a deficiency, the following will be utilized:

- The TA finds that the LOS of a segment will degrade from D or better to E or F.

The TA finds that a project will exacerbate an already deficient condition if it contributes 50 or more one-way peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.9 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TA identifies that the Project would contribute additional traffic volumes to traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future (Horizon Year) traffic less existing baseline traffic:

Project Fair Share % = Project (2040) AM/PM Traffic / (2040 With Project AM/PM Total Traffic – Existing AM/PM Traffic)

The project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the highest of the two has been selected. The Project fair share contribution calculations are presented in Section 8 *Local and Regional Funding Mechanisms* of this TA. The cost of implementing the improvements shown in Table 1-3 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a total cost escalation factor of 1.612 to more closely approximate current (2020) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended improvements (see Table 8-1). These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or physical improvements.

This Page Intentionally Left Blank

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Colton General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Colton staff (Appendix 1.1), the study area includes a total of 19 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF COLTON GENERAL PLAN CIRCULATION ELEMENT

The study area contains intersections that exist within the City of Colton. Exhibit 3-2 shows the City of Colton General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Colton General Plan Roadway Cross-Sections. The study area roadways that lie within the City of Colton are described below.

Major Arterials are designed to accommodate four travel lanes with a median, within a typical 104-foot right of way, carry high traffic volumes and provide limited access. Their primary function is to link the major arterial highways to the secondary arterials. Driveway access is also typically limited on these facilities, where feasible. The following study area roadways within the City of Colton are classified as Major Highways:

- Barton Road
- La Cadena Drive
- Rancho Avenue

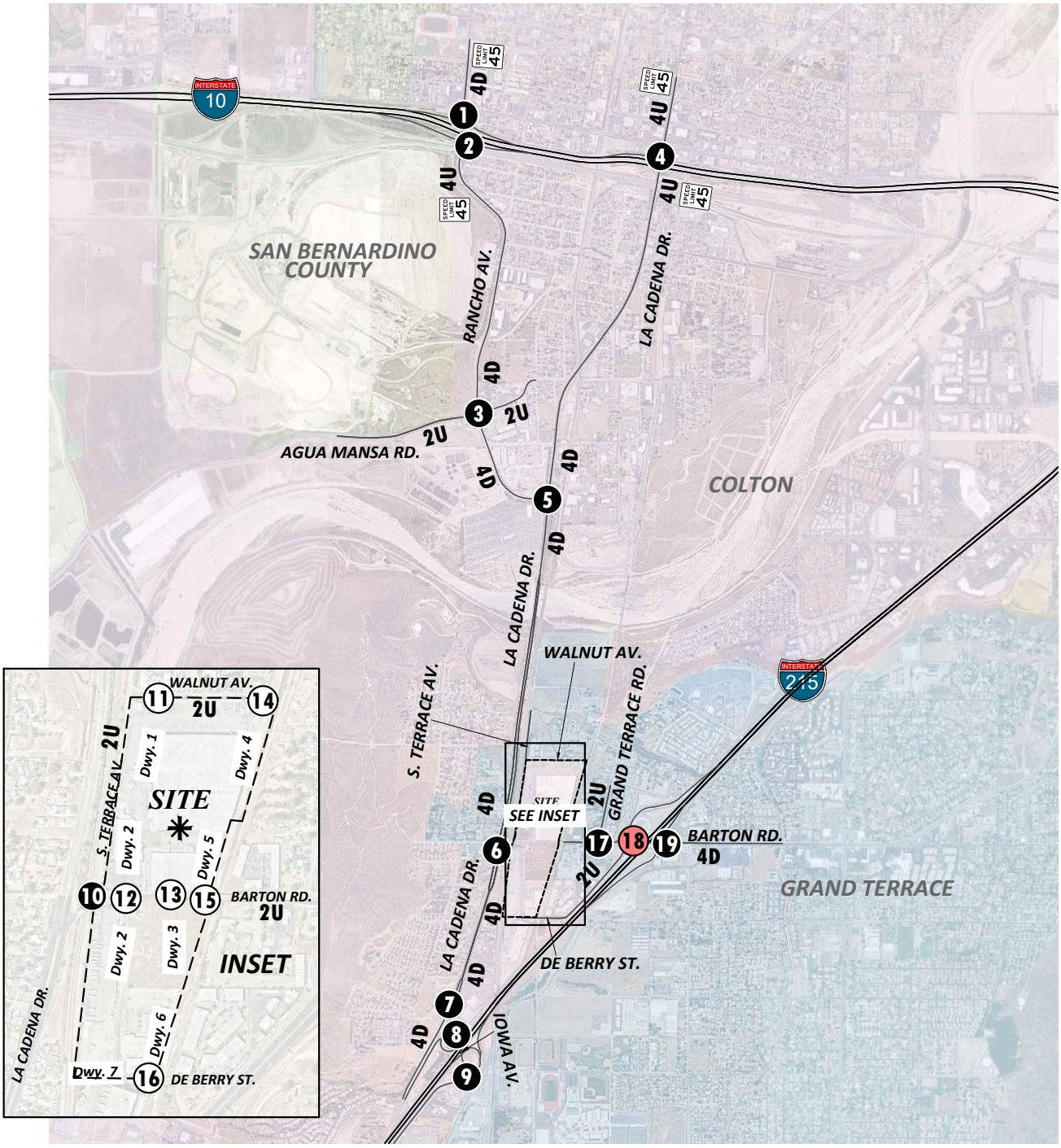
3.3 CITY OF GRAND TERRACE GENERAL PLAN CIRCULATION ELEMENT

The study area is also partially located within the City of Grand Terrace. Exhibit 3-4 shows the City of Grand Terrace General Plan Circulation Element and Exhibit 3-5 illustrates the City of Grand Terrace General Plan roadway cross-sections.

3.4 BICYCLE & PEDESTRIAN FACILITIES

Exhibit 3-6 shows the City of Colton General Plan Bicycle Plan and Exhibit 3-7 shows the City of Grand Terrace Bikeway Plan. As shown on Exhibit 3-6, there are planning Class II bicycle routes along Barton Road and La Cadena Drive and planned Class III bicycle routes along La Cadena Drive within the study area. Field observations indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-8 illustrates the existing pedestrian facilities within the study area. As shown on Exhibit 3-8, there are limited pedestrian facilities within close proximity to the Project site on Barton Road and La Cadena Drive.

EXHIBIT 3-1 (1OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



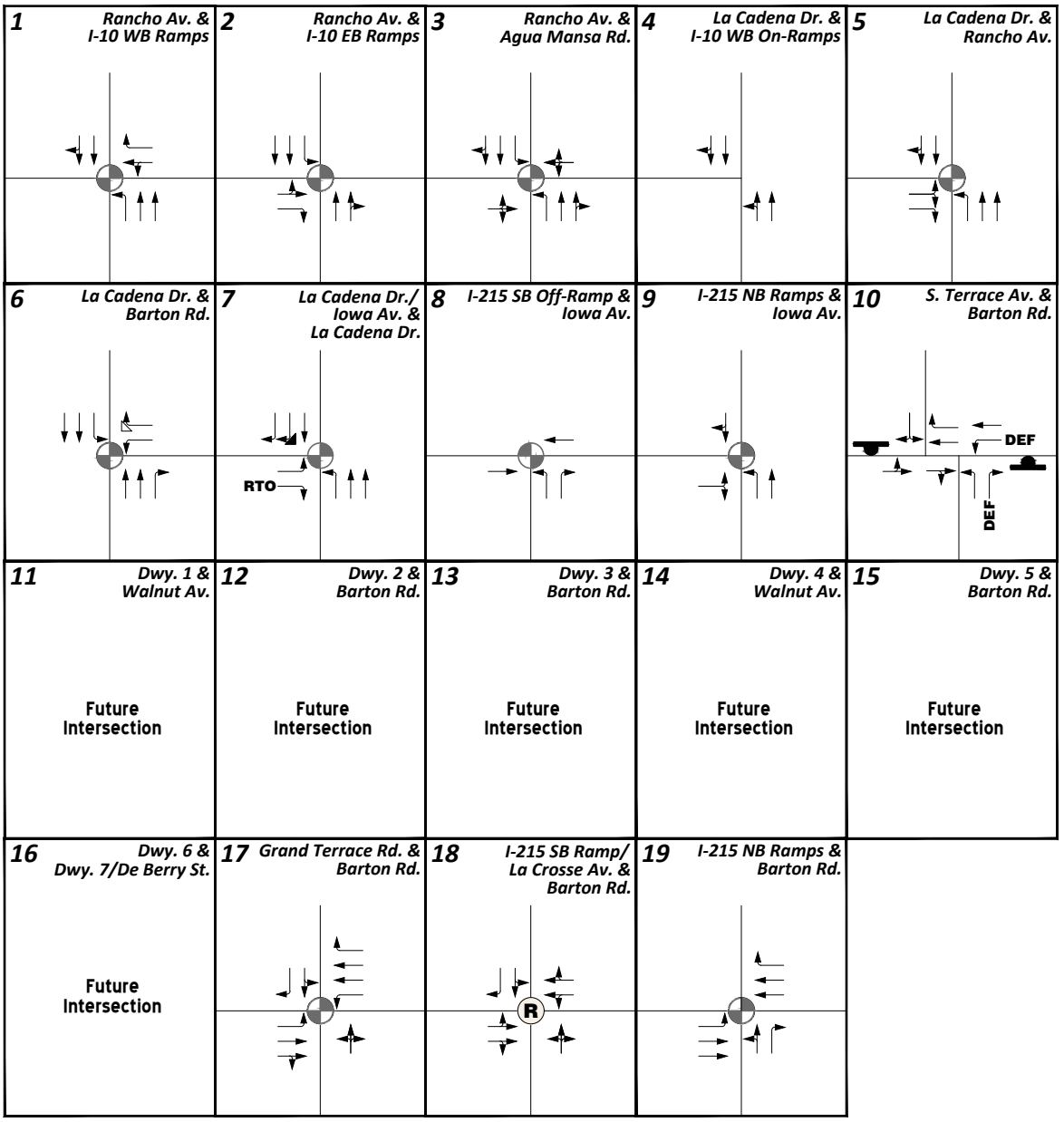
LEGEND:

- 4 = NUMBER OF LANES
- D = DIVIDED
- U = UNDIVIDED
- SPEED LIMIT 25 = FREE RIGHT TURN

N

12971 - icon.dwg

EXHIBIT 3-1 (2OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



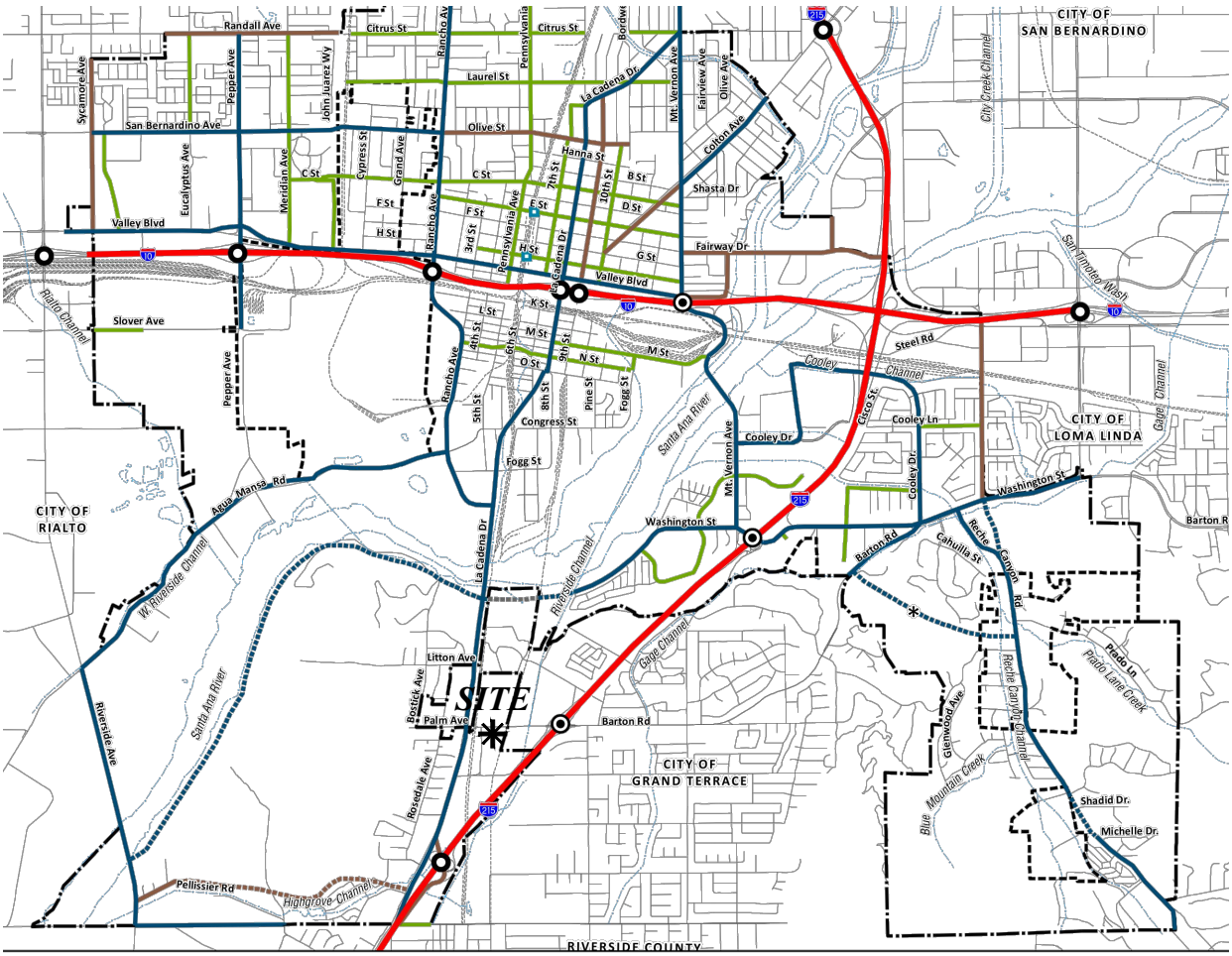
LEGEND:

- = TRAFFIC SIGNAL
- R = ROUNDABOUT
- = STOP SIGN
- RTO = RIGHT TURN OVERLAP
- DEF = DEFACTO RIGHT TURN
- = FREE RIGHT TURN
- = CHANNELIZED YIELD

N

12971 - icon.dwg

EXHIBIT 3-2: CITY OF COLTON GENERAL PLAN CIRCULATION ELEMENT



Circulation Plan

- Freeway
- Major Arterial
- Planned Arterial
- Secondary Arterial
- Planned Secondary
- Collector Street
- Planned Collector
- Planned Roadway Located in Another City

* Conceptual roadway location. Final roadway location to be determined on proposed subdivision design.

Freeway Interchanges

- Interchanges
- Interchanges with Planned Improvements

Street Closure

- Street Closure (BSNF Quiet Zone Project)

Boundaries

- City Boundary
- Sphere of Influence
- Railroad Tracks
- Watercourse

N

12971 - colton-ce.dwg

URBAN CROSSROADS

EXHIBIT 3-3 (1 OF 2): CITY OF COLTON GENERAL PLAN CROSS-SECTIONS

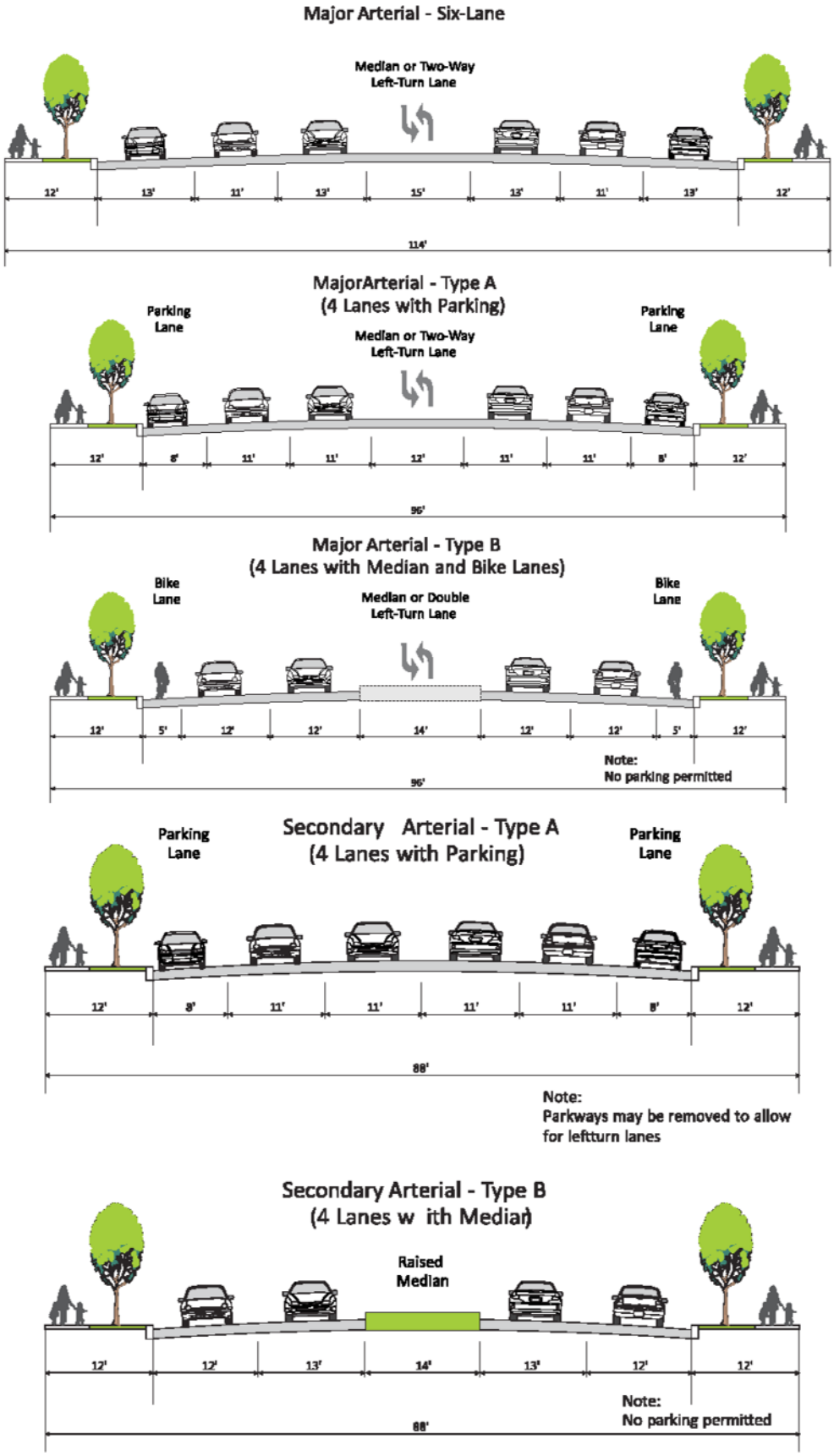
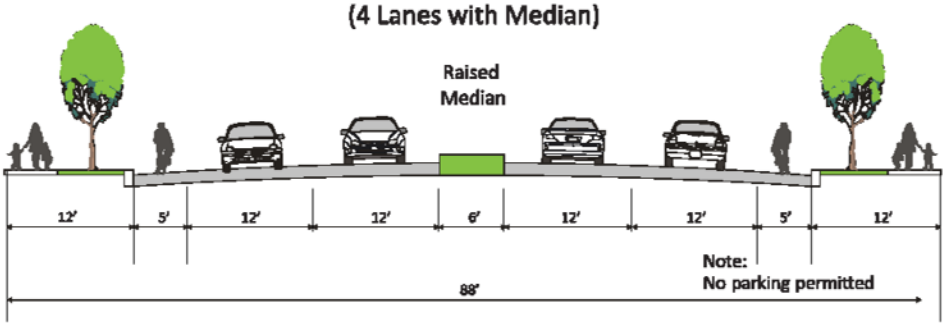
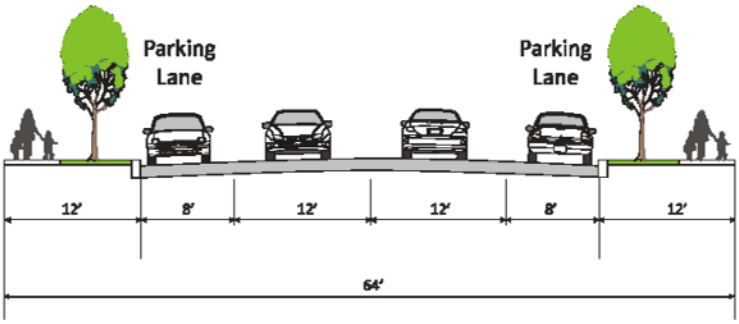


EXHIBIT 3-3 (2 OF 2): CITY OF COLTON GENERAL PLAN CROSS-SECTIONS

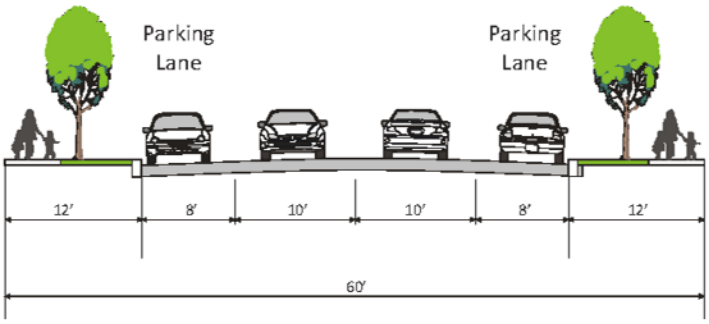
Secondary Arterial with Bike Lane - Type C
(4 Lanes with Median)



Collector Street
(2 Lanes with Parking)



Local Street
(2 Lanes with Parking)



Hillside Local Street
(2 Lanes)

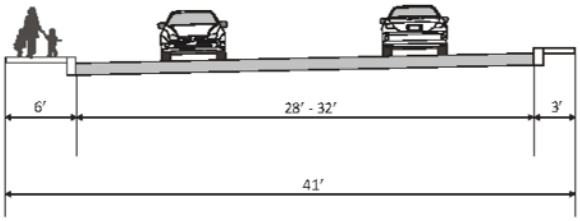
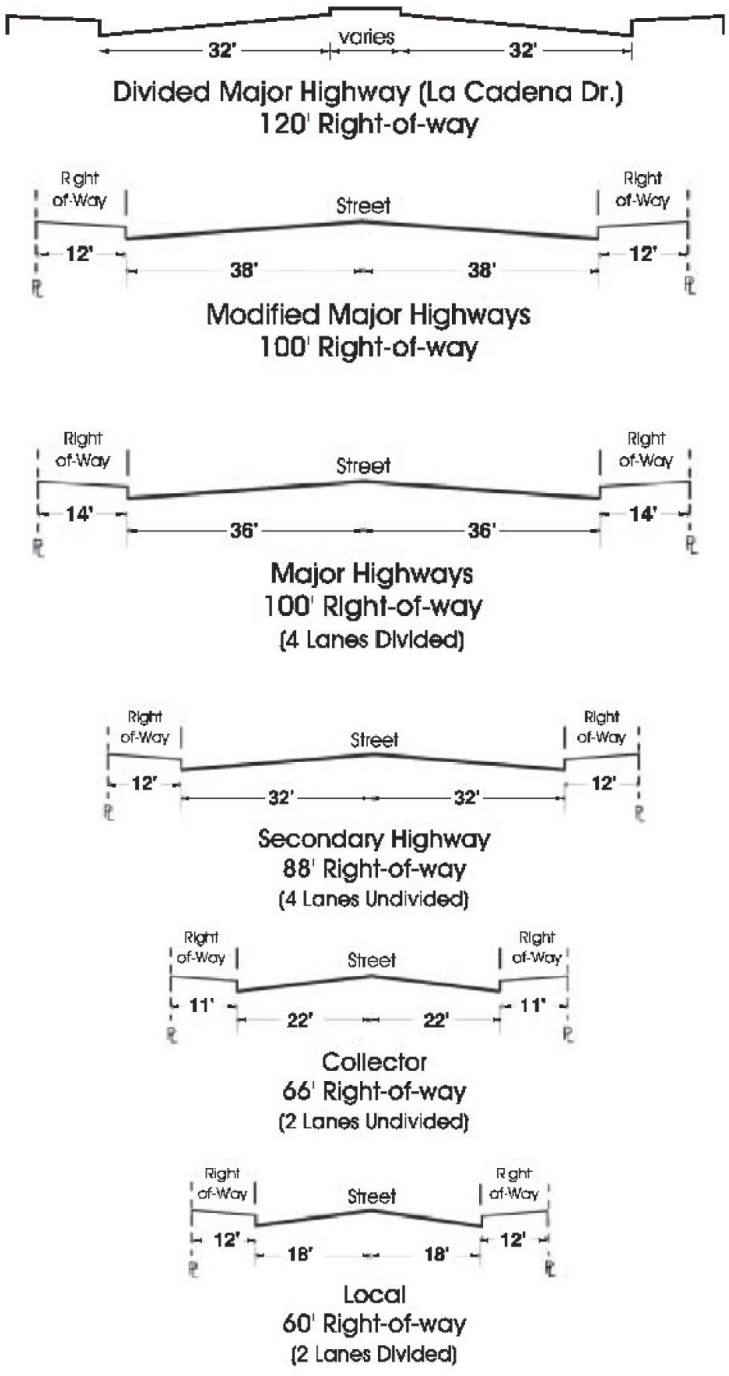


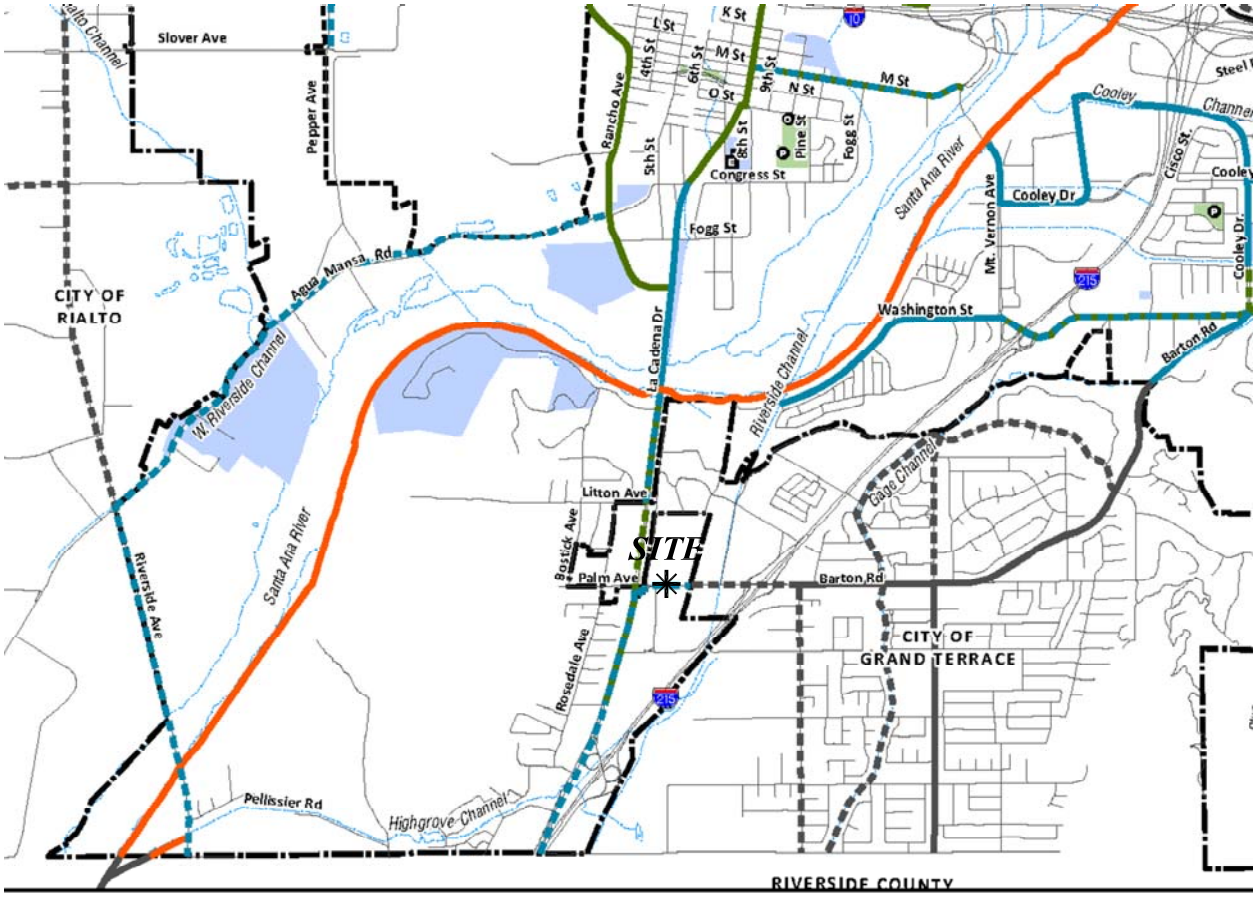
EXHIBIT 3-5: CITY OF GRAND TERRACE GENERAL PLAN ROADWAY CROSS-SECTIONS



N

12971 - gt-cross-sections.dwg

EXHIBIT 3-6: CITY OF COLTON GENERAL PLAN BICYCLE PLAN



Bicycle Classifications

- Class I
- Planned Class I
- Class II
- Planned Class II
- Class III
- Planned Class III
- Outside City of Colton
- Planned Outside City of Colton

N

12971 - colton-bikes.dwg

EXHIBIT 3-8: EXISTING PEDESTRIAN FACILITIES



LEGEND:

- = SIDEWALK
- = BIKE LANE
- B = BUS STOP
- 0 = NO CROSSWALK
- 0 = FUTURE INTERSECTION
- 0 = CROSSWALK ON THREE APPROACHES
- 0 = CROSSWALK ON ONE APPROACH

N

12971 - peds.dwg

3.5 TRANSIT SERVICE

Exhibit 3-9 shows the City of Colton Transit Plan. The study area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County, with bus service along La Cadena Drive, north of Congress Street, via Route 19 and Barton Road, east of the I-215 Freeway, via Route 305. Omnitrans Route 215 runs along the I-215 Freeway but does not provide transit service to the study area. The existing transit routes within the area by Omnitrans is shown on Exhibit 3-10. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.6 TRUCK ROUTES

The City of Colton designated truck route map is shown on Exhibit 3-11. La Cadena Drive, Iowa Avenue, Barton Road, and portions of Rancho Avenue are the designated City of Colton truck routes within the study area. The designated truck route map has been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

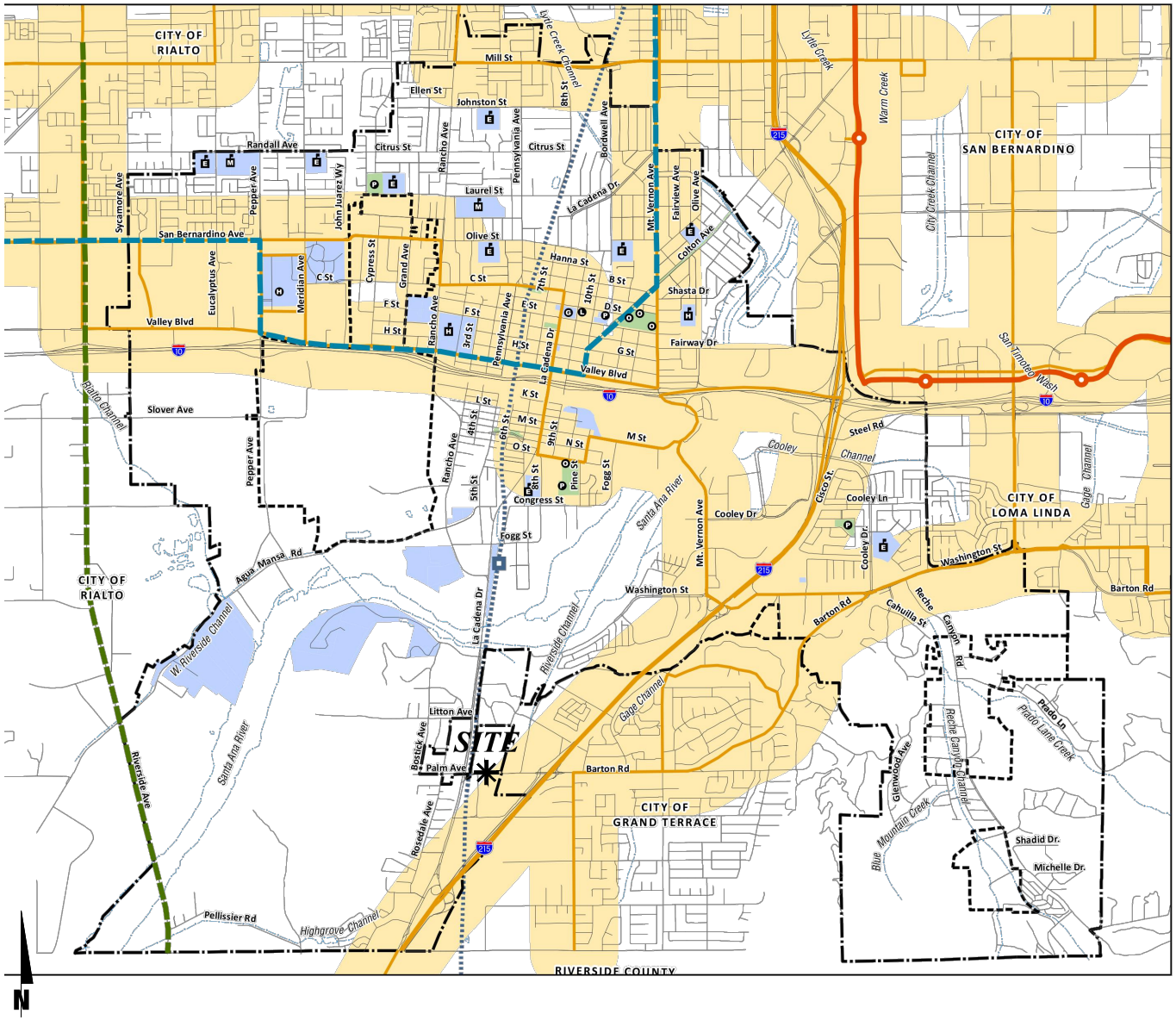
3.7 EXISTING (2020) TRAFFIC COUNTS

Based on direction from City staff, the intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in 2016, 2018, and 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

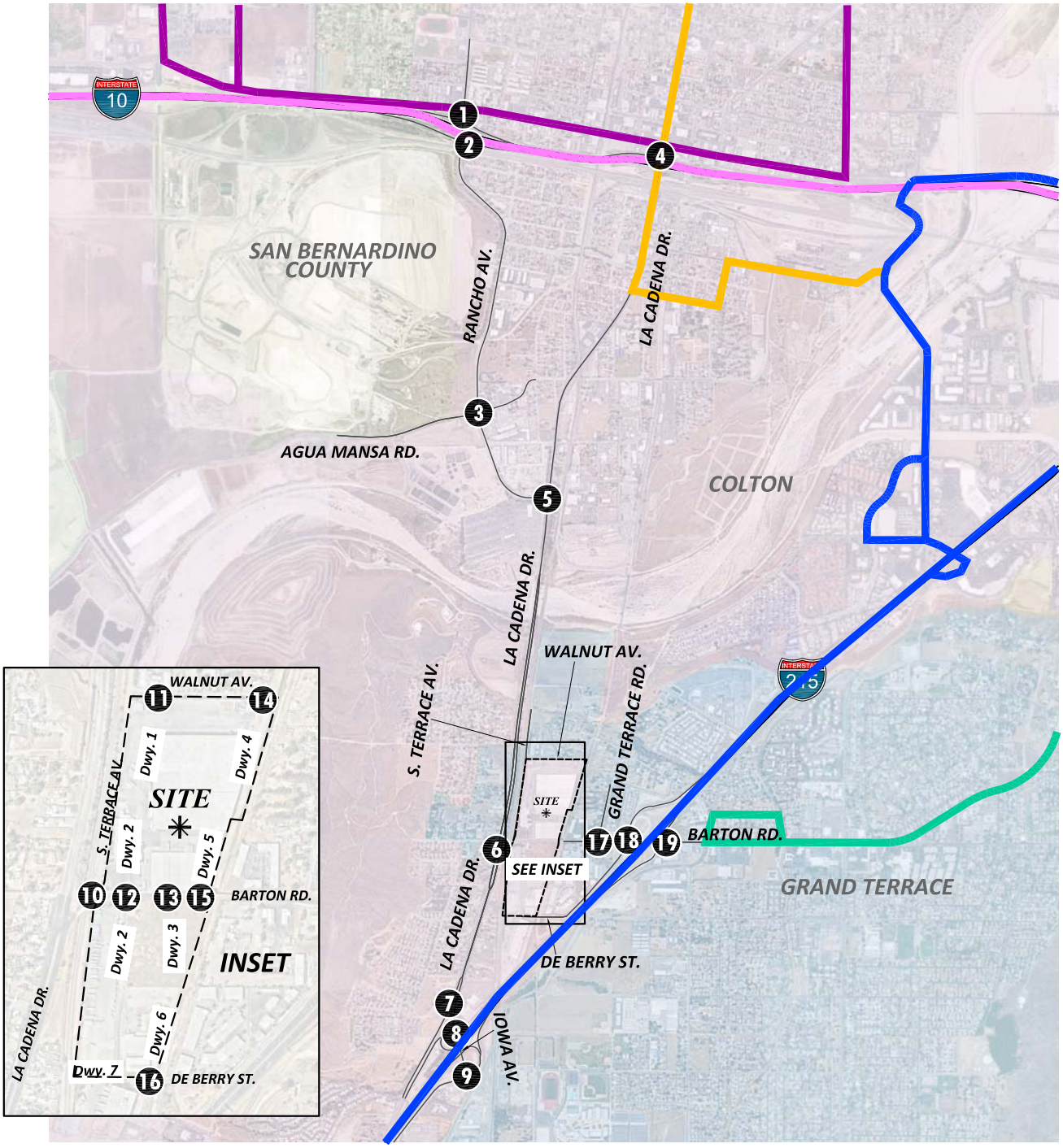
Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. As such, historic (2016, 2018, and 2019) traffic counts were utilized in conjunction with a 2% per year growth rate (compounded annually) to reflect 2020 conditions. The 2016, 2018, and 2019 weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The I-215 Freeway/Barton Road interchange project was recently completed and is fully operational (as of May 2020). As such, historic traffic volumes have been adjusted to reflect the newly constructed interchange's turning movements/configuration. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

EXHIBIT 3-9: CITY OF COLTON TRANSIT PLAN



URBAN CROSSROADS

EXHIBIT 3-10: EXISTING TRANSIT ROUTES



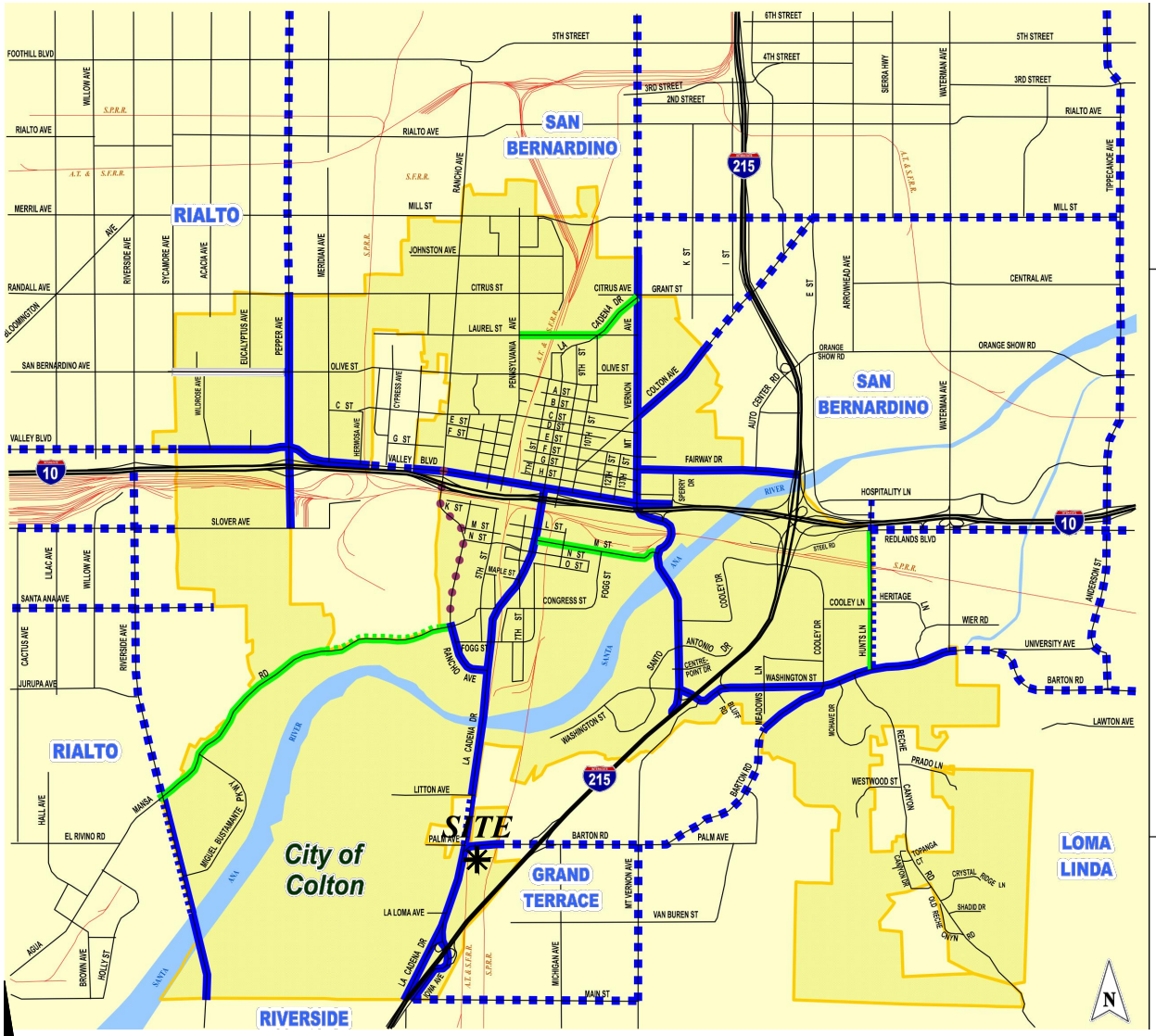
LEGEND:

- = OMNITRANS ROUTE 1
- = OMNITRANS ROUTE 290
- = OMNITRANS ROUTE 19
- = OMNITRANS ROUTE 305
- = OMNITRANS ROUTE 215

N

12971 - transit.dwg

EXHIBIT 3-11: CITY OF COLTON TRUCK ROUTES



Legend:

City Limit

Existing Truck Routes
- City of Colton (truck route to remain)
- City of Colton (subject to size restriction*)
- Other Agency

Proposed New Truck Routes
- City of Colton
- Other Agency

Freeway (State Truck Route)

Major Arterial / Collector Roadway

Railway

* Tractor-Semis Over 26 Feet Kingpin to Rear Axle Prohibited

The traffic counts include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4 or More Axle Trucks. To represent the effects large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCE. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the CMP.

Existing weekday ADT volumes are shown on Exhibit 3-12. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.16 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.96 percent. As such, the above equation utilizing a factor of 11.16 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.96 percent (i.e., 1/0.0896 = 11.16) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are shown on Exhibit 3-13.

3.8 INTERSECTION OPERATIONS ANALYSIS

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized in Table 3-1, which indicates that the following study area intersection is currently operating at an unacceptable LOS during the peak hours:

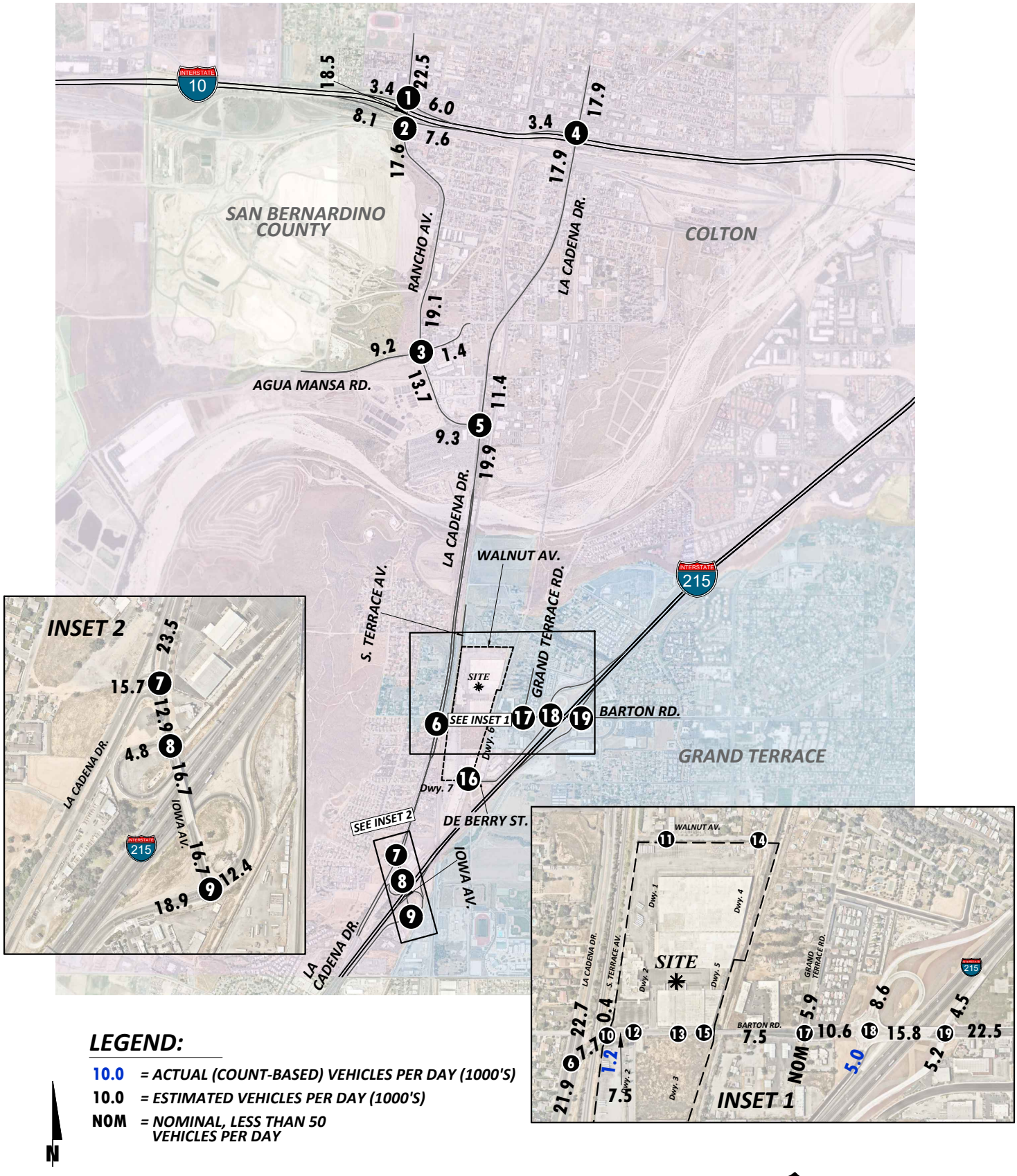
- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM peak hour; LOS E PM peak hour

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-14. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

3.9 TRAFFIC SIGNAL WARRANTS ANALYSIS

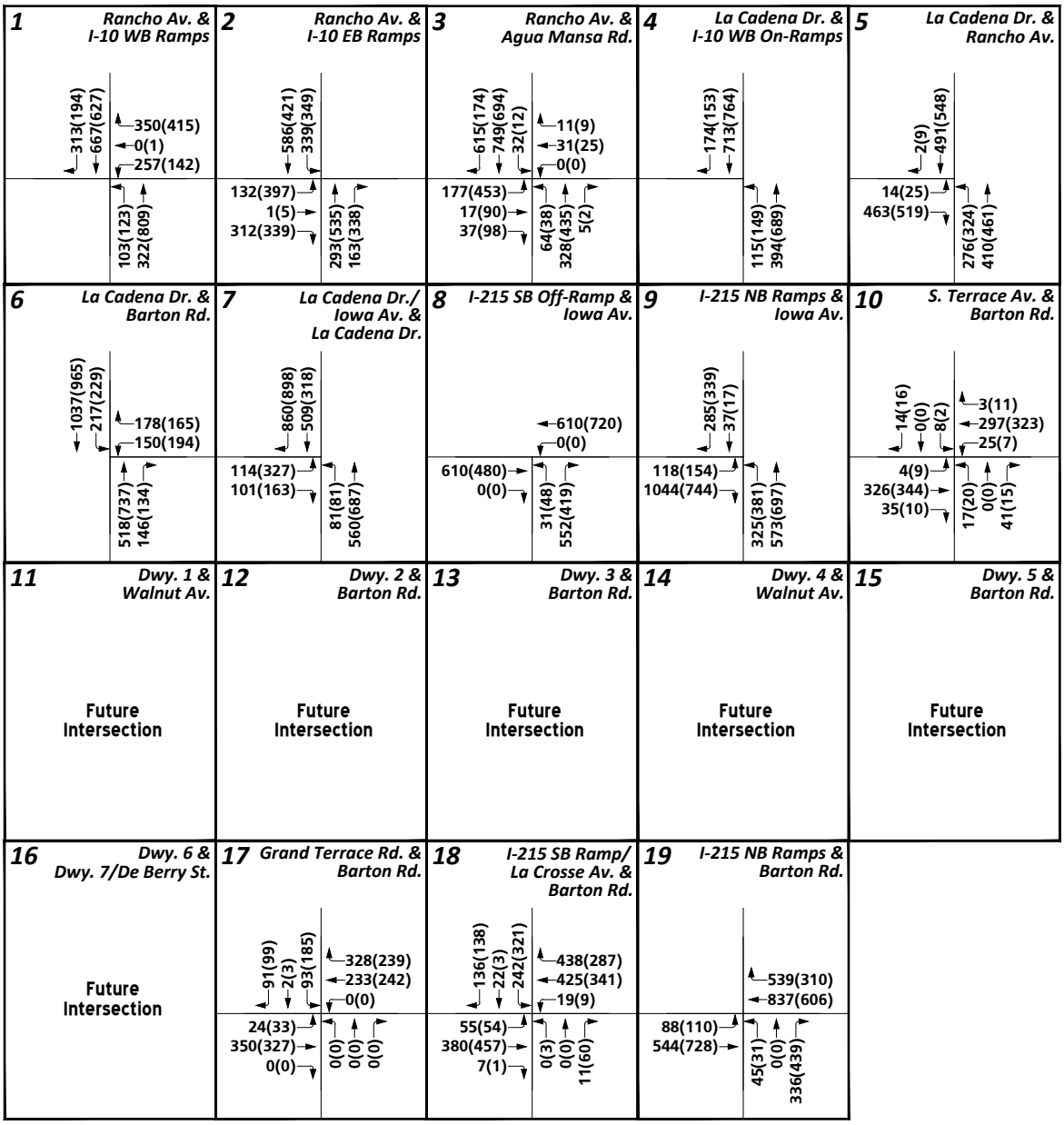
Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. There are no unsignalized study area intersections that currently warrant a traffic signal for Existing traffic conditions. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

EXHIBIT 3-12: EXISTING (2020) AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



12971 - adt.dwg

EXHIBIT 3-13: EXISTING (2020) TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

EXHIBIT 3-14: EXISTING (2020) SUMMARY OF LOS



Table 3-1

Intersection Analysis for Existing (2020) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Rancho Av. & I-10 WB Ramps	TS	1	2	0	0	2	0	0	0	0	0	1	1	26.5	22.4	C	C
2	Rancho Av. & I-10 EB Ramps	TS	0	2	0	1	2	0	0	1	1	0	0	0	25.9	36.2	C	D
3	Rancho Av. & Agua Mansa Rd.	TS	1	2	0	1	2	0	0	1	0	0	1	0	19.7	33.2	B	C
4	La Cadena Dr. & I-10 WB Ramps	UC	0	2	0	0	2	0	0	0	0	0	0	0	11.4	11.5	B	B
5	La Cadena Dr. & Rancho Av.	TS	1	2	0	0	2	0	0	1	1	0	0	0	16.0	18.8	B	B
6	La Cadena Dr. & Barton Rd.	TS	0	2	1	1	2	0	0	0	0	1	0	1	41.2	37.1	D	D
7	La Cadena Dr. & Iowa Av.	TS	1	1	0	0	1	2>>	1	0	1>	0	0	0	12.8	15.5	B	B
8	I-215 SB Ramps & Iowa Av.	TS	1	0	1	0	0	0	0	1	0	0	1	0	16.1	12.5	B	B
9	I-215 NB Ramps & Iowa Av.	TS	1	1	0	0	1	0	0	1	0	0	0	0	**117.4**	**78.3**	**F**	**E**
10	S. Terrace Av. & Barton Rd.	CSS	0	1	d	0	1	0	0	1	0	d	1	1	16.6	16.7	C	C
11	Dwy. 1 & Walnut Av.		Future Intersection															
12	Dwy. 2 & Barton Rd.		Future Intersection															
13	Dwy. 3 & Barton Rd.		Future Intersection															
14	Dwy. 4 & Walnut Av.		Future Intersection															
15	Dwy. 5 & Barton Rd.		Future Intersection															
16	Dwy. 6 & Dwy. 7/De Berry St.		Future Intersection															
17	Grand Terrace Rd. & Barton Rd.	TS	0	1	0	0	1	1	1	2	0	1	2	1	13.1	18.6	B	B
18	I-215 SB Ramps & Barton Rd.	RA	0	1	0	0	1	1	0	2	0	0	2	0	6.7	6.9	A	A
19	I-215 NB Ramps & Barton Rd.	TS	0	1	1	0	0	0	1	2	0	0	2	1	12.1	12.0	B	B

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free-Right Turn Lane; d = Defacto Turn Lane

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal; CSS = Cross-street Stop UC = Uncontrolled; RA = Roundabout

3.10 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the study area intersections along the I-10 Freeway and I-215 Freeway to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-10 Freeway or I-215 Freeway mainlines. Queuing analysis findings are presented in Table 3-2. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown in Table 3-2, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.4.

3.11 FREEWAY FACILITY ANALYSIS

Existing (2020) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 3-8. As shown in Table 3-3, the study area freeway segments and merge/diverge ramp junctions analyzed for this study are currently operating at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing (2020) traffic conditions. Existing (2020) freeway facility analysis worksheets are provided in Appendix 3.5.

3.12 DEFICIENCIES AND IMPROVEMENTS

This section provides a summary of deficiencies, based on the City of Colton's deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, and improvements needed to improve operations back to acceptable levels.

3.12.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Table 3-4 indicates the physical improvements needed to address LOS deficiencies at each of the study area intersections under Existing (2020) traffic conditions. The following improvement is necessary to improve the Existing (2020) deficiencies back to acceptable levels.

I-215 Northbound Ramps & Iowa Avenue (#9) – The following improvement is necessary to improve the peak hour deficiency:

- Add an eastbound right turn lane.

3.12.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown in Table 3-2, there are currently no peak hour queuing issues at the study area interchanges. As such, no improvements are necessary.

3.12.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown in Table 3-3, the study area freeway segments and merge/diverge ramp junctions are currently operating at an acceptable LOS. As such, no improvements are necessary.

Table 3-2

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2020) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Rancho Av. & I-10 WB Ramps (#1)	WBL/T	930	275	134	Yes	Yes
	WBR	150	75	296 [3]	Yes	Yes
Rancho Av. & I-10 EB Ramps (#2)	EBL/T	1,530	165	454 [2]	Yes	Yes
	EBR	160	135	146	Yes	Yes
I-215 SB Off-Ramp & Iowa Av. (#8)	NBL	1,420	36	43	Yes	Yes
	NBR	400	433 [3]	101	Yes	Yes
I-215 NB Ramps & Iowa Av. (#9)	SBT/R	1,155	1,095 [2]	478 [2]	Yes	Yes
I-215 SB Ramps & Barton Rd. (#18)	SBL/T	1,820	25	25	Yes	Yes
	SBR	1,100	25	0	Yes	Yes
I-215 NB Ramps & Barton Rd. (#19)	NBL/T	250	161 [2]	326 [2,3]	Yes	Yes
	NBR	1,580	168	238	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 or I-215 Freeway mainline.

Table 3-3

Freeway Facility Analysis for Existing (2020) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]
I-215 Freeway	Southbound	North of Barton Rd.	3	18.2	C	17.3	B
		Off-Ramp at Barton Rd.	3	25.1	C	24.3	C
		Loop On-Ramp at Barton Rd.	3	22.3	C	19.9	B
		South of Barton Rd.	3	18.7	C	16.7	B
	Northbound	North of Barton Rd.	3	23.9	C	20.8	C
		On-Ramp at Barton Rd.	3	27.3	C	24.2	C
		Off-Ramp at Barton Rd.	3	27.4	C	26.7	C
		South of Barton Rd.	3	22.3	C	21.2	C

* **BOLD** = Unacceptable Level of Service

[1] Number of mixed-flow lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 3-4

Intersection Analysis for Existing (2020) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
9	I-215 NB Ramps & Iowa Av.																	
	- Without Improvements	TS	1	1	0	0	1	0	0	1	0	0	0	0	**117.4**	**78.3**	**F**	**E**
	- With Improvements	TS	1	1	0	0	1	0	0	1	**1**	0	0	0	26.1	36.8	C	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

EXHIBIT 3-15: EXISTING (2020) FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

This Page Intentionally Left Blank

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of 960,040 square feet of High-Cube Transload Short-Term Storage Warehouse use within two buildings. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. Access to the Project site will be provided via the following driveways:

- Driveway 1 & Walnut Avenue – full access for passenger cars only
- Driveway 2 (North Side) & Barton Road – right-in/right-out access only for both passenger cars and trucks
- Driveway 2 (South Side) & Barton Road – full access for passenger cars only
- Driveway 3 & Barton Road – full access for both passenger cars and trucks
- Driveway 4 & Walnut Avenue – full access for passenger cars only
- Driveway 5 & Barton Road – full access for both passenger cars and trucks
- Driveway 6 & De Berry Street – full access for both passenger cars and trucks
- Driveway 7 & De Berry Street – full access for both passenger cars and trucks

Regional access to the Project site is available from the I-215 Freeway via Barton Road and Iowa Avenue interchanges and the I-10 Freeway via Rancho Avenue interchange.

4.1 TRIP GENERATION

4.1.1 EXISTING USES

There are currently existing uses on the site of the proposed Project. The following uses are to be demolished:

- 21700 Barton Road: 416,000 square foot warehouse, 118,383 square foot high-cube cold storage warehouse, 46,920 square foot office building (total of three structures).
- 275 De Berry Street: 59,662 square foot warehouse.
- 375 De Berry Street: 18,370 square foot warehouse.

There is an existing 125,801 square foot high-cube cold storage warehouse located at 280 De Berry Street, however this building will remain in-place and will not be demolished as part of the development of the proposed Project. Since the building is currently operational, it will not be reflected in the trip generation for the Project for the purposes of the traffic study as the baseline count data would include the activity at this site. Although the existing use at 280 De Berry Street will remain, improvements to the driveway at De Berry Street will be made as part of the Project.

In an effort to conduct a conservative analysis, no credit has been taken for the existing uses in order to evaluate the worst-case/highest trip generation for the Project.

4.1.2 PROPOSED PROJECT

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project in actual vehicles and PCE are shown in Table 4-1.

The following ITE land use code and vehicle mix has been utilized:

- High-Cube Transload and Short-Term Storage Warehouse (ITE 154): Transload facilities have a primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. They typically have little storage duration, high throughput, and are high-efficiency facilities. Short-term high-cube warehouses are high-efficiency distribution facilities often with custom/special features built into structure movement of large volumes of freight with only short-term storage of products. Based on the ITE Trip Generation 10th Edition Supplement (February 2020), the following vehicle mix was utilized: 20% trucks during the AM peak hour, 16% trucks during the PM peak hour, and 16% daily trucks. Based on this interim guidance from the South Coast Air Quality Management District (SCAQMD), the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site: 16.7% of the total trucks as 2-axle trucks, 20.7% of the total trucks as 3-axle trucks, and 62.6% of the total trucks as 4+-axle trucks.

Finally, PCE factors were applied to the trip generation rates to convert trips made by heavy trucks (large 2-axle, 3-axle, and 4+-axle trucks) to PCE values. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County Congestion Management Program (2016 Update). (1)

As shown in Table 4-1, the proposed Project is anticipated to generate 1,348 actual trip ends per day, with 81 AM peak hour trips and 99 PM peak hour trips. For the purposes of the operations analysis, the PCE values shown in Table 4-1 have been utilized.

4.1.3 TRIP GENERATION ALTERNATIVE

A trip generation alternative has been provided for informational purposes only. The alternative trip generation assumes a 480,020 square feet of High-Cube Transload and Short-Term Storage Warehousing use (50% of the total square footage) and 480,020 square feet of High-Cube Cold Storage Warehouse use (50% of the total square footage). Table 4-2 shows the anticipated trip generation associated with the alternative land uses.

Table 4-1

Project Trip Generation Summary

Project Trip Generation Rates									
Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (80.0% AM, 84.0% PM/Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (3.34% AM, 2.67% PM/Daily)			0.002	0.001	0.003	0.001	0.002	0.003	0.037
3-Axle Trucks (4.14% AM, 3.31% PM/Daily)			0.003	0.001	0.003	0.001	0.002	0.003	0.046
4-Axle+ Trucks (12.52% AM, 10.02% PM/Daily)			0.008	0.002	0.010	0.003	0.007	0.010	0.140
Passenger Car Equivalent									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (69.2% AM, 78.3% PM, 67.8% Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (5.14% AM, 3.62% PM, 5.38% Daily, PCE = 1.5)[5]			0.003	0.001	0.004	0.001	0.003	0.004	0.056
3-Axle Trucks (6.38% AM, 4.49% PM, 6.66% Daily, PCE = 2.0)[5]			0.005	0.002	0.007	0.002	0.005	0.007	0.093
4-Axle+ Trucks (19.28% AM, 13.59% PM, 20.16% Daily, PCE = 3.0)[5]			0.023	0.007	0.030	0.008	0.022	0.030	0.421

Project Trip Generation									
Project	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			2	1	3	1	2	3	36
3-axle:			3	1	4	1	3	4	46
4+-axle:			8	3	11	3	7	10	136
- Net Truck Trips (Actual Vehicles)			*13*	*5*	*18*	*5*	*12*	*17*	*218*
TOTAL NET TRIPS (Actual Vehicles)			***61***	***20***	***81***	***28***	***71***	***99***	***1,348***
Passenger Car Equivalent[5]									
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			3	1	4	2	3	5	54
3-axle:			5	2	7	2	5	7	90
4+-axle:			23	7	30	9	21	30	404
- Net Truck Trips			*31*	*10*	*41*	*13*	*29*	*42*	*548*
TOTAL NET TRIPS			***79***	***25***	***104***	***36***	***88***	***124***	***1,678***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet

[3] Vehicle Mix Source: Institute of Transportation Engineers (ITE) Trip Generation 10th Edition Supplement (February 2020).

[4] Truck Mix Source: SCAQMD Warehouse Truck Trip Study Data Results and Usage (2014).

Normalized % - Without Cold Storage:

16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks

[5] PCE rates are per San Bernardino County Transportation Authority (SBCTA) Congestion Management Program (CMP) Guidelines.

Table 4-2

Alternative Trip Generation Summary

Project Trip Generation Rates									
Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (80.0% AM, 84.0% PM/Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (3.34% AM, 2.67% PM/Daily)			0.002	0.001	0.003	0.001	0.002	0.003	0.037
3-Axle Trucks (4.14% AM, 3.31% PM/Daily)			0.003	0.001	0.003	0.001	0.002	0.003	0.046
4-Axle+ Trucks (12.52% AM, 10.02% PM/Daily)			0.008	0.002	0.010	0.003	0.007	0.010	0.140
High-Cube Cold Storage Warehouse (With Cold Storage)[3]	TSF	157	0.085	0.025	0.110	0.032	0.088	0.120	2.120
Passenger Cars (AM-73.0%; PM-77.0%; Daily-65.0%)			0.062	0.018	0.080	0.025	0.067	0.092	1.378
2-Axle Trucks (AM-9.37%; PM-7.98%; Daily-12.15%)			0.008	0.002	0.010	0.003	0.007	0.010	0.257
3-Axle Trucks (AM-2.97%; PM-2.53%; Daily-3.85%)			0.003	0.001	0.003	0.001	0.002	0.003	0.082
4-Axle+ Trucks (AM-14.66%; PM-12.49%; Daily-19.01%)			0.012	0.004	0.016	0.004	0.011	0.015	0.403
Passenger Car Equivalent									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (69.2% AM, 78.3% PM, 67.8% Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (5.14% AM, 3.62% PM, 5.38% Daily, PCE = 1.5)[5]			0.003	0.001	0.004	0.001	0.003	0.004	0.056
3-Axle Trucks (6.38% AM, 4.49% PM, 6.66% Daily, PCE = 2.0)[5]			0.005	0.002	0.007	0.002	0.005	0.007	0.093
4-Axle+ Trucks (19.28% AM, 13.59% PM, 20.16% Daily, PCE = 3.0)[5]			0.023	0.007	0.030	0.008	0.022	0.030	0.421
High-Cube Cold Storage Warehouse (With Cold Storage)[3]	TSF	157	0.085	0.025	0.110	0.032	0.088	0.120	2.120
Passenger Cars (AM-73.0%; PM-77.0%; Daily-65.0%)			0.062	0.018	0.080	0.025	0.067	0.092	1.378
2-Axle Trucks (AM-9.37%; PM-7.98%; Daily-12.15%, PCE = 1.5[5])			0.012	0.004	0.015	0.004	0.010	0.014	0.386
3-Axle Trucks (AM-2.97%; PM-2.53%; Daily-3.85%, PCE = 2.0[5])			0.005	0.002	0.007	0.002	0.004	0.006	0.163
4-Axle+ Trucks (AM-14.66%; PM-12.49%; Daily-19.01%, PCE = 3.0[5])			0.037	0.011	0.048	0.012	0.033	0.045	1.209

Table 4-2

Page 2 of 2

Alternative Trip Generation Summary

Project Trip Generation									
Project	**Quantity**	**Units[2]**	**AM Peak Hour**			**PM Peak Hour**			**Daily**
			In	**Out**	**Total**	**In**	**Out**	**Total**	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage	480.020	TSF							
Passenger Cars:			24	8	32	12	30	42	566
Truck Trips:									
2-axle:			1	1	2	1	1	2	18
3-axle:			2	1	3	1	2	3	24
4+-axle:			4	2	6	2	4	6	68
- Net Truck Trips (Actual Vehicles)			*7*	*4*	*11*	*4*	*7*	*11*	*110*
High-Cube Cold Storage Warehouse (With Cold Storage)	480.020	TSF							
Passenger Cars:			30	9	39	12	33	45	662
Truck Trips:									
2-axle:			4	2	6	2	4	6	124
3-axle:			2	1	3	1	2	3	40
4+-axle:			6	2	8	2	6	8	194
- Net Truck Trips (Actual Vehicles)			*12*	*5*	*17*	*5*	*12*	*17*	*358*
TOTAL NET TRIPS (Actual Vehicles)			***73***	***26***	***99***	***33***	***82***	***115***	***1,696***
Passenger Car Equivalent[5]									
High-Cube Transload Short-Term Warehouse without Cold Storage	480.020	TSF							
Passenger Cars:			24	8	32	12	30	42	566
Truck Trips:									
2-axle:			2	1	3	1	2	3	28
3-axle:			3	1	4	1	3	4	46
4+-axle:			12	4	16	5	11	16	202
- Net Truck Trips			*17*	*6*	*23*	*7*	*16*	*23*	*276*
High-Cube Cold Storage Warehouse (With Cold Storage)	480.020	TSF							
Passenger Cars:			30	9	39	12	33	45	662
Truck Trips:									
2-axle:			6	2	8	2	6	8	186
3-axle:			3	1	4	1	3	4	80
4+-axle:			18	6	24	6	16	22	582
- Net Truck Trips			*27*	*9*	*36*	*9*	*25*	*34*	*848*
TOTAL NET TRIPS			***98***	***32***	***130***	***40***	***104***	***144***	***2,352***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet

[3] Vehicle Mix Source: Institute of Transportation Engineers (ITE) Trip Generation 10th Edition Supplement (February 2020).

[4] Truck Mix Source: SCAQMD Warehouse Truck Trip Study Data Results and Usage (2014).

Normalized % - Without Cold Storage:

16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks

[5] PCE rates are per San Bernardino County Transportation Authority (SBCTA) Congestion Management Program (CMP) Guidelines.

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered to identify the route where the Project traffic would distribute. Truck distribution patterns are based on truck routes, the site's proximity to the regional freeway system and likely distribution of traffic if a future tenant is known. Passenger car distribution patterns are based on existing and planned land uses in the area along with the planned circulation system. Exhibit 4-1 illustrates the truck trip distribution patterns for the Project and Exhibit 4-2 illustrates the passenger car trip distribution patterns. Each of these distribution patterns was reviewed by the City of Colton as part of the TA scoping process (see Appendix 1.1).

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes (employee trips only).

4.4 PROJECT TRIP ASSIGNMENT

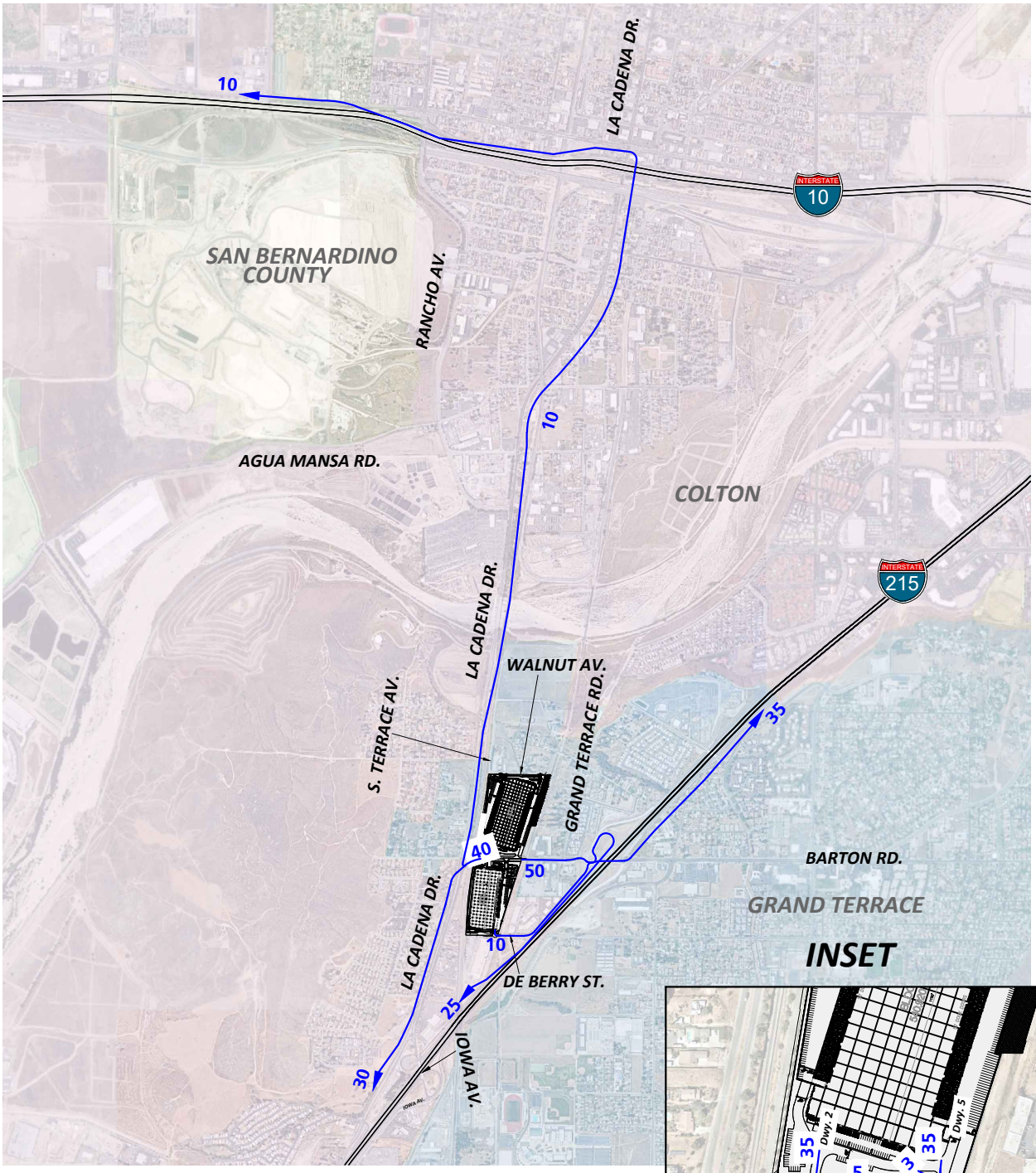
The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-3 and 4-4, respectively.

4.5 BACKGROUND TRAFFIC

4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year, compounded annually. The total ambient growth is 4.04% for 2022 traffic conditions (compounded growth of 2.0 percent per year over 2 years). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year Cumulative (2022) traffic volumes are provided in Section 6 of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative "With Project" forecasts.

EXHIBIT 4-1 (1OF2): PROJECT (TRUCK) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT FROM PROJECT

N

EXHIBIT 4-1 (2OF2): PROJECT (TRUCK) TRIP DISTRIBUTION

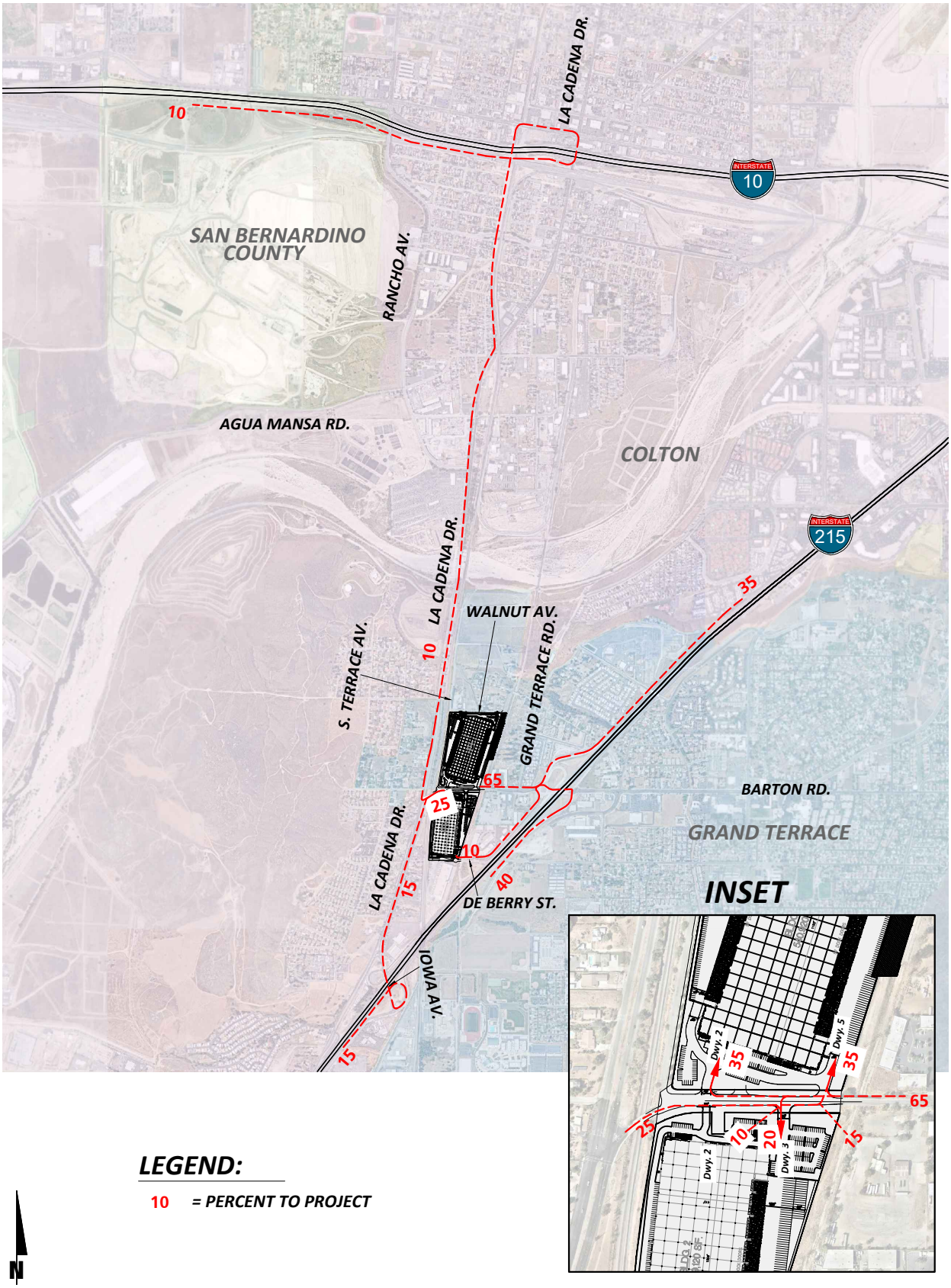
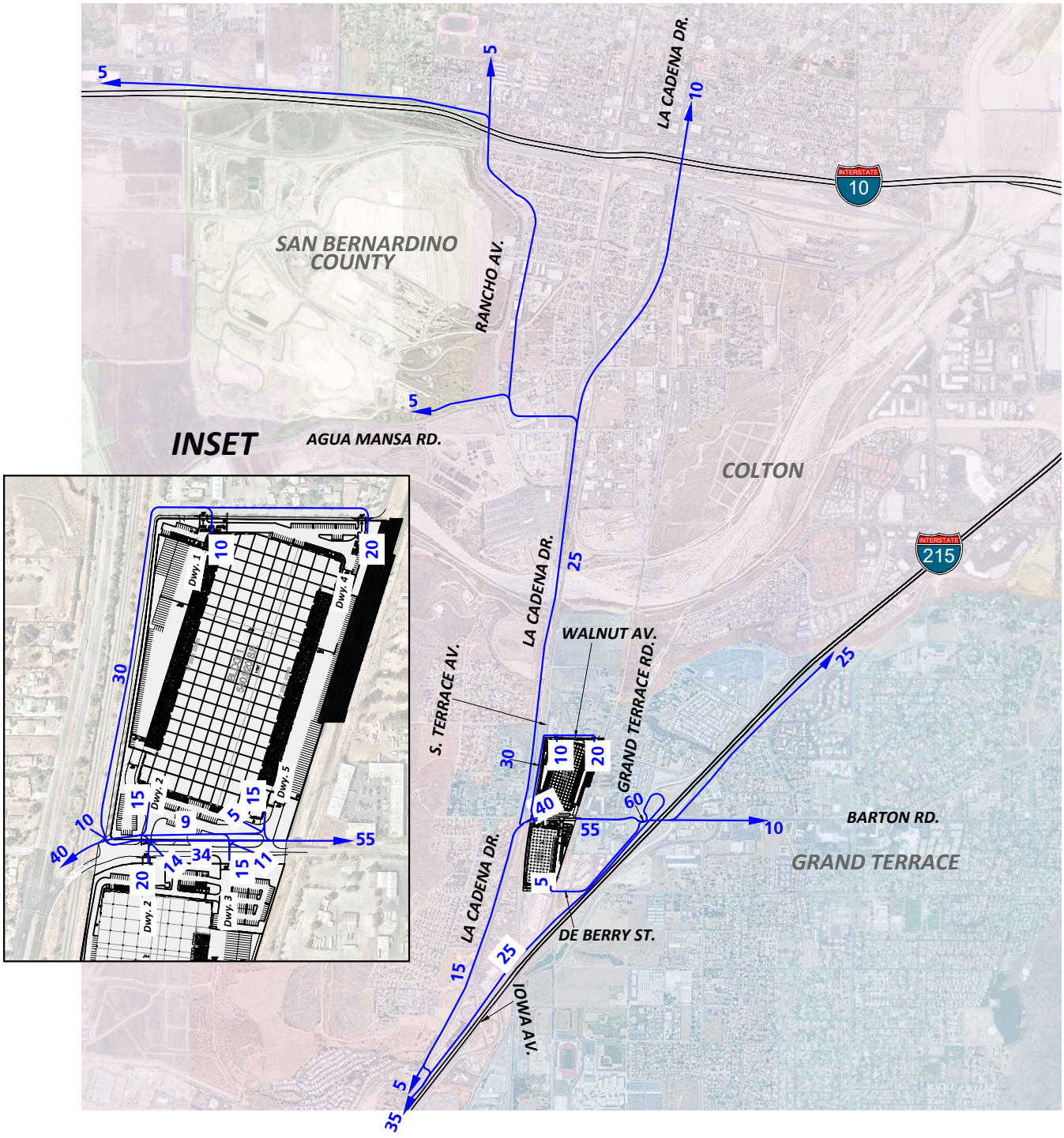


EXHIBIT 4-2 (1OF2): PROJECT (PASSENGER CAR) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT FROM PROJECT

EXHIBIT 4-2 (2OF2): PROJECT (PASSENGER CAR) TRIP DISTRIBUTION

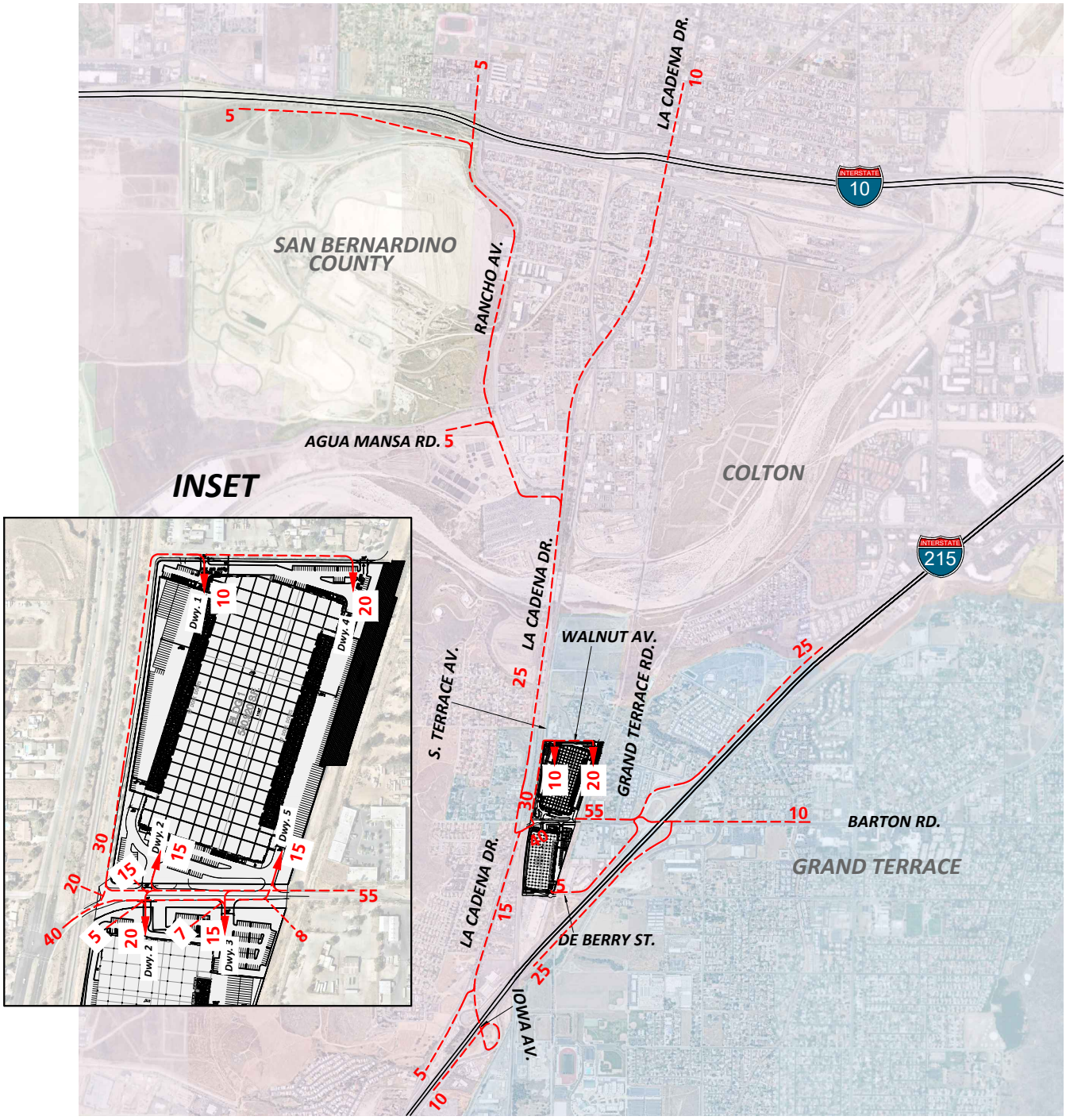
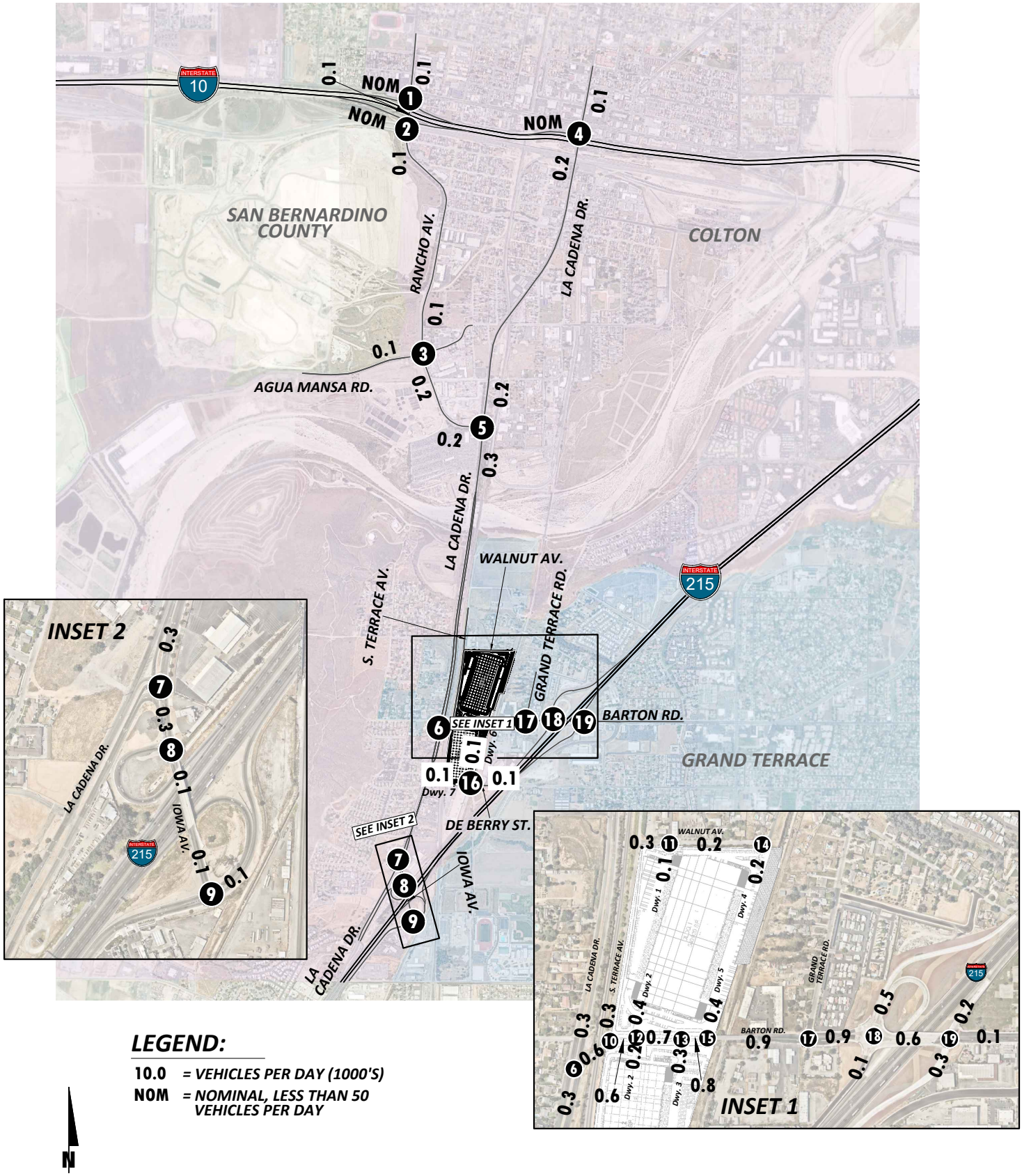


EXHIBIT 4-3: PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

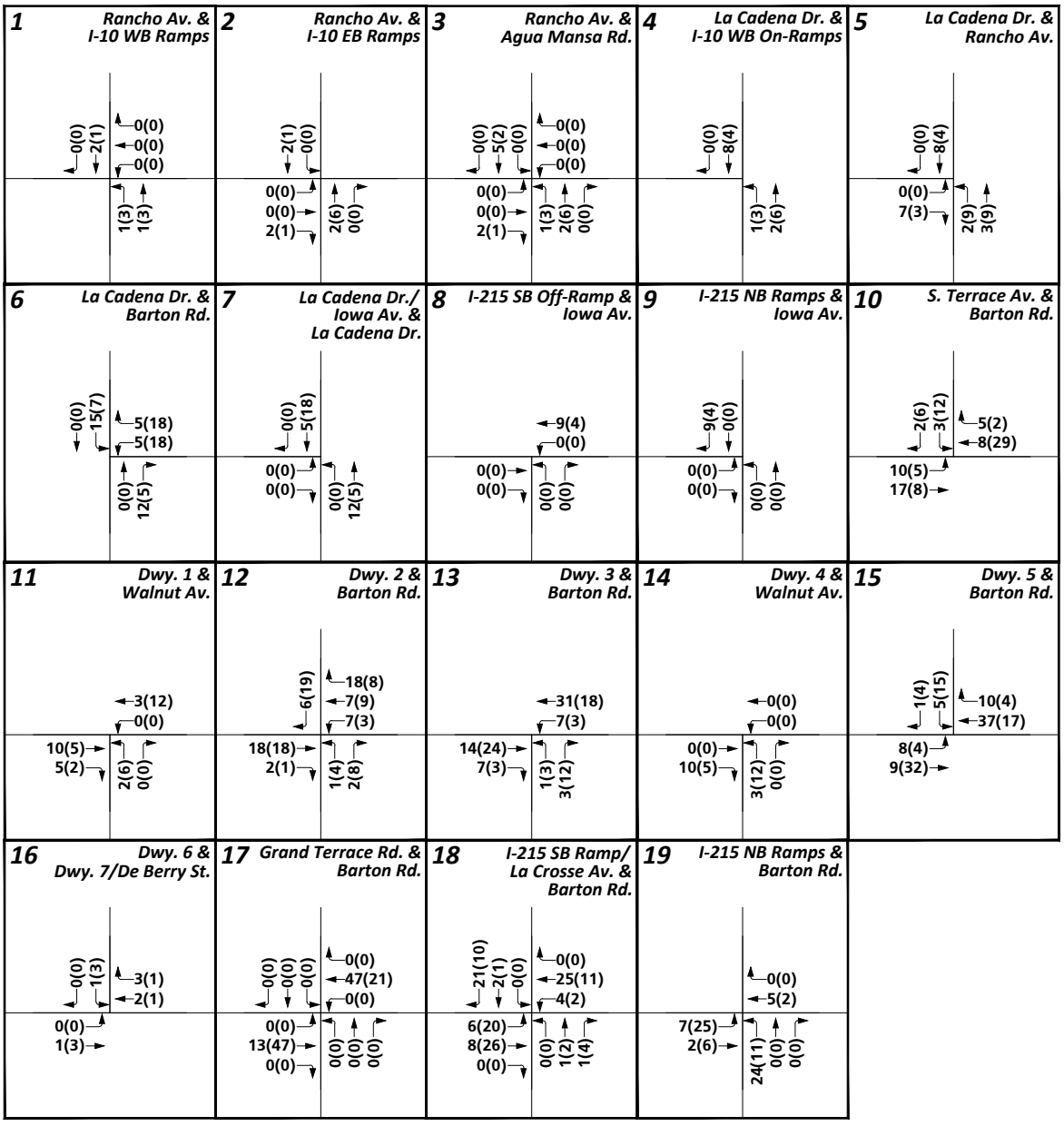


LEGEND:

10.0	= VEHICLES PER DAY (1000'S)
NOM	= NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

EXHIBIT 4-4: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

URBAN CROSSROADS

4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (May 2020, to be adopted September 2020) growth forecasts for the City of Colton identifies projected growth in population of 53,700 in 2016 to 70,700 in 2045, or a 31,66% increase over the 29-year period. (7) The change in population equates to roughly a 0.95% growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 44.67%, or a 1.28% annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 48.71%, or a 1.38% annual growth rate.

Based on a comparison of Existing (2020) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is estimated at approximately 2.18%, compounded annually between Existing (2020) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 1.38% compounded annually to as high as 3.37% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Colton for Opening Year Cumulative and Horizon Year (2040) traffic conditions, especially when considered along with the addition of project-related traffic, which would tend to overstate as opposed to understate the potential effects to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Colton. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Cumulative projects from the neighboring jurisdictions of Rialto, Riverside, Grand Terrace, and County of Riverside have also been included.

Exhibit 4-5 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown in Table 4-3. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-3 are reflected as part of the background traffic. In an effort to conduct a conservative analysis, the cumulative projects are added in conjunction with the ambient growth identified in Section 4.5.1 *Background Traffic: Opening Year Cumulative Conditions*. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-6 and 4-7, respectively, for near-term traffic conditions.

EXHIBIT 4-5: CUMULATIVE DEVELOPMENT LOCATION MAP

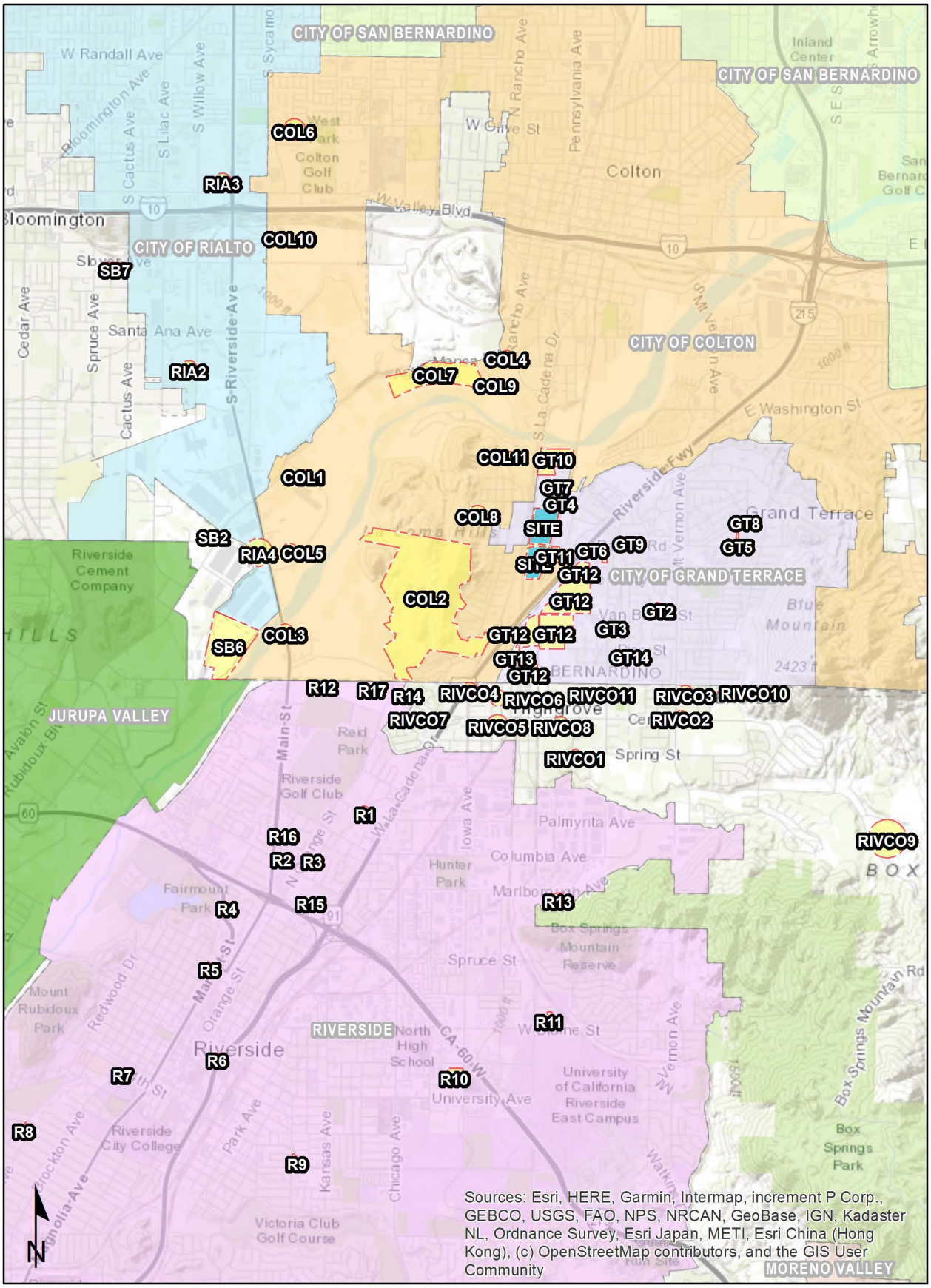
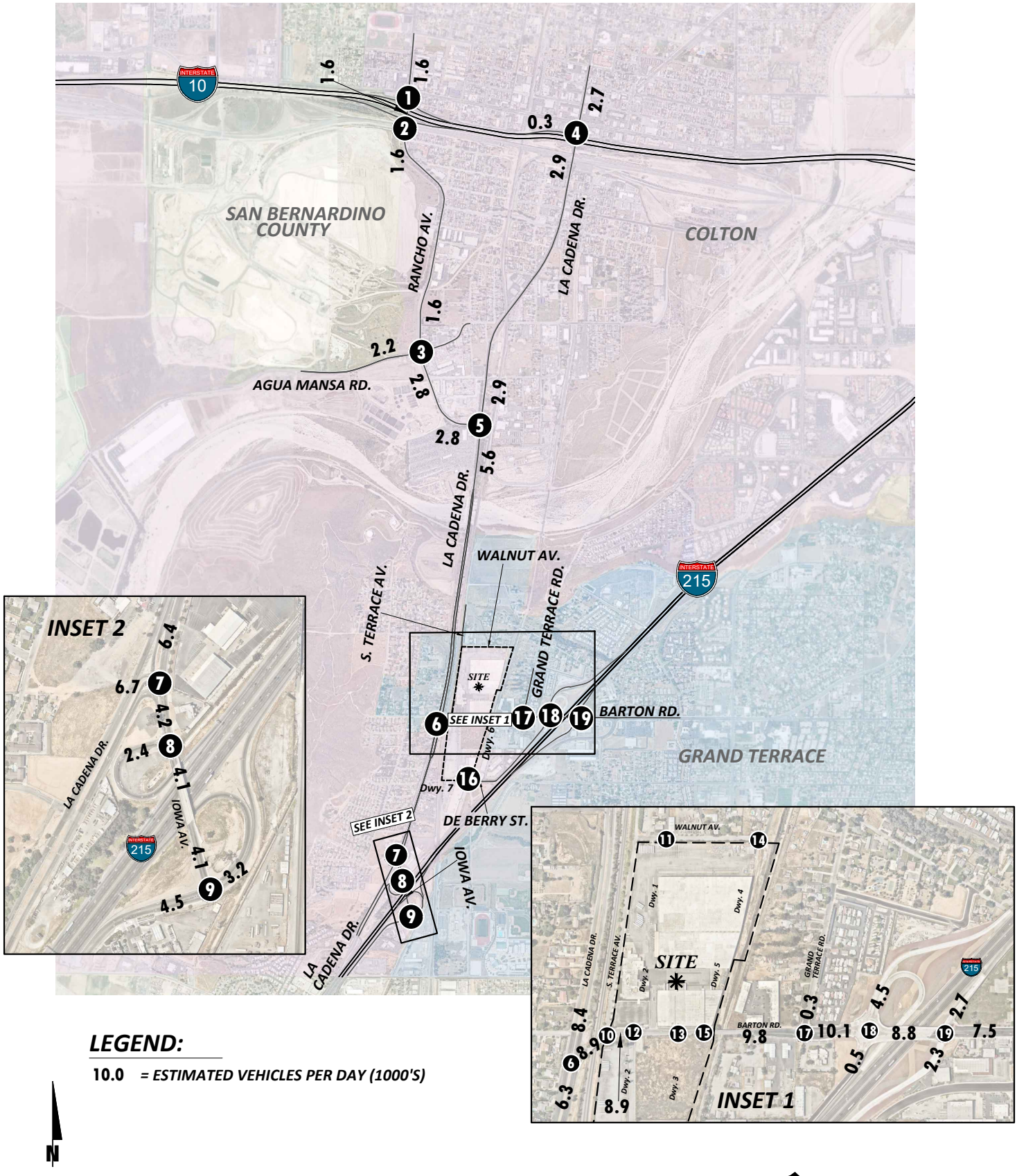


EXHIBIT 4-6: CUMULATIVE ONLY AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

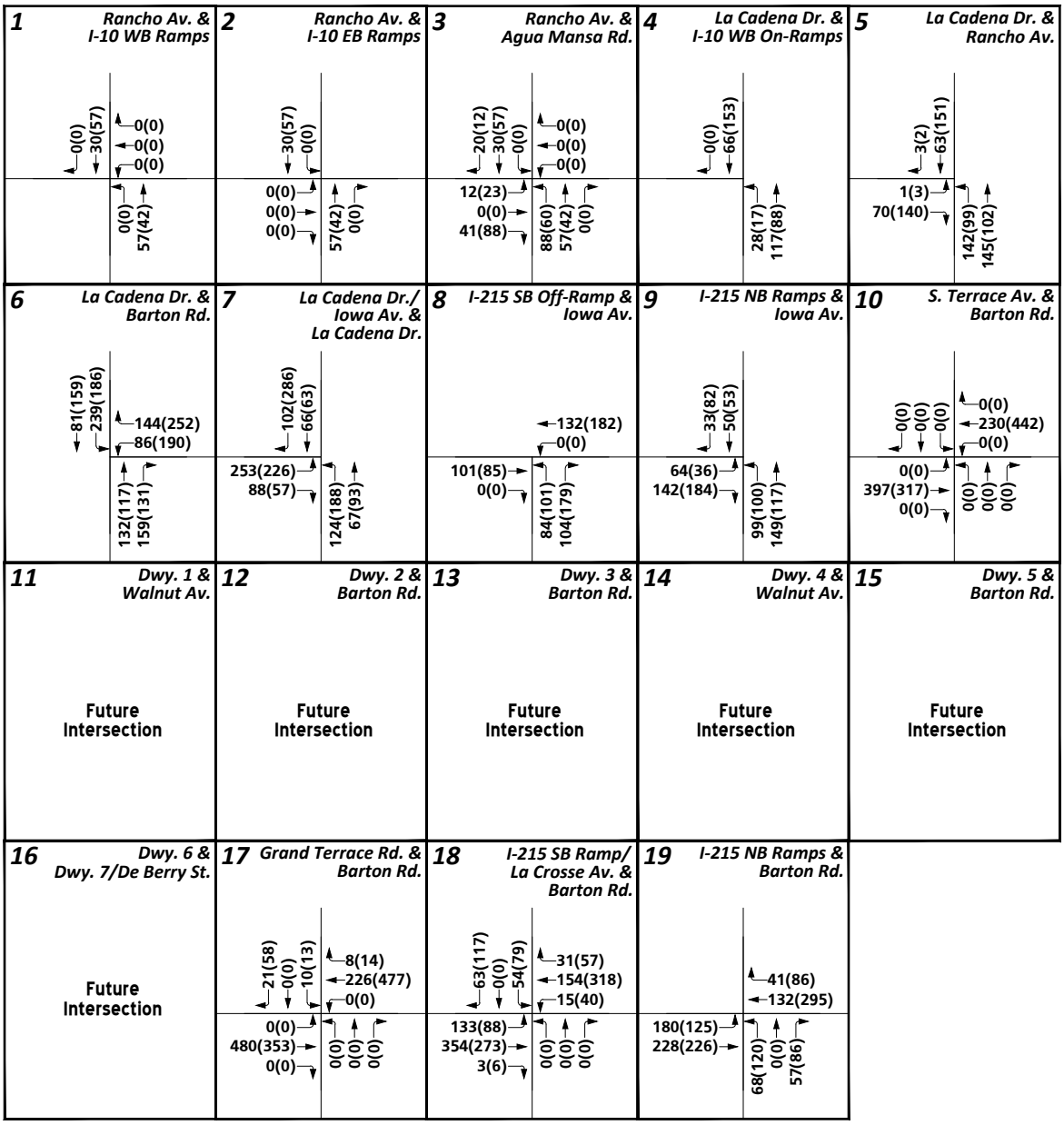


LEGEND:

10.0 *= ESTIMATED VEHICLES PER DAY (1000'S)*

N

EXHIBIT 4-7: CUMULATIVE ONLY TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
City of Colton				
COL1	2036 Miguel Bustamante Pkwy.	Warehouse	124.588	TSF
	2053 Miguel Bustamante Pkwy.	Warehouse	174.996	TSF
COL2	Roquet Ranch	SFDR	754	DU
		Condo/Townhomes	244	DU
		Active Adult - Attached	52	DU
		Shopping Center	6.500	TSF
		Coffee Shop with Drive Thru	1.500	TSF
		Fast Food with Drive Thru	4.000	TSF
		Active Park[2, 4]	11.1	AC
		Passive Park[4]	8.4	AC
COL3	2163 Riverside Av.	High-Cube Warehouse	447.330	TSF
COL4	Southwest Regional Operations Center	Office	--[3]	--
		Gasoline Service Station	--[3]	--
		Truck Wash, Service Facility, Parking Lot	--[3]	--
COL5	Agua Mansa Commerce Center	Warehouse	--[3]	--
COL6	Wildrose Village	SFDR	--[3]	--
COL7	Agua Mansa Commerce Center	High-Cube Warehouse	1,214.000	TSF
COL8	300 W. Litton Av. - Litton Housing	Single Family Detached Residential	89	DU
COL9	CalPortland (1500 Agua Mansa Rd.)	Cement Production Facility	66.0	AC
COL10	California High Speed Rail Facility	Intermodal Rail Facility	--[5]	--[5]
COL11	Tropica Commerce Center	Warehouse	266.030	TSF
City of Grand Terrace				
GT1	Grand Terrace Town Square	Supermarket	--[4]	--
		Shopping Center	--[4]	--
		Fast-Food Restaurant with Drive-Thru	--[4]	--
GT2	22394 and 22040 Van Buren St.	Single Family Detached Residential	--[4]	--
GT3	12569 Michigan St.	Single Family Detached Residential	--[4]	--
GT4	11832 and 11834 Burns Av.	Single Family Detached Residential	--[4]	--
GT5	22805 Barton Rd.	Medical Office	--[4]	--
		Coffee Shop without Drive-Thru	--[4]	--
GT6	22085 Commerce Wy.	Animal Clinic, Commercial Units	--[4]	--
GT7	11838 Burns Av.	Single Family Detached Residential	--[4]	--
GT8	22881 Barton Rd.	Coffee Shop with Drive-Thru	--[4]	--
GT9	NEC of Vivienda Av. & Barton Rd.	Fast-Food Restaurant with Drive-Thru	2.080	TSF
GT10	North of Vivienda Av. and east of La Cadena Av.	Trailer Storage Facility	22.0	AC
GT11	21801 Barton Rd.	Recycling Center	80.898	TSF
GT12	Gateway Specific Plan	Multifamily Housing	748	DU
		Business Park	12.196	TSF
		Shopping Center	356.296	TSF
		Public Facilities	3.7	AC
GT13	21496 Main St.	Warehouse	8.820	TSF
GT14	22247 Pico St.	Single Family Detached Residential	12	DU

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
County of San Bernardino				
SB1	Slover Av. between Locust Av. and Laurel Av.	High-Cube Warehouse	344	TSF
SB2	West of Agua Mansa Rd. and North of El Rivino Rd.	High-Cube Warehouse	476.000	TSF
		Warehouse	30.000	TSF
SB3	NWC of Cedar Av. and Jurupa Av.	High-Cube Warehouse	677.000	TSF
SB4	Locust Av. and 7th St.	SFDR	198	DU
SB5	NEC and NWC of Cedar Av. and Orange St.	Warehouse	395.000	TSF
SB6	Holly Street Truck Terminal	Truck Terminal	450.000	TSF
SB7	Bloomington Commerce Center	High-Cube Warehouse	800.000	TSF
		High-Cube Fulfillment Center	451.640	TSF
SB8	Slover and Cactus Warehouse	Warehouse	257.855	TSF
City of Rialto				
RIA1	Panattoni I-10 (Cactus Av. & El Rivino Rd.)	Warehouse	2,475.745	TSF
RIA2	CapRock III	Warehouse	582.000	TSF
RIA3	Newmark Merrill Companies	Discount Super Store	198.000	TSF
		Tire Store	9.861	TSF
		Retail	25.436	TSF
		Fast Food w/ Drive-Thru	5.484	TSF
RIA4	Kore Infrastructure	Biosolids Facility	288	TPD
County of Riverside				
RIVCO1	TR28957	Single-Family Residential	36	DU
RIVCO2	TR32989	Single-Family Residential	29	DU
RIVCO3	TR32291	SFDR	69	DU
RIVCO4	CUP03718	Light Industrial	19.988	TSF
RIVCO5	PP24798	Retail	2.400	TSF
		Offices	3.405	TSF
		Laundromat	2.961	TSF
RIVCO6	PP25482	General Office	2.632	TSF
RIVCO7	Truck Sales Facility (PP25505)	Office	1.952	TSF
		Storage	6.000	TSF
RIVCO8	TR36668 (Bixby Highgrove)	Single-Family Residential	201	DU
RIVCO9	Spring Mountain Ranch (SP 323) (PM36448; TR29597; TR29598; TR29600; TR29741; TR30908; TR30909)	Single-Family Residential	1,518	DU
		Elementary School	750	STU
		Day Care Center	4.000	TSF
		Commercial Retail	104.000	TSF
RIVCO10	TTM37743	Single-Family Residential	58	DU
RIVCO11	PP24778	Multifamily Housing	89	DU
City of Riverside				
R1	P06-0782 (Tract Map 34908) (1006 & 1008 Clark St.)	SFDR	15	DU
R2	P05-0269 & P08-0416 (Tract Map 33550) (3719 Strong St.)	SFDR	9	DU
R3	P06-1031 (Tract Map 31825) (1562 Orange St.)	SFDR	7	DU
R4	P13-0087 P13-0262 (2450 Market St.)	Senior Housing	67	DU
R5	P14-0183 (Centerpointe Apartments) (3105 Market St.)	Apartments	146	DU
R6	P09-0835 P10-0002 (3372 University Av.)	General Office	132.136	TSF
R7	P06-1237 (Jacobs Medical Office) (14th and Brockton Av.)	Medical Office	65.281	TSF
R8	P12-0799 & P12-0800 (Tract Map 36516)	SFDR	7	DU
R9	P09-0808 & P08-0809 (2340 14th St.)	Senior Housing	134	Beds
R10	P08-0980 & P09-0095 (3549 Iowa Av.)	Student Housing	114	Beds
R11	P09-0717 & P09-0718 (807 Blaine St.)	Apartments	55	DU

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
R12	3667 Placentia Ln.	Warehouse	308.000	TSF
R13	750 Marlborough Av.	Warehouse	346.330	TSF
R14	3444 Center St.	Mobile Home Park	104	DU
R15	The Exchange	Multifamily Housing	482	DU
		Shopping Center	44.500	TSF
		Gasoline Service Station with Convenience Market	16	VFP
		Hotel	229	RM
R16	3723 Strong St.	Senior Housing - Attached	58	DU
R17	3630 Center St.	Warehouse	8.156	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; STU = Students; AC = Acres; TPD = Tons Per Day; VFP = Vehicle Fueling Positions; RM = Rooms

[3] Quantity unknown. City of Colton provided estimated trips (AM/PM/Daily).

[4] Quantity unknown. City of Grand Terrace provided estimated trips (AM/PM/Daily).

[5] Per the California High Speed Rail Authority, the size of the facility is currently unknown.

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the SBTAM using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The current version of the SBTAM (Version 2.20, March 2019) reflects the local input in the adopted 2016 SCAG RTP within the County of San Bernardino. The post processing volume worksheets are provided in Appendix 4.1 of this TA.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2020) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location. The SBTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.27. These factors represent the relationship of the highest single AM peak hour to the modeled 3 hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4 hour PM peak period (an even distribution would result in a factor of 0.25).

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to Opening Year Cumulative (2022) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative (2022) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2020) and Opening Year Cumulative (2022) conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

This Page Intentionally Left Blank

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- S. Terrace Avenue, from Barton Road to De Berry Street, is assumed to be vacated.

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. With the development of the proposed Project, S. Terrace Avenue will be vacated, from Barton Road to De Berry Street. As such, existing volumes have been adjusted to reflect the vacation of S. Terrace Avenue. Existing volumes have been rerouted to utilize La Crosse Avenue to access Barton Road to the north. The ADT and weekday AM and PM peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibits 5-1 and 5-2, respectively.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized in Table 5-1 for E+P traffic conditions, which indicates that with the addition of Project traffic there are no additional study area intersections anticipated to operate at an unacceptable LOS during the peak hours, in addition to the study area intersection previously identified under Existing (2020) traffic conditions. Consistent with Table 5-1, a summary of the peak hour intersection LOS is shown on Exhibit 5-3 for E+P traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections anticipated to meet a peak hour volume-based or planning-level (ADT) traffic signal warrant for E+P traffic conditions (see Appendix 5.2).

EXHIBIT 5-1: E+P AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

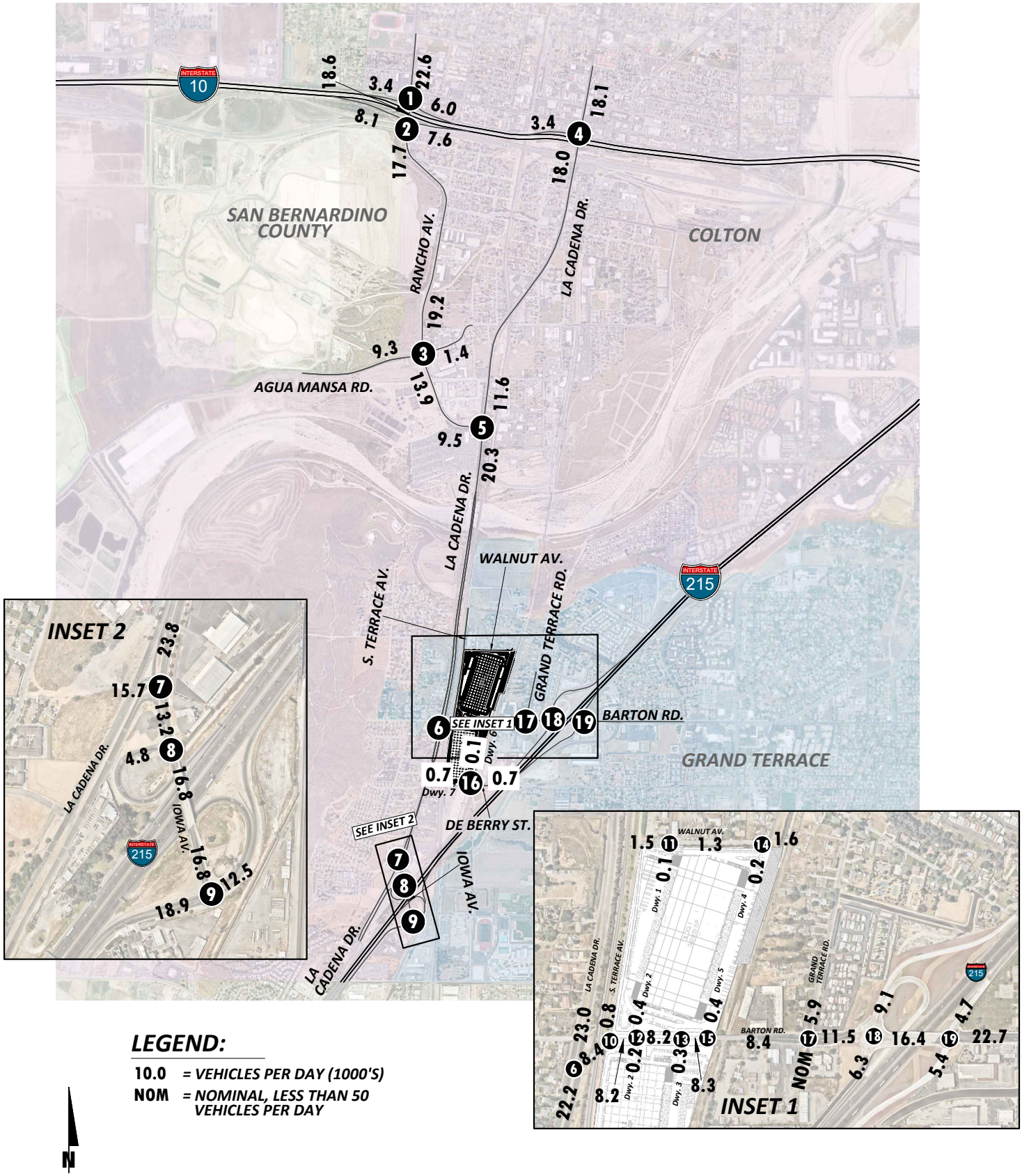
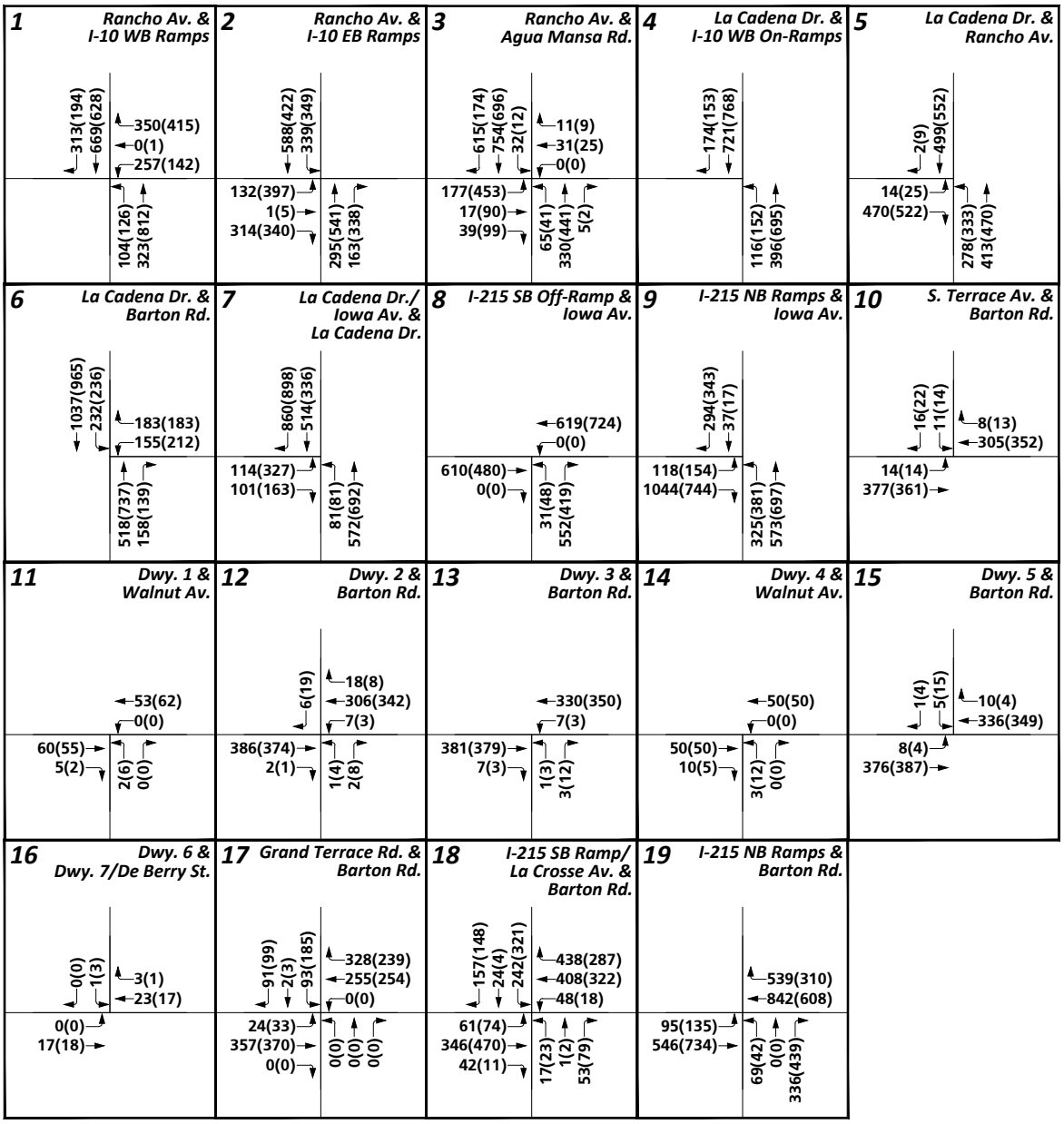


EXHIBIT 5-2: E+P TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

URBAN CROSSROADS

EXHIBIT 5-3: E+P SUMMARY OF LOS

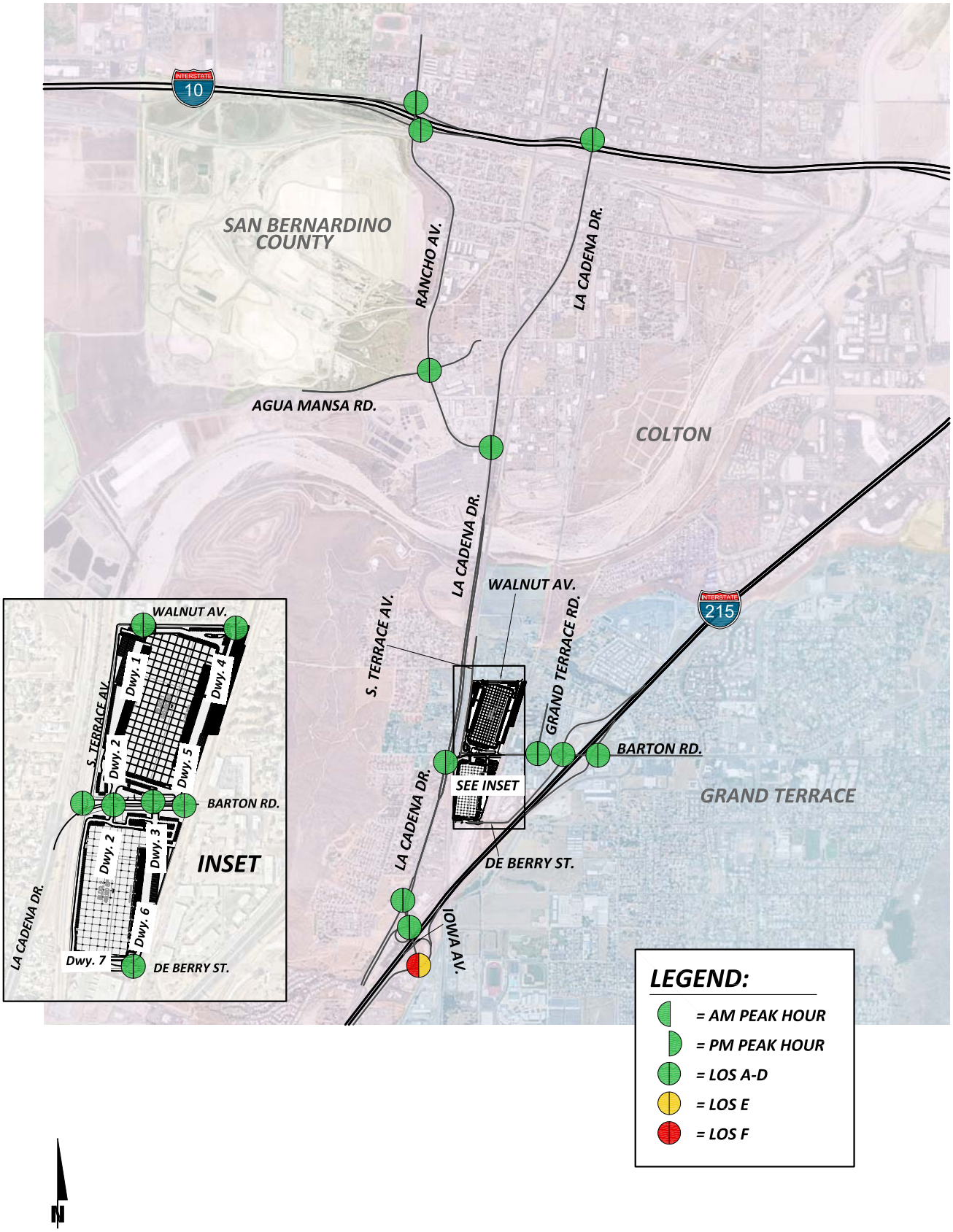


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2020)				E+P			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Rancho Av. & I-10 WB Ramps	TS	26.5	22.4	C	C	26.5	22.5	C	C
2	Rancho Av. & I-10 EB Ramps	TS	25.9	36.2	C	D	26.0	36.2	C	D
3	Rancho Av. & Agua Mansa Rd.	TS	19.7	33.2	B	C	20.0	33.7	C	C
4	La Cadena Dr. & I-10 WB Ramps	UC	11.4	11.5	B	B	11.4	11.5	B	B
5	La Cadena Dr. & Rancho Av.	TS	16.0	18.8	B	B	16.2	19.1	B	B
6	La Cadena Dr. & Barton Rd.	TS	41.2	37.1	D	D	41.3	37.1	D	D
7	La Cadena Dr. & Iowa Av.	TS	12.8	15.5	B	B	12.8	15.6	B	B
8	I-215 SB Ramps & Iowa Av.	TS	16.1	12.5	B	B	16.2	12.6	B	B
9	I-215 NB Ramps & Iowa Av.	TS	**117.4**	**78.3**	**F**	**E**	**122.1**	**79.7**	**F**	**E**
10	S. Terrace Av. & Barton Rd.	CSS	16.6	16.7	C	C	11.9	12.5	B	B
11	Dwy. 1 & Walnut Av.	**CSS**	Future Intersection				9.1	9.2	A	A
12	Dwy. 2 & Barton Rd.	**CSS**	Future Intersection				12.5	13.0	B	B
13	Dwy. 3 & Barton Rd.	**CSS**	Future Intersection				11.7	11.7	B	B
14	Dwy. 4 & Walnut Av.	**CSS**	Future Intersection				9.1	9.1	A	A
15	Dwy. 5 & Barton Rd.	**CSS**	Future Intersection				14.1	14.7	B	B
16	Dwy. 6 & Dwy. 7/De Berry St.	**CSS**	Future Intersection				8.7	8.7	A	A
17	Grand Terrace Rd. & Barton Rd.	TS	13.1	18.6	B	B	12.8	18.0	B	B
18	I-215 SB Ramps & Barton Rd.	RA	6.7	6.9	A	A	7.1	7.4	A	A
19	I-215 NB Ramps & Barton Rd.	TS	12.1	12.0	B	B	12.4	12.5	B	B

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; UC = Uncontrolled; RA = Roundabout;**CSS** = Improvement

5.5 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for E+P are presented in Table 5-2. As shown in Table 5-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with the addition of Project traffic. Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.3.

5.6 FREEWAY FACILITY ANALYSIS

E+P mainline directional volumes for the AM and PM peak hours are provided on Exhibit 5-3. As shown in Table 5-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for E+P traffic conditions. E+P freeway facility analysis worksheets are provided in Appendix 5.4.

5.7 DEFICIENCIES AND IMPROVEMENTS

This section provides a summary of deficiencies, based on the City of Colton's deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, and improvements needed to improve operations back to acceptable levels.

5.7.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the improvements needed to address LOS deficiencies at each study area intersection is presented in Table 5-4 for E+P traffic conditions. It should be noted that the identified improvements are consistent with those needed to address existing deficiencies. The Project is anticipated to contribute fewer than 50 peak hour trips to the deficient intersection. The intersection operations analysis worksheets for E+P traffic conditions, with improvements, are included in Appendix 5.4 of this TA.

5.7.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown in Table 5-2, there are no peak hour queuing issues at the study area interchanges for E+P traffic conditions. As such, no improvements are necessary.

5.7.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown in Table 5-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for E+P traffic conditions. As such, no improvements are necessary.

Table 5-2

Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2020)				E+P			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak	PM Peak	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Rancho Av. & I-10 WB Ramps (#1)	WBL/T	930	275	134	Yes	Yes	275	134	Yes	Yes
	WBR	145	75	296 [3]	Yes	No	75	296 [3]	Yes	Yes
Rancho Av. & I-10 EB Ramps (#2)	EBL/T	1,530	165	454 [2]	Yes	Yes	165	454 [2]	Yes	Yes
	EBR	160	135	146	Yes	Yes	139	146	Yes	Yes
I-215 SB Off-Ramp & Iowa Av. (#8)	NBL	1,420	36	43	Yes	Yes	36	43	Yes	Yes
	NBR	400	433 [3]	101	No	Yes	433 [3]	101	Yes	Yes
I-215 NB Ramps & Iowa Av. (#9)	SBT/R	1,155	1,095 [2]	478 [2]	Yes	Yes	238 [2]	112	Yes	Yes
I-215 SB Ramps & Barton Rd. (#18)	SBL/T	1,820	25	25	Yes	Yes	25	50	Yes	Yes
	SBR	1,100	25	0	Yes	Yes	25	25	Yes	Yes
I-215 NB Ramps & Barton Rd. (#19)	NBL/T	250	161 [2]	326 [2,3]	Yes	No	225 [2]	417 [2,3]	Yes	Yes
	NBR	1,580	168	238	Yes	Yes	169	238	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 or I-215 Freeway mainline.

Table 5-3

Freeway Facility Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2020)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215 Freeway	Southbound	North of Barton Rd.	3	18.2	C	17.3	B	18.3	C	17.3	B
		Off-Ramp at Barton Rd.	3	25.1	C	24.3	C	25.2	C	24.3	C
		Loop On-Ramp at Barton Rd.	3	22.3	C	19.9	B	22.3	C	20.0	B
		South of Barton Rd.	3	18.7	C	16.7	B	18.7	C	16.7	B
	Northbound	North of Barton Rd.	3	23.9	C	20.8	C	23.9	C	21.0	C
		On-Ramp at Barton Rd.	3	27.3	C	24.2	C	27.4	C	24.4	C
		Off-Ramp at Barton Rd.	3	27.4	C	26.7	C	27.7	C	18.5	C
		South of Barton Rd.	3	22.3	C	21.2	C	22.7	C	21.3	C

* **BOLD** = Unacceptable Level of Service

[1] Number of mixed-flow lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 5-4

Intersection Analysis for E+P Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
9	I-215 NB Ramps & Iowa Av.																	
	- Without Project	TS	1	1	0	0	1	0	0	1	**1**	0	0	0	26.1	36.8	C	D
	- With Project	TS	1	1	0	0	1	0	0	1	**1**	0	0	0	26.8	37.1	C	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

EXHIBIT 5-4: E+P FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

12971 - freeway.dwg

URBAN CROSSROADS

6 OPENING YEAR CUMULATIVE (2022) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2022) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2022) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only.
- S. Terrace Avenue, from Barton Road to De Berry Street, is assumed to be vacated for With Project conditions only.

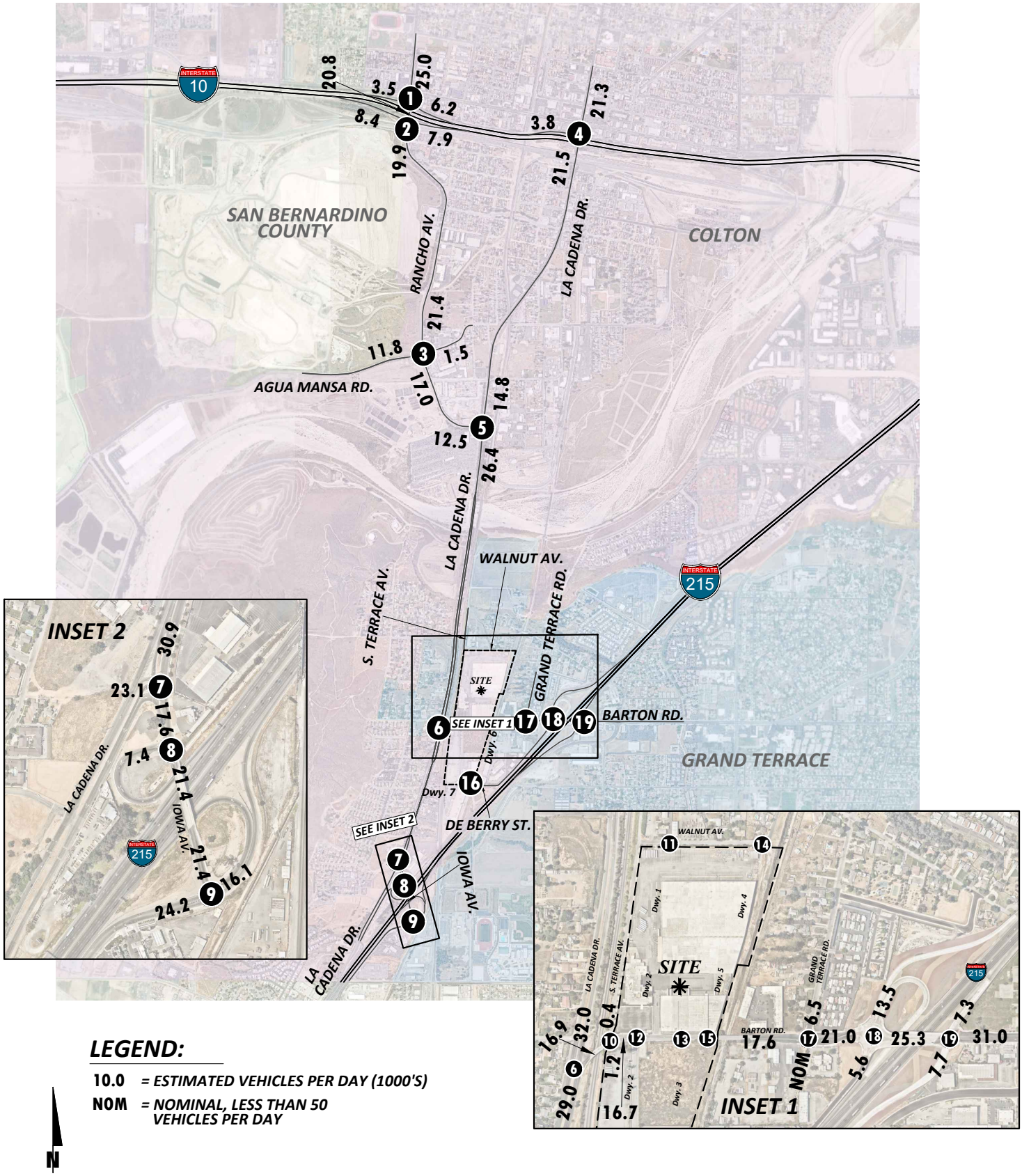
6.2 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 4.04% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) Without Project traffic conditions are shown on Exhibits 6-1 and 6-2, respectively.

6.3 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2022) Without Project traffic in conjunction with the addition of Project traffic. With the development of the proposed Project, S. Terrace Avenue will be vacated, from Barton Road to De Berry Street. As such, volumes have been adjusted to reflect the vacation of S. Terrace Avenue. Volumes have been rerouted to utilize La Crosse Avenue to access Barton Road to the north. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2022) With Project traffic conditions are shown on Exhibits 6-3 and 6-4, respectively.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)



LEGEND:

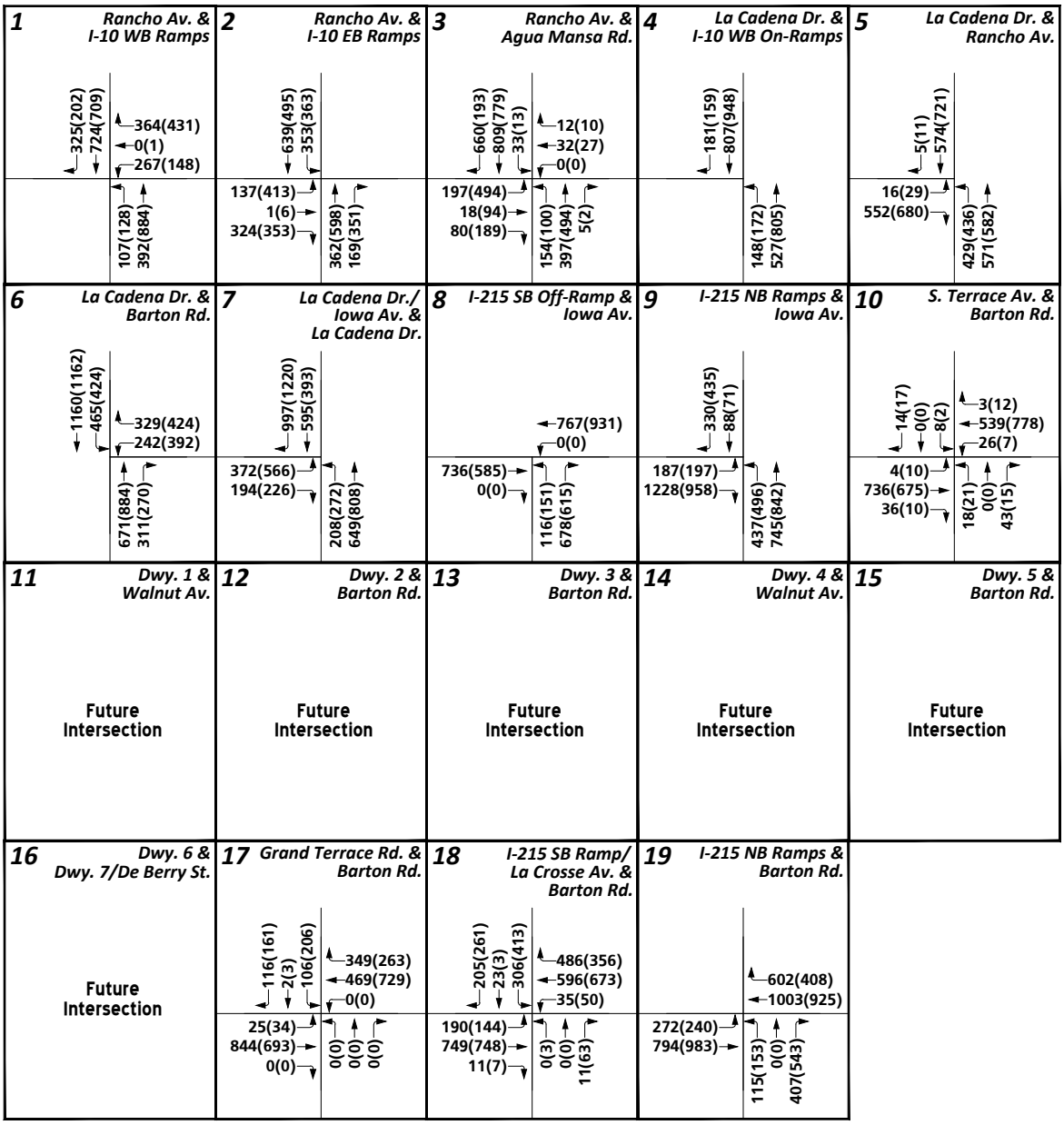
10.0 = ESTIMATED VEHICLES PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

12971 - adt.dwg

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2022) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

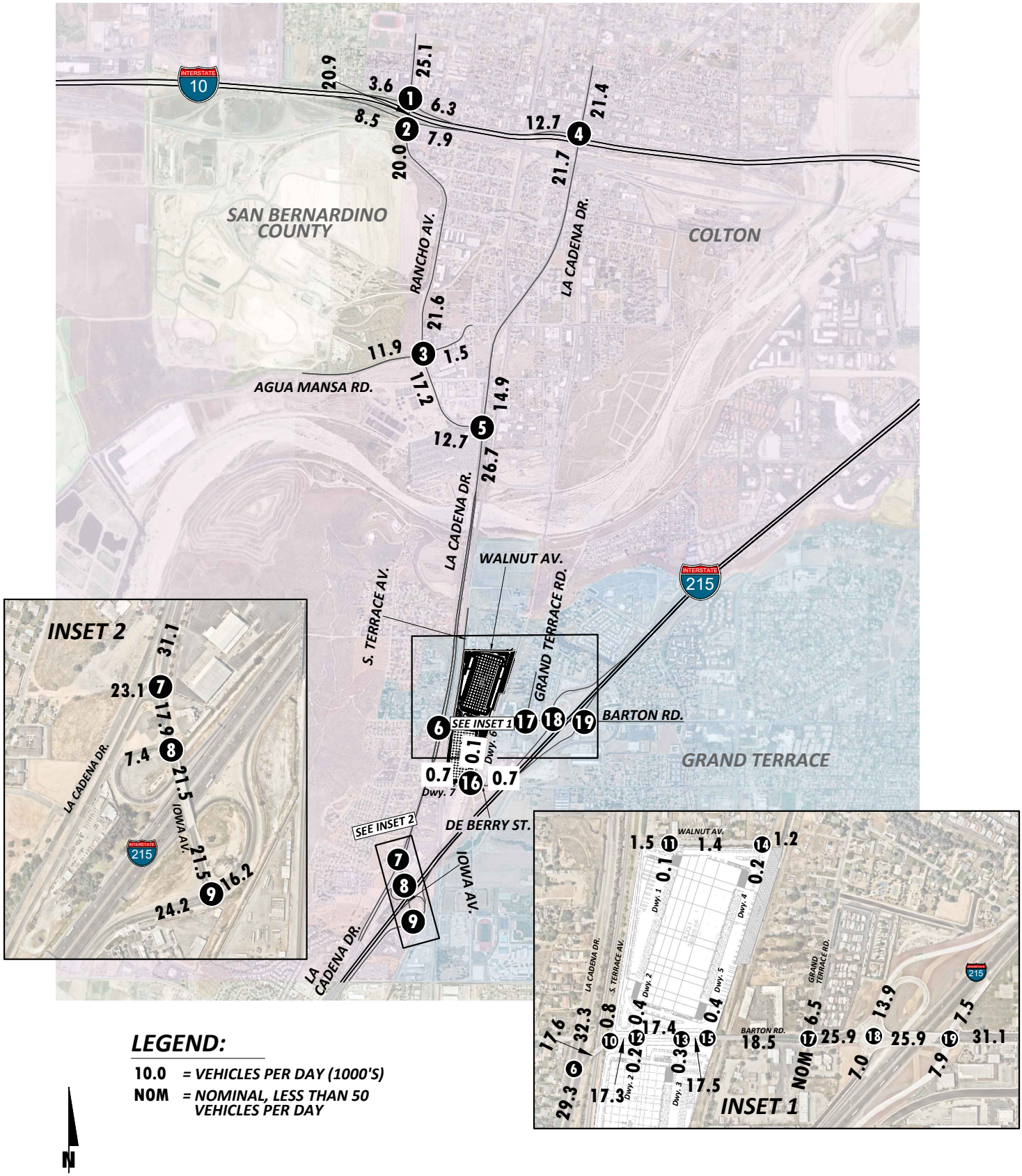
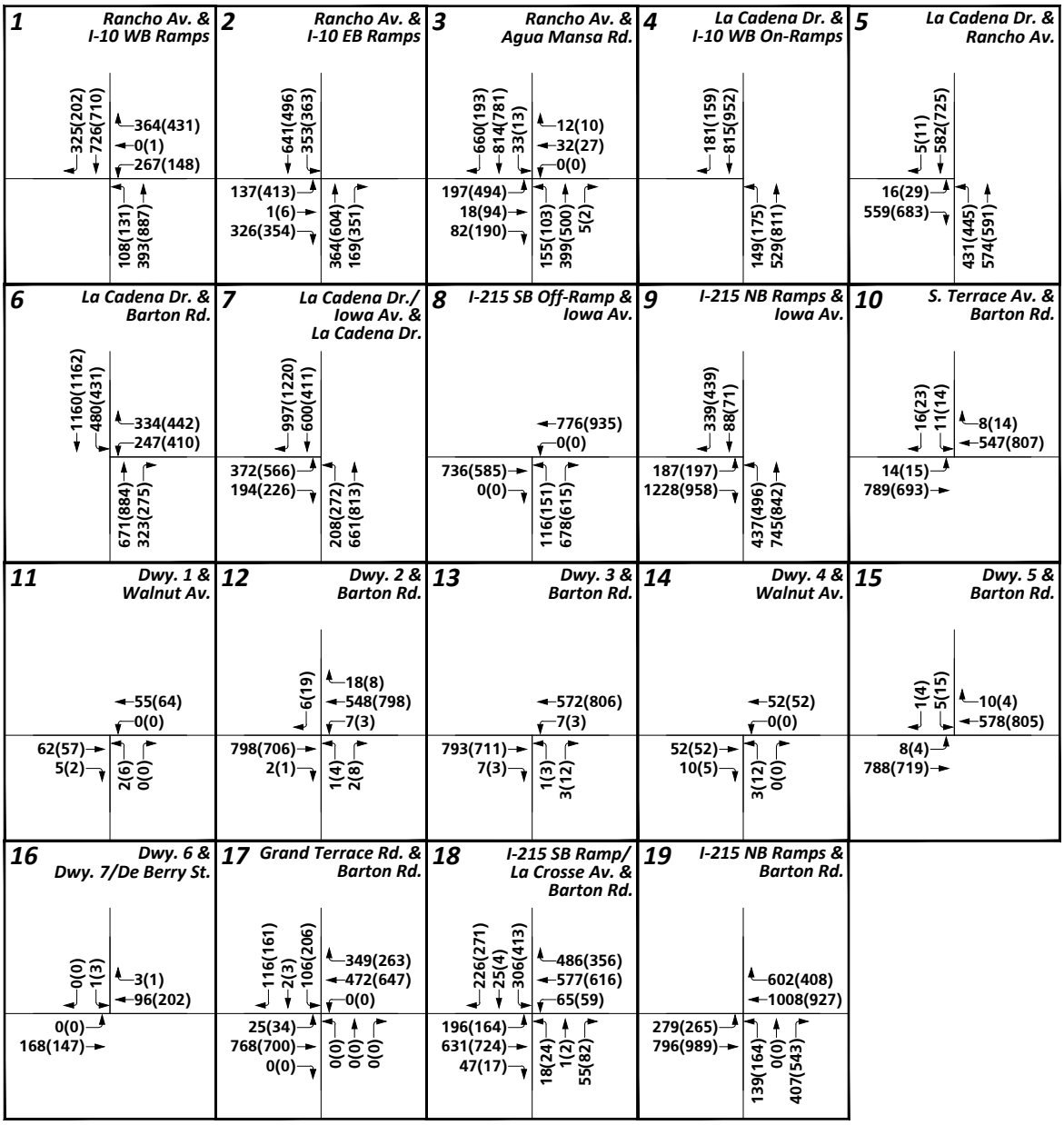


EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2022) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2022) Without Project traffic conditions:

- Rancho Avenue & Agua Mansa Road (#3) – LOS E PM peak hour only
- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM and PM peak hours
- S. Terrace Avenue & Barton Road (#10) – LOS F AM and PM peak hours

A summary of the peak hour intersection LOS for Opening Year Cumulative (2022) Without Project conditions is shown on Exhibit 6-5. The intersection operations analysis worksheets for Opening Year Cumulative (2022) Without Project traffic conditions are included in Appendix 6.1 of this TA.

6.4.2 OPENING YEAR CUMULATIVE (2022) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 6-1 and illustrated on Exhibit 6-4, there are no additional study area intersections that are anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2022) With Project traffic conditions, in addition to the locations identified above for Opening Year Cumulative (2022) Without Project traffic conditions. It should be noted the intersection of S. Terrace Avenue & Barton Road (#10) is anticipated to operate at an acceptable LOS during the peak hours since the south leg of the intersection will be vacated with the development of the proposed Project. The intersection operations analysis worksheets for Opening Year Cumulative (2022) With Project traffic conditions are included in Appendix 6.2 of this TA.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections that are anticipated to meet a peak hour volume-based or planning-level (ADT) traffic signal warrant under Opening Year Cumulative (2022) Without Project and With Project traffic conditions (see Appendix 6.3 and 6.4).

Table 6-1

Intersection Analysis for Opening Year Cumulative (2022) Conditions

#	Intersection	Traffic Control[2]	2022 Without Project				2022 With Project			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Rancho Av. & I-10 WB Ramps	TS	28.6	22.9	C	C	26.6	23.0	C	C
2	Rancho Av. & I-10 EB Ramps	TS	26.1	36.9	C	D	26.2	37.0	C	D
3	Rancho Av. & Agua Mansa Rd.	TS	46.5	**71.0**	D	**E**	47.4	**72.5**	D	**E**
4	La Cadena Dr. & I-10 WB Ramps	UC	12.8	13.6	B	B	12.9	13.7	B	B
5	La Cadena Dr. & Rancho Av.	TS	23.7	40.6	C	D	24.4	42.6	C	D
6	La Cadena Dr. & Barton Rd.	TS	43.2	39.7	D	D	44.8	41.0	D	D
7	La Cadena Dr. & Iowa Av.	TS	28.8	45.7	C	D	29.1	47.7	C	D
8	I-215 SB Ramps & Iowa Av.	TS	32.7	34.0	C	C	33.4	34.4	C	C
9	I-215 NB Ramps & Iowa Av.	TS	**>200.0**	**198.6**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
10	S. Terrace Av. & Barton Rd.	CSS	**98.6**	**58.8**	**F**	**F**	31.9	26.5	D	D
11	Dwy. 1 & Walnut Av.	**CSS**	Future Intersection				9.2	9.2	A	A
12	Dwy. 2 & Barton Rd.	**CSS**	Future Intersection				32.3	29.0	D	D
13	Dwy. 3 & Barton Rd.	**CSS**	Future Intersection				25.0	19.8	D	C
14	Dwy. 4 & Walnut Av.	**CSS**	Future Intersection				9.1	9.1	A	A
15	Dwy. 5 & Barton Rd.	**CSS**	Future Intersection				30.1	33.2	D	D
16	Dwy. 6 & Dwy. 7/De Berry St.	**CSS**	Future Intersection				10.1	10.8	B	B
17	Grand Terrace Rd. & Barton Rd.	TS	10.4	15.7	B	B	10.7	15.8	B	B
18	I-215 SB Ramps & Barton Rd.	RA	9.9	10.8	A	B	10.6	10.9	B	B
19	I-215 NB Ramps & Barton Rd.	TS	42.3	35.6	D	D	44.6	44.9	D	D

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

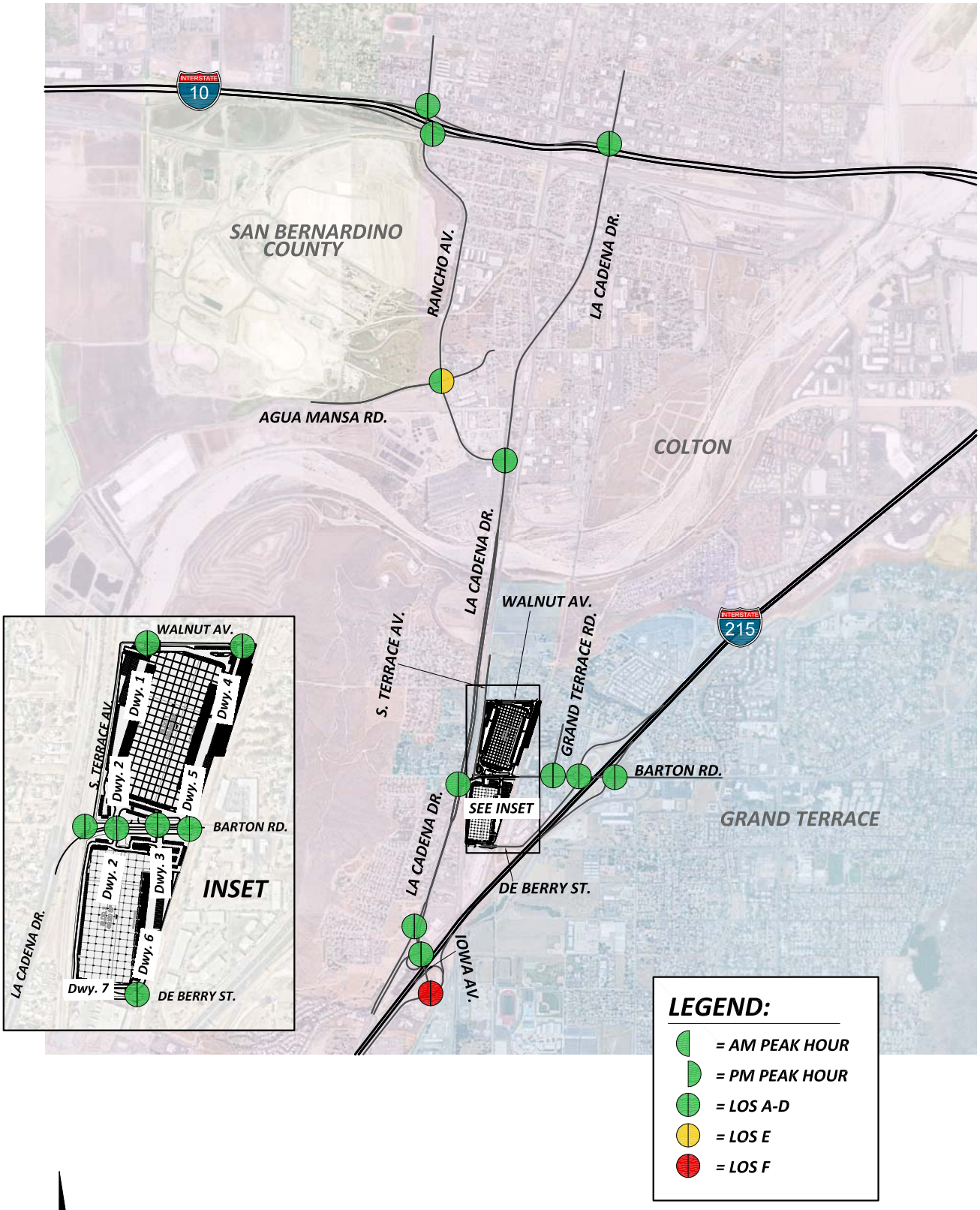
[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; UC = Uncontrolled; RA = Roundabout;**CSS** = Improvement

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT SUMMARY OF LOS



EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2022) WITH PROJECT SUMMARY OF LOS



6.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2022) Without and With Project traffic conditions are shown in Table 6-2. As shown in Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2022) Without Project and With Project traffic conditions. Worksheets for Opening Year Cumulative (2022) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 6.5 and 6.6, respectively.

6.7 FREEWAY FACILITY ANALYSIS

Opening Year Cumulative (2022) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 6-7 and 6-8, respectively. As shown in Table 6-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2022) Without Project and With Project traffic conditions. Opening Year Cumulative (2022) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 6.7 and 6.8, respectively.

6.8 DEFICIENCIES AND IMPROVEMENTS

This section provides a summary of deficiencies, based on the City of Colton's deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, and improvements needed to improve operations back to acceptable levels.

6.8.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the improvement strategies needed to address Opening Year Cumulative (2022) traffic deficiencies are presented in Table 6-4. The Project is anticipated to contribute fewer than 50 peak hour trips to both intersections shown on Table 6-4. Worksheets for Opening Year Cumulative (2022) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendices 6.9 and 6.10, respectively.

6.8.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously in Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Opening Year Cumulative (2022) traffic conditions. As such, no improvements are necessary.

6.8.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously in Table 6-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for Opening Year Cumulative (2022) traffic conditions. As such, no improvements are necessary.

Table 6-2

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2022) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2022 Without Project				2022 With Project			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak	PM Peak	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Rancho Av. & I-10 WB Ramps (#1)	WBL/T	930	285	134	Yes	Yes	285	134	Yes	Yes
	WBR	145	76	327 [3]	Yes	Yes	76	327 [3]	Yes	Yes
Rancho Av. & I-10 EB Ramps (#2)	EBL/T	1,530	164	486 [2]	Yes	Yes	164	486 [2]	Yes	Yes
	EBR	160	173 [3]	162 [3]	Yes	Yes	176 [3]	162 [2,3]	Yes	Yes
I-215 SB Off-Ramp & Iowa Av. (#8)	NBL	1,420	101	152	Yes	Yes	101	152	Yes	Yes
	NBR	400	749 [2,3]	525 [2,3]	Yes	Yes	749 [2,3]	525 [2,3]	Yes	Yes
I-215 NB Ramps & Iowa Av. (#9)	SBT/R	1,155	615 [2]	583 [2]	Yes	Yes	628 [2]	587 [2]	Yes	Yes
I-215 SB Ramps & Barton Rd. (#18)	SBL/T	1,820	75	125	Yes	Yes	75	125	Yes	Yes
	SBR	1,100	25	50	Yes	Yes	25	50	Yes	Yes
I-215 NB Ramps & Barton Rd. (#19)	NBL/T	250	330 [2,3]	1,228 [2,3]	Yes	Yes	386 [2,3]	1,303 [2,3]	Yes	Yes
	NBR	1,580	276	328	Yes	Yes	276	328	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 or I-215 Freeway mainline.

Table 6-3

Freeway Facility Analysis for Opening Year Cumulative (2022) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2022 Without Project				2022 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215 Freeway	Southbound	North of Barton Rd.	3	19.0	C	18.0	B	19.0	C	18.0	B
		Off-Ramp at Barton Rd.	3	25.8	C	25.0	C	26.0	C	25.1	C
		Loop On-Ramp at Barton Rd.	3	23.0	C	20.5	C	23.1	C	20.7	C
		South of Barton Rd.	3	19.5	C	17.3	B	19.5	C	17.4	B
	Northbound	North of Barton Rd.	3	25.0	C	21.8	C	25.1	C	21.9	C
		On-Ramp at Barton Rd.	3	28.3	D	25.1	C	28.4	D	25.2	C
		Off-Ramp at Barton Rd.	3	28.3	D	27.5	C	28.6	D	27.5	C
		South of Barton Rd.	3	23.4	C	22.2	C	23.8	C	22.2	C

* **BOLD** = Unacceptable Level of Service

[1] Number of mixed-flow lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 6-4

Intersection Analysis for Opening Year Cumulative (2022) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
3	Rancho Av. & Agua Mansa Rd.																	
	- Without Project	TS	1	2	0	1	2	0	**1**	1	0	0	1	0	30.3	33.2	C	C
	- With Project	TS	1	2	0	1	2	0	**1**	1	0	0	1	0	30.7	33.8	C	C
9	I-215 NB Ramps & Iowa Av.																	
	- Without Project	TS	1	1	0	0	1	0	**1**	**0**	**2**	0	0	0	51.6	43.5	D	D
	- With Project	TS	1	1	0	0	1	0	**1**	**0**	**2**	0	0	0	53.1	44.0	D	D

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] TS = Traffic Signal

EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2022) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

12971 - freeway.dwg

URBAN CROSSROADS

This Page Intentionally Left Blank

7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area.
- S. Terrace Avenue, from Barton Road to De Berry Street, is assumed to be vacated for With Project conditions only.

7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM (see Section 4.7 *Horizon Year (2040) Volume Development* of this TA for a detailed discussion on the post-processing methodology). The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibits 7-1 and 7-2, respectively.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project. With the development of the proposed Project, S. Terrace Avenue will be vacated, from Barton Road to De Berry Street. As such, existing volumes have been adjusted to reflect the vacation of S. Terrace Avenue. Volumes have been rerouted to utilize La Crosse Avenue to access Barton Road to the north. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibits 7-3 and 7-4, respectively.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

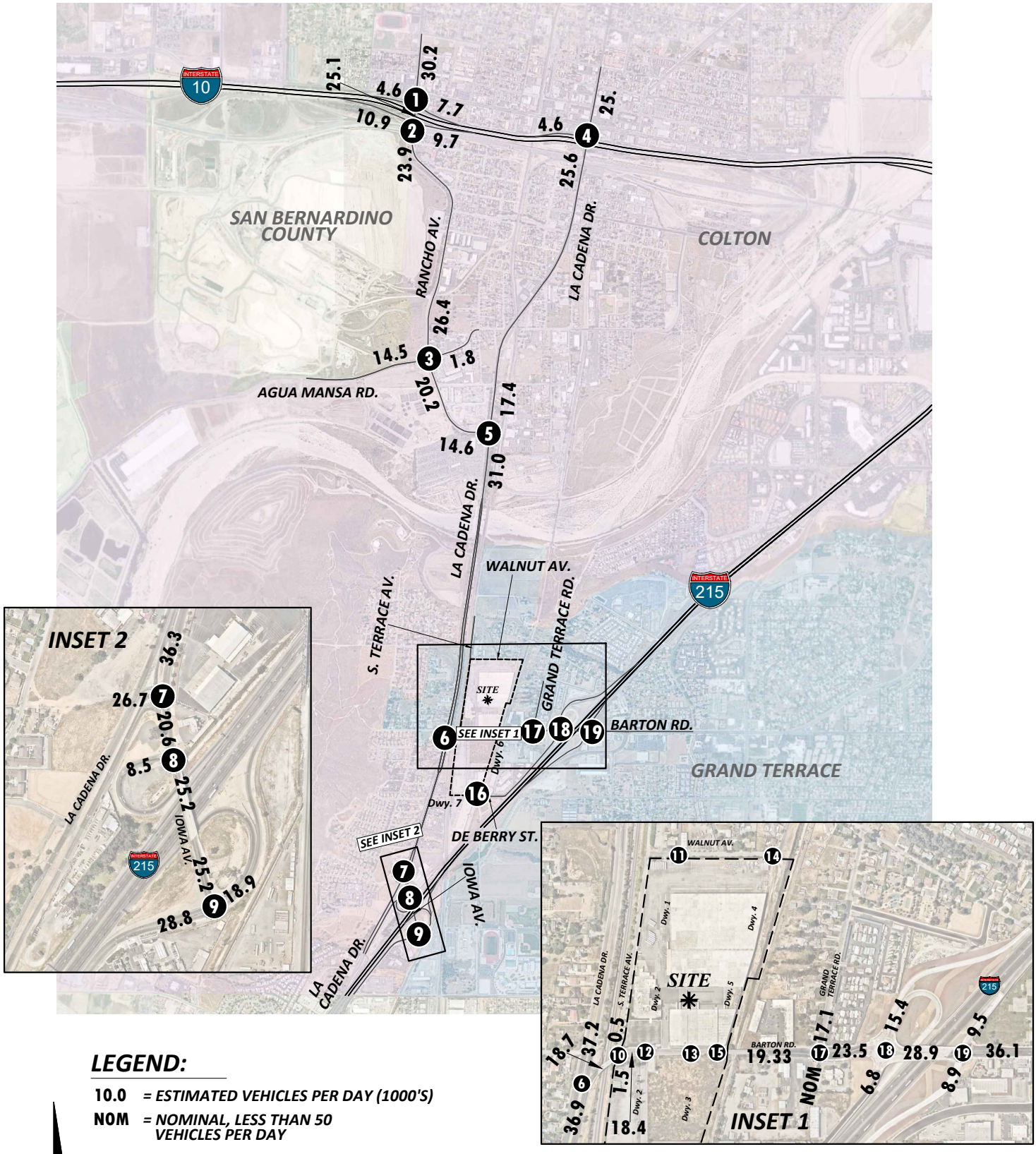
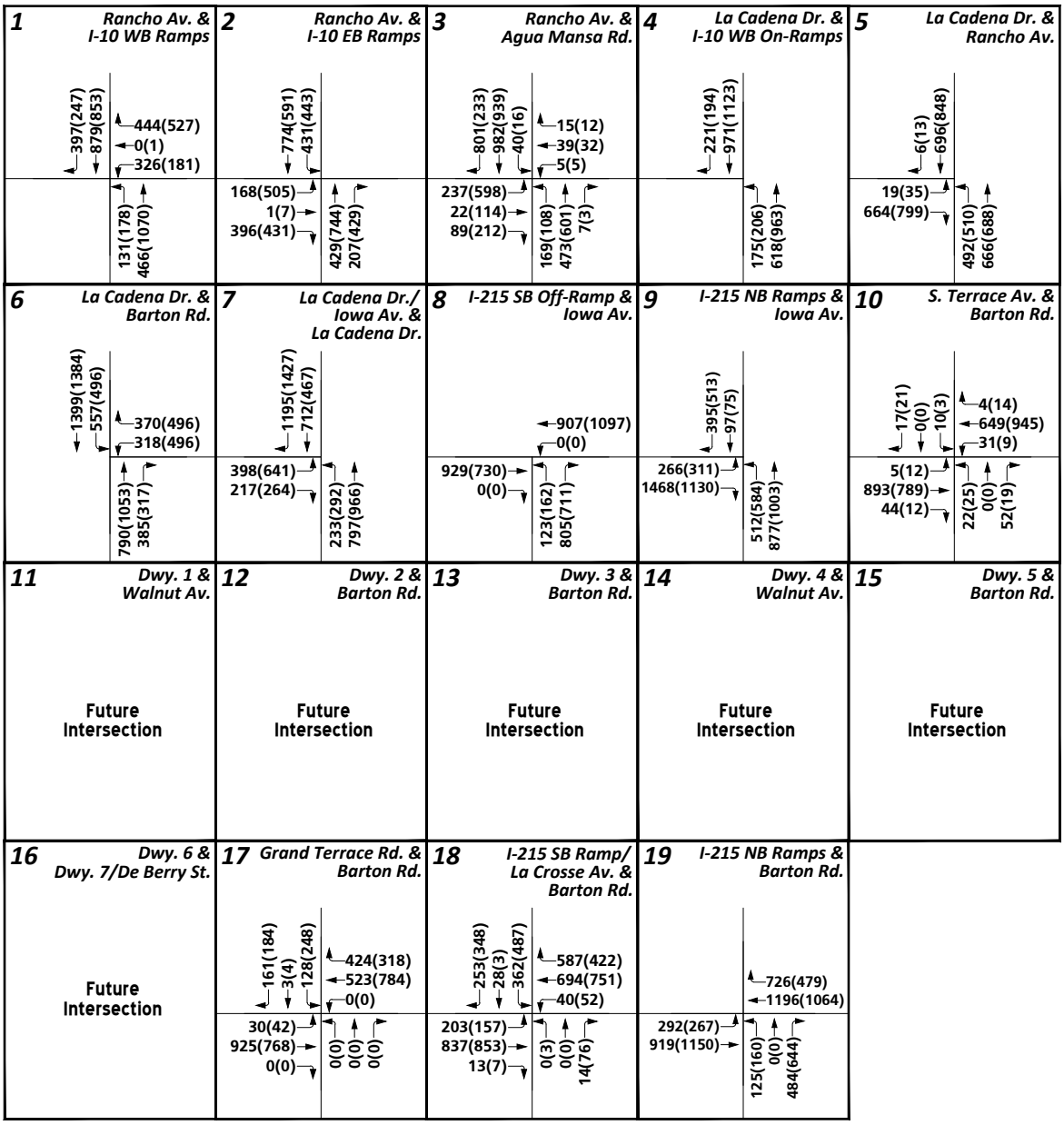


EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

URBAN CROSSROADS

EXHIBIT 7-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT) (IN PCE)

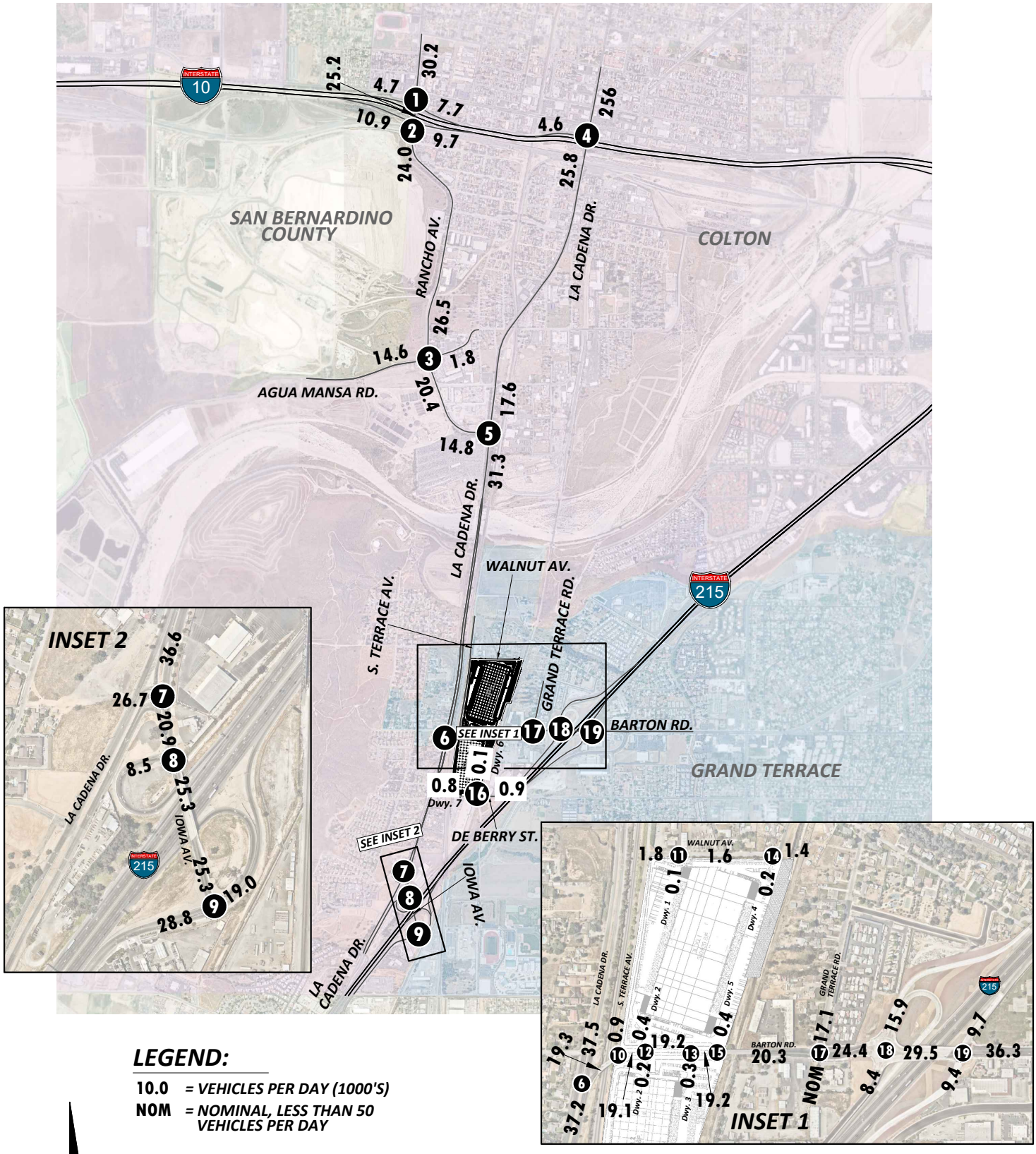
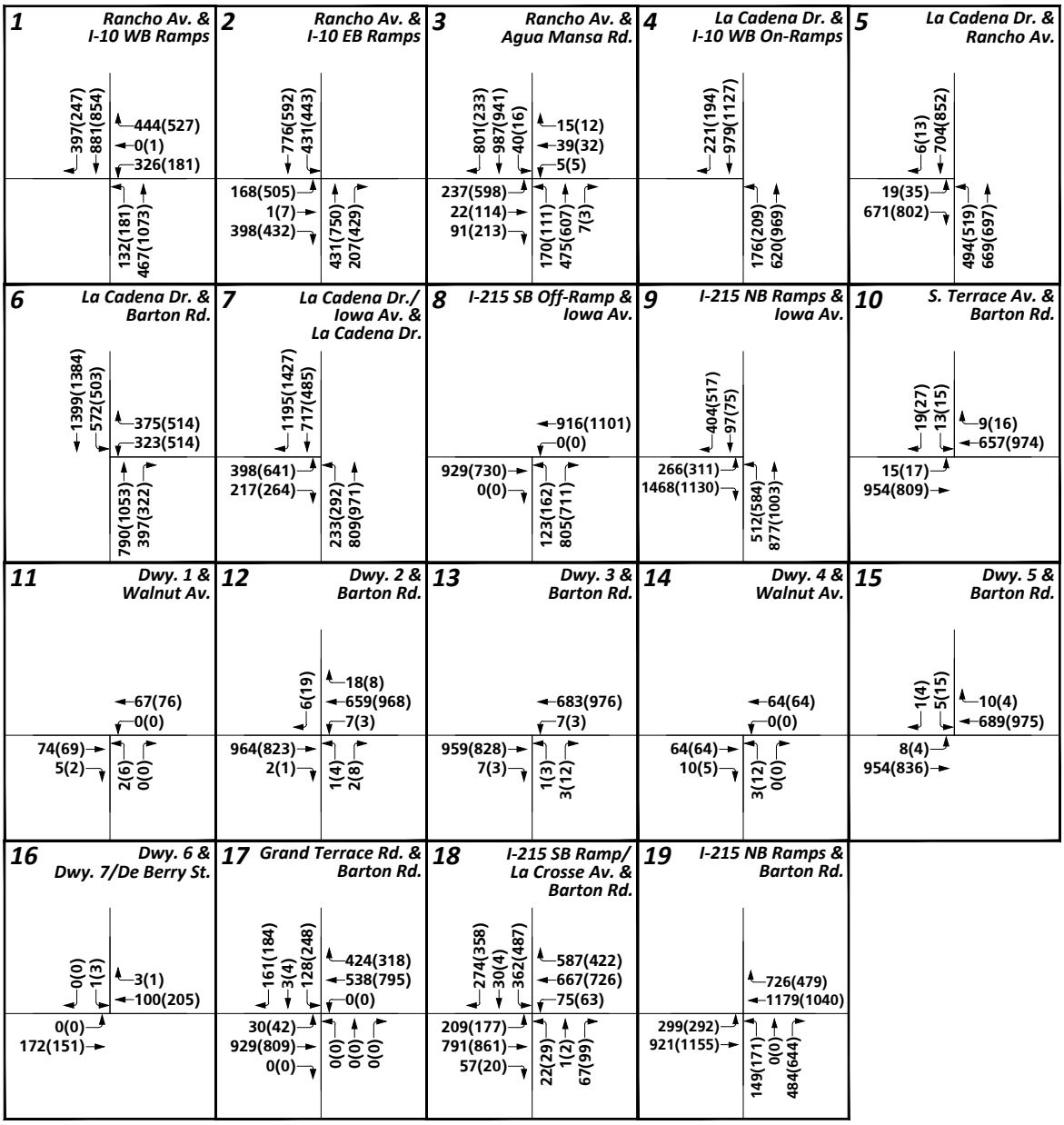


EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***

N

12971 - vols.dwg

7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions:

- Rancho Avenue & Agua Mansa Road (#3) – LOS E AM peak hour; LOS F PM peak hour
- La Cadena Drive & Rancho Avenue (#5) – LOS E PM peak hour only
- La Cadena Drive & Barton Road (#6) – LOS E AM peak hour only
- La Cadena Drive & Iowa Avenue (#7) – LOS F PM peak hour only
- I-215 SB Ramps & Iowa Avenue (#8) – LOS F AM peak hour; LOS E PM peak hour
- I-215 NB Ramps & Iowa Avenue (#9) – LOS F AM and PM peak hours
- S. Terrace Avenue & Barton Road (#10) – LOS F AM and PM peak hours

A summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions is shown on Exhibit 7-5. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendix 7.1 of this TA.

7.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown in Table 7-1 and illustrated on Exhibit 7-6, the following additional study area intersections are anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions:

- Driveway 2 & Barton Road (#12) – LOS F AM peak hour; LOS E PM peak hour
- Driveway 3 & Barton Road (#13) – LOS F AM peak hour only
- Driveway 5 & Barton Road (#15) – LOS F AM and PM peak hours

The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TA.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no unsignalized study area intersections that are anticipated to meet a peak hour volume-based or planning-level (ADT) traffic signal warrant under Horizon Year (2040) Without Project and With Project traffic conditions (see Appendix 7.3 and 7.4).

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project				2040 With Project			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Rancho Av. & I-10 WB Ramps	TS	32.7	29.0	C	C	32.8	29.1	C	C
2	Rancho Av. & I-10 EB Ramps	TS	28.8	54.1	C	D	28.9	54.4	C	D
3	Rancho Av. & Agua Mansa Rd.	TS	**59.7**	**104.1**	**E**	**F**	**60.4**	**105.2**	**E**	**F**
4	La Cadena Dr. & I-10 WB Ramps	UC	15.2	18.0	C	C	15.3	18.2	C	C
5	La Cadena Dr. & Rancho Av.	TS	35.0	**69.7**	C	**E**	36.1	**72.6**	D	**E**
6	La Cadena Dr. & Barton Rd.	TS	**57.1**	52.3	**E**	D	**67.7**	**55.2**	**E**	**E**
7	La Cadena Dr. & Iowa Av.	TS	36.5	**89.9**	D	**F**	36.9	**90.4**	D	**F**
8	I-215 SB Ramps & Iowa Av.	TS	**87.3**	**70.2**	**F**	**E**	**88.7**	**70.6**	**F**	**E**
9	I-215 NB Ramps & Iowa Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
10	S. Terrace Av. & Barton Rd.	CSS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**
11	Dwy. 1 & Walnut Av.	**CSS**	Future Intersection				9.3	9.3	A	A
12	Dwy. 2 & Barton Rd.	**CSS**	Future Intersection				**82.0**	**44.1**	**F**	**E**
13	Dwy. 3 & Barton Rd.	**CSS**	Future Intersection				**53.2**	25.7	**F**	D
14	Dwy. 4 & Walnut Av.	**CSS**	Future Intersection				9.2	9.3	A	A
15	Dwy. 5 & Barton Rd.	**CSS**	Future Intersection				**>100.0**	**64.0**	**F**	**F**
16	Dwy. 6 & Dwy. 7/De Berry St.	**CSS**	Future Intersection				10.2	10.8	B	B
17	Grand Terrace Rd. & Barton Rd.	TS	12.1	17.3	B	B	12.0	17.2	B	B
18	I-215 SB Ramps & Barton Rd.	RA	12.9	15.2	B	C	15.6	16.4	C	C
19	I-215 NB Ramps & Barton Rd.	TS	49.4	48.4	D	D	50.7	50.2	D	D

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal; UC = Uncontrolled; RA = Roundabout; **CSS** = Improvement

EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

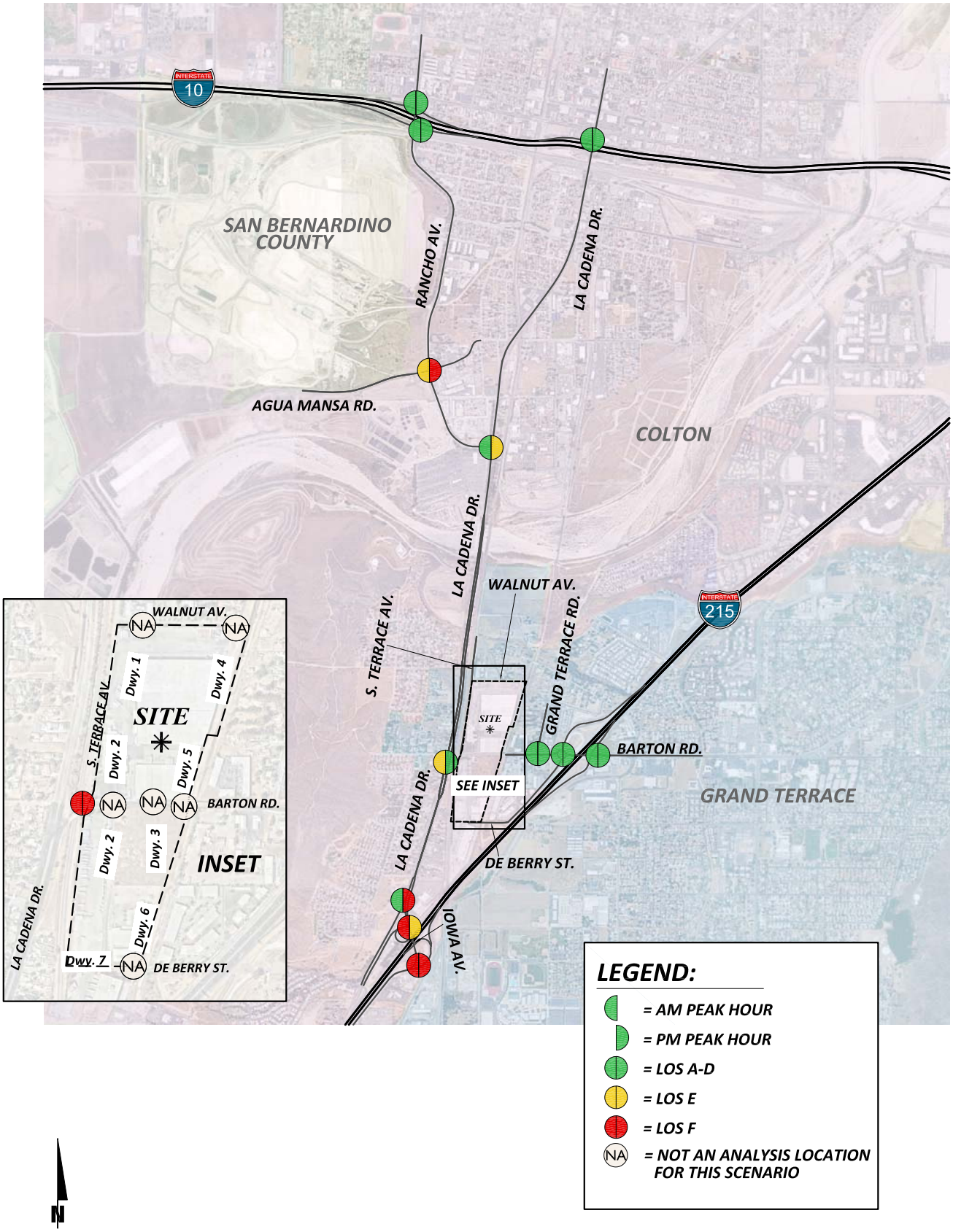
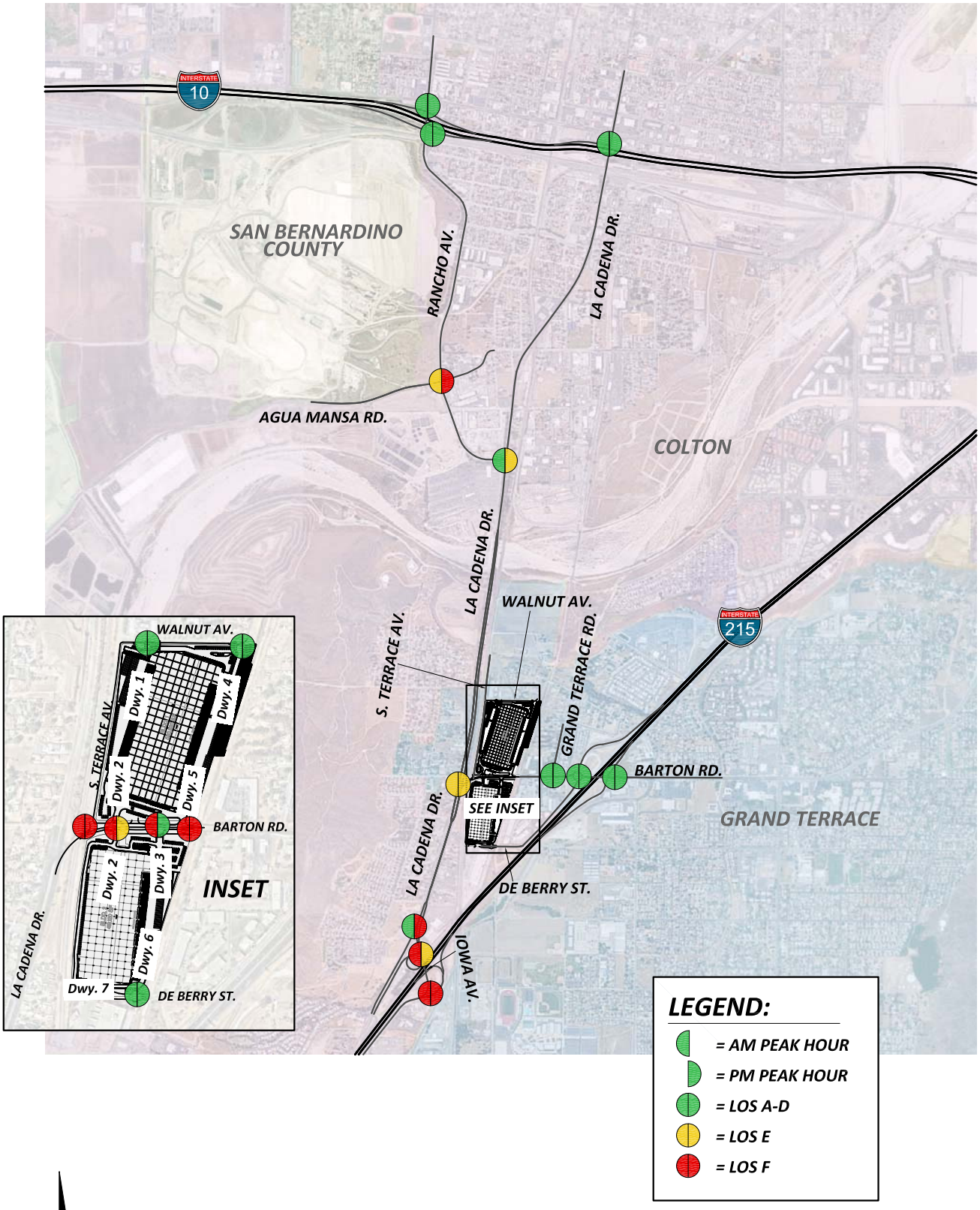


EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



7.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2040) Without and With Project traffic conditions are shown in Table 7-2. As shown in Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2040) Without Project and With Project. Worksheets for Horizon Year (2040) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 7.5 and 7.6, respectively.

7.7 FREEWAY FACILITY ANALYSIS

Horizon Year (2040) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 7-5 and 7-6, respectively. As shown in Table 7-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Horizon Year (2040) Without Project and With Project traffic conditions. Horizon Year (2040) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 7.7 and 7.8, respectively.

7.8 DEFICIENCIES AND IMPROVEMENTS

This section provides a summary of deficiencies, based on the City of Colton's deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, and improvements needed to improve operations back to acceptable levels.

7.8.1 IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the improvement strategies needed to address Horizon Year (2040) traffic deficiencies are presented in Table 7-5. The Project is anticipated to contribute fewer than 50 peak hour trips to the following intersections:

- Rancho Avenue & Agua Mansa Road (#3)
- La Cadena Drive & Rancho Avenue (#5)
- La Cadena Drive & Barton Road (#6)
- La Cadena Drive & Iowa Avenue (#7)
- I-215 SB Ramps & Iowa Avenue (#8)
- I-215 NB Ramps & Iowa Avenue (#9)

Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendices 7.9 and 7.10, respectively.

7.8.2 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously in Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Horizon Year (2040) traffic conditions. As such, no improvements are necessary.

Table 7-2

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak	PM Peak	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Rancho Av. & I-10 WB Ramps (#1)	WBL/T	930	354	162	Yes	Yes	354	162	Yes	Yes
	WBR	145	167 [3]	535 [2,3]	Yes	Yes	168 [3]	535 [2,3]	Yes	Yes
Rancho Av. & I-10 EB Ramps (#2)	EBL/T	1,530	186	669 [2]	Yes	Yes	186	669	Yes	Yes
	EBR	160	299 [3]	259 [3]	Yes	Yes	303 [3]	260 [2,3]	Yes	Yes
I-215 SB Off-Ramp & Iowa Av. (#8)	NBL	1,420	107	161	Yes	Yes	107	161	Yes	Yes
	NBR	400	1,037 [2]	794 [2,3]	Yes	Yes	1,037 [2,3]	794 [2,3]	Yes	Yes
I-215 NB Ramps & Iowa Av. (#9)	SBT/R	1,155	738 [2]	700 [2]	Yes	Yes	750 [2]	704 [2]	Yes	Yes
I-215 SB Ramps & Barton Rd. (#18)	SBL/T	1,820	125	225	Yes	Yes	125	225	Yes	Yes
	SBR	1,100	50	75	Yes	Yes	50	75	Yes	Yes
I-215 NB Ramps & Barton Rd. (#19)	NBL/T	250	353 [2,3]	1,276 [2,3]	Yes	Yes	405 [2,3]	1,354 [2,3]	Yes	Yes
	NBR	1,580	450	589	Yes	Yes	451	678	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 or I-215 Freeway mainline.

Table 7-3

Freeway Facility Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-215 Freeway	Southbound	North of Barton Rd.	3	24.2	C	19.8	C	24.3	C	20.0	C
		Off-Ramp at Barton Rd.	3	30.7	D	27.2	C	30.9	D	27.5	C
		Loop On-Ramp at Barton Rd.	3	28.7	D	25.4	C	28.7	D	25.6	C
		South of Barton Rd.	3	25.2	C	20.9	C	25.2	C	21.0	C
	Northbound	North of Barton Rd.	3	28.0	D	27.7	D	28.0	D	27.4	D
		On-Ramp at Barton Rd.	3	31.4	D	30.0	D	31.4	D	31.5	D
		Off-Ramp at Barton Rd.	3	29.7	D	31.5	D	29.9	D	30.1	D
		South of Barton Rd.	3	24.8	C	27.3	D	25.0	C	27.4	D

* **BOLD** = Unacceptable Level of Service

[1] Number of mixed-flow lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 7-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
3	Rancho Av. & Agua Mansa Rd.																	
	- Without Project	TS	1	2	0	1	2	**1**	**1**	1	0	0	1	0	23.4	43.6	C	D
	- With Project	TS	1	2	0	1	2	**1**	**1**	1	0	0	1	0	23.5	43.9	C	D
5	La Cadena Dr. & Rancho Av.																	
	- Without Project	TS	1	2	0	0	2	0	0	1	**1>**	0	0	0	34.7	28.8	C	C
	- With Project	TS	1	2	0	0	2	0	0	1	**1>**	0	0	0	36.1	29.5	D	C
6	La Cadena Dr. & Barton Rd.																	
	- Without Project	TS	0	2	1	1	2	0	0	0	0	**2**	0	1	46.0	43.1	D	D
	- With Project	TS	0	2	1	1	2	0	0	0	0	**2**	0	1	48.2	43.8	D	D
7	La Cadena Dr. & Iowa Av.																	
	- Without Project	TS	1	**2**	0	0	**2**	2>>	1	0	1>	0	0	0	18.0	26.7	B	C
	- With Project	TS	1	**2**	0	0	**2**	2>>	1	0	1>	0	0	0	18.1	27.3	B	C
8	I-215 SB Ramps & Iowa Av.																	
	- Without Project	TS	1	0	1	0	0	0	0	**2**	0	0	**2**	0	23.3	19.6	C	B
	- With Project	TS	1	0	1	0	0	0	0	**2**	0	0	**2**	0	23.4	19.6	C	B
9	I-215 NB Ramps & Iowa Av.																	
	- Without Project	TS	**2**	1	0	0	1	0	**1**	**0**	**2>**	0	0	0	29.0	34.0	C	C
	- With Project	TS	**2**	1	0	0	1	0	**1**	**0**	**2>**	0	0	0	29.3	34.2	C	C
10	S. Terrace Av. & Barton Rd.																	
	- Without Project	TS	0	1	d	0	1	0	**1**	**2**	0	d	**2**	1	31.0	17.4	D	C
	- With Project	TS	0	**0**	**0**	0	1	0	**1**	**2**	0	**0**	**2**	1	13.5	23.8	B	C
12	Dwy. 2 & Barton Rd.																	
	- Without Project		Future Intersection															
	- With Project	**CSS**	0	**1**	0	0	0	**1**	0	**2**	0	**1**	**2**	0	16.9	23.3	C	C
13	Dwy. 3 & Barton Rd.																	
	- Without Project		Future Intersection															
	- With Project	**CSS**	0	**1**	0	0	0	0	0	**2**	0	**1**	**2**	0	15.0	16.5	C	C
15	Dwy. 5 & Barton Rd.																	
	- Without Project		Future Intersection															
	- With Project	**CSS**	0	0	0	0	**1**	0	**1**	**2**	0	0	**2**	0	16.4	18.7	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right-Turn Overlap Phasing; >> = Free Right Turn Lane; **1** = Improvement

[2] Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross-street Stop; TS = Traffic Signal; **CSS** = Improvement

EXHIBIT 7-7: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

12971 - freeway.dwg

URBAN CROSSROADS

EXHIBIT 7-8: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 *= AM/PM PEAK HOUR VOLUMES*

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

12971 - freeway.dwg

URBAN CROSSROADS

7.8.3 IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously in Table 7-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for Horizon Year (2040) traffic conditions. As such, no improvements are necessary.

8 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Colton are funded through a combination of project improvements, DIF programs or fair share contributions, such as the City of Colton DIF program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

8.1 CITY OF COLTON DEVELOPMENT IMPACT FEE PROGRAM

The City of Colton has created its own local DIF program to impose and collect fees from new residential, commercial, and industrial development for the purpose of funding roadways and intersections necessary to accommodate City growth as identified in the City's General Plan Circulation Element. The City's DIF includes regional improvements to comply with Measure "I". The fee schedule was recently updated in July 2013 and reviewed/adjusted annually based upon changes in the construction cost index (CCI). Under the City's DIF program, the City may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the City's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the City are also periodically performed by City staff and consultants. The City uses this data to determine the timing of implementing the improvements listed in its facilities list. The City also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the City. In this way, the improvements are constructed before the LOS falls below the City's LOS performance thresholds.

The Project applicant will be subject to the City's DIF fee program and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The Project applicant's payment of the requisite DIF fees at the rates then in effect, pursuant to the DIF Program, will mitigate its impacts to DIF-funded facilities.

8.2 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in November 2011. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study. While Measure

"I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

8.3 FAIR SHARE CONTRIBUTION

The conditions of approval may include participating in established programs through payment of applicable fees, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the City's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, has been provided in Table 8-1 for the applicable deficient study area intersections.

Table 8-1

Project Fair Share Calculations for Intersection

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
3	Rancho Av. & Agua Mansa Rd.						
		AM:	2,067	10	2,888	821	1.2%
		PM:	2,032	12	2,885	853	**1.4%**
5	La Cadena Dr. & Rancho Av.						
		AM:	1,655	20	2,563	908	2.2%
		PM:	1,885	25	2,917	1,032	**2.4%**
6	La Cadena Dr. & Barton Rd.						
		AM:	2,247	37	3,857	1,610	2.3%
		PM:	2,423	48	4,289	1,866	**2.6%**
7	La Cadena Dr. & Iowa Av.						
		AM:	2,225	17	3,569	1,344	1.3%
		PM:	2,473	23	4,079	1,606	**1.4%**
8	I-215 SB Ramps & Iowa Av.						
		AM:	1,803	9	2,774	971	**0.9%**
		PM:	1,667	4	2,704	1,037	0.4%
9	I-215 NB Ramps & Iowa Av.						
		AM:	2,382	9	3,624	1,242	**0.7%**
		PM:	2,333	4	3,619	1,286	0.3%
10	S. Terrace Av. & Barton Rd.						
		AM:	769	45	1,667	898	5.0%
		PM:	757	62	1,858	1,101	**5.6%**

BOLD = Denotes highest fair share percentage.

This Page Intentionally Left Blank

9 REFERENCES

1. **San Bernardino County Transportation Authority.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.

2. **County of San Bernardino.** *Transportation Impact Study Guidelines.* County of San Bernardino : s.n., July 9, 2019.

3. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.

4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.

5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014.

6. **Transportation, California Department of.** *Freeway Performance Measurement (PeMS).* [Online] http://pems.dot.ca.gov/.

7. **Southern California Association of Governments.** *2020 Regional Transportation Plan/Sustainable Communities Strategy.* June 2020.

This Page Intentionally Left Blank

J.2 - Traffic Analysis Appendices

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX 1.1:

APPROVED TRAFFIC STUDY SCOPING AGREEMENT

This Page Intentionally Left Blank

SCOPING AGREEMENT FOR TRAFFIC IMPACT STUDY

This form acknowledges the City of Colton Engineering Division requirements for traffic impact analysis of the following project. The analysis must comply with SANBAG CMP TIA Guidelines, as applicable.

Case No. DAP-100-602

Related Cases:

APN(S): 1167-051-15-16 &18-20, 1167-061-06, 1167-131-03-04, 0275-223-23 &4 4-46

Project Name: Barton Road Logistics Center

Project Address: 21700 Barton Road and 275, 280 and 375 De Berry

Project Description: 960,040 square feet of High-Cube Transload Short-Term Storage Warehouse without Cold Storage

Project Size: 960,040 square feet **(See Exhibit 1)**

	Traffic Consultant	Developer
Name:	Urban Crossroads, Inc. – Charlene So	EBS Realty Partners, LLC
Address:	260 E. Baker Street, Costa Mesa, CA	1300 Bristol St. N #290
Telephone:	(949) 861-0177	Newport Beach, CA 92660
e-mail:	cso@urbanxroads.com	

A. Technical Methodology

Technical methodology to comply with SANBAG CMP guidelines. However, mitigation on non-State facilities to maintain LOS "D" threshold. **(See Exhibit 2 for location map)**

Traffic count data must be current or within previous 12 months. Provide traffic count dates. **New counts to be conducted once scoping agreement has been approved.**

B. Trip Generation Source: ITE Trip Generation manual, 10th Edition, 2017 **(See Table 1)**

Current GP Land Use: Light Industrial Proposed Land Use: Light Industrial

Current Zoning: M-1 Light Industrial Proposed Zoning: M-1 Light Industrial

Current Trip Generation				Proposed Trip Generation **(Actual Vehicles)**		
	In	Out	Total	In	Out	Total
AM Trips:	0	0	0	61	20	81
PM Trips:	0	0	0	28	71	99

Internal Trip Allowance: N/A

Pass-By Trip Allowance: N/A

C. Trip Geographic Distribution: To be submitted for approval by city staff. Cite source. Attach exhibit of detailed assignment. **(See Exhibits 3 and 4)**

D. Scenario Analysis

Project year of completion: 2022

Phase Year(s) None

Annual Ambient Growth rate: 2.0%

City staff has provided cumulative background projects list.

Scenarios:

Existing Conditions
Existing Plus Project (Project Buildout only) Conditions
Opening Year Cumulative (2022): 1) No Project; 2) With Project
Horizon Year 2040: 1) No Project; 2) With Project

E. Preliminary Study Intersections: (See SANBAG CMP guidelines or comments from other agencies.) **(See Exhibit 2 for location map)**

1. Rancho Av. & I-10 WB Ramps
2. Rancho Av. & I-10 EB Ramps
3. Rancho Av. & Agua Mansa Rd.
4. La Cadena Dr. & I-10 WB On-Ramp
5. La Cadena Dr. & Rancho Av.
6. La Cadena Dr. & Barton Rd.
7. La Cadena Dr. & Iowa Av.
8. I-215 SB Ramps & Iowa Av.
9. I-215 NB Ramps & Iowa Av.
10. S. Terrace Av. & Barton Rd.
11. Driveway 1 & Walnut Av.
12. Driveway 2 & Barton Rd.
13. Driveway 3 & Barton Rd.
14. Driveway 4 & Walnut Av.
15. Driveway 5 & Barton Rd.
16. Driveway 6 & De Berry St.
17. Grand Terrace Rd. & Barton Rd.
18. I-215 SB Ramps & Barton Rd.
19. I-215 NB Ramps & Barton Rd.

F. Preliminary Study Roadway Segments: (See SANBAG CMP guidelines or comments from other agencies.)

G. Freeways - N/A

H. Other Jurisdictional Impacts
Is this project within a one-mile radius of City or County boundaries? ☒ Yes ☐ No

If so, name of City Jurisdiction: City of Grand Terrace; County of San Bernardino

I. Site Plan (please attach reduced copy)

J. Specific issues to be addressed in the Study

Recommended by:

Charlene So

Consultant's Representative — 7/16/2020 Date

Approved Scoping Agreement:

City of Colton
Engineering Division — 7/16/20 Date

URBAN CROSSROADS

260 E. Baker St. | Suite 200 | Costa Mesa, CA 92626 | (949) 660-1994
urbanxroads.com

July 16, 2020 (Revised)

Mr. Victor Ortiz
City of Colton, Public Works Department
160 S. 10th Street
Colton, CA 92324

SUBJECT: BARTON ROAD LOGISTICS CENTER TRAFFIC IMPACT ANALYSIS – SCOPING AGREEMENT (REVISED)

Dear Mr. Victor Ortiz:

Urban Crossroads, Inc. is pleased to submit this scoping letter to City of Colton regarding the Traffic Impact Analysis (TIA) for the proposed Barton Road Logistics Center development ("Project"), which is located east of Terrace Avenue at Barton Road in the City Colton. It is our understanding that the Project is to consist of 960,040 square feet of High-Cube Transload Short-Term Storage Warehouse Without Cold Storage use within two buildings. This letter describes the draft proposed Project trip generation, trip distribution, and analysis methodology, which have been used to establish the proposed Project study area and analysis locations.

A preliminary site plan for the proposed Project is shown on Exhibit 1. Exhibit 2 depicts the location of the proposed Project in relation to the existing roadway network. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2022. As indicated on Exhibit 1, access to the Project site will be provided via the following driveways:

- Driveway 1 & Walnut Avenue – full access for passenger cars only
- Driveway 2 (North Side) & Barton Road – right-in/right-out access only for both passenger cars and trucks
- Driveway 2 (South Side) & Barton Road – full access for passenger cars only
- Driveway 3 & Barton Road – full access for both passenger cars and trucks
- Driveway 4 & Walnut Avenue – full access for passenger cars only
- Driveway 5 & Barton Road – full access for both passenger cars and trucks
- Driveway 6 & De Berry Street – full access for both passenger cars and trucks
- Driveway 7 & De Berry Street – full access for both passenger cars and trucks

It should be noted that this scoping agreement has been prepared in accordance with the County of San Bernardino's Congestion Management Program, 2016 Update and the County of San Bernardino Transportation Impact Study Guidelines, July 2019.

TRIP GENERATION

EXISTING USES

There are currently existing uses on the site of the proposed Project. The following uses are to be demolished:

- 21700 Barton Road: 416,000 square foot warehouse, 118,383 square foot cold storage warehouse, 46,920 square foot office building (total of three buildings).
- 275 De Berry Street: 59,662 square foot warehouse.
- 375 De Berry Street: 18,370 square foot warehousing.

There is an existing 125,801 square foot cold storage warehouse located at 280 De Berry Street, however this building will remain in-place and will not be demolished as part of the development of the proposed Project. Since the building is currently operational, it will not be reflected in the trip generation for the purposes of the traffic study as this baseline count data would include the activity at this site. Although the existing use at 280 De Berry Street will remain, the proposed Project will make improvements to the driveway at De Berry Street.

PROPOSED PROJECT

Trip generation represents the amount of traffic that is attracted and produced by a development, and is based upon the specific land uses planned for a given project. The trip generation summary illustrating daily and peak hour trip generation estimates for the proposed Project in actual vehicles and Passenger Car Equivalent (PCE) are shown in Table 1.

The following Institute of Transportation Engineers (ITE) land use code and vehicle mix has been utilized:

- High-Cube Transload and Short-Term Storage Warehouse (Without Cold Storage) (ITE 154): Transload facilities have a primary function of consolidation and distribution of pallet loads (or larger) for manufacturers, wholesalers, or retailers. They typically have little storage duration, high throughput, and are high-efficiency facilities. Short-term high-cube warehouses are high-efficiency distribution facilities often with custom/special features built into structure movement of large volumes of freight with only short-term storage of products. Based on the ITE Trip Generation 10th Edition Supplement (February 2020), the following vehicle mix was utilized: 20% trucks during the AM peak hour, 16% trucks during the PM peak hour, and 16% daily trucks. Based on this interim guidance from the South Coast Air Quality Management District (SCAQMD), the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site: 16.7% of the total trucks as 2-axle trucks, 20.7% of the total trucks as 3-axle trucks, and 62.6% of the total trucks as 4+-axle trucks.

Finally, PCE factors were applied to the trip generation rates to convert trips made by heavy trucks (large 2-axle, 3-axle, and 4+-axle trucks) to PCE values. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County Congestion Management Program (CMP) (2016 Update).

As shown in Table 1, the proposed Project is anticipated to generate 1,348 actual trip ends per day, with 81 AM peak hour trips and 99 PM peak hour trips. For the purposes of the operations analysis, the PCE values shown in Table 1 will be utilized.

TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered to identify the route where the Project traffic would distribute. Truck distribution patterns will be based on truck routes, the site's proximity to the regional freeway system and likely distribution of traffic if a future tenant is known. Passenger car distribution patterns will be based on existing and planned land uses in the area along with the planned circulation system.

A separate study has been prepared to discuss the proposed street vacation of Terrace Avenue, south of Barton Road. According to this separate study, most of the traffic volumes on Terrace Avenue seem attributable to the existing business adjacent to Terrace Avenue. Most of these buildings are proposed to be removed with the development of the proposed Project. For the purposes of this traffic study, any existing northbound traffic on Terrace Avenue will be rerouted to the east on La Crosse Avenue to access Barton Road. The project trip distribution patterns will assume the vacation of Terrace Avenue, south of Barton Road. The traffic study will reference and discuss the vacation of Terrace Avenue, south of Barton Road.

Exhibit 3 illustrates the truck trip distribution patterns for the Project and Exhibit 4 illustrates the passenger car trip distribution patterns.

ANALYSIS SCENARIOS

Consistent with the County's TIA guidelines, intersection analysis will be provided for the following analysis scenarios:

- Existing (2020) Conditions
- Opening Year Cumulative (2022) Without Project Conditions
- Opening Year Cumulative (2022) With Project Conditions
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

All study area intersections will be analyzed using the HCM (6th Edition) methodology using PCE traffic forecasts.

STUDY AREA

The traffic impact analysis study area was defined in conformance with the requirements of the County's Traffic Impact Analysis (TIA) guidelines, which state that the requirement to prepare a TIA will be based upon, but not limited to, one or more of the following criteria:

- If a project generates 100 or more trips without consideration of pass-by trips during any peak hour.
- If a project is located within 300 feet of the intersection of two streets designated as Collector or higher in the County's General Plan or the Department's Master Plan or impacted intersection as determined by the Traffic Division.
- If this project creates safety or operational concerns.

Exhibit 2 identifies the proposed study area intersections based on the aforementioned criteria.

LEVEL OF SERVICE (LOS) CRITERIA

Per the County of San Bernardino traffic study guidelines and consistent with the City of Colton General Plan, the following LOS will be utilized for study area intersections located within the County: Require development to achieve a peak hour Level of Service (LOS) D or better at intersections. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

THRESHOLDS OF SIGNIFICANCE

To determine whether the addition of project traffic at a study intersection results in a traffic impact, the following thresholds will be utilized:

- A traffic impact occurs at a study intersection if the addition of project-generated trips reduces the peak hour level of service of the study intersection to change from acceptable level of service (LOS "A", "B", "C" or "D") to an unacceptable level of service (LOS "E" or "F");
- A traffic impact occurs at a study intersection if the project-generated 50 or more peak hour trips worsen the pre-project level of service grade at a deficiently operating (LOS "E" or "F") intersection.

The proposed significance thresholds will be applied at study area intersections for the purposes of determining project-related impacts.

EXISTING COUNT DATA

Traffic counts for the study area intersections will be collected during the following time frames:

- Morning (7:00 a.m. to 9:00 a.m.)
- Afternoon/Evening (4:00 p.m. to 6:00 p.m.)

The I-215 Freeway/Barton Road interchange improvement project was completed in May 2020. However, due to the currently ongoing COVID-19 pandemic traffic counts cannot be conducted at this time. As such, historic traffic counts will be utilized in conjunction with the application of a growth factor (of 2% per year, compounded annually) and modified to reflect the configuration of the recently completed interchange improvements at the I-215 Freeway/Barton Road. The adjusted historic counts will be used to establish a 2020 baseline. The City of Grand Terrace is in agreement with this methodology for their intersections.

SPECIAL ISSUES

The following special issue will also be addressed as part of the TIA:

- *Truck Turns:* Truck turning templates will be used to address how Project truck traffic (e.g., large trucks such as a WB-67) would enter and exit the Project site to determine radii at curb returns, radii of streets per Highway Design Manual, and widths/radii required for on-site maneuvering for two-way truck traffic at the Project driveways and the intersection of Barton Road and Terrace Avenue. Additionally, truck turns will be addressed at the I-215 Freeway/Barton Road interchange roundabout to assess the feasibility of truck circulation at the roundabout in response to concerns from local residents.

- *Site Access Evaluation:* The turn pocket lengths will be determined through peak hour traffic simulations developed using Synchro and SimTraffic software in an effort to identify the required storage capacity for turn lanes at the Project driveways.
- *Guard Shack:* The existing guard shack for 280 De Berry Street is proposed to be relocated as part of the Project in order to accommodate additional queuing for inbound trucks. The vehicle check-in/queuing for this guard shack will be evaluated in the TIA.
- *Bridge Operations Analysis*: The City of Colton's Public Works Department will be consulted to obtain information on the grade separated railroad crossing on Barton Road. The operations of the existing railroad overcrossing at Barton Road, west of the Project site, will be evaluated. If applicable, recommendations will be discussed in the traffic study.
- *I-215 Freeway & Barton Road Interchange:* The I-215 Freeway interchange improvement project at Barton Road was completed in May 2020. As such, for the purposes of this traffic study, the baseline roadway network assumes the completion of the interchange improvement project.
- *Vehicle Miles Traveled (VMT):* The VMT analysis will be prepared under separate cover in accordance with SB743 and consistent with the methodology and thresholds outlined in the City of Colton's June 2020 VMT methodology guidelines.

CUMULATIVE DEVELOPMENT PROJECTS

A list of current cumulative projects has been obtained from the City of Colton, City of Riverside, City of Grand Terrace, County of Riverside, and County of San Bernardino. Major cumulative projects that will be included, but are not limited to the following, in conjunction with others provided by the surrounding agencies: Roquet Ranch, Westgate, California High Speed Rail Intermodal Facility, Tropica Warehouse, Litton Residential, CalPortland, Agua Mansa Warehouses, etc. These current lists of cumulative development projects will be included for analysis in the traffic study.

If you have any questions, please contact me directly at (949) 861-0177.

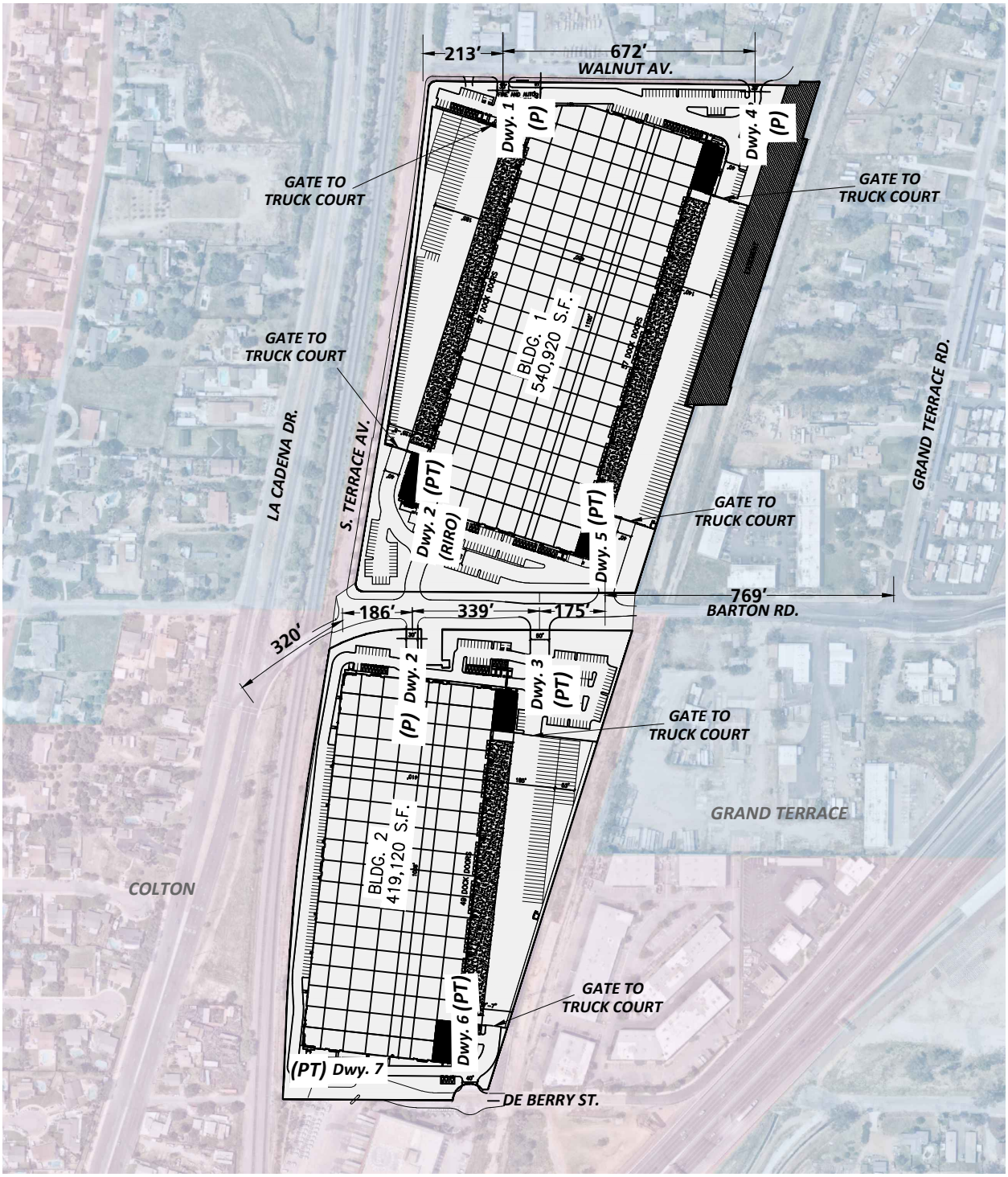
Respectfully submitted,

URBAN CROSSROADS, INC.

Charlene So

Charlene So, PE
Associate Principal

EXHIBIT 1: PRELIMINARY SITE PLAN



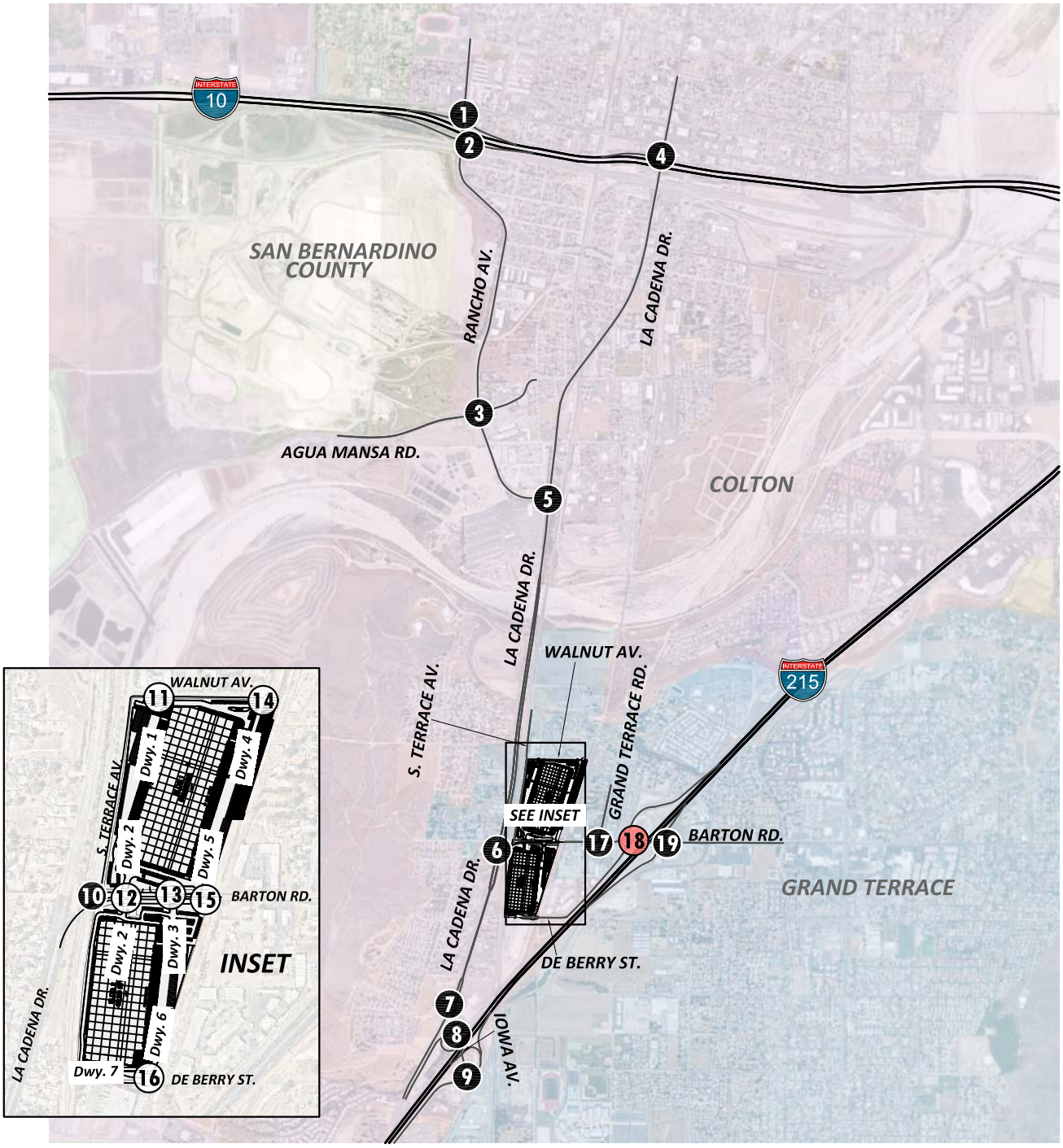
LEGEND:

RIRO *= RIGHT-IN/RIGHT-OUT ONLY ACCESS*
P *= PASSENGER CARS ONLY*
T *= TRUCKS ONLY*
PT *= PASSENGER CARS AND TRUCKS*

NOTE: UNLESS NOTED, ALL DRIVEWAYS ARE ASSUMED TO BE FULL ACCESS.

12971 - siteplan.dwg

EXHIBIT 2: LOCATION MAP



LEGEND:

- 0 = EXISTING INTERSECTION ANALYSIS LOCATION
- 0 = FUTURE INTERSECTION ANALYSIS LOCATION
- 0 = CMP INTERSECTION

N

12971 - locmap-a.dwg

EXHIBIT 3 (1OF2): PROJECT (TRUCK) TRIP DISTRIBUTION

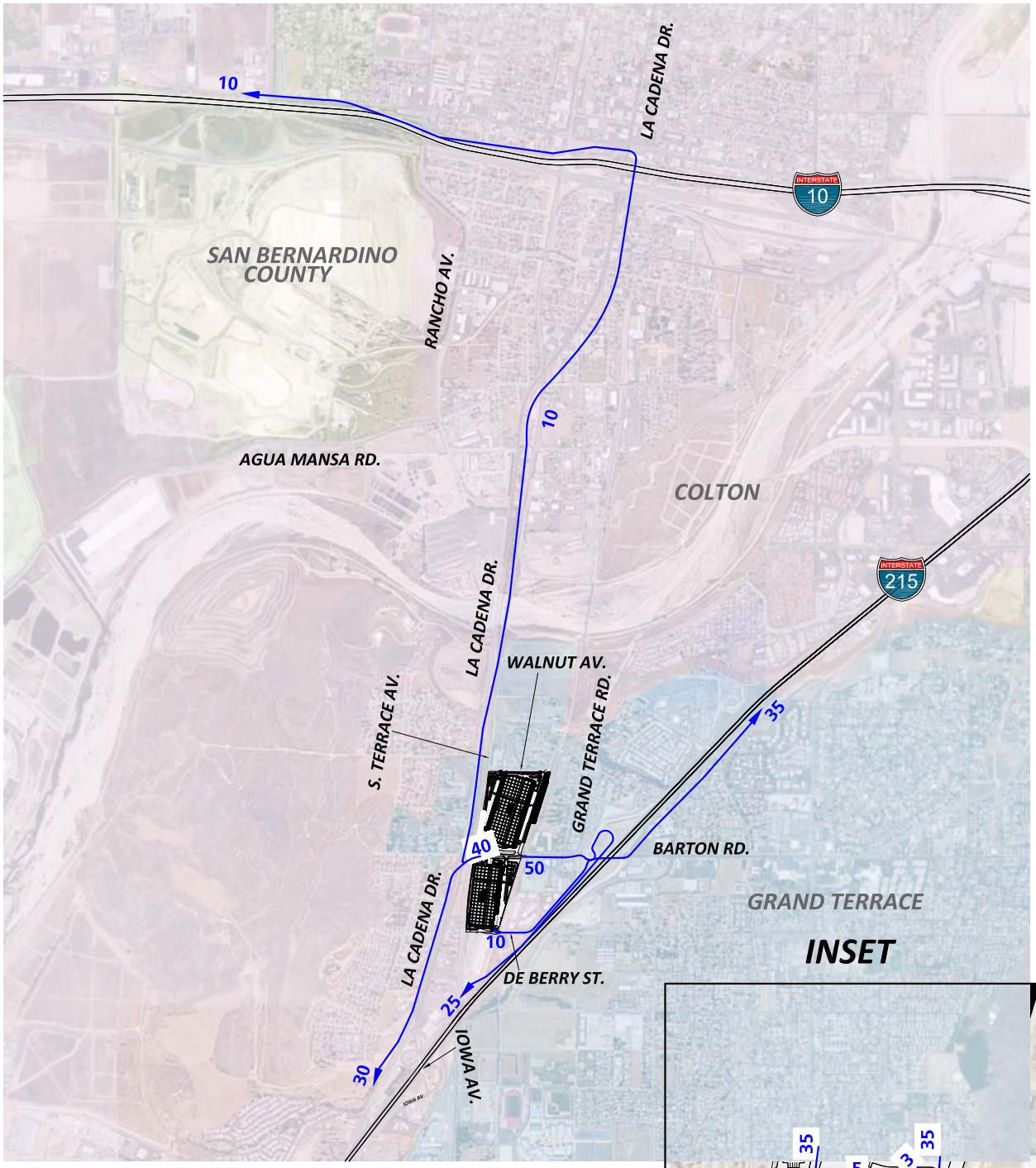


EXHIBIT 3 (2OF2): PROJECT (TRUCK) TRIP DISTRIBUTION

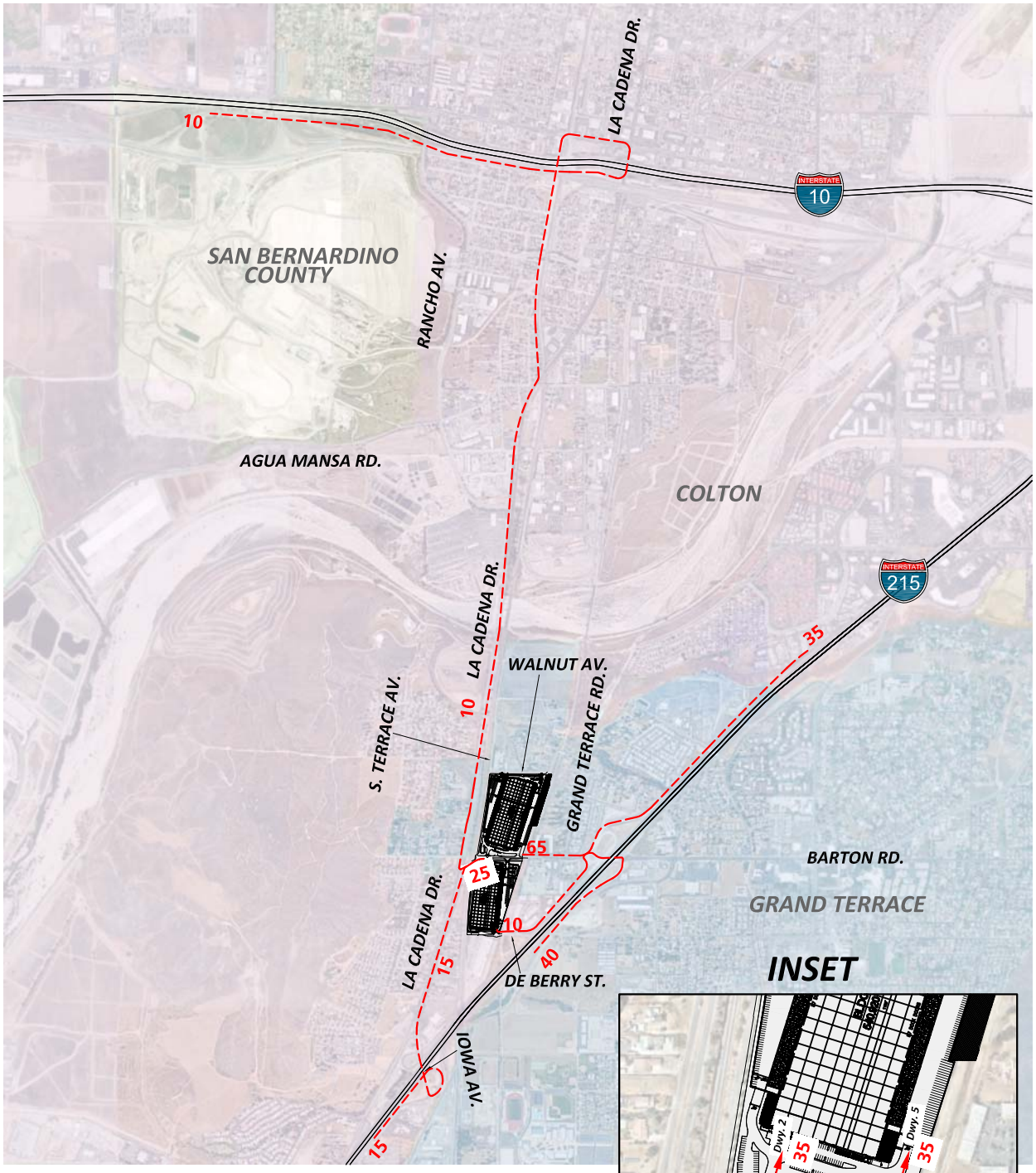
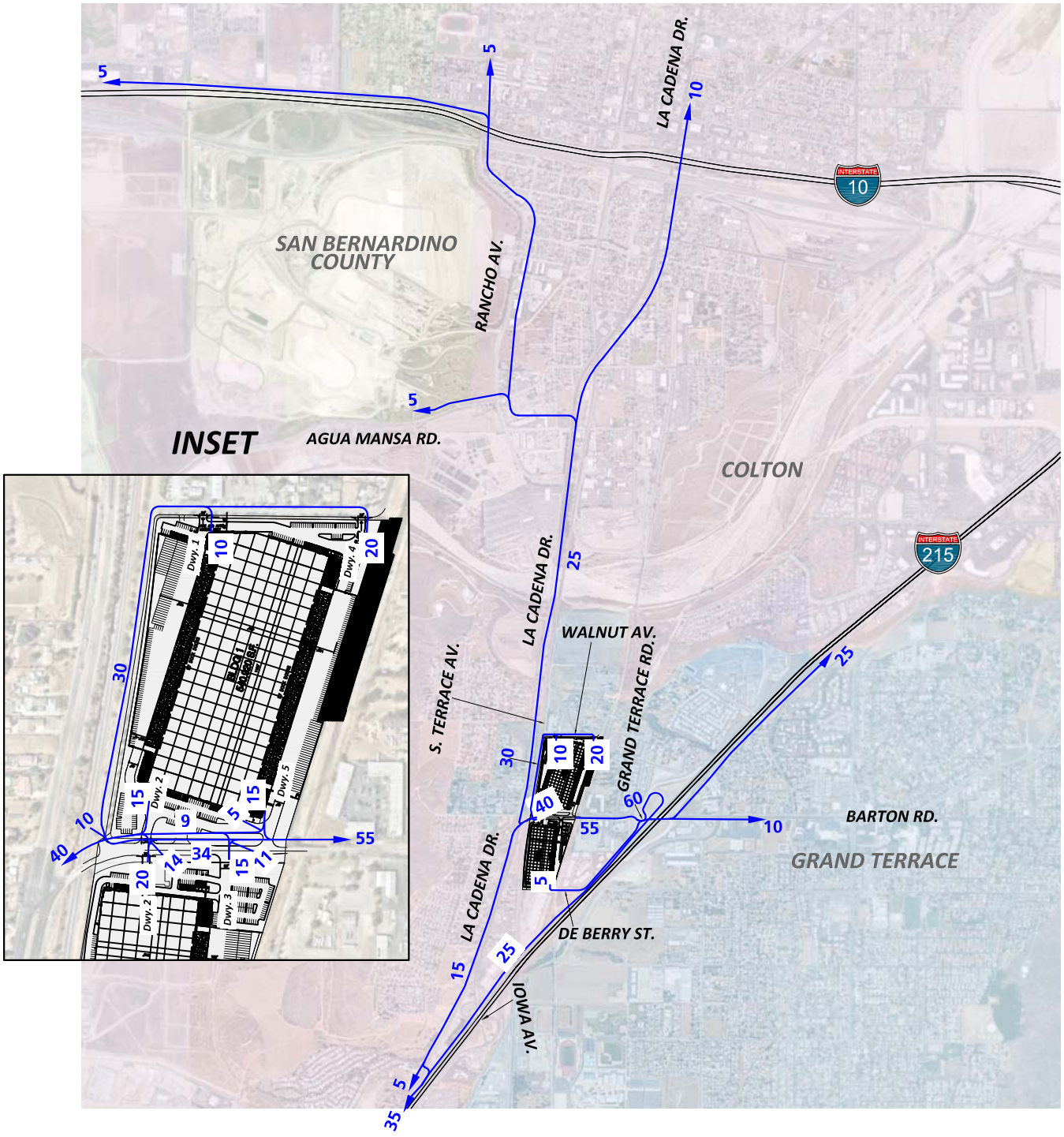


EXHIBIT 4 (1OF2): PROJECT (PASSENGER CAR) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT FROM PROJECT

N

EXHIBIT 4 (2OF2): PROJECT (PASSENGER CAR) TRIP DISTRIBUTION

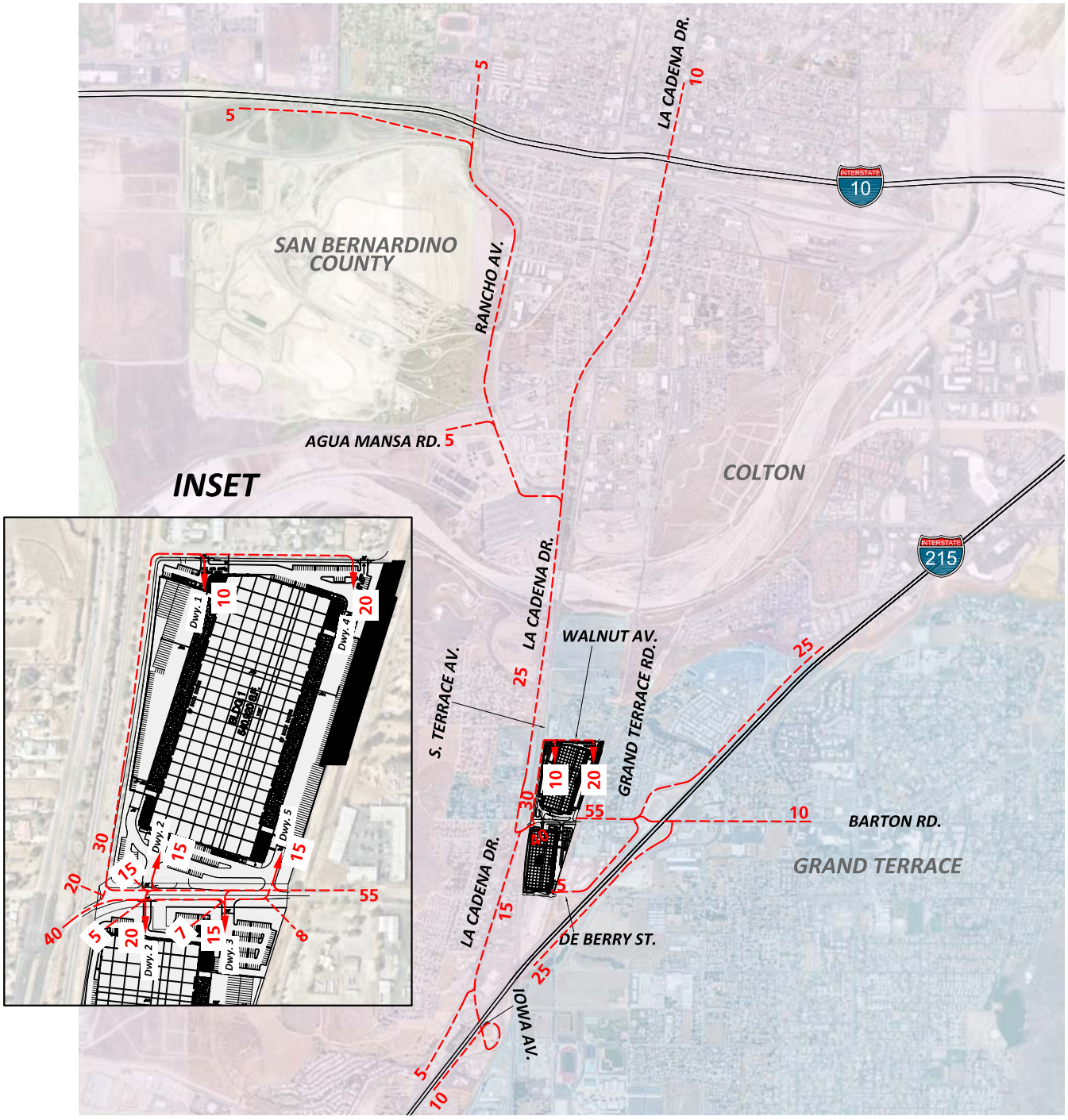


Table 1

Project Trip Generation Summary

Project Trip Generation Rates									
Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (80.0% AM, 84.0% PM/Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (3.34% AM, 2.67% PM/Daily)			0.002	0.001	0.003	0.001	0.002	0.003	0.037
3-Axle Trucks (4.14% AM, 3.31% PM/Daily)			0.003	0.001	0.003	0.001	0.002	0.003	0.046
4-Axle+ Trucks (12.52% AM, 10.02% PM/Daily)			0.008	0.002	0.010	0.003	0.007	0.010	0.140
Passenger Car Equivalent									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (69.2% AM, 78.3% PM, 67.8% Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (5.14% AM, 3.62% PM, 5.38% Daily, PCE = 1.5)[5]			0.003	0.001	0.004	0.001	0.003	0.004	0.056
3-Axle Trucks (6.38% AM, 4.49% PM, 6.66% Daily, PCE = 2.0)[5]			0.005	0.002	0.007	0.002	0.005	0.007	0.093
4-Axle+ Trucks (19.28% AM, 13.59% PM, 20.16% Daily, PCE = 3.0)[5]			0.023	0.007	0.030	0.008	0.022	0.030	0.421

Project Trip Generation									
Project	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			2	1	3	1	2	3	36
3-axle:			3	1	4	1	3	4	46
4+-axle:			8	3	11	3	7	10	136
- Net Truck Trips (Actual Vehicles)			*13*	*5*	*18*	*5*	*12*	*17*	*218*
TOTAL NET TRIPS (Actual Vehicles)			***61***	***20***	***81***	***28***	***71***	***99***	***1,348***
Passenger Car Equivalent[5]									
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			3	1	4	2	3	5	54
3-axle:			5	2	7	2	5	7	90
4+-axle:			23	7	30	9	21	30	404
- Net Truck Trips			*31*	*10*	*41*	*13*	*29*	*42*	*548*
TOTAL NET TRIPS			***79***	***25***	***104***	***36***	***88***	***124***	***1,678***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet

[3] Vehicle Mix Source: Institute of Transportation Engineers (ITE) Trip Generation 10th Edition Supplement (February 2020).

[4] Truck Mix Source: SCAQMD Warehouse Truck Trip Study Data Results and Usage (2014).

Normalized % - Without Cold Storage:

16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks

[5] PCE rates are per San Bernardino County Transportation Authority (SBCTA) Congestion Management Program (CMP) Guidelines.

APPENDIX 1.2:

SITE ADJACENT QUEUES

This Page Intentionally Left Blank

Intersection: 6: La Cadena Dr. & Barton Rd.

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	T	R	L	T	T
Maximum Queue (ft)	178	216	100	515	508	218	300	657	614
Average Queue (ft)	85	89	66	304	286	96	294	455	377
95th Queue (ft)	143	175	128	456	444	171	322	663	615
Link Distance (ft)	213	213		1920	1920	1920		3041	3041
Upstream Blk Time (%)		0							
Queuing Penalty (veh)		1							
Storage Bay Dist (ft)			50				275		
Storage Blk Time (%)		19	7				37	0	
Queuing Penalty (veh)		73	11				257	1	

Intersection: 10: Barton Rd. & S. Terrace Av.

Movement	EB	WB	SB
Directions Served	L	TR	LR
Maximum Queue (ft)	39	19	43
Average Queue (ft)	8	1	16
95th Queue (ft)	31	8	37
Link Distance (ft)		102	1107
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 11: Dwy. 1 & Walnut Av.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	25
Average Queue (ft)	2
95th Queue (ft)	13
Link Distance (ft)	240
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: Dwy. 2 & Barton Rd.

Movement	WB	NB	SB
Directions Served	L	LTR	R
Maximum Queue (ft)	30	28	29
Average Queue (ft)	6	3	5
95th Queue (ft)	25	17	24
Link Distance (ft)		254	187
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 13: Dwy. 3 & Barton Rd.

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	31	25
Average Queue (ft)	5	2
95th Queue (ft)	23	16
Link Distance (ft)		212
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 14: Dwy. 4 & Walnut Av.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	25
Average Queue (ft)	2
95th Queue (ft)	16
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: Barton Rd. & Dwy. 5

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	36	31
Average Queue (ft)	4	5
95th Queue (ft)	22	23
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Dwy. 7/De Berry St. & Dwy. 6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	15
Average Queue (ft)	1
95th Queue (ft)	8
Link Distance (ft)	293
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 342

Intersection: 6: La Cadena Dr. & Barton Rd.

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	L	R	T	T	R	L	T	T
Maximum Queue (ft)	236	233	100	743	735	150	300	1073	1066
Average Queue (ft)	159	183	96	537	521	73	292	663	622
95th Queue (ft)	240	266	121	942	928	121	339	1282	1256
Link Distance (ft)	213	213		1920	1920	1920		3041	3041
Upstream Blk Time (%)	3	9							
Queuing Penalty (veh)	17	45							
Storage Bay Dist (ft)			50				275		
Storage Blk Time (%)		41	11				52	0	
Queuing Penalty (veh)		211	28				358	1	

Intersection: 10: Barton Rd. & S. Terrace Av.

Movement	EB	WB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	36	101	132	74
Average Queue (ft)	11	13	39	23
95th Queue (ft)	36	60	119	53
Link Distance (ft)		102	102	1107
Upstream Blk Time (%)		0	3	
Queuing Penalty (veh)		1	16	
Storage Bay Dist (ft)	100			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 11: Dwy. 1 & Walnut Av.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	31
Average Queue (ft)	6
95th Queue (ft)	27
Link Distance (ft)	240
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: Dwy. 2 & Barton Rd.

Movement	WB	WB	WB	NB	SB
Directions Served	L	T	TR	LTR	R
Maximum Queue (ft)	24	60	109	42	50
Average Queue (ft)	2	2	10	11	14
95th Queue (ft)	13	26	59	34	40
Link Distance (ft)		272	272	254	187
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	100				
Storage Blk Time (%)		0			
Queuing Penalty (veh)		0			

Intersection: 13: Dwy. 3 & Barton Rd.

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	18	44
Average Queue (ft)	1	12
95th Queue (ft)	10	37
Link Distance (ft)		212
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 14: Dwy. 4 & Walnut Av.

Movement	NB
Directions Served	LR
Maximum Queue (ft)	40
Average Queue (ft)	12
95th Queue (ft)	37
Link Distance (ft)	321
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 15: Barton Rd. & Dwy. 5

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	25	51
Average Queue (ft)	2	16
95th Queue (ft)	13	44
Link Distance (ft)		217
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	50	
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Intersection: 16: Dwy. 7/De Berry St. & Dwy. 6

Movement	SB
Directions Served	LR
Maximum Queue (ft)	26
Average Queue (ft)	3
95th Queue (ft)	15
Link Distance (ft)	293
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 677

APPENDIX 3.1:

HISTORIC (2016, 2018, & 2019) TRAFFIC COUNTS

This Page Intentionally Left Blank

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

Day: Wednesday

Date: 7/27/2016

TOTALS

AM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
7:00 AM	21	55	0	0	113	75	0	0	0	51	0	87	402
7:15 AM	24	79	0	0	151	82	0	0	0	31	0	65	432
7:30 AM	18	80	0	0	181	79	0	0	0	55	0	71	484
7:45 AM	19	73	0	0	161	47	0	0	0	82	0	96	478
8:00 AM	15	75	0	0	128	53	0	0	0	38	1	57	367
8:15 AM	20	54	0	0	91	50	0	0	0	54	1	47	317
8:30 AM	18	55	0	0	123	60	0	0	0	40	0	60	356
8:45 AM	23	50	0	0	103	31	0	0	0	28	1	59	295
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	158	521	0	0	1051	477	0	0	0	379	3	542	3131
APPROACH %'s :	23.27%	76.73%	0.00%	0.00%	68.78%	31.22%	#DIV/0!	#DIV/0!	#DIV/0!	41.02%	0.32%	58.66%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	82	287	0	0	606	283	0	0	0	219	0	319	1796
PEAK HR FACTOR :	0.896			0.855			0.000			0.756			0.928

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

2 Axle Trucks

Date: 7/27/2016

AM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
7:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
7:15 AM	1	2	0	0	0	0	0	0	0	1	0	0	4
7:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:15 AM	1	0	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	3	0	0	0	0	0	0	0	0	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	2	6	0	0	1	0	0	0	0	2	0	0	11
APPROACH %'s :	25.00%	75.00%	0.00%	0.00%	100.00%	0.00%	#DIV/0!	#DIV/0!	#DIV/0!	100.00%	0.00%	0.00%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	1	3	0	0	1	0	0	0	0	1	0	0	6
PEAK HR FACTOR :	0.333			0.250			0.000			0.250			0.923

UTURNS	NB	SB	EB	WB
	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

3 Axle Trucks

Date: 7/27/2016

AM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
7:00 AM	1	0	0	0	1	0	0	0	0	4	0	1	7
7:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	0	1	0	0	2
7:45 AM	2	0	0	0	0	0	0	0	0	3	0	1	6
8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:15 AM	0	2	0	0	1	1	0	0	0	1	0	0	5
8:30 AM	1	2	0	0	0	0	0	0	0	4	0	0	7
8:45 AM	1	0	0	0	0	1	0	0	0	3	0	2	7
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	5	5	0	0	3	2	0	0	0	17	0	4	36
APPROACH %'s :	50.00%	50.00%	0.00%	0.00%	60.00%	40.00%	#DIV/0!	#DIV/0!	#DIV/0!	80.95%	0.00%	19.05%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	3	1	0	0	2	0	0	0	0	8	0	2	16
PEAK HR FACTOR :	0.500			0.500			0.000			0.500			0.923

UTURNS	NB	SB	EB	WB
	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

4 Axle+ Trucks

AM

Day: Wednesday

Date: 7/27/2016

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
7:00 AM	0	0	0	0	0	1	0	0	0	2	0	0	3
7:15 AM	1	0	0	0	0	0	0	0	0	2	0	0	3
7:30 AM	2	0	0	0	1	1	0	0	0	0	0	1	5
7:45 AM	1	0	0	0	0	1	0	0	0	4	0	0	6
8:00 AM	0	1	0	0	0	1	0	0	0	3	0	1	6
8:15 AM	1	1	0	0	0	0	0	0	0	7	0	0	9
8:30 AM	2	1	0	0	3	0	0	0	0	8	0	0	14
8:45 AM	2	0	0	0	1	1	0	0	0	5	0	1	10
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	9	3	0	0	5	5	0	0	0	31	0	3	56
APPROACH %'s :	75.00%	25.00%	0.00%	0.00%	50.00%	50.00%	#DIV/0!	#DIV/0!	#DIV/0!	91.18%	0.00%	8.82%	
PEAK HR START TIME :	700 AM												TOTAL
PEAK HR VOL :	4	0	0	0	1	3	0	0	0	8	0	1	17
PEAK HR FACTOR :	0.500			0.500			0.000			0.563			0.923

UTURNS	NB	SB	EB	WB
	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

Day: Wednesday

Date: 7/27/2016

TOTALS

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
4:00 PM	17	154	0	0	152	51	0	0	0	23	0	96	493
4:15 PM	32	153	0	0	139	40	0	0	0	30	0	99	493
4:30 PM	19	171	0	0	144	48	0	0	0	24	1	110	517
4:45 PM	25	159	0	0	156	43	0	0	0	23	0	94	500
5:00 PM	26	172	0	1	146	55	0	0	0	29	0	99	528
5:15 PM	36	178	0	0	139	42	0	0	0	23	0	91	509
5:30 PM	17	194	0	0	141	45	0	0	0	31	1	87	516
5:45 PM	28	191	0	0	131	31	0	0	0	29	0	105	515
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	200	1372	0	1	1148	355	0	0	0	212	2	781	4071
APPROACH %'s :	12.72%	87.28%	0.00%	0.07%	76.33%	23.60%	#DIV/0!	#DIV/0!	#DIV/0!	21.31%	0.20%	78.49%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	107	735	0	1	557	173	0	0	0	112	1	382	2068
PEAK HR FACTOR :	0.961			0.905			0.000			0.924			0.979

UTURNS	NB	SB	EB	WB
		0		
		0		
		0		
		0		
		1		
		0		
		0		
		0		
	NB	SB	EB	WB
	0	1	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

2 Axle Trucks

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
4:00 PM	1	1	0	0	1	0	0	0	0	0	0	1	4
4:15 PM	0	1	0	0	0	1	0	0	0	1	0	1	4
4:30 PM	0	1	0	0	0	0	0	0	0	1	0	0	2
4:45 PM	0	2	0	0	0	1	0	0	0	0	0	0	3
5:00 PM	0	1	0	0	0	1	0	0	0	1	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
5:30 PM	0	1	0	0	0	0	0	0	0	1	0	1	3
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	1	7	0	0	1	3	0	0	0	5	0	4	21
APPROACH %'s :	12.50%	87.50%	0.00%	0.00%	25.00%	75.00%	#DIV/0!	#DIV/0!	#DIV/0!	55.56%	0.00%	44.44%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	0	2	0	0	0	1	0	0	0	3	0	2	8
PEAK HR FACTOR :	0.500			0.250			0.000			0.625			0.974

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

3 Axle Trucks

City: Colton

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
4:00 PM	0	1	0	0	1	1	0	0	0	1	0	0	4
4:15 PM	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	1	1	0	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	1	0	0	0	0	0	0	0	3	0	0	4
5:45 PM	1	1	0	0	0	0	0	0	0	1	0	0	3
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	3	5	0	0	1	2	0	0	0	6	0	0	17
APPROACH %'s :	37.50%	62.50%	0.00%	0.00%	33.33%	66.67%	#DIV/0!	#DIV/0!	#DIV/0!	100.00%	0.00%	0.00%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	1	3	0	0	0	0	0	0	0	4	0	0	8
PEAK HR FACTOR :	0.500			0.000			0.000			0.333			0.974

UTURNS	NB	SB	EB	WB
	0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

4 Axle+ Trucks

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway WB Ramps			I-10 Freeway WB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	0	2	0	0	0	0	0.5	0.5	1	
4:00 PM	1	1	0	0	0	0	0	0	0	1	0	0	3
4:15 PM	1	0	0	0	0	1	0	0	0	2	0	0	4
4:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45 PM	1	0	0	0	0	2	0	0	0	2	0	0	5
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
5:15 PM	2	1	0	0	1	1	0	0	0	1	0	0	6
5:30 PM	1	1	0	0	0	0	0	0	0	2	0	0	4
5:45 PM	0	1	0	0	0	2	0	0	0	0	0	0	3
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	6	5	0	0	1	6	0	0	0	9	0	0	27
APPROACH %'s :	54.55%	45.45%	0.00%	0.00%	14.29%	85.71%	#DIV/0!	#DIV/0!	#DIV/0!	100.00%	0.00%	0.00%	
PEAK HR START TIME :	500 PM												TOTAL
PEAK HR VOL :	3	3	0	0	1	3	0	0	0	4	0	0	14
PEAK HR FACTOR :	0.500			0.500			0.000			0.500			0.974

UTURNS

NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

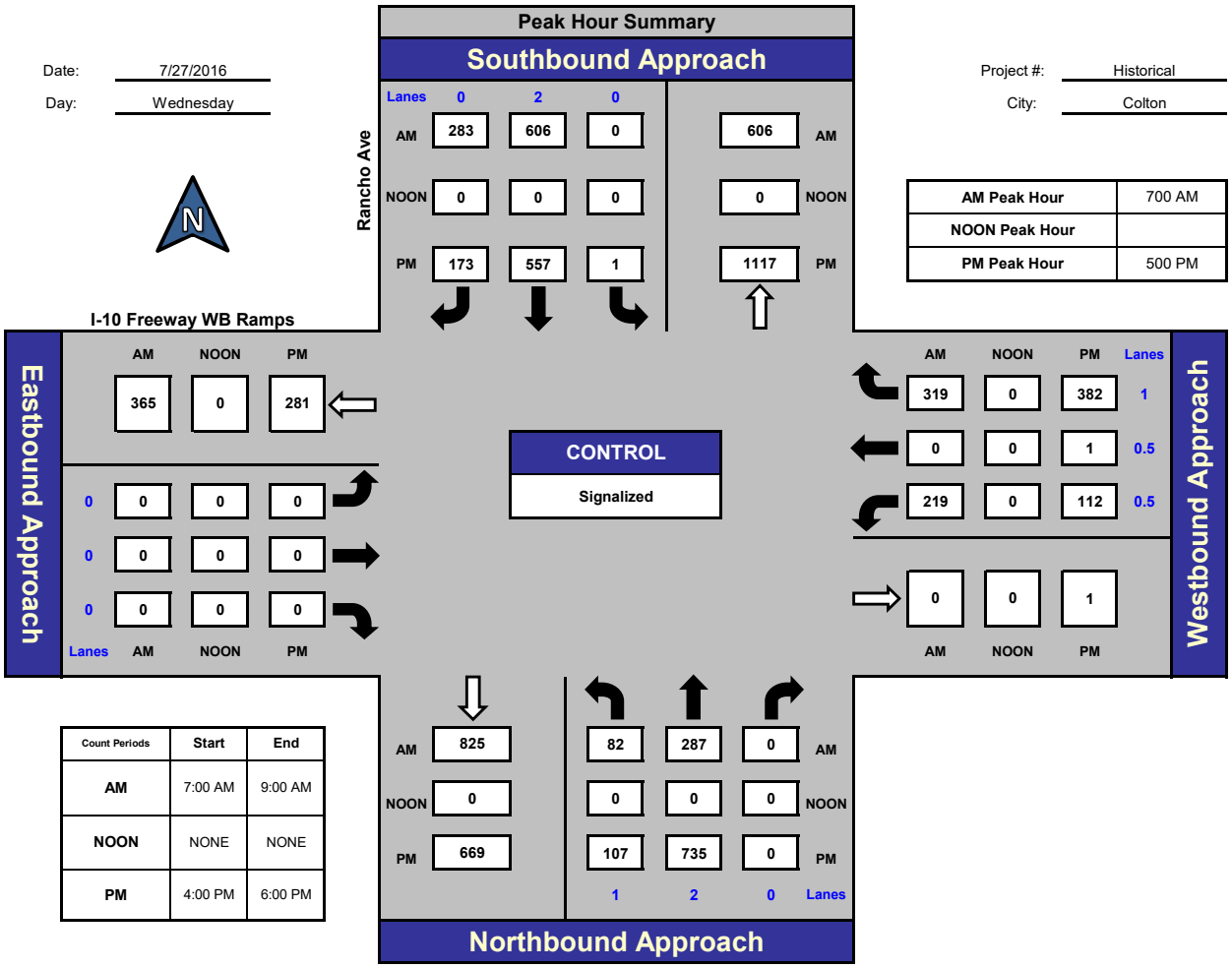
National Data & Surveying Services

Rancho Ave and I-10 Freeway WB Ramps , Colton

Date: 7/27/2016
Day: Wednesday

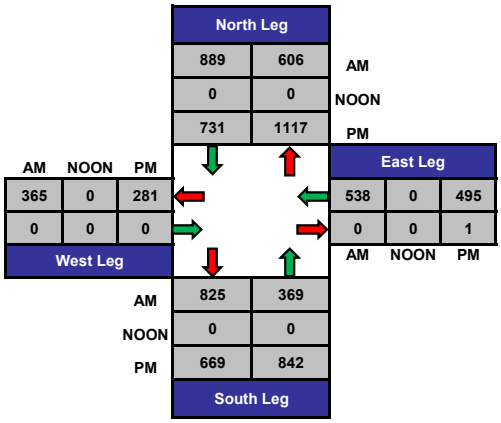
Project #: Historical
City: Colton

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	500 PM

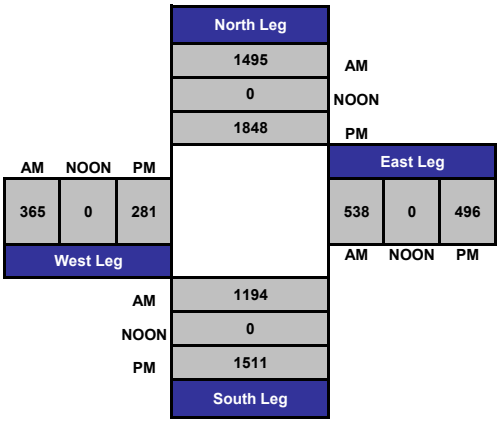


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

Day: Wednesday

Date: 7/27/2016

TOTALS

AM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
7:00 AM	0	62	25	59	106	0	19	0	50	0	0	0	321
7:15 AM	0	69	23	81	103	0	28	0	69	0	0	0	373
7:30 AM	0	77	36	77	148	0	27	1	62	0	0	0	428
7:45 AM	0	70	31	82	170	0	28	0	68	0	0	0	449
8:00 AM	0	45	28	69	96	0	35	0	63	0	0	0	336
8:15 AM	0	52	27	63	81	0	28	0	63	0	0	0	314
8:30 AM	0	38	25	74	88	0	30	0	64	0	0	0	319
8:45 AM	0	51	27	59	70	0	22	0	43	0	0	0	272
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	464	222	564	862	0	217	1	482	0	0	0	2812
APPROACH %'s :	0.00%	67.64%	32.36%	39.55%	60.45%	0.00%	31.00%	0.14%	68.86%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	261	118	309	517	0	118	1	262	0	0	0	1586
PEAK HR FACTOR :		0.838			0.819			0.972			0.000		0.883

UTURNS			
NB	SB	EB	WB
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

2 Axle Trucks

AM

Day: Wednesday

Date: 7/27/2016

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	1	0	1	0	1	0	0	0	0	0	4
7:30 AM	0	1	2	1	0	0	1	0	1	0	0	0	6
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	2	0	1	0	0	0	1	0	0	0	4
8:15 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
8:30 AM	0	1	1	0	0	0	1	0	1	0	0	0	4
8:45 AM	0	1	0	0	0	0	1	0	0	0	0	0	2
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	6	6	1	2	0	4	0	3	0	0	0	22
APPROACH %'s :	0.00%	50.00%	50.00%	33.33%	66.67%	0.00%	57.14%	0.00%	42.86%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	2	5	1	2	0	2	0	2	0	0	0	14
PEAK HR FACTOR :	0.583			0.750			0.500			0.000			0.880

UTURNS

NB	SB	EB	WB

NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

3 Axle Trucks

City: Colton

Date: 7/27/2016

AM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
7:00 AM	0	1	3	0	5	0	0	0	0	0	0	0	9
7:15 AM	0	0	0	0	1	0	1	0	0	0	0	0	2
7:30 AM	0	0	1	0	1	0	0	0	2	0	0	0	4
7:45 AM	0	2	2	0	3	0	0	0	0	0	0	0	7
8:00 AM	0	0	1	0	2	0	0	0	1	0	0	0	4
8:15 AM	0	1	3	0	3	0	1	0	0	0	0	0	8
8:30 AM	0	3	1	0	4	0	0	0	1	0	0	0	9
8:45 AM	0	1	5	0	1	0	0	0	0	0	0	0	7
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	8	16	0	20	0	2	0	4	0	0	0	50
APPROACH %'s :	0.00%	33.33%	66.67%	0.00%	100.00%	0.00%	33.33%	0.00%	66.67%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	2	4	0	7	0	1	0	3	0	0	0	17
PEAK HR FACTOR :	0.375			0.583			0.500			0.000			0.880

UTURNS				
NB	SB	EB	WB	
0	0	0	0	

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

4 Axle+ Trucks

AM

Day: Wednesday

Date: 7/27/2016

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
7:00 AM	0	1	4	0	2	0	0	0	4	0	0	0	11
7:15 AM	0	0	3	1	2	0	0	0	0	0	0	0	6
7:30 AM	0	3	3	1	0	0	0	0	4	0	0	0	11
7:45 AM	0	0	3	0	4	0	0	0	4	0	0	0	11
8:00 AM	0	0	4	0	2	0	1	0	3	0	0	0	10
8:15 AM	0	1	1	1	5	0	1	0	2	0	0	0	11
8:30 AM	0	2	2	2	9	0	1	0	4	0	0	0	20
8:45 AM	0	2	4	0	7	0	0	0	5	0	0	0	18
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	9	24	5	31	0	3	0	26	0	0	0	98
APPROACH %'s :	0.00%	27.27%	72.73%	13.89%	86.11%	0.00%	10.34%	0.00%	89.66%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	715 AM												TOTAL
PEAK HR VOL :	0	3	13	2	8	0	1	0	11	0	0	0	38
PEAK HR FACTOR :	0.667			0.625			0.750			0.000			0.880

UTURNS				
NB	SB	EB	WB	
NB	SB	EB	WB	
0	0	0	0	

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

City: Colton

Day: Wednesday

Date: 7/27/2016

TOTALS

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
4:00 PM	0	93	66	83	92	0	78	0	66	0	0	0	478
4:15 PM	0	112	76	75	93	0	73	0	70	0	0	0	499
4:30 PM	0	112	89	76	92	0	79	0	71	0	0	0	519
4:45 PM	0	118	80	89	90	0	74	3	81	0	0	0	535
5:00 PM	0	103	79	70	97	0	88	0	61	0	0	0	498
5:15 PM	0	127	81	76	93	0	92	1	88	0	0	0	558
5:30 PM	0	114	65	85	91	0	97	1	72	0	0	0	525
5:45 PM	0	126	52	73	90	0	91	0	63	0	0	0	495
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	905	588	627	738	0	672	5	572	0	0	0	4107
APPROACH %'s :	0.00%	60.62%	39.38%	45.93%	54.07%	0.00%	53.80%	0.40%	45.80%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	462	305	320	371	0	351	5	302	0	0	0	2116
PEAK HR FACTOR :		0.922			0.965			0.909			0.000		0.948

UTURNS	NB	SB	EB	WB
		0		
		0		
		0		
		0		
		1		
		0		
		0		
		0		
	NB	SB	EB	WB
	0	1	0	0

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

2 Axle Trucks

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
4:00 PM	0	0	0	0	1	0	1	0	0	0	0	0	2
4:15 PM	0	0	0	0	1	0	1	0	3	0	0	0	5
4:30 PM	0	0	0	0	1	0	1	0	3	0	0	0	5
4:45 PM	0	0	1	0	0	0	2	0	1	0	0	0	4
5:00 PM	0	0	1	0	1	0	1	0	2	0	0	0	5
5:15 PM	0	0	2	0	1	0	0	0	1	0	0	0	4
5:30 PM	0	0	0	0	2	0	1	0	1	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	1
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	0	4	0	7	0	7	0	12	0	0	0	30
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	36.84%	0.00%	63.16%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	0	4	0	4	0	4	0	5	0	0	0	17
PEAK HR FACTOR :	0.500			0.500			0.750			0.000			0.947

UTURNS				
NB	SB	EB	WB	
NB	SB	EB	WB	
0	0	0	0	

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

3 Axle Trucks

City: Colton

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
4:00 PM	0	0	2	0	2	0	1	0	0	0	0	0	5
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	1	2	0	0	0	0	0	1	0	0	0	4
4:45 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00 PM	0	1	1	0	0	0	1	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	2	0	0	0	2
5:30 PM	0	0	0	0	3	0	1	0	1	0	0	0	5
5:45 PM	0	1	0	0	1	0	1	0	0	0	0	0	3
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	4	5	0	7	0	4	0	4	0	0	0	24
APPROACH %'s :	0.00%	44.44%	55.56%	0.00%	100.00%	0.00%	50.00%	0.00%	50.00%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	1	1	0	4	0	2	0	3	0	0	0	11
PEAK HR FACTOR :	0.250			0.333			0.625			0.000			0.947

UTURNS				
NB	SB	EB	WB	
NB	SB	EB	WB	
0	0	0	0	

CONTROL : Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

Project ID: Historical

Day: Wednesday

City: Colton

4 Axle+ Trucks

Date: 7/27/2016

PM

NS/EW Streets:	Rancho Ave			Rancho Ave			I-10 Freeway EB Ramps			I-10 Freeway EB Ramps			
	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	0	2	0	1	2	0	0.5	0.5	1	0	0	0	
4:00 PM	0	3	0	0	1	0	0	0	0	0	0	0	4
4:15 PM	0	0	0	0	2	0	0	0	0	0	0	0	2
4:30 PM	0	0	0	0	0	0	1	0	1	0	0	0	2
4:45 PM	0	1	0	0	2	0	0	0	1	0	0	0	4
5:00 PM	0	1	2	0	1	0	0	0	0	0	0	0	4
5:15 PM	0	3	0	1	1	0	0	0	1	0	0	0	6
5:30 PM	0	2	0	0	2	0	0	0	1	0	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	1
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
TOTAL VOLUMES :	0	10	2	1	9	0	1	0	5	0	0	0	28
APPROACH %'s :	0.00%	83.33%	16.67%	10.00%	90.00%	0.00%	16.67%	0.00%	83.33%	#DIV/0!	#DIV/0!	#DIV/0!	
PEAK HR START TIME :	445 PM												TOTAL
PEAK HR VOL :	0	7	2	1	6	0	0	0	3	0	0	0	19
PEAK HR FACTOR :	0.750			0.875			0.750			0.000			0.947

UTURNS			
NB	SB	EB	WB
0	0	0	0

CONTROL : Signalized

ITM Peak Hour Summary

Prepared by:

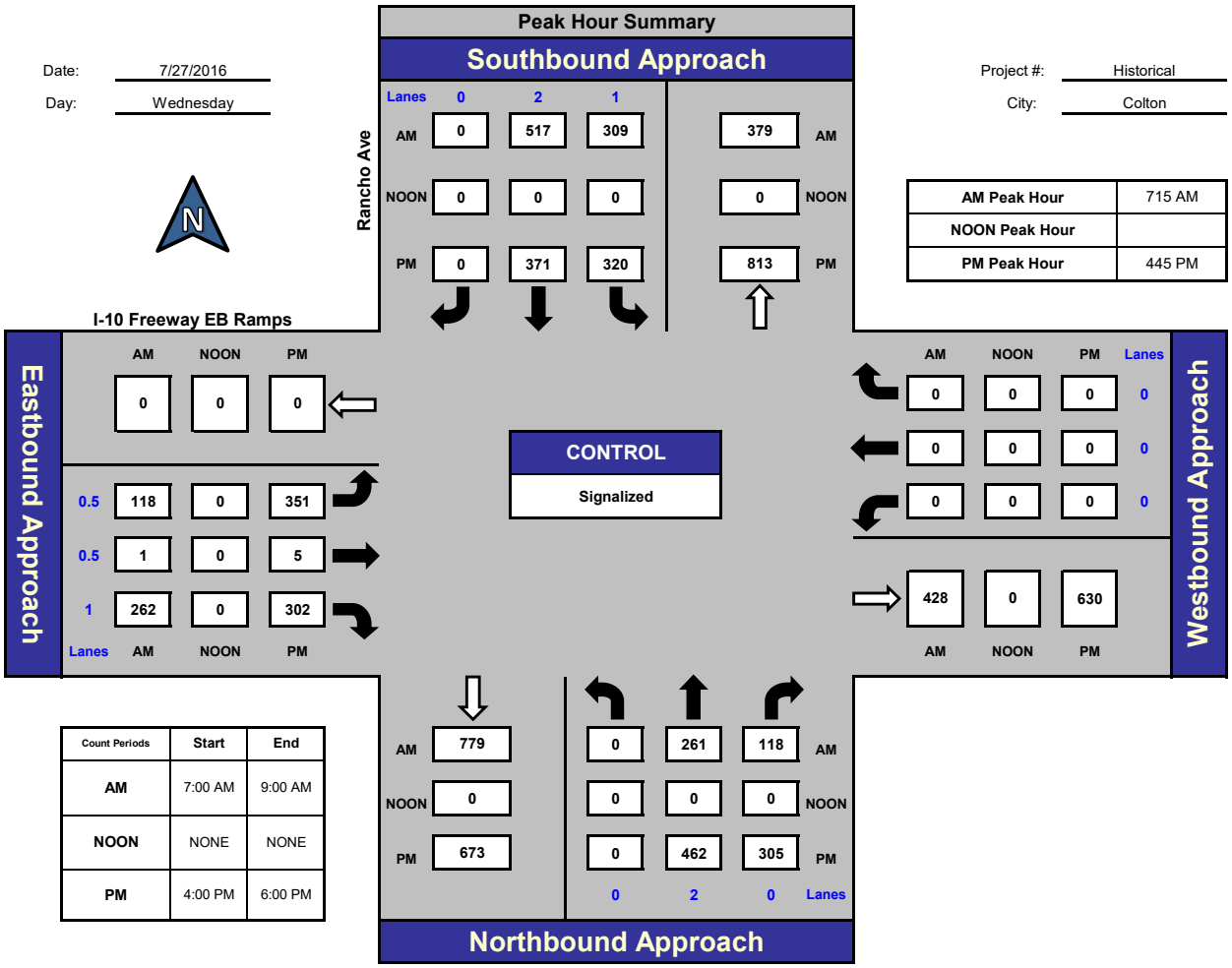
National Data & Surveying Services

Rancho Ave and I-10 Freeway EB Ramps , Colton

Date: 7/27/2016
Day: Wednesday

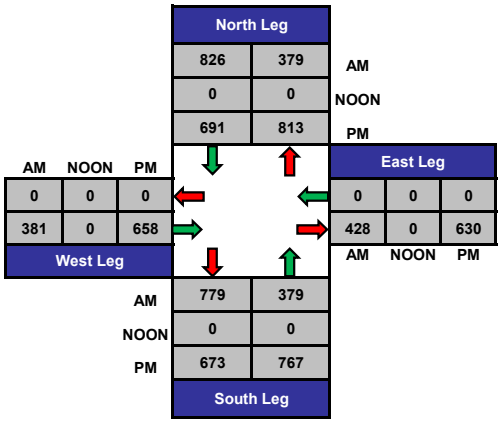
Project #: Historical
City: Colton

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	445 PM

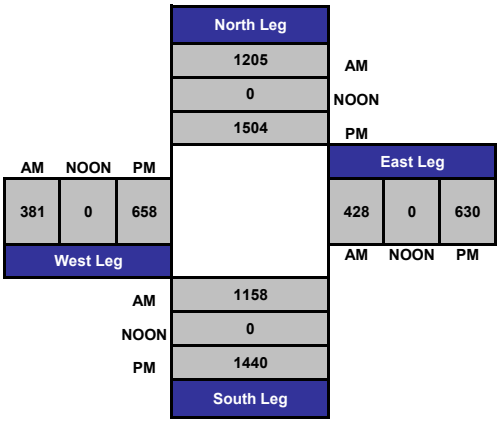


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	NONE	NONE
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

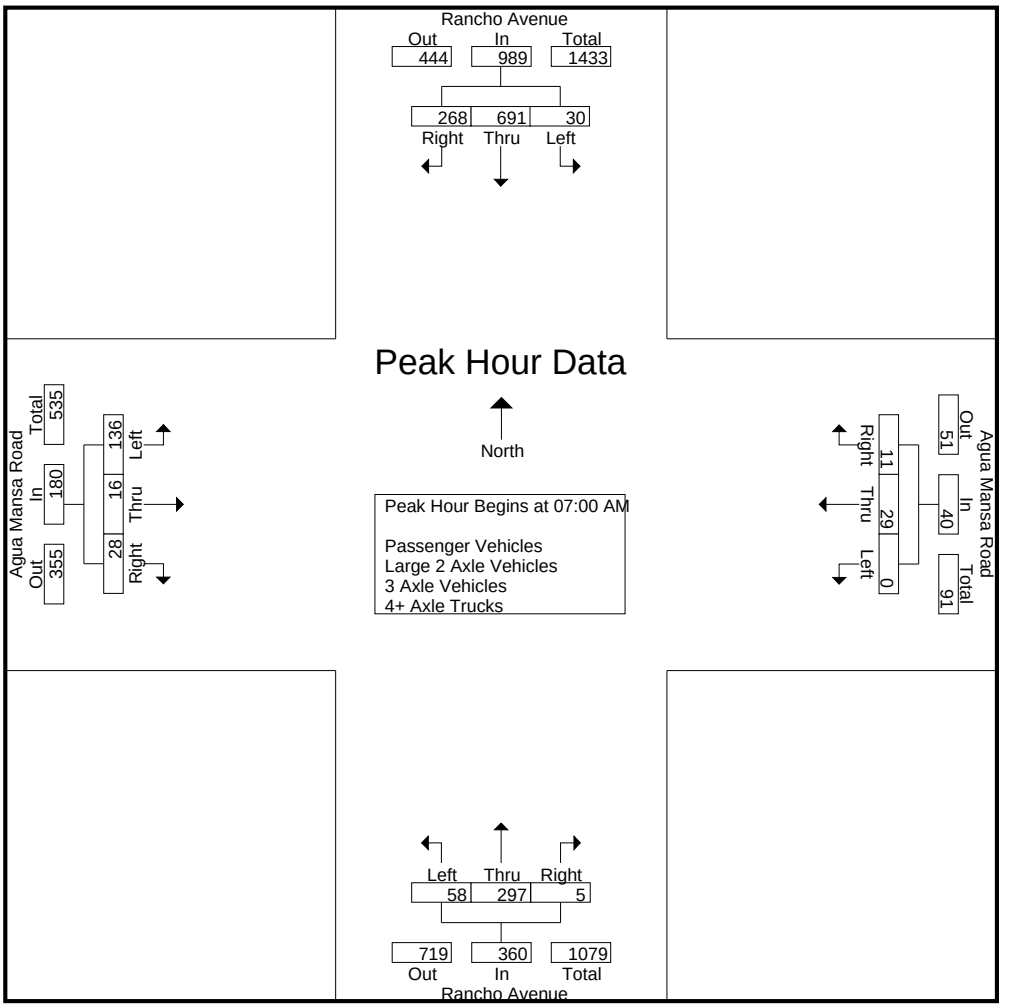
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	1	146	44	191	0	5	3	8	10	80	2	92	26	2	5	33	324
07:15 AM	6	161	66	233	0	6	3	9	13	63	0	76	33	4	8	45	363
07:30 AM	6	189	80	275	0	6	1	7	18	93	2	113	37	4	4	45	440
07:45 AM	17	195	78	290	0	12	4	16	17	61	1	79	40	6	11	57	442
Total	30	691	268	989	0	29	11	40	58	297	5	360	136	16	28	180	1569
08:00 AM	15	118	47	180	3	7	18	28	14	45	3	62	26	8	12	46	316
08:15 AM	14	121	42	177	0	4	8	12	8	38	5	51	22	2	9	33	273
08:30 AM	13	125	33	171	6	9	30	45	8	50	0	58	44	4	6	54	328
08:45 AM	5	94	21	120	1	4	3	8	6	38	1	45	29	2	8	39	212
Total	47	458	143	648	10	24	59	93	36	171	9	216	121	16	35	172	1129
Grand Total	77	1149	411	1637	10	53	70	133	94	468	14	576	257	32	63	352	2698
Apprch %	4.7	70.2	25.1		7.5	39.8	52.6		16.3	81.2	2.4		73	9.1	17.9		
Total %	2.9	42.6	15.2	60.7	0.4	2	2.6	4.9	3.5	17.3	0.5	21.3	9.5	1.2	2.3	13	
Passenger Vehicles	75	1104	374	1553	10	51	68	129	83	434	14	531	213	31	52	296	2509
% Passenger Vehicles	97.4	96.1	91	94.9	100	96.2	97.1	97	88.3	92.7	100	92.2	82.9	96.9	82.5	84.1	93
Large 2 Axle Vehicles	2	18	4	24	0	1	2	3	3	14	0	17	11	1	4	16	60
% Large 2 Axle Vehicles	2.6	1.6	1	1.5	0	1.9	2.9	2.3	3.2	3	0	3	4.3	3.1	6.3	4.5	2.2
3 Axle Vehicles	0	3	14	17	0	1	0	1	3	6	0	9	17	0	2	19	46
% 3 Axle Vehicles	0	0.3	3.4	1	0	1.9	0	0.8	3.2	1.3	0	1.6	6.6	0	3.2	5.4	1.7
4+ Axle Trucks	0	24	19	43	0	0	0	0	5	14	0	19	16	0	5	21	83
% 4+ Axle Trucks	0	2.1	4.6	2.6	0	0	0	0	5.3	3	0	3.3	6.2	0	7.9	6	3.1

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 07:00 AM																	
07:00 AM	1	146	44	191	0	5	3	8	10	80	**2**	92	26	2	5	33	324
07:15 AM	6	161	66	233	0	6	3	9	13	63	0	76	33	4	8	45	363
07:30 AM	6	189	**80**	275	0	6	1	7	**18**	**93**	2	**113**	37	4	4	45	440
07:45 AM	**17**	**195**	78	**290**	0	**12**	**4**	**16**	17	61	1	79	**40**	**6**	**11**	**57**	**442**
Total Volume	30	691	268	989	0	29	11	40	58	297	5	360	136	16	28	180	1569
% App. Total	3	69.9	27.1		0	72.5	27.5		16.1	82.5	1.4		75.6	8.9	15.6		
PHF	.441	.886	.838	.853	.000	.604	.688	.625	.806	.798	.625	.796	.850	.667	.636	.789	.887

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
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				07:00 AM				07:15 AM			
+0 mins.	1	146	44	191	0	**12**	4	16	10	80	**2**	92	33	4	8	45
+15 mins.	6	161	66	233	3	7	18	28	13	63	0	76	37	4	4	45
+30 mins.	6	189	**80**	275	0	4	8	12	**18**	**93**	2	**113**	**40**	6	11	**57**
+45 mins.	**17**	**195**	78	**290**	**6**	9	**30**	**45**	17	61	1	79	26	**8**	**12**	46
Total Volume	30	691	268	989	9	32	60	101	58	297	5	360	136	22	35	193
% App. Total	3	69.9	27.1		8.9	31.7	59.4		16.1	82.5	1.4		70.5	11.4	18.1	
PHF	.441	.886	.838	.853	.375	.667	.500	.561	.806	.798	.625	.796	.850	.688	.729	.846

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

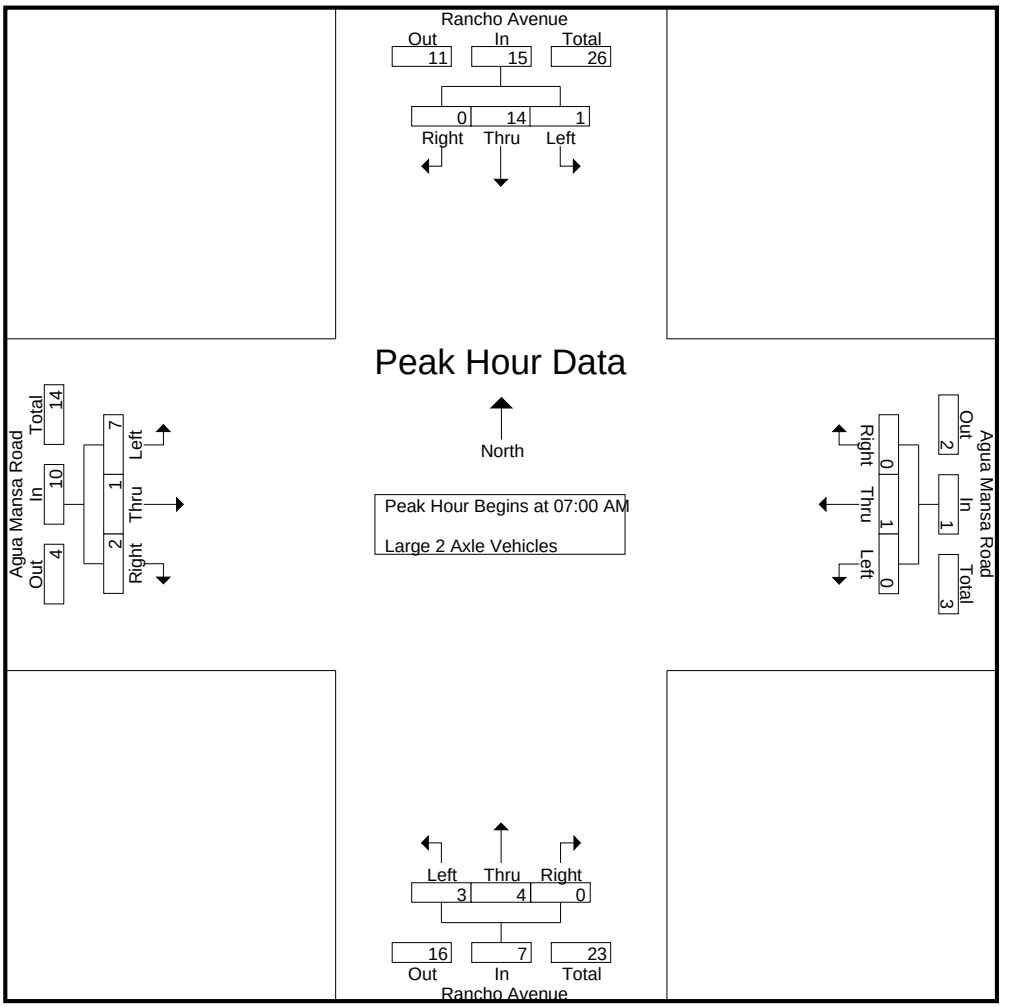
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	4	0	4	0	0	0	0	0	1	0	1	1	0	0	1	6
07:15 AM	0	3	0	3	0	0	0	0	2	0	0	2	5	1	1	7	12
07:30 AM	0	3	0	3	0	1	0	1	1	1	0	2	1	0	1	2	8
07:45 AM	1	4	0	5	0	0	0	0	0	2	0	2	0	0	0	0	7
Total	1	14	0	15	0	1	0	1	3	4	0	7	7	1	2	10	33
08:00 AM	1	3	1	5	0	0	1	1	0	3	0	3	2	0	0	2	11
08:15 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2	2	3
08:30 AM	0	0	1	1	0	0	0	0	0	5	0	5	1	0	0	1	7
08:45 AM	0	1	2	3	0	0	0	0	0	2	0	2	1	0	0	1	6
Total	1	4	4	9	0	0	2	2	0	10	0	10	4	0	2	6	27
Grand Total	2	18	4	24	0	1	2	3	3	14	0	17	11	1	4	16	60
Apprch %	8.3	75	16.7		0	33.3	66.7		17.6	82.4	0		68.8	6.2	25		
Total %	3.3	30	6.7	40	0	1.7	3.3	5	5	23.3	0	28.3	18.3	1.7	6.7	26.7	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	**4**	0	4	0	0	0	0	0	1	0	1	1	0	0	1	6
07:15 AM	0	3	0	3	0	0	0	0	**2**	0	0	**2**	**5**	**1**	**1**	**7**	**12**
07:30 AM	0	3	0	3	0	**1**	0	**1**	1	1	0	2	1	0	1	2	8
07:45 AM	**1**	4	0	**5**	0	0	0	0	0	**2**	0	2	0	0	0	0	7
Total Volume	1	14	0	15	0	1	0	1	3	4	0	7	7	1	2	10	33
% App. Total	6.7	93.3	0		0	100	0		42.9	57.1	0		70	10	20		
PHF	.250	.875	.000	.750	.000	.250	.000	.250	.375	.500	.000	.875	.350	.250	.500	.357	.688

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	**4**	0	4	0	0	0	0	0	1	0	1	1	0	0	1
+15 mins.	0	3	0	3	0	0	0	0	**2**	0	0	**2**	**5**	**1**	**1**	**7**
+30 mins.	0	3	0	3	0	**1**	0	**1**	1	1	0	2	1	0	1	2
+45 mins.	**1**	4	0	**5**	0	0	0	0	0	**2**	0	2	0	0	0	0
Total Volume	1	14	0	15	0	1	0	1	3	4	0	7	7	1	2	10
% App. Total	6.7	93.3	0		0	100	0		42.9	57.1	0		70	10	20	
PHF	.250	.875	.000	.750	.000	.250	.000	.250	.375	.500	.000	.875	.350	.250	.500	.357

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

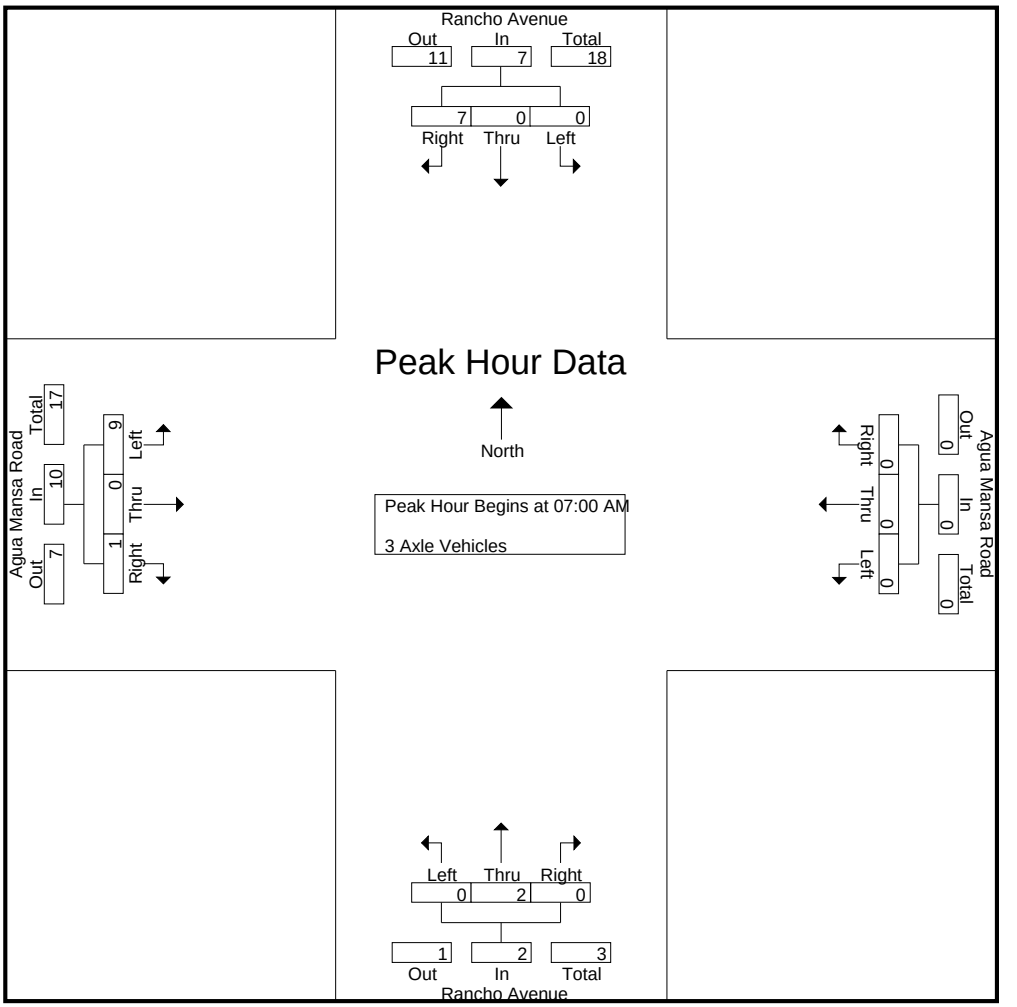
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	3	3	0	0	0	0	0	2	0	2	0	0	0	0	5
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	3
07:30 AM	0	0	3	3	0	0	0	0	0	0	0	0	5	0	0	5	8
07:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	2	3
Total	0	0	7	7	0	0	0	0	0	2	0	2	9	0	1	10	19
08:00 AM	0	0	1	1	0	0	0	0	1	0	0	1	2	0	0	2	4
08:15 AM	0	1	5	6	0	0	0	0	1	1	0	2	1	0	0	1	9
08:30 AM	0	0	0	0	0	1	0	1	1	2	0	3	3	0	0	3	7
08:45 AM	0	2	1	3	0	0	0	0	0	1	0	1	2	0	1	3	7
Total	0	3	7	10	0	1	0	1	3	4	0	7	8	0	1	9	27
Grand Total	0	3	14	17	0	1	0	1	3	6	0	9	17	0	2	19	46
Apprch %	0	17.6	82.4		0	100	0		33.3	66.7	0		89.5	0	10.5		
Total %	0	6.5	30.4	37	0	2.2	0	2.2	6.5	13	0	19.6	37	0	4.3	41.3	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	**3**	**3**	0	0	0	0	0	**2**	0	**2**	0	0	0	0	5
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**1**	3	3
07:30 AM	0	0	3	3	0	0	0	0	0	0	0	0	**5**	0	0	**5**	**8**
07:45 AM	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	2	3
Total Volume	0	0	7	7	0	0	0	0	0	2	0	2	9	0	1	10	19
% App. Total	0	0	100		0	0	0		0	100	0		90	0	10		
PHF	.000	.000	.583	.583	.000	.000	.000	.000	.000	.250	.000	.250	.450	.000	.250	.500	.594

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	0	**3**	**3**	0	0	0	0	0	**2**	0	**2**	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	2	0	**1**	3
+30 mins.	0	0	3	3	0	0	0	0	0	0	0	0	**5**	0	0	**5**
+45 mins.	0	0	1	1	0	0	0	0	0	0	0	0	2	0	0	2
Total Volume	0	0	7	7	0	0	0	0	0	2	0	2	9	0	1	10
% App. Total	0	0	100		0	0	0		0	100	0		90	0	10	
PHF	.000	.000	.583	.583	.000	.000	.000	.000	.000	.250	.000	.250	.450	.000	.250	.500

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

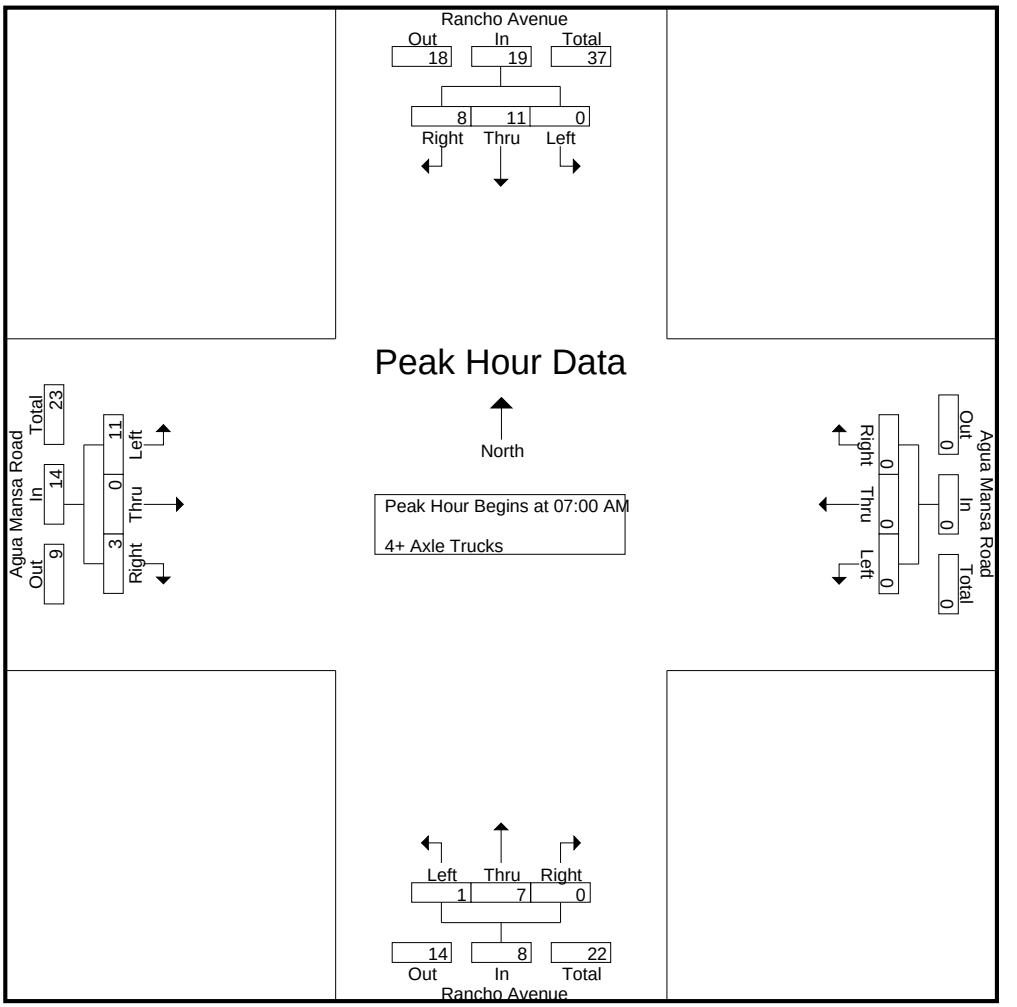
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	3	2	5	0	0	0	0	0	0	0	0	5	0	0	5	10
07:15 AM	0	4	3	7	0	0	0	0	0	2	0	2	3	0	0	3	12
07:30 AM	0	2	2	4	0	0	0	0	0	3	0	3	2	0	0	2	9
07:45 AM	0	2	1	3	0	0	0	0	1	2	0	3	1	0	3	4	10
Total	0	11	8	19	0	0	0	0	1	7	0	8	11	0	3	14	41
08:00 AM	0	4	4	8	0	0	0	0	1	1	0	2	1	0	2	3	13
08:15 AM	0	3	4	7	0	0	0	0	2	1	0	3	1	0	0	1	11
08:30 AM	0	3	3	6	0	0	0	0	0	4	0	4	1	0	0	1	11
08:45 AM	0	3	0	3	0	0	0	0	1	1	0	2	2	0	0	2	7
Total	0	13	11	24	0	0	0	0	4	7	0	11	5	0	2	7	42
Grand Total	0	24	19	43	0	0	0	0	5	14	0	19	16	0	5	21	83
Apprch %	0	55.8	44.2		0	0	0		26.3	73.7	0		76.2	0	23.8		
Total %	0	28.9	22.9	51.8	0	0	0	0	6	16.9	0	22.9	19.3	0	6	25.3	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 07:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	3	2	5	0	0	0	0	0	0	0	0	**5**	0	0	**5**	10
07:15 AM	0	**4**	**3**	**7**	0	0	0	0	0	2	0	2	3	0	0	3	**12**
07:30 AM	0	2	2	4	0	0	0	0	0	**3**	0	**3**	2	0	0	2	9
07:45 AM	0	2	1	3	0	0	0	0	**1**	2	0	3	1	0	**3**	4	10
Total Volume	0	11	8	19	0	0	0	0	1	7	0	8	11	0	3	14	41
% App. Total	0	57.9	42.1		0	0	0		12.5	87.5	0		78.6	0	21.4		
PHF	.000	.688	.667	.679	.000	.000	.000	.000	.250	.583	.000	.667	.550	.000	.250	.700	.854

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMAM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



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

	07:00 AM				07:00 AM				07:00 AM				07:00 AM			
+0 mins.	0	3	2	5	0	0	0	0	0	0	0	0	**5**	0	0	**5**
+15 mins.	0	**4**	**3**	**7**	0	0	0	0	0	2	0	2	3	0	0	3
+30 mins.	0	2	2	4	0	0	0	0	0	**3**	0	**3**	2	0	0	2
+45 mins.	0	2	1	3	0	0	0	0	**1**	2	0	3	1	0	**3**	4
Total Volume	0	11	8	19	0	0	0	0	1	7	0	8	11	0	3	14
% App. Total	0	57.9	42.1		0	0	0		12.5	87.5	0		78.6	0	21.4	
PHF	.000	.688	.667	.679	.000	.000	.000	.000	.250	.583	.000	.667	.550	.000	.250	.700

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

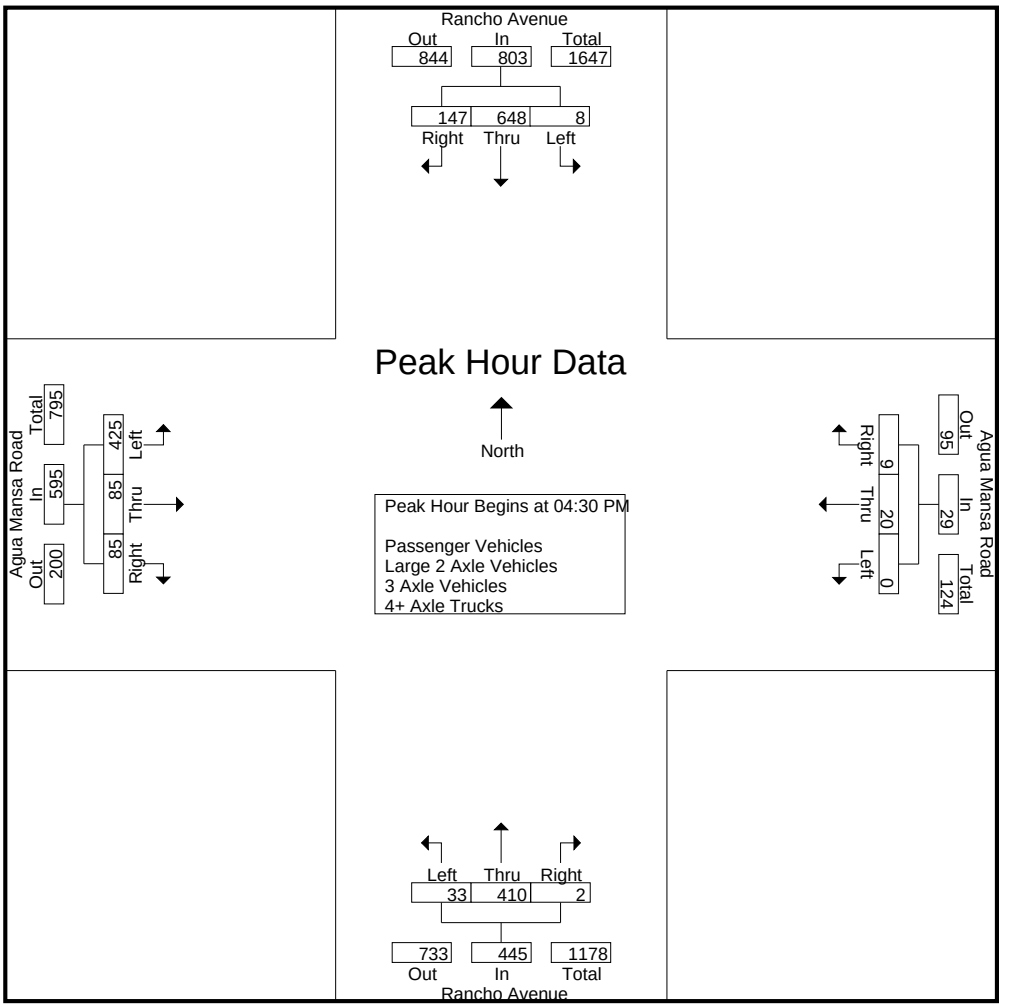
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	11	146	35	192	11	7	32	50	11	73	0	84	92	20	21	133	459
04:15 PM	3	127	27	157	0	6	4	10	13	102	1	116	110	15	17	142	425
04:30 PM	1	186	30	217	0	5	6	11	10	104	1	115	119	23	10	152	495
04:45 PM	2	152	32	186	0	2	1	3	6	107	0	113	109	21	21	151	453
Total	17	611	124	752	11	20	43	74	40	386	2	428	430	79	69	578	1832
05:00 PM	4	149	44	197	0	8	1	9	6	99	1	106	100	21	21	142	454
05:15 PM	1	161	41	203	0	5	1	6	11	100	0	111	97	20	33	150	470
05:30 PM	3	136	34	173	0	9	5	14	8	91	0	99	100	17	25	142	428
05:45 PM	3	164	36	203	1	0	1	2	4	97	0	101	85	14	30	129	435
Total	11	610	155	776	1	22	8	31	29	387	1	417	382	72	109	563	1787
Grand Total	28	1221	279	1528	12	42	51	105	69	773	3	845	812	151	178	1141	3619
Apprch %	1.8	79.9	18.3		11.4	40	48.6		8.2	91.5	0.4		71.2	13.2	15.6		
Total %	0.8	33.7	7.7	42.2	0.3	1.2	1.4	2.9	1.9	21.4	0.1	23.3	22.4	4.2	4.9	31.5	
Passenger Vehicles	21	1190	252	1463	12	37	50	99	61	753	3	817	780	147	165	1092	3471
% Passenger Vehicles	75	97.5	90.3	95.7	100	88.1	98	94.3	88.4	97.4	100	96.7	96.1	97.4	92.7	95.7	95.9
Large 2 Axle Vehicles	0	20	11	31	0	1	0	1	2	14	0	16	19	4	5	28	76
% Large 2 Axle Vehicles	0	1.6	3.9	2	0	2.4	0	1	2.9	1.8	0	1.9	2.3	2.6	2.8	2.5	2.1
3 Axle Vehicles	5	1	5	11	0	2	1	3	1	1	0	2	5	0	0	5	21
% 3 Axle Vehicles	17.9	0.1	1.8	0.7	0	4.8	2	2.9	1.4	0.1	0	0.2	0.6	0	0	0.4	0.6
4+ Axle Trucks	2	10	11	23	0	2	0	2	5	5	0	10	8	0	8	16	51
% 4+ Axle Trucks	7.1	0.8	3.9	1.5	0	4.8	0	1.9	7.2	0.6	0	1.2	1	0	4.5	1.4	1.4

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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	1	**186**	30	**217**	0	5	**6**	**11**	10	104	**1**	**115**	**119**	**23**	10	**152**	**495**
04:45 PM	2	152	32	186	0	2	1	3	6	**107**	0	113	109	21	21	151	453
05:00 PM	**4**	149	**44**	197	0	**8**	1	9	6	99	1	106	100	21	21	142	454
05:15 PM	1	161	41	203	0	5	1	6	**11**	100	0	111	97	20	**33**	150	470
Total Volume	8	648	147	803	0	20	9	29	33	410	2	445	425	85	85	595	1872
% App. Total	1	80.7	18.3		0	69	31		7.4	92.1	0.4		71.4	14.3	14.3		
PHF	.500	.871	.835	.925	.000	.625	.375	.659	.750	.958	.500	.967	.893	.924	.644	.979	.945

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
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				04:15 PM				04:30 PM			
+0 mins.	1	**186**	30	**217**	**11**	**7**	**32**	**50**	**13**	102	**1**	**116**	**119**	**23**	10	**152**
+15 mins.	2	152	32	186	0	6	4	10	10	104	1	115	109	21	21	151
+30 mins.	**4**	149	**44**	197	0	5	6	11	6	**107**	0	113	100	21	21	142
+45 mins.	1	161	41	203	0	2	1	3	6	99	1	106	97	20	**33**	150
Total Volume	8	648	147	803	11	20	43	74	35	412	3	450	425	85	85	595
% App. Total	1	80.7	18.3		14.9	27	58.1		7.8	91.6	0.7		71.4	14.3	14.3	
PHF	.500	.871	.835	.925	.250	.714	.336	.370	.673	.963	.750	.970	.893	.924	.644	.979

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- Large 2 Axle Vehicles

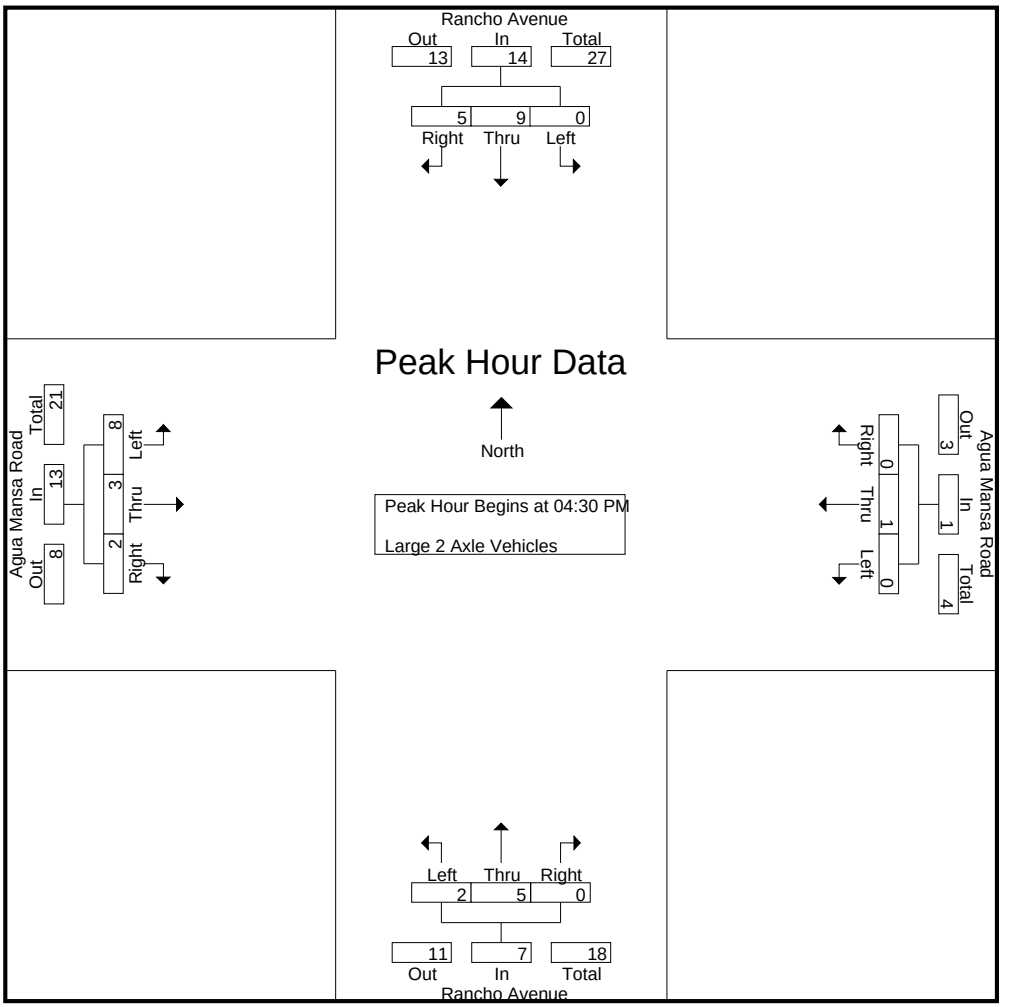
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	3	3	6	0	0	0	0	0	2	0	2	3	0	0	3	11
04:15 PM	0	4	0	4	0	0	0	0	0	2	0	2	3	0	2	5	11
04:30 PM	0	3	1	4	0	0	0	0	0	2	0	2	1	1	0	2	8
04:45 PM	0	2	1	3	0	0	0	0	0	0	0	0	2	1	0	3	6
Total	0	12	5	17	0	0	0	0	0	6	0	6	9	2	2	13	36
05:00 PM	0	2	2	4	0	1	0	1	1	3	0	4	1	1	0	2	11
05:15 PM	0	2	1	3	0	0	0	0	1	0	0	1	4	0	2	6	10
05:30 PM	0	2	0	2	0	0	0	0	0	1	0	1	2	1	1	4	7
05:45 PM	0	2	3	5	0	0	0	0	0	4	0	4	3	0	0	3	12
Total	0	8	6	14	0	1	0	1	2	8	0	10	10	2	3	15	40
Grand Total	0	20	11	31	0	1	0	1	2	14	0	16	19	4	5	28	76
Apprch %	0	64.5	35.5		0	100	0		12.5	87.5	0		67.9	14.3	17.9		
Total %	0	26.3	14.5	40.8	0	1.3	0	1.3	2.6	18.4	0	21.1	25	5.3	6.6	36.8	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**3**	1	**4**	0	0	0	0	0	2	0	2	1	**1**	0	2	8
04:45 PM	0	2	1	3	0	0	0	0	0	0	0	0	2	1	0	3	6
05:00 PM	0	2	**2**	4	0	**1**	0	**1**	**1**	**3**	0	**4**	1	1	0	2	**11**
05:15 PM	0	2	1	3	0	0	0	0	1	0	0	1	**4**	0	**2**	**6**	10
Total Volume	0	9	5	14	0	1	0	1	2	5	0	7	8	3	2	13	35
% App. Total	0	64.3	35.7		0	100	0		28.6	71.4	0		61.5	23.1	15.4		
PHF	.000	.750	.625	.875	.000	.250	.000	.250	.500	.417	.000	.438	.500	.750	.250	.542	.795

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	**3**	1	**4**	0	0	0	0	0	2	0	2	1	**1**	0	2
+15 mins.	0	2	1	3	0	0	0	0	0	0	0	0	2	1	0	3
+30 mins.	0	2	**2**	4	0	**1**	0	**1**	**1**	**3**	0	**4**	1	1	0	2
+45 mins.	0	2	1	3	0	0	0	0	1	0	0	1	**4**	0	**2**	**6**
Total Volume	0	9	5	14	0	1	0	1	2	5	0	7	8	3	2	13
% App. Total	0	64.3	35.7		0	100	0		28.6	71.4	0		61.5	23.1	15.4	
PHF	.000	.750	.625	.875	.000	.250	.000	.250	.500	.417	.000	.438	.500	.750	.250	.542

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- 3 Axle Vehicles

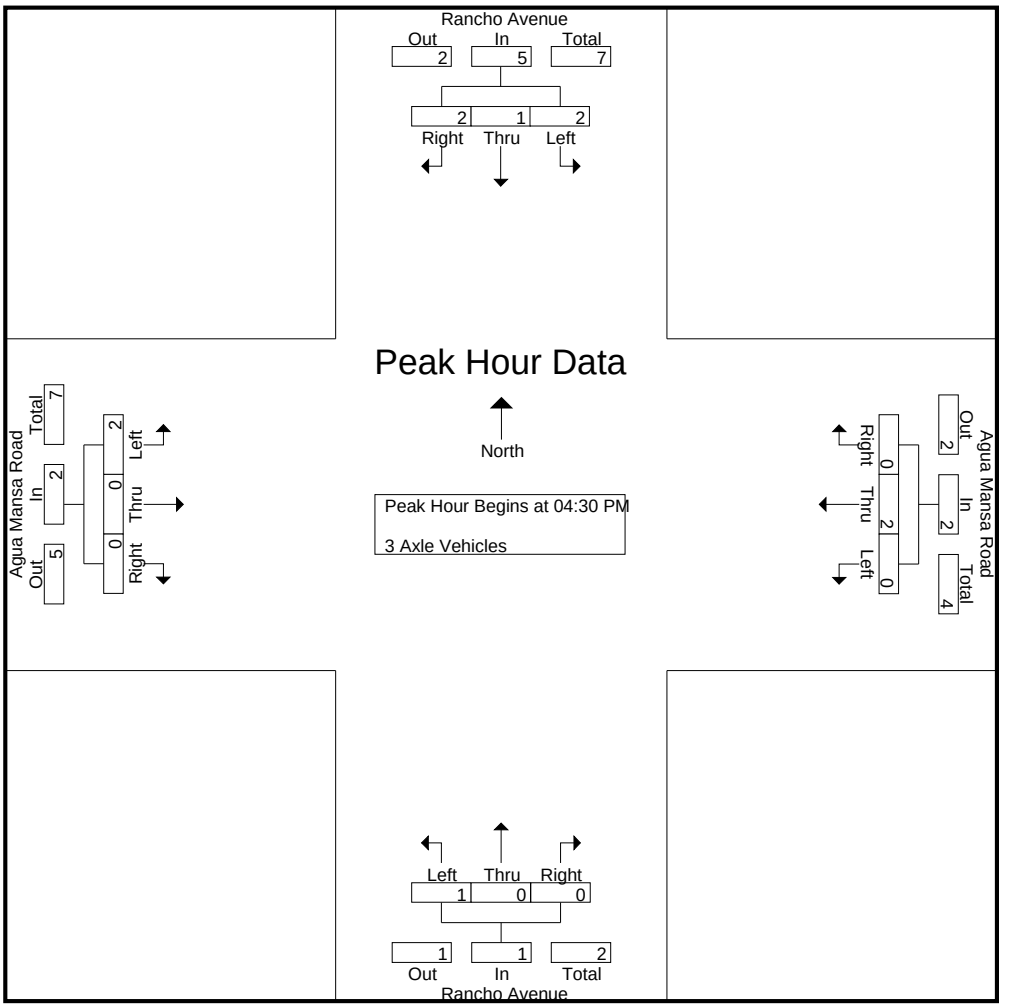
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	0	1	2	0	0	0	0	0	1	0	1	1	0	0	1	4
04:15 PM	0	0	2	2	0	0	0	0	0	0	0	0	1	0	0	1	3
04:30 PM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	1	1	0	2	0	0	0	0	1	0	0	1	1	0	0	1	4
Total	2	1	4	7	0	0	0	0	1	1	0	2	3	0	0	3	12
05:00 PM	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2
05:15 PM	1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	1	3
05:30 PM	1	0	0	1	0	0	1	1	0	0	0	0	1	0	0	1	3
05:45 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	3	0	1	4	0	2	1	3	0	0	0	0	2	0	0	2	9
Grand Total	5	1	5	11	0	2	1	3	1	1	0	2	5	0	0	5	21
Apprch %	45.5	9.1	45.5		0	66.7	33.3		50	50	0		100	0	0		
Total %	23.8	4.8	23.8	52.4	0	9.5	4.8	14.3	4.8	4.8	0	9.5	23.8	0	0	23.8	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	**1**	**1**	0	**2**	0	0	0	0	**1**	0	0	**1**	**1**	0	0	**1**	**4**
05:00 PM	0	0	1	1	0	**1**	0	**1**	0	0	0	0	0	0	0	0	2
05:15 PM	1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	1	3
Total Volume	2	1	2	5	0	2	0	2	1	0	0	1	2	0	0	2	10
% App. Total	40	20	40		0	100	0		100	0	0		100	0	0		
PHF	.500	.250	.500	.625	.000	.500	.000	.500	.250	.000	.000	.250	.500	.000	.000	.500	.625

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	**1**	1	0	0	0	0	0	0	0	0	0	0	0	0
+15 mins.	**1**	**1**	0	**2**	0	0	0	0	**1**	0	0	**1**	**1**	0	0	**1**
+30 mins.	0	0	1	1	0	**1**	0	**1**	0	0	0	0	0	0	0	0
+45 mins.	1	0	0	1	0	1	0	1	0	0	0	0	1	0	0	1
Total Volume	2	1	2	5	0	2	0	2	1	0	0	1	2	0	0	2
% App. Total	40	20	40		0	100	0		100	0	0		100	0	0	
PHF	.500	.250	.500	.625	.000	.500	.000	.500	.250	.000	.000	.250	.500	.000	.000	.500

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 1

Groups Printed- 4+ Axle Trucks

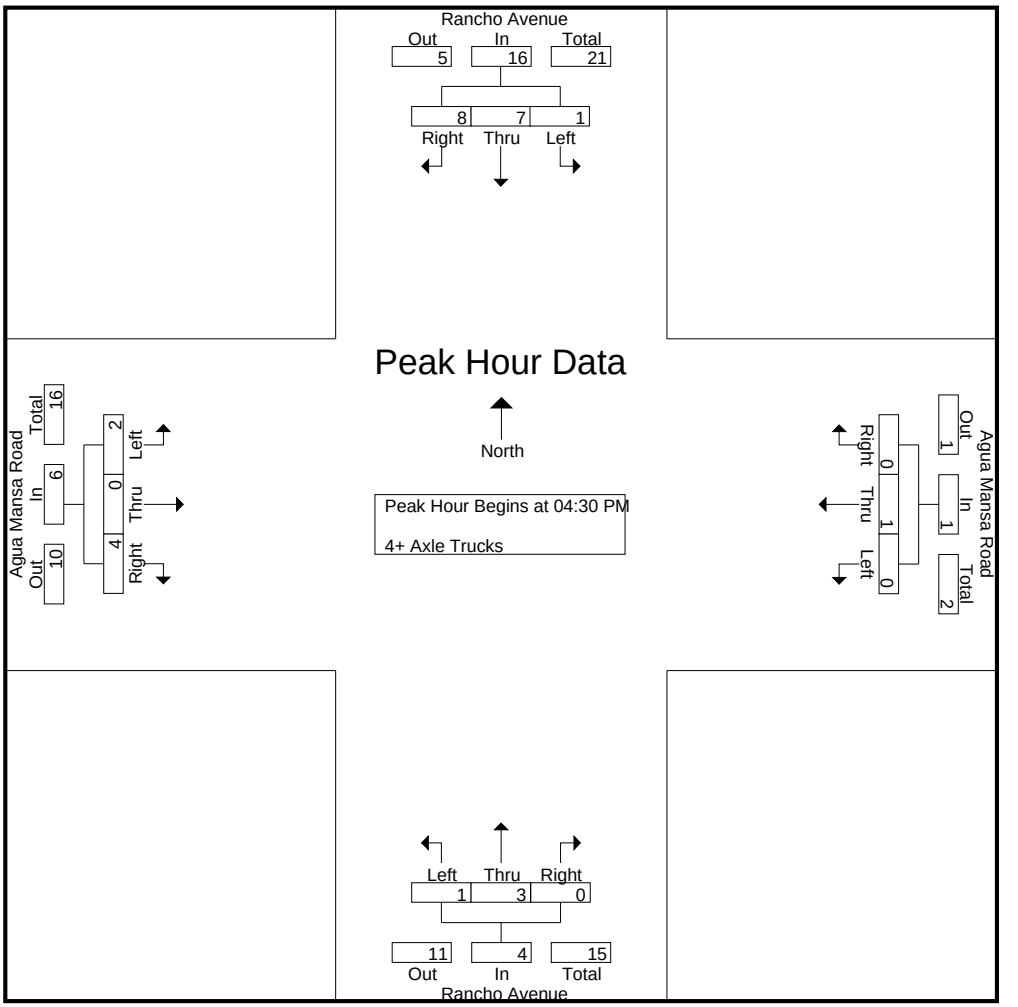
	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	1	0	2	0	0	0	0	1	0	0	1	4	0	1	5	8
04:15 PM	0	0	2	2	0	0	0	0	1	1	0	2	1	0	2	3	7
04:30 PM	0	2	3	5	0	0	0	0	1	0	0	1	1	0	1	2	8
04:45 PM	0	1	1	2	0	0	0	0	0	1	0	1	1	0	1	2	5
Total	1	4	6	11	0	0	0	0	3	2	0	5	7	0	5	12	28
05:00 PM	1	1	2	4	0	0	0	0	0	2	0	2	0	0	0	0	6
05:15 PM	0	3	2	5	0	1	0	1	0	0	0	0	0	0	2	2	8
05:30 PM	0	1	0	1	0	1	0	1	1	1	0	2	1	0	1	2	6
05:45 PM	0	1	1	2	0	0	0	0	1	0	0	1	0	0	0	0	3
Total	1	6	5	12	0	2	0	2	2	3	0	5	1	0	3	4	23
Grand Total	2	10	11	23	0	2	0	2	5	5	0	10	8	0	8	16	51
Apprch %	8.7	43.5	47.8		0	100	0		50	50	0		50	0	50		
Total %	3.9	19.6	21.6	45.1	0	3.9	0	3.9	9.8	9.8	0	19.6	15.7	0	15.7	31.4	

	Rancho Avenue Southbound				Agua Mansa Road Westbound				Rancho Avenue Northbound				Agua Mansa Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	2	**3**	**5**	0	0	0	0	**1**	0	0	1	**1**	0	1	**2**	**8**
04:45 PM	0	1	1	2	0	0	0	0	0	1	0	1	1	0	1	2	5
05:00 PM	**1**	1	2	4	0	0	0	0	0	**2**	0	**2**	0	0	0	0	6
05:15 PM	0	**3**	2	5	0	**1**	0	**1**	0	0	0	0	0	0	**2**	2	8
Total Volume	1	7	8	16	0	1	0	1	1	3	0	4	2	0	4	6	27
% App. Total	6.2	43.8	50		0	100	0		25	75	0		33.3	0	66.7		
PHF	.250	.583	.667	.800	.000	.250	.000	.250	.250	.375	.000	.500	.500	.000	.500	.750	.844

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

City of Colton
N/S: Rancho Avenue
E/W: Agua Mansa Road
Weather: Clear

File Name : COLRAAMPM
Site Code : 12218122
Start Date : 2/14/2018
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	2	**3**	**5**	0	0	0	0	**1**	0	0	1	**1**	0	1	**2**
+15 mins.	0	1	1	2	0	0	0	0	0	1	0	1	1	0	1	2
+30 mins.	**1**	1	2	4	0	0	0	0	0	**2**	0	**2**	0	0	0	0
+45 mins.	0	**3**	2	5	0	**1**	0	**1**	0	0	0	0	0	0	**2**	2
Total Volume	1	7	8	16	0	1	0	1	1	3	0	4	2	0	4	6
% App. Total	6.2	43.8	50		0	100	0		25	75	0		33.3	0	66.7	
PHF	.250	.583	.667	.800	.000	.250	.000	.250	.250	.375	.000	.500	.500	.000	.500	.750

INTERSECTION TURNING MOVEMENT COUNTS

T218

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Oct 16, 18

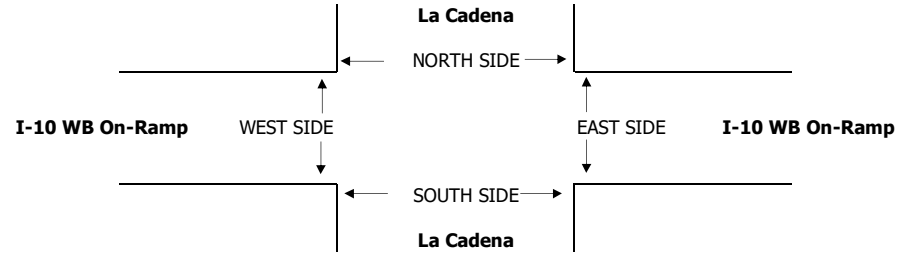
LOCATION: Colton
NORTH & SOUTH: La Cadena
EAST & WEST: I-10 WB On-Ramp
PROJECT #: SC1922
LOCATION #: 8
CONTROL:

NOTES: NB PM Queue

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

☐ Add U-Turns to Left Turns

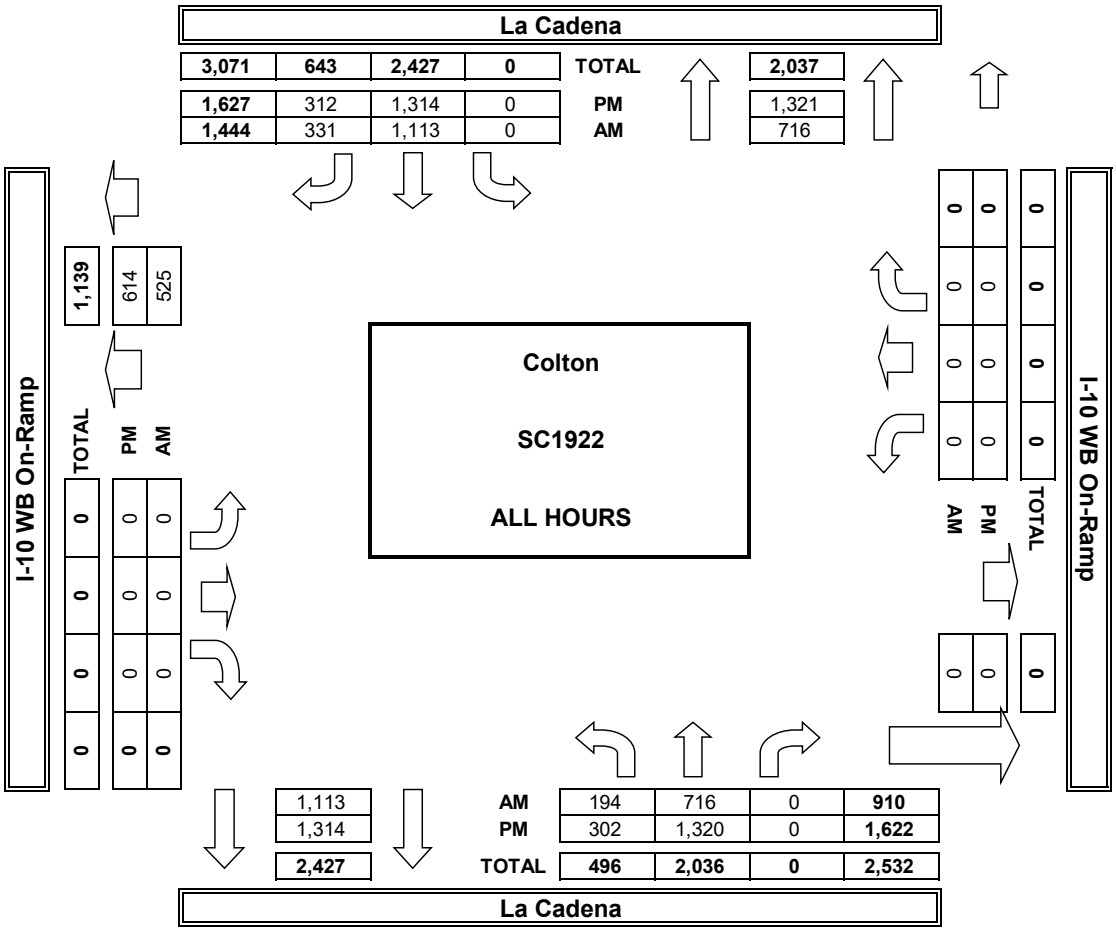
		NORTHBOUND La Cadena			SOUTHBOUND La Cadena			EASTBOUND I-10 WB On-Ramp			WESTBOUND I-10 WB On-Ramp				U-TURNS				
	LANES:	NL 0	NT 2	NR X	SL X	ST 2	SR 0	EL X	ET X	ER X	WL X	WT X	WR X	TOTAL	NB 0	SB 0	EB 0	WB 0	TTL
AM	7:00 AM	22	74	0	0	109	52	0	0	0	0	0	0	257	0	0	0	0	0
	7:15 AM	43	88	0	0	155	53	0	0	0	0	0	0	339	0	0	0	0	0
	7:30 AM	21	104	0	0	210	46	0	0	0	0	0	0	381	0	0	0	0	0
	7:45 AM	24	101	0	0	181	39	0	0	0	0	0	0	345	0	0	0	0	0
	8:00 AM	23	86	0	0	139	29	0	0	0	0	0	0	277	0	0	0	0	0
	8:15 AM	23	74	0	0	131	35	0	0	0	0	0	0	263	0	0	0	0	0
	8:30 AM	21	96	0	0	102	40	0	0	0	0	0	0	259	0	0	0	0	0
	8:45 AM	17	93	0	0	86	37	0	0	0	0	0	0	233	0	0	0	0	0
	VOLUMES	194	716	0	0	1,113	331	0	0	0	0	0	0	2,354	0	0	0	0	0
	APPROACH %	21%	79%	0%	0%	77%	23%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	910	/	716	1,444	/	1,113	0	/	0	0	/	525	0					
	BEGIN PEAK HR		7:15 AM																
	VOLUMES	111	379	0	0	685	167	0	0	0	0	0	0	1,342					
	APPROACH %	23%	77%	0%	0%	80%	20%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.935			0.832			0.000			0.000		0.881					
	APP/DEPART	490	/	379	852	/	685	0	/	0	0	/	278	0					
PM	4:00 PM	41	155	0	0	127	36	0	0	0	0	0	0	359	0	0	0	0	0
	4:15 PM	44	170	0	0	155	47	0	0	0	0	0	0	416	0	0	0	0	0
	4:30 PM	43	157	0	0	176	47	0	0	0	0	0	0	423	0	0	0	0	0
	4:45 PM	36	156	0	0	173	27	0	0	0	0	0	0	392	0	0	0	0	0
	5:00 PM	37	151	0	0	184	32	0	0	0	0	0	0	404	0	0	0	0	0
	5:15 PM	32	184	0	0	185	48	0	0	0	0	0	0	449	0	0	0	0	0
	5:30 PM	38	171	0	0	192	40	0	0	0	0	0	0	441	0	1	0	0	1
	5:45 PM	31	176	0	0	122	35	0	0	0	0	0	0	364	0	0	0	0	0
	VOLUMES	302	1,320	0	0	1,314	312	0	0	0	0	0	0	3,249	0	1	0	0	1
	APPROACH %	19%	81%	0%	0%	81%	19%	0%	0%	0%	0%	0%	0%						
	APP/DEPART	1,622	/	1,321	1,627	/	1,314	0	/	0	0	/	614	0					
	BEGIN PEAK HR		4:45 PM																
	VOLUMES	143	662	0	0	734	147	0	0	0	0	0	0	1,687					
	APPROACH %	18%	82%	0%	0%	83%	17%	0%	0%	0%	0%	0%	0%						
	PEAK HR FACTOR		0.932			0.946			0.000			0.000		0.939					
	APP/DEPART	805	/	663	882	/	734	0	/	0	0	/	290	0					

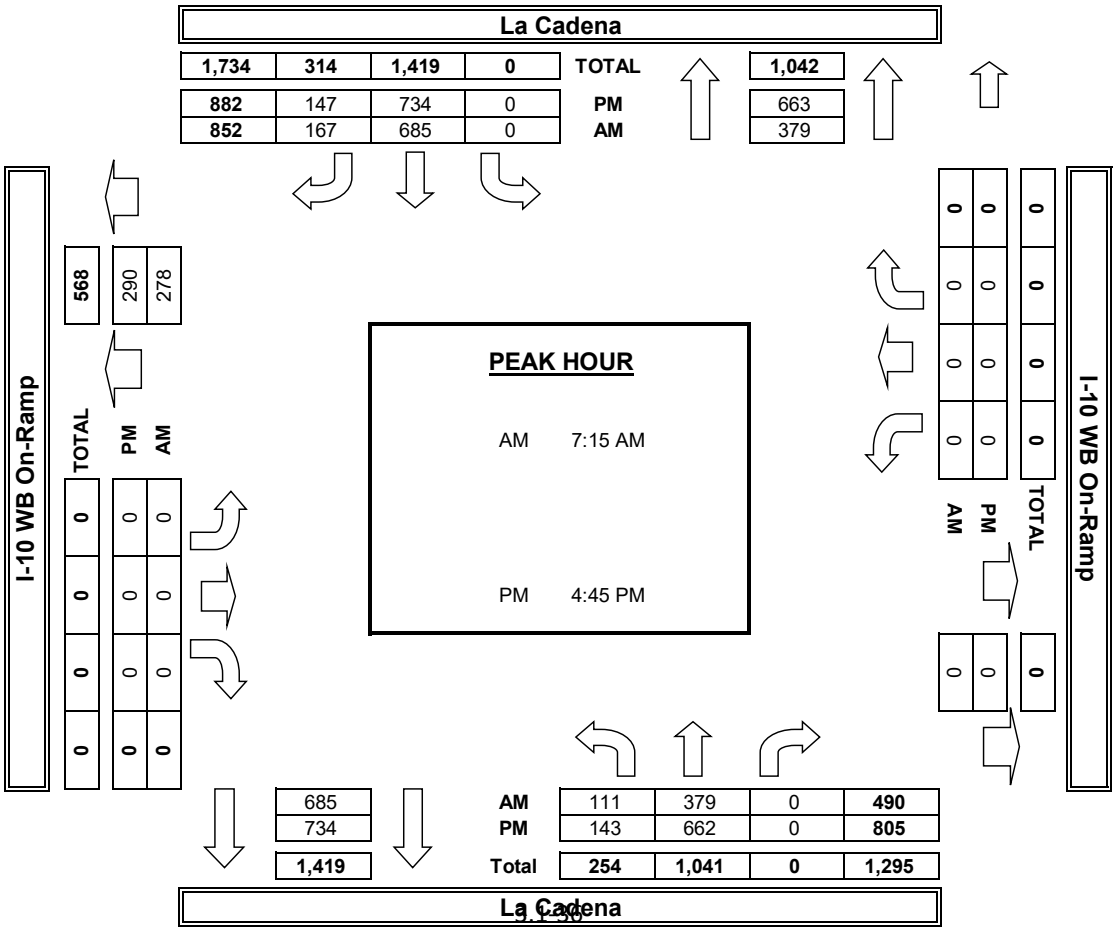


		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	1	2	3	0	0	0	2	2	0	0	1	0	1
	7:15 AM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
	7:30 AM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	7:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1
	8:00 AM	0	0	2	0	2	0	0	2	0	2	0	0	0	0	0
	8:15 AM	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0
	8:30 AM	0	0	1	2	3	0	0	1	2	3	0	0	0	0	0
	8:45 AM	0	0	3	4	7	0	0	3	3	6	0	0	0	1	1
	TOTAL	0	0	11	10	21	0	0	9	9	18	0	0	2	1	3
	AM BEGIN PEAK HR			7:15 AM			0	0	5	0	5					
PM	4:00 PM	0	0	2	1	3	0	0	2	1	3	0	0	0	0	0
	4:15 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
	4:30 PM	0	0	3	6	9	0	0	3	3	6	0	0	0	3	3
	4:45 PM	0	0	1	2	3	0	0	1	2	3	0	0	0	0	0
	5:00 PM	0	0	5	2	7	0	0	5	1	6	0	0	0	1	1
	5:15 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	5:30 PM	0	0	1	1	2	0	0	1	1	2	0	0	0	0	0
	5:45 PM	0	0	1	3	4	0	0	0	2	2	0	0	1	1	2
	TOTAL	0	0	14	16	30	0	0	13	10	23	0	0	1	6	7
	PM BEGIN PEAK HR			4:45 PM			0	0	7	4	11					

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE: Tue, Feb 2, 16

LOCATION: Colton
NORTH & SOUTH: La Cadena
EAST & WEST: Rancho

PROJECT #: SC0841
LOCATION #: 11
CONTROL: STOP E

NOTES:

AM PM MD OTHER OTHER — ▲ N ◄ W E ► S ▼

Add U-Turns to Left Turns

		NORTHBOUND (La Cadena)			SOUTHBOUND (La Cadena)			EASTBOUND (Rancho)			WESTBOUND (Rancho)			
	LANES:	NL 1	NT 2	NR X	SL X	ST 2	SR 0	EL 0	ET X	ER 1	WL X	WT X	WR X	TOTAL
AM	7:00 AM	61	94	0	0	111	1	3	0	82	0	0	0	352
AM	7:15 AM	54	101	0	0	117	0	4	0	91	0	0	0	367
AM	7:30 AM	62	72	0	0	109	0	3	0	112	0	0	0	358
AM	7:45 AM	57	97	0	0	97	1	3	0	107	0	0	0	362
AM	8:00 AM	50	75	0	0	87	2	3	0	90	0	0	0	307
AM	8:15 AM	49	70	0	0	78	2	4	0	93	0	0	0	296
AM	8:30 AM	39	81	0	0	76	2	2	0	92	0	0	0	292
AM	8:45 AM	45	73	0	0	70	3	6	0	62	0	0	0	259
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	417	663	0	0	745	11	28	0	729	0	0	0	2,593
AM	APPROACH %	39%	61%	0%	0%	99%	1%	4%	0%	96%	0%	0%	0%	
AM	APP/DEPART	1,080	/	691	756	/	1,475	757	/	0	0	/	427	0
AM	BEGIN PEAK HR		7:00 AM											
AM	VOLUMES	234	364	0	0	434	2	13	0	392	0	0	0	1,439
AM	APPROACH %	39%	61%	0%	0%	100%	0%	3%	0%	97%	0%	0%	0%	
AM	PEAK HR FACTOR		0.965			0.932			0.880			0.000		0.980
AM	APP/DEPART	598	/	377	436	/	827	405	/	0	0	/	235	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	75	96	0	0	99	1	8	0	105	0	0	0	384
PM	4:15 PM	67	111	0	0	126	5	4	0	107	0	0	0	420
PM	4:30 PM	66	111	0	0	123	0	10	0	125	0	0	0	435
PM	4:45 PM	64	86	0	0	119	1	4	0	118	0	0	0	392
PM	5:00 PM	90	105	0	0	130	2	5	0	102	0	0	0	434
PM	5:15 PM	83	109	0	0	112	1	5	0	99	0	0	0	409
PM	5:30 PM	79	111	0	0	105	0	6	0	115	0	0	0	416
PM	5:45 PM	76	84	0	0	92	0	2	0	100	0	0	0	354
PM	VOLUMES	600	813	0	0	906	10	44	0	871	0	0	0	3,244
PM	APPROACH %	42%	58%	0%	0%	99%	1%	5%	0%	95%	0%	0%	0%	
PM	APP/DEPART	1,413	/	857	916	/	1,777	915	/	0	0	/	610	0
PM	BEGIN PEAK HR		4:15 PM											
PM	VOLUMES	287	413	0	0	498	8	23	0	452	0	0	0	1,681
PM	APPROACH %	41%	59%	0%	0%	98%	2%	5%	0%	95%	0%	0%	0%	
PM	PEAK HR FACTOR		0.897			0.958			0.880			0.000		0.966
PM	APP/DEPART	700	/	436	506	/	950	475	/	0	0	/	295	0

U-TURNS

NB X	SB X	EB X	WB X	TTL
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
1	0	0	0	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

NRR 0	SRR 0	ERR 0	WRR 0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

La Cadena

NORTH SIDE

Rancho WEST SIDE EAST SIDE **Rancho**

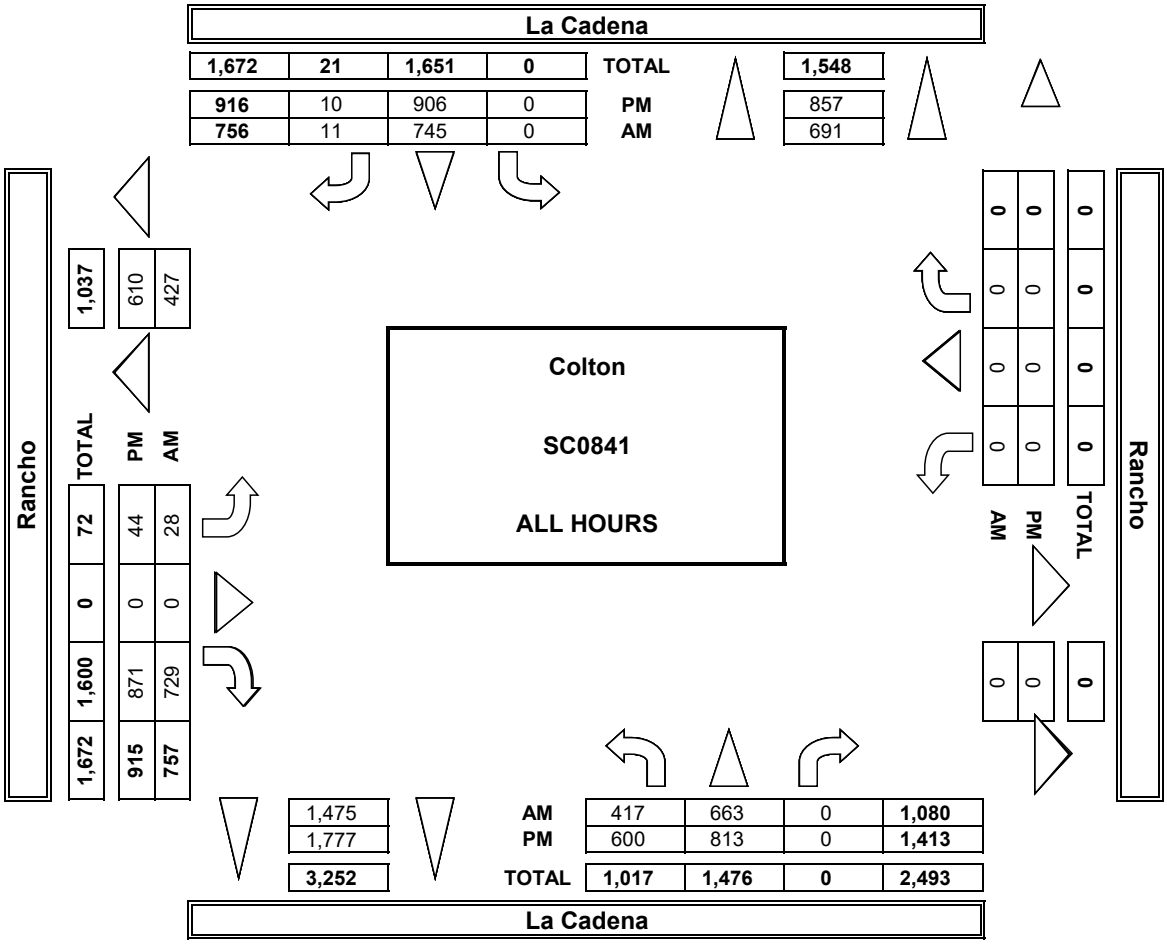
SOUTH SIDE

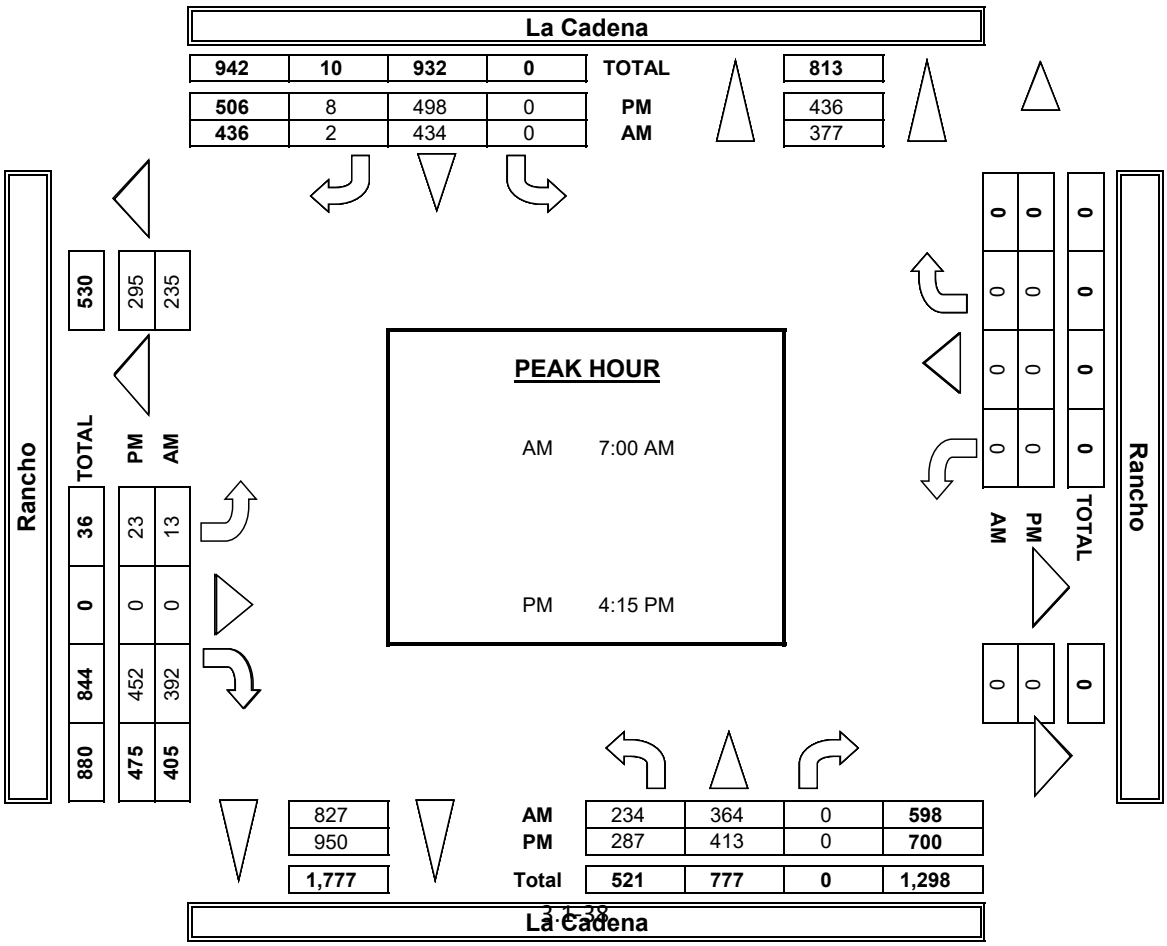
La Cadena

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
7:00 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	1	1	0	0	2	0	0	0	0	0	1	1	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	5	0	0	5	0	1	0	0	1	0	4	0	0	4
8:15 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1
8:30 AM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4
8:45 AM	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	15	0	0	16	0	1	0	0	1	1	1	0	0	2
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	1	2	0	0	3	0	1	0	0	1	1	1	0	0	2
4:45 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2
5:00 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2
5:15 PM	0	4	0	0	4	0	1	0	0	1	0	3	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	10	0	0	11	0	1	0	0	1	1	5	0	0	6

AimTD LLC

TURNING MOVEMENT COUNTS





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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

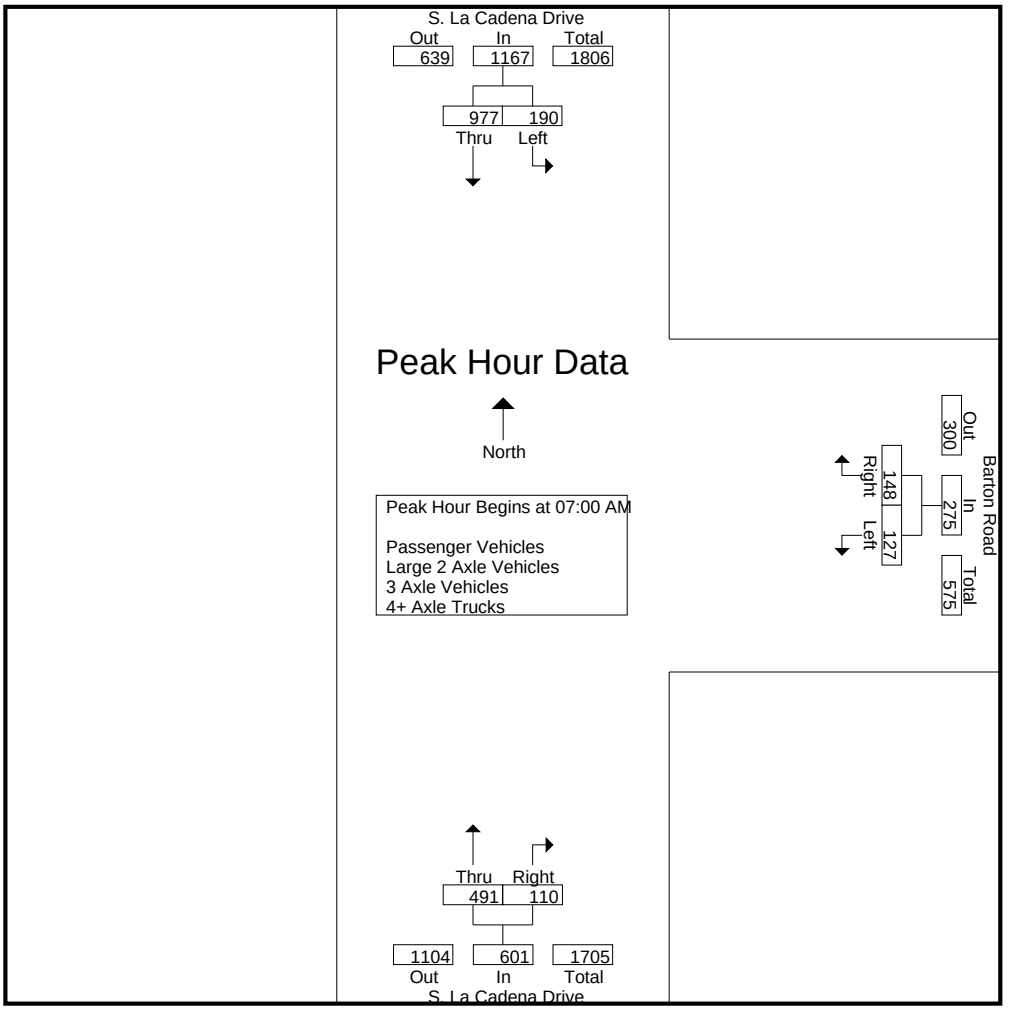
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	40	230	270	29	24	53	142	29	171	494
07:15 AM	65	239	304	29	28	57	118	36	154	515
07:30 AM	42	270	312	37	51	88	120	22	142	542
07:45 AM	43	238	281	32	45	77	111	23	134	492
Total	190	977	1167	127	148	275	491	110	601	2043
08:00 AM	31	201	232	24	33	57	72	25	97	386
08:15 AM	29	171	200	15	29	44	68	22	90	334
08:30 AM	26	126	152	15	23	38	74	18	92	282
08:45 AM	42	116	158	20	24	44	68	18	86	288
Total	128	614	742	74	109	183	282	83	365	1290
Grand Total	318	1591	1909	201	257	458	773	193	966	3333
Apprch %	16.7	83.3		43.9	56.1		80	20		
Total %	9.5	47.7	57.3	6	7.7	13.7	23.2	5.8	29	
Passenger Vehicles	298	1528	1826	182	231	413	735	164	899	3138
% Passenger Vehicles	93.7	96	95.7	90.5	89.9	90.2	95.1	85	93.1	94.1
Large 2 Axle Vehicles	10	38	48	10	10	20	24	14	38	106
% Large 2 Axle Vehicles	3.1	2.4	2.5	5	3.9	4.4	3.1	7.3	3.9	3.2
3 Axle Vehicles	2	10	12	1	5	6	2	4	6	24
% 3 Axle Vehicles	0.6	0.6	0.6	0.5	1.9	1.3	0.3	2.1	0.6	0.7
4+ Axle Trucks	8	15	23	8	11	19	12	11	23	65
% 4+ Axle Trucks	2.5	0.9	1.2	4	4.3	4.1	1.6	5.7	2.4	2

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	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 07:00 AM										
07:00 AM	40	230	270	29	24	53	**142**	29	**171**	494
07:15 AM	**65**	239	304	29	28	57	118	**36**	154	515
07:30 AM	42	**270**	**312**	**37**	**51**	**88**	120	22	142	**542**
07:45 AM	43	238	281	32	45	77	111	23	134	492
Total Volume	190	977	1167	127	148	275	491	110	601	2043
% App. Total	16.3	83.7		46.2	53.8		81.7	18.3		
PHF	.731	.905	.935	.858	.725	.781	.864	.764	.879	.942

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
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			07:15 AM			07:00 AM		
+0 mins.	40	230	270	29	28	57	**142**	29	**171**
+15 mins.	**65**	239	304	**37**	**51**	**88**	118	**36**	154
+30 mins.	42	**270**	**312**	32	45	77	120	22	142
+45 mins.	43	238	281	24	33	57	111	23	134
Total Volume	190	977	1167	122	157	279	491	110	601
% App. Total	16.3	83.7		43.7	56.3		81.7	18.3	
PHF	.731	.905	.935	.824	.770	.793	.864	.764	.879

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

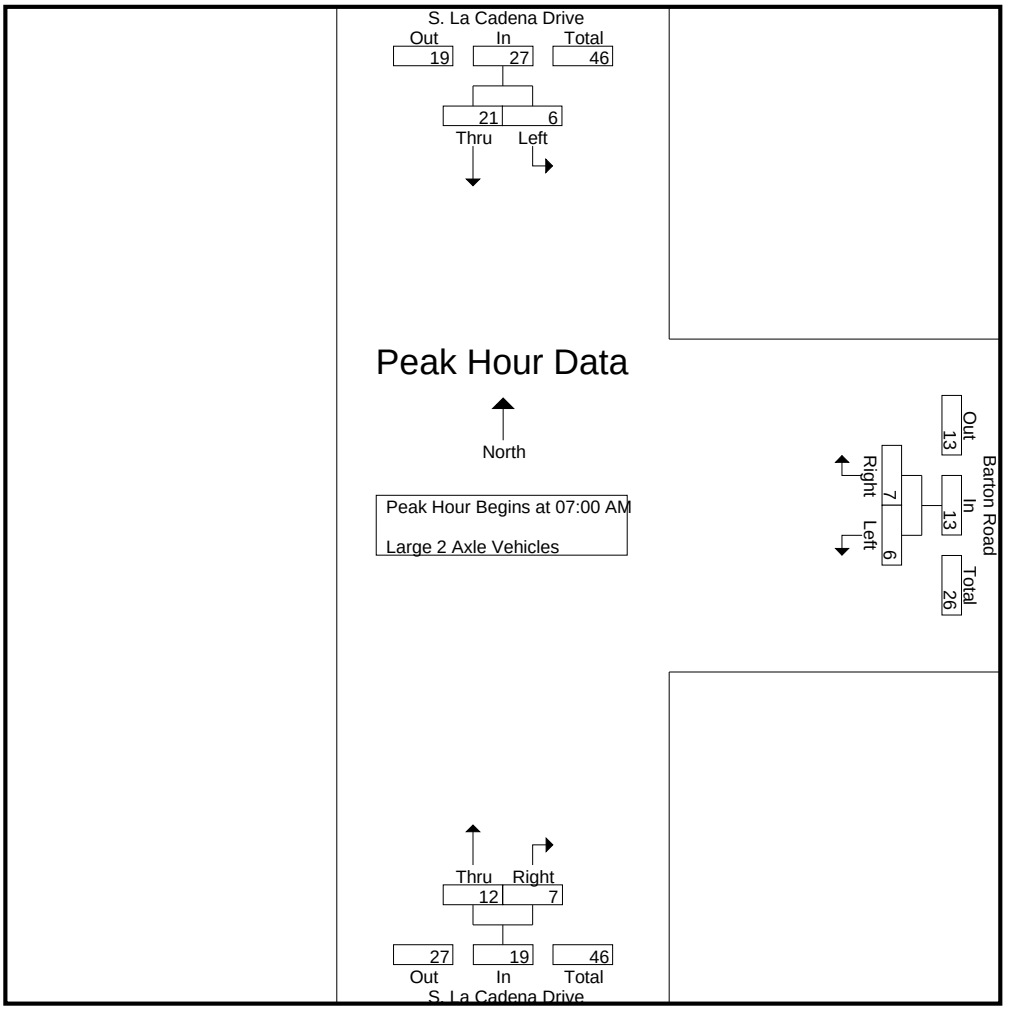
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	2	3	5	4	1	5	3	4	7	17
07:15 AM	0	7	7	1	1	2	3	0	3	12
07:30 AM	0	5	5	1	1	2	3	0	3	10
07:45 AM	4	6	10	0	4	4	3	3	6	20
Total	6	21	27	6	7	13	12	7	19	59
08:00 AM	1	5	6	0	2	2	4	2	6	14
08:15 AM	1	4	5	0	0	0	5	3	8	13
08:30 AM	1	4	5	0	0	0	1	1	2	7
08:45 AM	1	4	5	4	1	5	2	1	3	13
Total	4	17	21	4	3	7	12	7	19	47
Grand Total	10	38	48	10	10	20	24	14	38	106
Apprch %	20.8	79.2		50	50		63.2	36.8		
Total %	9.4	35.8	45.3	9.4	9.4	18.9	22.6	13.2	35.8	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	2	3	5	**4**	1	**5**	**3**	**4**	**7**	17
07:15 AM	0	**7**	7	1	1	2	3	0	3	12
07:30 AM	0	5	5	1	1	2	3	0	3	10
07:45 AM	**4**	6	**10**	0	**4**	4	3	3	6	**20**
Total Volume	6	21	27	6	7	13	12	7	19	59
% App. Total	22.2	77.8		46.2	53.8		63.2	36.8		
PHF	.375	.750	.675	.375	.438	.650	1.00	.438	.679	.738

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



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

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	2	3	5	**4**	1	**5**	**3**	**4**	**7**
+15 mins.	0	**7**	7	1	1	2	3	0	3
+30 mins.	0	5	5	1	1	2	3	0	3
+45 mins.	**4**	6	**10**	0	**4**	4	3	3	6
Total Volume	6	21	27	6	7	13	12	7	19
% App. Total	22.2	77.8		46.2	53.8		63.2	36.8	
PHF	.375	.750	.675	.375	.438	.650	1.000	.438	.679

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

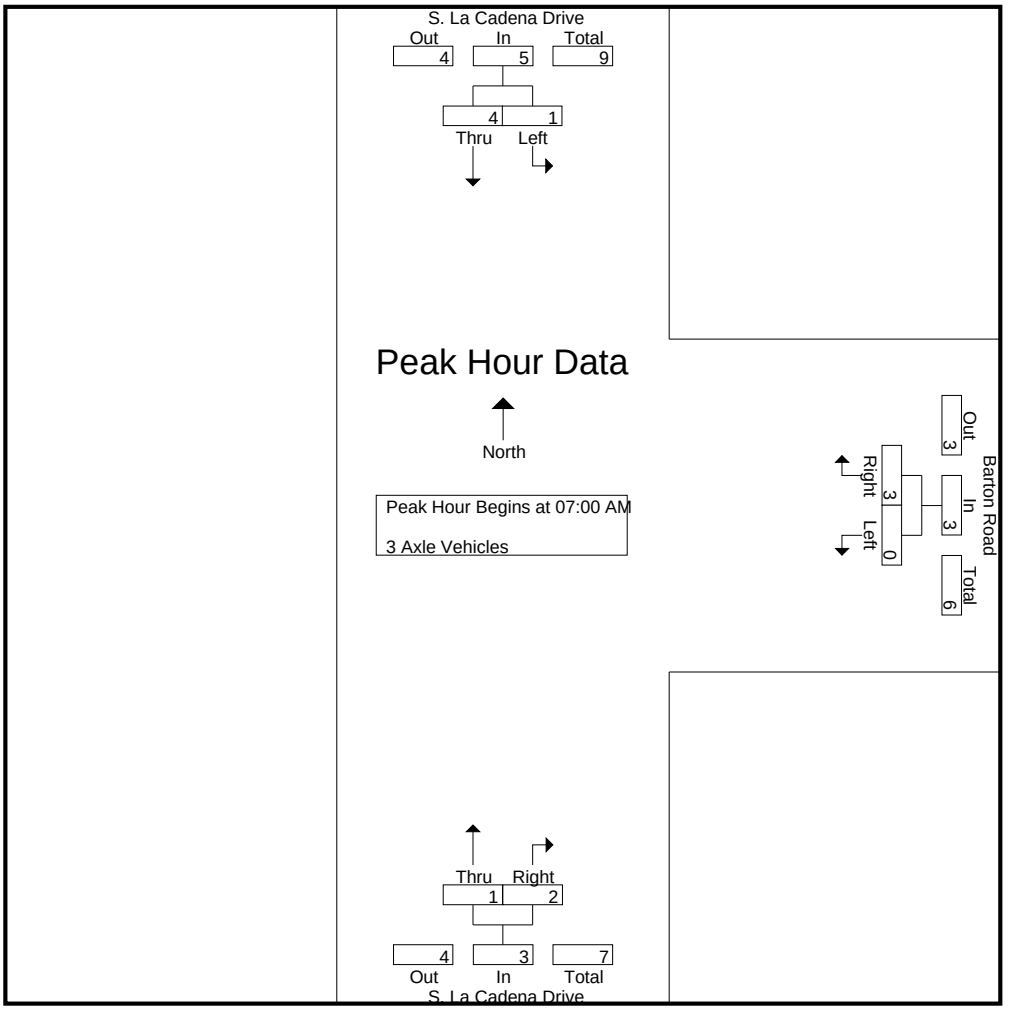
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	1	1	2	0	0	0	0	0	0	2
07:15 AM	0	1	1	0	0	0	1	0	1	2
07:30 AM	0	1	1	0	3	3	0	1	1	5
07:45 AM	0	1	1	0	0	0	0	1	1	2
Total	1	4	5	0	3	3	1	2	3	11
08:00 AM	0	2	2	0	0	0	0	1	1	3
08:15 AM	1	4	5	0	0	0	0	1	1	6
08:30 AM	0	0	0	1	0	1	1	0	1	2
08:45 AM	0	0	0	0	2	2	0	0	0	2
Total	1	6	7	1	2	3	1	2	3	13
Grand Total	2	10	12	1	5	6	2	4	6	24
Apprch %	16.7	83.3		16.7	83.3		33.3	66.7		
Total %	8.3	41.7	50	4.2	20.8	25	8.3	16.7	25	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**1**	**1**	**2**	0	0	0	0	0	0	2
07:15 AM	0	1	1	0	0	0	**1**	0	**1**	2
07:30 AM	0	1	1	0	**3**	**3**	0	**1**	1	**5**
07:45 AM	0	1	1	0	0	0	0	1	1	2
Total Volume	1	4	5	0	3	3	1	2	3	11
% App. Total	20	80		0	100		33.3	66.7		
PHF	.250	1.00	.625	.000	.250	.250	.250	.500	.750	.550

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



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

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	**1**	**1**	**2**	0	0	0	0	0	0
+15 mins.	0	1	1	0	0	0	**1**	0	**1**
+30 mins.	0	1	1	0	**3**	**3**	0	**1**	1
+45 mins.	0	1	1	0	0	0	0	1	1
Total Volume	1	4	5	0	3	3	1	2	3
% App. Total	20	80		0	100		33.3	66.7	
PHF	.250	1.000	.625	.000	.250	.250	.250	.500	.750

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

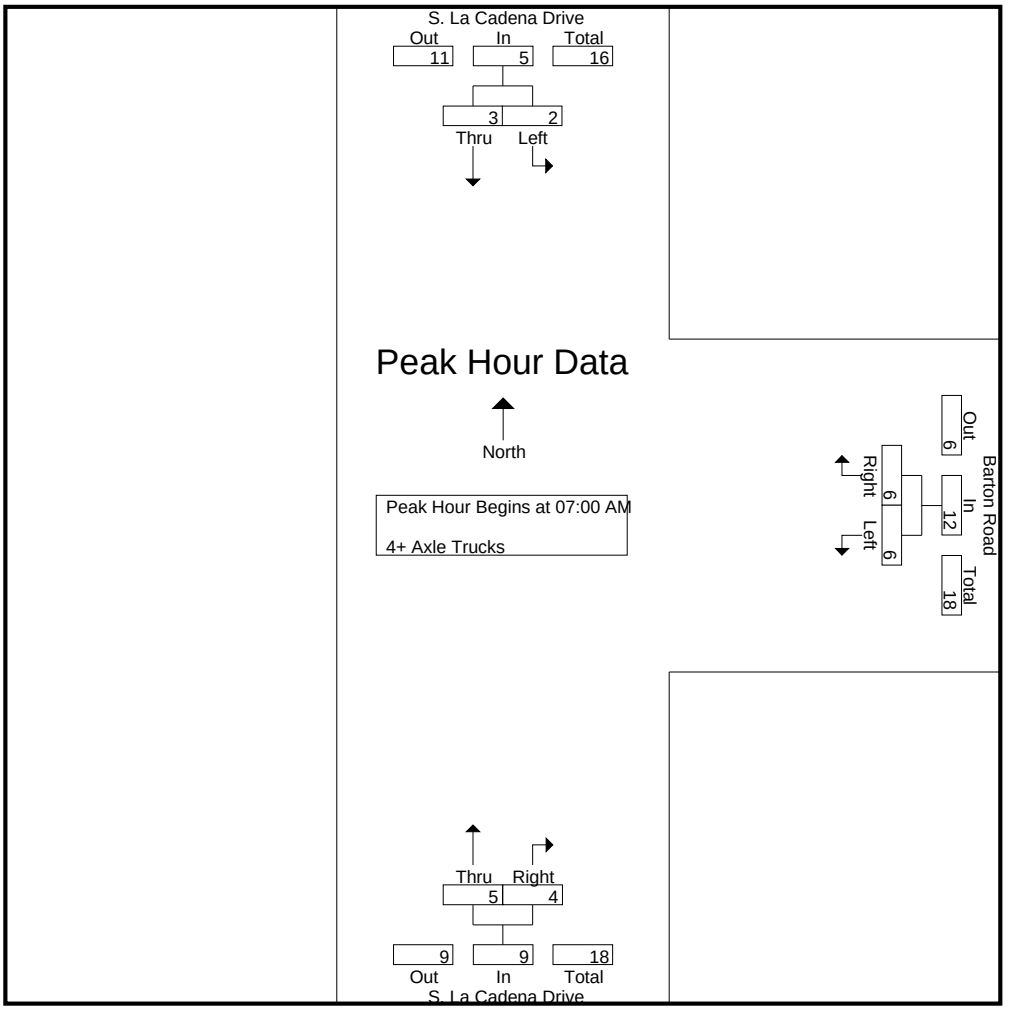
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	1	1	1	2	3	4
07:15 AM	0	1	1	1	2	3	2	1	3	7
07:30 AM	1	0	1	3	2	5	1	0	1	7
07:45 AM	1	2	3	2	1	3	1	1	2	8
Total	2	3	5	6	6	12	5	4	9	26
08:00 AM	3	3	6	0	2	2	0	1	1	9
08:15 AM	1	5	6	0	0	0	1	2	3	9
08:30 AM	0	2	2	0	2	2	2	3	5	9
08:45 AM	2	2	4	2	1	3	4	1	5	12
Total	6	12	18	2	5	7	7	7	14	39
Grand Total	8	15	23	8	11	19	12	11	23	65
Apprch %	34.8	65.2		42.1	57.9		52.2	47.8		
Total %	12.3	23.1	35.4	12.3	16.9	29.2	18.5	16.9	35.4	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	0	0	0	1	1	1	**2**	**3**	4
07:15 AM	0	1	1	1	**2**	3	**2**	1	3	7
07:30 AM	**1**	0	1	**3**	2	**5**	1	0	1	7
07:45 AM	1	**2**	**3**	2	1	3	1	1	2	**8**
Total Volume	2	3	5	6	6	12	5	4	9	26
% App. Total	40	60		50	50		55.6	44.4		
PHF	.500	.375	.417	.500	.750	.600	.625	.500	.750	.813

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_AM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



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

	07:00 AM			07:00 AM			07:00 AM		
+0 mins.	0	0	0	0	1	1	1	**2**	**3**
+15 mins.	0	1	1	1	**2**	3	**2**	1	3
+30 mins.	**1**	0	1	**3**	2	**5**	1	0	1
+45 mins.	1	**2**	**3**	2	1	3	1	1	2
Total Volume	2	3	5	6	6	12	5	4	9
% App. Total	40	60		50	50		55.6	44.4	
PHF	.500	.375	.417	.500	.750	.600	.625	.500	.750

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

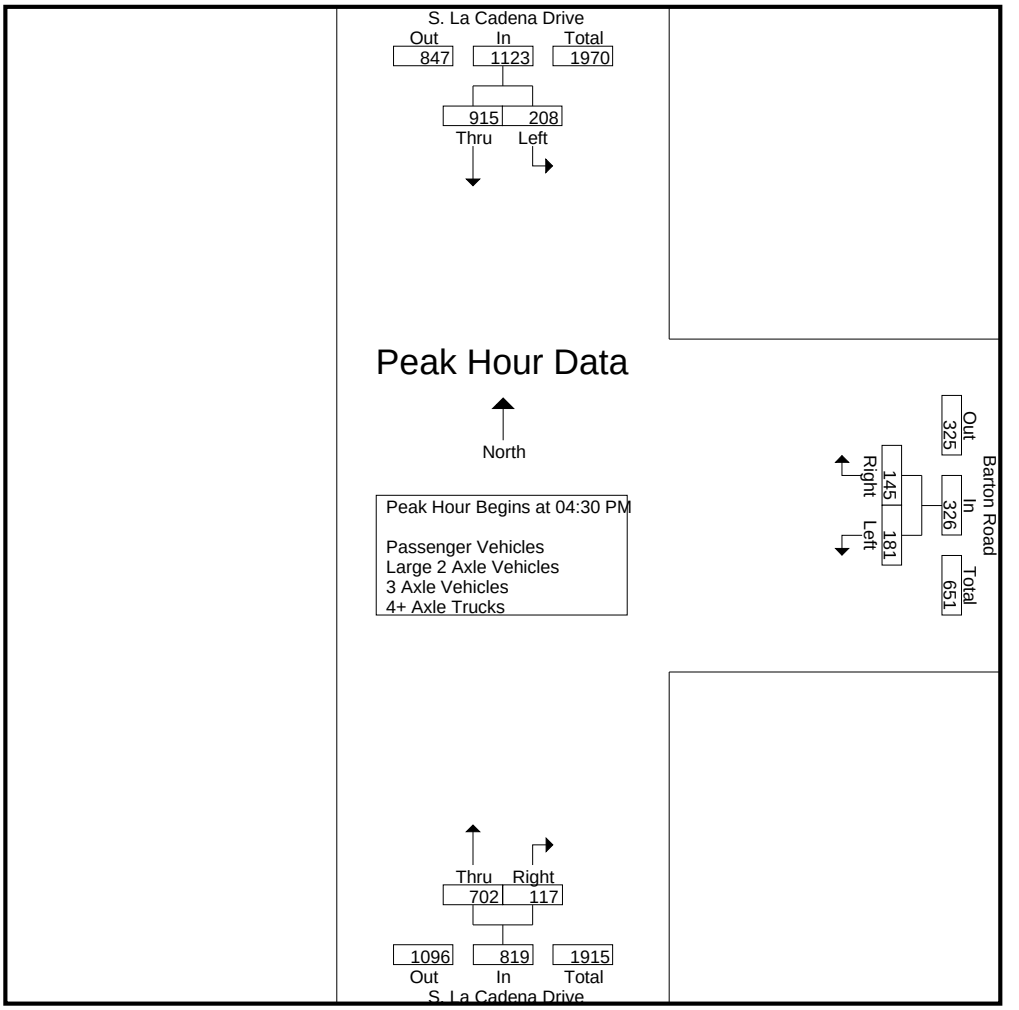
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	40	204	244	47	42	89	190	37	227	560
04:15 PM	56	201	257	47	38	85	147	33	180	522
04:30 PM	51	218	269	53	27	80	173	19	192	541
04:45 PM	58	228	286	33	44	77	184	36	220	583
Total	205	851	1056	180	151	331	694	125	819	2206
05:00 PM	52	239	291	43	43	86	167	24	191	568
05:15 PM	47	230	277	52	31	83	178	38	216	576
05:30 PM	65	224	289	42	27	69	151	25	176	534
05:45 PM	62	180	242	45	25	70	152	31	183	495
Total	226	873	1099	182	126	308	648	118	766	2173
Grand Total	431	1724	2155	362	277	639	1342	243	1585	4379
Apprch %	20	80		56.7	43.3		84.7	15.3		
Total %	9.8	39.4	49.2	8.3	6.3	14.6	30.6	5.5	36.2	
Passenger Vehicles	418	1686	2104	356	265	621	1305	222	1527	4252
% Passenger Vehicles	97	97.8	97.6	98.3	95.7	97.2	97.2	91.4	96.3	97.1
Large 2 Axle Vehicles	8	30	38	2	7	9	28	14	42	89
% Large 2 Axle Vehicles	1.9	1.7	1.8	0.6	2.5	1.4	2.1	5.8	2.6	2
3 Axle Vehicles	1	2	3	1	1	2	0	1	1	6
% 3 Axle Vehicles	0.2	0.1	0.1	0.3	0.4	0.3	0	0.4	0.1	0.1
4+ Axle Trucks	4	6	10	3	4	7	9	6	15	32
% 4+ Axle Trucks	0.9	0.3	0.5	0.8	1.4	1.1	0.7	2.5	0.9	0.7

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	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	51	218	269	**53**	27	80	173	19	192	541
04:45 PM	**58**	228	286	33	**44**	77	**184**	36	**220**	**583**
05:00 PM	52	**239**	**291**	43	43	**86**	167	24	191	568
05:15 PM	47	230	277	52	31	83	178	**38**	216	576
Total Volume	208	915	1123	181	145	326	702	117	819	2268
% App. Total	18.5	81.5		55.5	44.5		85.7	14.3		
PHF	.897	.957	.965	.854	.824	.948	.954	.770	.931	.973

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
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:

	04:45 PM			04:00 PM			04:00 PM		
+0 mins.	58	228	286	47	42	**89**	**190**	**37**	**227**
+15 mins.	52	**239**	**291**	47	38	85	147	33	180
+30 mins.	47	230	277	**53**	27	80	173	19	192
+45 mins.	**65**	224	289	33	**44**	77	184	36	220
Total Volume	222	921	1143	180	151	331	694	125	819
% App. Total	19.4	80.6		54.4	45.6		84.7	15.3	
PHF	.854	.963	.982	.849	.858	.930	.913	.845	.902

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

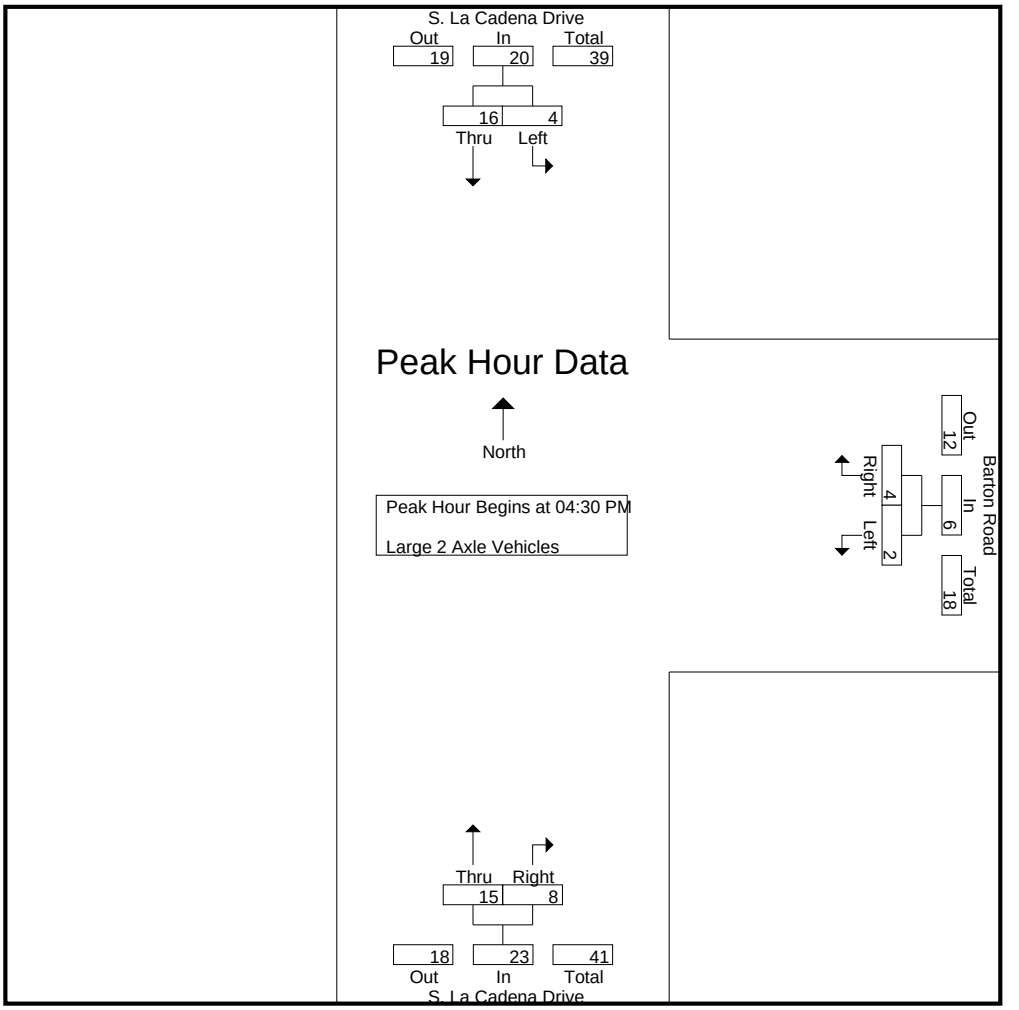
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	2	4	6	0	2	2	5	4	9	17
04:15 PM	1	4	5	0	0	0	5	2	7	12
04:30 PM	1	7	8	1	1	2	5	0	5	15
04:45 PM	1	4	5	0	0	0	5	6	11	16
Total	5	19	24	1	3	4	20	12	32	60
05:00 PM	2	4	6	1	1	2	3	1	4	12
05:15 PM	0	1	1	0	2	2	2	1	3	6
05:30 PM	0	4	4	0	0	0	1	0	1	5
05:45 PM	1	2	3	0	1	1	2	0	2	6
Total	3	11	14	1	4	5	8	2	10	29
Grand Total	8	30	38	2	7	9	28	14	42	89
Apprch %	21.1	78.9		22.2	77.8		66.7	33.3		
Total %	9	33.7	42.7	2.2	7.9	10.1	31.5	15.7	47.2	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	1	**7**	**8**	**1**	1	**2**	**5**	0	5	15
04:45 PM	1	4	5	0	0	0	5	**6**	**11**	**16**
05:00 PM	**2**	4	6	1	1	2	3	1	4	12
05:15 PM	0	1	1	0	**2**	2	2	1	3	6
Total Volume	4	16	20	2	4	6	15	8	23	49
% App. Total	20	80		33.3	66.7		65.2	34.8		
PHF	.500	.571	.625	.500	.500	.750	.750	.333	.523	.766

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	1	**7**	**8**	**1**	1	**2**	**5**	0	5
+15 mins.	1	4	5	0	0	0	5	**6**	**11**
+30 mins.	**2**	4	6	1	1	2	3	1	4
+45 mins.	0	1	1	0	**2**	2	2	1	3
Total Volume	4	16	20	2	4	6	15	8	23
% App. Total	20	80		33.3	66.7		65.2	34.8	
PHF	.500	.571	.625	.500	.500	.750	.750	.333	.523

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

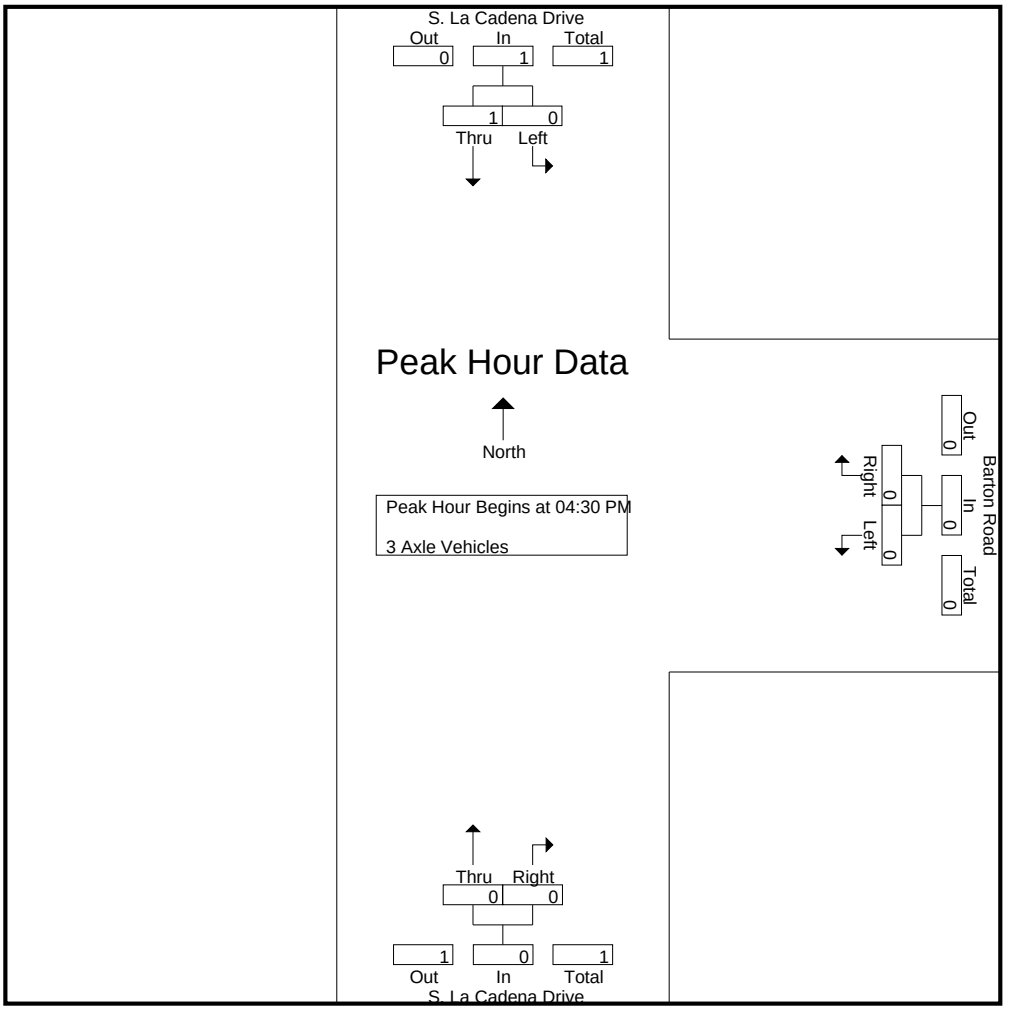
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	1	0	1	0	0	0	1
04:15 PM	1	1	2	0	1	1	0	1	1	4
04:30 PM	0	1	1	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	0	0	0
Total	1	2	3	1	1	2	0	1	1	6
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0
Grand Total	1	2	3	1	1	2	0	1	1	6
Apprch %	33.3	66.7		50	50		0	100		
Total %	16.7	33.3	50	16.7	16.7	33.3	0	16.7	16.7	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	0	**1**	**1**	0	0	0	0	0	0	**1**
04:45 PM	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	0	0	0	0	0	0	1
% App. Total	0	100		0	0		0	0		
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000	.250

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	0	**1**	**1**	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0
Total Volume	0	1	1	0	0	0	0	0	0
% App. Total	0	100		0	0		0	0	
PHF	.000	.250	.250	.000	.000	.000	.000	.000	.000

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

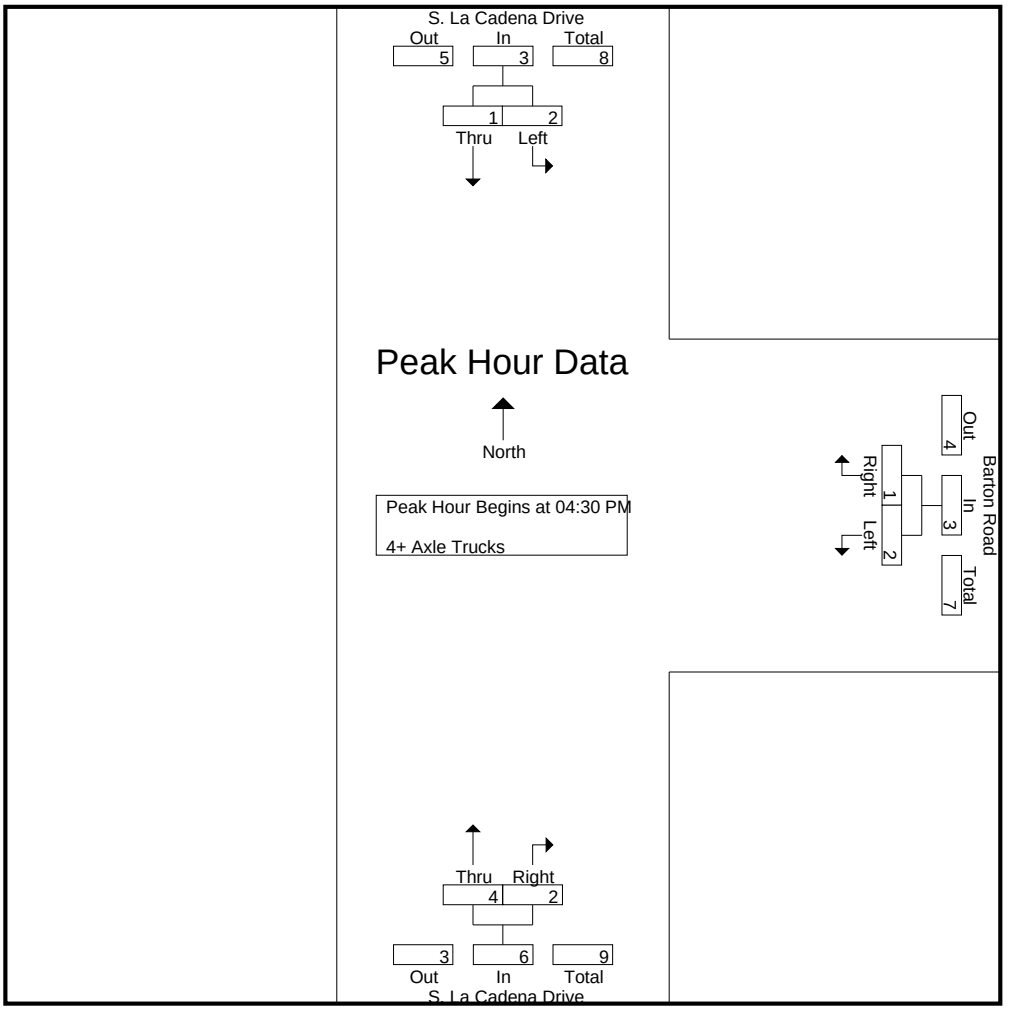
	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	0	3	3	1	0	1	2	1	3	7
04:15 PM	0	2	2	0	1	1	3	0	3	6
04:30 PM	1	0	1	1	0	1	1	0	1	3
04:45 PM	0	0	0	0	0	0	0	2	2	2
Total	1	5	6	2	1	3	6	3	9	18
05:00 PM	0	1	1	0	0	0	3	0	3	4
05:15 PM	1	0	1	1	1	2	0	0	0	3
05:30 PM	1	0	1	0	0	0	0	1	1	2
05:45 PM	1	0	1	0	2	2	0	2	2	5
Total	3	1	4	1	3	4	3	3	6	14
Grand Total	4	6	10	3	4	7	9	6	15	32
Apprch %	40	60		42.9	57.1		60	40		
Total %	12.5	18.8	31.2	9.4	12.5	21.9	28.1	18.8	46.9	

	S. La Cadena Drive Southbound			Barton Road Westbound			S. La Cadena Drive Northbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	**1**	0	**1**	**1**	0	1	1	0	1	3
04:45 PM	0	0	0	0	0	0	0	**2**	2	2
05:00 PM	0	**1**	1	0	0	0	**3**	0	**3**	**4**
05:15 PM	1	0	1	1	**1**	**2**	0	0	0	3
Total Volume	2	1	3	2	1	3	4	2	6	12
% App. Total	66.7	33.3		66.7	33.3		66.7	33.3		
PHF	.500	.250	.750	.500	.250	.375	.333	.250	.500	.750

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

City of Grand Terrace
N/S: S. La Cadena Drive
E/W: Barton Road
Weather: Clear

File Name : 01_GTC_La Cadena_Barton_PM
Site Code : 999-1939
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM			04:30 PM			04:30 PM		
+0 mins.	**1**	0	**1**	**1**	0	1	1	0	1
+15 mins.	0	0	0	0	0	0	0	**2**	2
+30 mins.	0	**1**	1	0	0	0	**3**	0	**3**
+45 mins.	1	0	1	1	**1**	**2**	0	0	0
Total Volume	2	1	3	2	1	3	4	2	6
% App. Total	66.7	33.3		66.7	33.3		66.7	33.3	
PHF	.500	.250	.750	.500	.250	.375	.333	.250	.500

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Dec 12, 18

LOCATION: Colton
NORTH & SOUTH: Iowa
EAST & WEST: La Cadena

PROJECT #: SC
LOCATION #: 5
CONTROL: SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N / ◄ W / E ► / S ▼

Add U-Turns to Left Turns

	NORTHBOUND (Iowa)			SOUTHBOUND (Iowa)			EASTBOUND (La Cadena)			WESTBOUND (La Cadena)			
LANES:	NL 1	NT 1	NR X	SL X	ST 1	SR 2	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL
7:00 AM	14	134	0	0	127	171	27	0	31	0	0	0	504
7:15 AM	18	142	0	0	102	187	19	0	20	0	0	0	488
7:30 AM	22	92	0	0	116	223	20	0	22	0	0	0	495
7:45 AM	12	101	0	0	105	197	32	0	15	0	0	0	462
8:00 AM	16	85	0	0	75	164	14	0	13	0	0	0	367
8:15 AM	26	82	0	0	48	124	14	0	10	0	0	0	304
8:30 AM	7	63	0	0	37	115	15	0	21	0	0	0	258
8:45 AM	17	70	0	0	45	113	18	0	21	0	0	0	284
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	132	769	0	0	655	1,294	159	0	153	0	0	0	3,162
APPROACH %	15%	85%	0%	0%	34%	66%	51%	0%	49%	0%	0%	0%	
APP/DEPART	901	/	928	1,949	/	809	312	/	0	0	/	1,425	0
BEGIN PEAK HR		7:00 AM											
VOLUMES	66	469	0	0	450	778	98	0	88	0	0	0	1,949
APPROACH %	12%	88%	0%	0%	37%	63%	53%	0%	47%	0%	0%	0%	
PEAK HR FACTOR		0.836			0.906			0.802			0.000		0.967
APP/DEPART	535	/	567	1,228	/	538	186	/	0	0	/	844	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	10	175	0	0	85	241	63	0	29	0	0	0	603
4:15 PM	20	130	0	0	68	197	46	0	26	0	0	0	487
4:30 PM	18	156	0	0	65	197	69	0	42	0	0	0	547
4:45 PM	19	149	0	0	70	198	73	0	37	0	0	0	546
5:00 PM	19	140	0	0	66	229	80	0	45	0	0	0	579
5:15 PM	11	147	0	0	84	202	85	0	26	0	0	0	555
5:30 PM	10	147	0	0	77	168	77	0	21	0	0	0	500
5:45 PM	16	130	0	0	83	226	65	0	16	0	0	0	536
VOLUMES	123	1,174	0	0	598	1,658	558	0	242	0	0	0	4,353
APPROACH %	9%	91%	0%	0%	27%	73%	70%	0%	30%	0%	0%	0%	
APP/DEPART	1,297	/	1,732	2,256	/	840	800	/	0	0	/	1,781	0
BEGIN PEAK HR		4:30 PM											
VOLUMES	67	592	0	0	285	826	307	0	150	0	0	0	2,227
APPROACH %	10%	90%	0%	0%	26%	74%	67%	0%	33%	0%	0%	0%	
PEAK HR FACTOR		0.947			0.942			0.914			0.000		0.962
APP/DEPART	659	/	899	1,111	/	435	457	/	0	0	/	893	0

U-TURNS

	NB	SB	EB	WB	TTL
	0	0	0	0	
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	1	0	0	0	1
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
	1	0	0	0	1
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
	0	0	0	0	0

Iowa

NORTH SIDE

La Cadena WEST SIDE EAST SIDE **La Cadena**

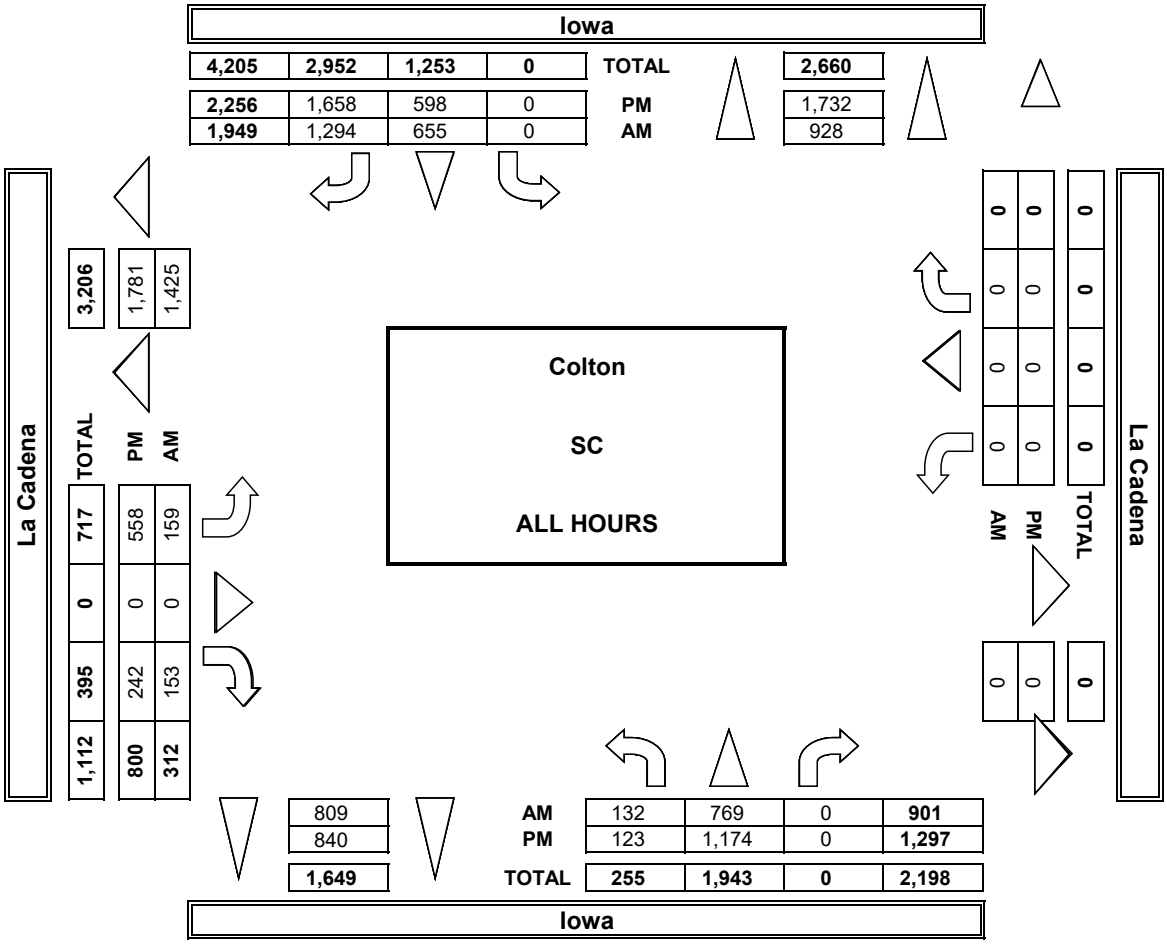
SOUTH SIDE

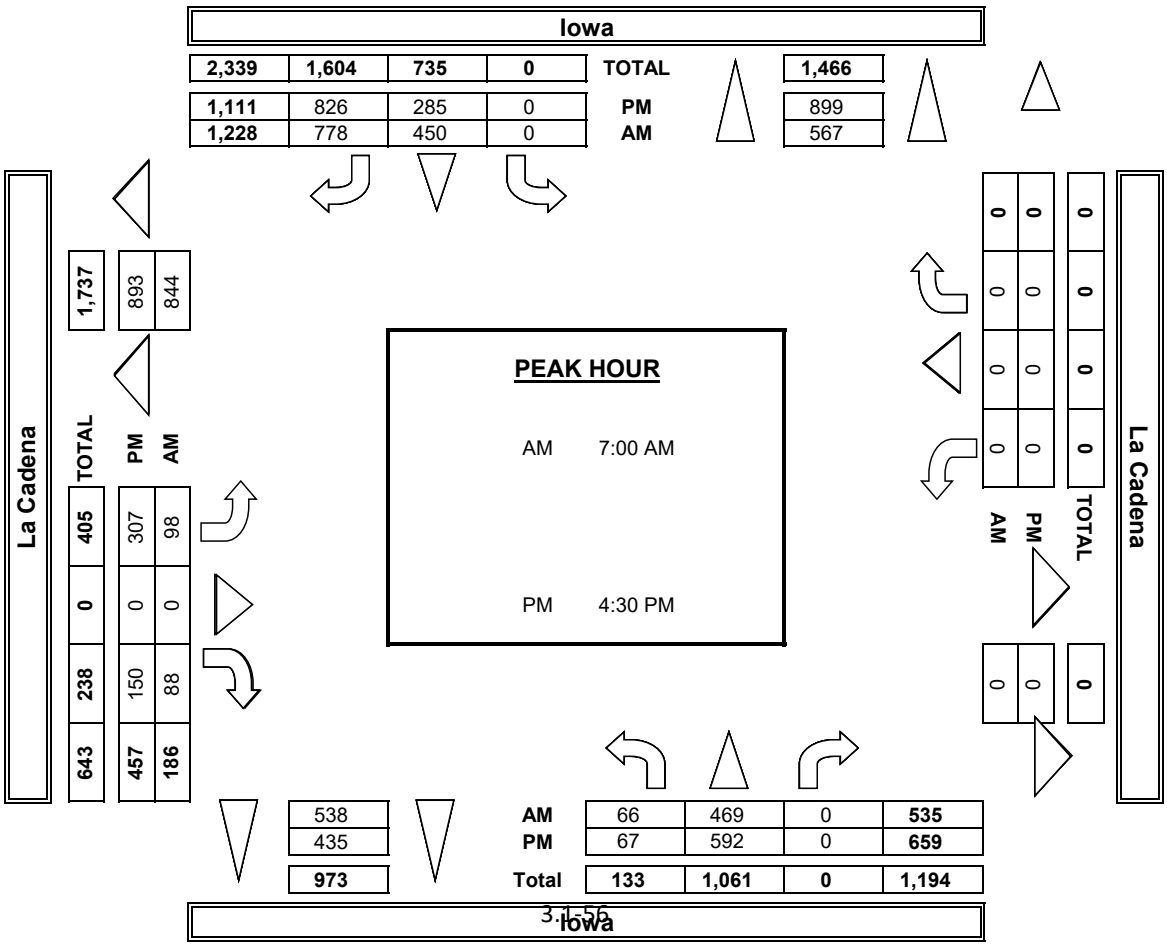
Iowa

	ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

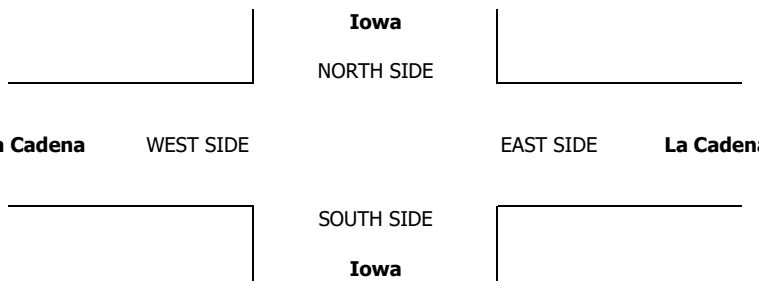
PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	5
WEDNESDAY	EAST & WEST:	La Cadena	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS	NOTES:	AM / PM / MD / OTHER / OTHER	▲ N / ◄ W / E ► / S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND La Cadena			WESTBOUND La Cadena			
	LANES:	NL 1	NT 1	NR X	SL X	ST 1	SR 2	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL
AM	7:00 AM	2	6	0	0	4	7	1	0	3	0	0	0	23
	7:15 AM	3	9	0	0	5	14	1	0	5	0	0	0	37
	7:30 AM	2	6	0	0	7	12	1	0	4	0	0	0	32
	7:45 AM	5	11	0	0	6	8	1	0	2	0	0	0	33
	8:00 AM	2	9	0	0	6	6	2	0	2	0	0	0	27
	8:15 AM	7	7	0	0	4	9	2	0	3	0	0	0	32
	8:30 AM	1	8	0	0	3	12	2	0	4	0	0	0	30
	8:45 AM	5	10	0	0	4	8	2	0	2	0	0	0	31
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	27	66	0	0	39	76	12	0	25	0	0	0	245
	APPROACH %	29%	71%	0%	0%	34%	66%	32%	0%	68%	0%	0%	0%	
	APP/DEPART	93	/	78	115	/	64	37	/	0	0	/	103	0
	BEGIN PEAK HR		7:15 AM											
	VOLUMES	12	35	0	0	24	40	5	0	13	0	0	0	129
	APPROACH %	26%	74%	0%	0%	38%	63%	28%	0%	72%	0%	0%	0%	
	PEAK HR FACTOR		0.734			0.842			0.750			0.000		0.872
	APP/DEPART	47	/	40	64	/	37	18	/	0	0	/	52	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	3	13	0	0	5	9	4	0	1	0	0	0	35
	4:15 PM	3	8	0	0	4	7	1	0	2	0	0	0	25
	4:30 PM	3	11	0	0	6	11	4	0	2	0	0	0	37
	4:45 PM	4	8	0	0	5	9	3	0	2	0	0	0	31
	5:00 PM	2	7	0	0	4	12	1	0	1	0	0	0	27
	5:15 PM	3	7	0	0	4	7	4	0	2	0	0	0	27
	5:30 PM	2	9	0	0	3	5	4	0	1	0	0	0	24
	5:45 PM	3	7	0	0	6	6	3	0	1	0	0	0	26
	VOLUMES	23	70	0	0	37	66	24	0	12	0	0	0	232
	APPROACH %	25%	75%	0%	0%	36%	64%	67%	0%	33%	0%	0%	0%	
	APP/DEPART	93	/	94	103	/	49	36	/	0	0	/	89	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	13	40	0	0	20	36	12	0	7	0	0	0	128
	APPROACH %	25%	75%	0%	0%	36%	64%	63%	0%	37%	0%	0%	0%	
	PEAK HR FACTOR		0.828			0.824			0.792			0.000		0.865
	APP/DEPART	53	/	52	56	/	27	19	/	0	0	/	49	0

U-TURNS					
	NB	SB	EB	WB	TTL
AM	0	0	0	0	0
PM	0	0	0	0	0



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	5
WEDNESDAY	EAST & WEST:	La Cadena	CONTROL:	SIGNAL

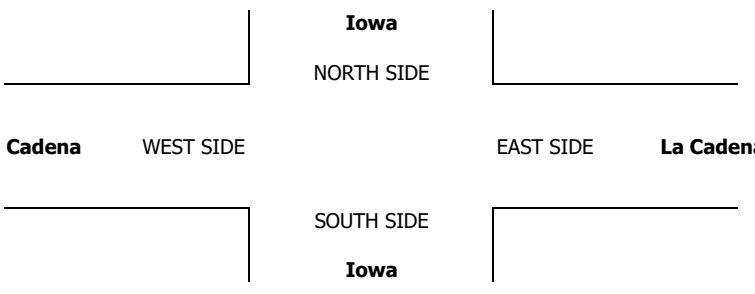
CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER

▲ N ◄ W E ► S ▼

	NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND La Cadena			WESTBOUND La Cadena				U-TURNS				
LANES:	NL 1	NT 1	NR X	SL X	ST 1	SR 2	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL	NB	SB	EB	WB	TTL
7:00 AM	1	0	0	0	0	1	1	0	0	0	0	0	3	0	0	0	0	0
7:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
7:30 AM	2	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0
7:45 AM	0	2	0	0	0	1	1	0	0	0	0	0	4	0	0	0	0	0
8:00 AM	1	2	0	0	0	3	0	0	0	0	0	0	6	0	0	0	0	0
8:15 AM	0	0	0	0	2	1	1	0	0	0	0	0	4	0	0	0	0	0
8:30 AM	1	0	0	0	2	1	1	0	0	0	0	0	5	0	0	0	0	0
8:45 AM	0	4	0	0	2	2	1	0	1	0	0	0	10	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	5	8	0	0	7	9	6	0	1	0	0	0	36	0	0	0	0	0
APPROACH %	38%	62%	0%	0%	44%	56%	86%	0%	14%	0%	0%	0%						
APP/DEPART	13	/	14	16	/	8	7	/	0	0	/	14	0					
BEGIN PEAK HR		8:00 AM																
VOLUMES	2	6	0	0	6	7	3	0	1	0	0	0	25					
APPROACH %	25%	75%	0%	0%	46%	54%	75%	0%	25%	0%	0%	0%						
PEAK HR FACTOR		0.500			0.813			0.500			0.000		0.625					
APP/DEPART	8	/	9	13	/	7	4	/	0	0	/	9	0					
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	4	0	0	3	1	0	0	0	0	0	0	9	0	0	0	0	0
4:15 PM	0	0	0	0	0	2	0	0	1	0	0	0	3	0	0	0	0	0
4:30 PM	0	1	0	0	2	5	1	0	0	0	0	0	9	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
5:00 PM	0	0	0	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0
5:15 PM	0	1	0	0	0	3	3	0	1	0	0	0	8	0	0	0	0	0
5:30 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
VOLUMES	1	8	0	0	5	13	5	0	2	0	0	0	34	0	0	0	0	0
APPROACH %	11%	89%	0%	0%	28%	72%	71%	0%	29%	0%	0%	0%						
APP/DEPART	9	/	13	18	/	7	7	/	0	0	/	14	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	1	5	0	0	5	9	1	0	1	0	0	0	22					
APPROACH %	17%	83%	0%	0%	36%	64%	50%	0%	50%	0%	0%	0%						
PEAK HR FACTOR		0.300			0.500			0.500			0.000		0.611					
APP/DEPART	6	/	6	14	/	6	2	/	0	0	/	10	0					



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	5
WEDNESDAY	EAST & WEST:	La Cadena	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND La Cadena			WESTBOUND La Cadena			
LANES:	NL 1	NT 1	NR X	SL X	ST 1	SR 2	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL
7:00 AM	0	4	0	0	2	6	0	0	2	0	0	0	14
7:15 AM	0	7	0	0	2	4	0	0	1	0	0	0	14
7:30 AM	1	3	0	0	1	2	0	0	0	0	0	0	7
7:45 AM	0	0	0	0	1	4	0	0	0	0	0	0	5
8:00 AM	1	4	0	0	6	6	1	0	0	0	0	0	18
8:15 AM	0	5	0	0	0	1	0	0	0	0	0	0	6
8:30 AM	1	7	0	0	1	2	2	0	1	0	0	0	14
8:45 AM	0	8	0	0	3	2	0	0	0	0	0	0	13
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	3	38	0	0	16	27	3	0	4	0	0	0	91
APPROACH %	7%	93%	0%	0%	37%	63%	43%	0%	57%	0%	0%	0%	
APP/DEPART	41	/	41	43	/	20	7	/	0	0	/	30	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	2	24	0	0	10	11	3	0	1	0	0	0	51
APPROACH %	8%	92%	0%	0%	48%	52%	75%	0%	25%	0%	0%	0%	
PEAK HR FACTOR		0.813			0.438			0.333			0.000		0.708
APP/DEPART	26	/	27	21	/	11	4	/	0	0	/	13	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
4:15 PM	0	2	0	0	1	4	0	0	0	0	0	0	7
4:30 PM	0	3	0	0	1	1	0	0	1	0	0	0	6
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
5:00 PM	0	1	0	0	1	1	0	0	1	0	0	0	4
5:15 PM	0	3	0	0	1	2	0	0	0	0	0	0	6
5:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
5:45 PM	0	3	0	0	3	2	0	0	0	0	0	0	8
VOLUMES	0	13	0	0	8	12	0	0	2	0	0	0	35
APPROACH %	0%	100%	0%	0%	40%	60%	0%	0%	100%	0%	0%	0%	
APP/DEPART	13	/	13	20	/	10	2	/	0	0	/	12	0
BEGIN PEAK HR		5:00 PM											
VOLUMES	0	8	0	0	6	5	0	0	1	0	0	0	20
APPROACH %	0%	100%	0%	0%	55%	45%	0%	0%	100%	0%	0%	0%	
PEAK HR FACTOR		0.667			0.550			0.250			0.000		0.625
APP/DEPART	8	/	8	11	/	7	1	/	0	0	/	5	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Dec 12, 18

LOCATION: Colton
NORTH & SOUTH: Iowa
EAST & WEST: I-215 Ramp

PROJECT #: SC
LOCATION #: 8
CONTROL: SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

		NORTHBOUND (Iowa)			SOUTHBOUND (Iowa)			EASTBOUND (I-215 Ramp)			WESTBOUND (I-215 Ramp)				U-TURNS				
	LANES:	NL X	NT 1	NR X	SL X	ST 1	SR X	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL	NB 0	SB 0	EB 0	WB 0	TTL
AM	7:00 AM	0	154	0	0	154	0	7	0	106	0	0	0	421	0	0	0	0	0
	7:15 AM	0	153	0	0	111	0	4	0	134	0	0	0	402	0	0	0	0	0
	7:30 AM	0	104	0	0	154	0	7	0	114	0	0	0	379	0	0	0	0	0
	7:45 AM	0	99	0	0	118	0	7	0	134	0	0	0	358	0	0	0	0	0
	8:00 AM	0	88	0	0	83	0	9	0	121	0	0	0	301	0	0	0	0	0
	8:15 AM	0	97	0	0	52	0	10	0	111	0	0	0	270	0	0	0	0	0
	8:30 AM	0	62	0	0	62	0	4	0	67	0	0	0	195	0	0	0	0	0
	8:45 AM	0	91	0	0	75	0	6	0	77	0	0	0	249	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	848	0	0	809	0	54	0	864	0	0	0	2,575	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	6%	0%	94%	0%	0%	0%						
	APP/DEPART	848	/	902	809	/	1,673	918	/	0	0	/	0	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	510	0	0	537	0	25	0	488	0	0	0	1,560					
	APPROACH %	0%	100%	0%	0%	100%	0%	5%	0%	95%	0%	0%	0%						
	PEAK HR FACTOR		0.828			0.872			0.910			0.000		0.926					
	APP/DEPART	510	/	535	537	/	1,025	513	/	0	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	174	0	0	120	0	8	0	72	0	0	0	374	0	0	0	0	0
	4:15 PM	0	147	0	0	93	0	10	0	92	0	0	0	342	0	0	0	0	0
	4:30 PM	0	156	0	0	106	0	15	0	105	0	0	0	382	0	0	0	0	0
	4:45 PM	0	166	0	0	104	0	11	0	100	0	0	0	381	0	0	0	0	0
	5:00 PM	0	142	0	0	106	0	5	0	85	0	0	0	338	0	0	0	0	0
	5:15 PM	0	155	0	0	113	0	7	0	98	0	0	0	373	0	0	0	0	0
	5:30 PM	0	148	0	0	104	0	11	0	89	0	0	0	352	0	0	0	0	0
	5:45 PM	0	139	0	0	93	0	5	0	78	0	0	0	315	0	0	0	0	0
	VOLUMES	0	1,227	0	0	839	0	72	0	719	0	0	0	2,857	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	9%	0%	91%	0%	0%	0%						
	APP/DEPART	1,227	/	1,299	839	/	1,558	791	/	0	0	/	0	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	643	0	0	423	0	44	0	369	0	0	0	1,479					
	APPROACH %	0%	100%	0%	0%	100%	0%	11%	0%	89%	0%	0%	0%						
	PEAK HR FACTOR		0.924			0.881			0.860			0.000		0.968					
	APP/DEPART	643	/	687	423	/	792	413	/	0	0	/	0	0					

Iowa

NORTH SIDE

I-215 Ramp — WEST SIDE — EAST SIDE — I-215 Ramp

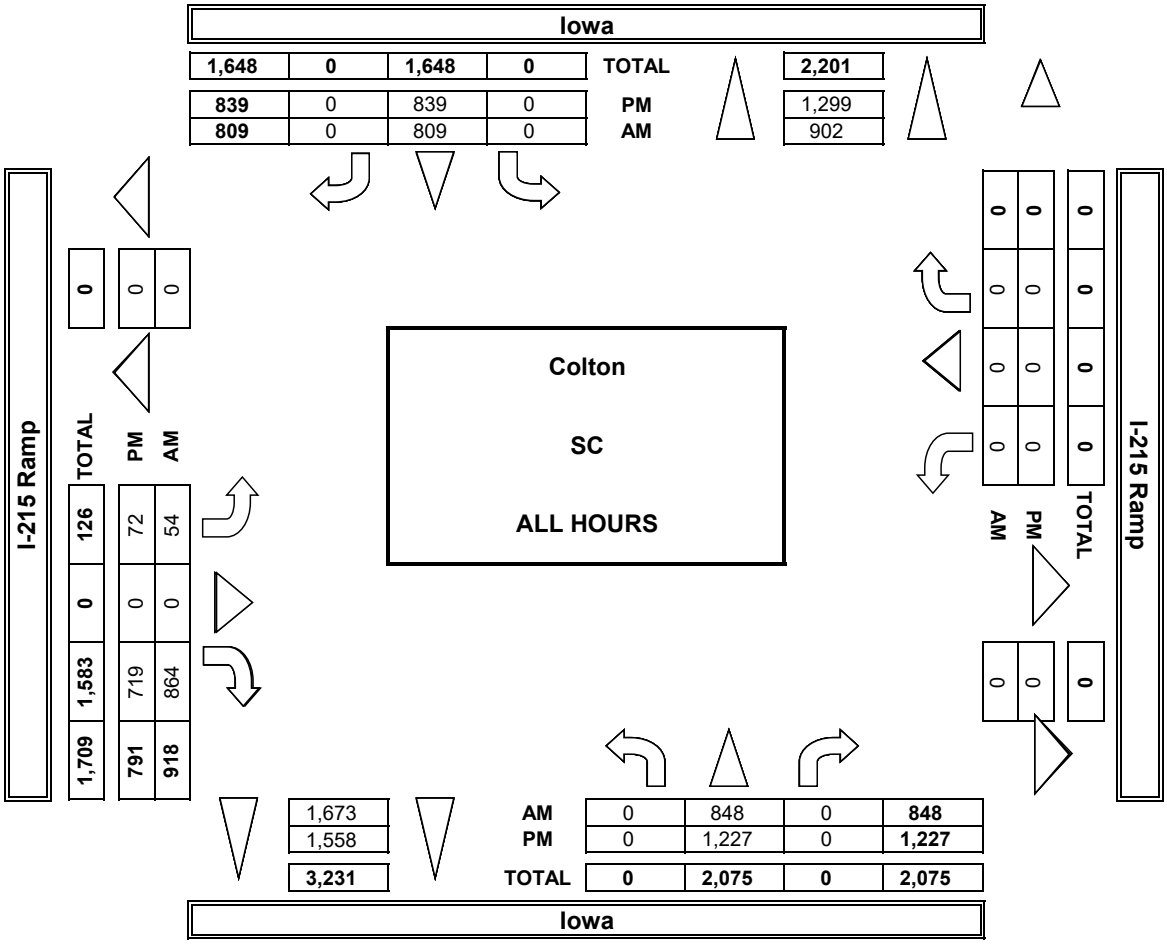
SOUTH SIDE

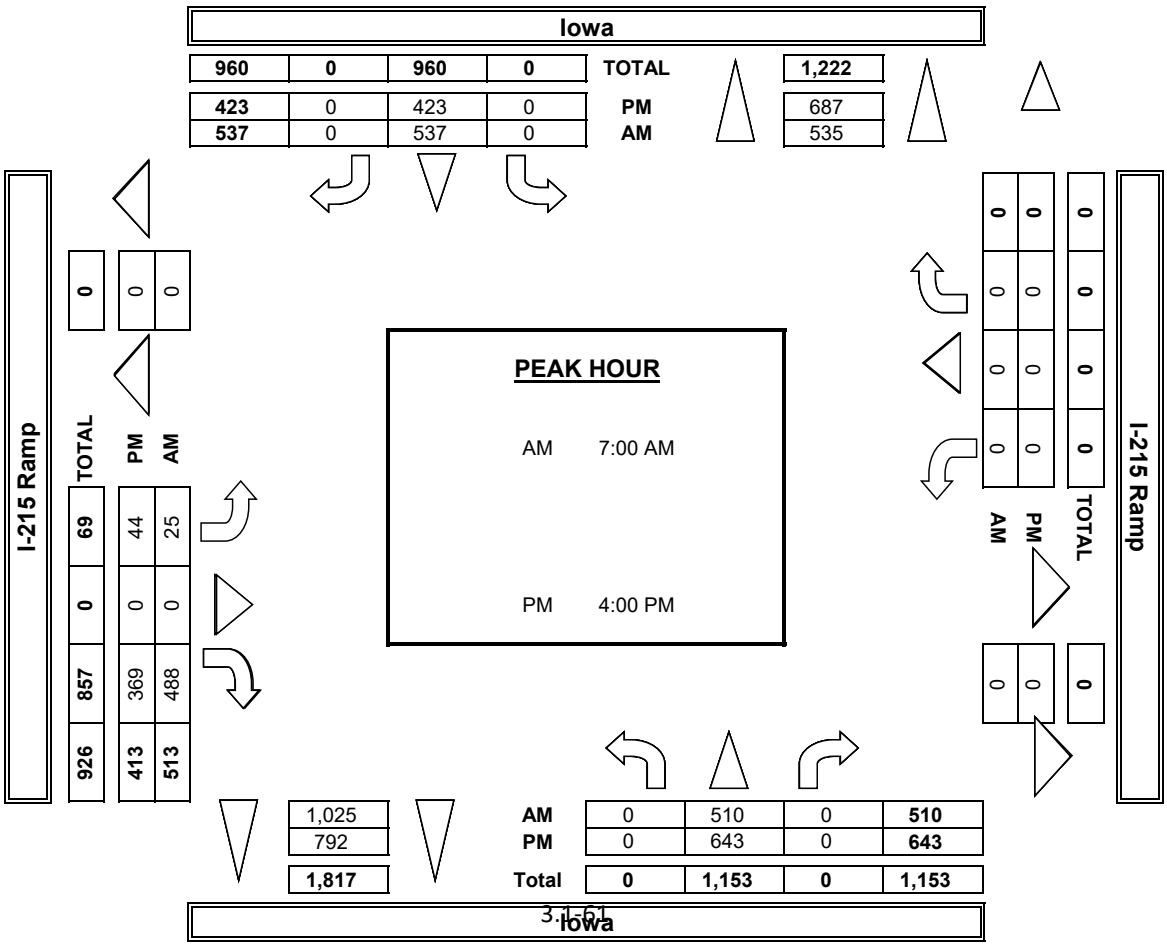
Iowa

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

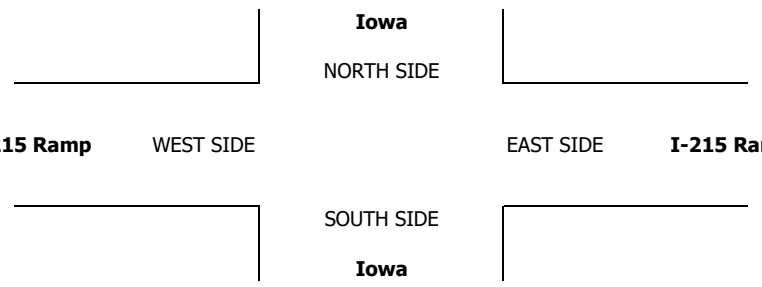
DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	8
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
LANES:	NL X	NT 1	NR X	SL X	ST 1	SR X	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL	NB	SB	EB	WB	TTL
AM																		
7:00 AM	0	12	0	0	12	0	0	0	7	0	0	0	31	0	0	0	0	0
7:15 AM	0	14	0	0	10	0	0	0	8	0	0	0	32	0	0	0	0	0
7:30 AM	0	8	0	0	10	0	0	0	7	0	0	0	25	0	0	0	0	0
7:45 AM	0	13	0	0	9	0	1	0	7	0	0	0	30	0	0	0	0	0
8:00 AM	0	7	0	0	3	0	0	0	8	0	0	0	18	0	0	0	0	0
8:15 AM	0	13	0	0	4	0	2	0	4	0	0	0	23	0	0	0	0	0
8:30 AM	0	7	0	0	11	0	0	0	2	0	0	0	20	0	0	0	0	0
8:45 AM	0	16	0	0	5	0	0	0	3	0	0	0	24	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	90	0	0	64	0	3	0	46	0	0	0	203	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	100%	0%	6%	0%	94%	0%	0%	0%						
APP/DEPART	90	/	93	64	/	110	49	/	0	0	/	0	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	47	0	0	41	0	1	0	29	0	0	0	118					
APPROACH %	0%	100%	0%	0%	100%	0%	3%	0%	97%	0%	0%	0%						
PEAK HR FACTOR		0.839			0.854			0.938			0.000		0.922					
APP/DEPART	47	/	48	41	/	70	30	/	0	0	/	0	0					
PM																		
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	17	0	0	7	0	0	0	9	0	0	0	33	0	0	0	0	0
4:15 PM	0	9	0	0	6	0	0	0	14	0	0	0	29	0	0	0	0	0
4:30 PM	0	21	0	0	12	0	0	0	8	0	0	0	41	0	0	0	0	0
4:45 PM	0	11	0	0	10	0	0	0	10	0	0	0	31	0	0	0	0	0
5:00 PM	0	6	0	0	3	0	0	0	3	0	0	0	12	0	0	0	0	0
5:15 PM	0	6	0	0	8	0	0	0	0	0	0	0	14	0	0	0	0	0
5:30 PM	0	13	0	0	3	0	0	0	5	0	0	0	21	0	0	0	0	0
5:45 PM	0	11	0	0	0	0	0	0	5	0	0	0	16	0	0	0	0	0
VOLUMES	0	94	0	0	49	0	0	0	54	0	0	0	197	0	0	0	0	0
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%						
APP/DEPART	94	/	94	49	/	103	54	/	0	0	/	0	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	58	0	0	35	0	0	0	41	0	0	0	134					
APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%						
PEAK HR FACTOR		0.690			0.729			0.732			0.000		0.817					
APP/DEPART	58	/	58	35	/	76	41	/	0	0	/	0	0					



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	8
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

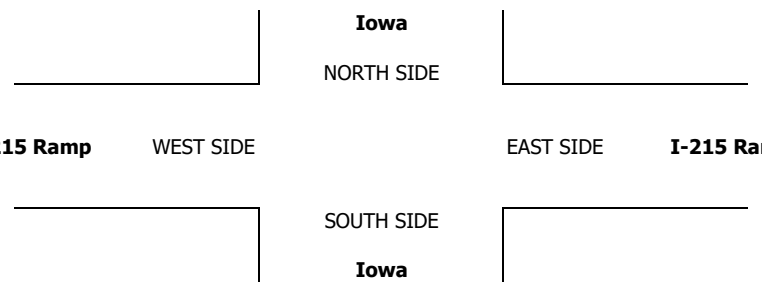
AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp			
	LANES:	NL X	NT 1	NR X	SL X	ST 1	SR X	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL
AM	7:00 AM	0	1	0	0	0	0	0	0	2	0	0	0	3
	7:15 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
	7:30 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
	7:45 AM	0	3	0	0	0	0	1	0	0	0	0	0	4
	8:00 AM	0	2	0	0	1	0	0	0	1	0	0	0	4
	8:15 AM	0	0	0	0	1	0	0	0	2	0	0	0	3
	8:30 AM	0	1	0	0	2	0	0	0	0	0	0	0	3
	8:45 AM	0	4	0	0	3	0	0	0	1	0	0	0	8
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	12	0	0	8	0	1	0	6	0	0	0	27
	APPROACH %	0%	100%	0%	0%	100%	0%	14%	0%	86%	0%	0%	0%	
	APP/DEPART	12	/	13	8	/	14	7	/	0	0	/	0	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	0	7	0	0	7	0	0	0	4	0	0	0	18
	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	
	PEAK HR FACTOR		0.438			0.583			0.500			0.000		0.563
	APP/DEPART	7	/	7	7	/	11	4	/	0	0	/	0	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	5	0	0	3	0	0	0	2	0	0	0	10
	4:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
	4:30 PM	0	0	0	0	2	0	0	0	1	0	0	0	3
	4:45 PM	0	0	0	0	1	0	0	0	2	0	0	0	3
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	1	0	0	0	0	0	0	1	0	0	0	2
	5:30 PM	0	1	0	0	0	0	0	0	1	0	0	0	2
	5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
	VOLUMES	0	9	0	0	7	0	0	0	7	0	0	0	23
	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	
	APP/DEPART	9	/	9	7	/	14	7	/	0	0	/	0	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	0	6	0	0	7	0	0	0	5	0	0	0	18
	APPROACH %	0%	100%	0%	0%	100%	0%	0%	0%	100%	0%	0%	0%	
	PEAK HR FACTOR		0.300			0.583			0.625			0.000		0.450
	APP/DEPART	6	/	6	7	/	12	5	/	0	0	/	0	0

U-TURNS

AM	NB	SB	EB	WB	TTL
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	0	0	0	0	0
8:00 AM	0	0	0	0	0
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
9:00 AM	0	0	0	0	0
9:15 AM	0	0	0	0	0
9:30 AM	0	0	0	0	0
9:45 AM	0	0	0	0	0
	0	0	0	0	0

PM	NB	SB	EB	WB	TTL
03:00 PM	0	0	0	0	0
3:15 PM	0	0	0	0	0
3:30 PM	0	0	0	0	0
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
	0	0	0	0	0



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

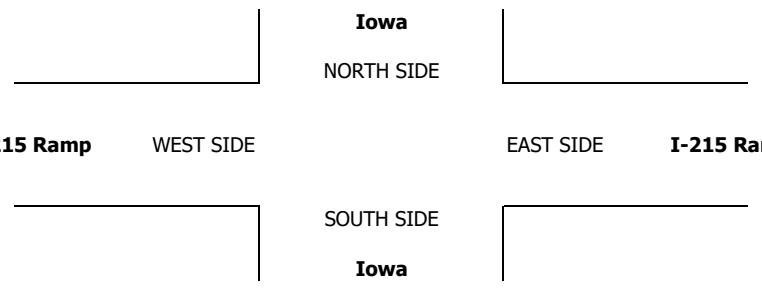
DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	8
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
	LANES:	NL X	NT 1	NR X	SL X	ST 1	SR X	EL 1	ET X	ER 1	WL X	WT X	WR X	TOTAL	NB	SB	EB	WB	TTL
AM	7:00 AM	0	4	0	0	4	0	1	0	4	0	0	0	13	0	0	0	0	0
	7:15 AM	0	7	0	0	3	0	0	0	0	0	0	0	10	0	0	0	0	0
	7:30 AM	0	4	0	0	1	0	0	0	5	0	0	0	10	0	0	0	0	0
	7:45 AM	0	0	0	0	1	0	0	0	5	0	0	0	6	0	0	0	0	0
	8:00 AM	0	5	0	0	6	0	0	0	3	0	0	0	14	0	0	0	0	0
	8:15 AM	0	4	0	0	0	0	0	0	3	0	0	0	7	0	0	0	0	0
	8:30 AM	0	7	0	0	1	0	1	0	4	0	0	0	13	0	0	0	0	0
	8:45 AM	0	7	0	0	4	0	1	0	2	0	0	0	14	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	38	0	0	20	0	3	0	26	0	0	0	87	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	10%	0%	90%	0%	0%	0%						
	APP/DEPART	38	/	41	20	/	46	29	/	0	0	/	0	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	23	0	0	11	0	2	0	12	0	0	0	48					
	APPROACH %	0%	100%	0%	0%	100%	0%	14%	0%	86%	0%	0%	0%						
	PEAK HR FACTOR		0.821			0.458			0.700			0.000		0.857					
	APP/DEPART	23	/	25	11	/	23	14	/	0	0	/	0	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	1	0	0	0	2	0	0	0	3	0	0	0	0	0
	4:15 PM	0	2	0	0	1	0	0	0	2	0	0	0	5	0	0	0	0	0
	4:30 PM	0	3	0	0	1	0	0	0	5	0	0	0	9	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
	5:00 PM	0	1	0	0	2	0	0	0	0	0	0	0	3	0	0	0	0	0
	5:15 PM	0	3	0	0	1	0	0	0	0	0	0	0	4	0	0	0	0	0
	5:30 PM	0	0	0	0	1	0	1	0	3	0	0	0	5	0	0	0	0	0
	5:45 PM	0	3	0	0	3	0	0	0	1	0	0	0	7	0	0	0	0	0
	VOLUMES	0	12	0	0	10	0	1	0	14	0	0	0	37	0	0	0	0	0
	APPROACH %	0%	100%	0%	0%	100%	0%	7%	0%	93%	0%	0%	0%						
	APP/DEPART	12	/	13	10	/	24	15	/	0	0	/	0	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	0	7	0	0	7	0	1	0	4	0	0	0	19					
	APPROACH %	0%	100%	0%	0%	100%	0%	20%	0%	80%	0%	0%	0%						
	PEAK HR FACTOR		0.583			0.583			0.313			0.000		0.679					
	APP/DEPART	7	/	8	7	/	11	5	/	0	0	/	0	0					



INTERSECTION TURNING MOVEMENT COUNTS

T816

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Wed, Dec 12, 18

LOCATION: Colton
NORTH & SOUTH: Iowa
EAST & WEST: I-215 Ramp

PROJECT #: SC
LOCATION #: 9
CONTROL: SIGNAL

NOTES:

AM
PM
MD
OTHER
OTHER

▲ N
◄ W
E ►
S ▼

Add U-Turns to Left Turns

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
	LANES:	NL X	NT X	NR X	SL 0	ST X	SR 0	EL 1	ET 1	ER X	WL X	WT 0.5	WR 0.5	TOTAL	NB 0	SB 0	EB 0	WB 0	TTL
AM	7:00 AM	0	0	0	25	0	235	80	125	0	0	11	74	550	0	0	0	0	0
	7:15 AM	0	0	0	23	0	222	90	129	0	0	5	63	532	0	0	0	0	0
	7:30 AM	0	0	0	33	0	235	67	124	0	0	4	37	500	0	0	0	0	0
	7:45 AM	0	0	0	18	0	234	44	107	0	0	8	55	466	0	0	0	0	0
	8:00 AM	0	0	0	14	0	190	38	99	0	0	6	50	397	0	0	0	0	0
	8:15 AM	0	0	0	13	0	150	55	112	0	0	9	42	381	0	0	0	0	0
	8:30 AM	0	0	0	24	0	105	27	83	0	0	10	35	284	0	0	0	0	0
	8:45 AM	0	0	0	26	0	126	44	97	0	0	11	47	351	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	176	0	1,497	445	876	0	0	64	403	3,461	0	0	0	0	0
	APPROACH %	0%	0%	0%	11%	0%	89%	34%	66%	0%	0%	14%	86%						
	APP/DEPART	0	/	848	1,673	/	0	1,321	/	1,052	467	/	1,561	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	0	99	0	926	281	485	0	0	28	229	2,048					
	APPROACH %	0%	0%	0%	10%	0%	90%	37%	63%	0%	0%	11%	89%						
	PEAK HR FACTOR		0.000			0.956			0.874			0.756		0.931					
	APP/DEPART	0	/	510	1,025	/	0	766	/	584	257	/	954	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	31	0	161	86	149	0	0	6	88	521	0	0	0	0	0
	4:15 PM	0	0	0	27	0	158	74	169	0	0	3	73	504	0	0	0	0	0
	4:30 PM	0	0	0	41	0	170	90	145	0	0	2	66	514	0	0	0	0	0
	4:45 PM	0	0	0	33	0	171	91	153	0	0	3	75	526	0	0	0	0	0
	5:00 PM	0	0	0	49	0	142	73	132	0	0	3	69	468	0	0	0	0	0
	5:15 PM	0	0	0	27	0	184	77	161	0	0	3	78	530	0	0	0	0	0
	5:30 PM	0	0	0	22	0	171	76	139	0	0	6	72	486	0	0	0	0	0
	5:45 PM	0	0	0	22	0	149	60	112	0	0	6	79	428	0	0	0	0	0
	VOLUMES	0	0	0	252	0	1,306	627	1,160	0	0	32	600	3,977	0	0	0	0	0
	APPROACH %	0%	0%	0%	16%	0%	84%	35%	65%	0%	0%	5%	95%						
	APP/DEPART	0	/	1,227	1,558	/	0	1,787	/	1,412	632	/	1,338	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	0	0	132	0	660	341	616	0	0	14	302	2,065					
	APPROACH %	0%	0%	0%	17%	0%	83%	36%	64%	0%	0%	4%	96%						
	PEAK HR FACTOR		0.000			0.938			0.981			0.840		0.981					
	APP/DEPART	0	/	643	792	/	0	957	/	748	316	/	674	0					

Iowa

NORTH SIDE

I-215 Ramp WEST SIDE EAST SIDE **I-215 Ramp**

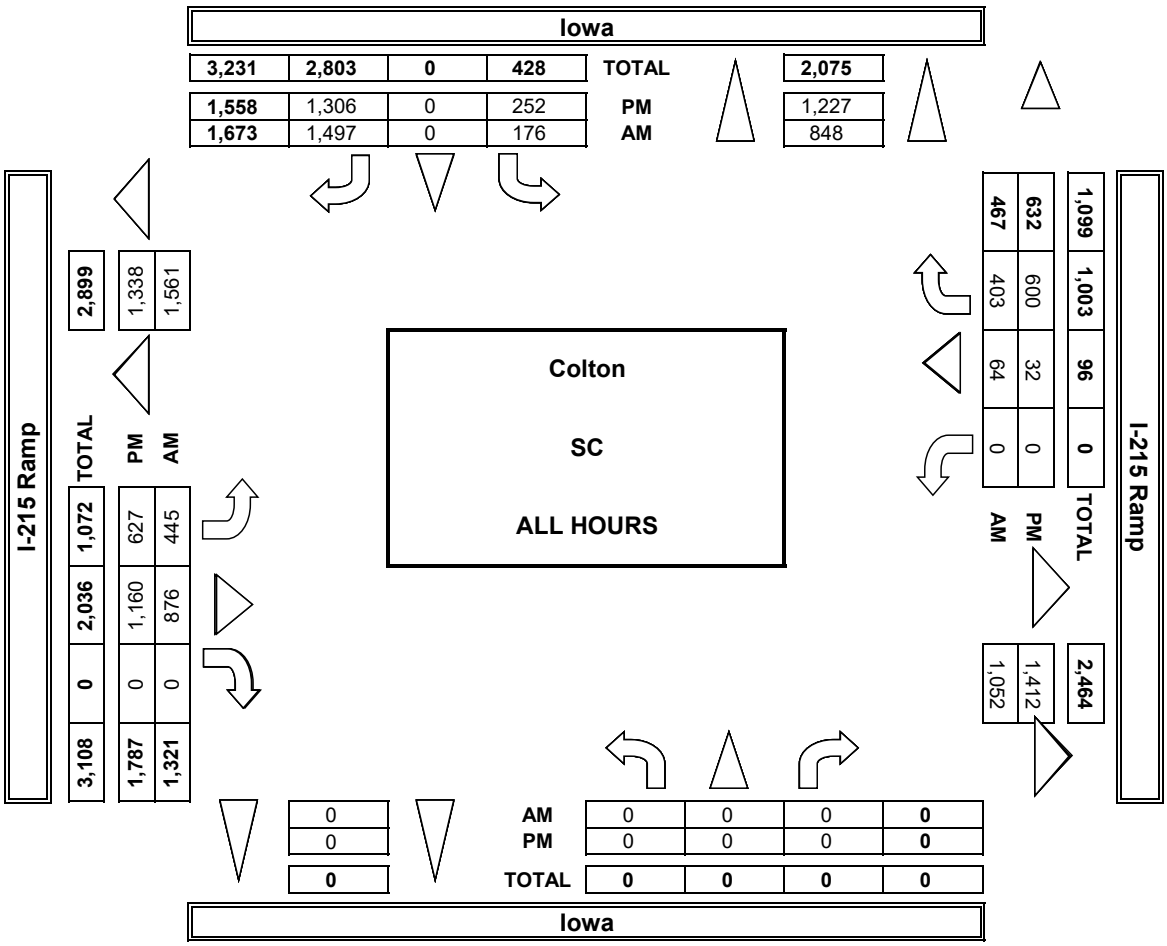
SOUTH SIDE

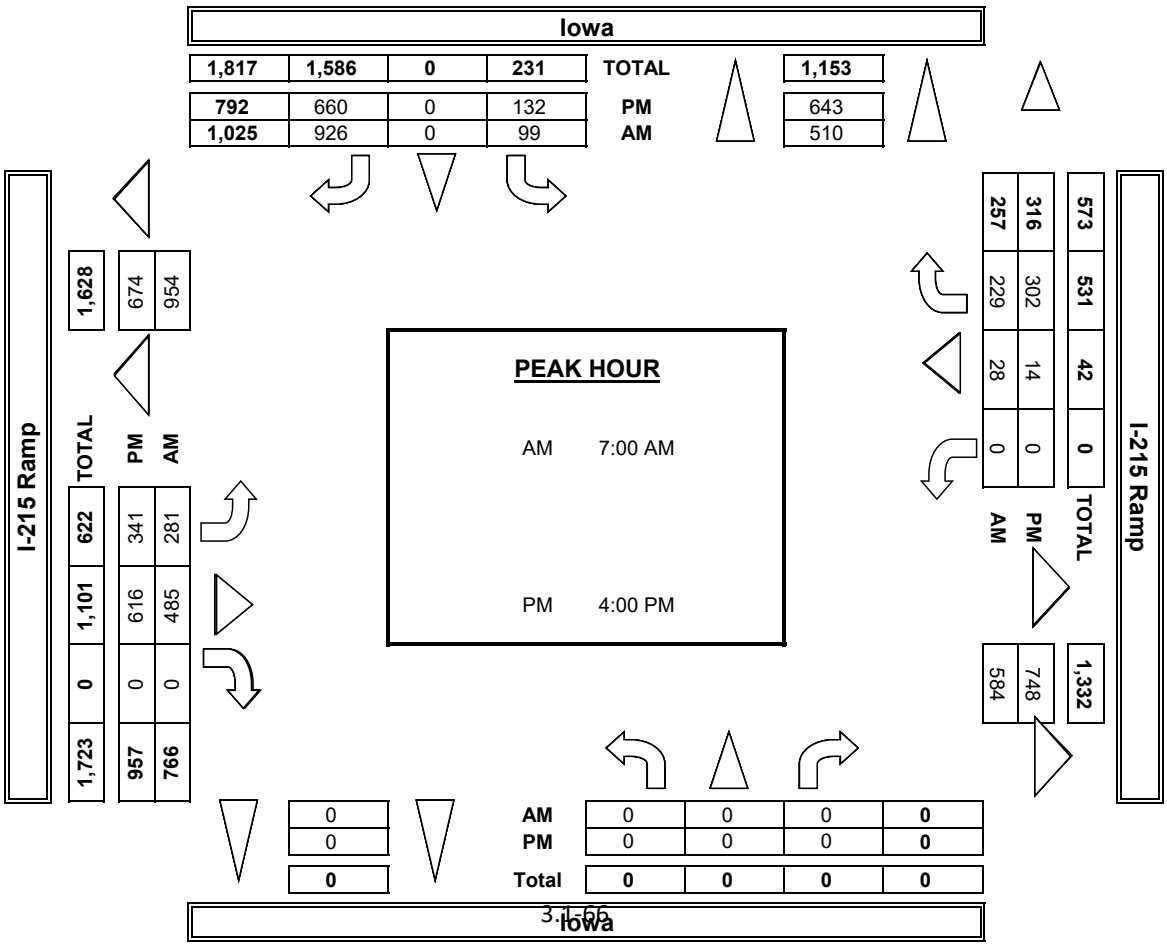
Iowa

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

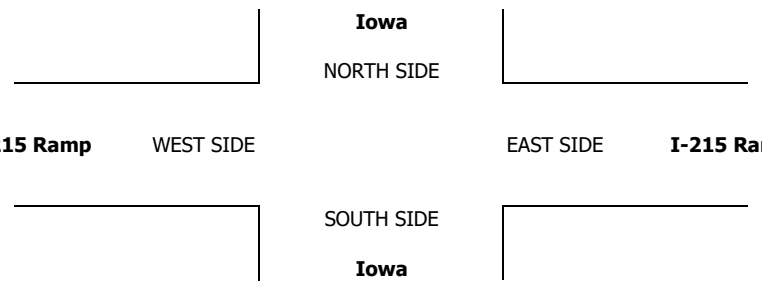
DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	9
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
LANES:	NL X	NT X	NR X	SL 0	ST X	SR 0	EL 1	ET 1	ER X	WL X	WT 0.5	WR 0.5	TOTAL	NB	SB	EB	WB	TTL
AM 7:00 AM	0	0	0	4	0	15	5	14	0	0	4	7	49	0	0	0	0	0
7:15 AM	0	0	0	4	0	14	9	6	0	0	1	5	39	0	0	0	0	0
7:30 AM	0	0	0	3	0	14	6	14	0	0	0	2	39	0	0	0	0	0
7:45 AM	0	0	0	2	0	14	7	19	0	0	0	6	48	0	0	0	0	0
8:00 AM	0	0	0	0	0	11	2	16	0	0	1	5	35	0	0	0	0	0
8:15 AM	0	0	0	2	0	6	9	17	0	0	1	4	39	0	0	0	0	0
8:30 AM	0	0	0	4	0	9	4	10	0	0	2	3	32	0	0	0	0	0
8:45 AM	0	0	0	2	0	6	8	20	0	0	0	8	44	0	0	0	0	0
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	0	21	0	89	50	116	0	0	9	40	325	0	0	0	0	0
APPROACH %	0%	0%	0%	19%	0%	81%	30%	70%	0%	0%	18%	82%						
APP/DEPART	0	/	90	110	/	0	166	/	137	49	/	98	0					
BEGIN PEAK HR		7:00 AM																
VOLUMES	0	0	0	13	0	57	27	53	0	0	5	20	175					
APPROACH %	0%	0%	0%	19%	0%	81%	34%	66%	0%	0%	20%	80%						
PEAK HR FACTOR		0.000			0.921			0.769			0.568		0.893					
APP/DEPART	0	/	47	70	/	0	80	/	66	25	/	62	0					
PM 03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	3	0	13	8	6	0	0	1	9	40	0	0	0	0	0
4:15 PM	0	0	0	1	0	19	4	16	0	0	0	5	45	0	0	0	0	0
4:30 PM	0	0	0	1	0	19	10	9	0	0	0	11	50	0	0	0	0	0
4:45 PM	0	0	0	4	0	16	6	11	0	0	0	5	42	0	0	0	0	0
5:00 PM	0	0	0	1	0	5	2	4	0	0	1	4	17	0	0	0	0	0
5:15 PM	0	0	0	0	0	8	3	5	0	0	0	3	19	0	0	0	0	0
5:30 PM	0	0	0	0	0	8	4	11	0	0	0	9	32	0	0	0	0	0
5:45 PM	0	0	0	0	0	5	4	1	0	0	1	7	18	0	0	0	0	0
VOLUMES	0	0	0	10	0	93	41	63	0	0	3	53	263	0	0	0	0	0
APPROACH %	0%	0%	0%	10%	0%	90%	39%	61%	0%	0%	5%	95%						
APP/DEPART	0	/	94	103	/	0	104	/	73	56	/	96	0					
BEGIN PEAK HR		4:00 PM																
VOLUMES	0	0	0	9	0	67	28	42	0	0	1	30	177					
APPROACH %	0%	0%	0%	12%	0%	88%	40%	60%	0%	0%	3%	97%						
PEAK HR FACTOR		0.000			0.950			0.875			0.705		0.885					
APP/DEPART	0	/	58	76	/	0	70	/	51	31	/	68	0					



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

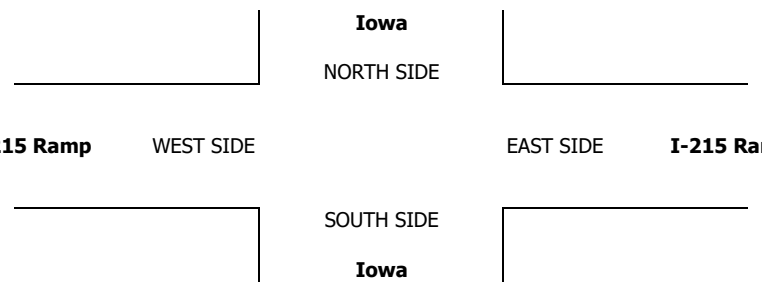
DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	9
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
	LANES:	NL X	NT X	NR X	SL 0	ST X	SR 0	EL 1	ET 1	ER X	WL X	WT 0.5	WR 0.5	TOTAL	NB	SB	EB	WB	TTL
AM	7:00 AM	0	0	0	0	0	2	0	2	0	0	0	1	5	0	0	0	0	0
	7:15 AM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	3	0	0	0	1	4	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0
	8:00 AM	0	0	0	0	0	2	0	1	0	0	0	2	5	0	0	0	0	0
	8:15 AM	0	0	0	0	0	3	0	1	0	0	0	0	4	0	0	0	0	0
	8:30 AM	0	0	0	0	0	2	1	0	0	0	0	0	3	0	0	0	0	0
	8:45 AM	0	0	0	0	0	4	3	1	0	0	1	1	10	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	14	4	8	0	0	1	8	35	0	0	0	0	0
	APPROACH %	0%	0%	0%	0%	0%	100%	33%	67%	0%	0%	11%	89%						
	APP/DEPART	0	/	12	14	/	0	12	/	8	9	/	15	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	0	0	0	0	11	4	3	0	0	1	3	22					
	APPROACH %	0%	0%	0%	0%	0%	100%	57%	43%	0%	0%	25%	75%						
	PEAK HR FACTOR		0.000			0.688			0.438			0.500		0.550					
	APP/DEPART	0	/	7	11	/	0	7	/	3	4	/	12	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	1	0	4	1	2	0	0	0	4	12	0	0	0	0	0
	4:15 PM	0	0	0	1	0	0	0	1	0	0	0	1	3	0	0	0	0	0
	4:30 PM	0	0	0	1	0	2	0	2	0	0	0	0	5	0	0	0	0	0
	4:45 PM	0	0	0	1	0	2	0	0	0	0	0	0	3	0	0	0	0	0
	5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
	5:15 PM	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0	0	0	0
	5:30 PM	0	0	0	0	0	1	0	0	0	0	0	1	2	0	0	0	0	0
	5:45 PM	0	0	0	0	0	0	0	1	0	0	0	1	2	0	0	0	0	0
	VOLUMES	0	0	0	4	0	10	1	7	0	0	0	8	30	0	0	0	0	0
	APPROACH %	0%	0%	0%	29%	0%	71%	13%	88%	0%	0%	0%	100%						
	APP/DEPART	0	/	9	14	/	0	8	/	11	8	/	10	0					
	BEGIN PEAK HR		4:00 PM																
	VOLUMES	0	0	0	4	0	8	1	5	0	0	0	5	23					
	APPROACH %	0%	0%	0%	33%	0%	67%	17%	83%	0%	0%	0%	100%						
	PEAK HR FACTOR		0.000			0.600			0.500			0.313		0.479					
	APP/DEPART	0	/	6	12	/	0	6	/	9	5	/	8	0					



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

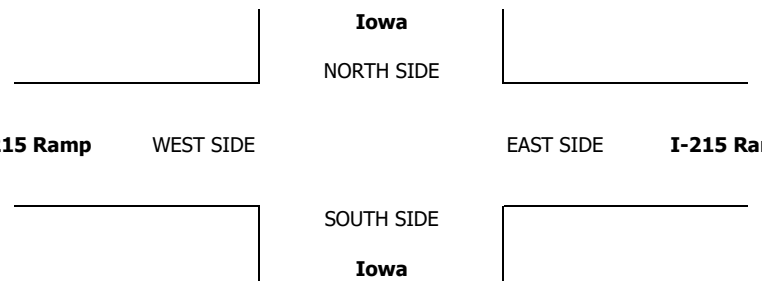
DATE:	LOCATION:	Colton	PROJECT #:	SC
12/12/18	NORTH & SOUTH:	Iowa	LOCATION #:	9
WEDNESDAY	EAST & WEST:	I-215 Ramp	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

		NORTHBOUND Iowa			SOUTHBOUND Iowa			EASTBOUND I-215 Ramp			WESTBOUND I-215 Ramp				U-TURNS				
	LANES:	NL X	NT X	NR X	SL 0	ST X	SR 0	EL 1	ET 1	ER X	WL X	WT 0.5	WR 0.5	TOTAL	NB	SB	EB	WB	TTL
AM	7:00 AM	0	0	0	2	0	6	1	4	0	0	0	3	16	0	0	0	0	0
	7:15 AM	0	0	0	0	0	3	3	0	0	0	0	4	10	0	0	0	0	0
	7:30 AM	0	0	0	0	0	6	1	3	0	0	0	3	13	0	0	0	0	0
	7:45 AM	0	0	0	0	0	6	0	0	0	0	1	0	7	0	0	0	0	0
	8:00 AM	0	0	0	1	0	8	5	2	0	0	0	0	16	0	0	0	0	0
	8:15 AM	0	0	0	1	0	2	1	6	0	0	0	3	13	0	0	0	0	0
	8:30 AM	0	0	0	1	0	4	1	4	0	0	0	6	16	0	0	0	0	0
	8:45 AM	0	0	0	1	0	5	0	6	0	0	2	7	21	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	6	0	40	12	25	0	0	3	26	112	0	0	0	0	0
	APPROACH %	0%	0%	0%	13%	0%	87%	32%	68%	0%	0%	10%	90%						
	APP/DEPART	0	/	38	46	/	0	37	/	31	29	/	43	0					
	BEGIN PEAK HR		8:00 AM																
	VOLUMES	0	0	0	4	0	19	7	18	0	0	2	16	66					
	APPROACH %	0%	0%	0%	17%	0%	83%	28%	72%	0%	0%	11%	89%						
	PEAK HR FACTOR		0.000			0.639			0.893			0.500		0.786					
	APP/DEPART	0	/	23	23	/	0	25	/	22	18	/	21	0					
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	3	0	3	0	0	0	0	6	0	0	0	0	0
	4:15 PM	0	0	0	0	0	3	1	3	0	0	0	1	8	0	0	0	0	0
	4:30 PM	0	0	0	0	0	6	2	3	0	0	0	1	12	0	0	0	0	0
	4:45 PM	0	0	0	0	0	1	0	4	0	0	1	0	6	0	0	0	0	0
	5:00 PM	0	0	0	2	0	0	1	3	0	0	0	0	6	0	0	0	0	0
	5:15 PM	0	0	0	1	0	0	1	3	0	0	0	2	7	0	0	0	0	0
	5:30 PM	0	0	0	0	0	4	0	4	0	0	1	0	9	0	0	0	0	0
	5:45 PM	0	0	0	1	0	3	3	4	0	0	0	0	11	0	0	0	0	0
	VOLUMES	0	0	0	4	0	20	8	27	0	0	2	4	65	0	0	0	0	0
	APPROACH %	0%	0%	0%	17%	0%	83%	23%	77%	0%	0%	33%	67%						
	APP/DEPART	0	/	12	24	/	0	35	/	31	6	/	22	0					
	BEGIN PEAK HR		5:00 PM																
	VOLUMES	0	0	0	4	0	7	5	14	0	0	1	2	33					
	APPROACH %	0%	0%	0%	36%	0%	64%	26%	74%	0%	0%	33%	67%						
	PEAK HR FACTOR		0.000			0.688			0.679			0.375		0.750					
	APP/DEPART	0	/	7	11	/	0	19	/	18	3	/	8	0					



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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

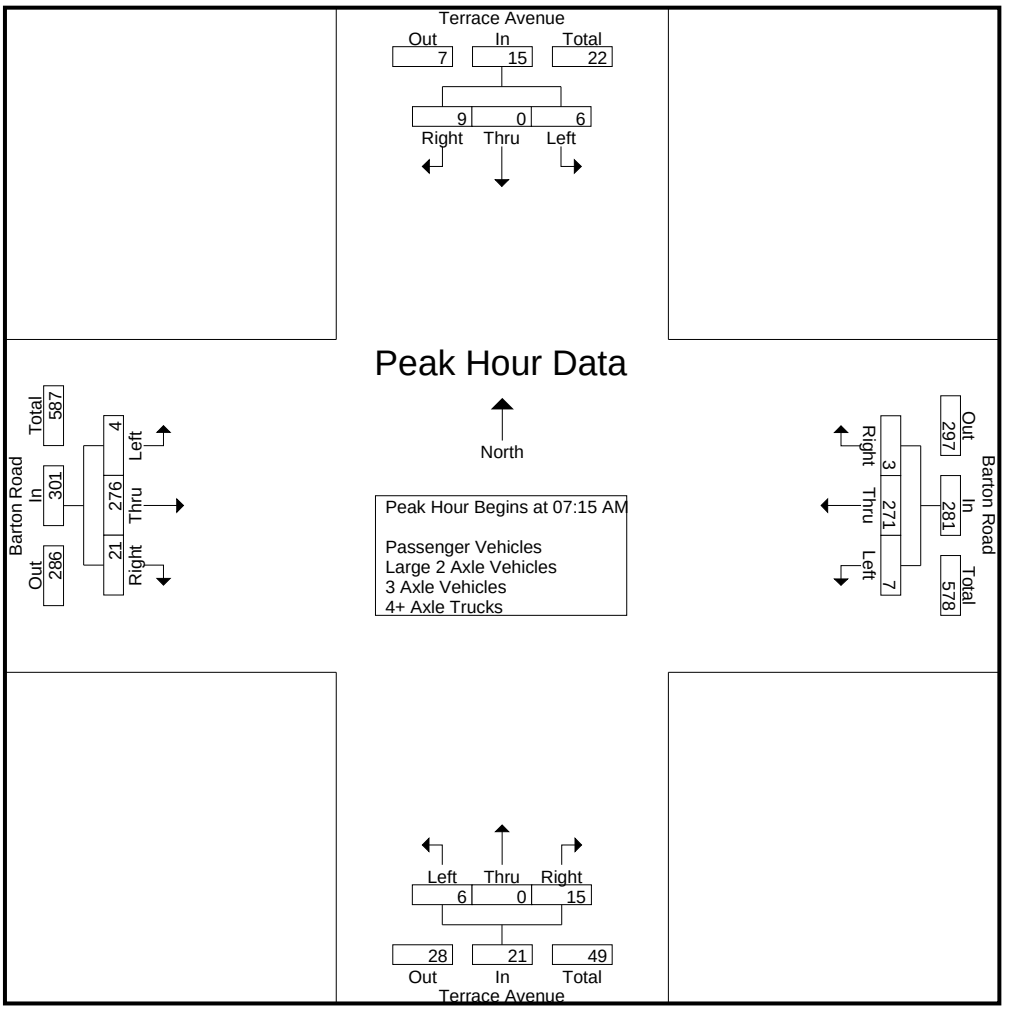
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	4	0	7	11	4	45	0	49	7	0	3	10	1	60	6	67	137
07:15 AM	2	0	3	5	1	53	0	54	0	0	3	3	1	96	4	101	163
07:30 AM	2	0	3	5	1	86	0	87	2	0	3	5	2	64	6	72	169
07:45 AM	1	0	2	3	3	75	1	79	2	0	2	4	1	57	4	62	148
Total	9	0	15	24	9	259	1	269	11	0	11	22	5	277	20	302	617
08:00 AM	1	0	1	2	2	57	2	61	2	0	7	9	0	59	7	66	138
08:15 AM	0	0	2	2	4	37	0	41	0	0	2	2	0	50	2	52	97
08:30 AM	1	0	0	1	6	42	1	49	1	0	5	6	1	40	2	43	99
08:45 AM	3	0	0	3	4	38	1	43	2	0	5	7	0	48	9	57	110
Total	5	0	3	8	16	174	4	194	5	0	19	24	1	197	20	218	444
Grand Total	14	0	18	32	25	433	5	463	16	0	30	46	6	474	40	520	1061
Apprch %	43.8	0	56.2		5.4	93.5	1.1		34.8	0	65.2		1.2	91.2	7.7		
Total %	1.3	0	1.7	3	2.4	40.8	0.5	43.6	1.5	0	2.8	4.3	0.6	44.7	3.8	49	
Passenger Vehicles	11	0	9	20	8	402	4	414	12	0	6	18	6	437	23	466	918
% Passenger Vehicles	78.6	0	50	62.5	32	92.8	80	89.4	75	0	20	39.1	100	92.2	57.5	89.6	86.5
Large 2 Axle Vehicles	3	0	5	8	1	16	1	18	0	0	4	4	0	23	4	27	57
% Large 2 Axle Vehicles	21.4	0	27.8	25	4	3.7	20	3.9	0	0	13.3	8.7	0	4.9	10	5.2	5.4
3 Axle Vehicles	0	0	3	3	3	2	0	5	1	0	2	3	0	4	3	7	18
% 3 Axle Vehicles	0	0	16.7	9.4	12	0.5	0	1.1	6.2	0	6.7	6.5	0	0.8	7.5	1.3	1.7
4+ Axle Trucks	0	0	1	1	13	13	0	26	3	0	18	21	0	10	10	20	68
% 4+ Axle Trucks	0	0	5.6	3.1	52	3	0	5.6	18.8	0	60	45.7	0	2.1	25	3.8	6.4

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 07:15 AM																	
07:15 AM	2	0	3	5	1	53	0	54	0	0	3	3	1	96	4	101	163
07:30 AM	2	0	3	5	1	86	0	87	2	0	3	5	2	64	6	72	169
07:45 AM	1	0	2	3	3	75	1	79	2	0	2	4	1	57	4	62	148
08:00 AM	1	0	1	2	2	57	2	61	2	0	7	9	0	59	7	66	138
Total Volume	6	0	9	15	7	271	3	281	6	0	15	21	4	276	21	301	618
% App. Total	40	0	60		2.5	96.4	1.1		28.6	0	71.4		1.3	91.7	7		
PHF	.750	.000	.750	.750	.583	.788	.375	.807	.750	.000	.536	.583	.500	.719	.750	.745	.914

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
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				07:15 AM				08:00 AM				07:00 AM			
+0 mins.	4	0	7	11	1	53	0	54	2	0	7	9	1	60	6	67
+15 mins.	2	0	3	5	1	86	0	87	0	0	2	2	1	96	4	101
+30 mins.	2	0	3	5	3	75	1	79	1	0	5	6	2	64	6	72
+45 mins.	1	0	2	3	2	57	2	61	2	0	5	7	1	57	4	62
Total Volume	9	0	15	24	7	271	3	281	5	0	19	24	5	277	20	302
% App. Total	37.5	0	62.5		2.5	96.4	1.1		20.8	0	79.2		1.7	91.7	6.6	
PHF	.563	.000	.536	.545	.583	.788	.375	.807	.625	.000	.679	.667	.625	.721	.833	.748

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

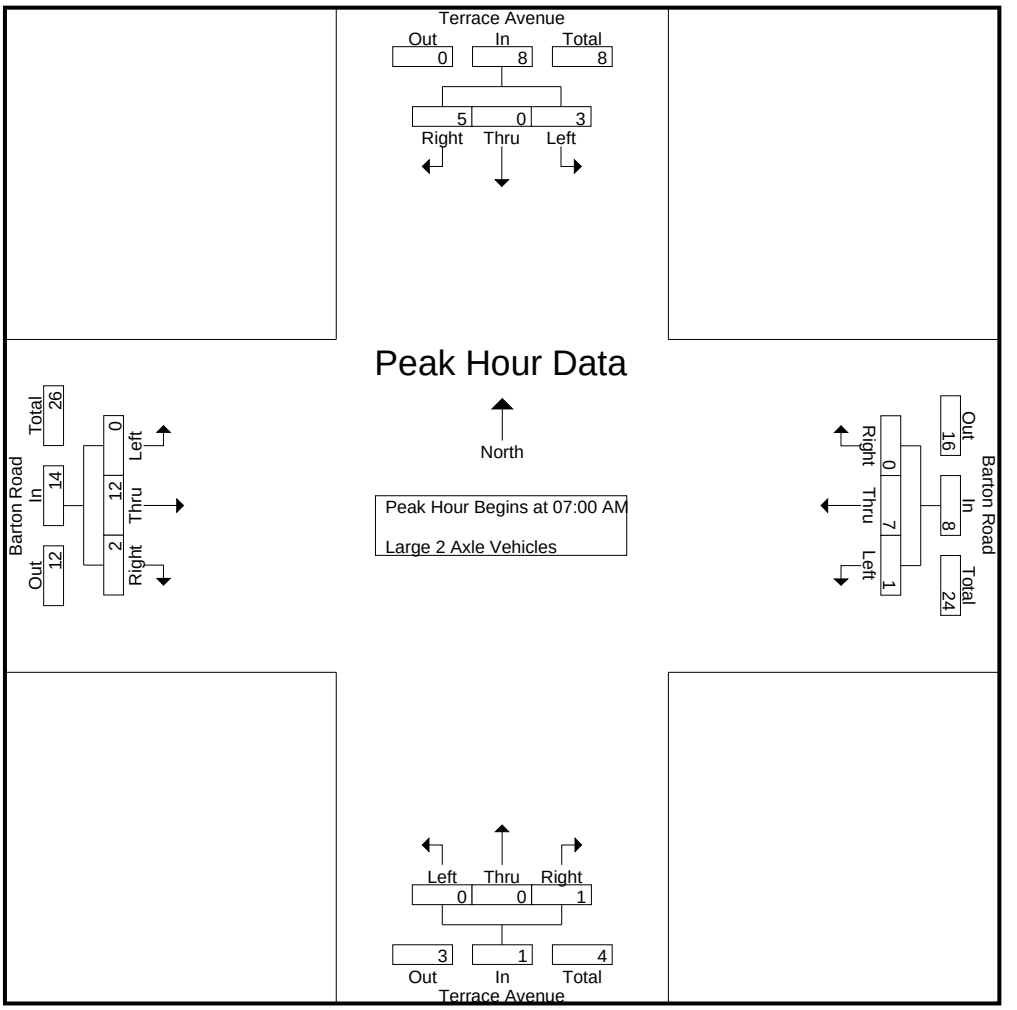
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	2	0	4	6	1	1	0	2	0	0	0	0	0	5	0	5	13
07:15 AM	1	0	0	1	0	2	0	2	0	0	0	0	0	0	2	2	5
07:30 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	1	3
07:45 AM	0	0	0	0	0	3	0	3	0	0	1	1	0	6	0	6	10
Total	3	0	5	8	1	7	0	8	0	0	1	1	0	12	2	14	31
08:00 AM	0	0	0	0	0	3	0	3	0	0	3	3	0	4	0	4	10
08:15 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	4	0	4	5
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
08:45 AM	0	0	0	0	0	5	1	6	0	0	0	0	0	1	2	3	9
Total	0	0	0	0	0	9	1	10	0	0	3	3	0	11	2	13	26
Grand Total	3	0	5	8	1	16	1	18	0	0	4	4	0	23	4	27	57
Apprch %	37.5	0	62.5		5.6	88.9	5.6		0	0	100		0	85.2	14.8		
Total %	5.3	0	8.8	14	1.8	28.1	1.8	31.6	0	0	7	7	0	40.4	7	47.4	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 07:00 AM																	
07:00 AM	2	0	4	6	1	1	0	2	0	0	0	0	0	5	0	5	13
07:15 AM	1	0	0	1	0	2	0	2	0	0	0	0	0	0	2	2	5
07:30 AM	0	0	1	1	0	1	0	1	0	0	0	0	0	1	0	1	3
07:45 AM	0	0	0	0	0	3	0	3	0	0	1	1	0	6	0	6	10
Total Volume	3	0	5	8	1	7	0	8	0	0	1	1	0	12	2	14	31
% App. Total	37.5	0	62.5		12.5	87.5	0		0	0	100		0	85.7	14.3		
PHF	.375	.000	.313	.333	.250	.583	.000	.667	.000	.000	.250	.250	.000	.500	.250	.583	.596

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
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				08:00 AM				07:15 AM				07:45 AM			
+0 mins.	2	0	4	6	0	3	0	3	0	0	0	0	0	6	0	6
+15 mins.	1	0	0	1	0	1	0	1	0	0	0	0	0	4	0	4
+30 mins.	0	0	1	1	0	0	0	0	0	0	1	1	0	4	0	4
+45 mins.	0	0	0	0	0	5	1	6	0	0	3	3	0	2	0	2
Total Volume	3	0	5	8	0	9	1	10	0	0	4	4	0	16	0	16
% App. Total	37.5	0	62.5		0	90	10		0	0	100		0	100	0	
PHF	.375	.000	.313	.333	.000	.450	.250	.417	.000	.000	.333	.333	.000	.667	.000	.667

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

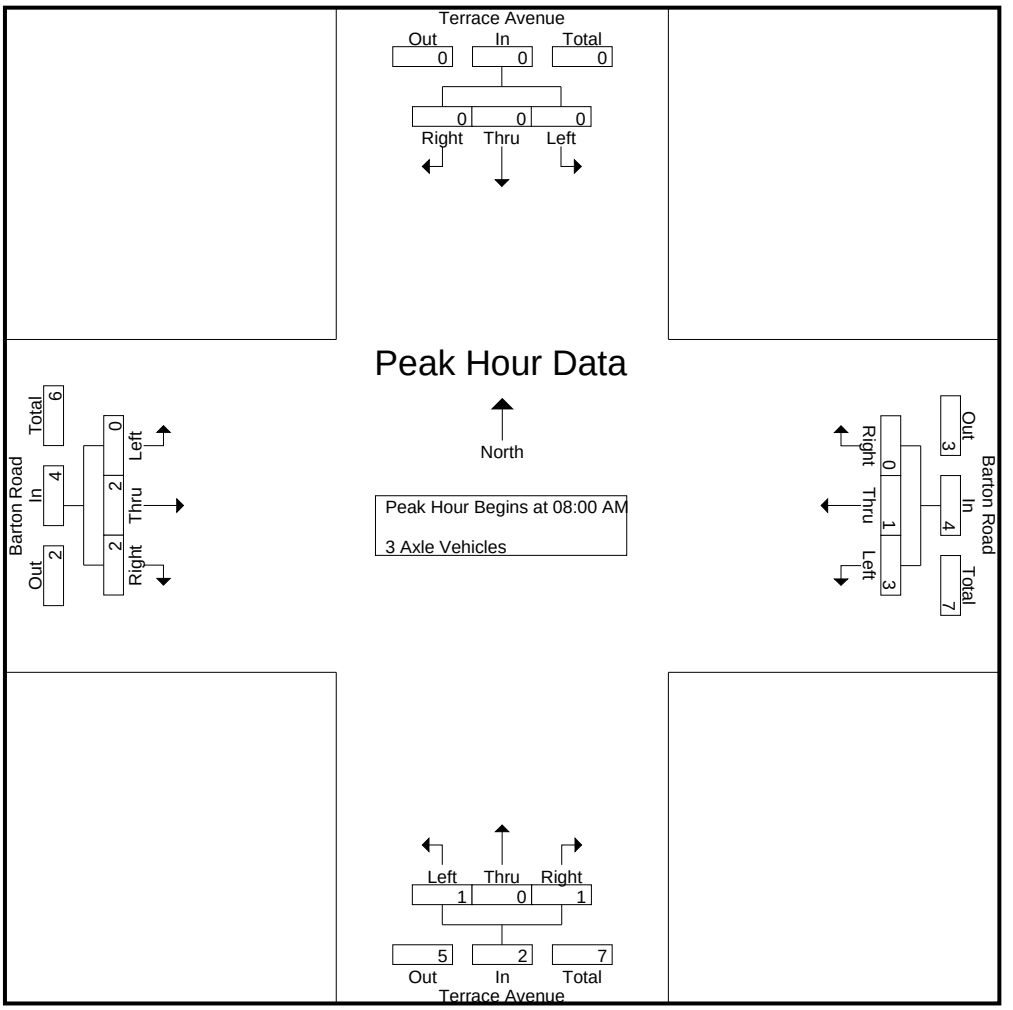
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	2
07:15 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
07:30 AM	0	0	2	2	0	1	0	1	0	0	0	0	0	1	0	1	4
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	0	0	3	3	0	1	0	1	0	0	1	1	0	2	1	3	8
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
08:30 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
08:45 AM	0	0	0	0	1	1	0	2	1	0	1	2	0	0	1	1	5
Total	0	0	0	0	3	1	0	4	1	0	1	2	0	2	2	4	10
Grand Total	0	0	3	3	3	2	0	5	1	0	2	3	0	4	3	7	18
Apprch %	0	0	100		60	40	0		33.3	0	66.7		0	57.1	42.9		
Total %	0	0	16.7	16.7	16.7	11.1	0	27.8	5.6	0	11.1	16.7	0	22.2	16.7	38.9	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 08:00 AM																	
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
08:15 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
08:30 AM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
08:45 AM	0	0	0	0	1	1	0	2	1	0	1	2	0	0	1	1	5
Total Volume	0	0	0	0	3	1	0	4	1	0	1	2	0	2	2	4	10
% App. Total	0	0	0		75	25	0		50	0	50		0	50	50		
PHF	.000	.000	.000	.000	.750	.250	.000	.500	.250	.000	.250	.250	.000	.500	.500	1.00	.500

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
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				08:00 AM				08:00 AM				07:30 AM			
+0 mins.	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	1
+15 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1
+30 mins.	0	0	2	2	1	0	0	1	0	0	0	0	0	0	1	1
+45 mins.	0	0	0	0	1	1	0	2	1	0	1	2	0	1	0	1
Total Volume	0	0	3	3	3	1	0	4	1	0	1	2	0	3	1	4
% App. Total	0	0	100		75	25	0		50	0	50		0	75	25	
PHF	.000	.000	.375	.375	.750	.250	.000	.500	.250	.000	.250	.250	.000	.750	.250	1.000

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

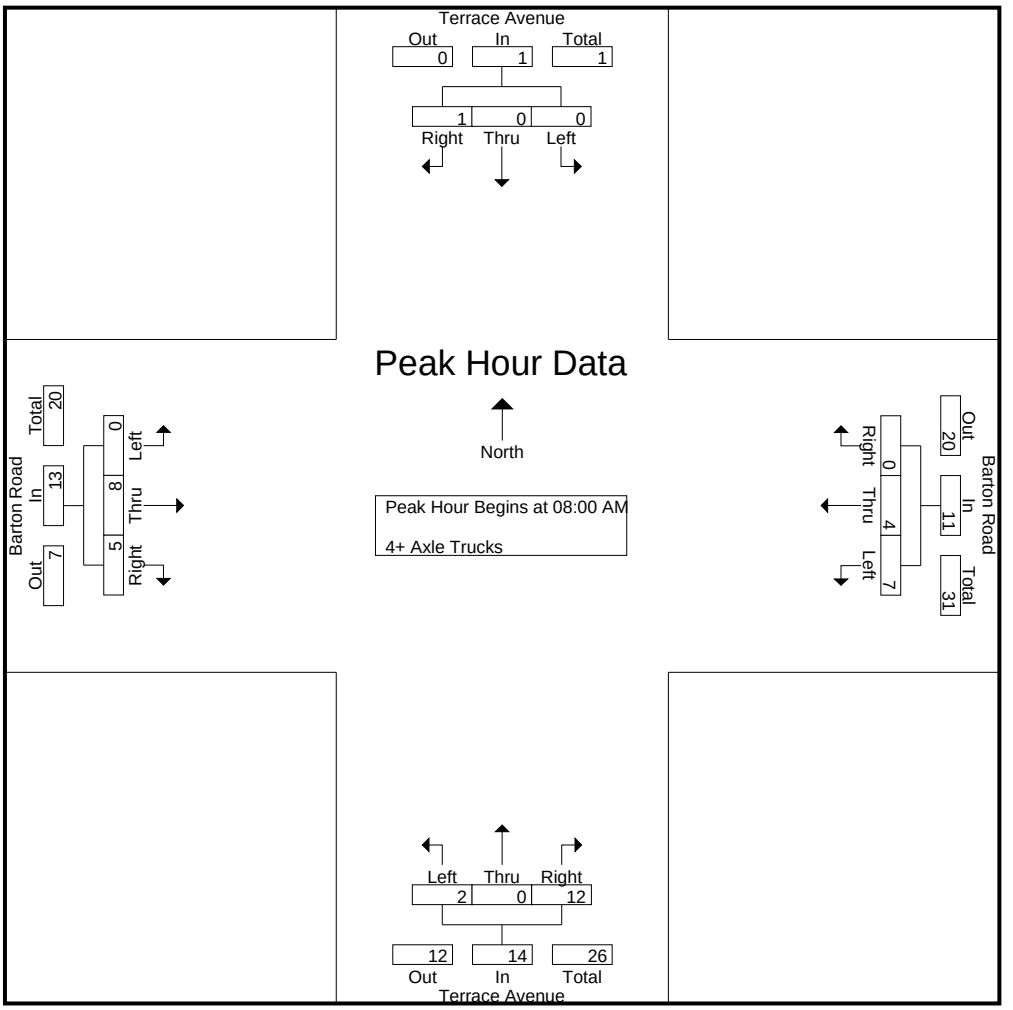
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	2	0	0	2	1	0	3	4	0	0	3	3	9
07:15 AM	0	0	0	0	1	2	0	3	0	0	2	2	0	0	0	0	5
07:30 AM	0	0	0	0	0	5	0	5	0	0	0	0	0	1	1	2	7
07:45 AM	0	0	0	0	3	2	0	5	0	0	1	1	0	1	1	2	8
Total	0	0	0	0	6	9	0	15	1	0	6	7	0	2	5	7	29
08:00 AM	0	0	1	1	2	1	0	3	1	0	4	5	0	4	0	4	13
08:15 AM	0	0	0	0	2	0	0	2	0	0	2	2	0	1	1	2	6
08:30 AM	0	0	0	0	1	2	0	3	0	0	4	4	0	1	1	2	9
08:45 AM	0	0	0	0	2	1	0	3	1	0	2	3	0	2	3	5	11
Total	0	0	1	1	7	4	0	11	2	0	12	14	0	8	5	13	39
Grand Total	0	0	1	1	13	13	0	26	3	0	18	21	0	10	10	20	68
Apprch %	0	0	100		50	50	0		14.3	0	85.7		0	50	50		
Total %	0	0	1.5	1.5	19.1	19.1	0	38.2	4.4	0	26.5	30.9	0	14.7	14.7	29.4	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 08:00 AM																	
08:00 AM	0	0	1	1	2	1	0	3	1	0	4	5	0	4	0	4	13
08:15 AM	0	0	0	0	2	0	0	2	0	0	2	2	0	1	1	2	6
08:30 AM	0	0	0	0	1	2	0	3	0	0	4	4	0	1	1	2	9
08:45 AM	0	0	0	0	2	1	0	3	1	0	2	3	0	2	3	5	11
Total Volume	0	0	1	1	7	4	0	11	2	0	12	14	0	8	5	13	39
% App. Total	0	0	100		63.6	36.4	0		14.3	0	85.7		0	61.5	38.5		
PHF	.000	.000	.250	.250	.875	.500	.000	.917	.500	.000	.750	.700	.000	.500	.417	.650	.750

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_AM
Site Code : 00319397
Start Date : 5/23/2019
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:

	07:15 AM				07:15 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	0	0	1	2	0	3	1	0	4	5	0	4	0	4
+15 mins.	0	0	0	0	0	5	0	5	0	0	2	2	0	1	1	2
+30 mins.	0	0	0	0	3	2	0	5	0	0	4	4	0	1	1	2
+45 mins.	0	0	1	1	2	1	0	3	1	0	2	3	0	2	3	5
Total Volume	0	0	1	1	6	10	0	16	2	0	12	14	0	8	5	13
% App. Total	0	0	100		37.5	62.5	0		14.3	0	85.7		0	61.5	38.5	
PHF	.000	.000	.250	.250	.500	.500	.000	.800	.500	.000	.750	.700	.000	.500	.417	.650

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- Passenger Vehicles - Large 2 Axle Vehicles - 3 Axle Vehicles - 4+ Axle Trucks

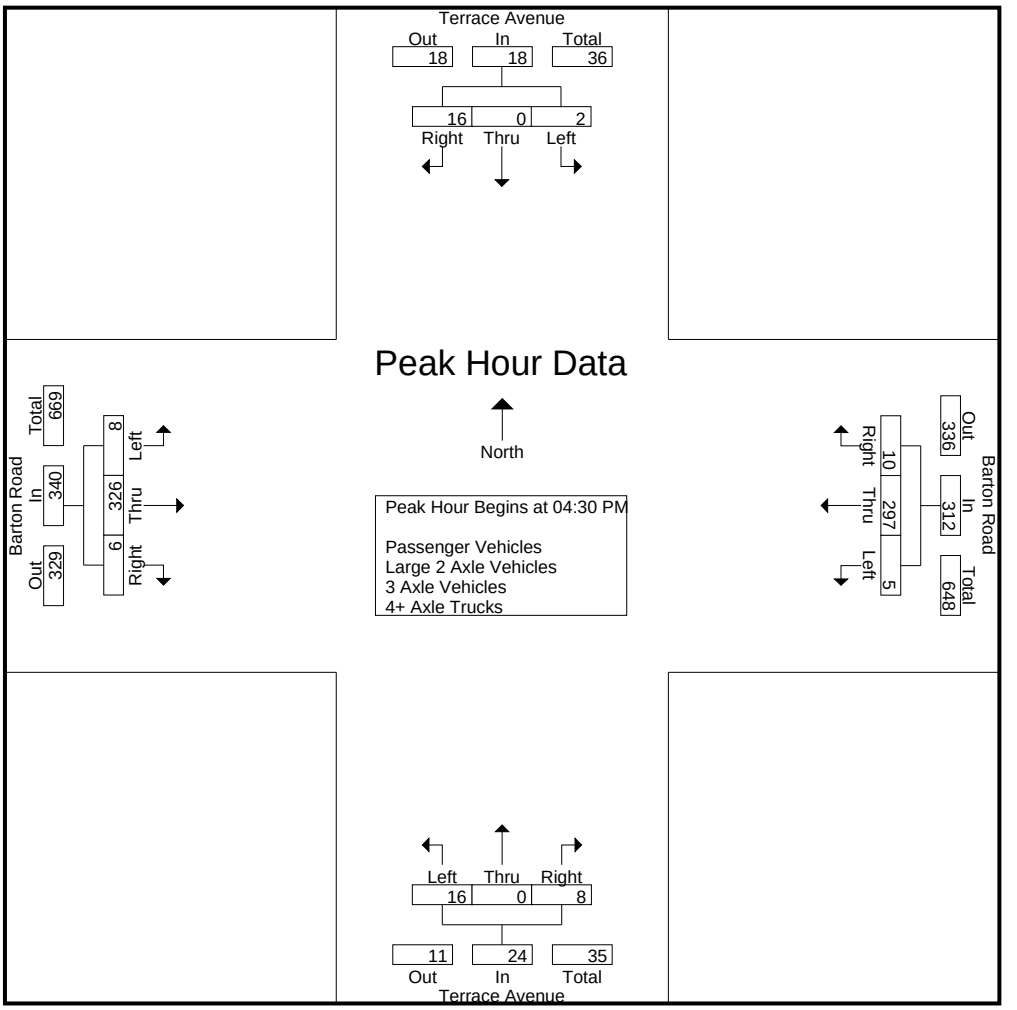
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	0	7	8	1	69	3	73	5	1	0	6	4	79	3	86	173
04:15 PM	1	0	0	1	1	74	3	78	2	0	1	3	1	78	0	79	161
04:30 PM	1	0	3	4	2	79	1	82	7	0	2	9	4	70	3	77	172
04:45 PM	1	0	4	5	1	66	4	71	2	0	2	4	3	94	2	99	179
Total	4	0	14	18	5	288	11	304	16	1	5	22	12	321	8	341	685
05:00 PM	0	0	7	7	0	77	0	77	5	0	3	8	0	85	1	86	178
05:15 PM	0	0	2	2	2	75	5	82	2	0	1	3	1	77	0	78	165
05:30 PM	1	0	1	2	0	72	1	73	0	0	1	1	1	88	1	90	166
05:45 PM	0	0	1	1	1	65	3	69	1	0	2	3	2	82	0	84	157
Total	1	0	11	12	3	289	9	301	8	0	7	15	4	332	2	338	666
Grand Total	5	0	25	30	8	577	20	605	24	1	12	37	16	653	10	679	1351
Apprch %	16.7	0	83.3		1.3	95.4	3.3		64.9	2.7	32.4		2.4	96.2	1.5		
Total %	0.4	0	1.9	2.2	0.6	42.7	1.5	44.8	1.8	0.1	0.9	2.7	1.2	48.3	0.7	50.3	
Passenger Vehicles	5	0	24	29	2	562	19	583	21	0	7	28	10	627	5	642	1282
% Passenger Vehicles	100	0	96	96.7	25	97.4	95	96.4	87.5	0	58.3	75.7	62.5	96	50	94.6	94.9
Large 2 Axle Vehicles	0	0	0	0	3	9	0	12	1	0	2	3	4	18	4	26	41
% Large 2 Axle Vehicles	0	0	0	0	37.5	1.6	0	2	4.2	0	16.7	8.1	25	2.8	40	3.8	3
3 Axle Vehicles	0	0	1	1	1	1	1	3	1	1	0	2	2	0	0	2	8
% 3 Axle Vehicles	0	0	4	3.3	12.5	0.2	5	0.5	4.2	100	0	5.4	12.5	0	0	0.3	0.6
4+ Axle Trucks	0	0	0	0	2	5	0	7	1	0	3	4	0	8	1	9	20
% 4+ Axle Trucks	0	0	0	0	25	0.9	0	1.2	4.2	0	25	10.8	0	1.2	10	1.3	1.5

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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	1	0	3	4	2	79	1	82	7	0	2	9	4	70	3	77	172
04:45 PM	1	0	4	5	1	66	4	71	2	0	2	4	3	94	2	99	179
05:00 PM	0	0	7	7	0	77	0	77	5	0	3	8	0	85	1	86	178
05:15 PM	0	0	2	2	2	75	5	82	2	0	1	3	1	77	0	78	165
Total Volume	2	0	16	18	5	297	10	312	16	0	8	24	8	326	6	340	694
% App. Total	11.1	0	88.9		1.6	95.2	3.2		66.7	0	33.3		2.4	95.9	1.8		
PHF	.500	.000	.571	.643	.625	.940	.500	.951	.571	.000	.667	.667	.500	.867	.500	.859	.969

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
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:

	04:00 PM				04:30 PM				04:15 PM				04:45 PM			
+0 mins.	1	0	7	8	2	79	1	82	2	0	1	3	3	94	2	99
+15 mins.	1	0	0	1	1	66	4	71	7	0	2	9	0	85	1	86
+30 mins.	1	0	3	4	0	77	0	77	2	0	2	4	1	77	0	78
+45 mins.	1	0	4	5	2	75	5	82	5	0	3	8	1	88	1	90
Total Volume	4	0	14	18	5	297	10	312	16	0	8	24	5	344	4	353
% App. Total	22.2	0	77.8		1.6	95.2	3.2		66.7	0	33.3		1.4	97.5	1.1	
PHF	1.000	.000	.500	.563	.625	.940	.500	.951	.571	.000	.667	.667	.417	.915	.500	.891

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- Large 2 Axle Vehicles

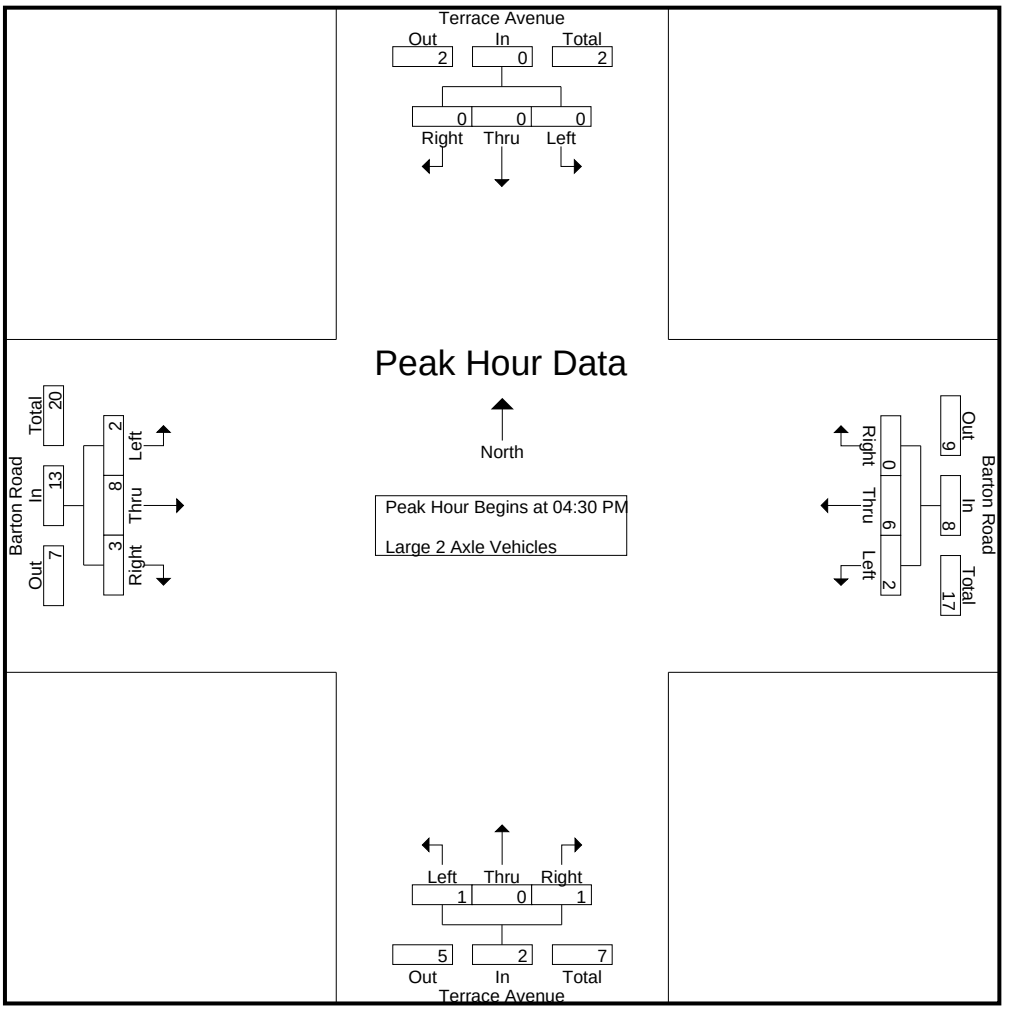
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	0	2	0	2	0	0	0	0	1	5	1	7	9
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	4	0	4	5
04:30 PM	0	0	0	0	0	3	0	3	0	0	1	1	0	1	1	2	6
04:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	2	4	1	7	8
Total	0	0	0	0	1	5	0	6	0	0	2	2	3	14	3	20	28
05:00 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	3	1	4	6
05:15 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	3
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	1	1	0	2	0	0	0	0	1	1	0	2	4
Total	0	0	0	0	2	4	0	6	1	0	0	1	1	4	1	6	13
Grand Total	0	0	0	0	3	9	0	12	1	0	2	3	4	18	4	26	41
Apprch %	0	0	0		25	75	0		33.3	0	66.7		15.4	69.2	15.4		
Total %	0	0	0	0	7.3	22	0	29.3	2.4	0	4.9	7.3	9.8	43.9	9.8	63.4	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	3	0	3	0	0	1	1	0	1	1	2	6
04:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	2	4	1	7	8
05:00 PM	0	0	0	0	0	1	0	1	1	0	0	1	0	3	1	4	6
05:15 PM	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	3
Total Volume	0	0	0	0	2	6	0	8	1	0	1	2	2	8	3	13	23
% App. Total	0	0	0		25	75	0		50	0	50		15.4	61.5	23.1		
PHF	.000	.000	.000	.000	.500	.500	.000	.667	.250	.000	.250	.500	.250	.500	.750	.464	.719

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	3	0	3	0	0	1	1	0	1	1	2
+15 mins.	0	0	0	0	1	0	0	1	0	0	0	0	2	4	1	7
+30 mins.	0	0	0	0	0	1	0	1	1	0	0	1	0	3	1	4
+45 mins.	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	2	6	0	8	1	0	1	2	2	8	3	13
% App. Total	0	0	0		25	75	0		50	0	50		15.4	61.5	23.1	
PHF	.000	.000	.000	.000	.500	.500	.000	.667	.250	.000	.250	.500	.250	.500	.750	.464

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- 3 Axle Vehicles

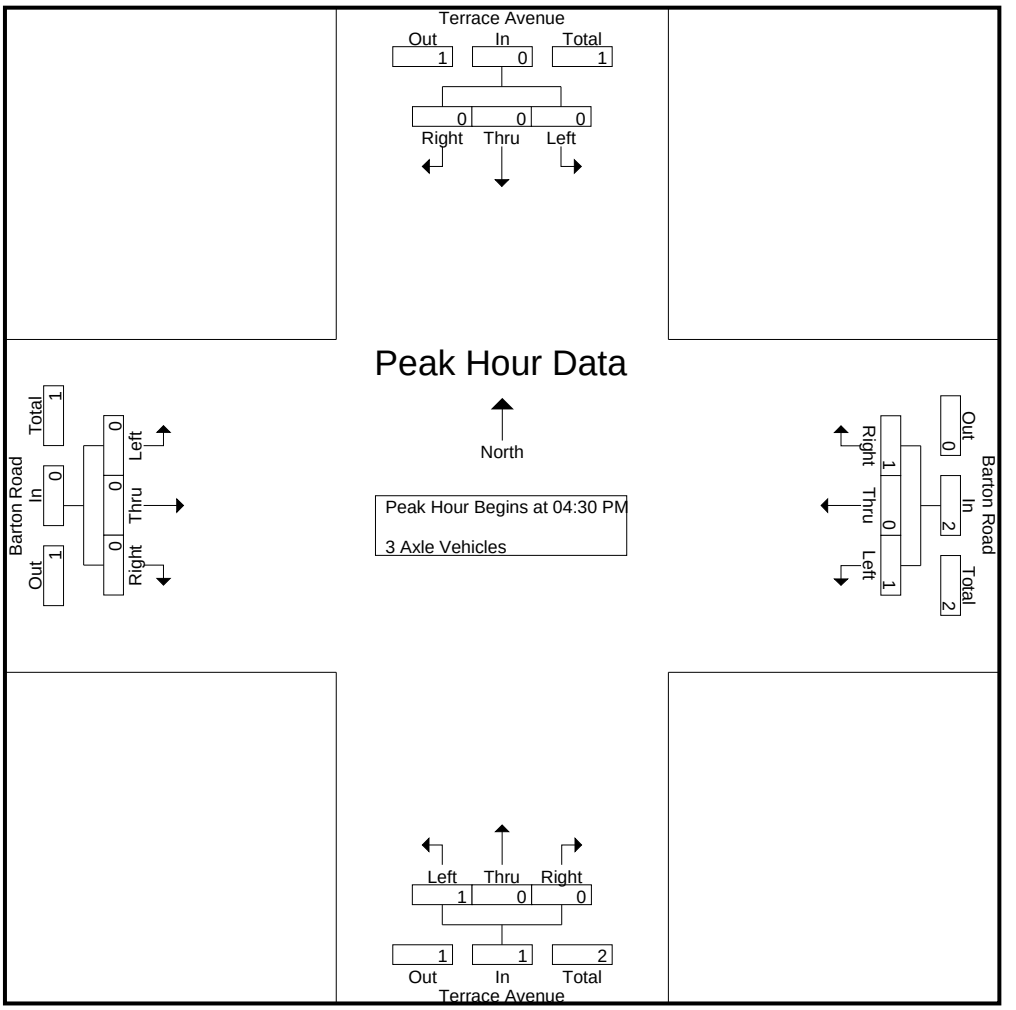
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	1	1	0	0	0	0	0	1	0	1	1	0	0	1	3
04:15 PM	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	2
04:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	2
Total	0	0	1	1	1	1	1	3	1	1	0	2	2	0	0	2	8
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	1	1	1	1	1	3	1	1	0	2	2	0	0	2	8
Apprch %	0	0	100		33.3	33.3	33.3		50	50	0		100	0	0		
Total %	0	0	12.5	12.5	12.5	12.5	12.5	37.5	12.5	12.5	0	25	25	0	0	25	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	0	1	2	1	0	0	1	0	0	0	0	3
% App. Total	0	0	0		50	0	50		100	0	0		0	0	0		
PHF	.000	.000	.000	.000	.250	.000	.250	.500	.250	.000	.000	.250	.000	.000	.000	.000	.375

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
+15 mins.	0	0	0	0	0	0	1	1	1	0	0	1	0	0	0	0
+30 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	1	0	1	2	1	0	0	1	0	0	0	0
% App. Total	0	0	0		50	0	50		100	0	0		0	0	0	
PHF	.000	.000	.000	.000	.250	.000	.250	.500	.250	.000	.000	.250	.000	.000	.000	.000

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 1

Groups Printed- 4+ Axle Trucks

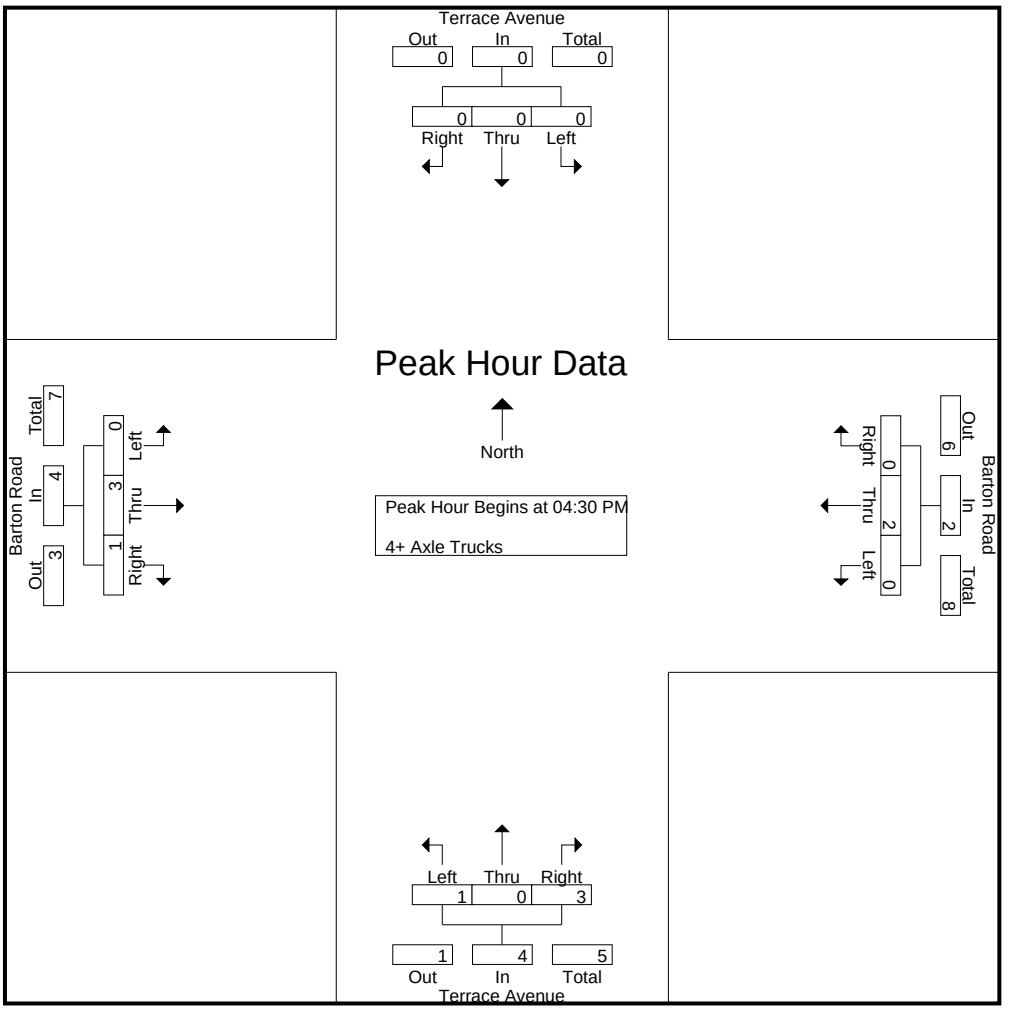
	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	1	2
04:15 PM	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	2	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total	0	0	0	0	2	1	0	3	0	0	1	1	0	3	1	4	8
05:00 PM	0	0	0	0	0	2	0	2	1	0	2	3	0	0	0	0	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
05:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	2	0	2	3
Total	0	0	0	0	0	4	0	4	1	0	2	3	0	5	0	5	12
Grand Total	0	0	0	0	2	5	0	7	1	0	3	4	0	8	1	9	20
Apprch %	0	0	0		28.6	71.4	0		25	0	75		0	88.9	11.1		
Total %	0	0	0	0	10	25	0	35	5	0	15	20	0	40	5	45	

	Terrace Avenue Southbound				Barton Road Westbound				Terrace Avenue Northbound				Barton Road 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 04:30 PM to 05:15 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	2	3
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
05:00 PM	0	0	0	0	0	2	0	2	1	0	2	3	0	0	0	0	5
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
Total Volume	0	0	0	0	0	2	0	2	1	0	3	4	0	3	1	4	10
% App. Total	0	0	0		0	100	0		25	0	75		0	75	25		
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.375	.333	.000	.750	.250	.500	.500

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

City of Grand Terrace
N/S:Terrace Avenue
E/W: Barton Road
Weather: Clear

File Name : 03_GTC_Terrace_Barton_PM
Site Code : 00319397
Start Date : 5/23/2019
Page No : 2



Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:30 PM				04:30 PM				04:30 PM				04:30 PM			
+0 mins.	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	2
+15 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
+30 mins.	0	0	0	0	0	2	0	2	1	0	2	3	0	0	0	0
+45 mins.	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Total Volume	0	0	0	0	0	2	0	2	1	0	3	4	0	3	1	4
% App. Total	0	0	0		0	100	0		25	0	75		0	75	25	
PHF	.000	.000	.000	.000	.000	.250	.000	.250	.250	.000	.375	.333	.000	.750	.250	.500

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 cs@aimtd.com

DATE: Tue, Jan 30, 18

LOCATION: Grand Terrace
NORTH & SOUTH: Grand Terrace
EAST & WEST: Barton

PROJECT #: SC1597
LOCATION #: 1
CONTROL: STOP S

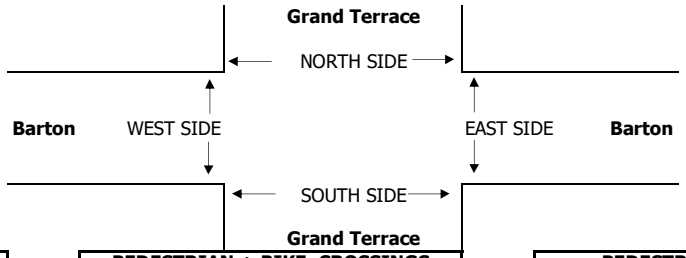
NOTES: Queue EB PM; Construction South side

AM / PM / MD / OTHER / OTHER

N ▲ S ▼ W ◄ E ►

☑ Add U-Turns to Left Turns

		NORTHBOUND Grand Terrace			SOUTHBOUND Grand Terrace			EASTBOUND Barton			WESTBOUND Barton				U-TURNS				
	LANES:	NL X	NT X	NR X	SL 0	ST X	SR 0	EL 0	ET 1	ER X	WL X	WT 1	WR 0	TOTAL	NB 0	SB 0	EB 0	WB 0	TTL
AM	7:00 AM	0	0	0	30	0	18	0	55	4	79	61	0	247	0	0	0	0	0
	7:15 AM	0	0	0	23	1	16	0	71	5	82	60	0	258	0	0	0	0	0
	7:30 AM	0	0	0	17	1	21	0	71	9	87	59	0	265	0	0	0	0	0
	7:45 AM	0	0	0	19	0	21	0	62	5	67	66	0	240	0	0	0	0	0
	8:00 AM	0	0	0	35	1	10	0	36	11	62	54	0	209	0	0	0	0	0
	8:15 AM	0	0	0	30	2	13	0	58	7	63	32	0	205	0	0	0	1	1
	8:30 AM	0	0	0	38	1	17	0	56	8	65	42	0	227	0	0	0	0	0
	8:45 AM	0	0	0	48	1	18	0	54	9	34	36	0	200	0	0	0	0	0
	VOLUMES	0	0	0	240	7	134	0	463	58	539	410	0	1,851	0	0	0	1	1
	APPROACH %	0%	0%	0%	63%	2%	35%	0%	89%	11%	57%	43%	0%						
	APP/DEPART	0	/	0	381	/	603	521	/	704	949	/	544	0					
	BEGIN PEAK HR		7:00 AM																
	VOLUMES	0	0	0	89	2	76	0	259	23	315	246	0	1,010					
	APPROACH %	0%	0%	0%	53%	1%	46%	0%	92%	8%	56%	44%	0%						
	PEAK HR FACTOR		0.000			0.870			0.881			0.961		0.953					
	APP/DEPART	0	/	0	167	/	340	282	/	348	561	/	322	0					
PM	4:00 PM	0	0	0	10	0	6	11	76	0	0	59	7	169	0	0	0	0	0
	4:15 PM	0	0	0	44	0	27	0	73	13	48	41	0	246	0	0	0	0	0
	4:30 PM	0	0	0	34	1	20	0	80	7	43	57	0	242	0	0	0	0	0
	4:45 PM	0	0	0	34	0	25	0	77	6	68	41	0	251	0	0	0	0	0
	5:00 PM	0	0	0	47	0	18	0	76	7	55	50	0	253	0	0	0	0	0
	5:15 PM	0	0	0	51	2	32	0	74	3	54	61	0	277	0	0	0	0	0
	5:30 PM	0	0	0	32	0	20	0	54	1	48	55	0	210	0	0	0	0	0
	5:45 PM	0	0	0	37	1	19	0	63	5	51	55	0	231	0	0	0	0	0
	VOLUMES	0	0	0	289	4	167	11	573	42	367	419	7	1,879	0	0	0	0	0
	APPROACH %	0%	0%	0%	63%	1%	36%	2%	92%	7%	46%	53%	1%						
	APP/DEPART	0	/	18	460	/	413	626	/	862	793	/	586	0					
	BEGIN PEAK HR		4:30 PM																
	VOLUMES	0	0	0	166	3	95	0	307	23	220	209	0	1,023					
	APPROACH %	0%	0%	0%	63%	1%	36%	0%	93%	7%	51%	49%	0%						
	PEAK HR FACTOR		0.000			0.776			0.948			0.933		0.923					
	APP/DEPART	0	/	0	264	/	246	330	/	473	429	/	304	0					



		PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	N SIDE	S SIDE	E SIDE	W SIDE	TOTAL	NS	SS	ES	WS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	8:15 AM	3	0	0	0	3	3	0	0	0	3	0	0	0	0	0
	8:30 AM	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	8:45 AM	4	0	0	0	4	4	0	0	0	4	0	0	0	0	0
	TOTAL	9	0	0	0	9	9	0	0	0	9	0	0	0	0	0
	AM	BEGIN PEAK HR		7:00 AM			0	0	0	0	0					
PM	4:00 PM	PEDESTRIAN + BIKE CROSSINGS					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
	4:15 PM	3	0	0	0	3	1	0	0	0	1	2	0	0	0	2
	4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:45 PM	2	0	0	0	2	2	0	0	0	2	0	0	0	0	0
	5:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1
	5:15 PM	2	0	0	0	2	1	0	0	0	1	1	0	0	0	1
	5:30 PM	6	0	0	0	6	5	0	0	0	5	1	0	0	0	1
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0
	PM	BEGIN PEAK HR		4:30 PM			0	0	0	0	0	4	1	0	0	5

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

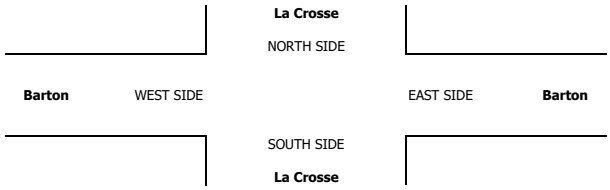
DATE:	LOCATION:	Colton	PROJECT #:	SC0841
Tue, Feb 2, 16	NORTH & SOUTH:	La Crosse	LOCATION #:	17
	EAST & WEST:	Barton	CONTROL:	STOP N/S

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N / ◄ W / E ► / S ▼

Add U-Turns to Left Turns

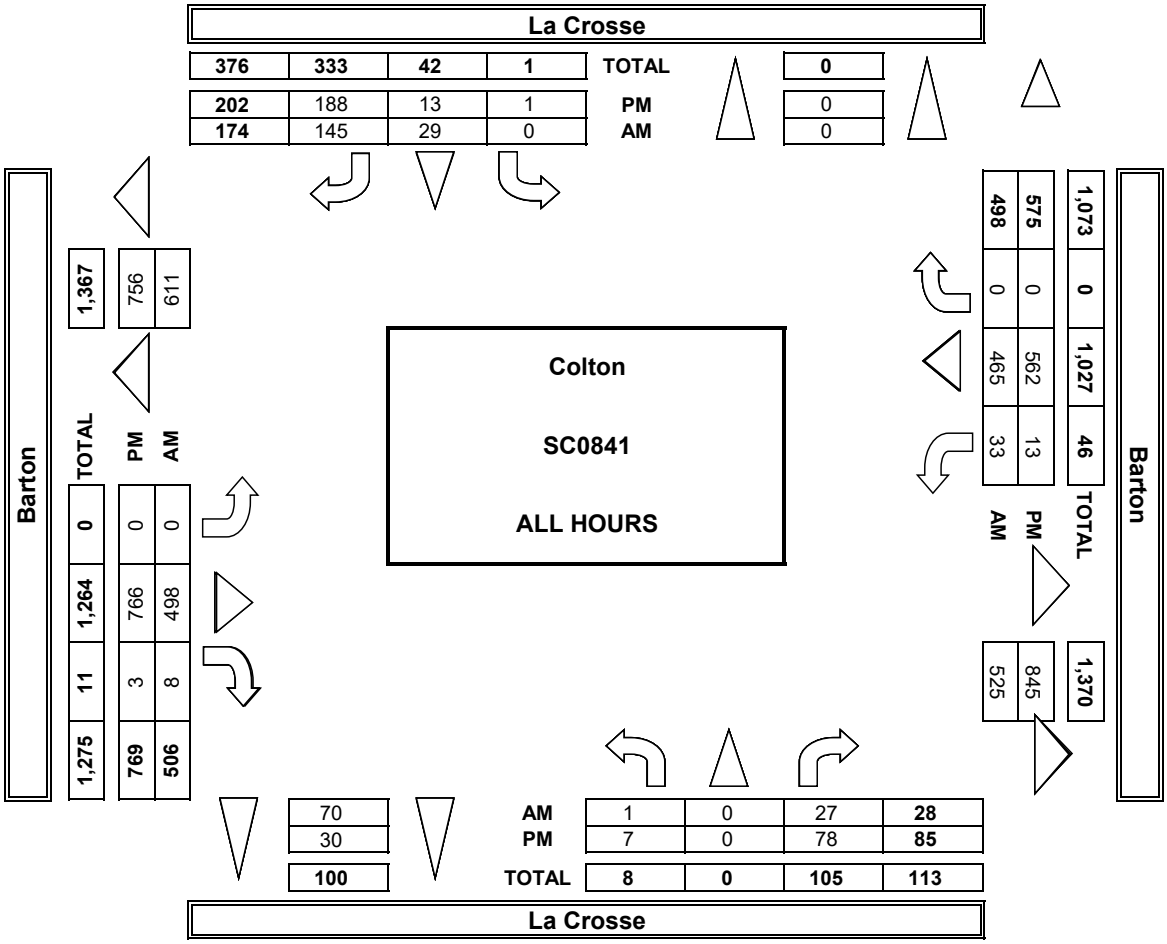
		NORTHBOUND (La Crosse)			SOUTHBOUND (La Crosse)			EASTBOUND (Barton)			WESTBOUND (Barton)				U-TURNS					RTOR			
	LANES:	NL 0	NT X	NR 0	SL X	ST 0.5	SR 0.5	EL X	ET 2	ER 0	WL 0	WT 2	WR X	TOTAL	NB X	SB X	EB X	WB X	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	0	0	1	0	3	13	0	76	0	2	45	0	140	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	2	0	2	19	0	80	1	2	73	0	179	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	1	0	1	17	0	73	0	1	104	0	197	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	1	0	7	30	0	74	1	6	76	0	195	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	3	0	8	21	0	49	3	8	53	0	145	0	0	0	0	0	0	0	0	0
	8:15 AM	1	0	8	0	4	15	0	51	0	3	37	0	119	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	5	0	2	15	0	50	0	3	50	0	125	0	0	0	0	0	0	0	0	0
	8:45 AM	0	0	6	0	2	15	0	45	3	8	27	0	106	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	0	27	0	29	145	0	498	8	33	465	0	1,206	0	0	0	0	0	0	0	0	0
	APPROACH %	4%	0%	96%	0%	17%	83%	0%	98%	2%	7%	93%	0%										
	APP/DEPART	28	/	0	174	/	70	506	/	525	498	/	611	0									
	BEGIN PEAK HR		7:15 AM																				
	VOLUMES	0	0	7	0	18	87	0	276	5	17	306	0	716						0	0	0	0
	APPROACH %	0%	0%	100%	0%	17%	83%	0%	98%	2%	5%	95%	0%										
	PEAK HR FACTOR		0.583			0.709			0.867			0.769		0.909									
	APP/DEPART	7	/	0	105	/	40	281	/	283	323	/	393	0									
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	9	0	2	22	0	101	0	4	64	0	202	0	0	0	0	0	0	0	0	0
	4:15 PM	1	0	8	0	4	23	0	90	1	0	72	0	199	0	0	0	0	0	0	0	0	0
	4:30 PM	2	0	6	0	5	17	0	93	0	2	52	0	177	1	0	0	0	1	0	0	0	0
	4:45 PM	0	0	4	1	0	24	0	104	0	1	68	0	202	0	0	0	0	0	0	0	0	0
	5:00 PM	0	0	28	0	0	16	0	98	1	3	63	0	209	0	0	0	0	0	0	0	0	0
	5:15 PM	1	0	8	0	1	26	0	90	0	1	86	0	213	0	0	0	0	0	0	0	0	0
	5:30 PM	1	0	11	0	1	26	0	110	0	1	80	0	230	0	0	0	0	0	0	0	0	0
	5:45 PM	2	0	4	0	0	34	0	80	1	1	77	0	199	0	0	0	0	0	0	0	0	0
	VOLUMES	7	0	78	1	13	188	0	766	3	13	562	0	1,631	1	0	0	0	1	0	0	0	0
	APPROACH %	8%	0%	92%	0%	6%	93%	0%	100%	0%	2%	98%	0%										
	APP/DEPART	85	/	0	202	/	30	769	/	845	575	/	756	0									
	BEGIN PEAK HR		4:45 PM																				
	VOLUMES	2	0	51	1	2	92	0	402	1	6	297	0	854						0	0	0	0
	APPROACH %	4%	0%	96%	1%	2%	97%	0%	100%	0%	2%	98%	0%										
	PEAK HR FACTOR		0.473			0.880			0.916			0.871		0.928									
	APP/DEPART	53	/	0	95	/	9	403	/	454	303	/	391	0									

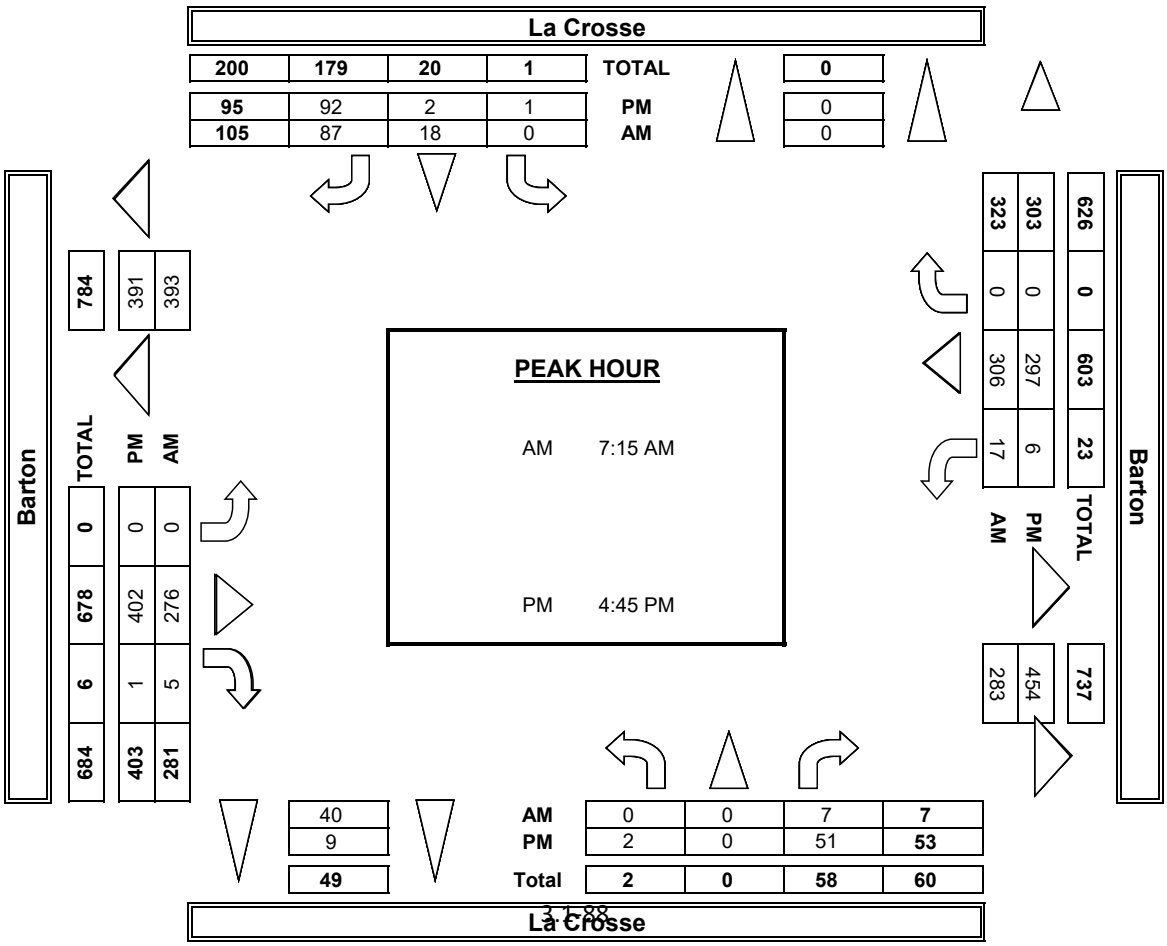


		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	7:30 AM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	7:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	8:45 AM	0	0	0	3	3	0	0	0	2	2	0	0	0	1	1
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	1	6	7	0	0	0	2	2	0	0	1	0	1
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	4:30 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	4:45 PM	0	0	1	3	4	0	0	0	3	3	0	0	1	0	1
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	5:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	1	7	8	0	0	0	4	4	0	0	1	1	2

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	17
TUESDAY	EAST & WEST:	Barton	CONTROL:	STOP N/S

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND Barton			WESTBOUND Barton			
	LANES:	NL 0	NT X	NR 0	SL X	ST 0.5	SR 0.5	EL X	ET 2	ER 0	WL 0	WT 2	WR X	TOTAL
AM	7:00 AM	0	0	0	0	0	1	0	10	0	0	1	0	12
	7:15 AM	0	0	0	0	0	1	0	4	0	0	1	0	6
	7:30 AM	0	0	0	0	0	2	0	6	0	0	1	0	9
	7:45 AM	0	0	1	0	0	2	0	9	1	0	1	0	14
	8:00 AM	0	0	0	0	1	0	0	2	1	0	1	0	5
	8:15 AM	0	0	3	0	1	1	0	10	0	0	2	0	17
	8:30 AM	0	0	0	0	0	1	0	2	0	1	3	0	7
	8:45 AM	0	0	0	0	1	0	0	6	2	3	1	0	13
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	4	0	3	8	0	49	4	4	11	0	83
	APPROACH %	0%	0%	100%	0%	27%	73%	0%	92%	8%	27%	73%	0%	
	APP/DEPART	4	/	0	11	/	11	53	/	53	15	/	19	0
	BEGIN PEAK HR		7:30 AM											
	VOLUMES	0	0	4	0	2	5	0	27	2	0	5	0	45
	APPROACH %	0%	0%	100%	0%	29%	71%	0%	93%	7%	0%	100%	0%	
	PEAK HR FACTOR		0.333			0.875			0.725			0.625		0.662
	APP/DEPART	4	/	0	7	/	4	29	/	31	5	/	10	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	1	0	0	1	0	5	0	2	6	0	15
	4:15 PM	1	0	3	0	1	1	0	4	0	0	4	0	14
	4:30 PM	0	0	1	0	0	1	0	1	0	1	3	0	7
	4:45 PM	0	0	0	0	0	1	0	2	0	0	4	0	7
	5:00 PM	0	0	2	0	0	2	0	1	0	0	2	0	7
	5:15 PM	0	0	1	0	0	1	0	1	0	0	0	0	3
	5:30 PM	0	0	0	0	0	1	0	1	0	0	1	0	3
	5:45 PM	1	0	0	0	0	0	0	0	0	0	2	0	3
	VOLUMES	2	0	8	0	1	8	0	15	0	3	22	0	59
	APPROACH %	20%	0%	80%	0%	11%	89%	0%	100%	0%	12%	88%	0%	
	APP/DEPART	10	/	0	9	/	4	15	/	23	25	/	32	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	1	0	5	0	1	4	0	12	0	3	17	0	43
	APPROACH %	17%	0%	83%	0%	20%	80%	0%	100%	0%	15%	85%	0%	
	PEAK HR FACTOR		0.375			0.625			0.600			0.625		0.717
	APP/DEPART	6	/	0	5	/	4	12	/	17	20	/	22	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	17
TUESDAY	EAST & WEST:	Barton	CONTROL:	STOP N/S

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND (La Crosse)			SOUTHBOUND (La Crosse)			EASTBOUND (Barton)			WESTBOUND (Barton)			
LANES:	NL 0	NT X	NR 0	SL X	ST 0.5	SR 0.5	EL X	ET 2	ER 0	WL 0	WT 2	WR X	TOTAL
AM													
7:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	2	0	1	0	0	3
8:00 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
8:15 AM	0	0	1	0	0	1	0	2	0	0	0	0	4
8:30 AM	0	0	0	0	0	1	0	0	0	0	1	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	0	0	1	0	1	2	0	7	0	2	1	0	14
APPROACH %	0%	0%	100%	0%	33%	67%	0%	100%	0%	67%	33%	0%	
APP/DEPART	1	/	0	3	/	3	7	/	8	3	/	3	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	0	0	1	0	1	2	0	4	0	1	1	0	10
APPROACH %	0%	0%	100%	0%	33%	67%	0%	100%	0%	50%	50%	0%	
PEAK HR FACTOR		0.250			0.750			0.500			0.500		0.625
APP/DEPART	1	/	0	3	/	2	4	/	5	2	/	3	0
PM													
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	1
5:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
VOLUMES	0	0	0	0	0	1	0	1	0	1	1	0	4
APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	50%	50%	0%	
APP/DEPART	0	/	0	1	/	1	1	/	1	2	/	2	0
BEGIN PEAK HR		3:30 PM											
VOLUMES	0	0	0	0	0	1	0	0	0	1	0	0	2
APPROACH %	0%	0%	0%	0%	0%	100%	0%	0%	0%	100%	0%	0%	
PEAK HR FACTOR		0.000			0.250			0.000			0.250		0.500
APP/DEPART	0	/	0	1	/	1	0	/	0	1	/	1	0

U-TURNS

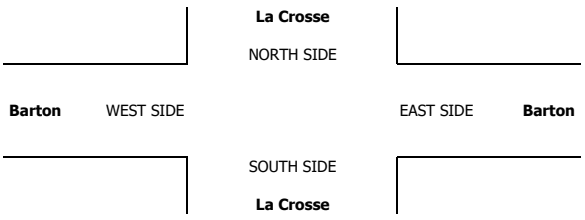
NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

NRR	SRR	ERR	WRR
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

0	0	0	0

0	0	0	0



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	17
TUESDAY	EAST & WEST:	Barton	CONTROL:	STOP N/S

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND Barton			WESTBOUND Barton			
	LANES:	NL 0	NT X	NR 0	SL X	ST 0.5	SR 0.5	EL X	ET 2	ER 0	WL 0	WT 2	WR X	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	2	0	0	0	0	2
	7:15 AM	0	0	0	0	0	0	0	2	0	0	1	0	3
	7:30 AM	0	0	0	0	0	2	0	0	0	0	2	0	4
	7:45 AM	0	0	0	0	0	2	0	2	0	0	1	0	5
	8:00 AM	0	0	0	0	0	1	0	2	0	0	2	0	5
	8:15 AM	0	0	0	0	0	2	0	4	0	0	1	0	7
	8:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	1
	8:45 AM	0	0	0	0	0	2	0	1	0	0	1	0	4
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	0	0	9	0	14	0	0	8	0	31
	APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	100%	0%	
	APP/DEPART	0	/	0	9	/	0	14	/	14	8	/	17	0
	BEGIN PEAK HR		7:30 AM											
	VOLUMES	0	0	0	0	0	7	0	8	0	0	6	0	21
	APPROACH %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%	100%	0%	
	PEAK HR FACTOR		0.000			0.875			0.500			0.750		0.750
	APP/DEPART	0	/	0	7	/	0	8	/	8	6	/	13	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
	4:15 PM	0	0	0	0	0	2	0	1	0	0	0	0	3
	4:30 PM	1	0	0	0	0	0	0	2	0	0	0	0	3
	4:45 PM	0	0	1	0	0	0	0	3	0	0	0	0	4
	5:00 PM	0	0	0	0	0	1	0	1	0	0	1	0	3
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	1	0	0	1	0	1	0	0	0	0	3
	5:45 PM	0	0	0	0	0	2	0	0	0	0	1	0	3
	VOLUMES	1	0	2	0	0	6	0	8	0	0	3	0	20
	APPROACH %	33%	0%	67%	0%	0%	100%	0%	100%	0%	0%	100%	0%	
	APP/DEPART	3	/	0	6	/	1	8	/	10	3	/	9	0
	BEGIN PEAK HR		4:15 PM											
	VOLUMES	0	0	1	0	0	3	0	7	0	0	1	0	13
	APPROACH %	0%	0%	50%	0%	0%	100%	0%	100%	0%	0%	100%	0%	
	PEAK HR FACTOR		0.500			0.375			0.583			0.250		0.813
	APP/DEPART	2	/	0	3	/	1	7	/	8	1	/	4	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

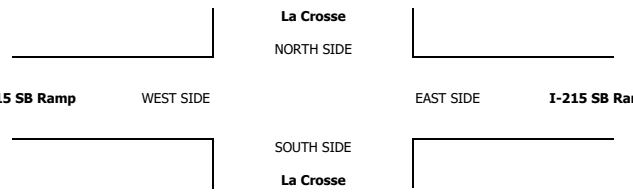
DATE:	LOCATION:	Colton	PROJECT #:	SC0841
Tue, Feb 2, 16	NORTH & SOUTH:	La Crosse	LOCATION #:	19
	EAST & WEST:	I-215 SB Ramp	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

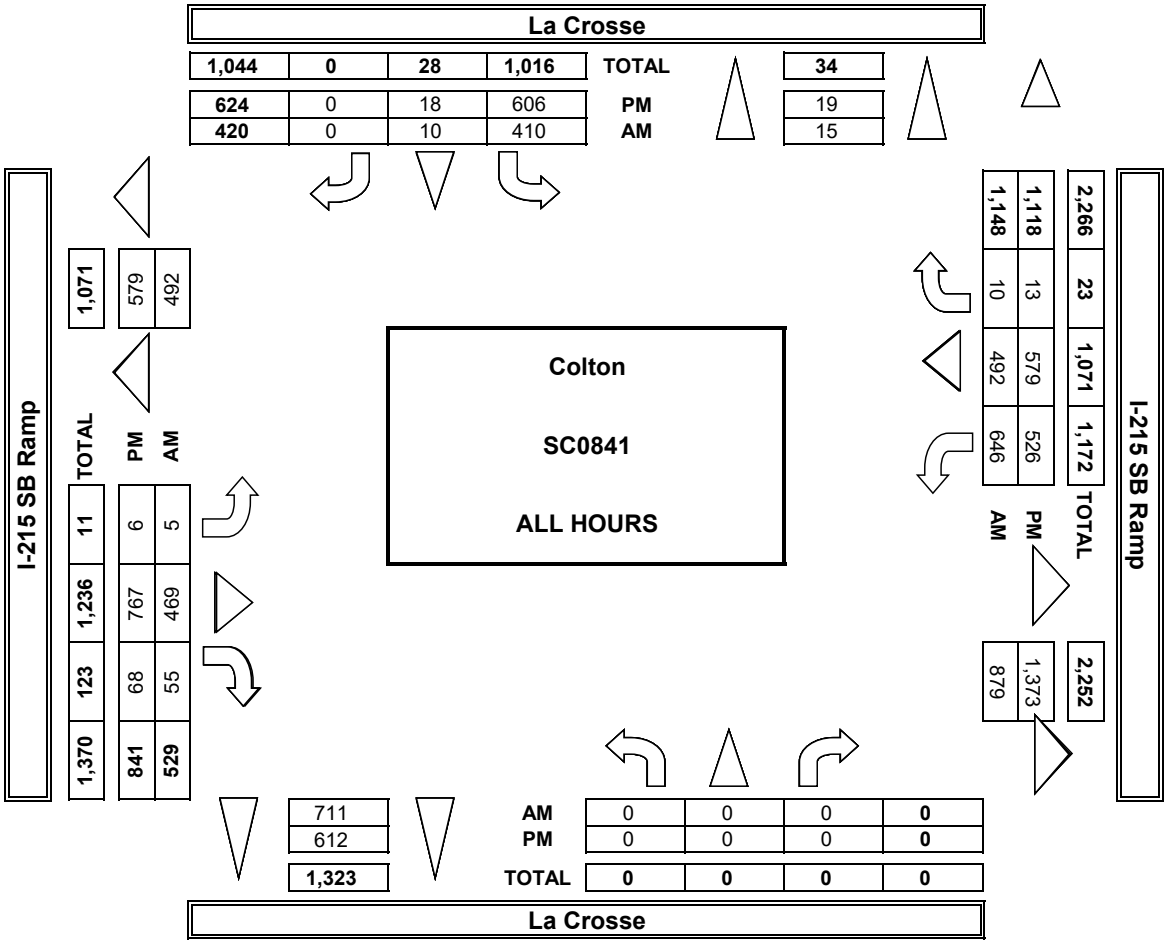
		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND I-215 SB Ramp			WESTBOUND I-215 SB Ramp				U-TURNS					RTOR			
	LANES:	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL	NB	SB	EB	WB	TTL	NRR	SRR	ERR	WRR
		X	X	X	0.5	0.5	X	0	2	0	1	1	0		X	X	X	X		0	0	0	0
AM	7:00 AM	0	0	0	74	0	0	0	63	11	87	49	1	285	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	62	1	0	0	72	7	115	76	4	337	0	0	0	0	0	0	0	0	2
	7:30 AM	0	0	0	31	4	0	0	69	4	108	103	0	319	0	0	0	0	0	0	0	1	0
	7:45 AM	0	0	0	41	0	0	3	66	8	74	80	0	272	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	41	2	0	0	50	4	62	61	2	222	0	0	0	0	0	0	0	0	1
	8:15 AM	0	0	0	62	2	0	1	50	9	61	38	0	223	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	52	0	0	1	49	7	83	50	2	244	0	0	0	0	0	0	0	2	0
	8:45 AM	0	0	0	47	1	0	0	50	5	56	35	1	195	0	0	0	0	0	0	0	0	0
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	410	10	0	5	469	55	646	492	10	2,097	0	0	0	0	0	0	0	3	3
	APPROACH %	0%	0%	0%	98%	2%	0%	1%	89%	10%	56%	43%	1%										
	APP/DEPART	0	/	15	420	/	711	529	/	879	1,148	/	492	0									
	BEGIN PEAK HR		7:00 AM																				
	VOLUMES	0	0	0	208	5	0	3	270	30	384	308	5	1,213						0	0	1	2
	APPROACH %	0%	0%	0%	98%	2%	0%	1%	89%	10%	55%	44%	1%										
	PEAK HR FACTOR		0.000			0.720			0.959			0.826		0.900									
	APP/DEPART	0	/	8	213	/	419	303	/	478	697	/	308	0									
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	84	2	0	0	98	14	80	69	2	349	0	0	0	0	0	0	0	5	1
	4:15 PM	0	0	0	78	3	0	0	87	10	57	69	2	306	0	0	0	0	0	0	0	4	2
	4:30 PM	0	0	0	72	3	0	1	88	11	68	66	0	309	0	0	0	0	0	0	0	1	0
	4:45 PM	0	0	0	81	3	0	2	103	3	57	70	3	322	0	0	0	0	0	0	0	1	0
	5:00 PM	0	0	0	63	1	0	0	112	16	75	64	1	332	0	0	0	0	0	0	0	9	0
	5:15 PM	0	0	0	71	3	0	1	93	3	61	88	2	322	0	0	0	0	0	0	0	1	0
	5:30 PM	0	0	0	75	1	0	1	108	6	60	78	1	330	0	0	0	0	0	0	0	3	0
	5:45 PM	0	0	0	82	2	0	1	78	5	68	75	2	313	0	0	0	0	0	0	0	2	0
	VOLUMES	0	0	0	606	18	0	6	767	68	526	579	13	2,583	0	0	0	0	0	0	0	26	3
	APPROACH %	0%	0%	0%	97%	3%	0%	1%	91%	8%	47%	52%	1%										
	APP/DEPART	0	/	19	624	/	612	841	/	1,373	1,118	/	579	0									
	BEGIN PEAK HR		4:45 PM																				
	VOLUMES	0	0	0	290	8	0	4	416	28	253	300	7	1,306						0	0	14	0
	APPROACH %	0%	0%	0%	97%	3%	0%	1%	93%	6%	45%	54%	1%										
	PEAK HR FACTOR		0.000			0.887			0.875			0.927		0.983									
	APP/DEPART	0	/	11	298	/	289	448	/	706	560	/	300	0									

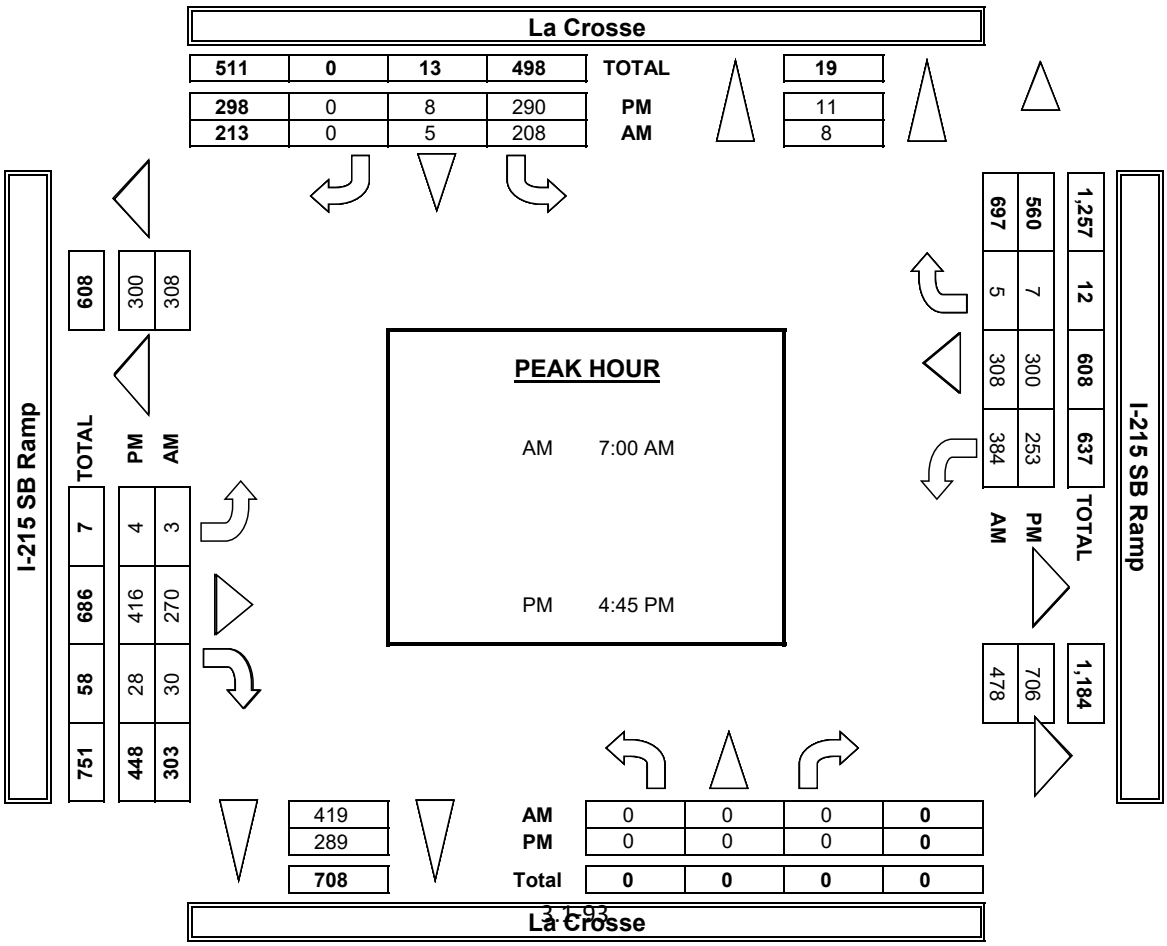


		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:30 AM	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0
	7:45 AM	0	0	1	0	1	0	0	0	0	0	0	0	1	0	1
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:30 AM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	8:45 AM	0	0	0	3	3	0	0	0	2	2	0	0	0	1	1
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	1	6	7	0	0	0	2	2	0	0	1	0	1
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	4:30 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	4:45 PM	0	0	1	3	4	0	0	0	3	3	0	0	1	0	1
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
	5:30 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	1	7	8	0	0	0	4	4	0	0	1	1	2

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	19
TUESDAY	EAST & WEST:	I-215 SB Ramp	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND I-215 SB Ramp			WESTBOUND I-215 SB Ramp			
	LANES:	NL X	NT X	NR X	SL 0.5	ST 0.5	SR X	EL 0	ET 2	ER 0	WL 1	WT 1	WR 0	TOTAL
AM	7:00 AM	0	0	0	5	0	0	0	7	2	1	1	0	16
	7:15 AM	0	0	0	3	0	0	0	2	1	9	2	0	17
	7:30 AM	0	0	0	1	0	0	0	8	1	3	0	0	13
	7:45 AM	0	0	0	3	0	0	0	5	4	4	0	0	16
	8:00 AM	0	0	0	4	0	0	0	2	1	3	2	0	12
	8:15 AM	0	0	0	5	1	0	0	8	4	4	2	0	24
	8:30 AM	0	0	0	3	0	0	0	1	1	8	4	0	17
	8:45 AM	0	0	0	6	0	0	0	7	1	2	3	0	19
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	30	1	0	0	40	15	34	14	0	134
	APPROACH %	0%	0%	0%	97%	3%	0%	0%	73%	27%	71%	29%	0%	
	APP/DEPART	0	/	0	31	/	50	55	/	70	48	/	14	0
	BEGIN PEAK HR		8:00 AM											
	VOLUMES	0	0	0	18	1	0	0	18	7	17	11	0	72
	APPROACH %	0%	0%	0%	95%	5%	0%	0%	72%	28%	61%	39%	0%	
	PEAK HR FACTOR		0.000			0.792			0.521			0.583		0.750
	APP/DEPART	0	/	0	19	/	25	25	/	36	28	/	11	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	1	0	0	0	7	1	1	7	0	17
	4:15 PM	0	0	0	2	0	0	0	3	1	2	4	0	12
	4:30 PM	0	0	0	4	0	0	0	1	0	3	4	0	12
	4:45 PM	0	0	0	1	0	0	0	1	1	1	4	0	8
	5:00 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
	5:15 PM	0	0	0	3	0	0	0	1	1	0	0	0	5
	5:30 PM	0	0	0	0	0	0	0	2	0	0	2	0	4
	5:45 PM	0	0	0	4	0	0	0	2	1	0	2	0	9
	VOLUMES	0	0	0	15	0	0	0	18	5	7	24	0	69
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	78%	22%	23%	77%	0%	
	APP/DEPART	0	/	0	15	/	12	23	/	33	31	/	24	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	0	0	0	8	0	0	0	12	3	7	19	0	49
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	80%	20%	27%	73%	0%	
	PEAK HR FACTOR		0.000			0.500			0.469			0.813		0.721
	APP/DEPART	0	/	0	8	/	10	15	/	20	26	/	19	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	19
TUESDAY	EAST & WEST:	I-215 SB Ramp	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND I-215 SB Ramp			WESTBOUND I-215 SB Ramp			
	LANES:	NL X	NT X	NR X	SL 0.5	ST 0.5	SR X	EL 0	ET 2	ER 0	WL 1	WT 1	WR 0	TOTAL
	7:00 AM	0	0	0	0	0	0	0	0	2	0	0	0	2
	7:15 AM	0	0	0	0	0	0	0	1	0	0	1	0	2
	7:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
	7:45 AM	0	0	0	2	0	0	0	2	0	1	0	0	5
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	0	0	0	1	0	0	0	2	0	0	0	0	3
	8:30 AM	0	0	0	0	0	0	0	0	0	2	1	0	3
	8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	3	0	0	0	5	2	4	3	0	17
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	71%	29%	57%	43%	0%	
	APP/DEPART	0	/	0	3	/	6	7	/	8	7	/	3	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	0	0	0	3	0	0	0	4	0	3	1	0	11
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	100%	0%	75%	25%	0%	
	PEAK HR FACTOR		0.000			0.375			0.500			0.333		0.550
#	APP/DEPART	0	/	0	3	/	3	4	/	7	4	/	1	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	0	1	0	0	0	1	0	0	0	0	2
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
PM	4:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	1
PM	4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	2
PM	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	5:30 PM	0	0	0	0	0	0	0	0	0	1	1	0	2
PM	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	VOLUMES	0	0	0	4	0	0	0	1	0	1	2	0	8
PM	APPROACH %	0%	0%	0%	100%	0%	0%	0%	100%	0%	33%	67%	0%	
PM	APP/DEPART	0	/	0	4	/	1	1	/	5	3	/	2	0
PM	BEGIN PEAK HR		3:45 PM											
PM	VOLUMES	0	0	0	2	0	0	0	0	0	1	1	0	4
PM	APPROACH %	0%	0%	0%	100%	0%	0%	0%	0%	0%	50%	50%	0%	
PM	PEAK HR FACTOR		0.000			0.250			0.000			0.250		0.500
PM	APP/DEPART	0	/	0	2	/	1	0	/	2	2	/	1	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	La Crosse	LOCATION #:	19
TUESDAY	EAST & WEST:	I-215 SB Ramp	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

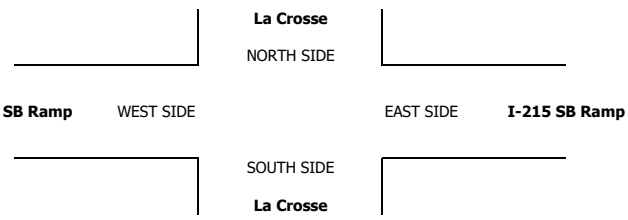
		NORTHBOUND La Crosse			SOUTHBOUND La Crosse			EASTBOUND I-215 SB Ramp			WESTBOUND I-215 SB Ramp			
	LANES:	NL X	NT X	NR X	SL 0.5	ST 0.5	SR X	EL 0	ET 2	ER 0	WL 1	WT 1	WR 0	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	1	1	0	0	0	2
	7:15 AM	0	0	0	0	0	0	0	2	1	0	1	0	4
	7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	7:45 AM	0	0	0	0	0	0	0	0	2	0	3	0	5
	8:00 AM	0	0	0	0	1	0	0	1	1	0	1	0	4
	8:15 AM	0	0	0	1	0	0	0	4	1	2	1	0	9
	8:30 AM	0	0	0	1	0	0	0	1	0	1	0	0	3
	8:45 AM	0	0	0	0	0	0	0	0	1	0	1	0	2
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	0	0	0	2	1	0	0	9	7	3	8	0	30
	APPROACH %	0%	0%	0%	67%	33%	0%	0%	56%	44%	27%	73%	0%	
	APP/DEPART	0	/	0	3	/	11	16	/	11	11	/	8	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	0	0	0	2	1	0	0	6	4	3	5	0	21
	APPROACH %	0%	0%	0%	67%	33%	0%	0%	60%	40%	38%	63%	0%	
	PEAK HR FACTOR		0.000			0.750			0.500			0.667		0.583
	APP/DEPART	0	/	0	3	/	8	10	/	8	8	/	5	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	0	0	0	0	0	0	0	0	0	1	1	0	2
	4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
	4:30 PM	0	0	0	0	0	0	0	1	1	1	0	0	3
	4:45 PM	0	0	0	0	0	0	0	4	0	0	0	0	4
	5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:30 PM	0	0	0	0	0	0	0	2	0	1	0	0	3
	5:45 PM	0	0	0	1	0	0	0	1	0	0	1	0	3
	VOLUMES	0	0	0	1	0	0	0	9	1	3	3	0	17
	APPROACH %	0%	0%	0%	100%	0%	0%	0%	90%	10%	50%	50%	0%	
	APP/DEPART	0	/	0	1	/	4	10	/	10	6	/	3	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	0	0	0	0	0	0	0	6	1	2	1	0	10
	APPROACH %	0%	0%	0%	0%	0%	0%	0%	86%	14%	67%	33%	0%	
	PEAK HR FACTOR		0.000			0.000			0.438			0.375		0.625
	APP/DEPART	0	/	0	0	/	3	7	/	6	3	/	1	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

NRR	SRR	ERR	WRR
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0



INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
Tue, Feb 2, 16	NORTH & SOUTH:	I-215 NB Ramp	LOCATION #:	21
	EAST & WEST:	Barton	CONTROL:	SIGNAL

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

Add U-Turns to Left Turns

		NORTHBOUND (I-215 NB Ramp)			SOUTHBOUND (I-215 NB Ramp)			EASTBOUND (Barton)			WESTBOUND (Barton)				U-TURNS					RTOR			
	LANES:	NL 1	NT X	NR 1	SL X	ST X	SR X	EL 1	ET 1	ER X	WL X	WT 1	WR 1	TOTAL	NB X	SB X	EB X	WB X	TTL	NRR 0	SRR 0	ERR 0	WRR 0
AM	7:00 AM	7	0	72	0	0	0	9	132	0	0	124	79	423	0	0	0	0	0	0	0	0	0
AM	7:15 AM	8	0	83	0	0	0	11	127	0	0	184	124	537	0	0	0	0	0	0	0	0	0
AM	7:30 AM	2	0	75	0	0	0	18	84	0	0	209	151	539	0	0	0	0	0	0	0	0	0
AM	7:45 AM	8	0	73	0	0	0	21	86	0	0	146	133	467	0	0	0	0	0	0	0	0	0
AM	8:00 AM	10	0	55	0	0	0	19	72	0	0	115	58	329	0	0	0	0	0	0	0	0	0
AM	8:15 AM	20	0	73	0	0	0	17	95	0	0	79	60	344	0	0	0	0	0	0	0	0	0
AM	8:30 AM	18	0	62	0	0	0	11	90	0	0	117	55	353	0	0	0	0	0	0	0	0	0
AM	8:45 AM	14	0	50	0	0	0	15	82	0	0	78	56	295	0	0	0	0	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	VOLUMES	87	0	543	0	0	0	121	768	0	0	1,052	716	3,287	0	0	0	0	0	0	0	0	0
AM	APPROACH %	14%	0%	86%	0%	0%	0%	14%	86%	0%	0%	60%	40%										
AM	APP/DEPART	630	/	837	0	/	0	889	/	1,311	1,768	/	1,139	0									
AM	BEGIN PEAK HR		7:00 AM																				
AM	VOLUMES	25	0	303	0	0	0	59	429	0	0	663	487	1,966						0	0	0	0
AM	APPROACH %	8%	0%	92%	0%	0%	0%	12%	88%	0%	0%	58%	42%										
AM	PEAK HR FACTOR		0.901			0.000			0.865			0.799		0.912									
AM	APP/DEPART	328	/	546	0	/	0	488	/	732	1,150	/	688	0									
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	15	0	59	0	0	0	31	151	0	0	134	67	457	0	0	0	0	0	0	0	0	0
PM	4:15 PM	8	0	74	0	0	0	31	134	0	0	118	69	434	0	0	0	0	0	0	0	0	0
PM	4:30 PM	9	0	89	0	0	0	27	133	0	0	123	54	435	0	0	0	0	0	0	0	0	0
PM	4:45 PM	5	0	89	0	0	0	23	161	0	0	123	56	457	0	0	0	0	0	0	0	0	0
PM	5:00 PM	6	0	96	0	0	0	28	147	0	0	132	90	499	0	0	0	0	0	0	0	0	0
PM	5:15 PM	6	0	105	0	0	0	28	136	0	0	143	72	490	0	0	0	0	0	0	0	0	0
PM	5:30 PM	6	0	100	0	0	0	19	164	0	0	131	50	470	0	0	0	0	0	0	0	0	0
PM	5:45 PM	9	0	99	0	0	0	11	149	0	0	134	64	466	0	0	0	0	0	0	0	0	0
PM	VOLUMES	64	0	711	0	0	0	198	1,175	0	0	1,038	522	3,708	0	0	0	0	0	0	0	0	0
PM	APPROACH %	8%	0%	92%	0%	0%	0%	14%	86%	0%	0%	67%	33%										
PM	APP/DEPART	775	/	720	0	/	0	1,373	/	1,886	1,560	/	1,102	0									
PM	BEGIN PEAK HR		5:00 PM																				
PM	VOLUMES	27	0	400	0	0	0	86	596	0	0	540	276	1,925						0	0	0	0
PM	APPROACH %	6%	0%	94%	0%	0%	0%	13%	87%	0%	0%	66%	34%										
PM	PEAK HR FACTOR		0.962			0.000			0.932			0.919		0.964									
PM	APP/DEPART	427	/	362	0	/	0	682	/	996	816	/	567	0									

I-215 NB Ramp

NORTH SIDE

Barton WEST SIDE EAST SIDE **Barton**

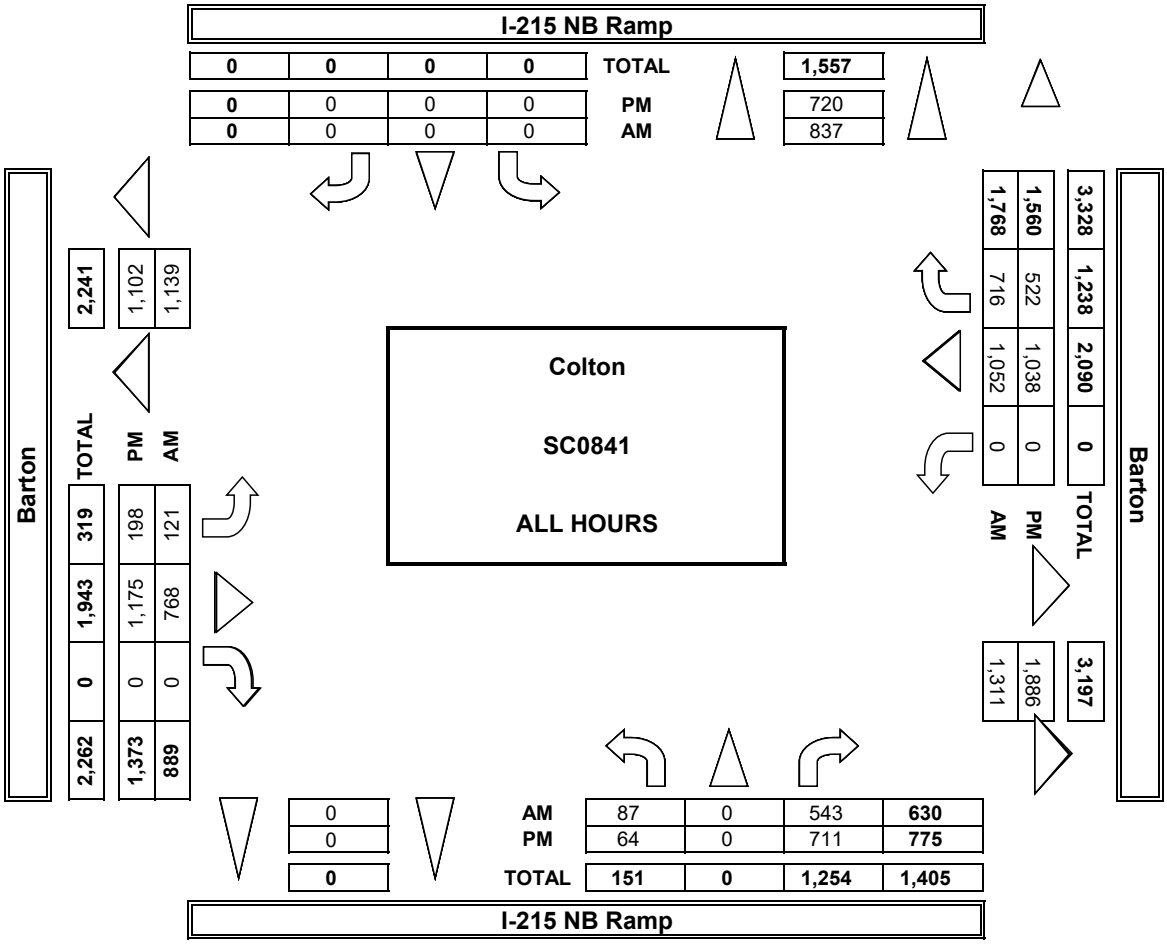
SOUTH SIDE

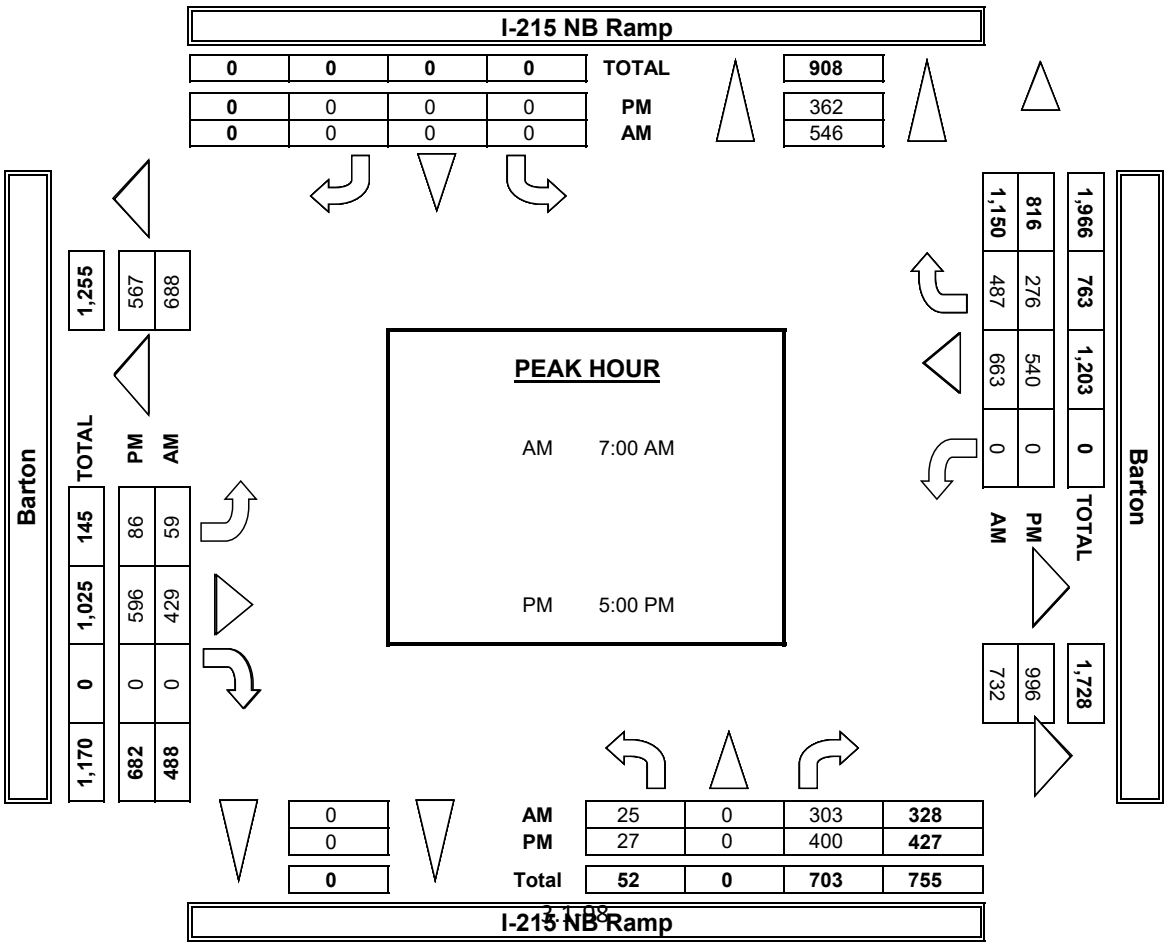
I-215 NB Ramp

		ALL PED AND BIKE					PEDESTRIAN CROSSINGS					BICYCLE CROSSINGS				
		E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	E SIDE	W SIDE	S SIDE	N SIDE	TOTAL	ES	WS	SS	NS	TOTAL
AM	7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:00 AM	1	0	0	1	2	1	0	0	1	2	0	0	0	0	0
AM	8:15 AM	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0
AM	8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AM	TOTAL	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0
PM	3:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:00 PM	0	0	3	9	12	0	0	2	0	2	0	0	1	9	10
PM	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM	4:30 PM	0	0	2	1	3	0	0	1	1	2	0	0	1	0	1
PM	4:45 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
PM	5:00 PM	0	0	0	1	1	0	0	0	1	1	0	0	0	0	0
PM	5:15 PM	0	0	1	2	3	0	0	1	2	3	0	0	0	0	0
PM	5:30 PM	0	0	0	2	2	0	0	0	1	1	0	0	0	1	1
PM	5:45 PM	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
	TOTAL	0	0	6	17	23	0	0	1	4	5	0	0	0	2	2

AimTD LLC

TURNING MOVEMENT COUNTS





INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	I-215 NB Ramp	LOCATION #:	21
TUESDAY	EAST & WEST:	Barton	CONTROL:	SIGNAL

CLASS 2: 2-AXLE WORK VEHICLES/ TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

	NORTHBOUND (I-215 NB Ramp)			SOUTHBOUND (I-215 NB Ramp)			EASTBOUND (Barton)			WESTBOUND (Barton)			
LANES:	NL 1	NT X	NR 1	SL X	ST X	SR X	EL 1	ET 1	ER X	WL X	WT 1	WR 1	TOTAL
7:00 AM	0	0	3	0	0	0	2	10	0	0	2	3	20
7:15 AM	1	0	1	0	0	0	1	4	0	0	10	4	21
7:30 AM	1	0	3	0	0	0	4	5	0	0	2	1	16
7:45 AM	0	0	3	0	0	0	2	6	0	0	4	4	19
8:00 AM	2	0	1	0	0	0	0	6	0	0	3	5	17
8:15 AM	3	0	5	0	0	0	1	12	0	0	3	2	26
8:30 AM	1	0	4	0	0	0	1	3	0	0	11	7	27
8:45 AM	2	0	1	0	0	0	2	11	0	0	3	2	21
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	10	0	21	0	0	0	13	57	0	0	38	28	167
APPROACH %	32%	0%	68%	0%	0%	0%	19%	81%	0%	0%	58%	42%	
APP/DEPART	31	/	41	0	/	0	70	/	78	66	/	48	0
BEGIN PEAK HR		8:00 AM											
VOLUMES	8	0	11	0	0	0	4	32	0	0	20	16	91
APPROACH %	42%	0%	58%	0%	0%	0%	11%	89%	0%	0%	56%	44%	
PEAK HR FACTOR		0.594			0.000			0.692			0.500		0.843
APP/DEPART	19	/	20	0	/	0	36	/	43	36	/	28	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	3	0	3	0	0	0	3	5	0	0	5	2	21
4:15 PM	0	0	1	0	0	0	2	3	0	0	6	1	13
4:30 PM	0	0	5	0	0	0	1	4	0	0	7	2	19
4:45 PM	0	0	1	0	0	0	0	2	0	0	5	1	9
5:00 PM	0	0	2	0	0	0	0	1	0	0	1	4	8
5:15 PM	0	0	1	0	0	0	3	1	0	0	0	1	6
5:30 PM	0	0	3	0	0	0	2	0	0	0	2	2	9
5:45 PM	0	0	1	0	0	0	0	6	0	0	2	2	11
VOLUMES	3	0	17	0	0	0	11	22	0	0	28	15	96
APPROACH %	15%	0%	85%	0%	0%	0%	33%	67%	0%	0%	65%	35%	
APP/DEPART	20	/	26	0	/	0	33	/	39	43	/	31	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	3	0	10	0	0	0	6	14	0	0	23	6	62
APPROACH %	23%	0%	77%	0%	0%	0%	30%	70%	0%	0%	79%	21%	
PEAK HR FACTOR		0.542			0.000			0.625			0.806		0.738
APP/DEPART	13	/	12	0	/	0	20	/	24	29	/	26	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	I-215 NB Ramp	LOCATION #:	21
TUESDAY	EAST & WEST:	Barton	CONTROL:	SIGNAL

CLASS 3: 3-AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N, ◄ W, E ►, S ▼

		NORTHBOUND (I-215 NB Ramp)			SOUTHBOUND (I-215 NB Ramp)			EASTBOUND (Barton)			WESTBOUND (Barton)			
	LANES:	NL 1	NT X	NR 1	SL X	ST X	SR X	EL 1	ET 1	ER X	WL X	WT 1	WR 1	TOTAL
AM	7:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	1
	7:15 AM	0	0	1	0	0	0	0	1	0	0	1	0	3
	7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	7:45 AM	0	0	0	0	0	0	2	2	0	0	1	1	6
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:15 AM	1	0	0	0	0	0	0	3	0	0	0	0	4
	8:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	2
	8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
	9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	0	2	0	0	0	2	6	0	0	6	1	18
	APPROACH %	33%	0%	67%	0%	0%	0%	25%	75%	0%	0%	86%	14%	
	APP/DEPART	3	/	3	0	/	0	8	/	8	7	/	7	0
	BEGIN PEAK HR		7:45 AM											
	VOLUMES	1	0	0	0	0	0	2	5	0	0	3	1	12
	APPROACH %	100%	0%	0%	0%	0%	0%	29%	71%	0%	0%	75%	25%	
	PEAK HR FACTOR		0.250			0.000			0.438			0.500		0.500
	APP/DEPART	1	/	3	0	/	0	7	/	5	4	/	4	0
PM	03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	4:00 PM	1	0	0	0	0	0	1	1	0	0	0	0	3
	4:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
	4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
	4:45 PM	0	0	0	0	0	0	1	0	0	0	0	0	1
	5:00 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	1
	5:30 PM	0	0	1	0	0	0	0	0	0	0	2	0	3
	5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	VOLUMES	1	0	1	0	0	0	2	3	0	0	2	2	11
	APPROACH %	50%	0%	50%	0%	0%	0%	40%	60%	0%	0%	50%	50%	
	APP/DEPART	2	/	4	0	/	0	5	/	4	4	/	3	0
	BEGIN PEAK HR		4:00 PM											
	VOLUMES	0	0	1	0	0	0	1	1	0	0	2	1	6
	APPROACH %	0%	0%	100%	0%	0%	0%	50%	50%	0%	0%	67%	33%	
	PEAK HR FACTOR		0.250			0.000			0.250			0.375		0.500
	APP/DEPART	1	/	2	0	/	0	2	/	2	3	/	2	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: AimTD LLC. tel: 714 253 7888 pacific@aimtd.com

DATE:	LOCATION:	Colton	PROJECT #:	SC0841
2/2/16	NORTH & SOUTH:	I-215 NB Ramp	LOCATION #:	21
TUESDAY	EAST & WEST:	Barton	CONTROL:	SIGNAL

CLASS 4: 4 OR MORE AXLE TRUCKS

NOTES:

AM / PM / MD / OTHER / OTHER — ▲ N ◄ W E ► S ▼

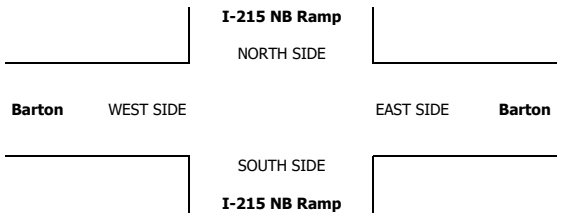
	NORTHBOUND I-215 NB Ramp			SOUTHBOUND I-215 NB Ramp			EASTBOUND Barton			WESTBOUND Barton			
LANES:	NL 1	NT X	NR 1	SL X	ST X	SR X	EL 1	ET 1	ER X	WL X	WT 1	WR 1	TOTAL
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	2
7:15 AM	0	0	1	0	0	0	2	0	0	0	1	2	6
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
7:45 AM	1	0	0	0	0	0	0	0	0	0	2	0	3
8:00 AM	1	0	0	0	0	0	1	0	0	0	0	1	3
8:15 AM	0	0	0	0	0	0	1	4	0	0	2	0	7
8:30 AM	2	0	1	0	0	0	2	0	0	0	0	0	5
8:45 AM	1	0	1	0	0	0	0	0	0	0	0	0	2
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
VOLUMES	5	0	3	0	0	0	6	5	0	0	6	4	29
APPROACH %	63%	0%	38%	0%	0%	0%	55%	45%	0%	0%	60%	40%	
APP/DEPART	8	/	10	0	/	0	11	/	8	10	/	11	0
BEGIN PEAK HR		7:45 AM											
VOLUMES	4	0	1	0	0	0	4	4	0	0	4	1	18
APPROACH %	80%	0%	20%	0%	0%	0%	50%	50%	0%	0%	80%	20%	
PEAK HR FACTOR		0.417			0.000			0.400			0.625		0.643
APP/DEPART	5	/	5	0	/	0	8	/	5	5	/	8	0
03:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	0	0	0	0	0	0	0	0	0	0	2	0	2
4:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	2
4:30 PM	0	0	0	0	0	0	0	1	0	0	1	0	2
4:45 PM	0	0	0	0	0	0	0	4	0	0	0	2	6
5:00 PM	0	0	0	0	0	0	0	0	0	0	1	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	2	0	0	1	0	3
5:45 PM	0	0	1	0	0	0	0	2	0	0	1	0	4
VOLUMES	0	0	1	0	0	0	1	9	0	0	6	3	20
APPROACH %	0%	0%	100%	0%	0%	0%	10%	90%	0%	0%	67%	33%	
APP/DEPART	1	/	4	0	/	0	10	/	10	9	/	6	0
BEGIN PEAK HR		4:00 PM											
VOLUMES	0	0	0	0	0	0	1	5	0	0	3	3	12
APPROACH %	0%	0%	0%	0%	0%	0%	17%	83%	0%	0%	50%	50%	
PEAK HR FACTOR		0.000			0.000			0.375			0.750		0.500
APP/DEPART	0	/	4	0	/	0	6	/	5	6	/	3	0

U-TURNS

NB	SB	EB	WB	TTL
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

RTOR

NRR	SRR	ERR	WRR
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0



This Page Intentionally Left Blank

APPENDIX 3.2:

EXISTING (2020) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

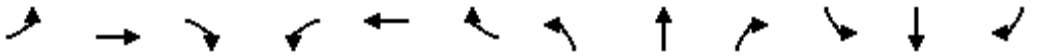
This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	350	103	322	667
Future Volume (vph)	0	350	103	322	667
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	24.4	24.4	11.7	84.7	68.5
Actuated g/C Ratio	0.20	0.20	0.10	0.71	0.57
v/c Ratio	0.75	0.60	0.63	0.14	0.53
Control Delay	57.5	7.9	83.3	1.5	17.1
Queue Delay	0.4	0.0	0.0	0.0	0.0
Total Delay	58.0	7.9	83.3	1.5	17.1
LOS	E	A	F	A	B
Approach Delay	29.1			21.4	17.1
Approach LOS	C			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 21.6	Intersection LOS: C
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	257	0	350	103	322	0	0	667	313
Future Volume (veh/h)	0	0	0	257	0	350	103	322	0	0	667	313
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				276	0	268	111	346	0	0	717	256
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				351	0	312	137	2583	0	0	1570	561
Arrive On Green				0.19	0.00	0.19	0.08	0.72	0.00	0.00	0.60	0.60
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2702	931
Grp Volume(v), veh/h				276	0	268	111	346	0	0	496	477
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1732
Q Serve(g_s), s				17.4	0.0	19.3	7.2	3.6	0.0	0.0	18.1	18.1
Cycle Q Clear(g_c), s				17.4	0.0	19.3	7.2	3.6	0.0	0.0	18.1	18.1
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.54
Lane Grp Cap(c), veh/h				351	0	312	137	2583	0	0	1087	1043
V/C Ratio(X)				0.79	0.00	0.86	0.81	0.13	0.00	0.00	0.46	0.46
Avail Cap(c_a), veh/h				501	0	445	249	2583	0	0	1087	1043
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.96	0.96	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				46.0	0.0	46.8	54.6	5.4	0.0	0.0	13.1	13.1
Incr Delay (d2), s/veh				5.3	0.0	11.2	4.1	0.1	0.0	0.0	1.4	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.1	0.0	8.5	3.4	1.3	0.0	0.0	7.4	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				51.4	0.0	58.0	58.7	5.5	0.0	0.0	14.5	14.5
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					544			457			973	
Approach Delay, s/veh					54.6			18.4			14.5	
Approach LOS					D			B			B	

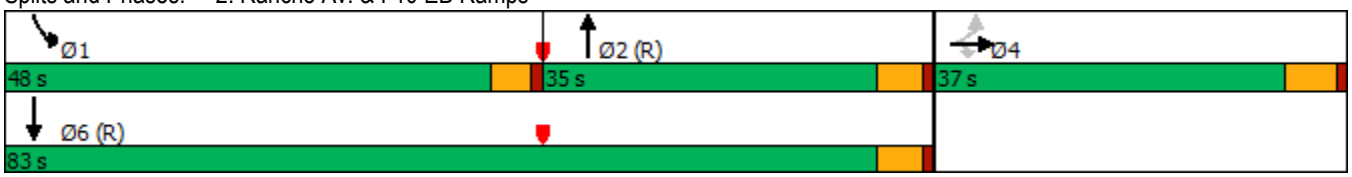
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		91.0			13.6	77.4		29.0				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		5.6			9.2	20.1		21.3				
Green Ext Time (p_c), s		2.4			0.1	7.4		1.9				

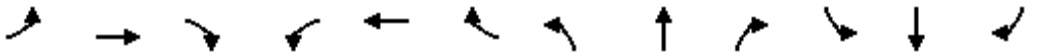
Intersection Summary												
HCM 6th Ctrl Delay			26.5									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	312	293	339	586
Future Volume (vph)	1	312	293	339	586
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.2	16.2	57.8	30.5	92.9
Actuated g/C Ratio	0.14	0.14	0.48	0.25	0.77
v/c Ratio	0.62	0.76	0.31	0.84	0.24
Control Delay	59.2	21.6	18.3	53.8	4.2
Queue Delay	0.0	0.0	0.0	1.3	0.4
Total Delay	59.2	21.6	18.3	55.2	4.6
LOS	E	C	B	E	A
Approach Delay	32.8		18.3		23.1
Approach LOS	C		B		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 24.3	Intersection LOS: C
Intersection Capacity Utilization 61.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	1	312	0	0	0	0	293	163	339	586	0
Future Volume (veh/h)	132	1	312	0	0	0	0	293	163	339	586	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	150	1	270				0	333	140	385	666	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	341	2	306				0	1137	469	407	2597	0
Arrive On Green	0.19	0.19	0.19				0.00	0.46	0.46	0.45	1.00	0.00
Sat Flow, veh/h	1798	12	1610				0	2587	1028	1810	3705	0
Grp Volume(v), veh/h	151	0	270				0	239	234	385	666	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1715	1810	1805	0
Q Serve(g_s), s	8.8	0.0	19.6				0.0	10.0	10.3	24.5	0.0	0.0
Cycle Q Clear(g_c), s	8.8	0.0	19.6				0.0	10.0	10.3	24.5	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.60	1.00		0.00
Lane Grp Cap(c), veh/h	344	0	306				0	823	782	407	2597	0
V/C Ratio(X)	0.44	0.00	0.88				0.00	0.29	0.30	0.95	0.26	0.00
Avail Cap(c_a), veh/h	471	0	419				0	823	782	654	2597	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	43.0	0.0	47.3				0.0	20.5	20.5	32.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	15.3				0.0	0.9	1.0	10.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	8.9				0.0	4.3	4.3	9.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.8	0.0	62.6				0.0	21.4	21.5	43.3	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		421						473			1051	
Approach Delay, s/veh		55.9						21.4			16.0	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	31.6	59.8		28.6		91.4
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9
Max Q Clear Time (g_c+I1), s	26.5	12.3		21.6		2.0
Green Ext Time (p_c), s	0.5	2.6		1.2		5.2

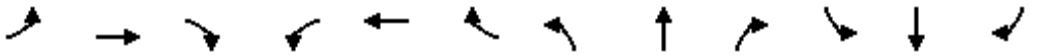
Intersection Summary			
HCM 6th Ctrl Delay			25.9
HCM 6th LOS			C

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	177	17	31	64	328	32	749
Future Volume (vph)	177	17	31	64	328	32	749
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		24.4	25.8	8.1	54.4	6.8	51.0
Actuated g/C Ratio		0.25	0.26	0.08	0.56	0.07	0.52
v/c Ratio		0.78	0.10	0.54	0.20	0.32	0.86
Control Delay		54.0	26.0	66.4	12.2	59.9	23.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.0	26.0	66.4	12.2	59.9	23.3
LOS		D	C	E	B	E	C
Approach Delay		54.0	26.0		20.9		24.2
Approach LOS		D	C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 97.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 26.9	Intersection LOS: C
Intersection Capacity Utilization 80.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	17	37	0	31	11	64	328	5	32	749	615
Future Volume (veh/h)	177	17	37	0	31	11	64	328	5	32	749	615
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	199	19	32	0	35	10	72	369	5	36	842	518
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	315	23	38	0	306	87	89	1851	25	56	1055	638
Arrive On Green	0.23	0.23	0.23	0.00	0.23	0.23	0.06	0.54	0.54	0.03	0.52	0.52
Sat Flow, veh/h	1031	101	166	0	1346	385	1619	3455	47	1619	2048	1239
Grp Volume(v), veh/h	250	0	0	0	0	45	72	182	192	36	701	659
Grp Sat Flow(s),veh/h/ln	1298	0	0	0	0	1731	1619	1710	1792	1619	1710	1577
Q Serve(g_s), s	13.4	0.0	0.0	0.0	0.0	1.6	3.5	4.4	4.4	1.8	26.9	27.8
Cycle Q Clear(g_c), s	15.1	0.0	0.0	0.0	0.0	1.6	3.5	4.4	4.4	1.8	26.9	27.8
Prop In Lane	0.80		0.13	0.00		0.22	1.00		0.03	1.00		0.79
Lane Grp Cap(c), veh/h	376	0	0	0	0	393	89	916	960	56	881	812
V/C Ratio(X)	0.67	0.00	0.00	0.00	0.00	0.11	0.81	0.20	0.20	0.65	0.80	0.81
Avail Cap(c_a), veh/h	608	0	0	0	0	702	178	1395	1462	150	1365	1259
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	0.0	0.0	0.0	24.5	37.3	9.6	9.6	38.1	15.9	16.1
Incr Delay (d2), s/veh	2.0	0.0	0.0	0.0	0.0	0.1	6.2	0.1	0.1	4.6	1.8	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	0.0	0.0	0.0	0.7	1.5	1.4	1.5	0.7	9.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.5	0.0	0.0	0.0	0.0	24.6	43.6	9.7	9.7	42.7	17.8	18.5
LnGrp LOS	C	A	A	A	A	C	D	A	A	D	B	B
Approach Vol, veh/h		250			45			446			1396	
Approach Delay, s/veh		32.5			24.6			15.2			18.8	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	48.6		23.9	9.0	47.0		23.9				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	3.8	6.4		17.1	5.5	29.8		3.6				
Green Ext Time (p_c), s	0.0	2.1		1.1	0.0	11.3		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		19.7	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	115	394	713	174
Future Vol, veh/h	0	0	115	394	713	174
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	131	448	810	198

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1395	504	1008	0	-	0
Stage 1	909	-	-	-	-	-
Stage 2	486	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	135	518	695	-	-	-
Stage 1	358	-	-	-	-	-
Stage 2	590	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	101	518	695	-	-	-
Mov Cap-2 Maneuver	101	-	-	-	-	-
Stage 1	268	-	-	-	-	-
Stage 2	590	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	3.3	0
HCM LOS	A		

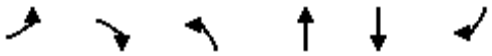
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	695	-	-	-	-
HCM Lane V/C Ratio	0.188	-	-	-	-
HCM Control Delay (s)	11.4	0.9	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	14	463	276	410	491
Future Volume (vph)	14	463	276	410	491
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	11.3	11.3	17.6	39.4	17.0
Actuated g/C Ratio	0.18	0.18	0.28	0.62	0.27
v/c Ratio	0.56	0.56	0.70	0.22	0.61
Control Delay	11.2	10.2	31.2	5.2	24.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	10.2	31.2	5.2	24.5
LOS	B	B	C	A	C
Approach Delay	10.7			15.6	24.5
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 63.2	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 60.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	463	276	410	491	2
Future Volume (veh/h)	14	463	276	410	491	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	370	282	418	501	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	309	549	332	1719	748	3
Arrive On Green	0.00	0.20	0.23	0.56	0.24	0.24
Sat Flow, veh/h	1543	2746	1457	3159	3225	13
Grp Volume(v), veh/h	0	370	282	418	245	258
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1618
Q Serve(g_s), s	0.0	6.2	9.2	3.4	7.2	7.2
Cycle Q Clear(g_c), s	0.0	6.2	9.2	3.4	7.2	7.2
Prop In Lane	1.00	1.00	1.00			0.01
Lane Grp Cap(c), veh/h	309	549	332	1719	366	385
V/C Ratio(X)	0.00	0.67	0.85	0.24	0.67	0.67
Avail Cap(c_a), veh/h	783	1393	1156	5130	1202	1263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	18.4	18.4	5.6	17.2	17.2
Incr Delay (d2), s/veh	0.0	1.4	2.4	0.1	2.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.7	2.6	0.6	2.2	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	19.8	20.7	5.7	19.3	19.2
LnGrp LOS	A	B	C	A	B	B
Approach Vol, veh/h	370			700	503	
Approach Delay, s/veh	19.8			11.7	19.2	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		33.9		15.7	15.9	18.0
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		5.4		8.2	11.2	9.2
Green Ext Time (p_c), s		2.6		1.3	0.4	2.6

Intersection Summary		
HCM 6th Ctrl Delay		16.0
HCM 6th LOS		B

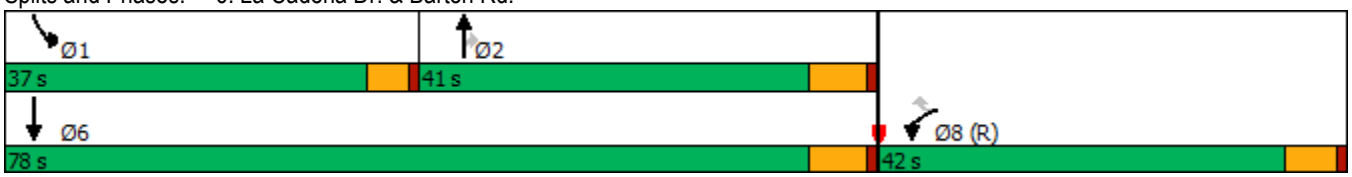
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	150	178	518	146	217	1037
Future Volume (vph)	150	178	518	146	217	1037
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	42.0	42.0	41.0	41.0	37.0	78.0
Total Split (%)	35.0%	35.0%	34.2%	34.2%	30.8%	65.0%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	56.1	56.1	25.8	25.8	21.5	51.9
Actuated g/C Ratio	0.47	0.47	0.22	0.22	0.18	0.43
v/c Ratio	0.20	0.24	0.75	0.34	0.75	0.75
Control Delay	19.3	4.6	50.5	7.6	61.8	31.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.3	4.6	50.5	7.6	61.8	31.3
LOS	B	A	D	A	E	C
Approach Delay	11.3		41.1			36.6
Approach LOS	B		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 34.2	Intersection LOS: C
Intersection Capacity Utilization 50.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	150	178	518	146	217	1037
Future Volume (veh/h)	150	178	518	146	217	1037
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	160	0	551	118	231	1103
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	517		673	300	262	1327
Arrive On Green	0.30	0.00	0.20	0.20	0.15	0.39
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	160	0	551	118	231	1103
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	8.6	0.0	18.5	8.1	15.8	35.0
Cycle Q Clear(g_c), s	8.6	0.0	18.5	8.1	15.8	35.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	517		673	300	262	1327
V/C Ratio(X)	0.31		0.82	0.39	0.88	0.83
Avail Cap(c_a), veh/h	517		992	442	463	2046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.91	0.91	0.78	0.78
Uniform Delay (d), s/veh	32.3	0.0	46.1	42.0	49.8	33.2
Incr Delay (d2), s/veh	1.6	0.0	3.2	0.8	7.6	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	7.9	3.0	7.1	13.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.8	0.0	49.4	42.7	57.3	34.6
LnGrp LOS	C		D	D	E	C
Approach Vol, veh/h	160	A	669			1334
Approach Delay, s/veh	33.8		48.2			38.5
Approach LOS	C		D			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	22.9	29.8				52.8	42.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	32.4	34.8				71.8	36.2
Max Q Clear Time (g_c+I1), s	17.8	20.5				37.0	10.6
Green Ext Time (p_c), s	0.5	3.1				8.4	0.2

Intersection Summary	
HCM 6th Ctrl Delay	41.2
HCM 6th LOS	D

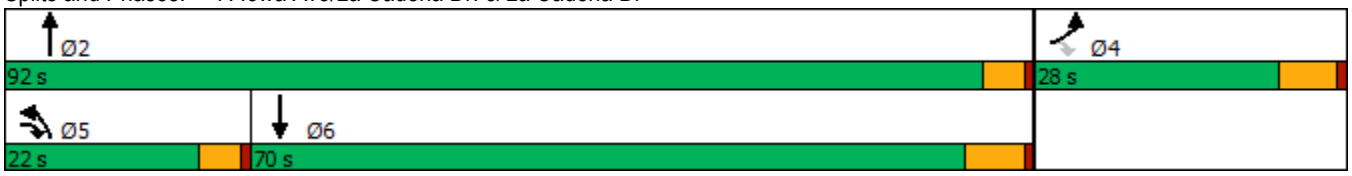
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	114	101	81	560	509	860
Future Volume (vph)	114	101	81	560	509	860
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	13.9	21.8	9.1	41.0	30.3	57.0
Actuated g/C Ratio	0.24	0.38	0.16	0.72	0.53	1.00
v/c Ratio	0.30	0.18	0.33	0.45	0.55	0.35
Control Delay	28.2	14.2	31.8	6.8	17.5	0.4
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	28.2	14.2	31.8	6.9	17.5	0.4
LOS	C	B	C	A	B	A
Approach Delay	21.6			10.1	6.8	
Approach LOS	C			B	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 57	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.1	Intersection LOS: A
Intersection Capacity Utilization 55.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	101	81	560	509	860
Future Volume (veh/h)	114	101	81	560	509	860
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	118	78	84	577	525	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	318	408	115	970	666	
Arrive On Green	0.20	0.20	0.07	0.54	0.37	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	118	78	84	577	525	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	3.0	1.9	2.4	10.2	12.2	0.0
Cycle Q Clear(g_c), s	3.0	1.9	2.4	10.2	12.2	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	318	408	115	970	666	
V/C Ratio(X)	0.37	0.19	0.73	0.59	0.79	
Avail Cap(c_a), veh/h	752	817	600	3353	2448	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.3	13.3	21.4	7.3	13.1	0.0
Incr Delay (d2), s/veh	0.7	0.2	3.3	0.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.8	2.0	3.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.1	13.5	24.7	7.9	15.3	0.0
LnGrp LOS	B	B	C	A	B	
Approach Vol, veh/h	196			661	525	A
Approach Delay, s/veh	15.6			10.1	15.3	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.5		15.4	7.9	23.6
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		12.2		5.0	4.4	14.2
Green Ext Time (p_c), s		3.7		0.5	0.1	3.2

Intersection Summary		
HCM 6th Ctrl Delay	12.8	
HCM 6th LOS	B	

Notes

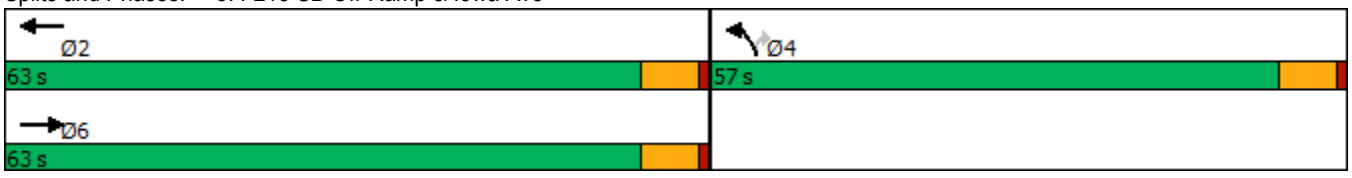
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	610	610	31	552
Future Volume (vph)	610	610	31	552
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	34.3	34.3	29.7	29.7
Actuated g/C Ratio	0.44	0.44	0.38	0.38
v/c Ratio	0.79	0.79	0.05	0.82
Control Delay	27.7	27.7	17.8	26.5
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	28.0	27.7	17.8	26.5
LOS	C	C	B	C
Approach Delay	28.0	27.7	26.0	
Approach LOS	C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 78	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 27.3	Intersection LOS: C
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	610	0	0	610	31	552
Future Volume (veh/h)	610	0	0	610	31	552
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	656	0	0	656	34	452
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	808	0	0	808	606	539
Arrive On Green	0.43	0.00	0.00	0.43	0.33	0.33
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	656	0	0	656	34	452
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	15.7	0.0	0.0	15.7	0.7	13.4
Cycle Q Clear(g_c), s	15.7	0.0	0.0	15.7	0.7	13.4
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	808	0	0	808	606	539
V/C Ratio(X)	0.81	0.00	0.00	0.81	0.06	0.84
Avail Cap(c_a), veh/h	2089	0	0	2089	1779	1583
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	0.0	0.0	13.0	11.6	15.9
Incr Delay (d2), s/veh	2.0	0.0	0.0	2.0	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.9	0.0	0.0	4.9	0.2	4.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	15.1	0.0	0.0	15.1	11.7	19.5
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	656			656	486	
Approach Delay, s/veh	15.1			15.1	18.9	
Approach LOS	B			B	B	

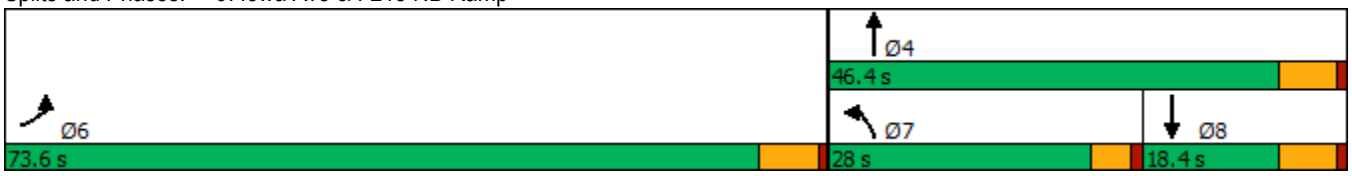
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		28.2		23.5		28.2
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		17.7		15.4		17.7
Green Ext Time (p_c), s		4.3		1.9		4.3

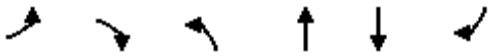
Intersection Summary		
HCM 6th Ctrl Delay	16.1	
HCM 6th LOS	B	

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	118	325	573	37
Future Volume (vph)	118	325	573	37
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	39.8	11.8
Actuated g/C Ratio	0.56	0.20	0.33	0.10
v/c Ratio	1.04	0.99	0.98	0.88
Control Delay	52.3	94.1	70.2	38.5
Queue Delay	5.9	0.0	0.0	0.0
Total Delay	58.2	94.1	70.2	38.5
LOS	E	F	E	D
Approach Delay	58.2		78.9	38.5
Approach LOS	E		E	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 63.3	Intersection LOS: E
Intersection Capacity Utilization 122.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	118	1044	325	573	37	285
Future Volume (veh/h)	118	1044	325	573	37	285
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	127	849	349	616	40	247
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	119	797	353	636	23	144
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	212	1420	1810	1900	229	1416
Grp Volume(v), veh/h	977	0	349	616	0	287
Grp Sat Flow(s),veh/h/ln	1634	0	1810	1900	0	1645
Q Serve(g_s), s	67.4	0.0	23.1	38.3	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.1	38.3	0.0	12.2
Prop In Lane	0.13	0.87	1.00			0.86
Lane Grp Cap(c), veh/h	918	0	353	637	0	167
V/C Ratio(X)	1.06	0.00	0.99	0.97	0.00	1.72
Avail Cap(c_a), veh/h	918	0	353	637	0	167
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.2	39.3	0.0	53.9
Incr Delay (d2), s/veh	48.5	0.0	44.8	27.7	0.0	346.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.0	0.0	14.7	22.5	0.0	21.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	74.8	0.0	92.9	67.0	0.0	400.1
LnGrp LOS	F	A	F	E	A	F
Approach Vol, veh/h	977			965	287	
Approach Delay, s/veh	74.8			76.4	400.1	
Approach LOS	E			E	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	40.3	69.4	25.1	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	117.4
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	4	326	35	25	297	3	17	0	41	8	0	14
Future Vol, veh/h	4	326	35	25	297	3	17	0	41	8	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	358	38	27	326	3	19	0	45	9	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	326	0	0	396	0	0	773	-	377	788	784	326
Stage 1	-	-	-	-	-	-	385	-	-	380	380	-
Stage 2	-	-	-	-	-	-	388	-	-	408	404	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	*1277	-	-	1174	-	-	341	0	674	330	333	*851
Stage 1	-	-	-	-	-	-	642	0	-	742	659	-
Stage 2	-	-	-	-	-	-	733	0	-	624	603	-
Platoon blocked, %	1	-	-		-	-	1			1	1	1
Mov Cap-1 Maneuver	*1277	-	-	1174	-	-	328	-	674	302	324	*851
Mov Cap-2 Maneuver	-	-	-	-	-	-	328	-	-	302	324	-
Stage 1	-	-	-	-	-	-	639	-	-	739	644	-
Stage 2	-	-	-	-	-	-	703	-	-	580	601	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.6	12.4	12.4
HCM LOS			B	B

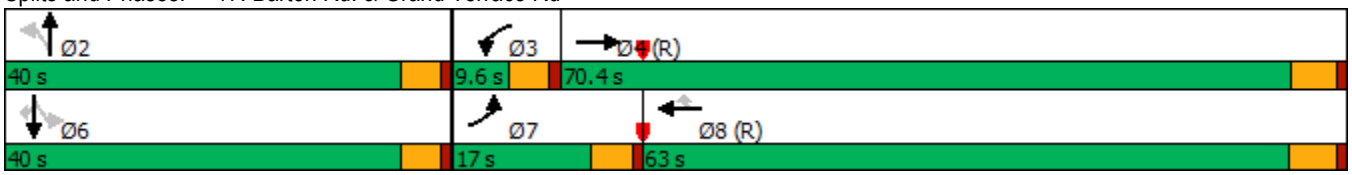
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	328	674	* 1277	-	-	1174	-	-	512
HCM Lane V/C Ratio	0.057	0.067	0.003	-	-	0.023	-	-	0.047
HCM Control Delay (s)	16.6	10.7	7.8	0	-	8.1	-	-	12.4
HCM Lane LOS	C	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.2	0	-	-	0.1	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	24	350	233	328	93	2	91		
Future Volume (vph)	24	350	233	328	93	2	91		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.5	95.5	88.0	88.0		14.8	14.8		
Actuated g/C Ratio	0.05	0.80	0.73	0.73		0.12	0.12		
v/c Ratio	0.28	0.14	0.10	0.28		0.62	0.34		
Control Delay	87.3	1.4	6.0	1.5		65.7	10.5		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	87.3	1.4	6.0	1.5		65.7	10.5		
LOS	F	A	A	A		E	B		
Approach Delay		6.8	3.3			38.6			
Approach LOS		A	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 10.4	Intersection LOS: B
Intersection Capacity Utilization 34.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	350	0	0	233	328	0	0	0	93	2	91
Future Volume (veh/h)	24	350	0	0	233	328	0	0	0	93	2	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	25	368	0	0	245	261	0	0	0	98	2	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	38	2826	0	1	2614	1166	0	163	0	188	3	138
Arrive On Green	0.02	0.83	0.00	0.00	0.76	0.76	0.00	0.00	0.00	0.09	0.09	0.09
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1417	29	1525
Grp Volume(v), veh/h	25	368	0	0	245	261	0	0	0	100	0	73
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1446	0	1525
Q Serve(g_s), s	1.8	2.5	0.0	0.0	2.2	5.8	0.0	0.0	0.0	8.1	0.0	5.5
Cycle Q Clear(g_c), s	1.8	2.5	0.0	0.0	2.2	5.8	0.0	0.0	0.0	8.1	0.0	5.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	38	2826	0	1	2614	1166	0	163	0	190	0	138
V/C Ratio(X)	0.66	0.13	0.00	0.00	0.09	0.22	0.00	0.00	0.00	0.53	0.00	0.53
Avail Cap(c_a), veh/h	167	2826	0	67	2614	1166	0	531	0	486	0	450
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	2.0	0.0	0.0	3.6	4.0	0.0	0.0	0.0	53.3	0.0	52.1
Incr Delay (d2), s/veh	6.9	0.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0	2.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.6	0.0	0.0	0.7	1.6	0.0	0.0	0.0	3.1	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.0	2.1	0.0	0.0	3.7	4.5	0.0	0.0	0.0	55.6	0.0	55.3
LnGrp LOS	E	A	A	A	A	A	A	A	A	E	A	E
Approach Vol, veh/h		393			506			0			173	
Approach Delay, s/veh		6.1			4.1			0.0			55.4	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.5	0.0	104.5		15.5	7.4	97.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	4.5		10.1	3.8	7.8				
Green Ext Time (p_c), s		0.0	0.0	2.6		0.8	0.0	2.6				

Intersection Summary		
HCM 6th Ctrl Delay	13.1	
HCM 6th LOS	B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

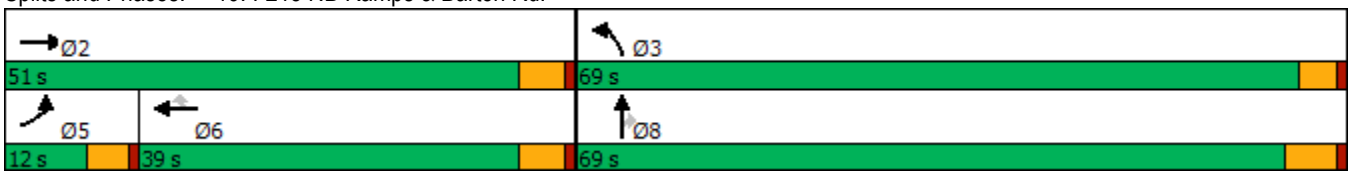
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	481	959	44	435
Demand Flow Rate, veh/h	481	959	44	435
Vehicles Circulating, veh/h	308	60	736	483
Vehicles Exiting, veh/h	610	720	53	536
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.1	5.9	6.3	6.7
Approach LOS	A	A	A	A

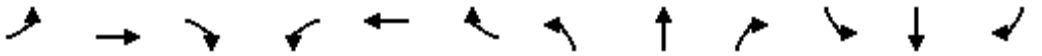
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.983	0.017	0.504	0.496	1.000	0.660	0.340
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	473	8	483	476	44	287	148
Cap Entry Lane, veh/h	1073	1073	1345	1345	651	915	915
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	473	8	483	476	44	287	148
Cap Entry, veh/h	1073	1073	1345	1345	651	915	915
V/C Ratio	0.441	0.007	0.359	0.354	0.068	0.314	0.162
Control Delay, s/veh	8.2	3.4	6.0	5.9	6.3	7.3	5.5
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	2	0	2	2	0	1	1

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	88	544	837	539	0	336	
Future Volume (vph)	88	544	837	539	0	336	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	12.0	51.0	39.0	39.0	69.0	69.0	69.0
Total Split (%)	10.0%	42.5%	32.5%	32.5%	57.5%	57.5%	58%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	8.2	45.6	32.3	32.3	49.0	49.0	
Actuated g/C Ratio	0.08	0.43	0.30	0.30	0.46	0.46	
v/c Ratio	0.70	0.39	0.84	0.82	24.50	0.45	
Control Delay	82.2	25.9	46.3	26.3	14409.3	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	82.2	25.9	46.3	26.3	14409.3	12.0	
LOS	F	C	D	C	F	B	
Approach Delay		33.8	38.5		1699.7		
Approach LOS		C	D		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 106.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 24.50	
Intersection Signal Delay: 301.8	Intersection LOS: F
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	544	0	0	837	539	45	0	336	0	0	0
Future Volume (veh/h)	88	544	0	0	837	539	45	0	336	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	97	598	0	0	920	444	49	0	276			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	132	2133	0	0	1545	670	401	0	357			
Arrive On Green	0.07	0.59	0.00	0.00	0.43	0.43	0.22	0.00	0.22			
Sat Flow, veh/h	1810	3705	0	0	3705	1566	1810	0	1610			
Grp Volume(v), veh/h	97	598	0	0	920	444	49	0	276			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1566	1810	0	1610			
Q Serve(g_s), s	2.7	4.2	0.0	0.0	10.0	11.6	1.1	0.0	8.2			
Cycle Q Clear(g_c), s	2.7	4.2	0.0	0.0	10.0	11.6	1.1	0.0	8.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	132	2133	0	0	1545	670	401	0	357			
V/C Ratio(X)	0.73	0.28	0.00	0.00	0.60	0.66	0.12	0.00	0.77			
Avail Cap(c_a), veh/h	262	3239	0	0	2392	1037	2282	0	2030			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.2	5.1	0.0	0.0	11.2	11.7	15.9	0.0	18.7			
Incr Delay (d2), s/veh	2.9	0.1	0.0	0.0	0.4	1.1	0.1	0.0	3.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.1	1.0	0.0	0.0	3.2	3.3	0.4	0.0	2.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.1	5.2	0.0	0.0	11.6	12.8	16.1	0.0	22.3			
LnGrp LOS	C	A	A	A	B	B	B	A	C			
Approach Vol, veh/h		695			1364			325				
Approach Delay, s/veh		8.1			12.0			21.4				
Approach LOS		A			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		35.3			8.3	27.0		15.8				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		45.9			7.4	33.9		64.5				
Max Q Clear Time (g_c+I1), s		6.2			4.7	13.6		10.2				
Green Ext Time (p_c), s		4.4			0.0	8.3		1.2				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	415	123	809	627
Future Volume (vph)	1	415	123	809	627
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	28.4	28.4	12.7	80.7	63.5
Actuated g/C Ratio	0.24	0.24	0.11	0.67	0.53
v/c Ratio	0.34	0.85	0.66	0.34	0.45
Control Delay	38.0	43.2	62.4	12.5	19.8
Queue Delay	0.1	0.0	0.0	0.5	0.0
Total Delay	38.1	43.2	62.4	13.0	19.9
LOS	D	D	E	B	B
Approach Delay	41.9			19.6	19.9
Approach LOS	D			B	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 25.1	Intersection LOS: C
Intersection Capacity Utilization 80.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	142	1	415	123	809	0	0	627	194
Future Volume (veh/h)	0	0	0	142	1	415	123	809	0	0	627	194
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				145	1	318	126	826	0	0	640	148
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				400	3	358	153	2479	0	0	1644	380
Arrive On Green				0.22	0.22	0.22	0.08	0.69	0.00	0.00	0.56	0.56
Sat Flow, veh/h				1798	12	1610	1810	3705	0	0	3007	672
Grp Volume(v), veh/h				146	0	318	126	826	0	0	396	392
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1779
Q Serve(g_s), s				8.2	0.0	23.0	8.2	11.1	0.0	0.0	14.7	14.7
Cycle Q Clear(g_c), s				8.2	0.0	23.0	8.2	11.1	0.0	0.0	14.7	14.7
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.38
Lane Grp Cap(c), veh/h				402	0	358	153	2479	0	0	1019	1005
V/C Ratio(X)				0.36	0.00	0.89	0.82	0.33	0.00	0.00	0.39	0.39
Avail Cap(c_a), veh/h				652	0	580	264	2479	0	0	1019	1005
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.67	0.67	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				39.5	0.0	45.2	54.0	7.6	0.0	0.0	14.6	14.6
Incr Delay (d2), s/veh				0.5	0.0	9.8	2.8	0.2	0.0	0.0	1.1	1.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.6	0.0	9.8	3.8	4.0	0.0	0.0	6.1	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				40.0	0.0	55.0	56.9	7.9	0.0	0.0	15.7	15.7
LnGrp LOS				D	A	D	E	A	A	A	B	B
Approach Vol, veh/h					464			952			788	
Approach Delay, s/veh					50.3			14.4			15.7	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		87.5			14.6	72.9		32.5				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		65.9			17.5	43.9		43.2				
Max Q Clear Time (g_c+I1), s		13.1			10.2	16.7		25.0				
Green Ext Time (p_c), s		6.8			0.1	5.3		1.7				

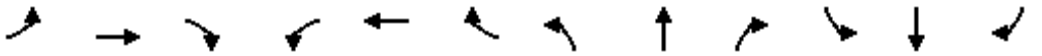
Intersection Summary												
HCM 6th Ctrl Delay			22.4									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	5	339	535	349	421
Future Volume (vph)	5	339	535	349	421
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	41.0	41.0	43.0	36.0	79.0
Total Split (%)	34.2%	34.2%	35.8%	30.0%	65.8%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	32.1	32.1	44.8	27.6	77.0
Actuated g/C Ratio	0.27	0.27	0.37	0.23	0.64
v/c Ratio	0.87	0.57	0.68	0.89	0.19
Control Delay	61.1	13.4	31.8	84.3	7.7
Queue Delay	0.0	0.0	0.0	12.3	0.0
Total Delay	61.1	13.4	31.8	96.6	7.7
LOS	E	B	C	F	A
Approach Delay	39.3		31.8		48.0
Approach LOS	D		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 39.3	Intersection LOS: D
Intersection Capacity Utilization 80.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	397	5	339	0	0	0	0	535	338	349	421	0
Future Volume (veh/h)	397	5	339	0	0	0	0	535	338	349	421	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	418	5	268				0	563	267	367	443	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	461	6	415				0	948	449	388	2351	0
Arrive On Green	0.26	0.26	0.26				0.00	0.40	0.40	0.43	1.00	0.00
Sat Flow, veh/h	1789	21	1610				0	2472	1125	1810	3705	0
Grp Volume(v), veh/h	423	0	268				0	427	403	367	443	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1697	1810	1805	0
Q Serve(g_s), s	27.1	0.0	17.8				0.0	22.4	22.4	23.4	0.0	0.0
Cycle Q Clear(g_c), s	27.1	0.0	17.8				0.0	22.4	22.4	23.4	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.66	1.00		0.00
Lane Grp Cap(c), veh/h	467	0	415				0	719	677	388	2351	0
V/C Ratio(X)	0.91	0.00	0.65				0.00	0.59	0.60	0.95	0.19	0.00
Avail Cap(c_a), veh/h	531	0	472				0	719	677	473	2351	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	43.1	0.0	39.6				0.0	28.4	28.5	33.6	0.0	0.0
Incr Delay (d2), s/veh	17.8	0.0	2.5				0.0	3.6	3.8	22.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	0.0	7.1				0.0	10.2	9.7	10.3	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.9	0.0	42.1				0.0	32.0	32.3	55.8	0.2	0.0
LnGrp LOS	E	A	D				A	C	C	E	A	A
Approach Vol, veh/h		691						830			810	
Approach Delay, s/veh		53.6						32.1			25.4	
Approach LOS		D						C			C	

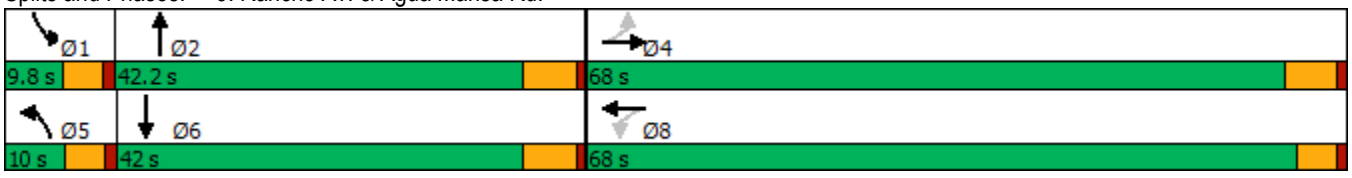
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	30.3	52.9		36.7		83.3
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	31.4	37.9		35.2		73.9
Max Q Clear Time (g_c+I1), s	25.4	24.4		29.1		2.0
Green Ext Time (p_c), s	0.3	4.4		1.8		3.2

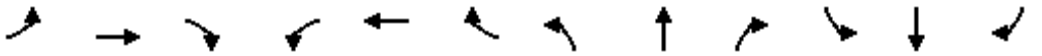
Intersection Summary	
HCM 6th Ctrl Delay	36.2
HCM 6th LOS	D

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	453	90	25	38	435	12	694
Future Volume (vph)	453	90	25	38	435	12	694
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		58.7	60.0	5.4	38.0	5.2	34.2
Actuated g/C Ratio		0.52	0.53	0.05	0.34	0.05	0.30
v/c Ratio		0.96	0.04	0.52	0.40	0.17	0.90
Control Delay		52.1	10.9	79.4	30.9	60.9	50.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.1	10.9	79.4	30.9	60.9	50.0
LOS		D	B	E	C	E	D
Approach Delay		52.1	10.9		34.7		50.1
Approach LOS		D	B		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.3	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 46.5	Intersection LOS: D
Intersection Capacity Utilization 88.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	453	90	98	0	25	9	38	435	2	12	694	174
Future Volume (veh/h)	453	90	98	0	25	9	38	435	2	12	694	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	482	96	77	0	27	8	40	463	2	13	738	138
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	584	103	83	0	659	195	55	1121	5	25	869	162
Arrive On Green	0.49	0.49	0.49	0.00	0.49	0.49	0.03	0.32	0.32	0.02	0.30	0.30
Sat Flow, veh/h	1050	209	168	0	1334	395	1619	3492	15	1619	2876	538
Grp Volume(v), veh/h	655	0	0	0	0	35	40	227	238	13	439	437
Grp Sat Flow(s),veh/h/ln	1427	0	0	0	0	1729	1619	1710	1797	1619	1710	1703
Q Serve(g_s), s	40.3	0.0	0.0	0.0	0.0	1.0	2.3	9.9	9.9	0.8	23.1	23.1
Cycle Q Clear(g_c), s	41.3	0.0	0.0	0.0	0.0	1.0	2.3	9.9	9.9	0.8	23.1	23.1
Prop In Lane	0.74		0.12	0.00		0.23	1.00		0.01	1.00		0.32
Lane Grp Cap(c), veh/h	771	0	0	0	0	855	55	549	577	25	517	515
V/C Ratio(X)	0.85	0.00	0.00	0.00	0.00	0.04	0.72	0.41	0.41	0.53	0.85	0.85
Avail Cap(c_a), veh/h	997	0	0	0	0	1145	91	650	684	88	647	644
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.1	0.0	0.0	0.0	0.0	12.5	45.8	25.4	25.4	46.8	31.3	31.4
Incr Delay (d2), s/veh	5.6	0.0	0.0	0.0	0.0	0.0	6.5	0.5	0.5	6.3	8.6	8.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.3	0.0	0.0	0.0	0.0	0.4	1.0	3.9	4.0	0.3	10.1	10.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.8	0.0	0.0	0.0	0.0	12.5	52.2	25.9	25.9	53.1	40.0	40.0
LnGrp LOS	C	A	A	A	A	B	D	C	C	D	D	D
Approach Vol, veh/h		655			35			505			889	
Approach Delay, s/veh		28.8			12.5			28.0			40.2	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	36.5		53.1	7.9	34.7		53.1				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	2.8	11.9		43.3	4.3	25.1		3.0				
Green Ext Time (p_c), s	0.0	2.4		4.0	0.0	3.9		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		33.2
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	149	689	764	153
Future Vol, veh/h	0	0	149	689	764	153
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	159	733	813	163

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1580	488	976	0	-	0
Stage 1	895	-	-	-	-	-
Stage 2	685	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	102	531	715	-	-	-
Stage 1	364	-	-	-	-	-
Stage 2	467	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	64	531	715	-	-	-
Mov Cap-2 Maneuver	64	-	-	-	-	-
Stage 1	228	-	-	-	-	-
Stage 2	467	-	-	-	-	-

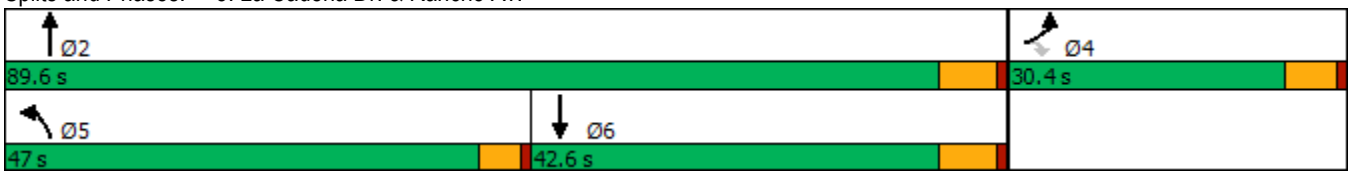
Approach	EB	NB	SB
HCM Control Delay, s	0	3.3	0
HCM LOS	A		

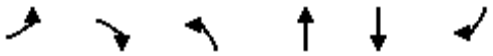
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	715	-	-	-	-
HCM Lane V/C Ratio	0.222	-	-	-	-
HCM Control Delay (s)	11.5	1.5	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.8	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	25	519	324	461	548
Future Volume (vph)	25	519	324	461	548
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.2	12.2	22.3	47.7	20.5
Actuated g/C Ratio	0.17	0.17	0.31	0.66	0.28
v/c Ratio	0.63	0.62	0.75	0.24	0.66
Control Delay	13.7	11.3	35.2	5.2	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	11.3	35.2	5.2	28.4
LOS	B	B	D	A	C
Approach Delay	12.5			17.6	28.4
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 72.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.3	Intersection LOS: B
Intersection Capacity Utilization 68.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	519	324	461	548	9
Future Volume (veh/h)	25	519	324	461	548	9
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	430	334	475	565	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	318	565	379	1815	782	10
Arrive On Green	0.00	0.21	0.26	0.59	0.25	0.25
Sat Flow, veh/h	1543	2746	1457	3159	3194	39
Grp Volume(v), veh/h	0	430	334	475	279	293
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1613
Q Serve(g_s), s	0.0	8.7	12.9	4.4	9.7	9.7
Cycle Q Clear(g_c), s	0.0	8.7	12.9	4.4	9.7	9.7
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	318	565	379	1815	386	405
V/C Ratio(X)	0.00	0.76	0.88	0.26	0.72	0.72
Avail Cap(c_a), veh/h	647	1151	1053	4374	955	1000
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	21.9	20.8	5.8	20.1	20.1
Incr Delay (d2), s/veh	0.0	2.1	2.7	0.1	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.5	3.9	0.8	3.2	3.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.1	23.5	5.9	22.7	22.6
LnGrp LOS	A	C	C	A	C	C
Approach Vol, veh/h	430			809	572	
Approach Delay, s/veh	24.1			13.2	22.6	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.8		17.9	19.9	20.9
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		6.4		10.7	14.9	11.7
Green Ext Time (p_c), s		3.0		1.4	0.4	3.0

Intersection Summary		
HCM 6th Ctrl Delay		18.8
HCM 6th LOS		B

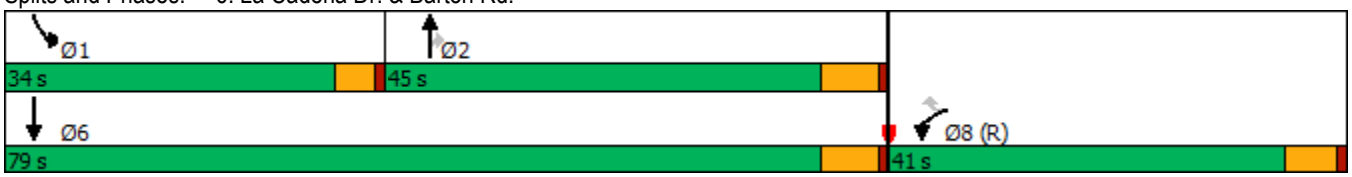
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	194	165	737	134	229	965
Future Volume (vph)	194	165	737	134	229	965
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	48.4	48.4	33.3	33.3	21.7	59.6
Actuated g/C Ratio	0.40	0.40	0.28	0.28	0.18	0.50
v/c Ratio	0.29	0.25	0.80	0.26	0.76	0.59
Control Delay	33.6	17.7	47.0	6.1	62.2	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.6	17.7	47.0	6.1	62.2	22.3
LOS	C	B	D	A	E	C
Approach Delay	26.3		40.7			29.9
Approach LOS	C		D			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 33.3	Intersection LOS: C
Intersection Capacity Utilization 60.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	194	165	737	134	229	965
Future Volume (veh/h)	194	165	737	134	229	965
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	200	0	760	105	236	995
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		889	396	266	1551
Arrive On Green	0.29	0.00	0.26	0.26	0.16	0.45
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	200	0	760	105	236	995
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	11.2	0.0	25.4	6.6	16.2	26.9
Cycle Q Clear(g_c), s	11.2	0.0	25.4	6.6	16.2	26.9
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		889	396	266	1551
V/C Ratio(X)	0.40		0.86	0.26	0.89	0.64
Avail Cap(c_a), veh/h	503		1106	493	420	2075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.60	0.60	0.72	0.72
Uniform Delay (d), s/veh	33.9	0.0	42.3	35.3	49.6	25.3
Incr Delay (d2), s/veh	2.3	0.0	3.5	0.2	9.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	10.6	2.4	7.4	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.3	0.0	45.7	35.5	59.6	25.6
LnGrp LOS	D		D	D	E	C
Approach Vol, veh/h	200	A	865			1231
Approach Delay, s/veh	36.3		44.5			32.1
Approach LOS	D		D			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	23.2	37.4				60.6	41.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8				72.8	35.2
Max Q Clear Time (g_c+I1), s	18.2	27.4				28.9	13.2
Green Ext Time (p_c), s	0.5	3.8				7.5	0.3

Intersection Summary		
HCM 6th Ctrl Delay		37.1
HCM 6th LOS		D

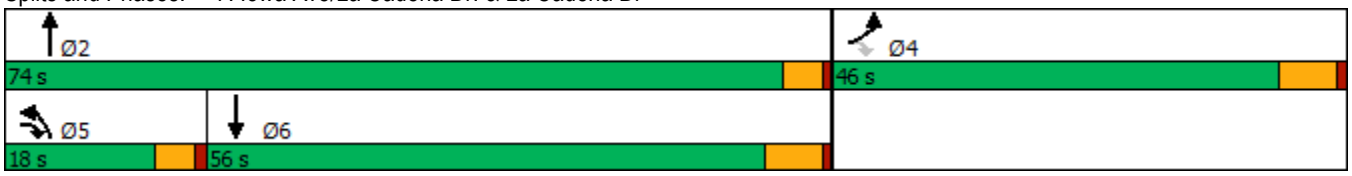
Notes

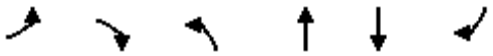
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	327	163	81	687	318	898
Future Volume (vph)	327	163	81	687	318	898
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	46.0	18.0	18.0	74.0	56.0	
Total Split (%)	38.3%	15.0%	15.0%	61.7%	46.7%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	21.4	37.0	8.8	37.0	21.4	70.2
Actuated g/C Ratio	0.30	0.53	0.13	0.53	0.30	1.00
v/c Ratio	0.69	0.21	0.42	0.76	0.60	0.37
Control Delay	31.7	11.3	41.0	19.8	26.8	0.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	31.7	11.3	41.0	20.0	26.8	0.4
LOS	C	B	D	B	C	A
Approach Delay	24.9			22.2	7.3	
Approach LOS	C			C	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 70.2	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 15.4	Intersection LOS: B
Intersection Capacity Utilization 67.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	327	163	81	687	318	898
Future Volume (veh/h)	327	163	81	687	318	898
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	341	127	84	716	331	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	428	509	112	870	577	
Arrive On Green	0.26	0.26	0.07	0.48	0.32	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	341	127	84	716	331	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	9.7	3.0	2.5	16.8	7.5	0.0
Cycle Q Clear(g_c), s	9.7	3.0	2.5	16.8	7.5	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	428	509	112	870	577	
V/C Ratio(X)	0.80	0.25	0.75	0.82	0.57	
Avail Cap(c_a), veh/h	1310	1340	441	2540	1823	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.9	11.9	22.5	10.9	13.9	0.0
Incr Delay (d2), s/veh	3.4	0.3	3.7	2.0	0.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	2.9	0.9	4.4	2.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.3	12.2	26.1	12.9	14.8	0.0
LnGrp LOS	C	B	C	B	B	
Approach Vol, veh/h	468			800	331	A
Approach Delay, s/veh	18.1			14.3	14.8	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.0		19.2	8.0	22.0
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 69		39.8	13.4	49.8
Max Q Clear Time (g_c+I1), s		18.8		11.7	4.5	9.5
Green Ext Time (p_c), s		5.0		1.4	0.0	1.8

Intersection Summary	
HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	480	720	48	419
Future Volume (vph)	480	720	48	419
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	25.5	25.5	12.2	12.2
Actuated g/C Ratio	0.50	0.50	0.24	0.24
v/c Ratio	0.52	0.78	0.11	0.64
Control Delay	10.5	16.7	18.9	9.4
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	10.5	16.8	18.9	9.4
LOS	B	B	B	A
Approach Delay	10.5	16.8	10.4	
Approach LOS	B	B	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 50.9	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 13.2	Intersection LOS: B
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	0	0	720	48	419
Future Volume (veh/h)	480	0	0	720	48	419
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	495	0	0	742	49	314
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	922	0	0	922	451	402
Arrive On Green	0.49	0.00	0.00	0.49	0.25	0.25
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	495	0	0	742	49	314
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	8.5	0.0	0.0	15.4	1.0	8.5
Cycle Q Clear(g_c), s	8.5	0.0	0.0	15.4	1.0	8.5
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	922	0	0	922	451	402
V/C Ratio(X)	0.54	0.00	0.00	0.80	0.11	0.78
Avail Cap(c_a), veh/h	2916	0	0	2916	1384	1232
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	0.0	10.2	13.5	16.4
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.7	0.1	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	4.0	0.4	3.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.9	0.0	0.0	11.9	13.6	19.7
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	495			742	363	
Approach Delay, s/veh	8.9			11.9	18.9	
Approach LOS	A			B	B	

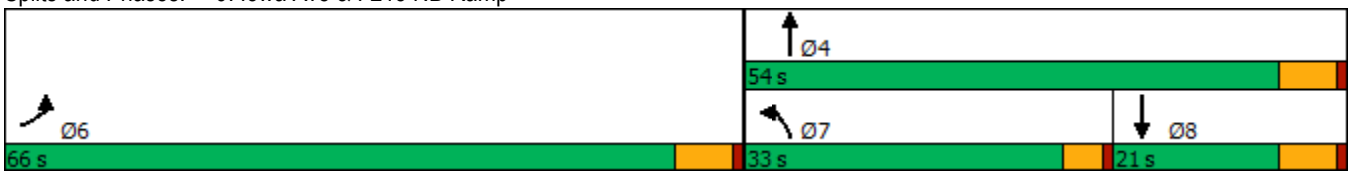
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		28.9		17.9		28.9
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		17.4		10.5		10.5
Green Ext Time (p_c), s		5.3		1.3		3.0

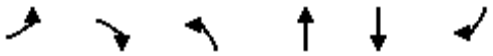
Intersection Summary		
HCM 6th Ctrl Delay		12.5
HCM 6th LOS		B

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	154	381	697	17
Future Volume (vph)	154	381	697	17
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	27.2	46.3	14.5
Actuated g/C Ratio	0.50	0.23	0.39	0.12
v/c Ratio	0.93	0.94	0.96	0.72
Control Delay	35.3	77.0	60.2	15.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	77.0	60.2	15.2
LOS	D	E	E	B
Approach Delay	35.3		66.1	15.2
Approach LOS	D		E	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 46.5	Intersection LOS: D
Intersection Capacity Utilization 111.6%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	154	744	381	697	17	339
Future Volume (veh/h)	154	744	381	697	17	339
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	157	580	389	711	17	259
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	177	652	414	745	12	190
Arrive On Green	0.50	0.50	0.23	0.39	0.12	0.12
Sat Flow, veh/h	351	1296	1810	1900	100	1525
Grp Volume(v), veh/h	738	0	389	711	0	276
Grp Sat Flow(s),veh/h/ln	1649	0	1810	1900	0	1625
Q Serve(g_s), s	47.8	0.0	25.1	43.2	0.0	14.8
Cycle Q Clear(g_c), s	47.8	0.0	25.1	43.2	0.0	14.8
Prop In Lane	0.21	0.79	1.00			0.94
Lane Grp Cap(c), veh/h	830	0	414	745	0	203
V/C Ratio(X)	0.89	0.00	0.94	0.95	0.00	1.36
Avail Cap(c_a), veh/h	830	0	433	765	0	203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.5	0.0	45.0	35.1	0.0	52.0
Incr Delay (d2), s/veh	13.6	0.0	27.3	21.8	0.0	191.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.0	0.0	14.3	24.0	0.0	16.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	0.0	72.3	56.8	0.0	243.8
LnGrp LOS	D	A	E	E	A	F
Approach Vol, veh/h	738			1100	276	
Approach Delay, s/veh	40.2			62.3	243.8	
Approach LOS	D			E	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	52.8	66.0	31.8	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	45.2	49.8	27.1	16.8
Green Ext Time (p_c), s	1.2	2.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	78.3
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	9	344	10	7	323	11	20	0	15	2	0	16
Future Vol, veh/h	9	344	10	7	323	11	20	0	15	2	0	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	9	355	10	7	333	11	21	0	15	2	0	16

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	333	0	0	365	0	0	733	-	360	733	730	333
Stage 1	-	-	-	-	-	-	378	-	-	347	347	-
Stage 2	-	-	-	-	-	-	355	-	-	386	383	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1238	-	-	1205	-	-	339	0	689	339	352	713
Stage 1	-	-	-	-	-	-	648	0	-	673	638	-
Stage 2	-	-	-	-	-	-	666	0	-	641	616	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1238	-	-	1205	-	-	327	-	689	328	347	713
Mov Cap-2 Maneuver	-	-	-	-	-	-	327	-	-	328	347	-
Stage 1	-	-	-	-	-	-	642	-	-	667	634	-
Stage 2	-	-	-	-	-	-	647	-	-	621	610	-

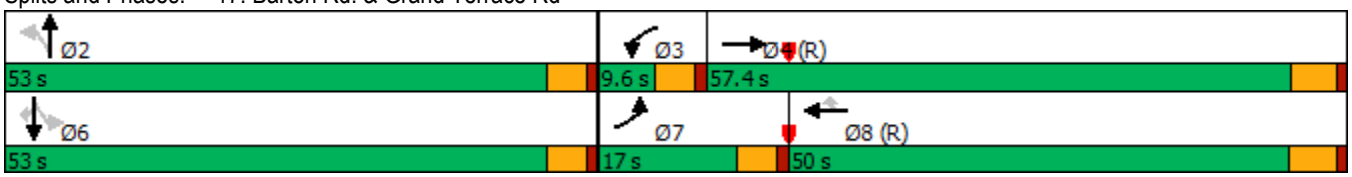
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0.2	14	10.9
HCM LOS			B	B

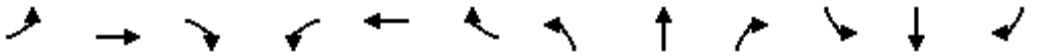
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	327	689	1238	-	-	1205	-	-	631
HCM Lane V/C Ratio	0.063	0.022	0.007	-	-	0.006	-	-	0.029
HCM Control Delay (s)	16.7	10.3	7.9	0	-	8	-	-	10.9
HCM Lane LOS	C	B	A	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0.1	0	-	-	0	-	-	0.1

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	33	327	242	239	185	3	99		
Future Volume (vph)	33	327	242	239	185	3	99		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.3	85.7	77.5	77.5		24.6	24.6		
Actuated g/C Ratio	0.06	0.71	0.65	0.65		0.20	0.20		
v/c Ratio	0.37	0.15	0.12	0.24		0.76	0.27		
Control Delay	40.2	12.4	10.6	2.3		61.7	8.0		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	40.2	12.4	10.6	2.3		61.7	8.0		
LOS	D	B	B	A		E	A		
Approach Delay		14.9	6.5			43.1			
Approach LOS		B	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 36.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	327	0	0	242	239	0	0	0	185	3	99
Future Volume (veh/h)	33	327	0	0	242	239	0	0	0	185	3	99
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	36	355	0	0	263	200	0	0	0	201	3	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	47	2565	0	1	2334	1041	0	300	0	297	4	254
Arrive On Green	0.03	0.75	0.00	0.00	0.68	0.68	0.00	0.00	0.00	0.17	0.17	0.17
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1423	21	1525
Grp Volume(v), veh/h	36	355	0	0	263	200	0	0	0	204	0	81
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1444	0	1525
Q Serve(g_s), s	2.6	3.5	0.0	0.0	3.2	5.7	0.0	0.0	0.0	16.4	0.0	5.6
Cycle Q Clear(g_c), s	2.6	3.5	0.0	0.0	3.2	5.7	0.0	0.0	0.0	16.4	0.0	5.6
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	47	2565	0	1	2334	1041	0	300	0	300	0	254
V/C Ratio(X)	0.76	0.14	0.00	0.00	0.11	0.19	0.00	0.00	0.00	0.68	0.00	0.32
Avail Cap(c_a), veh/h	167	2565	0	67	2334	1041	0	726	0	642	0	615
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	4.2	0.0	0.0	6.5	7.0	0.0	0.0	0.0	48.5	0.0	44.0
Incr Delay (d2), s/veh	9.1	0.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0	2.7	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.1	0.0	0.0	1.1	1.8	0.0	0.0	0.0	6.2	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.0	4.3	0.0	0.0	6.6	7.4	0.0	0.0	0.0	51.2	0.0	44.7
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	D
Approach Vol, veh/h		391			463			0			285	
Approach Delay, s/veh		10.1			7.0			0.0			49.4	
Approach LOS		B			A						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		24.6	0.0	95.4		24.6	8.1	87.3				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	5.5		18.4	4.6	7.7				
Green Ext Time (p_c), s		0.0	0.0	2.5		1.5	0.0	2.4				

Intersection Summary												
HCM 6th Ctrl Delay			18.6									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	539	670	66	486
Demand Flow Rate, veh/h	539	670	66	486
Vehicles Circulating, veh/h	350	60	876	371
Vehicles Exiting, veh/h	507	882	13	359
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	4.8	7.8	6.4
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.998	0.002	0.549	0.451	1.000	0.702	0.298
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	538	1	368	302	66	341	145
Cap Entry Lane, veh/h	1033	1033	1345	1345	565	1013	1013
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	538	1	368	302	66	341	145
Cap Entry, veh/h	1033	1033	1345	1345	565	1013	1013
V/C Ratio	0.521	0.001	0.274	0.225	0.117	0.337	0.143
Control Delay, s/veh	9.8	3.5	5.1	4.6	7.8	7.0	4.9
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	3	0	1	1	0	1	0

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	110	728	606	310	0	439	
Future Volume (vph)	110	728	606	310	0	439	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	13.0	43.0	30.0	30.0	77.0	77.0	77.0
Total Split (%)	10.8%	35.8%	25.0%	25.0%	64.2%	64.2%	64%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	8.4	37.1	24.1	24.1	71.2	71.2	
Actuated g/C Ratio	0.07	0.31	0.20	0.20	0.60	0.60	
v/c Ratio	0.89	0.67	0.86	0.62	62.00	0.46	
Control Delay	110.6	39.2	58.7	15.3	25721.5	13.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	110.6	39.2	58.7	15.3	25721.5	13.2	
LOS	F	D	E	B	F	B	
Approach Delay		48.5	44.0		5538.0		
Approach LOS		D	D		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 62.00	
Intersection Signal Delay: 1374.2	Intersection LOS: F
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	110	728	0	0	606	310	31	0	439	0	0	0
Future Volume (veh/h)	110	728	0	0	606	310	31	0	439	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	113	751	0	0	625	242	124	0	340			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	155	1793	0	0	1098	475	509	0	453			
Arrive On Green	0.09	0.50	0.00	0.00	0.30	0.30	0.28	0.00	0.28			
Sat Flow, veh/h	1810	3705	0	0	3705	1560	1810	0	1610			
Grp Volume(v), veh/h	113	751	0	0	625	242	124	0	340			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1560	1810	0	1610			
Q Serve(g_s), s	2.6	5.7	0.0	0.0	6.3	5.5	2.3	0.0	8.3			
Cycle Q Clear(g_c), s	2.6	5.7	0.0	0.0	6.3	5.5	2.3	0.0	8.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	155	1793	0	0	1098	475	509	0	453			
V/C Ratio(X)	0.73	0.42	0.00	0.00	0.57	0.51	0.24	0.00	0.75			
Avail Cap(c_a), veh/h	352	3167	0	0	2081	900	3037	0	2703			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.2	6.9	0.0	0.0	12.6	12.4	12.0	0.0	14.1			
Incr Delay (d2), s/veh	2.4	0.2	0.0	0.0	0.5	0.8	0.2	0.0	2.5			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.0	1.4	0.0	0.0	2.1	1.6	0.7	0.0	2.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.7	7.1	0.0	0.0	13.1	13.2	12.2	0.0	16.7			
LnGrp LOS	C	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		864			867			464				
Approach Delay, s/veh		9.0			13.1			15.5				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		26.5			8.3	18.2		16.6				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		37.9			8.4	24.9		72.5				
Max Q Clear Time (g_c+I1), s		7.7			4.6	8.3		10.3				
Green Ext Time (p_c), s		5.6			0.0	4.6		1.9				
Intersection Summary												
HCM 6th Ctrl Delay			12.0									
HCM 6th LOS			B									

APPENDIX 3.3:

EXISTING (2020) CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

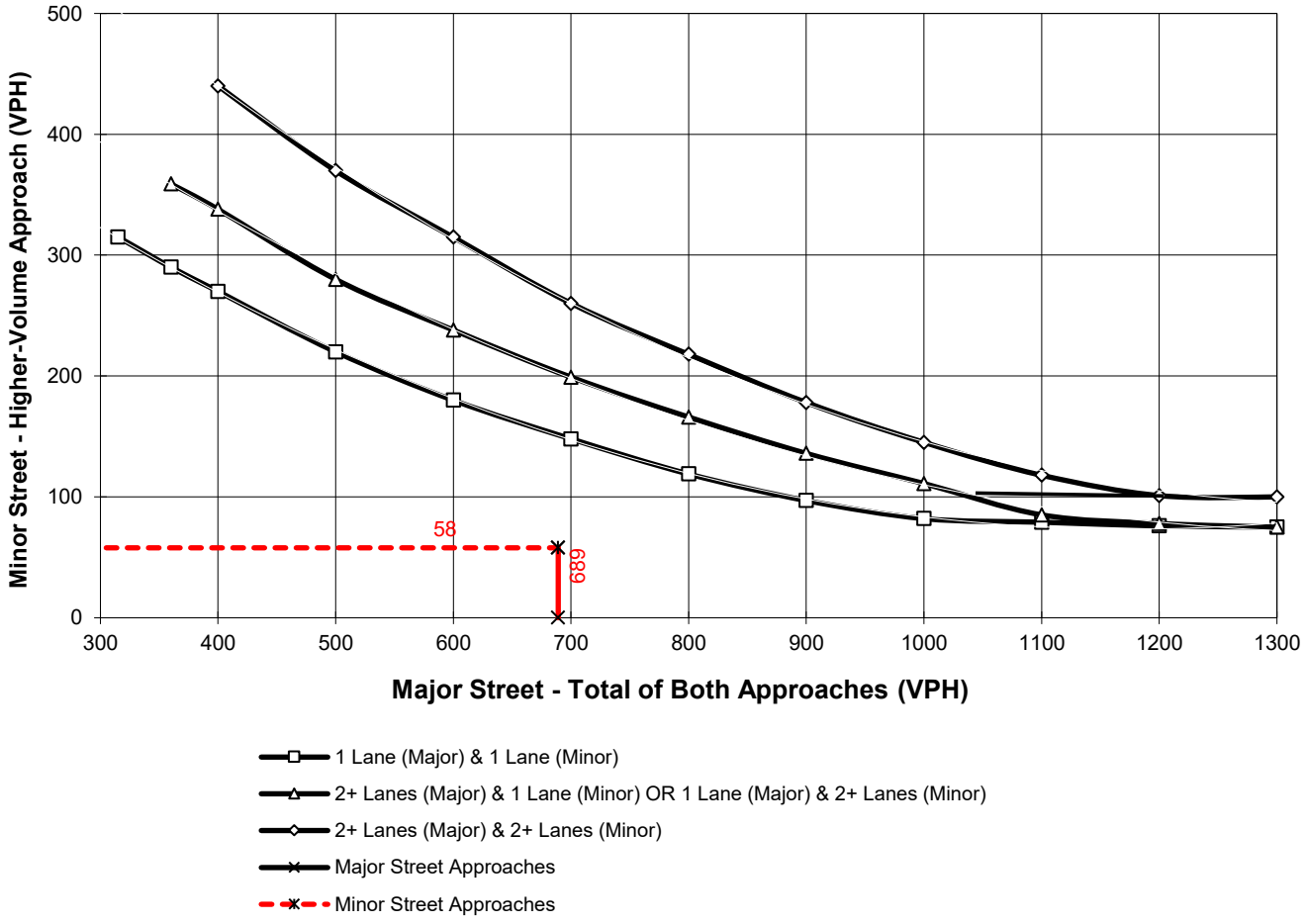
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **Existing Conditions - Weekday AM Peak Hour**

Major Street Name = **Barton Rd.**
Total of Both Approaches (VPH) = **689**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave**
High Volume Approach (VPH) = **58**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

This Page Intentionally Left Blank

APPENDIX 3.4:

EXISTING (2020) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	276	376	111	346	1054
v/c Ratio	0.75	0.60	0.63	0.14	0.53
Control Delay	57.5	7.9	83.3	1.5	17.1
Queue Delay	0.4	0.0	0.0	0.0	0.0
Total Delay	58.0	7.9	83.3	1.5	17.1
Queue Length 50th (ft)	203	0	79	5	230
Queue Length 95th (ft)	275	75	153	16	368
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	718	248	2549	1998
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	41	0	0	0	38
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.52	0.45	0.14	0.54

Intersection Summary



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	151	355	518	385	666
v/c Ratio	0.62	0.76	0.31	0.84	0.24
Control Delay	59.2	21.6	18.3	53.8	4.2
Queue Delay	0.0	0.0	0.0	1.3	0.4
Total Delay	59.2	21.6	18.3	55.2	4.6
Queue Length 50th (ft)	113	48	101	248	42
Queue Length 95th (ft)	165	135	178	397	112
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	633	1688	652	2795
Starvation Cap Reductn	0	0	0	116	1517
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.56	0.31	0.72	0.52

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	656	656	34	594
v/c Ratio	0.79	0.79	0.05	0.82
Control Delay	27.7	27.7	17.8	26.5
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	28.0	27.7	17.8	26.5
Queue Length 50th (ft)	241	241	9	167
Queue Length 95th (ft)	547	547	36	433
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1448	1448	1268	1187
Starvation Cap Reductn	292	11	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.57	0.46	0.03	0.50

Intersection Summary



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1250	349	616	346
v/c Ratio	1.04	0.99	0.98	0.88
Control Delay	52.3	94.1	70.2	38.5
Queue Delay	5.9	0.0	0.0	0.0
Total Delay	58.2	94.1	70.2	38.5
Queue Length 50th (ft)	~829	272	467	68
Queue Length 95th (ft)	#1095	#466	#706	#235
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1200	352	638	399
Starvation Cap Reductn	18	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	0.99	0.97	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	6.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	481	959	44	435
Demand Flow Rate, veh/h	481	959	44	435
Vehicles Circulating, veh/h	308	60	736	483
Vehicles Exiting, veh/h	610	720	53	536
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.1	5.9	6.3	6.7
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.983	0.017	0.504	0.496	1.000	0.660	0.340
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	473	8	483	476	44	287	148
Cap Entry Lane, veh/h	1073	1073	1345	1345	651	915	915
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	473	8	483	476	44	287	148
Cap Entry, veh/h	1073	1073	1345	1345	651	915	915
V/C Ratio	0.441	0.007	0.359	0.354	0.068	0.314	0.162
Control Delay, s/veh	8.2	3.4	6.0	5.9	6.3	7.3	5.5
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	2	0	2	2	0	1	1



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	97	598	920	592	49	369
v/c Ratio	0.70	0.39	0.84	0.82	24.50	0.45
Control Delay	82.2	25.9	46.3	26.3	14409.3	12.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	25.9	46.3	26.3	14409.3	12.0
Queue Length 50th (ft)	76	178	361	187	~76	98
Queue Length 95th (ft)	#180	230	#478	#403	#161	168
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	139	1726	1274	779	7	1056
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.35	0.72	0.76	7.00	0.35

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	146	423	126	826	838
v/c Ratio	0.34	0.85	0.66	0.34	0.45
Control Delay	38.0	43.2	62.4	12.5	19.8
Queue Delay	0.1	0.0	0.0	0.5	0.0
Total Delay	38.1	43.2	62.4	13.0	19.9
Queue Length 50th (ft)	94	210	105	166	194
Queue Length 95th (ft)	134	296	m144	197	327
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	678	264	2427	1862
Starvation Cap Reductn	0	0	0	1064	0
Spillback Cap Reductn	72	0	0	0	56
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.62	0.48	0.61	0.46

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	423	357	919	367	443
v/c Ratio	0.87	0.57	0.68	0.89	0.19
Control Delay	61.1	13.4	31.8	84.3	7.7
Queue Delay	0.0	0.0	0.0	12.3	0.0
Total Delay	61.1	13.4	31.8	96.6	7.7
Queue Length 50th (ft)	303	54	290	261	54
Queue Length 95th (ft)	#454	146	382	#416	66
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	531	661	1346	472	2316
Starvation Cap Reductn	0	0	0	87	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.80	0.54	0.68	0.95	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	495	742	49	432
v/c Ratio	0.52	0.78	0.11	0.64
Control Delay	10.5	16.7	18.9	9.4
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	10.5	16.8	18.9	9.4
Queue Length 50th (ft)	76	139	10	12
Queue Length 95th (ft)	187	340	43	101
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1882	1882	1345	1299
Starvation Cap Reductn	251	242	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.45	0.04	0.33

Intersection Summary



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	916	389	711	363
v/c Ratio	0.93	0.94	0.96	0.72
Control Delay	35.3	77.0	60.2	15.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	77.0	60.2	15.2
Queue Length 50th (ft)	495	295	523	12
Queue Length 95th (ft)	#817	#478	#770	112
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	988	432	766	509
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.93	0.90	0.93	0.71

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	6.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	539	670	66	486
Demand Flow Rate, veh/h	539	670	66	486
Vehicles Circulating, veh/h	350	60	876	371
Vehicles Exiting, veh/h	507	882	13	359
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	4.8	7.8	6.4
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.998	0.002	0.549	0.451	1.000	0.702	0.298
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	538	1	368	302	66	341	145
Cap Entry Lane, veh/h	1033	1033	1345	1345	565	1013	1013
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	538	1	368	302	66	341	145
Cap Entry, veh/h	1033	1033	1345	1345	565	1013	1013
V/C Ratio	0.521	0.001	0.274	0.225	0.117	0.337	0.143
Control Delay, s/veh	9.8	3.5	5.1	4.6	7.8	7.0	4.9
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	3	0	1	1	0	1	0



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	113	751	625	320	124	453
v/c Ratio	0.89	0.67	0.86	0.62	62.00	0.46
Control Delay	110.6	39.2	58.7	15.3	25721.5	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.6	39.2	58.7	15.3	25721.5	13.2
Queue Length 50th (ft)	88	263	246	40	~198	159
Queue Length 95th (ft)	#201	332	#331	135	#326	238
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	127	1148	754	528	6	989
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.65	0.83	0.61	20.67	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 3.5:

EXISTING (2020) CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/5/2020
Agency	Urban Crossroads, Inc.	Analysis Year	Existing (2020)
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3753	7161	0.52	68.7	18.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.893	3753	438	7200	2100	0.52	0.21	64.7	60.6	19.3	25.1	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	3320	7161	0.46	68.7	16.1	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.909	3860	540	7200	2100	0.54	0.26	62.8	60.7	20.5	22.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3856	7161	0.54	68.7	18.7	C

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.4	18.5	18.0	2.1	C

Facility Overall Results

Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	18.0
Average Travel Time, min	2.1	Density, pc/mi/ln	18.5

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/5/2020
Agency	Urban Crossroads, Inc.	Analysis Year	Existing (2020)
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4543	7161	0.63	67.9	22.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.926	4543	421	7200	2100	0.63	0.20	64.7	60.6	23.4	27.4	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4138	7161	0.58	68.5	20.1	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4825	687	7200	2100	0.67	0.33	61.5	59.4	26.2	27.3	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4811	7161	0.67	67.2	23.9	C

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	66.3	23.3	22.4	2.0	C

Facility Overall Results			
Space Mean Speed, mi/h	66.3	Density, veh/mi/ln	22.4
Average Travel Time, min	2.0	Density, pc/mi/ln	23.3

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/5/2020
Agency	Urban Crossroads, Inc.	Analysis Year	Existing (2020)
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3562	7161	0.50	68.7	17.3	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3562	508	7200	2100	0.49	0.24	64.5	60.4	18.4	24.3	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3064	7161	0.43	68.7	14.9	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3438	374	7200	2100	0.48	0.18	63.2	61.1	18.1	19.9	B

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3431	7161	0.48	68.7	16.7	B

Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.5	17.1	16.6	2.1	B

Facility Overall Results

Space Mean Speed, mi/h	67.5	Density, veh/mi/ln	16.6
Average Travel Time, min	2.1	Density, pc/mi/ln	17.1

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/5/2020
Agency	Urban Crossroads, Inc.	Analysis Year	Existing (2020)
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4343	7161	0.61	68.2	21.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.971	4343	517	6600	2100	0.66	0.25	64.5	60.3	22.4	26.7	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	3821	7161	0.53	68.7	18.5	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4282	461	6600	2100	0.65	0.22	62.3	60.3	22.9	24.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4273	7161	0.60	68.3	20.8	C

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	67.0	21.0	20.2	2.0	C

Facility Overall Results			
Space Mean Speed, mi/h	67.0	Density, veh/mi/ln	20.2
Average Travel Time, min	2.0	Density, pc/mi/ln	21.0

APPENDIX 3.6:

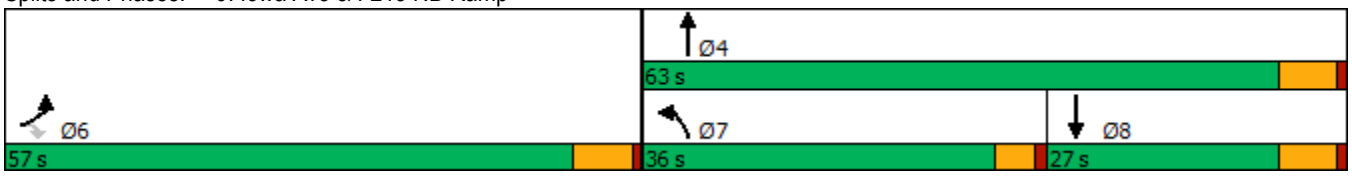
EXISTING (2020) CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

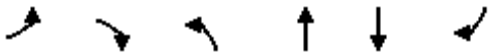
This Page Intentionally Left Blank

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	118	1044	325	573	37
Future Volume (vph)	118	1044	325	573	37
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	57.0	57.0	36.0	63.0	27.0
Total Split (%)	47.5%	47.5%	30.0%	52.5%	22.5%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	31.9	31.9	21.2	39.3	13.1
Actuated g/C Ratio	0.38	0.38	0.25	0.46	0.15
v/c Ratio	0.84	0.64	0.77	0.70	0.70
Control Delay	27.6	5.2	44.5	24.7	18.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	5.2	44.5	24.7	18.2
LOS	C	A	D	C	B
Approach Delay	16.5			31.9	18.2
Approach LOS	B			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 84.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 79.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	118	1044	325	573	37	285
Future Volume (veh/h)	118	1044	325	573	37	285
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	985	349	616	40	247
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	657	1169	394	912	47	289
Arrive On Green	0.00	0.36	0.22	0.48	0.20	0.20
Sat Flow, veh/h	1810	3220	1810	1900	229	1416
Grp Volume(v), veh/h	0	985	349	616	0	287
Grp Sat Flow(s),veh/h/ln	1810	1610	1810	1900	0	1645
Q Serve(g_s), s	0.0	22.2	14.8	19.7	0.0	13.3
Cycle Q Clear(g_c), s	0.0	22.2	14.8	19.7	0.0	13.3
Prop In Lane	1.00	1.00	1.00			0.86
Lane Grp Cap(c), veh/h	657	1169	394	912	0	335
V/C Ratio(X)	0.00	0.84	0.88	0.68	0.00	0.86
Avail Cap(c_a), veh/h	1163	2070	719	1366	0	433
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.1	29.9	15.8	0.0	30.3
Incr Delay (d2), s/veh	0.0	1.7	2.7	0.9	0.0	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	6.5	8.0	0.0	6.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.8	32.6	16.7	0.0	42.9
LnGrp LOS	A	C	C	B	A	D
Approach Vol, veh/h	985			965	287	
Approach Delay, s/veh	24.8			22.4	42.9	
Approach LOS	C			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	44.1	34.9	21.8	22.3
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	56.8	50.8	31.4	20.8
Max Q Clear Time (g_c+I1), s	21.7	24.2	16.8	15.3
Green Ext Time (p_c), s	4.7	4.5	0.5	0.8

Intersection Summary	
HCM 6th Ctrl Delay	26.1
HCM 6th LOS	C

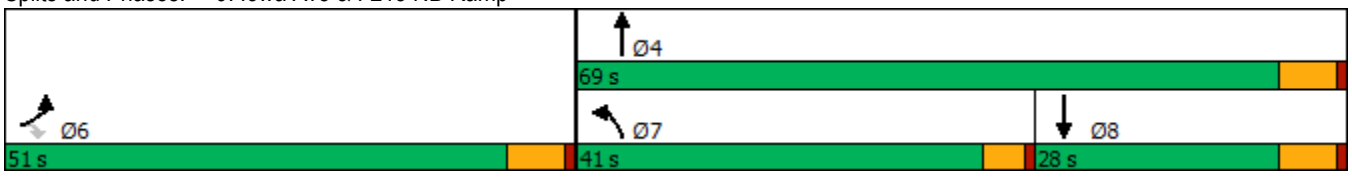
Notes

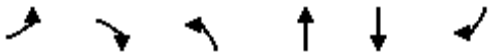
User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	154	744	381	697	17
Future Volume (vph)	154	744	381	697	17
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	51.0	51.0	41.0	69.0	28.0
Total Split (%)	42.5%	42.5%	34.2%	57.5%	23.3%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	Max	Max	None	Min	Min
Act Effct Green (s)	45.3	45.3	25.4	44.4	14.3
Actuated g/C Ratio	0.44	0.44	0.25	0.43	0.14
v/c Ratio	0.59	0.48	0.87	0.86	0.69
Control Delay	22.4	4.2	57.1	37.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	4.2	57.1	37.3	13.0
LOS	C	A	E	D	B
Approach Delay	13.5			44.3	13.0
Approach LOS	B			D	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 80.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	154	744	381	697	17	339
Future Volume (veh/h)	154	744	381	697	17	339
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	355	369	389	711	17	259
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	759	675	422	882	19	287
Arrive On Green	0.42	0.42	0.23	0.46	0.19	0.19
Sat Flow, veh/h	1810	1610	1810	1900	100	1525
Grp Volume(v), veh/h	355	369	389	711	0	276
Grp Sat Flow(s),veh/h/ln	1810	1610	1810	1900	0	1625
Q Serve(g_s), s	15.1	18.4	22.4	34.2	0.0	17.7
Cycle Q Clear(g_c), s	15.1	18.4	22.4	34.2	0.0	17.7
Prop In Lane	1.00	1.00	1.00			0.94
Lane Grp Cap(c), veh/h	759	675	422	882	0	306
V/C Ratio(X)	0.47	0.55	0.92	0.81	0.00	0.90
Avail Cap(c_a), veh/h	759	675	617	1117	0	332
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	23.3	40.0	24.5	0.0	42.4
Incr Delay (d2), s/veh	2.1	3.2	12.0	3.5	0.0	25.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	17.9	11.2	15.6	0.0	9.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.5	26.5	51.9	28.0	0.0	67.9
LnGrp LOS	C	C	D	C	A	E
Approach Vol, veh/h	724			1100	276	
Approach Delay, s/veh	25.5			36.5	67.9	
Approach LOS	C			D	E	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	55.8	51.0	29.5	26.3
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	62.8	44.8	36.4	21.8
Max Q Clear Time (g_c+I1), s	36.2	20.4	24.4	19.7
Green Ext Time (p_c), s	5.5	2.3	0.5	0.3

Intersection Summary	
HCM 6th Ctrl Delay	36.8
HCM 6th LOS	D

Notes

User approved volume balancing among the lanes for turning movement.

APPENDIX 4.1:

POST-PROCESS WORKSHEETS

This Page Intentionally Left Blank

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: Rancho Av. & I-10 Westbound Ramps
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	103	121	18	17%	123	178	55	44%
	Through	322	383	61	19%	809	975	166	20%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	426	504	78	18%	933	1,153	220	24%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	667	801	134	20%	627	694	67	11%
	Right	313	379	66	21%	194	231	37	19%
	SB Total	980	1,180	200	20%	821	925	104	13%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
WEST BOUND	Left	257	279	22	9%	142	166	24	17%
	Through	0	0	0	#DIV/0!	1	1	0	-8%
	Right	350	387	37	11%	415	435	20	5%
	WB Total	607	666	59	10%	558	602	44	8%
TOTAL ENTERING VOLUME		2,012	2,350	337.742393	17%	2,312	2,680	368	16%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	1,180	925			
North Leg	Outbound	770	1,410			
North Leg	**TOTAL**	**1,950**	**2,335**	**7%**	**8%**	**28,868**
South Leg	Inbound	504	1,153			
South Leg	Outbound	1,080	860			
South Leg	**TOTAL**	**1,584**	**2,013**	**6%**	**8%**	**24,397**
East Leg	Inbound	666	602			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**666**	**602**	**9%**	**8%**	**7,633**
West Leg	Inbound	0	0			
West Leg	Outbound	500	410			
West Leg	**TOTAL**	**500**	**410**	**11%**	**9%**	**4,633**
OVERALL TOTAL		***4,700***	***5,360***	***7%***	***8%***	***65,531***

Z:\Shared\UcJobs\12971\Post Processing\[01 Rancho_I10 WB.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: Rancho Av. & I-10 Eastbound Ramps
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	293	357	64	22%	535	710	175	33%
	Right	163	173	10	6%	338	370	32	10%
	NB Total	456	530	74	16%	873	1,080	207	24%
SOUTH BOUND	Left	339	338	-1	0%	349	370	21	6%
	Through	586	742	156	27%	421	490	69	16%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	925	1,080	155	17%	770	860	90	12%
EAST BOUND	Left	132	146	14	11%	397	448	51	13%
	Through	1	1	0	-8%	5	5	0	-8%
	Right	312	383	71	23%	339	346	7	2%
	EB Total	445	530	85	19%	742	799	57	8%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		1,826	2,140	314.019378	17%	2,385	2,739	354	15%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	1,080	860			
North Leg	Outbound	503	1,158			
North Leg	**TOTAL**	**1,583**	**2,018**	**6%**	**8%**	**24,389**
South Leg	Inbound	530	1,080			
South Leg	Outbound	1,125	836			
South Leg	**TOTAL**	**1,655**	**1,916**	**7%**	**8%**	**23,754**
East Leg	Inbound	0	0			
East Leg	Outbound	512	745			
East Leg	**TOTAL**	**512**	**745**	**6%**	**8%**	**9,249**
West Leg	Inbound	530	799			
West Leg	Outbound	0	0			
West Leg	**TOTAL**	**530**	**799**	**5%**	**7%**	**10,850**
OVERALL TOTAL		***4,280***	***5,478***	**6%**	***8%***	***68,242***

Z:\Shared\UcJobs\12971\Post Processing\[02 Rancho_I10 EB.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: Rancho Avenue & Auga Mansa Road
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	64	90	26	41%	38	74	36	92%
	Through	328	385	57	17%	435	601	166	38%
	Right	5	6	1	15%	2	2	0	-4%
	NB Total	397	481	84	21%	476	677	201	42%
SOUTH BOUND	Left	32	28	-4	-12%	12	8	-4	-36%
	Through	749	951	202	27%	694	781	87	12%
	Right	615	699	84	14%	174	192	18	10%
	SB Total	1,396	1,678	282	20%	881	981	100	11%
EAST BOUND	Left	177	175	-2	-1%	453	552	99	22%
	Through	17	16	-1	-7%	90	90	0	0%
	Right	37	49	12	31%	98	169	71	73%
	EB Total	232	240	8	3%	640	811	171	27%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	31	31	0	1%	25	24	-1	-6%
	Right	11	10	-1	-13%	9	6	-3	-36%
	WB Total	42	41	-1	-3%	35	30	-5	-14%
TOTAL ENTERING VOLUME		2,067	2,440	373.2454	18%	2,032	2,499	467	23%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	1,678	981			
North Leg	Outbound	570	1,159			
North Leg	**TOTAL**	**2,248**	**2,140**	**9%**	**8%**	**26,416**
South Leg	Inbound	481	677			
South Leg	Outbound	1,000	950			
South Leg	**TOTAL**	**1,481**	**1,627**	**7%**	**8%**	**20,229**
East Leg	Inbound	41	30			
East Leg	Outbound	50	100			
East Leg	**TOTAL**	**91**	**130**	**#DIV/0!**	**#DIV/0!**	**-**
West Leg	Inbound	240	811			
West Leg	Outbound	820	290			
West Leg	**TOTAL**	**1,060**	**1,101**	**7%**	**8%**	**14,510**
OVERALL TOTAL		***4,880***	***4,998***	***8%***	***8%***	***61,155***

Z:\Shared\UcJobs\12971\Post Processing\[03 Rancho_Agua Mansa.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: La Cadena Drive & I-10 Westbound Ramps
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	115	147	32	27%	149	181	32	22%
	Through	394	425	31	8%	689	818	129	19%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	510	572	62	12%	838	999	161	19%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	713	891	178	25%	764	879	115	15%
	Right	174	167	-7	-4%	153	173	20	13%
	SB Total	886	1,058	172	19%	917	1,052	135	15%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		1,396	1,630	233.7832	17%	1,754	2,051	297	17%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	1,058	1,052			
North Leg	Outbound	425	818			
North Leg	**TOTAL**	**1,483**	**1,870**	**7%**	**9%**	**21,897**
South Leg	Inbound	572	999			
South Leg	Outbound	891	879			
South Leg	**TOTAL**	**1,463**	**1,878**	**7%**	**9%**	**22,066**
East Leg	Inbound	0	0			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
West Leg	Inbound	0	0			
West Leg	Outbound	314	354			
West Leg	**TOTAL**	**314**	**354**	**8%**	**9%**	**3,816**
OVERALL TOTAL		***3,260***	***4,102***	***7%***	***9%***	***47,779***

Z:\Shared\UcJobs\12971\Post Processing\[04 La Cadena_I10 WB.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: La Cadena Drive & Rancho Avenue
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	276	338	62	23%	324	465	141	44%
	Through	410	467	57	14%	461	584	123	27%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	686	805	119	17%	785	1,049	264	34%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	491	696	205	42%	548	682	134	24%
	Right	2	2	0	-8%	9	9	0	4%
	SB Total	493	698	205	42%	557	691	134	24%
EAST BOUND	Left	14	13	-1	-8%	25	21	-4	-16%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	463	664	201	43%	519	639	120	23%
	EB Total	477	677	200	42%	544	660	116	21%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		1,655	2,180	524.600122	32%	1,885	2,400	515	27%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	698	691			
North Leg	Outbound	480	605			
North Leg	**TOTAL**	**1,178**	**1,296**	**8%**	**8%**	**15,402**
South Leg	Inbound	805	1,049			
South Leg	Outbound	1,360	1,321			
South Leg	**TOTAL**	**2,165**	**2,370**	**7%**	**8%**	**29,010**
East Leg	Inbound	0	0			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
West Leg	Inbound	677	660			
West Leg	Outbound	340	474			
West Leg	**TOTAL**	**1,017**	**1,134**	**7%**	**8%**	**13,929**
OVERALL TOTAL		***4,360***	***4,800***	***7%***	***8%***	***58,341***

Z:\Shared\UcJobs\12971\Post Processing\[05 La Cadena_Rancho.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: La Cadena Drive & Barton Road
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	518	600	82	16%	737	1,002	265	36%
	Right	146	301	155	106%	134	272	139	104%
	NB Total	665	901	236	36%	870	1,274	404	46%
SOUTH BOUND	Left	217	299	82	37%	229	257	28	12%
	Through	1,037	1,372	335	32%	965	1,158	193	20%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	1,255	1,671	416	33%	1,193	1,415	222	19%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
WEST BOUND	Left	150	318	168	112%	194	471	277	143%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	178	220	42	24%	165	250	85	52%
	WB Total	328	538	210	64%	359	721	362	101%
TOTAL ENTERING VOLUME		2,247	3,110	862.79	38%	2,423	3,410	987	41%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	1,671	1,415			
North Leg	Outbound	820	1,252			
North Leg	**TOTAL**	**2,491**	**2,667**	**8%**	**8%**	**32,339**
South Leg	Inbound	901	1,274			
South Leg	Outbound	1,690	1,629			
South Leg	**TOTAL**	**2,591**	**2,903**	**7%**	**8%**	**36,937**
East Leg	Inbound	538	721			
East Leg	Outbound	600	529			
East Leg	**TOTAL**	**1,138**	**1,250**	**7%**	**7%**	**17,299**
West Leg	Inbound	0	0			
West Leg	Outbound	0	0			
West Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
OVERALL TOTAL		***6,220***	***6,820***	***7%***	***8%***	***86,576***

Z:\Shared\UcJobs\12971\Post Processing\[06 La Cadena_Barton.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: I-215 Northbound Ramps & Iowa Avenue
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	325	400	75	23%	381	440	59	16%
	Through	573	596	23	4%	697	753	56	8%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	898	996	98	11%	1,078	1,193	115	11%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	37	29	-8	-21%	17	14	-3	-18%
	Right	285	303	18	6%	339	347	8	2%
	SB Total	322	332	10	3%	356	361	5	1%
EAST BOUND	Left	118	157	39	33%	154	200	46	29%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	1,044	1,235	191	18%	744	825	81	11%
	EB Total	1,162	1,392	230	20%	899	1,025	126	14%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
TOTAL ENTERING VOLUME		2,382	2,720	338.0042	14%	2,333	2,579	246	11%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	332	361			
North Leg	Outbound	753	953			
North Leg	**TOTAL**	**1,085**	**1,314**	**7%**	**9%**	**14,806**
South Leg	Inbound	996	1,193			
South Leg	Outbound	1,264	839			
South Leg	**TOTAL**	**2,260**	**2,032**	**8%**	**7%**	**28,748**
East Leg	Inbound	0	0			
East Leg	Outbound	0	0			
East Leg	**TOTAL**	**0**	**0**	**#DIV/0!**	**#DIV/0!**	**-**
West Leg	Inbound	1,392	1,025			
West Leg	Outbound	703	787			
West Leg	**TOTAL**	**2,095**	**1,812**	**9%**	**7%**	**24,283**
OVERALL TOTAL		***5,440***	***5,158***	***8%***	***8%***	***67,837***

Z:\Shared\UcJobs\12971\Post Processing\[9 I-215 NB_Iowa.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: Grand Terrace Road & Barton Road
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
SOUTH BOUND	Left	93	109	16	18%	185	218	33	18%
	Through	2	0	-2	-100%	3	0	-3	-100%
	Right	91	111	20	22%	99	123	24	24%
	SB Total	186	220	34	18%	288	341	53	19%
EAST BOUND	Left	24	26	2	9%	33	27	-6	-18%
	Through	350	588	238	68%	327	512	185	57%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	374	614	240	64%	360	539	179	50%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	233	422	189	81%	242	577	335	138%
	Right	328	374	46	14%	239	283	44	18%
	WB Total	561	796	235	42%	481	860	379	79%
TOTAL ENTERING VOLUME		1,121	1,630	509.196	45%	1,129	1,740	611	54%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	220	341			
North Leg	Outbound	400	310			
North Leg	**TOTAL**	**620**	**651**	**4%**	**4%**	**17,103**
South Leg	Inbound	0	0			
South Leg	Outbound	0	0			
South Leg	**TOTAL**	**0**	**0**	**0%**	**0%**	**35**
East Leg	Inbound	796	860			
East Leg	Outbound	697	730			
East Leg	**TOTAL**	**1,493**	**1,590**	**6%**	**7%**	**23,507**
West Leg	Inbound	614	539			
West Leg	Outbound	533	700			
West Leg	**TOTAL**	**1,147**	**1,239**	**7%**	**7%**	**16,765**
OVERALL TOTAL		***3,260***	***3,480***	**6%**	***6%***	***57,410***

Z:\Shared\UcJobs\12971\Post Processing\[17 Grand Terrace_Barton.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: I-215 Southbound Ramps & Barton Road
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	NB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
SOUTH BOUND	Left	225	276	51	23%	321	360	39	12%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	135	205	70	52%	141	209	68	48%
	SB Total	360	481	121	34%	462	569	107	23%
EAST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	336	554	218	65%	547	769	222	41%
	Right	36	68	32	89%	54	69	15	28%
	EB Total	372	622	250	67%	601	838	237	39%
WEST BOUND	Left	416	542	126	30%	287	375	88	31%
	Through	406	575	169	42%	341	648	307	90%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	WB Total	822	1,117	295	36%	628	1,023	395	63%
TOTAL ENTERING VOLUME		1,554	2,220	666	43%	1,691	2,430	739	44%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	481	569			
North Leg	Outbound	0	0			
North Leg	**TOTAL**	**481**	**569**	**5%**	**6%**	**9,383**
South Leg	Inbound	0	0			
South Leg	Outbound	610	444			
South Leg	**TOTAL**	**610**	**444**	**11%**	**8%**	**5,729**
East Leg	Inbound	1,117	1,023			
East Leg	Outbound	830	1,129			
East Leg	**TOTAL**	**1,947**	**2,152**	**7%**	**8%**	**28,434**
West Leg	Inbound	622	838			
West Leg	Outbound	780	857			
West Leg	**TOTAL**	**1,402**	**1,695**	**6%**	**7%**	**22,823**
OVERALL TOTAL		***4,440***	***4,860***	***7%***	***7%***	***66,369***

Z:\Shared\UcJobs\12971\Post Processing\[18 I215 SB_Barton.xls]Output (3)

Project:	Barton Logistics	Job #:	12971
Scenario:	Horizon Year (2040) Without Project	Analyst:	CS
		Date:	8/6/20

LOCATION: I-215 Northbound Ramps & Barton Road
FORECAST YEAR: 2040

INDIVIDUAL TURN VOLUME GROWTH REVIEW

		AM PEAK HOUR INPUT DATA				PM PEAK HOUR INPUT DATA			
APPROACH	TURNING MOVEMENT	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE	EXISTING COUNT	FUTURE VOLUME	DIFF-ERENCE	% CHANGE
NORTH BOUND	Left	45	77	32	71%	31	69	38	120%
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	336	348	12	4%	439	464	25	6%
	NB Total	381	425	44	11%	471	533	62	13%
SOUTH BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	SB Total	0	0	0	#DIV/0!	0	0	0	#DIV/0!
EAST BOUND	Left	88	169	81	91%	110	210	100	91%
	Through	544	722	178	33%	728	866	138	19%
	Right	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	EB Total	633	891	258	41%	838	1,076	238	28%
WEST BOUND	Left	0	0	0	#DIV/0!	0	0	0	#DIV/0!
	Through	837	1,093	256	31%	606	961	355	59%
	Right	539	611	72	13%	310	380	70	23%
	WB Total	1,376	1,704	328	24%	915	1,341	426	47%
TOTAL ENTERING VOLUME		2,390	3,020	629.730966	26%	2,224	2,950	726	33%

FORECAST PEAK HOUR TO ADT COMPARISON

		VOLUMES		PERCENT OF ADT		
		AM	PM	AM	PM	ADT
North Leg	Inbound	0	0			
North Leg	Outbound	780	590			
North Leg	**TOTAL**	**780**	**590**	**8%**	**6%**	**9,473**
South Leg	Inbound	425	533			
South Leg	Outbound	0	0			
South Leg	**TOTAL**	**425**	**533**	**6%**	**8%**	**7,039**
East Leg	Inbound	1,704	1,341			
East Leg	Outbound	1,070	1,330			
East Leg	**TOTAL**	**2,774**	**2,671**	**8%**	**7%**	**35,628**
West Leg	Inbound	891	1,076			
West Leg	Outbound	1,170	1,030			
West Leg	**TOTAL**	**2,061**	**2,106**	**7%**	**7%**	**28,430**
OVERALL TOTAL		***6,040***	***5,900***	***7%***	***7%***	***80,570***

Z:\Shared\UcJobs\12971\Post Processing\[19 I215 NB_Barton.xls]Output (3)

APPENDIX 5.1:

E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

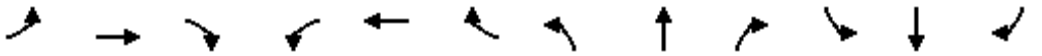
This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	350	104	323	669
Future Volume (vph)	0	350	104	323	669
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	24.4	24.4	11.8	84.7	68.5
Actuated g/C Ratio	0.20	0.20	0.10	0.71	0.57
v/c Ratio	0.75	0.60	0.63	0.14	0.53
Control Delay	57.5	7.9	83.1	1.5	17.2
Queue Delay	0.5	0.0	0.0	0.0	0.0
Total Delay	58.0	7.9	83.1	1.5	17.2
LOS	E	A	F	A	B
Approach Delay	29.1			21.4	17.2
Approach LOS	C			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 21.7	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	257	0	350	104	323	0	0	669	313
Future Volume (veh/h)	0	0	0	257	0	350	104	323	0	0	669	313
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				276	0	268	112	347	0	0	719	256
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				351	0	312	138	2583	0	0	1570	559
Arrive On Green				0.19	0.00	0.19	0.08	0.72	0.00	0.00	0.60	0.60
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2704	929
Grp Volume(v), veh/h				276	0	268	112	347	0	0	497	478
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1733
Q Serve(g_s), s				17.4	0.0	19.3	7.3	3.6	0.0	0.0	18.2	18.2
Cycle Q Clear(g_c), s				17.4	0.0	19.3	7.3	3.6	0.0	0.0	18.2	18.2
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.54
Lane Grp Cap(c), veh/h				351	0	312	138	2583	0	0	1086	1043
V/C Ratio(X)				0.79	0.00	0.86	0.81	0.13	0.00	0.00	0.46	0.46
Avail Cap(c_a), veh/h				501	0	445	249	2583	0	0	1086	1043
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.96	0.96	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				46.0	0.0	46.8	54.6	5.4	0.0	0.0	13.1	13.1
Incr Delay (d2), s/veh				5.3	0.0	11.2	4.1	0.1	0.0	0.0	1.4	1.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.1	0.0	8.5	3.5	1.3	0.0	0.0	7.4	7.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				51.4	0.0	58.0	58.7	5.5	0.0	0.0	14.5	14.6
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					544			459			975	
Approach Delay, s/veh					54.6			18.5			14.6	
Approach LOS					D			B			B	

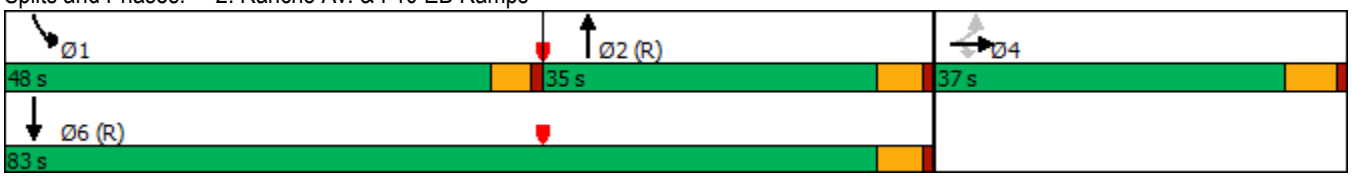
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		91.0			13.7	77.3		29.0				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		5.6			9.3	20.2		21.3				
Green Ext Time (p_c), s		2.4			0.1	7.4		1.9				

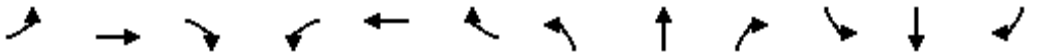
Intersection Summary												
HCM 6th Ctrl Delay			26.5									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	314	295	339	588
Future Volume (vph)	1	314	295	339	588
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	16.3	16.3	57.7	30.5	92.8
Actuated g/C Ratio	0.14	0.14	0.48	0.25	0.77
v/c Ratio	0.62	0.77	0.31	0.84	0.24
Control Delay	58.9	22.3	18.4	53.9	4.3
Queue Delay	0.0	0.0	0.0	1.4	0.4
Total Delay	58.9	22.3	18.4	55.3	4.7
LOS	E	C	B	E	A
Approach Delay	33.2		18.4		23.2
Approach LOS	C		B		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 24.4	Intersection LOS: C
Intersection Capacity Utilization 61.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	1	314	0	0	0	0	295	163	339	588	0
Future Volume (veh/h)	132	1	314	0	0	0	0	295	163	339	588	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	150	1	272				0	335	140	385	668	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	344	2	308				0	1136	466	407	2592	0
Arrive On Green	0.19	0.19	0.19				0.00	0.45	0.45	0.45	1.00	0.00
Sat Flow, veh/h	1798	12	1610				0	2592	1024	1810	3705	0
Grp Volume(v), veh/h	151	0	272				0	240	235	385	668	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1716	1810	1805	0
Q Serve(g_s), s	8.8	0.0	19.7				0.0	10.1	10.4	24.5	0.0	0.0
Cycle Q Clear(g_c), s	8.8	0.0	19.7				0.0	10.1	10.4	24.5	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.60	1.00		0.00
Lane Grp Cap(c), veh/h	346	0	308				0	821	781	407	2592	0
V/C Ratio(X)	0.44	0.00	0.88				0.00	0.29	0.30	0.95	0.26	0.00
Avail Cap(c_a), veh/h	471	0	419				0	821	781	654	2592	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	42.8	0.0	47.2				0.0	20.6	20.6	32.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	15.5				0.0	0.9	1.0	10.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	9.0				0.0	4.4	4.3	9.4	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.7	0.0	62.8				0.0	21.5	21.6	43.3	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		423						475			1053	
Approach Delay, s/veh		56.0						21.6			15.9	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	31.6	59.7		28.7		91.3
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9
Max Q Clear Time (g_c+I1), s	26.5	12.4		21.7		2.0
Green Ext Time (p_c), s	0.5	2.6		1.2		5.2

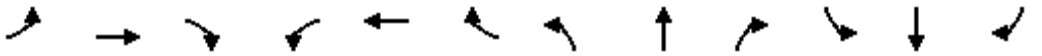
Intersection Summary	
HCM 6th Ctrl Delay	26.0
HCM 6th LOS	C

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	177	17	31	65	330	32	754
Future Volume (vph)	177	17	31	65	330	32	754
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		24.5	25.9	8.1	54.6	6.8	51.2
Actuated g/C Ratio		0.25	0.26	0.08	0.56	0.07	0.52
v/c Ratio		0.78	0.10	0.54	0.20	0.32	0.86
Control Delay		54.3	26.1	66.9	12.2	60.1	23.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		54.3	26.1	66.9	12.2	60.1	23.4
LOS		D	C	E	B	E	C
Approach Delay		54.3	26.1		21.1		24.3
Approach LOS		D	C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 98	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 27.1	Intersection LOS: C
Intersection Capacity Utilization 81.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	177	17	39	0	31	11	65	330	5	32	754	615
Future Volume (veh/h)	177	17	39	0	31	11	65	330	5	32	754	615
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	199	19	34	0	35	10	73	371	5	36	847	518
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	313	23	40	0	307	88	91	1856	25	56	1058	636
Arrive On Green	0.23	0.23	0.23	0.00	0.23	0.23	0.06	0.54	0.54	0.03	0.52	0.52
Sat Flow, veh/h	1024	100	175	0	1346	385	1619	3455	47	1619	2053	1235
Grp Volume(v), veh/h	252	0	0	0	0	45	73	183	193	36	703	662
Grp Sat Flow(s),veh/h/ln	1300	0	0	0	0	1731	1619	1710	1792	1619	1710	1578
Q Serve(g_s), s	13.7	0.0	0.0	0.0	0.0	1.7	3.6	4.5	4.5	1.8	27.3	28.3
Cycle Q Clear(g_c), s	15.4	0.0	0.0	0.0	0.0	1.7	3.6	4.5	4.5	1.8	27.3	28.3
Prop In Lane	0.79		0.13	0.00		0.22	1.00		0.03	1.00		0.78
Lane Grp Cap(c), veh/h	376	0	0	0	0	394	91	919	962	56	881	813
V/C Ratio(X)	0.67	0.00	0.00	0.00	0.00	0.11	0.80	0.20	0.20	0.65	0.80	0.81
Avail Cap(c_a), veh/h	602	0	0	0	0	694	176	1380	1446	148	1351	1246
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.8	0.0	0.0	0.0	0.0	24.7	37.7	9.7	9.7	38.5	16.1	16.3
Incr Delay (d2), s/veh	2.1	0.0	0.0	0.0	0.0	0.1	6.1	0.1	0.1	4.7	2.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	0.0	0.0	0.0	0.7	1.5	1.4	1.5	0.7	9.2	8.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	0.0	0.0	0.0	0.0	24.8	43.8	9.8	9.8	43.2	18.1	18.8
LnGrp LOS	C	A	A	A	A	C	D	A	A	D	B	B
Approach Vol, veh/h		252			45			449			1401	
Approach Delay, s/veh		32.9			24.8			15.3			19.1	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.4	49.2		24.2	9.1	47.4		24.2				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	3.8	6.5		17.4	5.6	30.3		3.7				
Green Ext Time (p_c), s	0.0	2.1		1.1	0.0	11.3		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		20.0	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	116	396	721	174
Future Vol, veh/h	0	0	116	396	721	174
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	132	450	819	198

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1407	509	1017	0	-	0
Stage 1	918	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	132	515	690	-	-	-
Stage 1	354	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	98	515	690	-	-	-
Mov Cap-2 Maneuver	98	-	-	-	-	-
Stage 1	264	-	-	-	-	-
Stage 2	588	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	3.3	0
HCM LOS	A		

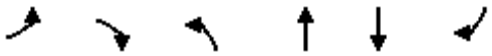
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	690	-	-	-	-
HCM Lane V/C Ratio	0.191	-	-	-	-
HCM Control Delay (s)	11.4	0.9	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.7	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	14	470	278	413	499
Future Volume (vph)	14	470	278	413	499
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	11.3	11.3	17.8	39.9	17.3
Actuated g/C Ratio	0.18	0.18	0.28	0.63	0.27
v/c Ratio	0.57	0.57	0.70	0.22	0.61
Control Delay	11.3	10.3	31.5	5.2	24.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.3	10.3	31.5	5.2	24.7
LOS	B	B	C	A	C
Approach Delay	10.8			15.8	24.7
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 63.7	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 17.0	Intersection LOS: B
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	470	278	413	499	2
Future Volume (veh/h)	14	470	278	413	499	2
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	378	284	421	509	2
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	307	546	334	1728	756	3
Arrive On Green	0.00	0.20	0.23	0.56	0.24	0.24
Sat Flow, veh/h	1543	2746	1457	3159	3225	12
Grp Volume(v), veh/h	0	378	284	421	249	262
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1618
Q Serve(g_s), s	0.0	6.4	9.3	3.5	7.3	7.3
Cycle Q Clear(g_c), s	0.0	6.4	9.3	3.5	7.3	7.3
Prop In Lane	1.00	1.00	1.00			0.01
Lane Grp Cap(c), veh/h	307	546	334	1728	370	389
V/C Ratio(X)	0.00	0.69	0.85	0.24	0.67	0.67
Avail Cap(c_a), veh/h	777	1382	1147	5092	1193	1254
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	18.6	18.5	5.6	17.2	17.2
Incr Delay (d2), s/veh	0.0	1.6	2.4	0.1	2.1	2.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	4.9	2.7	0.6	2.2	2.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	20.2	20.8	5.6	19.4	19.3
LnGrp LOS	A	C	C	A	B	B
Approach Vol, veh/h	378			705	511	
Approach Delay, s/veh	20.2			11.8	19.3	
Approach LOS	C			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		34.3		15.7	16.1	18.2
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		5.5		8.4	11.3	9.3
Green Ext Time (p_c), s		2.6		1.3	0.4	2.7

Intersection Summary		
HCM 6th Ctrl Delay		16.2
HCM 6th LOS		B

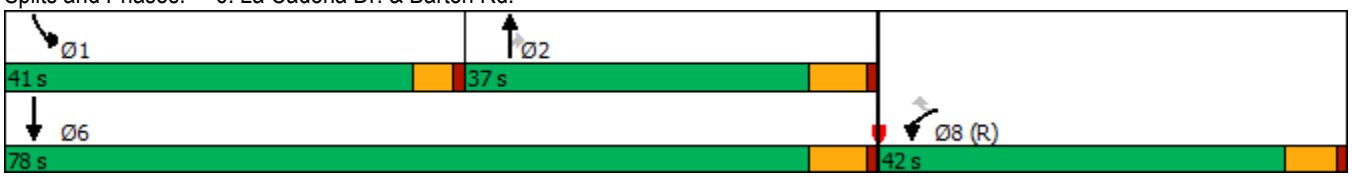
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	155	183	518	158	232	1037
Future Volume (vph)	155	183	518	158	232	1037
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	42.0	42.0	37.0	37.0	41.0	78.0
Total Split (%)	35.0%	35.0%	30.8%	30.8%	34.2%	65.0%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	55.1	55.1	25.6	25.6	22.7	52.9
Actuated g/C Ratio	0.46	0.46	0.21	0.21	0.19	0.44
v/c Ratio	0.21	0.25	0.76	0.37	0.76	0.73
Control Delay	19.9	5.0	50.9	7.6	61.0	30.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	5.0	50.9	7.6	61.0	30.1
LOS	B	A	D	A	E	C
Approach Delay	11.8		40.8			35.8
Approach LOS	B		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 33.7	Intersection LOS: C
Intersection Capacity Utilization 51.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	155	183	518	158	232	1037
Future Volume (veh/h)	155	183	518	158	232	1037
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	165	0	551	131	247	1103
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	517		663	296	279	1350
Arrive On Green	0.30	0.00	0.19	0.19	0.16	0.39
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	165	0	551	131	247	1103
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	8.9	0.0	18.6	9.1	16.9	34.6
Cycle Q Clear(g_c), s	8.9	0.0	18.6	9.1	16.9	34.6
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	517		663	296	279	1350
V/C Ratio(X)	0.32		0.83	0.44	0.89	0.82
Avail Cap(c_a), veh/h	517		878	392	520	2046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.90	0.90	0.77	0.77
Uniform Delay (d), s/veh	32.4	0.0	46.5	42.7	49.2	32.5
Incr Delay (d2), s/veh	1.6	0.0	4.7	0.9	7.3	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	8.0	3.4	7.5	13.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.0	0.0	51.2	43.6	56.5	33.7
LnGrp LOS	C		D	D	E	C
Approach Vol, veh/h	165	A	682			1350
Approach Delay, s/veh	34.0		49.8			37.9
Approach LOS	C		D			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	24.1	29.4				53.6	42.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	36.4	30.8				71.8	36.2
Max Q Clear Time (g_c+I1), s	18.9	20.6				36.6	10.9
Green Ext Time (p_c), s	0.6	2.7				8.5	0.2

Intersection Summary	
HCM 6th Ctrl Delay	41.3
HCM 6th LOS	D

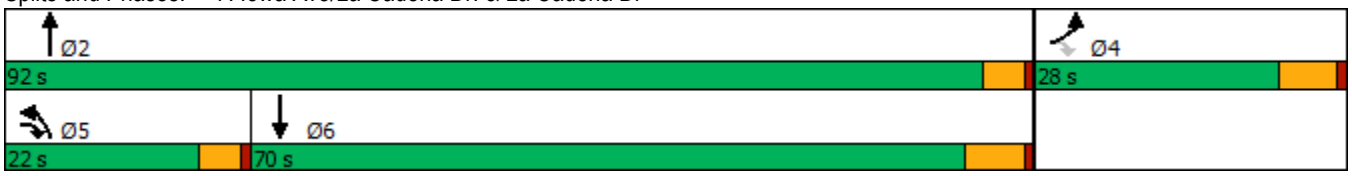
Notes

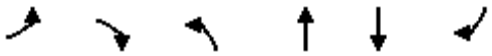
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	114	101	81	572	514	860
Future Volume (vph)	114	101	81	572	514	860
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	12.5	21.7	8.5	42.6	25.3	59.2
Actuated g/C Ratio	0.21	0.37	0.14	0.72	0.43	1.00
v/c Ratio	0.35	0.19	0.36	0.46	0.69	0.35
Control Delay	29.2	14.4	33.0	6.9	20.7	0.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	29.2	14.4	33.0	7.0	20.7	0.4
LOS	C	B	C	A	C	A
Approach Delay	22.3			10.2	8.0	
Approach LOS	C			B	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 59.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 10.0	Intersection LOS: B
Intersection Capacity Utilization 56.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	101	81	572	514	860
Future Volume (veh/h)	114	101	81	572	514	860
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	118	78	84	590	530	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	317	407	115	974	671	
Arrive On Green	0.20	0.20	0.07	0.54	0.37	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	118	78	84	590	530	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	3.0	1.9	2.4	10.5	12.3	0.0
Cycle Q Clear(g_c), s	3.0	1.9	2.4	10.5	12.3	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	317	407	115	974	671	
V/C Ratio(X)	0.37	0.19	0.73	0.61	0.79	
Avail Cap(c_a), veh/h	749	813	598	3337	2436	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.4	13.4	21.5	7.4	13.1	0.0
Incr Delay (d2), s/veh	0.7	0.2	3.4	0.6	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.8	2.1	3.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.2	13.6	24.8	8.0	15.3	0.0
LnGrp LOS	B	B	C	A	B	
Approach Vol, veh/h	196			674	530	A
Approach Delay, s/veh	15.7			10.1	15.3	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		31.7		15.4	7.9	23.8
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		12.5		5.0	4.4	14.3
Green Ext Time (p_c), s		3.8		0.5	0.1	3.2

Intersection Summary		
HCM 6th Ctrl Delay		12.8
HCM 6th LOS		B

Notes

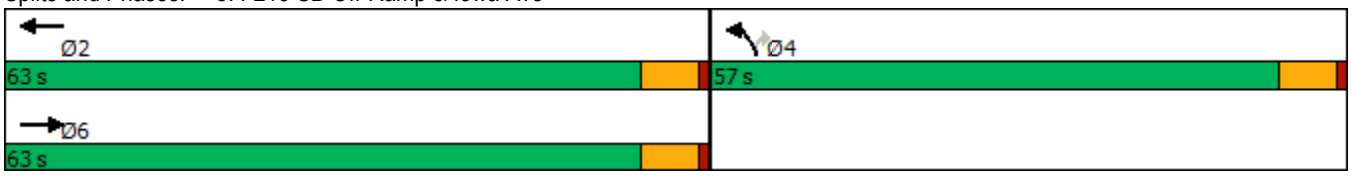
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	610	619	31	552
Future Volume (vph)	610	619	31	552
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	34.8	34.8	30.0	30.0
Actuated g/C Ratio	0.44	0.44	0.38	0.38
v/c Ratio	0.78	0.79	0.05	0.82
Control Delay	27.6	28.2	18.0	26.7
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	27.9	28.2	18.0	26.7
LOS	C	C	B	C
Approach Delay	27.9	28.2	26.2	
Approach LOS	C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 78.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 76.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	610	0	0	619	31	552
Future Volume (veh/h)	610	0	0	619	31	552
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	656	0	0	666	34	452
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	816	0	0	816	604	538
Arrive On Green	0.43	0.00	0.00	0.43	0.33	0.33
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	656	0	0	666	34	452
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	15.8	0.0	0.0	16.2	0.7	13.6
Cycle Q Clear(g_c), s	15.8	0.0	0.0	16.2	0.7	13.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	816	0	0	816	604	538
V/C Ratio(X)	0.80	0.00	0.00	0.82	0.06	0.84
Avail Cap(c_a), veh/h	2057	0	0	2057	1752	1559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	13.0	0.0	0.0	13.1	11.9	16.2
Incr Delay (d2), s/veh	1.9	0.0	0.0	2.1	0.0	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	0.0	5.1	0.3	5.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	14.9	0.0	0.0	15.2	11.9	19.8
LnGrp LOS	B	A	A	B	B	B
Approach Vol, veh/h	656			666	486	
Approach Delay, s/veh	14.9			15.2	19.3	
Approach LOS	B			B	B	

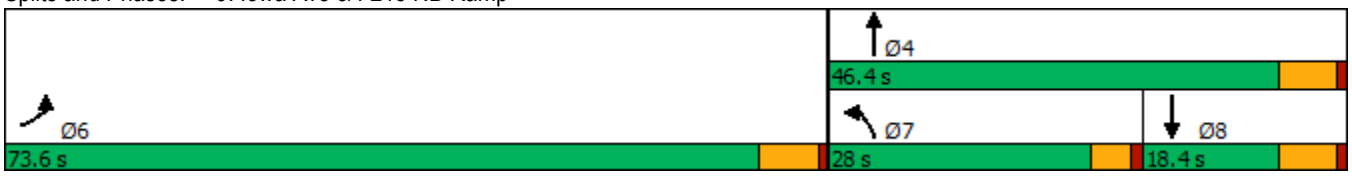
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		28.7		23.7		28.7
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		18.2		15.6		17.8
Green Ext Time (p_c), s		4.4		1.9		4.3

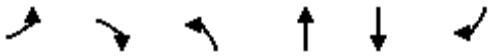
Intersection Summary		
HCM 6th Ctrl Delay		16.2
HCM 6th LOS		B

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	118	325	573	37
Future Volume (vph)	118	325	573	37
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	39.8	11.8
Actuated g/C Ratio	0.56	0.20	0.33	0.10
v/c Ratio	1.04	0.99	0.98	0.89
Control Delay	52.3	94.1	70.2	38.8
Queue Delay	5.9	0.0	0.0	0.0
Total Delay	58.2	94.1	70.2	38.8
LOS	E	F	E	D
Approach Delay	58.2		78.9	38.8
Approach LOS	E		E	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.04	
Intersection Signal Delay: 63.3	Intersection LOS: E
Intersection Capacity Utilization 123.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	118	1044	325	573	37	294
Future Volume (veh/h)	118	1044	325	573	37	294
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	127	849	349	616	40	257
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	119	797	353	636	23	145
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	212	1420	1810	1900	221	1423
Grp Volume(v), veh/h	977	0	349	616	0	297
Grp Sat Flow(s),veh/h/ln	1634	0	1810	1900	0	1644
Q Serve(g_s), s	67.4	0.0	23.1	38.3	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.1	38.3	0.0	12.2
Prop In Lane	0.13	0.87	1.00			0.87
Lane Grp Cap(c), veh/h	918	0	353	637	0	167
V/C Ratio(X)	1.06	0.00	0.99	0.97	0.00	1.78
Avail Cap(c_a), veh/h	918	0	353	637	0	167
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.2	39.3	0.0	53.9
Incr Delay (d2), s/veh	48.5	0.0	44.8	27.7	0.0	372.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	35.0	0.0	14.7	22.5	0.0	22.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	74.8	0.0	92.9	67.0	0.0	426.7
LnGrp LOS	F	A	F	E	A	F
Approach Vol, veh/h	977			965	297	
Approach Delay, s/veh	74.8			76.4	426.7	
Approach LOS	E			E	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	40.3	69.4	25.1	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	122.1
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	377	305	8	11	16
Future Vol, veh/h	14	377	305	8	11	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	15	414	335	9	12	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	335	0	-	0	779	335
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	444	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1269	-	-	-	376	843
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	1269	-	-	-	371	843
Mov Cap-2 Maneuver	-	-	-	-	371	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	651	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	11.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1269	-	-	-	555
HCM Lane V/C Ratio	0.012	-	-	-	0.053
HCM Control Delay (s)	7.9	0	-	-	11.9
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	60	5	0	53	2	0
Future Vol, veh/h	60	5	0	53	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	65	5	0	58	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	70	0	126	68
Stage 1	-	-	-	-	68	-
Stage 2	-	-	-	-	58	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1544	-	874	1001
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	970	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1544	-	874	1001
Mov Cap-2 Maneuver	-	-	-	-	874	-
Stage 1	-	-	-	-	960	-
Stage 2	-	-	-	-	970	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	874	-	-	1544	-
HCM Lane V/C Ratio	0.002	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↱
Traffic Vol, veh/h	0	386	2	7	306	18	1	0	2	0	0	6
Future Vol, veh/h	0	386	2	7	306	18	1	0	2	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	420	2	8	333	20	1	0	2	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	353	0	0	422	0	0	784	790	421	-	-	343
Stage 1	-	-	-	-	-	-	421	421	-	-	-	-
Stage 2	-	-	-	-	-	-	363	369	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	1245	-	-	1148	-	-	333	330	637	0	0	833
Stage 1	-	-	-	-	-	-	614	592	-	0	0	-
Stage 2	-	-	-	-	-	-	761	669	-	0	0	-
Platoon blocked, %	1	-	-		-	-	1	1				1
Mov Cap-1 Maneuver	1245	-	-	1148	-	-	328	327	637	-	-	833
Mov Cap-2 Maneuver	-	-	-	-	-	-	328	327	-	-	-	-
Stage 1	-	-	-	-	-	-	614	592	-	-	-	-
Stage 2	-	-	-	-	-	-	749	662	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	12.5	9.4
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	485	1245	-	-	1148	-	-	833
HCM Lane V/C Ratio	0.007	-	-	-	0.007	-	-	0.008
HCM Control Delay (s)	12.5	0	-	-	8.2	0	-	9.4
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	381	7	7	330	1	3
Future Vol, veh/h	381	7	7	330	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	414	8	8	359	1	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	422	0	793	418
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	375	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1148	-	370	639
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	768	-
Platoon blocked, %	-	-		-	1	
Mov Cap-1 Maneuver	-	-	1148	-	367	639
Mov Cap-2 Maneuver	-	-	-	-	367	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	761	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	539	-	-	1148	-
HCM Lane V/C Ratio	0.008	-	-	0.007	-
HCM Control Delay (s)	11.7	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	50	10	0	50	3	0
Future Vol, veh/h	50	10	0	50	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	54	11	0	54	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	65	0	114	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	54	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1550	-	887	1011
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1550	-	887	1011
Mov Cap-2 Maneuver	-	-	-	-	887	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	887	-	-	1550	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	376	336	10	5	1
Future Vol, veh/h	8	376	336	10	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	409	365	11	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	376	0	-	0	798	371
Stage 1	-	-	-	-	371	-
Stage 2	-	-	-	-	427	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1223	-	-	-	367	816
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	662	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	1223	-	-	-	363	816
Mov Cap-2 Maneuver	-	-	-	-	363	-
Stage 1	-	-	-	-	764	-
Stage 2	-	-	-	-	662	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1223	-	-	-	400
HCM Lane V/C Ratio	0.007	-	-	-	0.016
HCM Control Delay (s)	8	0	-	-	14.1
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	17	23	3	1	0
Future Vol, veh/h	0	17	23	3	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	18	25	3	1	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	28	0	-	0	45	27
Stage 1	-	-	-	-	27	-
Stage 2	-	-	-	-	18	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1599	-	-	-	970	1054
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	1010	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1599	-	-	-	970	1054
Mov Cap-2 Maneuver	-	-	-	-	970	-
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	1010	-

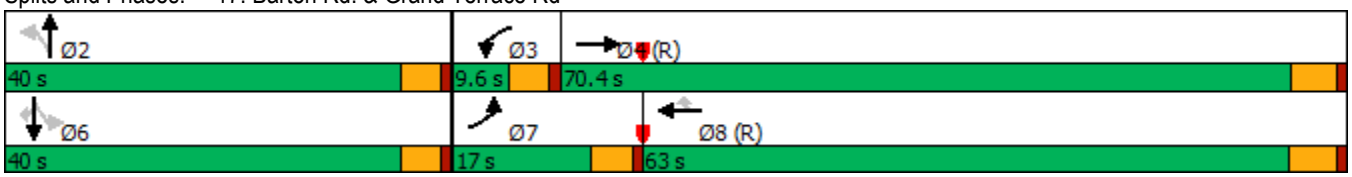
Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

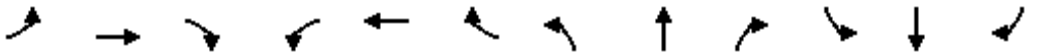
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1599	-	-	-	970
HCM Lane V/C Ratio	-	-	-	-	0.001
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	24	357	255	328	93	2	91		
Future Volume (vph)	24	357	255	328	93	2	91		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.5	95.5	88.0	88.0		14.8	14.8		
Actuated g/C Ratio	0.05	0.80	0.73	0.73		0.12	0.12		
v/c Ratio	0.28	0.14	0.11	0.28		0.62	0.34		
Control Delay	88.9	1.2	6.0	1.5		65.7	10.5		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	88.9	1.2	6.0	1.5		65.7	10.5		
LOS	F	A	A	A		E	B		
Approach Delay		6.7	3.5			38.6			
Approach LOS		A	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 10.2	Intersection LOS: B
Intersection Capacity Utilization 34.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	357	0	0	255	328	0	0	0	93	2	91
Future Volume (veh/h)	24	357	0	0	255	328	0	0	0	93	2	91
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	25	376	0	0	268	261	0	0	0	98	2	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	38	2826	0	1	2614	1166	0	163	0	188	3	138
Arrive On Green	0.02	0.83	0.00	0.00	0.76	0.76	0.00	0.00	0.00	0.09	0.09	0.09
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1417	29	1525
Grp Volume(v), veh/h	25	376	0	0	268	261	0	0	0	100	0	73
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1446	0	1525
Q Serve(g_s), s	1.8	2.6	0.0	0.0	2.4	5.8	0.0	0.0	0.0	8.1	0.0	5.5
Cycle Q Clear(g_c), s	1.8	2.6	0.0	0.0	2.4	5.8	0.0	0.0	0.0	8.1	0.0	5.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	38	2826	0	1	2614	1166	0	163	0	190	0	138
V/C Ratio(X)	0.66	0.13	0.00	0.00	0.10	0.22	0.00	0.00	0.00	0.53	0.00	0.53
Avail Cap(c_a), veh/h	167	2826	0	67	2614	1166	0	531	0	486	0	450
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	2.0	0.0	0.0	3.6	4.0	0.0	0.0	0.0	53.3	0.0	52.1
Incr Delay (d2), s/veh	6.9	0.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0	2.2	0.0	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.6	0.0	0.0	0.7	1.6	0.0	0.0	0.0	3.1	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.0	2.1	0.0	0.0	3.7	4.5	0.0	0.0	0.0	55.6	0.0	55.3
LnGrp LOS	E	A	A	A	A	A	A	A	A	E	A	E
Approach Vol, veh/h		401			529			0			173	
Approach Delay, s/veh		6.1			4.1			0.0			55.4	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		15.5	0.0	104.5		15.5	7.4	97.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	4.6		10.1	3.8	7.8				
Green Ext Time (p_c), s		0.0	0.0	2.6		0.8	0.0	2.7				

Intersection Summary		
HCM 6th Ctrl Delay		12.8
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

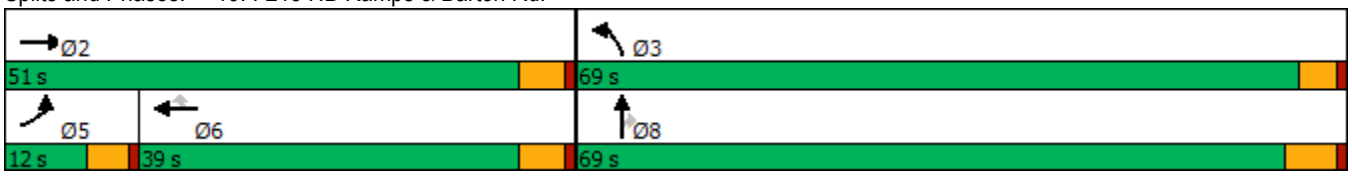
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	488	971	231	460
Demand Flow Rate, veh/h	488	971	231	460
Vehicles Circulating, veh/h	341	85	705	513
Vehicles Exiting, veh/h	632	851	124	543
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.7	6.2	9.8	7.0
Approach LOS	A	A	A	A

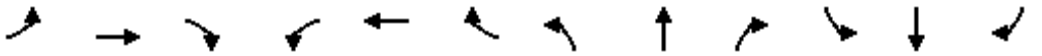
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.906	0.094	0.510	0.490	1.000	0.628	0.372
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	442	46	495	476	231	289	171
Cap Entry Lane, veh/h	1041	1041	1314	1314	672	890	890
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	442	46	495	476	231	289	171
Cap Entry, veh/h	1041	1041	1314	1314	672	890	890
V/C Ratio	0.425	0.044	0.377	0.362	0.344	0.325	0.192
Control Delay, s/veh	8.1	3.8	6.3	6.1	9.8	7.6	6.0
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	2	0	2	2	2	1	1

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	95	546	842	539	0	336	
Future Volume (vph)	95	546	842	539	0	336	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	12.0	51.0	39.0	39.0	69.0	69.0	69.0
Total Split (%)	10.0%	42.5%	32.5%	32.5%	57.5%	57.5%	58%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	7.4	45.9	33.9	33.9	63.2	63.2	
Actuated g/C Ratio	0.06	0.38	0.28	0.28	0.53	0.53	
v/c Ratio	0.94	0.44	0.91	0.85	38.00	0.40	
Control Delay	126.2	28.7	55.2	29.2	17529.6	11.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	126.2	28.7	55.2	29.2	17529.6	11.6	
LOS	F	C	E	C	F	B	
Approach Delay		43.1	45.0		3003.5		
Approach LOS		D	D		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 38.00	
Intersection Signal Delay: 538.3	Intersection LOS: F
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	95	546	0	0	842	539	69	0	336	0	0	0
Future Volume (veh/h)	95	546	0	0	842	539	69	0	336	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	104	600	0	0	925	444	76	0	276			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	136	2132	0	0	1540	668	405	0	361			
Arrive On Green	0.07	0.59	0.00	0.00	0.43	0.43	0.22	0.00	0.22			
Sat Flow, veh/h	1810	3705	0	0	3705	1565	1810	0	1610			
Grp Volume(v), veh/h	104	600	0	0	925	444	76	0	276			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1565	1810	0	1610			
Q Serve(g_s), s	2.9	4.2	0.0	0.0	10.2	11.7	1.8	0.0	8.3			
Cycle Q Clear(g_c), s	2.9	4.2	0.0	0.0	10.2	11.7	1.8	0.0	8.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	136	2132	0	0	1540	668	405	0	361			
V/C Ratio(X)	0.77	0.28	0.00	0.00	0.60	0.66	0.19	0.00	0.77			
Avail Cap(c_a), veh/h	259	3204	0	0	2367	1026	2257	0	2008			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	23.5	5.2	0.0	0.0	11.4	11.9	16.3	0.0	18.8			
Incr Delay (d2), s/veh	3.4	0.1	0.0	0.0	0.4	1.1	0.2	0.0	3.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.3	1.0	0.0	0.0	3.3	3.4	0.6	0.0	2.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	5.3	0.0	0.0	11.8	13.0	16.5	0.0	22.2			
LnGrp LOS	C	A	A	A	B	B	B	A	C			
Approach Vol, veh/h		704			1369			352				
Approach Delay, s/veh		8.5			12.2			21.0				
Approach LOS		A			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		35.6			8.5	27.2		16.1				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		45.9			7.4	33.9		64.5				
Max Q Clear Time (g_c+I1), s		6.2			4.9	13.7		10.3				
Green Ext Time (p_c), s		4.4			0.0	8.3		1.3				
Intersection Summary												
HCM 6th Ctrl Delay			12.4									
HCM 6th LOS			B									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	415	126	812	628
Future Volume (vph)	1	415	126	812	628
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	28.5	28.5	12.9	80.6	63.2
Actuated g/C Ratio	0.24	0.24	0.11	0.67	0.53
v/c Ratio	0.34	0.85	0.66	0.34	0.45
Control Delay	37.9	43.2	62.7	12.5	20.1
Queue Delay	0.1	0.0	0.0	0.5	0.0
Total Delay	38.0	43.2	62.7	13.0	20.1
LOS	D	D	E	B	C
Approach Delay	41.9			19.7	20.1
Approach LOS	D			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 25.2	Intersection LOS: C
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	142	1	415	126	812	0	0	628	194
Future Volume (veh/h)	0	0	0	142	1	415	126	812	0	0	628	194
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				145	1	318	129	829	0	0	641	148
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				400	3	358	156	2479	0	0	1640	378
Arrive On Green				0.22	0.22	0.22	0.09	0.69	0.00	0.00	0.56	0.56
Sat Flow, veh/h				1798	12	1610	1810	3705	0	0	3008	672
Grp Volume(v), veh/h				146	0	318	129	829	0	0	397	392
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1779
Q Serve(g_s), s				8.2	0.0	23.0	8.4	11.2	0.0	0.0	14.8	14.8
Cycle Q Clear(g_c), s				8.2	0.0	23.0	8.4	11.2	0.0	0.0	14.8	14.8
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.38
Lane Grp Cap(c), veh/h				402	0	358	156	2479	0	0	1016	1002
V/C Ratio(X)				0.36	0.00	0.89	0.83	0.33	0.00	0.00	0.39	0.39
Avail Cap(c_a), veh/h				652	0	580	264	2479	0	0	1016	1002
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.67	0.67	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				39.5	0.0	45.2	53.9	7.6	0.0	0.0	14.7	14.7
Incr Delay (d2), s/veh				0.5	0.0	9.8	2.8	0.2	0.0	0.0	1.1	1.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.6	0.0	9.8	3.9	4.0	0.0	0.0	6.2	6.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				40.0	0.0	55.0	56.8	7.9	0.0	0.0	15.8	15.8
LnGrp LOS				D	A	D	E	A	A	A	B	B
Approach Vol, veh/h					464			958			789	
Approach Delay, s/veh					50.3			14.5			15.8	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		87.5			14.9	72.7		32.5				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		65.9			17.5	43.9		43.2				
Max Q Clear Time (g_c+I1), s		13.2			10.4	16.8		25.0				
Green Ext Time (p_c), s		6.8			0.1	5.3		1.7				

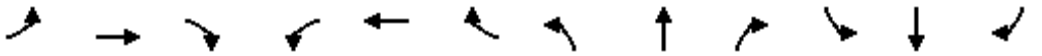
Intersection Summary												
HCM 6th Ctrl Delay			22.5									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	5	340	541	349	422
Future Volume (vph)	5	340	541	349	422
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	41.0	41.0	43.0	36.0	79.0
Total Split (%)	34.2%	34.2%	35.8%	30.0%	65.8%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	32.1	32.1	44.8	27.6	77.0
Actuated g/C Ratio	0.27	0.27	0.37	0.23	0.64
v/c Ratio	0.87	0.57	0.69	0.89	0.19
Control Delay	61.1	13.4	32.1	85.0	7.7
Queue Delay	0.0	0.0	0.0	13.1	0.0
Total Delay	61.1	13.4	32.1	98.1	7.7
LOS	E	B	C	F	A
Approach Delay	39.2		32.1		48.6
Approach LOS	D		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 39.6	Intersection LOS: D
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	397	5	340	0	0	0	0	541	338	349	422	0
Future Volume (veh/h)	397	5	340	0	0	0	0	541	338	349	422	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	418	5	269				0	569	267	367	444	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	461	6	415				0	951	446	388	2351	0
Arrive On Green	0.26	0.26	0.26				0.00	0.40	0.40	0.43	1.00	0.00
Sat Flow, veh/h	1789	21	1610				0	2481	1118	1810	3705	0
Grp Volume(v), veh/h	423	0	269				0	430	406	367	444	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1699	1810	1805	0
Q Serve(g_s), s	27.1	0.0	17.9				0.0	22.6	22.6	23.4	0.0	0.0
Cycle Q Clear(g_c), s	27.1	0.0	17.9				0.0	22.6	22.6	23.4	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.66	1.00		0.00
Lane Grp Cap(c), veh/h	467	0	415				0	719	677	388	2351	0
V/C Ratio(X)	0.91	0.00	0.65				0.00	0.60	0.60	0.95	0.19	0.00
Avail Cap(c_a), veh/h	531	0	472				0	719	677	473	2351	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.89	0.89	0.00
Uniform Delay (d), s/veh	43.1	0.0	39.7				0.0	28.5	28.5	33.6	0.0	0.0
Incr Delay (d2), s/veh	17.8	0.0	2.6				0.0	3.6	3.9	22.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	0.0	7.1				0.0	10.3	9.8	10.3	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.9	0.0	42.2				0.0	32.1	32.4	55.8	0.2	0.0
LnGrp LOS	E	A	D				A	C	C	E	A	A
Approach Vol, veh/h		692						836			811	
Approach Delay, s/veh		53.6						32.3			25.4	
Approach LOS		D						C			C	

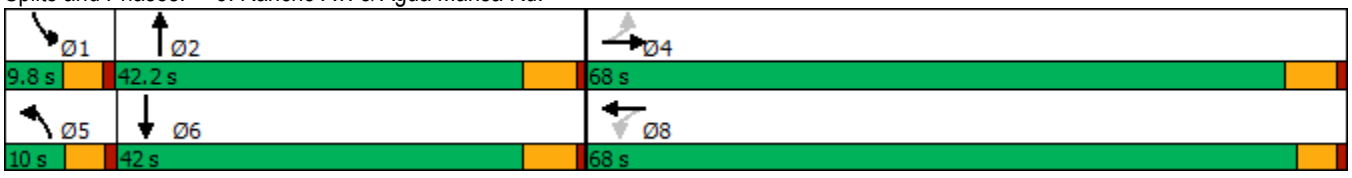
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	30.3	52.9		36.7		83.3						
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1						
Max Green Setting (Gmax), s	31.4	37.9		35.2		73.9						
Max Q Clear Time (g_c+I1), s	25.4	24.6		29.1		2.0						
Green Ext Time (p_c), s	0.3	4.4		1.8		3.2						

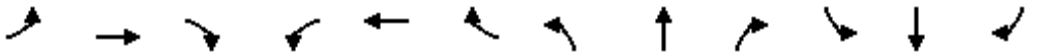
Intersection Summary												
HCM 6th Ctrl Delay			36.2									
HCM 6th LOS			D									

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	453	90	25	41	441	12	696
Future Volume (vph)	453	90	25	41	441	12	696
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		58.8	60.0	5.4	38.0	5.2	34.2
Actuated g/C Ratio		0.52	0.53	0.05	0.34	0.05	0.30
v/c Ratio		0.96	0.04	0.57	0.41	0.18	0.90
Control Delay		52.3	10.9	84.1	31.0	60.9	50.2
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		52.3	10.9	84.1	31.0	60.9	50.2
LOS		D	B	F	C	E	D
Approach Delay		52.3	10.9		35.5		50.3
Approach LOS		D	B		D		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.4	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 46.8	Intersection LOS: D
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	453	90	99	0	25	9	41	441	2	12	696	174
Future Volume (veh/h)	453	90	99	0	25	9	41	441	2	12	696	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	482	96	78	0	27	8	44	469	2	13	740	138
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	583	103	84	0	660	195	58	1126	5	25	869	162
Arrive On Green	0.49	0.49	0.49	0.00	0.49	0.49	0.04	0.32	0.32	0.02	0.30	0.30
Sat Flow, veh/h	1049	209	170	0	1334	395	1619	3492	15	1619	2877	536
Grp Volume(v), veh/h	656	0	0	0	0	35	44	230	241	13	440	438
Grp Sat Flow(s),veh/h/ln	1427	0	0	0	0	1729	1619	1710	1797	1619	1710	1703
Q Serve(g_s), s	40.8	0.0	0.0	0.0	0.0	1.0	2.6	10.1	10.2	0.8	23.3	23.4
Cycle Q Clear(g_c), s	41.8	0.0	0.0	0.0	0.0	1.0	2.6	10.1	10.2	0.8	23.3	23.4
Prop In Lane	0.73		0.12	0.00		0.23	1.00		0.01	1.00		0.31
Lane Grp Cap(c), veh/h	770	0	0	0	0	855	58	552	580	25	516	514
V/C Ratio(X)	0.85	0.00	0.00	0.00	0.00	0.04	0.76	0.42	0.42	0.53	0.85	0.85
Avail Cap(c_a), veh/h	988	0	0	0	0	1135	91	644	677	87	641	638
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.4	0.0	0.0	0.0	0.0	12.6	46.1	25.6	25.6	47.2	31.7	31.7
Incr Delay (d2), s/veh	5.8	0.0	0.0	0.0	0.0	0.0	7.3	0.5	0.5	6.3	9.0	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.5	0.0	0.0	0.0	0.0	0.4	1.1	4.0	4.2	0.3	10.3	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.2	0.0	0.0	0.0	0.0	12.6	53.4	26.1	26.1	53.5	40.7	40.7
LnGrp LOS	C	A	A	A	A	B	D	C	C	D	D	D
Approach Vol, veh/h		656			35			515			891	
Approach Delay, s/veh		29.2			12.6			28.4			40.9	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.1	37.0		53.6	8.1	35.0		53.6				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	2.8	12.2		43.8	4.6	25.4		3.0				
Green Ext Time (p_c), s	0.0	2.5		4.0	0.0	3.8		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		33.7
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	152	695	768	153
Future Vol, veh/h	0	0	152	695	768	153
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	162	739	817	163

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1593	490	980	0	-	0
Stage 1	899	-	-	-	-	-
Stage 2	694	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	100	529	712	-	-	-
Stage 1	362	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	61	529	712	-	-	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	222	-	-	-	-	-
Stage 2	462	-	-	-	-	-

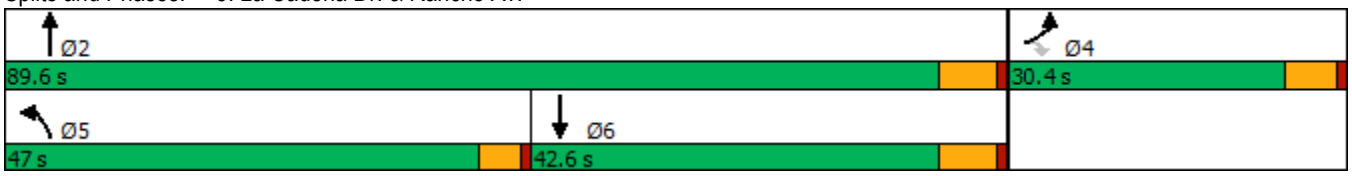
Approach	EB	NB	SB
HCM Control Delay, s	0	3.3	0
HCM LOS	A		

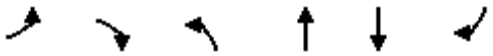
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	712	-	-	-	-
HCM Lane V/C Ratio	0.227	-	-	-	-
HCM Control Delay (s)	11.5	1.5	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	0.9	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	25	522	333	470	552
Future Volume (vph)	25	522	333	470	552
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.3	12.3	23.0	48.7	20.8
Actuated g/C Ratio	0.17	0.17	0.31	0.66	0.28
v/c Ratio	0.64	0.62	0.76	0.24	0.67
Control Delay	13.9	11.5	35.6	5.1	29.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	13.9	11.5	35.6	5.1	29.0
LOS	B	B	D	A	C
Approach Delay	12.7			17.7	29.0
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 73.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 69.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	522	333	470	552	9
Future Volume (veh/h)	25	522	333	470	552	9
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	433	343	485	569	7
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	318	566	387	1827	782	10
Arrive On Green	0.00	0.21	0.27	0.59	0.25	0.25
Sat Flow, veh/h	1543	2746	1457	3159	3195	38
Grp Volume(v), veh/h	0	433	343	485	281	295
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1613
Q Serve(g_s), s	0.0	8.9	13.5	4.6	10.0	10.0
Cycle Q Clear(g_c), s	0.0	8.9	13.5	4.6	10.0	10.0
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	318	566	387	1827	386	405
V/C Ratio(X)	0.00	0.77	0.89	0.27	0.73	0.73
Avail Cap(c_a), veh/h	634	1128	1031	4286	935	980
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	22.4	21.1	5.9	20.6	20.6
Incr Delay (d2), s/veh	0.0	2.2	2.7	0.1	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	6.6	4.1	0.9	3.3	3.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	24.6	23.8	5.9	23.2	23.1
LnGrp LOS	A	C	C	A	C	C
Approach Vol, veh/h	433			828	576	
Approach Delay, s/veh	24.6			13.4	23.1	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		41.8		18.1	20.5	21.2
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		6.6		10.9	15.5	12.0
Green Ext Time (p_c), s		3.1		1.4	0.4	3.0

Intersection Summary		
HCM 6th Ctrl Delay	19.1	
HCM 6th LOS	B	

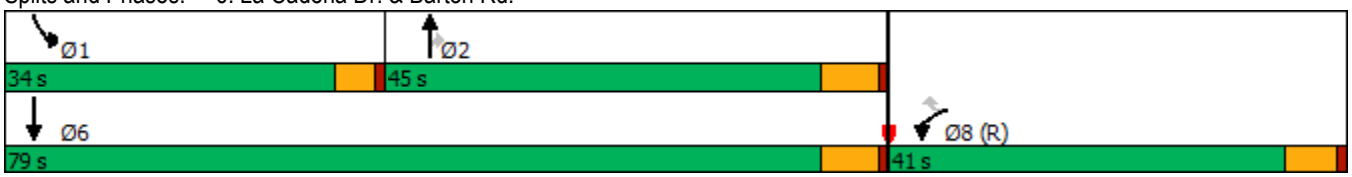
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	212	183	737	139	236	965
Future Volume (vph)	212	183	737	139	236	965
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	48.0	48.0	33.2	33.2	22.2	60.0
Actuated g/C Ratio	0.40	0.40	0.28	0.28	0.18	0.50
v/c Ratio	0.32	0.28	0.80	0.27	0.77	0.58
Control Delay	33.8	18.5	47.2	6.1	62.2	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	18.5	47.2	6.1	62.2	22.0
LOS	C	B	D	A	E	C
Approach Delay	26.7		40.7			29.9
Approach LOS	C		D			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 33.2	Intersection LOS: C
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	212	183	737	139	236	965
Future Volume (veh/h)	212	183	737	139	236	965
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	219	0	760	110	243	995
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		889	397	273	1565
Arrive On Green	0.29	0.00	0.26	0.26	0.16	0.46
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	219	0	760	110	243	995
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	12.4	0.0	25.4	6.9	16.7	26.7
Cycle Q Clear(g_c), s	12.4	0.0	25.4	6.9	16.7	26.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		889	397	273	1565
V/C Ratio(X)	0.44		0.85	0.28	0.89	0.64
Avail Cap(c_a), veh/h	503		1106	493	420	2075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.60	0.60	0.71	0.71
Uniform Delay (d), s/veh	34.4	0.0	42.2	35.4	49.4	24.9
Incr Delay (d2), s/veh	2.7	0.0	3.5	0.2	10.5	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	10.6	2.5	7.7	10.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.1	0.0	45.7	35.6	59.9	25.2
LnGrp LOS	D		D	D	E	C
Approach Vol, veh/h	219	A	870			1238
Approach Delay, s/veh	37.1		44.4			32.0
Approach LOS	D		D			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	23.7	37.4				61.1	41.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8				72.8	35.2
Max Q Clear Time (g_c+I1), s	18.7	27.4				28.7	14.4
Green Ext Time (p_c), s	0.5	3.8				7.6	0.3

Intersection Summary	
HCM 6th Ctrl Delay	37.1
HCM 6th LOS	D

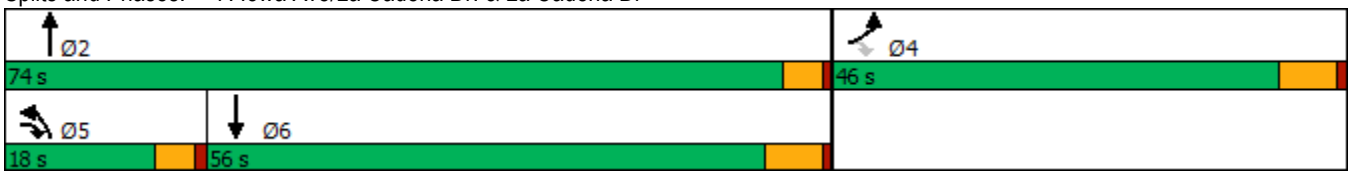
Notes

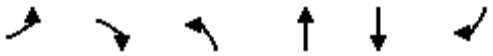
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	327	163	81	692	336	898
Future Volume (vph)	327	163	81	692	336	898
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	46.0	18.0	18.0	74.0	56.0	
Total Split (%)	38.3%	15.0%	15.0%	61.7%	46.7%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	21.4	37.0	8.8	37.5	22.0	70.8
Actuated g/C Ratio	0.30	0.52	0.12	0.53	0.31	1.00
v/c Ratio	0.70	0.21	0.42	0.76	0.63	0.37
Control Delay	32.2	11.5	41.5	19.8	27.3	0.4
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0
Total Delay	32.2	11.5	41.5	20.0	27.3	0.4
LOS	C	B	D	C	C	A
Approach Delay	25.3			22.3	7.7	
Approach LOS	C			C	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 70.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 67.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	327	163	81	692	336	898
Future Volume (veh/h)	327	163	81	692	336	898
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	341	127	84	721	350	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	428	508	112	874	583	
Arrive On Green	0.26	0.26	0.07	0.49	0.32	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	341	127	84	721	350	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	9.7	3.0	2.5	17.0	8.1	0.0
Cycle Q Clear(g_c), s	9.7	3.0	2.5	17.0	8.1	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	428	508	112	874	583	
V/C Ratio(X)	0.80	0.25	0.75	0.82	0.60	
Avail Cap(c_a), veh/h	1300	1330	438	2520	1809	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	17.0	12.0	22.6	10.9	14.1	0.0
Incr Delay (d2), s/veh	3.4	0.3	3.8	2.0	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.1	2.9	0.9	4.4	2.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	20.5	12.3	26.4	13.0	15.1	0.0
LnGrp LOS	C	B	C	B	B	
Approach Vol, veh/h	468			805	350	A
Approach Delay, s/veh	18.2			14.4	15.1	
Approach LOS	B			B	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		30.3		19.3	8.0	22.2
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 69		39.8	13.4	49.8
Max Q Clear Time (g_c+I1), s		19.0		11.7	4.5	10.1
Green Ext Time (p_c), s		5.0		1.4	0.0	1.9

Intersection Summary	
HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	480	724	48	419
Future Volume (vph)	480	724	48	419
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	25.7	25.7	12.2	12.2
Actuated g/C Ratio	0.50	0.50	0.24	0.24
v/c Ratio	0.52	0.78	0.11	0.64
Control Delay	10.5	16.8	19.0	9.5
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	10.5	16.9	19.0	9.5
LOS	B	B	B	A
Approach Delay	10.5	16.9	10.4	
Approach LOS	B	B	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 51.1	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 13.3	Intersection LOS: B
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	0	0	724	48	419
Future Volume (veh/h)	480	0	0	724	48	419
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	495	0	0	746	49	314
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	926	0	0	926	451	401
Arrive On Green	0.49	0.00	0.00	0.49	0.25	0.25
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	495	0	0	746	49	314
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	8.5	0.0	0.0	15.6	1.0	8.6
Cycle Q Clear(g_c), s	8.5	0.0	0.0	15.6	1.0	8.6
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	926	0	0	926	451	401
V/C Ratio(X)	0.53	0.00	0.00	0.81	0.11	0.78
Avail Cap(c_a), veh/h	2899	0	0	2899	1376	1225
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	8.4	0.0	0.0	10.2	13.6	16.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	1.7	0.1	3.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	0.0	4.0	0.4	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	8.8	0.0	0.0	11.9	13.7	19.8
LnGrp LOS	A	A	A	B	B	B
Approach Vol, veh/h	495			746	363	
Approach Delay, s/veh	8.8			11.9	19.0	
Approach LOS	A			B	B	

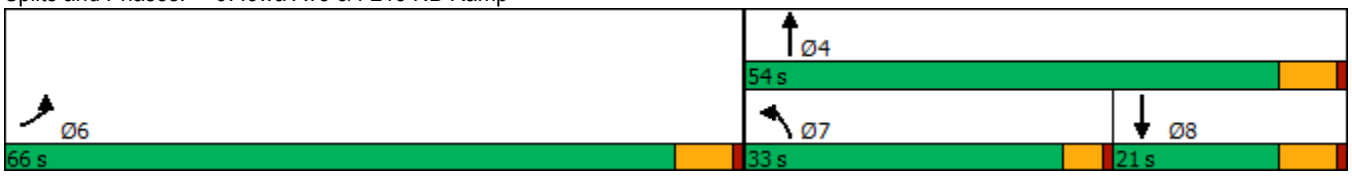
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		29.1		17.9		29.1
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		17.6		10.6		10.5
Green Ext Time (p_c), s		5.3		1.3		3.0

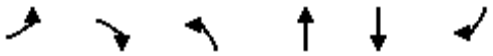
Intersection Summary		
HCM 6th Ctrl Delay		12.6
HCM 6th LOS		B

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	154	381	697	17
Future Volume (vph)	154	381	697	17
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	27.2	46.3	14.5
Actuated g/C Ratio	0.50	0.23	0.39	0.12
v/c Ratio	0.93	0.94	0.96	0.72
Control Delay	35.3	77.0	60.2	15.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	77.0	60.2	15.2
LOS	D	E	E	B
Approach Delay	35.3		66.1	15.2
Approach LOS	D		E	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 118.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 46.4	Intersection LOS: D
Intersection Capacity Utilization 111.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	154	744	381	697	17	343
Future Volume (veh/h)	154	744	381	697	17	343
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	157	580	389	711	17	263
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	177	652	414	745	12	190
Arrive On Green	0.50	0.50	0.23	0.39	0.12	0.12
Sat Flow, veh/h	351	1296	1810	1900	99	1527
Grp Volume(v), veh/h	738	0	389	711	0	280
Grp Sat Flow(s),veh/h/ln	1649	0	1810	1900	0	1625
Q Serve(g_s), s	47.8	0.0	25.1	43.2	0.0	14.8
Cycle Q Clear(g_c), s	47.8	0.0	25.1	43.2	0.0	14.8
Prop In Lane	0.21	0.79	1.00			0.94
Lane Grp Cap(c), veh/h	830	0	414	745	0	202
V/C Ratio(X)	0.89	0.00	0.94	0.95	0.00	1.38
Avail Cap(c_a), veh/h	830	0	433	765	0	202
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.5	0.0	45.0	35.1	0.0	52.0
Incr Delay (d2), s/veh	13.6	0.0	27.3	21.8	0.0	200.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.0	0.0	14.3	24.0	0.0	17.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.2	0.0	72.3	56.8	0.0	252.0
LnGrp LOS	D	A	E	E	A	F
Approach Vol, veh/h	738			1100	280	
Approach Delay, s/veh	40.2			62.3	252.0	
Approach LOS	D			E	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	52.8	66.0	31.8	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	45.2	49.8	27.1	16.8
Green Ext Time (p_c), s	1.2	2.2	0.1	0.0

Intersection Summary	
HCM 6th Ctrl Delay	79.7
HCM 6th LOS	E

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	361	352	13	14	22
Future Vol, veh/h	14	361	352	13	14	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	14	372	363	13	14	23

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	363	0	-	0	763	363
Stage 1	-	-	-	-	363	-
Stage 2	-	-	-	-	400	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1207	-	-	-	375	686
Stage 1	-	-	-	-	708	-
Stage 2	-	-	-	-	681	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1207	-	-	-	369	686
Mov Cap-2 Maneuver	-	-	-	-	369	-
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	681	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	12.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1207	-	-	-	514
HCM Lane V/C Ratio	0.012	-	-	-	0.072
HCM Control Delay (s)	8	0	-	-	12.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	55	2	0	62	6	0
Future Vol, veh/h	55	2	0	62	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	60	2	0	67	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	128	61
Stage 1	-	-	-	-	61	-
Stage 2	-	-	-	-	67	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1554	-	871	1010
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	961	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1554	-	871	1010
Mov Cap-2 Maneuver	-	-	-	-	871	-
Stage 1	-	-	-	-	967	-
Stage 2	-	-	-	-	961	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	871	-	-	1554	-
HCM Lane V/C Ratio	0.007	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↱
Traffic Vol, veh/h	0	374	1	3	342	8	4	0	8	0	0	19
Future Vol, veh/h	0	374	1	3	342	8	4	0	8	0	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	407	1	3	372	9	4	0	9	0	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	381	0	0	408	0	0	801	795	408	-	-	377
Stage 1	-	-	-	-	-	-	408	408	-	-	-	-
Stage 2	-	-	-	-	-	-	393	387	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	1189	-	-	1162	-	-	305	323	648	0	0	674
Stage 1	-	-	-	-	-	-	624	600	-	0	0	-
Stage 2	-	-	-	-	-	-	636	613	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1189	-	-	1162	-	-	295	322	648	-	-	674
Mov Cap-2 Maneuver	-	-	-	-	-	-	295	322	-	-	-	-
Stage 1	-	-	-	-	-	-	624	600	-	-	-	-
Stage 2	-	-	-	-	-	-	615	611	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	13	10.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	463	1189	-	-	1162	-	-	674
HCM Lane V/C Ratio	0.028	-	-	-	0.003	-	-	0.031
HCM Control Delay (s)	13	0	-	-	8.1	0	-	10.5
HCM Lane LOS	B	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	379	3	3	350	3	12
Future Vol, veh/h	379	3	3	350	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	412	3	3	380	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	415	0	800	414
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	386	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1155	-	357	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1155	-	356	643
Mov Cap-2 Maneuver	-	-	-	-	356	-
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	689	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	554	-	-	1155	-
HCM Lane V/C Ratio	0.029	-	-	0.003	-
HCM Control Delay (s)	11.7	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	50	5	0	50	12	0
Future Vol, veh/h	50	5	0	50	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	54	5	0	54	13	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	59	0	111	57
Stage 1	-	-	-	-	57	-
Stage 2	-	-	-	-	54	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1558	-	891	1015
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	974	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1558	-	891	1015
Mov Cap-2 Maneuver	-	-	-	-	891	-
Stage 1	-	-	-	-	971	-
Stage 2	-	-	-	-	974	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	891	-	-	1558	-
HCM Lane V/C Ratio	0.015	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	387	349	4	15	4
Future Vol, veh/h	4	387	349	4	15	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	421	379	4	16	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	383	0	-	0	810	381
Stage 1	-	-	-	-	381	-
Stage 2	-	-	-	-	429	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1187	-	-	-	352	671
Stage 1	-	-	-	-	695	-
Stage 2	-	-	-	-	661	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1187	-	-	-	351	671
Mov Cap-2 Maneuver	-	-	-	-	351	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	661	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	14.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1187	-	-	-	390
HCM Lane V/C Ratio	0.004	-	-	-	0.053
HCM Control Delay (s)	8	0	-	-	14.7
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	18	17	1	3	0
Future Vol, veh/h	0	18	17	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	20	18	1	3	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	19	0	-	0	39	19
Stage 1	-	-	-	-	19	-
Stage 2	-	-	-	-	20	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1611	-	-	-	978	1065
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	1008	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1611	-	-	-	978	1065
Mov Cap-2 Maneuver	-	-	-	-	978	-
Stage 1	-	-	-	-	1009	-
Stage 2	-	-	-	-	1008	-

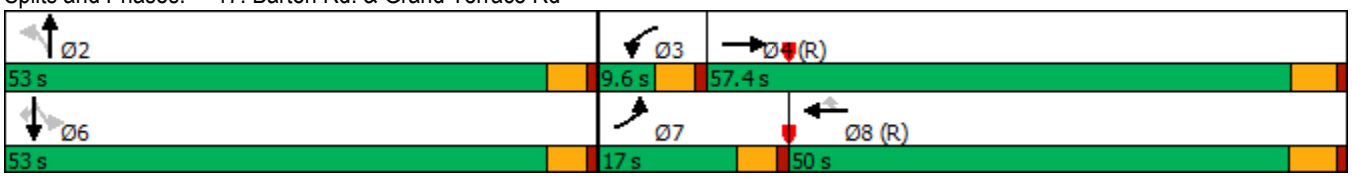
Approach	EB	WB	SB
HCM Control Delay, s	0	0	8.7
HCM LOS			A

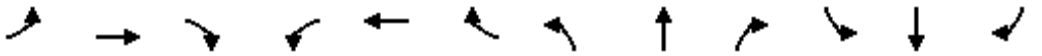
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1611	-	-	-	978
HCM Lane V/C Ratio	-	-	-	-	0.003
HCM Control Delay (s)	0	-	-	-	8.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	33	370	254	239	185	3	99		
Future Volume (vph)	33	370	254	239	185	3	99		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.3	85.7	77.5	77.5		24.6	24.6		
Actuated g/C Ratio	0.06	0.71	0.65	0.65		0.20	0.20		
v/c Ratio	0.37	0.16	0.12	0.24		0.76	0.27		
Control Delay	42.7	12.1	10.6	2.3		61.7	8.0		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	42.7	12.1	10.6	2.3		61.7	8.0		
LOS	D	B	B	A		E	A		
Approach Delay		14.6	6.6			43.1			
Approach LOS		B	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 37.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	33	370	0	0	254	239	0	0	0	185	3	99
Future Volume (veh/h)	33	370	0	0	254	239	0	0	0	185	3	99
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	36	402	0	0	276	200	0	0	0	201	3	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	47	2565	0	1	2334	1041	0	300	0	297	4	254
Arrive On Green	0.03	0.75	0.00	0.00	0.68	0.68	0.00	0.00	0.00	0.17	0.17	0.17
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1423	21	1525
Grp Volume(v), veh/h	36	402	0	0	276	200	0	0	0	204	0	81
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1444	0	1525
Q Serve(g_s), s	2.6	4.0	0.0	0.0	3.3	5.7	0.0	0.0	0.0	16.4	0.0	5.6
Cycle Q Clear(g_c), s	2.6	4.0	0.0	0.0	3.3	5.7	0.0	0.0	0.0	16.4	0.0	5.6
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	47	2565	0	1	2334	1041	0	300	0	300	0	254
V/C Ratio(X)	0.76	0.16	0.00	0.00	0.12	0.19	0.00	0.00	0.00	0.68	0.00	0.32
Avail Cap(c_a), veh/h	167	2565	0	67	2334	1041	0	726	0	642	0	615
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	4.2	0.0	0.0	6.6	7.0	0.0	0.0	0.0	48.5	0.0	44.0
Incr Delay (d2), s/veh	9.1	0.1	0.0	0.0	0.1	0.4	0.0	0.0	0.0	2.7	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	1.2	0.0	0.0	1.2	1.8	0.0	0.0	0.0	6.2	0.0	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.0	4.4	0.0	0.0	6.7	7.4	0.0	0.0	0.0	51.2	0.0	44.7
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	D
Approach Vol, veh/h		438			476			0			285	
Approach Delay, s/veh		9.5			7.0			0.0			49.4	
Approach LOS		A			A						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		24.6	0.0	95.4		24.6	8.1	87.3				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	6.0		18.4	4.6	7.7				
Green Ext Time (p_c), s		0.0	0.0	2.8		1.5	0.0	2.5				

Intersection Summary		
HCM 6th Ctrl Delay		18.0
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	585	660	109	498
Demand Flow Rate, veh/h	585	660	109	498
Vehicles Circulating, veh/h	361	104	911	382
Vehicles Exiting, veh/h	519	916	35	382
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.6	5.0	9.3	6.5
Approach LOS	B	A	A	A

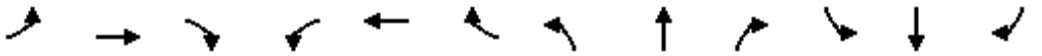
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.979	0.021	0.542	0.458	1.000	0.687	0.313
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	573	12	358	302	109	342	156
Cap Entry Lane, veh/h	1022	1022	1292	1292	545	1003	1003
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	573	12	358	302	109	342	156
Cap Entry, veh/h	1022	1022	1292	1292	545	1003	1003
V/C Ratio	0.560	0.012	0.277	0.234	0.200	0.341	0.156
Control Delay, s/veh	10.7	3.6	5.2	4.8	9.3	7.1	5.0
LOS	B	A	A	A	A	A	A
95th %tile Queue, veh	4	0	1	1	1	2	1

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	135	734	608	310	0	439	
Future Volume (vph)	135	734	608	310	0	439	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	13.0	43.0	30.0	30.0	77.0	77.0	77.0
Total Split (%)	10.8%	35.8%	25.0%	25.0%	64.2%	64.2%	64%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	8.4	37.1	24.1	24.1	71.2	71.2	
Actuated g/C Ratio	0.07	0.31	0.20	0.20	0.60	0.60	
v/c Ratio	1.09	0.67	0.86	0.62	84.00	0.46	
Control Delay	159.4	39.3	58.8	15.5	34724.1	13.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	159.4	39.3	58.8	15.5	34724.1	13.2	
LOS	F	D	E	B	F	B	
Approach Delay		57.9	44.2		9403.6		
Approach LOS		E	D		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 84.00	
Intersection Signal Delay: 2408.0	Intersection LOS: F
Intersection Capacity Utilization 56.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	734	0	0	608	310	42	0	439	0	0	0
Future Volume (veh/h)	135	734	0	0	608	310	42	0	439	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	139	757	0	0	627	242	168	0	340			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	180	1811	0	0	1082	467	514	0	457			
Arrive On Green	0.10	0.50	0.00	0.00	0.30	0.30	0.28	0.00	0.28			
Sat Flow, veh/h	1810	3705	0	0	3705	1560	1810	0	1610			
Grp Volume(v), veh/h	139	757	0	0	627	242	168	0	340			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1560	1810	0	1610			
Q Serve(g_s), s	3.4	5.9	0.0	0.0	6.6	5.8	3.3	0.0	8.6			
Cycle Q Clear(g_c), s	3.4	5.9	0.0	0.0	6.6	5.8	3.3	0.0	8.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	180	1811	0	0	1082	467	514	0	457			
V/C Ratio(X)	0.77	0.42	0.00	0.00	0.58	0.52	0.33	0.00	0.74			
Avail Cap(c_a), veh/h	340	3057	0	0	2008	868	2931	0	2608			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	19.7	7.0	0.0	0.0	13.3	13.0	12.7	0.0	14.5			
Incr Delay (d2), s/veh	2.7	0.2	0.0	0.0	0.5	0.9	0.4	0.0	2.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.4	1.5	0.0	0.0	2.2	1.7	1.0	0.0	2.6			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	7.2	0.0	0.0	13.8	13.9	13.0	0.0	17.0			
LnGrp LOS	C	A	A	A	B	B	B	A	B			
Approach Vol, veh/h		896			869			508				
Approach Delay, s/veh		9.5			13.8			15.7				
Approach LOS		A			B			B				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		27.6			9.0	18.5		17.2				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		37.9			8.4	24.9		72.5				
Max Q Clear Time (g_c+I1), s		7.9			5.4	8.6		10.6				
Green Ext Time (p_c), s		5.7			0.0	4.6		2.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.5									
HCM 6th LOS			B									

APPENDIX 5.2:

E+P CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

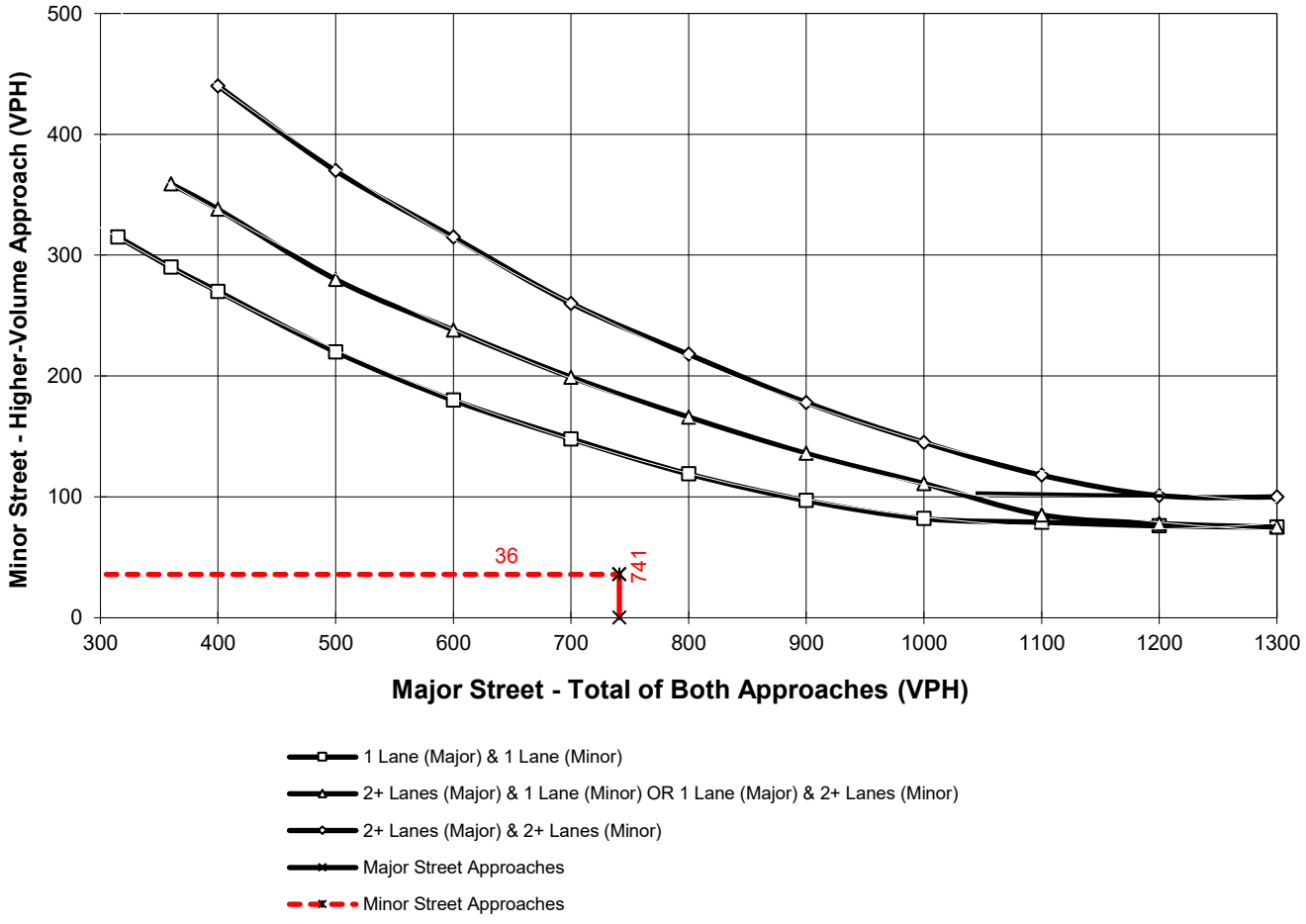
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **E+P Conditions - Weekday PM Peak Hour**

Major Street Name = **Barton Rd.**
Total of Both Approaches (VPH) = **741**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave**
High Volume Approach (VPH) = **36**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 1				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,399** vpd Minor Street Future ADT = **57** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,399**	*1* **57**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,399**	*1* **57**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 2% **B** 5%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Barton Rd.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 3				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **8,274** vpd Minor Street Future ADT = **140** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Number of lanes for moving traffic on each approach		Minimum Requirements EADT			
			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Major Street	Minor Street	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume						
Satisfied: Not Satisfied XX	*1* **8,274**	*1* **140**	8,000 *	5,600	2,400	1,680
XX	*2* +	*1*	9,600	6,720	2,400	1,680
	2 +	*2* +	9,600	6,720	3,200	2,240
	1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic			Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied: Not Satisfied XX						
	Major Street	Minor Street	Urban	Rural	Urban	Rural
	1 **8,274**	*1* **140**	12,000	8,400	1,200	850
	2 +	*1*	14,400	10,080	1,200	850
	2 +	*2* +	14,400	10,080	1,600	1,120
	1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B						
Satisfied: Not Satisfied XX			2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 6%	**B** 12%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 4				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,229** vpd Minor Street Future ADT = **113** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume				
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1 **1,229** / 1 **113**	8,000	5,600	2,400	1,680
2 + / 1	9,600	6,720	2,400	1,680
2 + / 2 +	9,600	6,720	3,200	2,240
1 / 2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 **1,229** / 1 **113**	12,000	8,400	1,200	850
2 + / 1	14,400	10,080	1,200	850
2 + / 2 +	14,400	10,080	1,600	1,120
1 / 2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 5% B: 9%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P	
				CALC	CH	DATE	07/30/20
Jurisdiction:	City of Grand Terrace			CHK	CH	DATE	07/30/20
Major Street:	Barton Rd.			Critical Approach Speed (Major)		25	mph
Minor Street:	Driveway 5			Critical Approach Speed (Minor)		25	mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **8,375** vpd Minor Street Future ADT = **180** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
CONDITION A - Minimum Vehicular Volume	Urban	Rural	Urban	Rural
Satisfied / Not Satisfied: XX / XX				
Number of lanes for moving traffic on each approach				
Major Street: *1* **8,375** / Minor Street: *1* **180**	8,000 *	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach				
Major Street: *1* **8,375** / Minor Street: *1* **180**	12,000	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 8% B: 15%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		E+P
				CALC CH	DATE	07/30/20
Jurisdiction: **City of Grand Terrace**				CHK CH	DATE	07/30/20
Major Street: **Driveway 7 / De Berry St.**				Critical Approach Speed (Major)		25 mph
Minor Street: **Driveway 6**				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **685** vpd Minor Street Future ADT = **28** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
XX	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
CONDITION A - Minimum Vehicular Volume	Urban	Rural	Urban	Rural
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street: *1* **685** / Minor Street: *1* **28**	8,000	5,600	2,400	1,680
Major Street: *2* + / Minor Street: *1*	9,600	6,720	2,400	1,680
Major Street: *2* + / Minor Street: *2* +	9,600	6,720	3,200	2,240
Major Street: *1* / Minor Street: *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach				
Major Street: *1* **685** / Minor Street: *1* **28**	12,000	8,400	1,200	850
Major Street: *2* + / Minor Street: *1*	14,400	10,080	1,200	850
Major Street: *2* + / Minor Street: *2* +	14,400	10,080	1,600	1,120
Major Street: *1* / Minor Street: *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX				
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 1% B: 2%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 5.3:

E+P CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	276	376	112	347	1056
v/c Ratio	0.75	0.60	0.63	0.14	0.53
Control Delay	57.5	7.9	83.1	1.5	17.2
Queue Delay	0.5	0.0	0.0	0.0	0.0
Total Delay	58.0	7.9	83.1	1.5	17.2
Queue Length 50th (ft)	203	0	79	5	231
Queue Length 95th (ft)	275	75	154	16	371
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	718	248	2549	1997
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	42	0	0	0	38
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.60	0.52	0.45	0.14	0.54

Intersection Summary



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	151	357	520	385	668
v/c Ratio	0.62	0.77	0.31	0.84	0.24
Control Delay	58.9	22.3	18.4	53.9	4.3
Queue Delay	0.0	0.0	0.0	1.4	0.4
Total Delay	58.9	22.3	18.4	55.3	4.7
Queue Length 50th (ft)	113	51	102	248	42
Queue Length 95th (ft)	165	139	181	400	115
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	631	1688	652	2793
Starvation Cap Reductn	0	0	0	117	1514
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.57	0.31	0.72	0.52

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	656	666	34	594
v/c Ratio	0.78	0.79	0.05	0.82
Control Delay	27.6	28.2	18.0	26.7
Queue Delay	0.3	0.0	0.0	0.0
Total Delay	27.9	28.2	18.0	26.7
Queue Length 50th (ft)	244	250	10	170
Queue Length 95th (ft)	547	560	36	433
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1437	1437	1259	1180
Starvation Cap Reductn	297	10	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.58	0.47	0.03	0.50

Intersection Summary



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1250	349	616	356
v/c Ratio	1.04	0.99	0.98	0.89
Control Delay	52.3	94.1	70.2	38.8
Queue Delay	5.9	0.0	0.0	0.0
Total Delay	58.2	94.1	70.2	38.8
Queue Length 50th (ft)	~829	272	467	69
Queue Length 95th (ft)	#1095	#466	#706	#238
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1200	352	638	407
Starvation Cap Reductn	18	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.06	0.99	0.97	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	7.1
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	488	971	231	460
Demand Flow Rate, veh/h	488	971	231	460
Vehicles Circulating, veh/h	341	85	705	513
Vehicles Exiting, veh/h	632	851	124	543
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.7	6.2	9.8	7.0
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.906	0.094	0.510	0.490	1.000	0.628	0.372
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	442	46	495	476	231	289	171
Cap Entry Lane, veh/h	1041	1041	1314	1314	672	890	890
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	442	46	495	476	231	289	171
Cap Entry, veh/h	1041	1041	1314	1314	672	890	890
V/C Ratio	0.425	0.044	0.377	0.362	0.344	0.325	0.192
Control Delay, s/veh	8.1	3.8	6.3	6.1	9.8	7.6	6.0
LOS	A	A	A	A	A	A	A
95th %tile Queue, veh	2	0	2	2	2	1	1



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	104	600	925	592	76	369
v/c Ratio	0.94	0.44	0.91	0.85	38.00	0.40
Control Delay	126.2	28.7	55.2	29.2	17529.6	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.2	28.7	55.2	29.2	17529.6	11.6
Queue Length 50th (ft)	82	178	364	188	~120	98
Queue Length 95th (ft)	#194	231	#482	#406	#225	169
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	111	1381	1019	693	6	915
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.94	0.43	0.91	0.85	12.67	0.40

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	146	423	129	829	839
v/c Ratio	0.34	0.85	0.66	0.34	0.45
Control Delay	37.9	43.2	62.7	12.5	20.1
Queue Delay	0.1	0.0	0.0	0.5	0.0
Total Delay	38.0	43.2	62.7	13.0	20.1
Queue Length 50th (ft)	94	210	107	166	196
Queue Length 95th (ft)	134	296	m147	197	330
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	677	265	2425	1853
Starvation Cap Reductn	0	0	0	1060	0
Spillback Cap Reductn	72	0	0	0	55
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.62	0.49	0.61	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	423	358	925	367	444
v/c Ratio	0.87	0.57	0.69	0.89	0.19
Control Delay	61.1	13.4	32.1	85.0	7.7
Queue Delay	0.0	0.0	0.0	13.1	0.0
Total Delay	61.1	13.4	32.1	98.1	7.7
Queue Length 50th (ft)	303	54	294	264	54
Queue Length 95th (ft)	#454	146	387	#417	66
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	531	661	1344	472	2316
Starvation Cap Reductn	0	0	0	89	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.80	0.54	0.69	0.96	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	495	746	49	432
v/c Ratio	0.52	0.78	0.11	0.64
Control Delay	10.5	16.8	19.0	9.5
Queue Delay	0.0	0.1	0.0	0.0
Total Delay	10.5	16.9	19.0	9.5
Queue Length 50th (ft)	76	140	10	12
Queue Length 95th (ft)	188	344	43	101
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1879	1879	1340	1295
Starvation Cap Reductn	255	245	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.30	0.46	0.04	0.33

Intersection Summary



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	916	389	711	367
v/c Ratio	0.93	0.94	0.96	0.72
Control Delay	35.3	77.0	60.2	15.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	35.3	77.0	60.2	15.2
Queue Length 50th (ft)	495	295	523	12
Queue Length 95th (ft)	#817	#478	#770	112
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	988	432	766	512
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.93	0.90	0.93	0.72

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	585	660	109	498
Demand Flow Rate, veh/h	585	660	109	498
Vehicles Circulating, veh/h	361	104	911	382
Vehicles Exiting, veh/h	519	916	35	382
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.6	5.0	9.3	6.5
Approach LOS	B	A	A	A

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	R	LT	R	LTR	LT	R
Assumed Moves	LT	R	LT	R	LTR	LT	R
RT Channelized							
Lane Util	0.979	0.021	0.542	0.458	1.000	0.687	0.313
Follow-Up Headway, s	2.535	2.535	2.535	2.535	2.609	2.535	2.535
Critical Headway, s	4.544	4.544	4.544	4.544	4.976	4.544	4.544
Entry Flow, veh/h	573	12	358	302	109	342	156
Cap Entry Lane, veh/h	1022	1022	1292	1292	545	1003	1003
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	573	12	358	302	109	342	156
Cap Entry, veh/h	1022	1022	1292	1292	545	1003	1003
V/C Ratio	0.560	0.012	0.277	0.234	0.200	0.341	0.156
Control Delay, s/veh	10.7	3.6	5.2	4.8	9.3	7.1	5.0
LOS	B	A	A	A	A	A	A
95th %tile Queue, veh	4	0	1	1	1	2	1



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	139	757	627	320	168	453
v/c Ratio	1.09	0.67	0.86	0.62	84.00	0.46
Control Delay	159.4	39.3	58.8	15.5	34724.1	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	159.4	39.3	58.8	15.5	34724.1	13.2
Queue Length 50th (ft)	~122	266	247	41	~271	159
Queue Length 95th (ft)	#254	335	#333	136	#417	238
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	127	1148	754	527	6	989
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.09	0.66	0.83	0.61	28.00	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 5.4:

E+P CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	E+P
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	4610	7161	0.64	67.7	22.7	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.917	4610	446	7200	2100	0.64	0.21	64.7	60.5	23.8	27.7	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4138	7161	0.58	68.5	20.1	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4832	694	7200	2100	0.67	0.33	61.5	59.4	26.2	27.4	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4818	7161	0.67	67.2	23.9	C

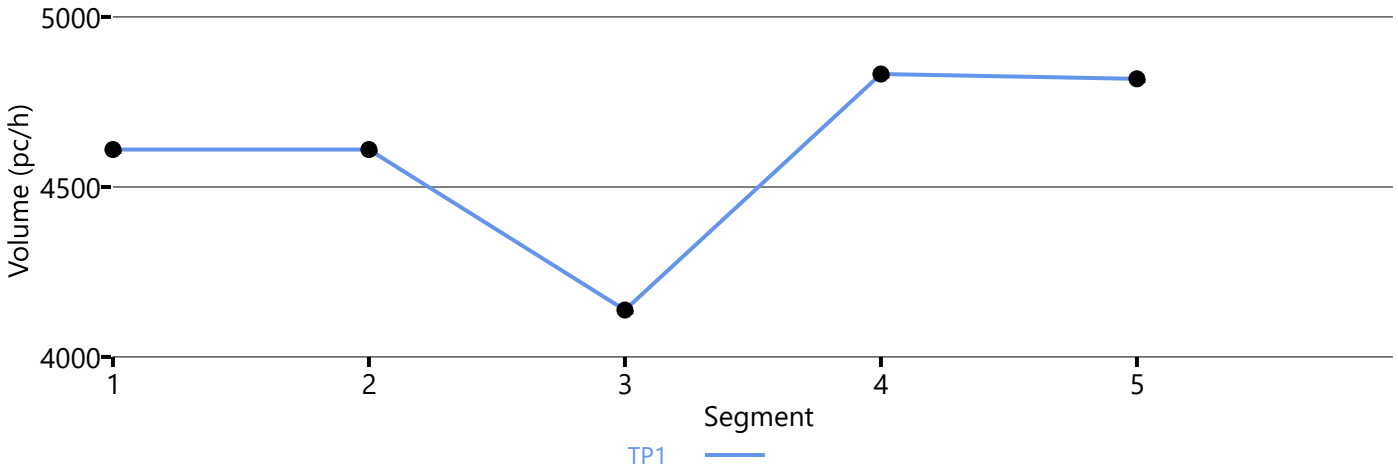
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.3	23.4	22.4	2.0	C

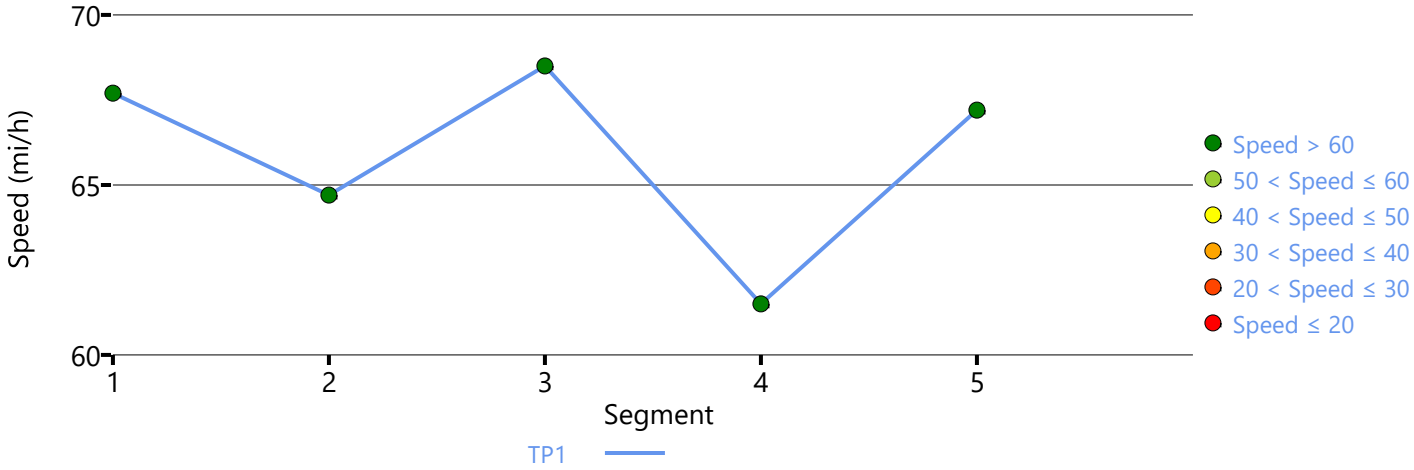
Facility Overall Results

Space Mean Speed, mi/h	66.3	Density, veh/mi/ln	22.4
Average Travel Time, min	2.0	Density, pc/mi/ln	23.4

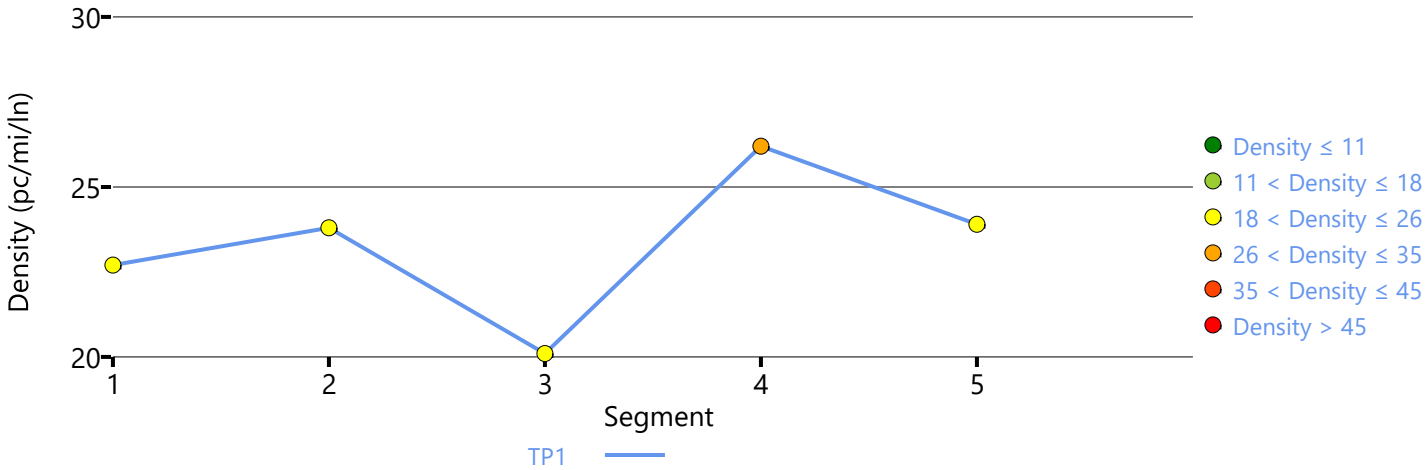
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	E+P
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3772	7161	0.53	68.7	18.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.885	3772	463	7200	2100	0.52	0.22	64.6	60.5	19.5	25.2	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	3320	7161	0.46	68.7	16.1	B

Segment 4: Merge

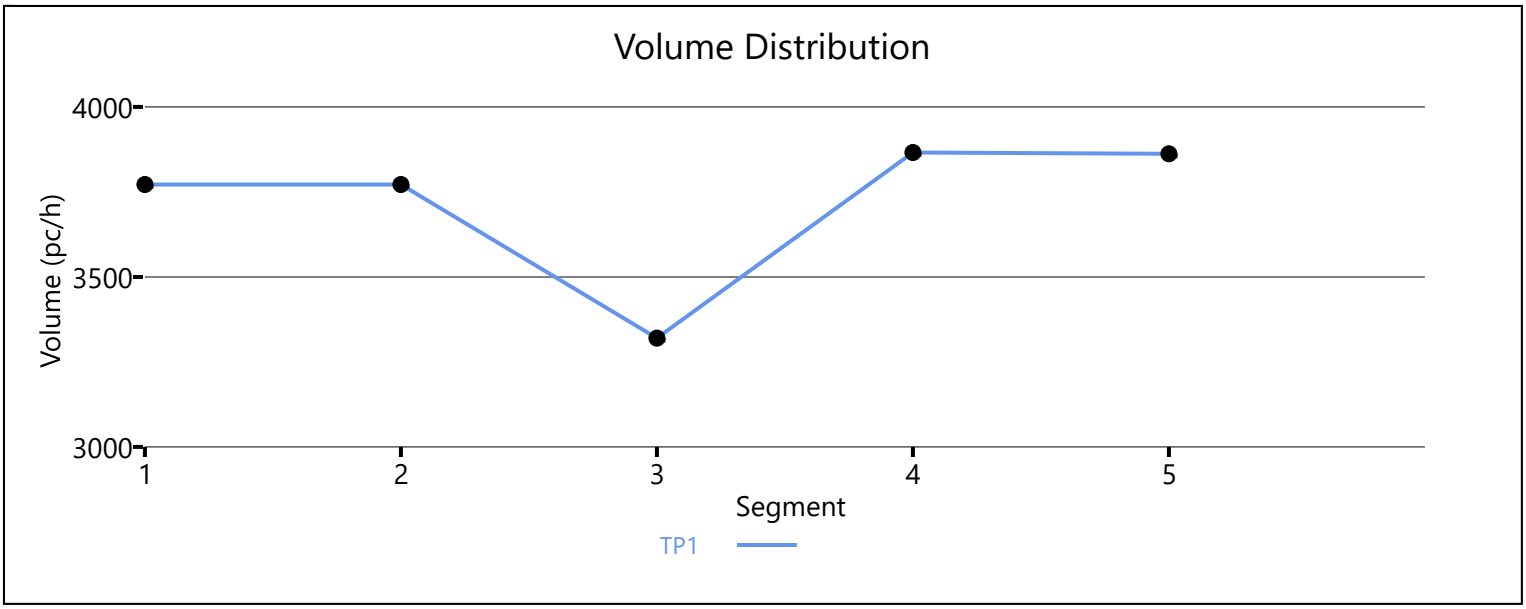
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.909	3866	546	7200	2100	0.54	0.26	62.8	60.7	20.5	22.3	C

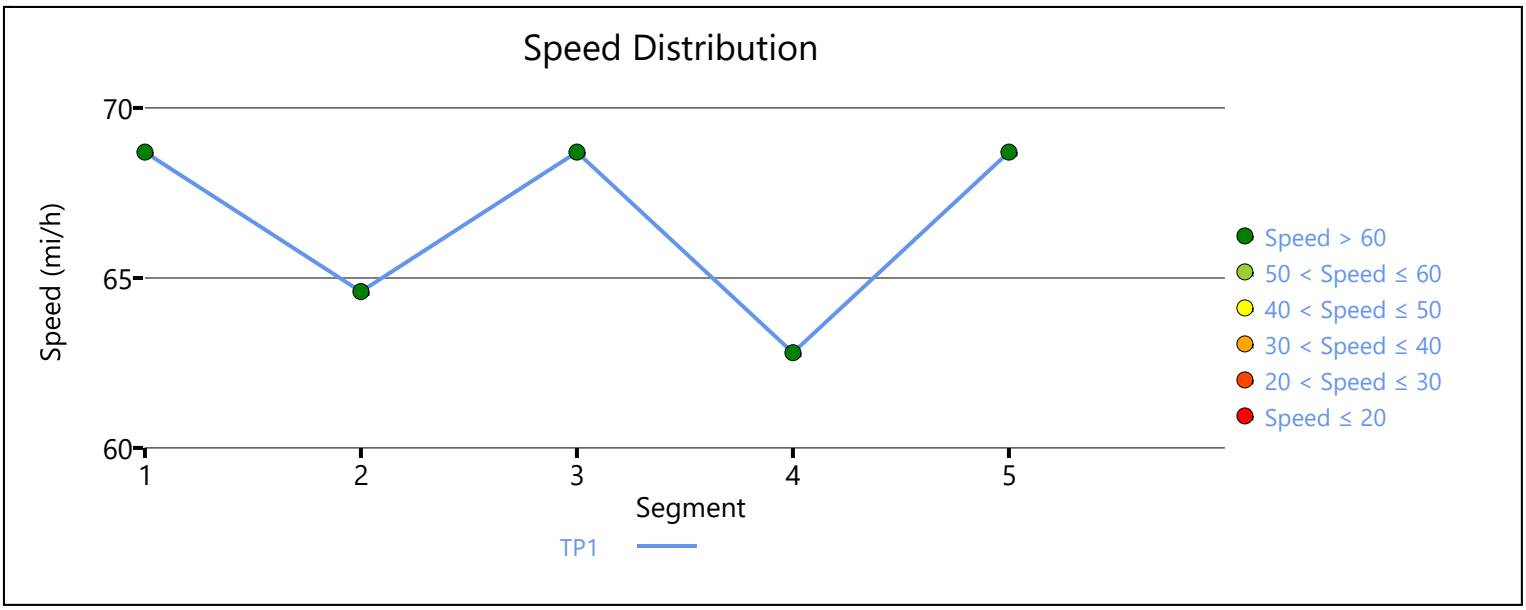
Segment 5: Basic

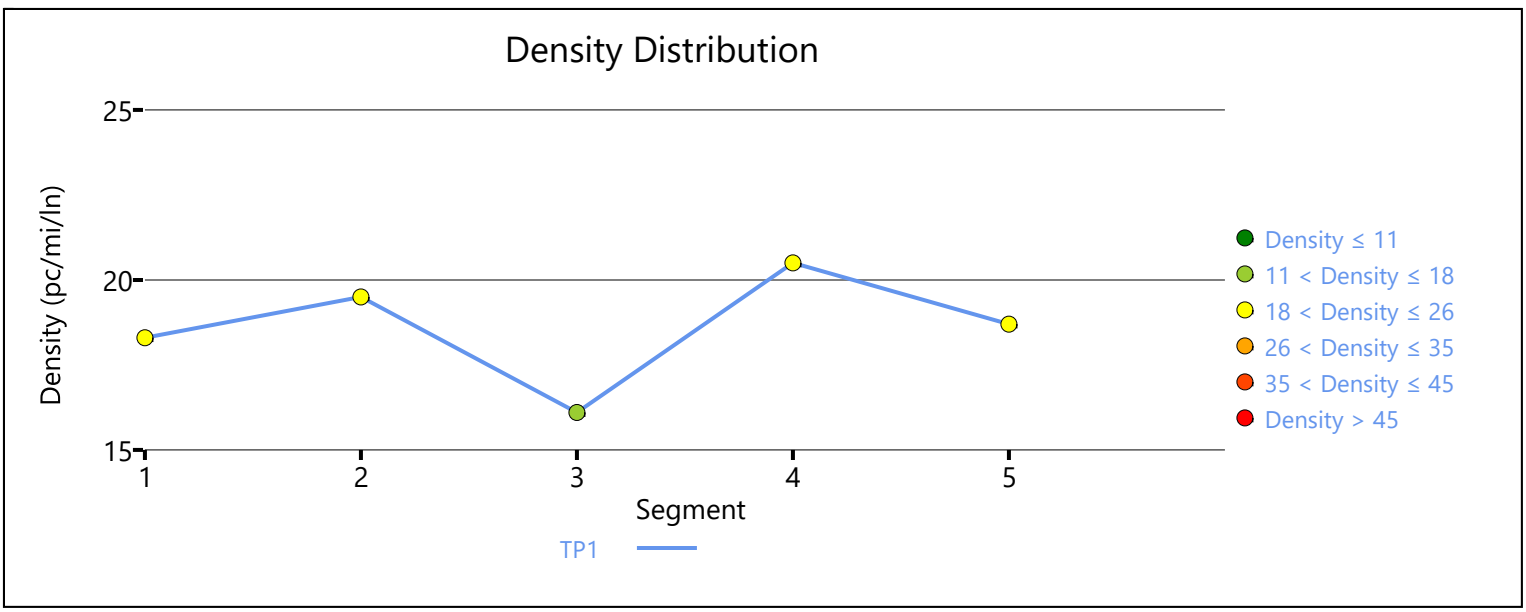
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3862	7161	0.54	68.7	18.7	C

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	67.4	18.5	18.1	2.1	C

Facility Overall Results			
Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	18.1
Average Travel Time, min	2.1	Density, pc/mi/ln	18.5







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	E+P
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4352	7161	0.61	68.2	21.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.962	4352	531	6600	2100	0.66	0.25	64.5	60.3	22.5	26.7	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	3821	7161	0.53	68.7	18.5	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4304	483	6600	2100	0.65	0.23	62.2	60.2	23.1	24.4	C

Segment 5: Basic

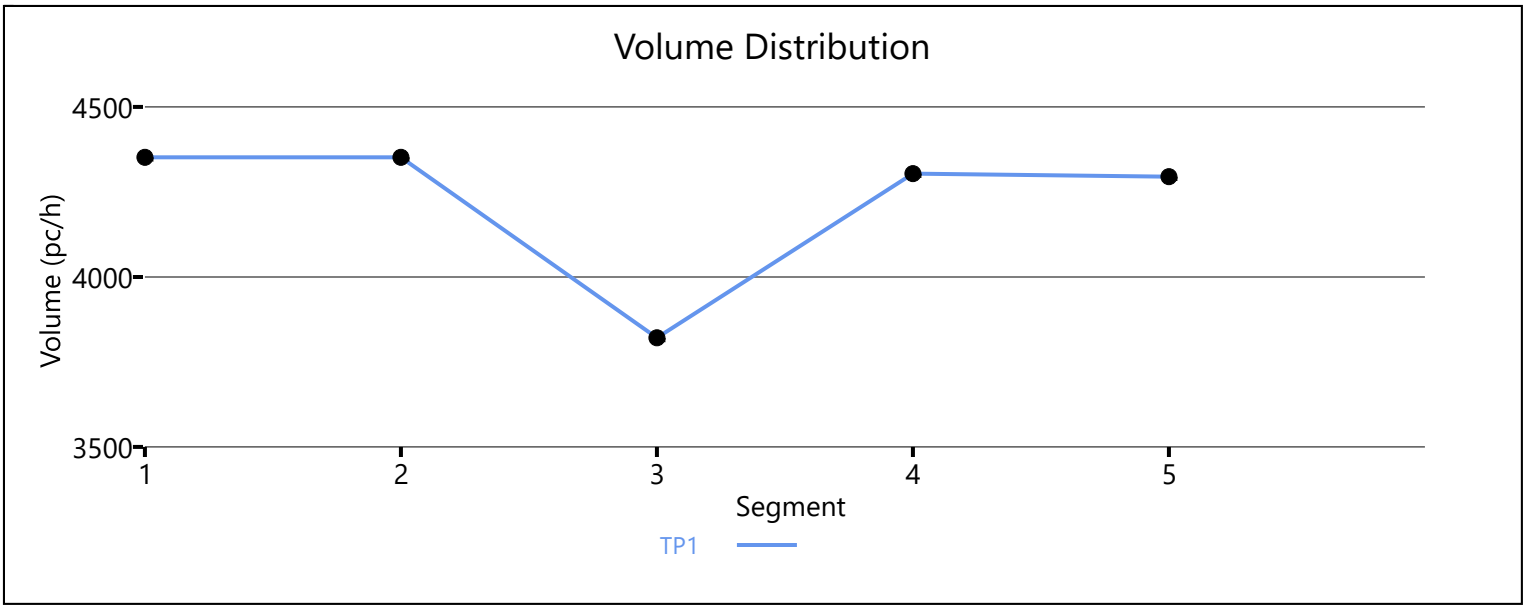
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4295	7161	0.60	68.3	21.0	C

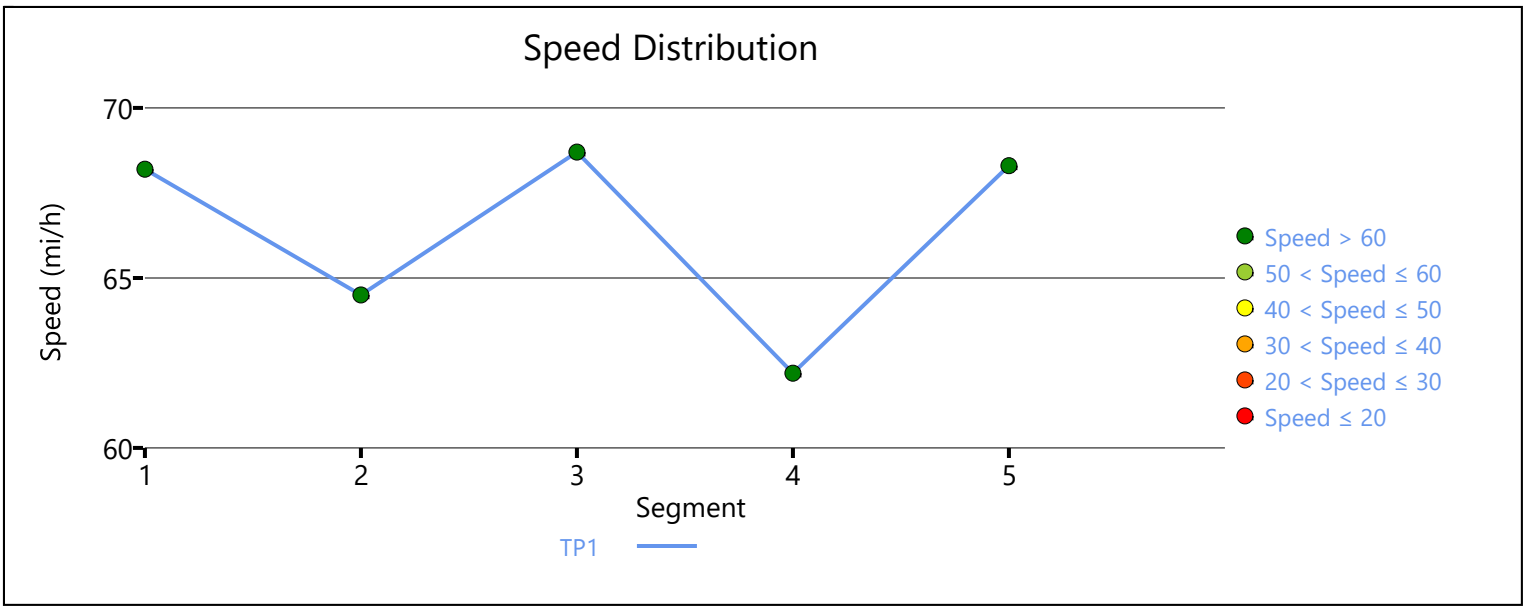
Facility Time Period Results

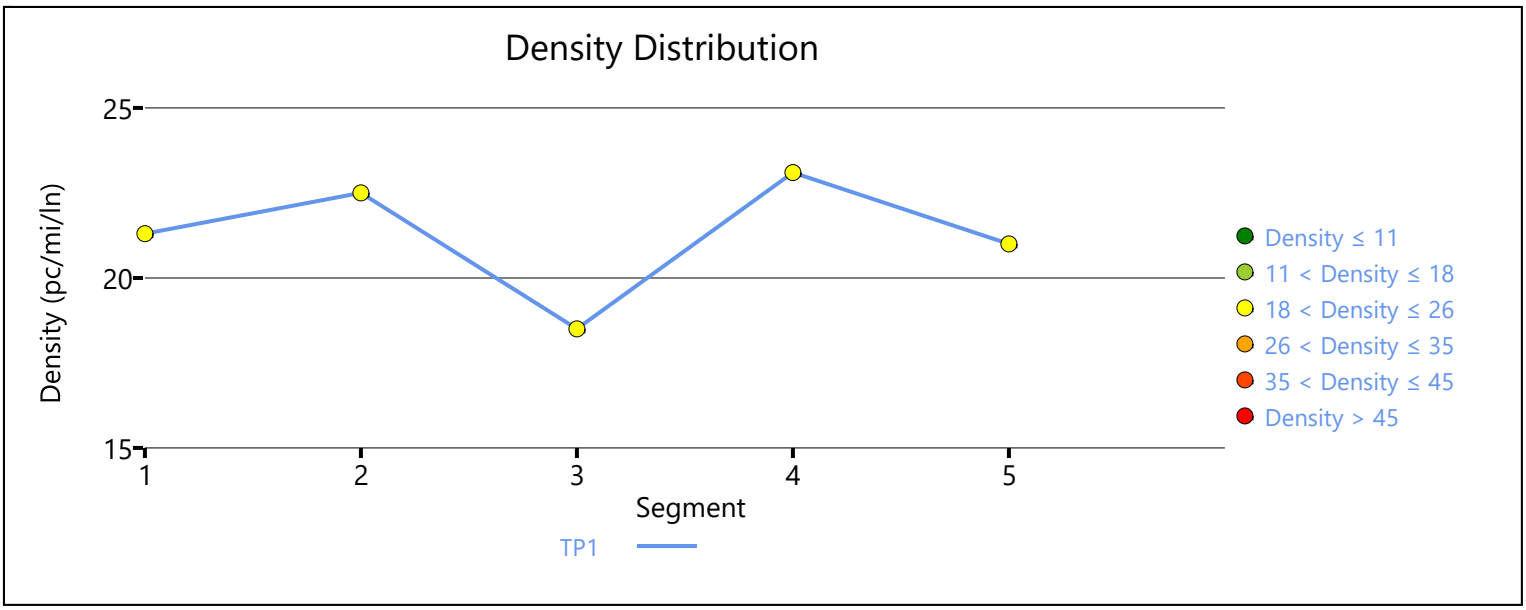
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.9	21.2	20.4	2.0	C

Facility Overall Results

Space Mean Speed, mi/h	66.9	Density, veh/mi/ln	20.4
Average Travel Time, min	2.0	Density, pc/mi/ln	21.2







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	E+P
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3570	7161	0.50	68.7	17.3	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3570	516	7200	2100	0.50	0.25	64.5	60.4	18.4	24.3	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3064	7161	0.43	68.7	14.9	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3458	394	7200	2100	0.48	0.19	63.2	61.0	18.2	20.0	B

Segment 5: Basic

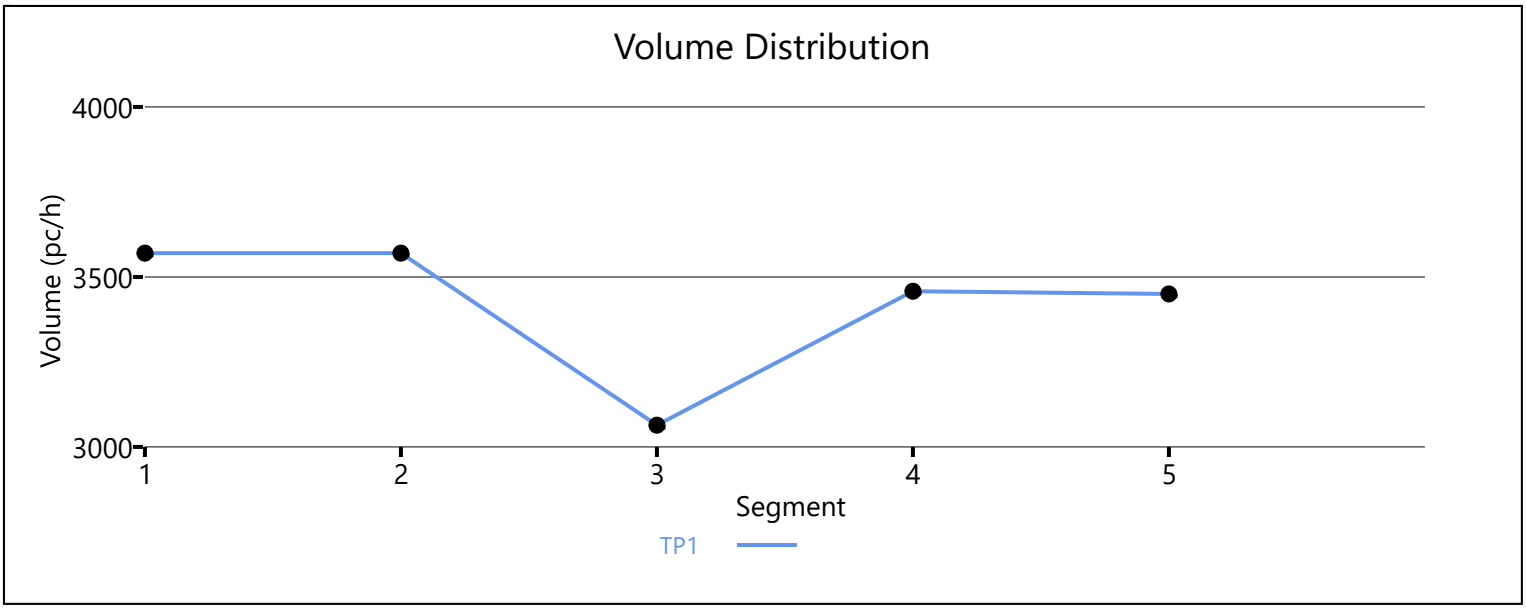
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3450	7161	0.48	68.7	16.7	B

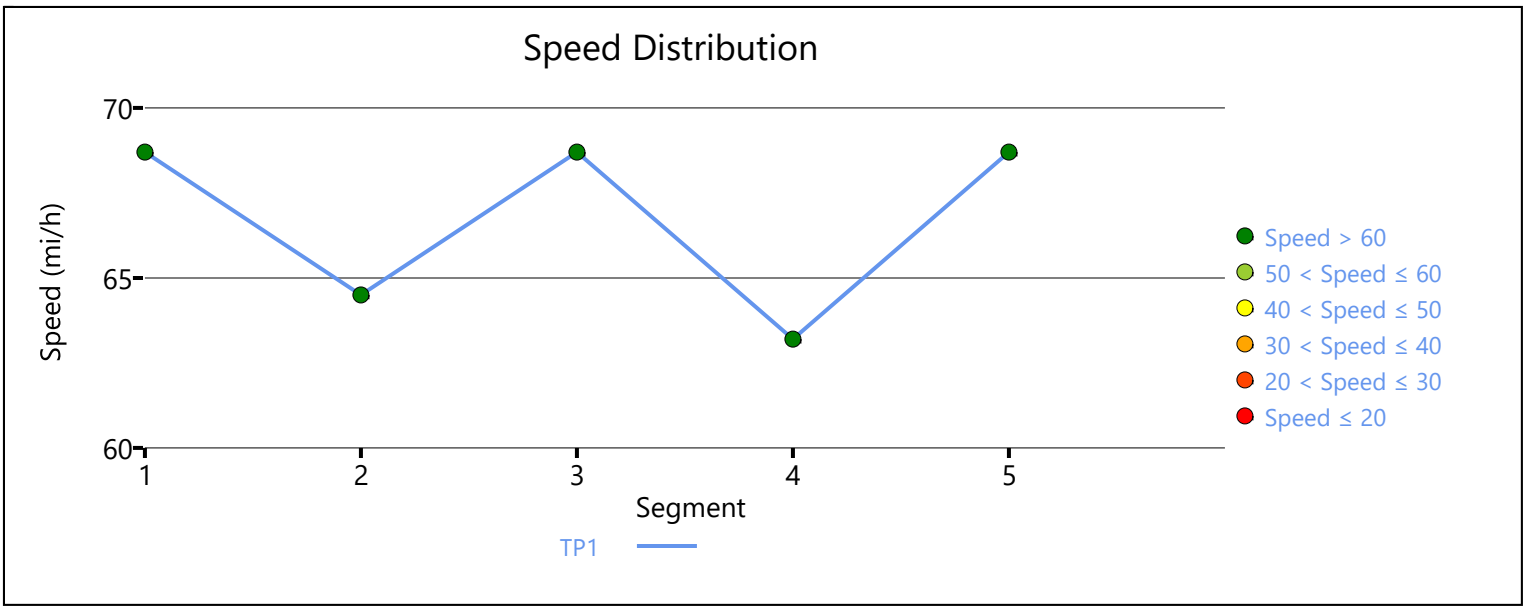
Facility Time Period Results

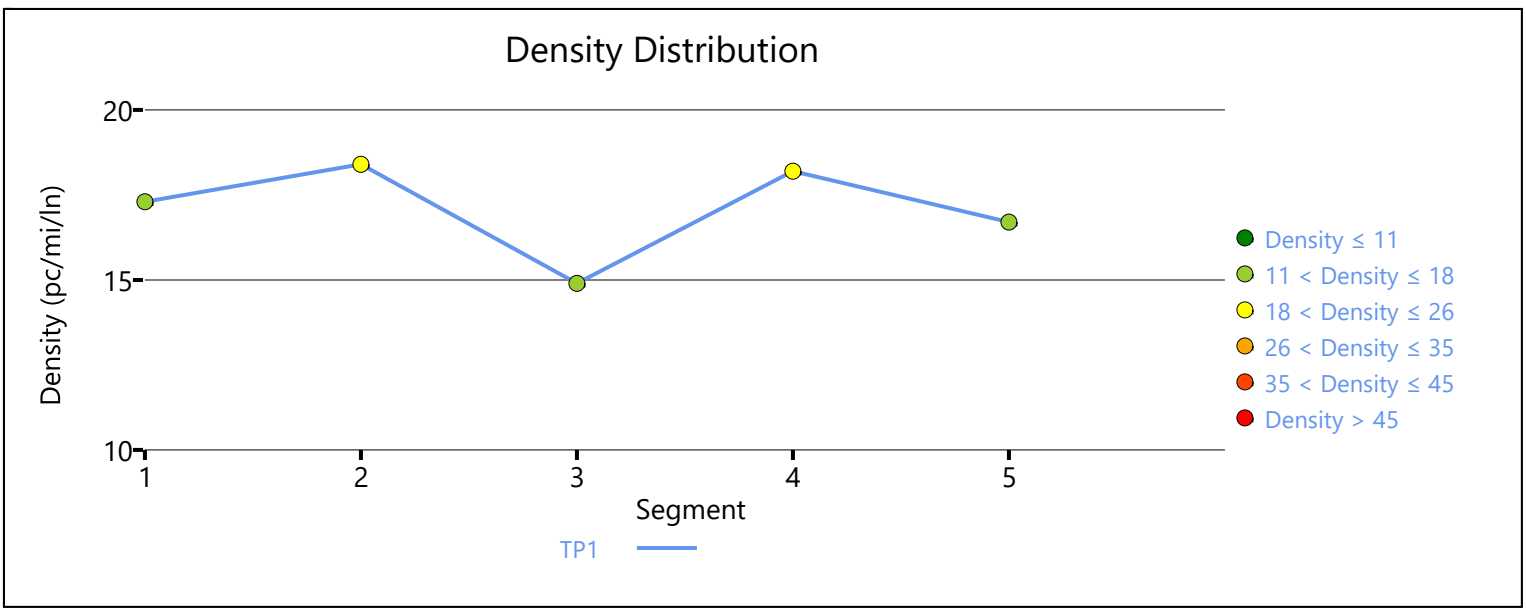
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.5	17.1	16.6	2.1	B

Facility Overall Results

Space Mean Speed, mi/h	67.5	Density, veh/mi/ln	16.6
Average Travel Time, min	2.1	Density, pc/mi/ln	17.1







Copyright © 2020 University of Florida. All Rights Reserved.

APPENDIX 5.5:

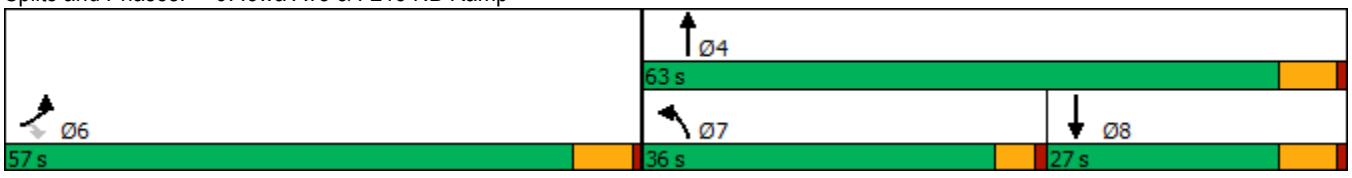
E+P CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

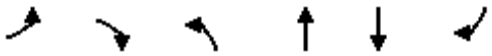
This Page Intentionally Left Blank

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	118	1044	325	573	37
Future Volume (vph)	118	1044	325	573	37
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	57.0	57.0	36.0	63.0	27.0
Total Split (%)	47.5%	47.5%	30.0%	52.5%	22.5%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	32.0	32.0	21.2	39.3	13.1
Actuated g/C Ratio	0.38	0.38	0.25	0.46	0.15
v/c Ratio	0.84	0.64	0.77	0.70	0.71
Control Delay	27.6	5.2	44.6	24.7	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	5.2	44.6	24.7	18.3
LOS	C	A	D	C	B
Approach Delay	16.5			31.9	18.3
Approach LOS	B			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 84.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.84	
Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 80.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	118	1044	325	573	37	294
Future Volume (veh/h)	118	1044	325	573	37	294
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	0	985	349	616	40	257
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	655	1166	394	919	46	297
Arrive On Green	0.00	0.36	0.22	0.48	0.21	0.21
Sat Flow, veh/h	1810	3220	1810	1900	221	1423
Grp Volume(v), veh/h	0	985	349	616	0	297
Grp Sat Flow(s),veh/h/ln	1810	1610	1810	1900	0	1644
Q Serve(g_s), s	0.0	22.6	15.0	19.9	0.0	14.0
Cycle Q Clear(g_c), s	0.0	22.6	15.0	19.9	0.0	14.0
Prop In Lane	1.00	1.00	1.00			0.87
Lane Grp Cap(c), veh/h	655	1166	394	919	0	343
V/C Ratio(X)	0.00	0.85	0.89	0.67	0.00	0.86
Avail Cap(c_a), veh/h	1144	2037	707	1344	0	426
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	23.6	30.5	15.8	0.0	30.7
Incr Delay (d2), s/veh	0.0	1.8	2.7	0.9	0.0	14.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	6.6	8.1	0.0	6.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	25.3	33.2	16.7	0.0	45.0
LnGrp LOS	A	C	C	B	A	D
Approach Vol, veh/h	985			965	297	
Approach Delay, s/veh	25.3			22.7	45.0	
Approach LOS	C			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	45.1	35.3	22.1	23.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	56.8	50.8	31.4	20.8
Max Q Clear Time (g_c+I1), s	21.9	24.6	17.0	16.0
Green Ext Time (p_c), s	4.7	4.5	0.5	0.8

Intersection Summary	
HCM 6th Ctrl Delay	26.8
HCM 6th LOS	C

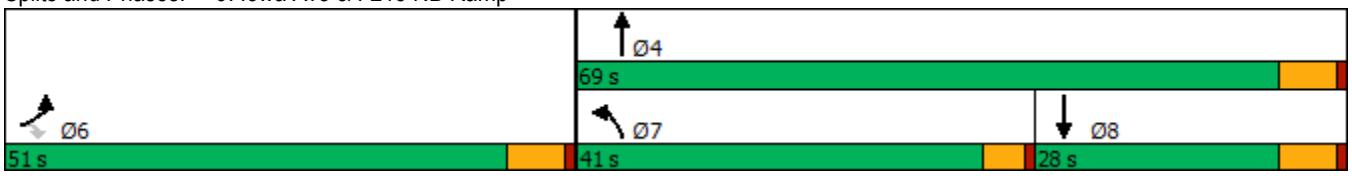
Notes

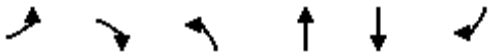
User approved volume balancing among the lanes for turning movement.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	154	744	381	697	17
Future Volume (vph)	154	744	381	697	17
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	51.0	51.0	41.0	69.0	28.0
Total Split (%)	42.5%	42.5%	34.2%	57.5%	23.3%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	Max	Max	None	Min	Min
Act Effct Green (s)	45.3	45.3	25.4	44.4	14.3
Actuated g/C Ratio	0.44	0.44	0.25	0.43	0.14
v/c Ratio	0.59	0.48	0.87	0.86	0.69
Control Delay	22.4	4.2	57.1	37.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	4.2	57.1	37.3	13.0
LOS	C	A	E	D	B
Approach Delay	13.5			44.3	13.0
Approach LOS	B			D	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 81.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	154	744	381	697	17	343
Future Volume (veh/h)	154	744	381	697	17	343
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	355	369	389	711	17	263
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	757	673	422	886	19	290
Arrive On Green	0.42	0.42	0.23	0.47	0.19	0.19
Sat Flow, veh/h	1810	1610	1810	1900	99	1527
Grp Volume(v), veh/h	355	369	389	711	0	280
Grp Sat Flow(s),veh/h/ln	1810	1610	1810	1900	0	1625
Q Serve(g_s), s	15.2	18.5	22.5	34.2	0.0	18.1
Cycle Q Clear(g_c), s	15.2	18.5	22.5	34.2	0.0	18.1
Prop In Lane	1.00	1.00	1.00			0.94
Lane Grp Cap(c), veh/h	757	673	422	886	0	309
V/C Ratio(X)	0.47	0.55	0.92	0.80	0.00	0.91
Avail Cap(c_a), veh/h	757	673	615	1114	0	331
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.6	23.5	40.1	24.4	0.0	42.5
Incr Delay (d2), s/veh	2.1	3.2	12.1	3.4	0.0	26.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	18.0	11.3	15.6	0.0	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.7	26.7	52.2	27.8	0.0	68.9
LnGrp LOS	C	C	D	C	A	E
Approach Vol, veh/h	724			1100	280	
Approach Delay, s/veh	25.7			36.5	68.9	
Approach LOS	C			D	E	

Timer - Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				56.2		51.0	29.6	26.6
Change Period (Y+Rc), s				6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s				62.8		44.8	36.4	21.8
Max Q Clear Time (g_c+I1), s				36.2		20.5	24.5	20.1
Green Ext Time (p_c), s				5.5		2.3	0.5	0.3

Intersection Summary								
HCM 6th Ctrl Delay			37.1					
HCM 6th LOS			D					

Notes

User approved volume balancing among the lanes for turning movement.

APPENDIX 6.1:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

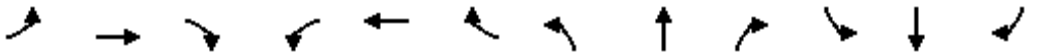
This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	364	107	392	724
Future Volume (vph)	0	364	107	392	724
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	25.2	25.2	11.9	83.9	67.5
Actuated g/C Ratio	0.21	0.21	0.10	0.70	0.56
v/c Ratio	0.76	0.60	0.64	0.17	0.57
Control Delay	56.9	7.7	88.4	1.4	18.6
Queue Delay	0.8	0.0	0.0	0.0	0.0
Total Delay	57.7	7.7	88.4	1.4	18.6
LOS	E	A	F	A	B
Approach Delay	28.9			20.0	18.6
Approach LOS	C			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 21.9	Intersection LOS: C
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	267	0	364	107	392	0	0	724	325
Future Volume (veh/h)	0	0	0	267	0	364	107	392	0	0	724	325
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				287	0	283	115	422	0	0	778	268
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				367	0	327	141	2550	0	0	1556	536
Arrive On Green				0.20	0.00	0.20	0.08	0.71	0.00	0.00	0.59	0.59
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2729	907
Grp Volume(v), veh/h				287	0	283	115	422	0	0	533	513
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1737
Q Serve(g_s), s				18.0	0.0	20.4	7.5	4.7	0.0	0.0	20.6	20.6
Cycle Q Clear(g_c), s				18.0	0.0	20.4	7.5	4.7	0.0	0.0	20.6	20.6
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.52
Lane Grp Cap(c), veh/h				367	0	327	141	2550	0	0	1066	1026
V/C Ratio(X)				0.78	0.00	0.87	0.81	0.17	0.00	0.00	0.50	0.50
Avail Cap(c_a), veh/h				501	0	445	249	2550	0	0	1066	1026
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.94	0.94	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				45.3	0.0	46.3	54.5	5.9	0.0	0.0	14.3	14.3
Incr Delay (d2), s/veh				5.5	0.0	12.7	4.0	0.1	0.0	0.0	1.7	1.7
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.4	0.0	9.0	3.5	1.6	0.0	0.0	8.5	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				50.8	0.0	58.9	58.5	6.0	0.0	0.0	15.9	16.0
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					570			537			1046	
Approach Delay, s/veh					54.8			17.2			16.0	
Approach LOS					D			B			B	

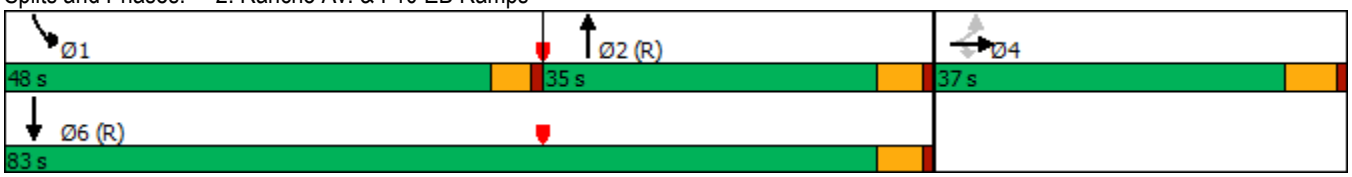
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		89.9			13.9	76.0		30.1				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		6.7			9.5	22.6		22.4				
Green Ext Time (p_c), s		3.0			0.1	8.1		1.9				

Intersection Summary												
HCM 6th Ctrl Delay			26.6									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	324	362	353	639
Future Volume (vph)	1	324	362	353	639
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	17.6	17.6	55.4	31.5	91.5
Actuated g/C Ratio	0.15	0.15	0.46	0.26	0.76
v/c Ratio	0.59	0.81	0.37	0.85	0.26
Control Delay	55.7	29.4	22.1	54.6	5.3
Queue Delay	0.0	0.0	0.0	2.2	0.5
Total Delay	55.7	29.4	22.1	56.7	5.7
LOS	E	C	C	E	A
Approach Delay	37.2		22.1		23.9
Approach LOS	D		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 26.5	Intersection LOS: C
Intersection Capacity Utilization 64.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	1	324	0	0	0	0	362	169	353	639	0
Future Volume (veh/h)	137	1	324	0	0	0	0	362	169	353	639	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	156	1	283				0	411	147	401	726	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	356	2	318				0	1149	407	422	2568	0
Arrive On Green	0.20	0.20	0.20				0.00	0.44	0.44	0.47	1.00	0.00
Sat Flow, veh/h	1799	12	1610				0	2709	925	1810	3705	0
Grp Volume(v), veh/h	157	0	283				0	282	276	401	726	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1734	1810	1805	0
Q Serve(g_s), s	9.1	0.0	20.5				0.0	12.5	12.7	25.5	0.0	0.0
Cycle Q Clear(g_c), s	9.1	0.0	20.5				0.0	12.5	12.7	25.5	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.53	1.00		0.00
Lane Grp Cap(c), veh/h	358	0	318				0	794	762	422	2568	0
V/C Ratio(X)	0.44	0.00	0.89				0.00	0.36	0.36	0.95	0.28	0.00
Avail Cap(c_a), veh/h	471	0	419				0	794	762	654	2568	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.80	0.80	0.00
Uniform Delay (d), s/veh	42.3	0.0	46.9				0.0	22.3	22.4	31.3	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	16.7				0.0	1.2	1.3	12.1	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	9.4				0.0	5.5	5.4	9.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.1	0.0	63.6				0.0	23.6	23.7	43.4	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		440						558			1127	
Approach Delay, s/veh		56.3						23.6			15.6	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	32.6	57.9		29.5		90.5
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9
Max Q Clear Time (g_c+I1), s	27.5	14.7		22.5		2.0
Green Ext Time (p_c), s	0.5	2.9		1.2		5.8

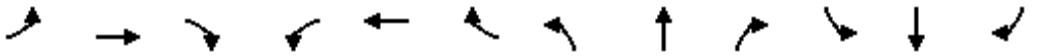
Intersection Summary		
HCM 6th Ctrl Delay		26.1
HCM 6th LOS		C

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	197	18	32	154	397	33	809
Future Volume (vph)	197	18	32	154	397	33	809
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		29.6	30.8	8.9	66.1	6.6	59.4
Actuated g/C Ratio		0.26	0.27	0.08	0.58	0.06	0.52
v/c Ratio		0.93	0.10	1.38	0.23	0.40	0.93
Control Delay		73.8	26.5	254.0	13.0	67.4	31.3
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		73.8	26.5	254.0	13.0	67.4	31.3
LOS		E	C	F	B	E	C
Approach Delay		73.8	26.5		79.7		32.1
Approach LOS		E	C		E		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.38	
Intersection Signal Delay: 48.1	Intersection LOS: D
Intersection Capacity Utilization 93.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	18	80	0	32	12	154	397	5	33	809	660
Future Volume (veh/h)	197	18	80	0	32	12	154	397	5	33	809	660
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	221	20	80	0	36	11	173	446	5	37	909	569
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	293	22	86	0	346	106	129	1943	22	50	1046	636
Arrive On Green	0.26	0.26	0.26	0.00	0.26	0.26	0.08	0.56	0.56	0.03	0.51	0.51
Sat Flow, veh/h	910	82	329	0	1323	404	1619	3464	39	1619	2043	1243
Grp Volume(v), veh/h	321	0	0	0	0	47	173	220	231	37	757	721
Grp Sat Flow(s),veh/h/ln	1322	0	0	0	0	1727	1619	1710	1793	1619	1710	1576
Q Serve(g_s), s	24.1	0.0	0.0	0.0	0.0	2.3	8.8	7.2	7.2	2.5	42.7	45.5
Cycle Q Clear(g_c), s	26.4	0.0	0.0	0.0	0.0	2.3	8.8	7.2	7.2	2.5	42.7	45.5
Prop In Lane	0.69		0.25	0.00		0.23	1.00		0.02	1.00		0.79
Lane Grp Cap(c), veh/h	401	0	0	0	0	452	129	959	1006	50	875	807
V/C Ratio(X)	0.80	0.00	0.00	0.00	0.00	0.10	1.34	0.23	0.23	0.74	0.86	0.89
Avail Cap(c_a), veh/h	431	0	0	0	0	507	129	1010	1059	109	989	911
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.9	0.0	0.0	0.0	0.0	30.9	50.8	12.2	12.2	53.1	23.6	24.3
Incr Delay (d2), s/veh	9.7	0.0	0.0	0.0	0.0	0.1	195.9	0.1	0.1	7.9	7.4	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	0.0	0.0	0.0	0.0	1.0	10.5	2.5	2.6	1.1	17.3	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.7	0.0	0.0	0.0	0.0	31.0	246.7	12.3	12.3	60.9	31.0	34.7
LnGrp LOS	D	A	A	A	A	C	F	B	B	E	C	C
Approach Vol, veh/h		321			47			624			1515	
Approach Delay, s/veh		50.7			31.0			77.3			33.5	
Approach LOS		D			C			E			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	67.7		34.7	13.4	62.3		34.7				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	4.5	9.2		28.4	10.8	47.5		4.3				
Green Ext Time (p_c), s	0.0	2.5		0.5	0.0	9.0		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		46.5
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	148	527	807	181
Future Vol, veh/h	0	0	148	527	807	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	168	599	917	206

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1656	562	1123	0	-	0
Stage 1	1020	-	-	-	-	-
Stage 2	636	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	91	475	629	-	-	-
Stage 1	313	-	-	-	-	-
Stage 2	495	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	55	475	629	-	-	-
Mov Cap-2 Maneuver	55	-	-	-	-	-
Stage 1	188	-	-	-	-	-
Stage 2	495	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	4.1	0
HCM LOS	A		

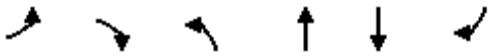
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	629	-	-	-	-
HCM Lane V/C Ratio	0.267	-	-	-	-
HCM Control Delay (s)	12.8	1.6	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	16	552	429	571	574
Future Volume (vph)	16	552	429	571	574
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.0	12.0	31.9	59.3	22.6
Actuated g/C Ratio	0.14	0.14	0.38	0.71	0.27
v/c Ratio	0.67	0.66	0.79	0.27	0.71
Control Delay	14.6	13.1	36.2	4.7	33.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.6	13.1	36.2	4.7	33.8
LOS	B	B	D	A	C
Approach Delay	13.8			18.2	33.8
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 83.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 76.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	552	429	571	574	5
Future Volume (veh/h)	16	552	429	571	574	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	463	438	583	586	5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	320	569	473	1940	761	6
Arrive On Green	0.00	0.21	0.32	0.63	0.24	0.24
Sat Flow, veh/h	1543	2746	1457	3159	3209	27
Grp Volume(v), veh/h	0	463	438	583	288	303
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1615
Q Serve(g_s), s	0.0	11.9	21.4	6.4	12.9	12.9
Cycle Q Clear(g_c), s	0.0	11.9	21.4	6.4	12.9	12.9
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	320	569	473	1940	374	393
V/C Ratio(X)	0.00	0.81	0.93	0.30	0.77	0.77
Avail Cap(c_a), veh/h	526	937	777	3450	808	848
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	27.9	24.1	6.2	26.0	26.0
Incr Delay (d2), s/veh	0.0	2.9	7.6	0.1	3.4	3.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.7	7.3	1.4	4.5	4.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	30.8	31.7	6.3	29.4	29.2
LnGrp LOS	A	C	C	A	C	C
Approach Vol, veh/h	463			1021	591	
Approach Delay, s/veh	30.8			17.2	29.3	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		52.8		21.1	28.6	24.2
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		8.4		13.9	23.4	14.9
Green Ext Time (p_c), s		3.8		1.4	0.5	3.1

Intersection Summary	
HCM 6th Ctrl Delay	23.7
HCM 6th LOS	C

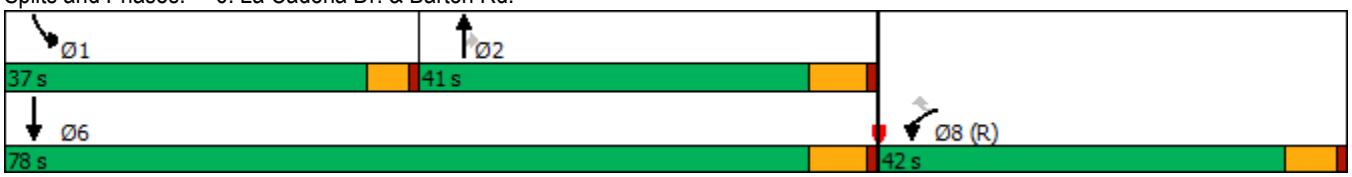
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	242	329	671	311	465	1160
Future Volume (vph)	242	329	671	311	465	1160
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	42.0	42.0	41.0	41.0	37.0	78.0
Total Split (%)	35.0%	35.0%	34.2%	34.2%	30.8%	65.0%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	39.8	39.8	31.2	31.2	32.4	68.2
Actuated g/C Ratio	0.33	0.33	0.26	0.26	0.27	0.57
v/c Ratio	0.45	0.56	0.80	0.52	1.07	0.64
Control Delay	31.0	15.8	49.0	6.6	105.2	19.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	15.8	49.0	6.6	105.2	19.0
LOS	C	B	D	A	F	B
Approach Delay	22.2		35.5			43.6
Approach LOS	C		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.07	
Intersection Signal Delay: 37.3	Intersection LOS: D
Intersection Capacity Utilization 74.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	242	329	671	311	465	1160
Future Volume (veh/h)	242	329	671	311	465	1160
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	257	0	714	294	495	1234
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	517		839	374	463	1894
Arrive On Green	0.30	0.00	0.25	0.25	0.27	0.55
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	257	0	714	294	495	1234
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	14.8	0.0	23.9	21.6	32.4	30.2
Cycle Q Clear(g_c), s	14.8	0.0	23.9	21.6	32.4	30.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	517		839	374	463	1894
V/C Ratio(X)	0.50		0.85	0.79	1.07	0.65
Avail Cap(c_a), veh/h	517		992	442	463	2046
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.61	0.61	0.66	0.66
Uniform Delay (d), s/veh	34.4	0.0	43.2	42.3	43.8	18.7
Incr Delay (d2), s/veh	3.4	0.0	3.9	4.8	54.1	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	0.0	10.1	8.3	20.0	10.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.8	0.0	47.1	47.2	97.9	19.1
LnGrp LOS	D		D	D	F	B
Approach Vol, veh/h	257	A	1008			1729
Approach Delay, s/veh	37.8		47.1			41.7
Approach LOS	D		D			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	37.0	35.6				72.6	42.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	32.4	34.8				71.8	36.2
Max Q Clear Time (g_c+I1), s	34.4	25.9				32.2	16.8
Green Ext Time (p_c), s	0.0	3.6				10.2	0.3

Intersection Summary	
HCM 6th Ctrl Delay	43.2
HCM 6th LOS	D

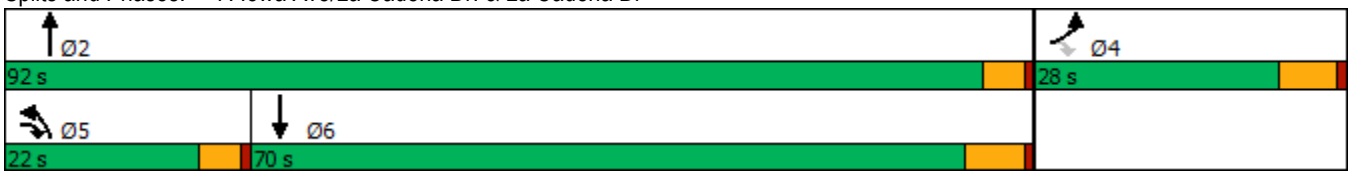
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	372	194	208	649	595	997
Future Volume (vph)	372	194	208	649	595	997
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	22.2	44.8	16.4	59.4	36.7	92.5
Actuated g/C Ratio	0.24	0.48	0.18	0.64	0.40	1.00
v/c Ratio	0.99	0.27	0.75	0.58	0.86	0.40
Control Delay	83.2	17.7	55.8	11.3	38.1	0.5
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	83.2	17.7	55.8	11.8	38.1	0.5
LOS	F	B	E	B	D	A
Approach Delay	60.7			22.4	14.5	
Approach LOS	E			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 92.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 25.5	Intersection LOS: C
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	372	194	208	649	595	997
Future Volume (veh/h)	372	194	208	649	595	997
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	384	174	214	669	613	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	415	625	248	1071	696	
Arrive On Green	0.26	0.26	0.15	0.60	0.39	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	384	174	214	669	613	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	19.3	6.4	10.8	20.0	26.5	0.0
Cycle Q Clear(g_c), s	19.3	6.4	10.8	20.0	26.5	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	415	625	248	1071	696	
V/C Ratio(X)	0.92	0.28	0.86	0.62	0.88	
Avail Cap(c_a), veh/h	422	632	337	1882	1374	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.3	16.4	34.5	10.9	23.8	0.0
Incr Delay (d2), s/veh	25.9	0.2	12.4	0.6	3.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	6.5	4.8	6.2	10.4	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	56.2	16.7	47.0	11.5	27.7	0.0
LnGrp LOS	E	B	D	B	C	
Approach Vol, veh/h	558			883	613	A
Approach Delay, s/veh	43.9			20.1	27.7	
Approach LOS	D			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		55.9		27.6	17.4	38.5
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		22.0		21.3	12.8	28.5
Green Ext Time (p_c), s		4.5		0.1	0.1	3.9

Intersection Summary		
HCM 6th Ctrl Delay		28.8
HCM 6th LOS		C

Notes

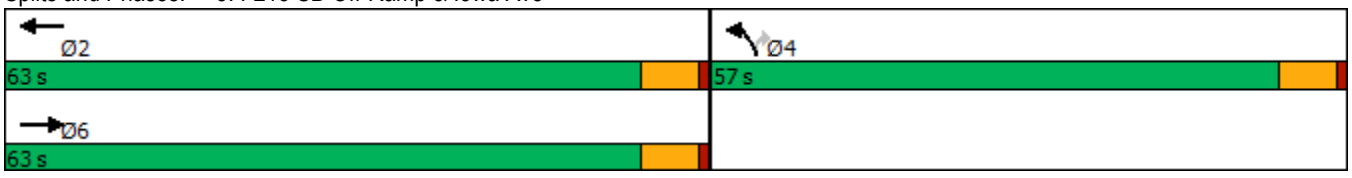
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	736	767	116	678
Future Volume (vph)	736	767	116	678
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	52.5	52.5	48.4	48.4
Actuated g/C Ratio	0.46	0.46	0.43	0.43
v/c Ratio	0.90	0.94	0.16	0.96
Control Delay	43.2	48.7	21.7	52.5
Queue Delay	50.6	1.0	0.0	0.0
Total Delay	93.8	49.6	21.7	52.5
LOS	F	D	C	D
Approach Delay	93.8	49.6	48.0	
Approach LOS	F	D	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 63.2	Intersection LOS: E
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	736	0	0	767	116	678
Future Volume (veh/h)	736	0	0	767	116	678
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	791	0	0	825	126	587
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	902	0	0	902	715	636
Arrive On Green	0.47	0.00	0.00	0.47	0.39	0.39
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	791	0	0	825	126	587
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	35.7	0.0	0.0	38.4	4.3	33.1
Cycle Q Clear(g_c), s	35.7	0.0	0.0	38.4	4.3	33.1
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	902	0	0	902	715	636
V/C Ratio(X)	0.88	0.00	0.00	0.91	0.18	0.92
Avail Cap(c_a), veh/h	1132	0	0	1132	964	858
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.5	0.0	0.0	23.2	18.8	27.5
Incr Delay (d2), s/veh	6.7	0.0	0.0	9.8	0.1	12.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.4	0.0	0.0	17.2	1.8	14.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.2	0.0	0.0	33.0	18.9	40.0
LnGrp LOS	C	A	A	C	B	D
Approach Vol, veh/h	791			825	713	
Approach Delay, s/veh	29.2			33.0	36.3	
Approach LOS	C			C	D	

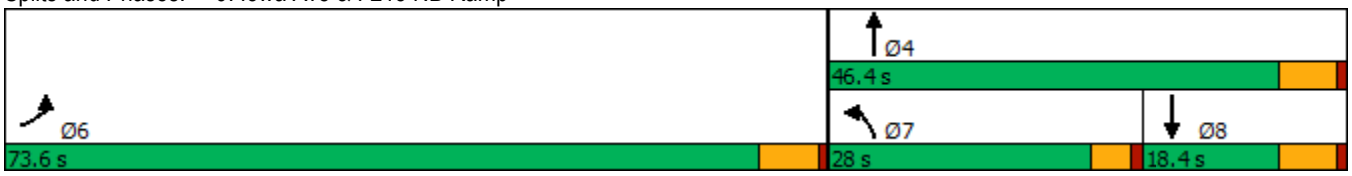
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		51.5		43.9		51.5
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		40.4		35.1		37.7
Green Ext Time (p_c), s		4.9		2.6		4.9

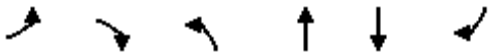
Intersection Summary		
HCM 6th Ctrl Delay		32.7
HCM 6th LOS		C

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	187	437	745	88
Future Volume (vph)	187	437	745	88
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	40.2	12.2
Actuated g/C Ratio	0.56	0.20	0.34	0.10
v/c Ratio	1.34	1.34	1.26	1.58
Control Delay	180.8	208.9	164.1	305.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	180.8	208.9	164.1	305.2
LOS	F	F	F	F
Approach Delay	180.8		180.7	305.2
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.58	
Intersection Signal Delay: 198.0	Intersection LOS: F
Intersection Capacity Utilization 149.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	187	1228	437	745	88	330
Future Volume (veh/h)	187	1228	437	745	88	330
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	1046	470	801	95	296
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	148	772	353	636	41	129
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	264	1374	1810	1900	406	1266
Grp Volume(v), veh/h	1248	0	470	801	0	391
Grp Sat Flow(s),veh/h/ln	1639	0	1810	1900	0	1672
Q Serve(g_s), s	67.4	0.0	23.4	40.2	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.4	40.2	0.0	12.2
Prop In Lane	0.16	0.84	1.00			0.76
Lane Grp Cap(c), veh/h	921	0	353	637	0	170
V/C Ratio(X)	1.36	0.00	1.33	1.26	0.00	2.30
Avail Cap(c_a), veh/h	921	0	353	637	0	170
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.3	39.9	0.0	53.9
Incr Delay (d2), s/veh	167.0	0.0	167.6	128.7	0.0	603.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	65.5	0.0	26.9	41.2	0.0	33.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	193.3	0.0	215.9	168.6	0.0	657.1
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1248			1271	391	
Approach Delay, s/veh	193.3			186.1	657.1	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	42.2	69.4	25.4	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	252.5
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	4	736	36	26	539	3	18	0	43	8	0	14
Future Vol, veh/h	4	736	36	26	539	3	18	0	43	8	0	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	809	40	29	592	3	20	0	47	9	0	15

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	592	0	0	849	0	0	1495	-	829	1511	1507	592
Stage 1	-	-	-	-	-	-	837	-	-	650	650	-
Stage 2	-	-	-	-	-	-	658	-	-	861	857	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	*967	-	-	798	-	-	61	0	374	58	72	*645
Stage 1	-	-	-	-	-	-	364	0	-	564	500	-
Stage 2	-	-	-	-	-	-	554	0	-	353	377	-
Platoon blocked, %	1	-	-		-	-	1			1	1	1
Mov Cap-1 Maneuver	*967	-	-	798	-	-	57	-	374	49	68	*645
Mov Cap-2 Maneuver	-	-	-	-	-	-	57	-	-	49	68	-
Stage 1	-	-	-	-	-	-	361	-	-	559	482	-
Stage 2	-	-	-	-	-	-	521	-	-	306	374	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.4	40.4	42.8
HCM LOS			E	E

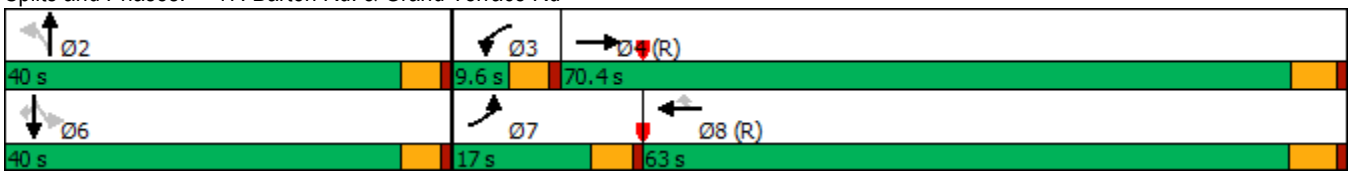
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	57	374	* 967	-	-	798	-	-	119
HCM Lane V/C Ratio	0.347	0.126	0.005	-	-	0.036	-	-	0.203
HCM Control Delay (s)	98.6	16	8.7	0	-	9.7	-	-	42.8
HCM Lane LOS	F	C	A	A	-	A	-	-	E
HCM 95th %tile Q(veh)	1.3	0.4	0	-	-	0.1	-	-	0.7

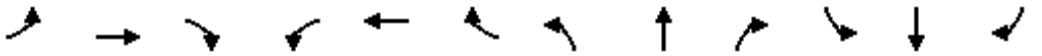
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	25	844	469	349	106	2	116		
Future Volume (vph)	25	844	469	349	106	2	116		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.6	94.3	86.7	86.7		16.0	16.0		
Actuated g/C Ratio	0.06	0.79	0.72	0.72		0.13	0.13		
v/c Ratio	0.29	0.33	0.20	0.30		0.66	0.39		
Control Delay	81.0	1.7	6.9	1.6		66.0	11.4		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	81.0	1.7	6.9	1.6		66.0	11.4		
LOS	F	A	A	A		E	B		
Approach Delay		4.0	4.7			37.8			
Approach LOS		A	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 8.2	Intersection LOS: A
Intersection Capacity Utilization 41.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	844	0	0	469	349	0	0	0	106	2	116
Future Volume (veh/h)	25	844	0	0	469	349	0	0	0	106	2	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	26	888	0	0	494	283	0	0	0	112	2	99
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	39	2788	0	1	2574	1148	0	183	0	204	3	155
Arrive On Green	0.02	0.82	0.00	0.00	0.75	0.75	0.00	0.00	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1420	25	1525
Grp Volume(v), veh/h	26	888	0	0	494	283	0	0	0	114	0	99
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1445	0	1525
Q Serve(g_s), s	1.9	7.8	0.0	0.0	5.0	6.8	0.0	0.0	0.0	9.2	0.0	7.5
Cycle Q Clear(g_c), s	1.9	7.8	0.0	0.0	5.0	6.8	0.0	0.0	0.0	9.2	0.0	7.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	39	2788	0	1	2574	1148	0	183	0	206	0	155
V/C Ratio(X)	0.66	0.32	0.00	0.00	0.19	0.25	0.00	0.00	0.00	0.55	0.00	0.64
Avail Cap(c_a), veh/h	167	2788	0	67	2574	1148	0	531	0	486	0	450
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	2.8	0.0	0.0	4.3	4.5	0.0	0.0	0.0	52.6	0.0	51.8
Incr Delay (d2), s/veh	7.0	0.3	0.0	0.0	0.2	0.5	0.0	0.0	0.0	2.3	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.9	0.0	0.0	1.5	1.9	0.0	0.0	0.0	3.5	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	3.1	0.0	0.0	4.5	5.0	0.0	0.0	0.0	54.9	0.0	56.2
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	E
Approach Vol, veh/h		914			777			0			213	
Approach Delay, s/veh		4.8			4.7			0.0			55.5	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.8	0.0	103.2		16.8	7.5	95.7				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	9.8		11.2	3.9	8.8				
Green Ext Time (p_c), s		0.0	0.0	7.5		0.9	0.0	4.7				

Intersection Summary												
HCM 6th Ctrl Delay			10.4									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

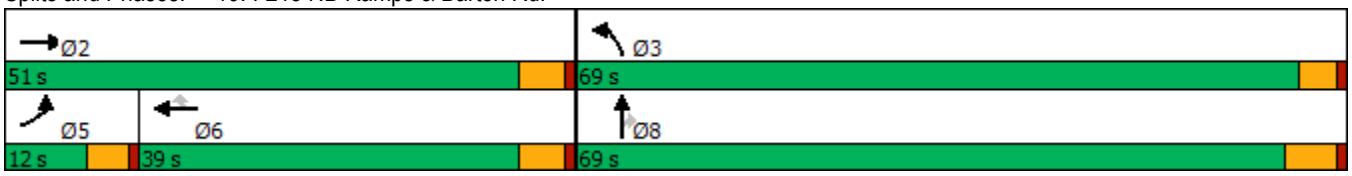
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1033	1214	44	581
Demand Flow Rate, veh/h	1033	1214	44	581
Vehicles Circulating, veh/h	396	207	1354	686
Vehicles Exiting, veh/h	871	1191	75	735
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.4	9.2	9.4	10.6
Approach LOS	B	A	A	B

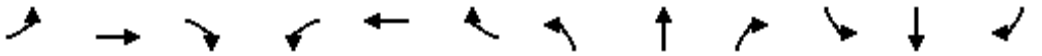
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.616	0.384
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	486	547	571	643	44	358	223
Cap Entry Lane, veh/h	938	1014	1116	1191	449	718	793
Entry HV Adj Factor	0.999	1.001	0.999	1.001	1.000	1.000	1.000
Flow Entry, veh/h	486	547	571	643	44	358	223
Cap Entry, veh/h	937	1015	1115	1192	449	718	793
V/C Ratio	0.518	0.539	0.512	0.540	0.098	0.498	0.281
Control Delay, s/veh	10.5	10.3	9.1	9.2	9.4	12.4	7.7
LOS	B	B	A	A	A	B	A
95th %tile Queue, veh	3	3	3	3	0	3	1

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	272	794	1003	602	0	407	
Future Volume (vph)	272	794	1003	602	0	407	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	12.0	51.0	39.0	39.0	69.0	69.0	69.0
Total Split (%)	10.0%	42.5%	32.5%	32.5%	57.5%	57.5%	58%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	7.4	45.9	33.9	33.9	63.2	63.2	
Actuated g/C Ratio	0.06	0.38	0.28	0.28	0.53	0.53	
v/c Ratio	2.69	0.63	1.08	0.98	63.00	0.51	
Control Delay	808.9	32.7	93.9	51.3	28787.3	18.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	808.9	32.7	93.9	51.3	28787.3	18.0	
LOS	F	C	F	D	F	B	
Approach Delay		230.7	77.9		6344.2		
Approach LOS		F	E		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 63.00	
Intersection Signal Delay: 1152.2	Intersection LOS: F
Intersection Capacity Utilization 74.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	272	794	0	0	1003	602	115	0	407	0	0	0
Future Volume (veh/h)	272	794	0	0	1003	602	115	0	407	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	299	873	0	0	1102	514	126	0	354			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	195	2151	0	0	1521	659	479	0	426			
Arrive On Green	0.11	0.60	0.00	0.00	0.42	0.42	0.26	0.00	0.26			
Sat Flow, veh/h	1810	3705	0	0	3705	1565	1810	0	1610			
Grp Volume(v), veh/h	299	873	0	0	1102	514	126	0	354			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1565	1810	0	1610			
Q Serve(g_s), s	7.4	8.9	0.0	0.0	17.5	19.5	3.8	0.0	14.2			
Cycle Q Clear(g_c), s	7.4	8.9	0.0	0.0	17.5	19.5	3.8	0.0	14.2			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	195	2151	0	0	1521	659	479	0	426			
V/C Ratio(X)	1.54	0.41	0.00	0.00	0.72	0.78	0.26	0.00	0.83			
Avail Cap(c_a), veh/h	195	2410	0	0	1780	772	1698	0	1511			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.7	7.4	0.0	0.0	16.6	17.1	20.0	0.0	23.8			
Incr Delay (d2), s/veh	264.9	0.1	0.0	0.0	1.2	4.4	0.3	0.0	4.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	17.4	2.7	0.0	0.0	6.6	6.9	1.5	0.0	5.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	295.6	7.5	0.0	0.0	17.8	21.5	20.3	0.0	28.1			
LnGrp LOS	F	A	A	A	B	C	C	A	C			
Approach Vol, veh/h		1172			1616			480				
Approach Delay, s/veh		81.0			19.0			26.0				
Approach LOS		F			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		46.1			12.0	34.1		22.7				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		45.9			7.4	33.9		64.5				
Max Q Clear Time (g_c+I1), s		10.9			9.4	21.5		16.2				
Green Ext Time (p_c), s		7.0			0.0	7.5		1.9				
Intersection Summary												
HCM 6th Ctrl Delay			42.3									
HCM 6th LOS			D									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	431	128	884	709
Future Volume (vph)	1	431	128	884	709
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	31.3	31.3	12.9	77.8	60.4
Actuated g/C Ratio	0.26	0.26	0.11	0.65	0.50
v/c Ratio	0.32	0.86	0.68	0.39	0.52
Control Delay	35.5	45.4	64.6	13.4	23.0
Queue Delay	0.3	0.0	0.0	0.6	0.0
Total Delay	35.9	45.4	64.6	14.0	23.1
LOS	D	D	E	B	C
Approach Delay	42.9			20.4	23.1
Approach LOS	D			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 26.6	Intersection LOS: C
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	148	1	431	128	884	0	0	709	202
Future Volume (veh/h)	0	0	0	148	1	431	128	884	0	0	709	202
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				151	1	335	131	902	0	0	723	156
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				419	3	375	158	2441	0	0	1628	351
Arrive On Green				0.23	0.23	0.23	0.09	0.68	0.00	0.00	0.55	0.55
Sat Flow, veh/h				1798	12	1610	1810	3705	0	0	3048	637
Grp Volume(v), veh/h				152	0	335	131	902	0	0	442	437
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1785
Q Serve(g_s), s				8.4	0.0	24.2	8.5	12.9	0.0	0.0	17.5	17.5
Cycle Q Clear(g_c), s				8.4	0.0	24.2	8.5	12.9	0.0	0.0	17.5	17.5
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				422	0	375	158	2441	0	0	995	984
V/C Ratio(X)				0.36	0.00	0.89	0.83	0.37	0.00	0.00	0.44	0.44
Avail Cap(c_a), veh/h				652	0	580	264	2441	0	0	995	984
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.55	0.55	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				38.5	0.0	44.6	53.9	8.4	0.0	0.0	16.0	16.0
Incr Delay (d2), s/veh				0.5	0.0	11.0	2.3	0.2	0.0	0.0	1.4	1.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.7	0.0	10.5	4.0	4.7	0.0	0.0	7.3	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				39.1	0.0	55.6	56.2	8.6	0.0	0.0	17.4	17.5
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					487			1033			879	
Approach Delay, s/veh					50.4			14.7			17.4	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		86.2			15.0	71.2		33.8				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		65.9			17.5	43.9		43.2				
Max Q Clear Time (g_c+I1), s		14.9			10.5	19.5		26.2				
Green Ext Time (p_c), s		7.6			0.1	5.9		1.8				

Intersection Summary												
HCM 6th Ctrl Delay			22.9									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	6	353	598	363	495
Future Volume (vph)	6	353	598	363	495
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	41.0	41.0	43.0	36.0	79.0
Total Split (%)	34.2%	34.2%	35.8%	30.0%	65.8%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	32.7	32.7	43.5	28.3	76.4
Actuated g/C Ratio	0.27	0.27	0.36	0.24	0.64
v/c Ratio	0.89	0.59	0.77	0.90	0.23
Control Delay	63.3	14.5	36.1	87.4	8.5
Queue Delay	0.0	0.0	0.0	37.2	0.2
Total Delay	63.3	14.5	36.1	124.6	8.8
LOS	E	B	D	F	A
Approach Delay	41.0		36.1		57.8
Approach LOS	D		D		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 44.8	Intersection LOS: D
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	413	6	353	0	0	0	0	598	351	363	495	0
Future Volume (veh/h)	413	6	353	0	0	0	0	598	351	363	495	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	435	6	283				0	629	280	382	521	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	476	7	429				0	929	413	402	2321	0
Arrive On Green	0.27	0.27	0.27				0.00	0.38	0.38	0.44	1.00	0.00
Sat Flow, veh/h	1786	25	1610				0	2524	1081	1810	3705	0
Grp Volume(v), veh/h	441	0	283				0	467	442	382	521	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1705	1810	1805	0
Q Serve(g_s), s	28.3	0.0	18.8				0.0	25.9	25.9	24.4	0.0	0.0
Cycle Q Clear(g_c), s	28.3	0.0	18.8				0.0	25.9	25.9	24.4	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.63	1.00		0.00
Lane Grp Cap(c), veh/h	482	0	429				0	690	652	402	2321	0
V/C Ratio(X)	0.91	0.00	0.66				0.00	0.68	0.68	0.95	0.22	0.00
Avail Cap(c_a), veh/h	531	0	472				0	690	652	473	2321	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	42.7	0.0	39.2				0.0	30.9	30.9	32.7	0.0	0.0
Incr Delay (d2), s/veh	19.5	0.0	3.0				0.0	5.3	5.6	22.8	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.8	0.0	7.5				0.0	12.0	11.4	10.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	42.2				0.0	36.2	36.5	55.5	0.2	0.0
LnGrp LOS	E	A	D				A	D	D	E	A	A
Approach Vol, veh/h		724						909			903	
Approach Delay, s/veh		54.3						36.3			23.6	
Approach LOS		D						D			C	

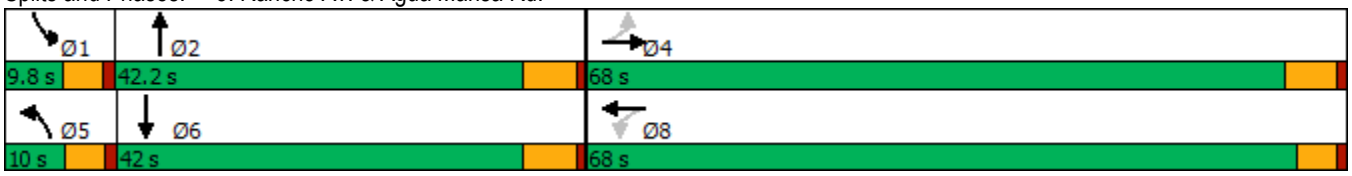
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	31.3	51.0		37.8		82.2
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	31.4	37.9		35.2		73.9
Max Q Clear Time (g_c+I1), s	26.4	27.9		30.3		2.0
Green Ext Time (p_c), s	0.3	4.1		1.6		3.8

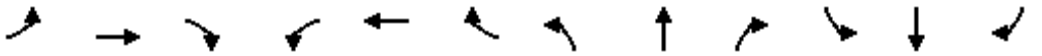
Intersection Summary		
HCM 6th Ctrl Delay		36.9
HCM 6th LOS		D

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	494	94	27	100	494	13	779
Future Volume (vph)	494	94	27	100	494	13	779
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		62.2	63.4	5.4	42.3	5.1	36.2
Actuated g/C Ratio		0.52	0.53	0.04	0.35	0.04	0.30
v/c Ratio		1.16	0.04	1.47	0.44	0.21	1.02
Control Delay		113.3	10.9	312.7	32.1	62.6	72.9
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		113.3	10.9	312.7	32.1	62.6	72.9
LOS		F	B	F	C	E	E
Approach Delay		113.3	10.9		79.0		72.7
Approach LOS		F	B		E		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.47	
Intersection Signal Delay: 86.5	Intersection LOS: F
Intersection Capacity Utilization 101.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	494	94	189	0	27	10	100	494	2	13	779	193
Future Volume (veh/h)	494	94	189	0	27	10	100	494	2	13	779	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	526	100	174	0	29	9	106	526	2	14	829	158
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	537	93	161	0	683	212	73	1156	4	25	864	165
Arrive On Green	0.52	0.52	0.52	0.00	0.52	0.52	0.05	0.33	0.33	0.02	0.30	0.30
Sat Flow, veh/h	940	179	311	0	1318	409	1619	3494	13	1619	2866	546
Grp Volume(v), veh/h	800	0	0	0	0	38	106	257	271	14	495	492
Grp Sat Flow(s),veh/h/ln	1430	0	0	0	0	1726	1619	1710	1798	1619	1710	1702
Q Serve(g_s), s	60.9	0.0	0.0	0.0	0.0	1.3	5.4	14.2	14.2	1.0	34.1	34.1
Cycle Q Clear(g_c), s	62.2	0.0	0.0	0.0	0.0	1.3	5.4	14.2	14.2	1.0	34.1	34.1
Prop In Lane	0.66		0.22	0.00		0.24	1.00		0.01	1.00		0.32
Lane Grp Cap(c), veh/h	791	0	0	0	0	895	73	566	595	25	516	513
V/C Ratio(X)	1.01	0.00	0.00	0.00	0.00	0.04	1.45	0.45	0.45	0.56	0.96	0.96
Avail Cap(c_a), veh/h	791	0	0	0	0	912	73	566	595	70	516	513
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.4	0.0	0.0	0.0	0.0	14.2	57.3	31.6	31.6	58.6	41.2	41.2
Incr Delay (d2), s/veh	34.7	0.0	0.0	0.0	0.0	0.0	265.4	0.6	0.5	7.0	29.6	29.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.8	0.0	0.0	0.0	0.0	0.5	7.5	5.8	6.1	0.5	17.9	17.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	0.0	0.0	0.0	0.0	14.2	322.7	32.2	32.2	65.6	70.7	70.8
LnGrp LOS	F	A	A	A	A	B	F	C	C	E	E	E
Approach Vol, veh/h		800			38			634			1001	
Approach Delay, s/veh		66.2			14.2			80.7			70.7	
Approach LOS		E			B			F			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	45.5		68.0	10.0	42.0		68.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	3.0	16.2		64.2	7.4	36.1		3.3				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	0.1		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		71.0
HCM 6th LOS		E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	172	805	948	159
Future Vol, veh/h	0	0	172	805	948	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	183	856	1009	169

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1888	589	1178	0	-	0
Stage 1	1094	-	-	-	-	-
Stage 2	794	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	63	457	600	-	-	-
Stage 1	287	-	-	-	-	-
Stage 2	411	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	26	457	600	-	-	-
Mov Cap-2 Maneuver	26	-	-	-	-	-
Stage 1	120	-	-	-	-	-
Stage 2	411	-	-	-	-	-

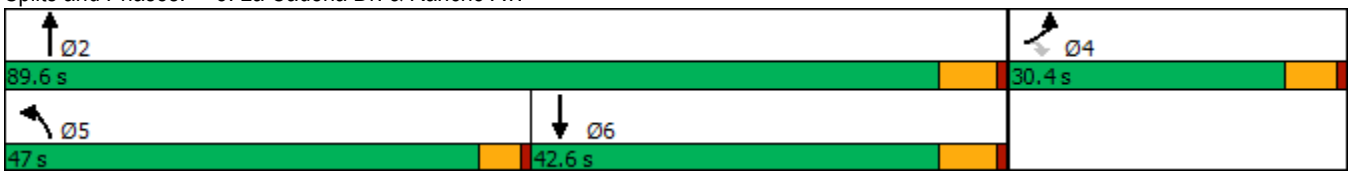
Approach	EB	NB	SB
HCM Control Delay, s	0	4.7	0
HCM LOS	A		

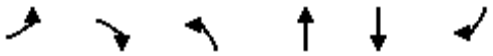
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	600	-	-	-	-
HCM Lane V/C Ratio	0.305	-	-	-	-
HCM Control Delay (s)	13.6	2.8	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	29	680	436	582	721
Future Volume (vph)	29	680	436	582	721
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.6	13.6	34.1	67.9	29.0
Actuated g/C Ratio	0.14	0.14	0.36	0.72	0.31
v/c Ratio	0.75	0.73	0.85	0.27	0.80
Control Delay	17.1	13.8	46.0	5.0	38.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	13.8	46.0	5.0	38.3
LOS	B	B	D	A	D
Approach Delay	15.5			22.6	38.3
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 94	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 25.2	Intersection LOS: C
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	680	436	582	721	11
Future Volume (veh/h)	29	680	436	582	721	11
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	600	449	600	743	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	364	647	474	1991	862	10
Arrive On Green	0.00	0.24	0.33	0.65	0.28	0.28
Sat Flow, veh/h	1543	2746	1457	3159	3195	38
Grp Volume(v), veh/h	0	600	449	600	367	385
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1613
Q Serve(g_s), s	0.0	21.8	30.7	8.7	23.1	23.1
Cycle Q Clear(g_c), s	0.0	21.8	30.7	8.7	23.1	23.1
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	364	647	474	1991	426	446
V/C Ratio(X)	0.00	0.93	0.95	0.30	0.86	0.86
Avail Cap(c_a), veh/h	372	662	605	2515	549	575
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	38.2	33.6	7.9	35.1	35.1
Incr Delay (d2), s/veh	0.0	19.1	19.7	0.1	10.8	10.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	16.7	12.5	2.3	9.3	9.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	57.3	53.3	8.0	45.9	45.5
LnGrp LOS	A	E	D	A	D	D
Approach Vol, veh/h	600			1049	752	
Approach Delay, s/veh	57.3			27.4	45.7	
Approach LOS	E			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		72.2		29.9	37.8	34.4
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		10.7		23.8	32.7	25.1
Green Ext Time (p_c), s		4.0		0.2	0.5	3.1

Intersection Summary		
HCM 6th Ctrl Delay	40.6	
HCM 6th LOS	D	

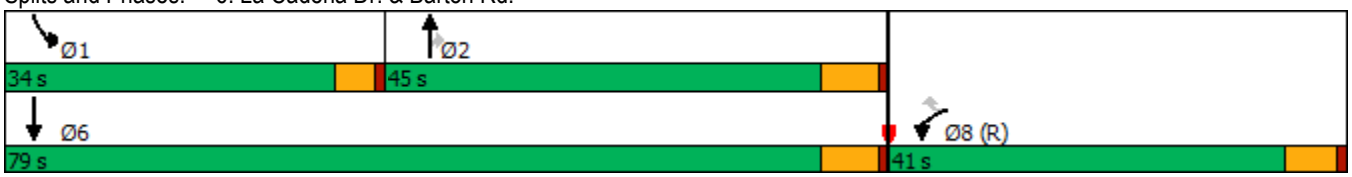
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	392	424	884	270	424	1162
Future Volume (vph)	392	424	884	270	424	1162
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	37.1	37.1	36.9	36.9	29.4	70.9
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.24	0.59
v/c Ratio	0.77	0.77	0.87	0.42	1.05	0.59
Control Delay	57.9	45.8	48.9	5.5	100.6	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.9	45.8	48.9	5.5	100.6	16.7
LOS	E	D	D	A	F	B
Approach Delay	51.6		38.8			39.2
Approach LOS	D		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 41.9	Intersection LOS: D
Intersection Capacity Utilization 87.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	392	424	884	270	424	1162
Future Volume (veh/h)	392	424	884	270	424	1162
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	404	0	911	245	437	1198
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		1021	455	420	1990
Arrive On Green	0.29	0.00	0.30	0.30	0.25	0.58
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	404	0	911	245	437	1198
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	26.1	0.0	30.6	16.1	29.4	27.0
Cycle Q Clear(g_c), s	26.1	0.0	30.6	16.1	29.4	27.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		1021	455	420	1990
V/C Ratio(X)	0.80		0.89	0.54	1.04	0.60
Avail Cap(c_a), veh/h	503		1106	493	420	2075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.25	0.25	0.54	0.54
Uniform Delay (d), s/veh	39.2	0.0	40.2	35.2	45.3	16.1
Incr Delay (d2), s/veh	12.8	0.0	2.5	0.2	43.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	0.0	12.5	5.7	16.9	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	52.0	0.0	42.7	35.4	88.6	16.4
LnGrp LOS	D		D	D	F	B
Approach Vol, veh/h	404	A	1156			1635
Approach Delay, s/veh	52.0		41.2			35.7
Approach LOS	D		D			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	34.0	42.0				76.0	41.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8				72.8	35.2
Max Q Clear Time (g_c+I1), s	31.4	32.6				29.0	28.1
Green Ext Time (p_c), s	0.0	3.3				9.9	0.4

Intersection Summary	
HCM 6th Ctrl Delay	39.7
HCM 6th LOS	D

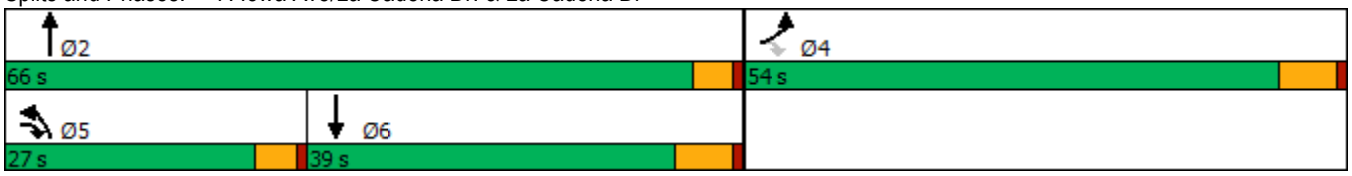
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	566	226	272	808	393	1220
Future Volume (vph)	566	226	272	808	393	1220
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	54.0	27.0	27.0	66.0	39.0	
Total Split (%)	45.0%	22.5%	22.5%	55.0%	32.5%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	43.6	71.5	21.6	56.9	29.0	111.5
Actuated g/C Ratio	0.39	0.64	0.19	0.51	0.26	1.00
v/c Ratio	0.93	0.24	0.91	0.92	0.87	0.50
Control Delay	56.8	9.7	78.3	42.0	60.5	0.7
Queue Delay	0.0	0.0	6.6	49.8	0.0	0.0
Total Delay	56.8	9.7	84.9	91.8	60.5	0.7
LOS	E	A	F	F	E	A
Approach Delay	43.4			90.1	15.3	
Approach LOS	D			F	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 44.8	Intersection LOS: D
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	566	226	272	808	393	1220
Future Volume (veh/h)	566	226	272	808	393	1220
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	590	192	283	842	409	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	626	881	309	897	477	
Arrive On Green	0.39	0.39	0.19	0.50	0.27	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	590	192	283	842	409	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	38.0	6.6	18.5	47.6	23.3	0.0
Cycle Q Clear(g_c), s	38.0	6.6	18.5	47.6	23.3	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	626	881	309	897	477	
V/C Ratio(X)	0.94	0.22	0.92	0.94	0.86	
Avail Cap(c_a), veh/h	717	967	336	1024	547	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	31.9	11.0	42.8	25.5	37.7	0.0
Incr Delay (d2), s/veh	19.5	0.1	26.6	14.5	11.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	16.9	0.0	9.3	21.4	11.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	51.4	11.2	69.4	39.9	49.3	0.0
LnGrp LOS	D	B	E	D	D	
Approach Vol, veh/h	782			1125	409	A
Approach Delay, s/veh	41.5			47.4	49.3	
Approach LOS	D			D	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		60.0		47.9	25.2	34.8
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 61		47.8	22.4	32.8
Max Q Clear Time (g_c+I1), s		49.6		40.0	20.5	25.3
Green Ext Time (p_c), s		4.2		1.8	0.1	1.3

Intersection Summary		
HCM 6th Ctrl Delay		45.7
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	585	931	151	615
Future Volume (vph)	585	931	151	615
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	56.5	56.5	30.5	30.5
Actuated g/C Ratio	0.56	0.56	0.30	0.30
v/c Ratio	0.56	0.90	0.28	0.91
Control Delay	16.4	31.9	31.1	38.0
Queue Delay	1.1	0.3	0.0	0.0
Total Delay	17.5	32.2	31.1	38.0
LOS	B	C	C	D
Approach Delay	17.5	32.2	36.6	
Approach LOS	B	C	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 29.9	Intersection LOS: C
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	585	0	0	931	151	615
Future Volume (veh/h)	585	0	0	931	151	615
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	603	0	0	960	156	516
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1039	0	0	1039	606	540
Arrive On Green	0.55	0.00	0.00	0.55	0.34	0.34
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	603	0	0	960	156	516
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	22.1	0.0	0.0	48.7	6.6	33.0
Cycle Q Clear(g_c), s	22.1	0.0	0.0	48.7	6.6	33.0
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1039	0	0	1039	606	540
V/C Ratio(X)	0.58	0.00	0.00	0.92	0.26	0.96
Avail Cap(c_a), veh/h	1298	0	0	1298	616	548
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	0.0	0.0	21.8	25.4	34.2
Incr Delay (d2), s/veh	0.5	0.0	0.0	9.7	0.2	27.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	0.0	0.0	21.1	2.9	16.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.3	0.0	0.0	31.5	25.6	61.7
LnGrp LOS	B	A	A	C	C	E
Approach Vol, veh/h	603			960	672	
Approach Delay, s/veh	16.3			31.5	53.4	
Approach LOS	B			C	D	

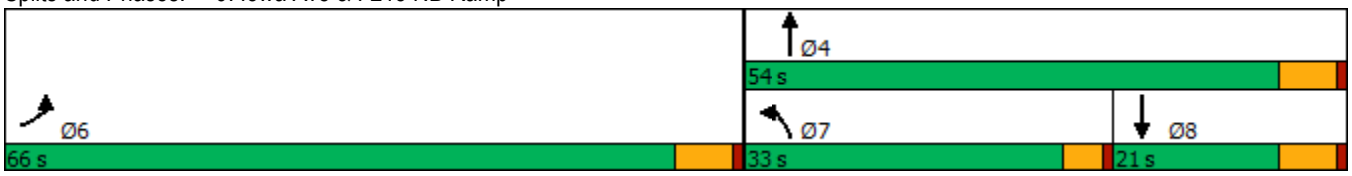
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		63.7		41.4		63.7
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		50.7		35.0		24.1
Green Ext Time (p_c), s		6.8		0.3		3.9

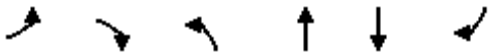
Intersection Summary		
HCM 6th Ctrl Delay		34.0
HCM 6th LOS		C

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	197	496	842	71
Future Volume (vph)	197	496	842	71
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	28.4	47.8	14.8
Actuated g/C Ratio	0.50	0.24	0.40	0.12
v/c Ratio	1.20	1.19	1.14	1.32
Control Delay	124.3	145.3	111.5	184.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	124.3	145.3	111.5	184.4
LOS	F	F	F	F
Approach Delay	124.3		124.0	184.4
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.32	
Intersection Signal Delay: 134.3	Intersection LOS: F
Intersection Capacity Utilization 142.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	197	958	496	842	71	435
Future Volume (veh/h)	197	958	496	842	71	435
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	799	506	859	72	357
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	165	655	428	757	34	170
Arrive On Green	0.50	0.50	0.24	0.40	0.12	0.12
Sat Flow, veh/h	331	1315	1810	1900	277	1375
Grp Volume(v), veh/h	1001	0	506	859	0	429
Grp Sat Flow(s),veh/h/ln	1647	0	1810	1900	0	1652
Q Serve(g_s), s	59.8	0.0	28.4	47.8	0.0	14.8
Cycle Q Clear(g_c), s	59.8	0.0	28.4	47.8	0.0	14.8
Prop In Lane	0.20	0.80	1.00			0.83
Lane Grp Cap(c), veh/h	821	0	428	757	0	204
V/C Ratio(X)	1.22	0.00	1.18	1.13	0.00	2.10
Avail Cap(c_a), veh/h	821	0	428	757	0	204
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	45.8	36.1	0.0	52.6
Incr Delay (d2), s/veh	109.8	0.0	103.3	76.6	0.0	513.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	46.2	0.0	24.9	37.7	0.0	35.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	139.9	0.0	149.1	112.7	0.0	566.1
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1001			1365	429	
Approach Delay, s/veh	139.9			126.2	566.1	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	54.0	66.0	33.0	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	49.8	61.8	30.4	16.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	198.6
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	10	675	10	7	778	12	21	0	15	2	0	17
Future Vol, veh/h	10	675	10	7	778	12	21	0	15	2	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	10	696	10	7	802	12	22	0	15	2	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	802	0	0	706	0	0	1546	-	701	1545	1542	802
Stage 1	-	-	-	-	-	-	721	-	-	816	816	-
Stage 2	-	-	-	-	-	-	825	-	-	729	726	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	830	-	-	902	-	-	94	0	442	94	116	387
Stage 1	-	-	-	-	-	-	422	0	-	374	393	-
Stage 2	-	-	-	-	-	-	370	0	-	417	433	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	830	-	-	902	-	-	88	-	442	89	113	387
Mov Cap-2 Maneuver	-	-	-	-	-	-	88	-	-	89	113	-
Stage 1	-	-	-	-	-	-	414	-	-	367	390	-
Stage 2	-	-	-	-	-	-	351	-	-	394	424	-

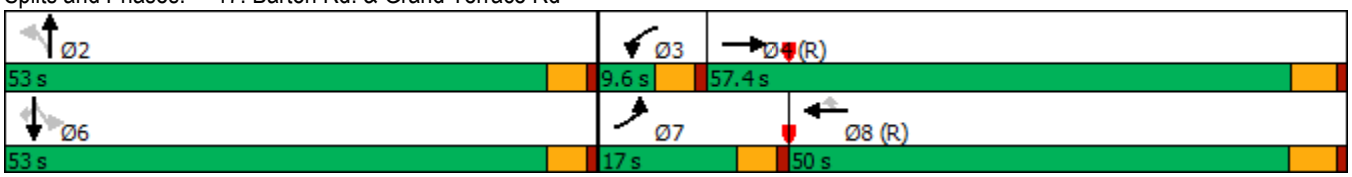
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	39.9	18.5
HCM LOS			E	C

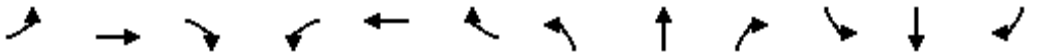
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	88	442	830	-	-	902	-	-	286
HCM Lane V/C Ratio	0.246	0.035	0.012	-	-	0.008	-	-	0.068
HCM Control Delay (s)	58.8	13.4	9.4	0	-	9	-	-	18.5
HCM Lane LOS	F	B	A	A	-	A	-	-	C
HCM 95th %tile Q(veh)	0.9	0.1	0	-	-	0	-	-	0.2

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	34	693	729	263	206	3	161		
Future Volume (vph)	34	693	729	263	206	3	161		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.4	83.2	75.0	75.0		27.1	27.1		
Actuated g/C Ratio	0.06	0.69	0.62	0.62		0.23	0.23		
v/c Ratio	0.37	0.32	0.37	0.28		0.77	0.36		
Control Delay	41.1	15.1	14.0	6.9		59.5	6.8		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	41.1	15.1	14.0	6.9		59.5	6.8		
LOS	D	B	B	A		E	A		
Approach Delay		16.3	12.1			36.6			
Approach LOS		B	B			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 17.9	Intersection LOS: B
Intersection Capacity Utilization 49.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	693	0	0	729	263	0	0	0	206	3	161
Future Volume (veh/h)	34	693	0	0	729	263	0	0	0	206	3	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	37	753	0	0	792	226	0	0	0	224	3	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	48	2502	0	1	2270	1013	0	333	0	323	4	282
Arrive On Green	0.03	0.73	0.00	0.00	0.66	0.66	0.00	0.00	0.00	0.18	0.18	0.18
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1425	19	1525
Grp Volume(v), veh/h	37	753	0	0	792	226	0	0	0	227	0	148
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1444	0	1525
Q Serve(g_s), s	2.7	9.1	0.0	0.0	12.2	7.0	0.0	0.0	0.0	18.2	0.0	10.5
Cycle Q Clear(g_c), s	2.7	9.1	0.0	0.0	12.2	7.0	0.0	0.0	0.0	18.2	0.0	10.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	48	2502	0	1	2270	1013	0	333	0	327	0	282
V/C Ratio(X)	0.77	0.30	0.00	0.00	0.35	0.22	0.00	0.00	0.00	0.69	0.00	0.52
Avail Cap(c_a), veh/h	167	2502	0	67	2270	1013	0	726	0	642	0	615
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	5.5	0.0	0.0	8.8	8.0	0.0	0.0	0.0	47.3	0.0	44.1
Incr Delay (d2), s/veh	9.5	0.3	0.0	0.0	0.4	0.5	0.0	0.0	0.0	2.7	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	2.9	0.0	0.0	4.3	2.3	0.0	0.0	0.0	6.8	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.3	5.8	0.0	0.0	9.2	8.5	0.0	0.0	0.0	50.0	0.0	45.7
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	D
Approach Vol, veh/h		790			1018			0			375	
Approach Delay, s/veh		8.7			9.1			0.0			48.3	
Approach LOS		A			A						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.8	0.0	93.2		26.8	8.1	85.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	11.1		20.2	4.7	14.2				
Green Ext Time (p_c), s		0.0	0.0	5.9		1.9	0.0	7.0				

Intersection Summary		
HCM 6th Ctrl Delay		15.7
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

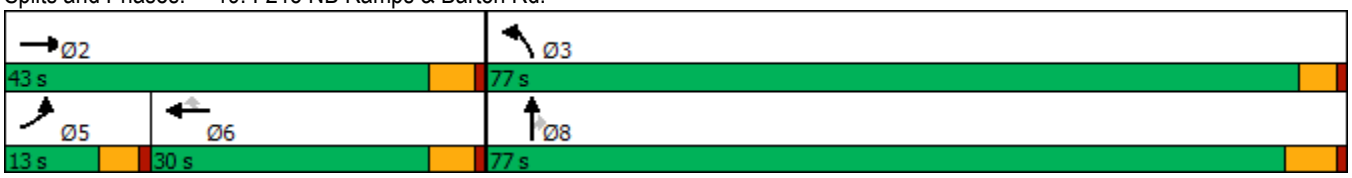
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	946	1136	69	713
Demand Flow Rate, veh/h	946	1136	69	713
Vehicles Circulating, veh/h	491	155	1374	764
Vehicles Exiting, veh/h	986	1288	63	527
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.0	8.0	10.4	14.9
Approach LOS	B	A	B	B

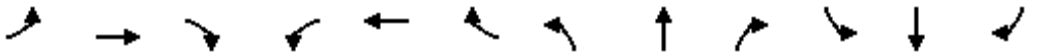
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.614	0.386
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	445	501	534	602	69	438	275
Cap Entry Lane, veh/h	859	935	1170	1245	442	668	742
Entry HV Adj Factor	0.999	1.001	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	445	501	534	602	69	438	275
Cap Entry, veh/h	859	936	1170	1245	442	668	742
V/C Ratio	0.518	0.536	0.456	0.484	0.156	0.655	0.371
Control Delay, s/veh	11.2	10.9	7.9	8.0	10.4	18.3	9.5
LOS	B	B	A	A	B	C	A
95th %tile Queue, veh	3	3	2	3	1	5	2

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	240	983	925	408	0	543	
Future Volume (vph)	240	983	925	408	0	543	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	13.0	43.0	30.0	30.0	77.0	77.0	77.0
Total Split (%)	10.8%	35.8%	25.0%	25.0%	64.2%	64.2%	64%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	8.4	37.9	24.9	24.9	71.2	71.2	
Actuated g/C Ratio	0.07	0.32	0.21	0.21	0.59	0.59	
v/c Ratio	1.96	0.89	1.27	0.85	306.00	0.57	
Control Delay	489.1	49.9	172.9	38.1	138147.3	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	489.1	49.9	172.9	38.1	138147.3	15.9	
LOS	F	D	F	D	F	B	
Approach Delay		136.0	131.6		72145.9		
Approach LOS		F	F		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 306.00	
Intersection Signal Delay: 22303.0	Intersection LOS: F
Intersection Capacity Utilization 69.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	983	0	0	925	408	153	0	543	0	0	0
Future Volume (veh/h)	240	983	0	0	925	408	153	0	543	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	247	1013	0	0	954	343	612	0	447			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	194	1693	0	0	1095	473	739	0	658			
Arrive On Green	0.11	0.47	0.00	0.00	0.30	0.30	0.41	0.00	0.41			
Sat Flow, veh/h	1810	3705	0	0	3705	1560	1810	0	1610			
Grp Volume(v), veh/h	247	1013	0	0	954	343	612	0	447			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1560	1810	0	1610			
Q Serve(g_s), s	8.4	16.3	0.0	0.0	19.6	15.4	23.7	0.0	17.8			
Cycle Q Clear(g_c), s	8.4	16.3	0.0	0.0	19.6	15.4	23.7	0.0	17.8			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	194	1693	0	0	1095	473	739	0	658			
V/C Ratio(X)	1.28	0.60	0.00	0.00	0.87	0.72	0.83	0.00	0.68			
Avail Cap(c_a), veh/h	194	1743	0	0	1145	495	1671	0	1487			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	35.0	15.4	0.0	0.0	25.9	24.4	20.7	0.0	19.0			
Incr Delay (d2), s/veh	157.8	0.5	0.0	0.0	7.3	5.0	2.4	0.0	1.2			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	12.0	6.1	0.0	0.0	8.9	6.0	9.2	0.0	6.0			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	192.8	15.9	0.0	0.0	33.2	29.4	23.2	0.0	20.2			
LnGrp LOS	F	B	A	A	C	C	C	A	C			
Approach Vol, veh/h		1260			1297			1059				
Approach Delay, s/veh		50.6			32.2			21.9				
Approach LOS		D			C			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		41.9			13.0	28.9		36.6				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		37.9			8.4	24.9		72.5				
Max Q Clear Time (g_c+I1), s		18.3			10.4	21.6		25.7				
Green Ext Time (p_c), s		7.1			0.0	2.2		6.4				
Intersection Summary												
HCM 6th Ctrl Delay			35.6									
HCM 6th LOS			D									

APPENDIX 6.2:

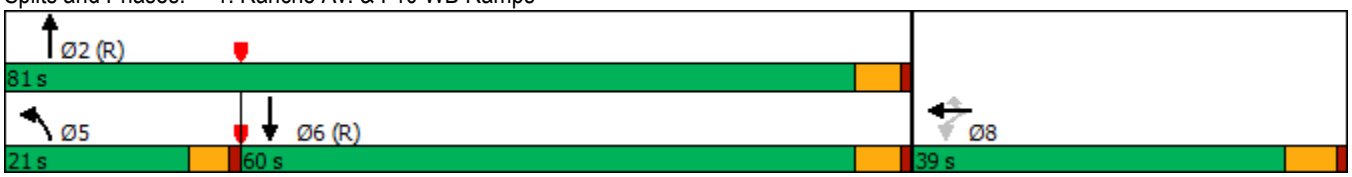
OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	364	108	393	726
Future Volume (vph)	0	364	108	393	726
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	25.2	25.2	12.0	83.9	67.4
Actuated g/C Ratio	0.21	0.21	0.10	0.70	0.56
v/c Ratio	0.76	0.60	0.64	0.17	0.57
Control Delay	56.9	7.7	88.6	1.3	18.7
Queue Delay	0.8	0.0	0.0	0.0	0.0
Total Delay	57.7	7.7	88.6	1.3	18.7
LOS	E	A	F	A	B
Approach Delay	28.9			20.1	18.7
Approach LOS	C			C	B

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 22.0	Intersection LOS: C
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	267	0	364	108	393	0	0	726	325
Future Volume (veh/h)	0	0	0	267	0	364	108	393	0	0	726	325
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				287	0	283	116	423	0	0	781	268
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				367	0	327	142	2550	0	0	1557	534
Arrive On Green				0.20	0.00	0.20	0.08	0.71	0.00	0.00	0.59	0.59
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2732	905
Grp Volume(v), veh/h				287	0	283	116	423	0	0	534	515
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1737
Q Serve(g_s), s				18.0	0.0	20.4	7.6	4.7	0.0	0.0	20.7	20.7
Cycle Q Clear(g_c), s				18.0	0.0	20.4	7.6	4.7	0.0	0.0	20.7	20.7
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.52
Lane Grp Cap(c), veh/h				367	0	327	142	2550	0	0	1065	1025
V/C Ratio(X)				0.78	0.00	0.87	0.81	0.17	0.00	0.00	0.50	0.50
Avail Cap(c_a), veh/h				501	0	445	249	2550	0	0	1065	1025
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.93	0.93	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				45.3	0.0	46.3	54.4	5.9	0.0	0.0	14.3	14.3
Incr Delay (d2), s/veh				5.5	0.0	12.7	4.0	0.1	0.0	0.0	1.7	1.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				8.4	0.0	9.0	3.6	1.6	0.0	0.0	8.5	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				50.8	0.0	58.9	58.4	6.0	0.0	0.0	16.0	16.1
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					570			539			1049	
Approach Delay, s/veh					54.8			17.3			16.0	
Approach LOS					D			B			B	

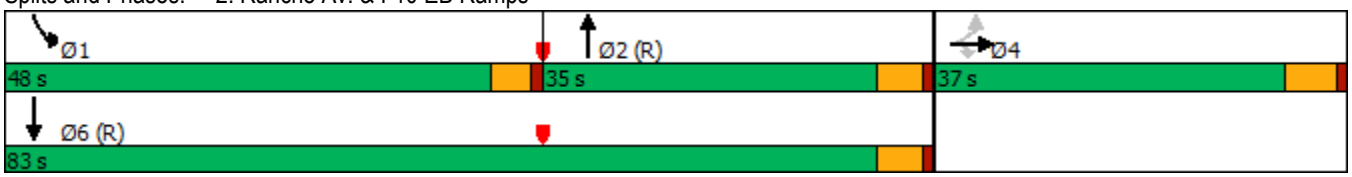
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		89.9			13.9	75.9		30.1				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		6.7			9.6	22.7		22.4				
Green Ext Time (p_c), s		3.0			0.1	8.1		1.9				

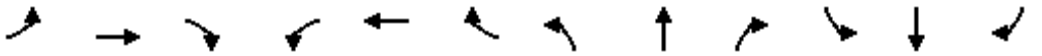
Intersection Summary												
HCM 6th Ctrl Delay			26.6									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	326	364	353	641
Future Volume (vph)	1	326	364	353	641
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	17.7	17.7	55.3	31.5	91.4
Actuated g/C Ratio	0.15	0.15	0.46	0.26	0.76
v/c Ratio	0.59	0.82	0.38	0.85	0.26
Control Delay	55.4	29.9	22.3	54.6	5.4
Queue Delay	0.0	0.0	0.0	2.2	0.5
Total Delay	55.4	29.9	22.3	56.9	5.8
LOS	E	C	C	E	A
Approach Delay	37.5		22.3		24.0
Approach LOS	D		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 26.7	Intersection LOS: C
Intersection Capacity Utilization 64.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	137	1	326	0	0	0	0	364	169	353	641	0
Future Volume (veh/h)	137	1	326	0	0	0	0	364	169	353	641	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	156	1	285				0	414	147	401	728	0
Peak Hour Factor	0.88	0.88	0.88				0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	358	2	320				0	1149	404	422	2564	0
Arrive On Green	0.20	0.20	0.20				0.00	0.44	0.44	0.47	1.00	0.00
Sat Flow, veh/h	1799	12	1610				0	2714	920	1810	3705	0
Grp Volume(v), veh/h	157	0	285				0	284	277	401	728	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1734	1810	1805	0
Q Serve(g_s), s	9.1	0.0	20.7				0.0	12.6	12.8	25.5	0.0	0.0
Cycle Q Clear(g_c), s	9.1	0.0	20.7				0.0	12.6	12.8	25.5	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.53	1.00		0.00
Lane Grp Cap(c), veh/h	360	0	320				0	792	761	422	2564	0
V/C Ratio(X)	0.44	0.00	0.89				0.00	0.36	0.36	0.95	0.28	0.00
Avail Cap(c_a), veh/h	471	0	419				0	792	761	654	2564	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.79	0.79	0.00
Uniform Delay (d), s/veh	42.2	0.0	46.8				0.0	22.4	22.5	31.3	0.0	0.0
Incr Delay (d2), s/veh	0.8	0.0	16.9				0.0	1.3	1.3	11.9	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	9.5				0.0	5.5	5.4	9.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.0	0.0	63.7				0.0	23.7	23.9	43.3	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		442						561			1129	
Approach Delay, s/veh		56.4						23.8			15.5	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	32.6	57.7		29.7		90.3
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9
Max Q Clear Time (g_c+I1), s	27.5	14.8		22.7		2.0
Green Ext Time (p_c), s	0.5	2.9		1.2		5.8

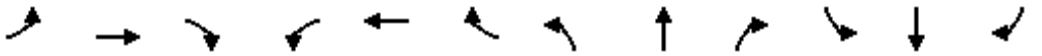
Intersection Summary	
HCM 6th Ctrl Delay	26.2
HCM 6th LOS	C

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	197	18	32	155	399	33	814
Future Volume (vph)	197	18	32	155	399	33	814
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		29.7	30.9	8.9	66.3	6.6	59.6
Actuated g/C Ratio		0.26	0.27	0.08	0.58	0.06	0.52
v/c Ratio		0.93	0.10	1.39	0.23	0.40	0.93
Control Delay		74.5	26.5	258.8	13.0	67.5	31.7
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		74.5	26.5	258.8	13.0	67.5	31.7
LOS		E	C	F	B	E	C
Approach Delay		74.5	26.5		81.1		32.5
Approach LOS		E	C		F		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.5	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.39	
Intersection Signal Delay: 48.8	Intersection LOS: D
Intersection Capacity Utilization 93.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	18	82	0	32	12	155	399	5	33	814	660
Future Volume (veh/h)	197	18	82	0	32	12	155	399	5	33	814	660
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	221	20	82	0	36	11	174	448	5	37	915	569
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	292	22	88	0	347	106	128	1943	22	50	1050	634
Arrive On Green	0.26	0.26	0.26	0.00	0.26	0.26	0.08	0.56	0.56	0.03	0.51	0.51
Sat Flow, veh/h	905	82	336	0	1323	404	1619	3464	39	1619	2049	1238
Grp Volume(v), veh/h	323	0	0	0	0	47	174	221	232	37	759	725
Grp Sat Flow(s),veh/h/ln	1323	0	0	0	0	1727	1619	1710	1793	1619	1710	1577
Q Serve(g_s), s	24.4	0.0	0.0	0.0	0.0	2.3	8.8	7.2	7.2	2.5	43.2	46.1
Cycle Q Clear(g_c), s	26.7	0.0	0.0	0.0	0.0	2.3	8.8	7.2	7.2	2.5	43.2	46.1
Prop In Lane	0.68		0.25	0.00		0.23	1.00		0.02	1.00		0.78
Lane Grp Cap(c), veh/h	402	0	0	0	0	453	128	959	1006	50	876	808
V/C Ratio(X)	0.80	0.00	0.00	0.00	0.00	0.10	1.36	0.23	0.23	0.75	0.87	0.90
Avail Cap(c_a), veh/h	428	0	0	0	0	504	128	1004	1053	108	982	906
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.2	0.0	0.0	0.0	0.0	31.0	51.1	12.3	12.3	53.4	23.7	24.4
Incr Delay (d2), s/veh	10.1	0.0	0.0	0.0	0.0	0.1	202.6	0.1	0.1	8.0	7.6	10.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	0.0	0.0	0.0	1.0	10.7	2.6	2.7	1.1	17.5	17.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.3	0.0	0.0	0.0	0.0	31.1	253.7	12.4	12.4	61.4	31.4	35.2
LnGrp LOS	D	A	A	A	A	C	F	B	B	E	C	D
Approach Vol, veh/h		323			47			627			1521	
Approach Delay, s/veh		51.3			31.1			79.4			33.9	
Approach LOS		D			C			E			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	68.1		35.0	13.4	62.7		35.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	4.5	9.2		28.7	10.8	48.1		4.3				
Green Ext Time (p_c), s	0.0	2.5		0.4	0.0	8.8		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		47.4
HCM 6th LOS		D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	149	529	815	181
Future Vol, veh/h	0	0	149	529	815	181
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	169	601	926	206

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1668	566	1132	0	-	0
Stage 1	1029	-	-	-	-	-
Stage 2	639	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	89	473	625	-	-	-
Stage 1	310	-	-	-	-	-
Stage 2	493	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	53	473	625	-	-	-
Mov Cap-2 Maneuver	53	-	-	-	-	-
Stage 1	184	-	-	-	-	-
Stage 2	493	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	4.2	0
HCM LOS	A		

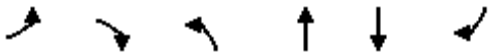
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	625	-	-	-	-
HCM Lane V/C Ratio	0.271	-	-	-	-
HCM Control Delay (s)	12.9	1.7	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.1	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	16	559	431	574	582
Future Volume (vph)	16	559	431	574	582
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.0	12.0	32.3	60.2	23.1
Actuated g/C Ratio	0.14	0.14	0.38	0.71	0.27
v/c Ratio	0.68	0.67	0.79	0.27	0.71
Control Delay	14.7	13.2	36.6	4.7	33.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	13.2	36.6	4.7	33.9
LOS	B	B	D	A	C
Approach Delay	13.9			18.4	33.9
Approach LOS	B			B	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 84.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 21.4	Intersection LOS: C
Intersection Capacity Utilization 77.1%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	559	431	574	582	5
Future Volume (veh/h)	16	559	431	574	582	5
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	470	440	586	594	5
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	322	574	474	1944	766	6
Arrive On Green	0.00	0.21	0.33	0.63	0.24	0.24
Sat Flow, veh/h	1543	2746	1457	3159	3209	26
Grp Volume(v), veh/h	0	470	440	586	292	307
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1615
Q Serve(g_s), s	0.0	12.3	22.0	6.5	13.3	13.3
Cycle Q Clear(g_c), s	0.0	12.3	22.0	6.5	13.3	13.3
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	322	574	474	1944	377	396
V/C Ratio(X)	0.00	0.82	0.93	0.30	0.77	0.78
Avail Cap(c_a), veh/h	516	919	762	3384	793	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	28.4	24.5	6.3	26.5	26.5
Incr Delay (d2), s/veh	0.0	3.2	8.5	0.1	3.4	3.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	7.6	1.4	4.7	4.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	31.6	33.1	6.4	29.9	29.8
LnGrp LOS	A	C	C	A	C	C
Approach Vol, veh/h	470			1026	599	
Approach Delay, s/veh	31.6			17.8	29.9	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		53.8		21.5	29.1	24.7
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		8.5		14.3	24.0	15.3
Green Ext Time (p_c), s		3.9		1.4	0.5	3.1

Intersection Summary		
HCM 6th Ctrl Delay	24.4	
HCM 6th LOS	C	

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	247	334	671	323	480	1160
Future Volume (vph)	247	334	671	323	480	1160
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	47.0	47.0	32.0	32.0	41.0	73.0
Total Split (%)	39.2%	39.2%	26.7%	26.7%	34.2%	60.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	41.2	41.2	25.8	25.8	36.4	66.8
Actuated g/C Ratio	0.34	0.34	0.22	0.22	0.30	0.56
v/c Ratio	0.45	0.55	0.97	0.58	0.99	0.65
Control Delay	29.1	13.9	73.9	8.3	78.4	20.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	13.9	73.9	8.3	78.4	20.5
LOS	C	B	E	A	E	C
Approach Delay	20.4		52.6			37.4
Approach LOS	C		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 75.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	247	334	671	323	480	1160
Future Volume (veh/h)	247	334	671	323	480	1160
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	263	0	714	307	511	1234
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	589		735	328	520	1904
Arrive On Green	0.34	0.00	0.22	0.22	0.30	0.56
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	263	0	714	307	511	1234
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	14.3	0.0	24.9	23.7	35.5	30.0
Cycle Q Clear(g_c), s	14.3	0.0	24.9	23.7	35.5	30.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	589		735	328	520	1904
V/C Ratio(X)	0.45		0.97	0.94	0.98	0.65
Avail Cap(c_a), veh/h	589		735	328	520	1904
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.60	0.60	0.65	0.65
Uniform Delay (d), s/veh	30.6	0.0	46.7	46.3	41.5	18.4
Incr Delay (d2), s/veh	2.4	0.0	19.1	23.8	27.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	12.0	10.8	18.1	10.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.0	0.0	65.8	70.1	68.9	19.0
LnGrp LOS	C		E	E	E	B
Approach Vol, veh/h	263	A	1021			1745
Approach Delay, s/veh	33.0		67.1			33.6
Approach LOS	C		E			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	41.0	32.0				73.0	47.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	36.4	25.8				66.8	41.2
Max Q Clear Time (g_c+I1), s	37.5	26.9				32.0	16.3
Green Ext Time (p_c), s	0.0	0.0				9.9	0.4

Intersection Summary	
HCM 6th Ctrl Delay	44.8
HCM 6th LOS	D

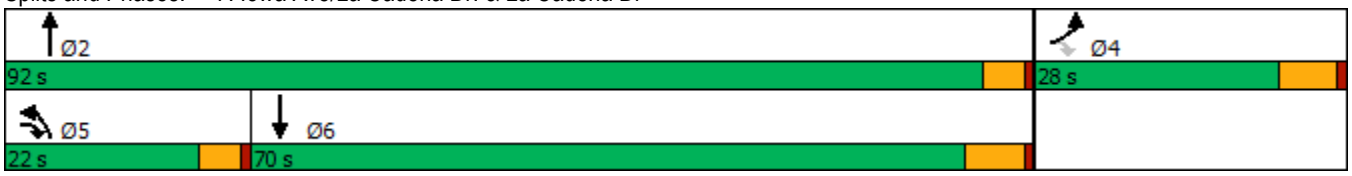
Notes

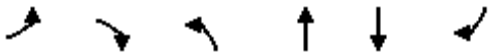
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	372	194	208	661	600	997
Future Volume (vph)	372	194	208	661	600	997
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	22.1	44.8	16.3	59.8	37.1	92.9
Actuated g/C Ratio	0.24	0.48	0.18	0.64	0.40	1.00
v/c Ratio	1.00	0.27	0.75	0.59	0.86	0.40
Control Delay	84.8	17.9	56.5	11.5	38.1	0.5
Queue Delay	0.0	0.0	0.0	0.4	0.0	0.0
Total Delay	84.8	17.9	56.5	11.9	38.1	0.5
LOS	F	B	E	B	D	A
Approach Delay	61.9			22.6	14.6	
Approach LOS	E			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 92.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	372	194	208	661	600	997
Future Volume (veh/h)	372	194	208	661	600	997
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	384	174	214	681	619	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	414	624	248	1075	702	
Arrive On Green	0.26	0.26	0.15	0.60	0.39	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	384	174	214	681	619	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	19.5	6.4	10.9	20.7	27.0	0.0
Cycle Q Clear(g_c), s	19.5	6.4	10.9	20.7	27.0	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	414	624	248	1075	702	
V/C Ratio(X)	0.93	0.28	0.86	0.63	0.88	
Avail Cap(c_a), veh/h	418	627	334	1863	1360	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.7	16.7	34.9	11.0	24.0	0.0
Incr Delay (d2), s/veh	26.6	0.2	12.9	0.6	3.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	6.5	4.9	6.4	10.7	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	57.3	16.9	47.8	11.6	27.8	0.0
LnGrp LOS	E	B	D	B	C	
Approach Vol, veh/h	558			895	619	A
Approach Delay, s/veh	44.7			20.3	27.8	
Approach LOS	D			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		56.7		27.8	17.5	39.1
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		22.7		21.5	12.9	29.0
Green Ext Time (p_c), s		4.6		0.1	0.1	3.9

Intersection Summary		
HCM 6th Ctrl Delay		29.1
HCM 6th LOS		C

Notes

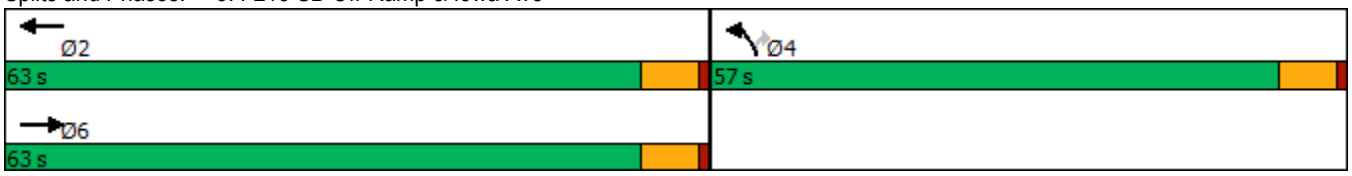
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	736	776	116	678
Future Volume (vph)	736	776	116	678
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	53.1	53.1	48.6	48.6
Actuated g/C Ratio	0.46	0.46	0.43	0.43
v/c Ratio	0.90	0.94	0.16	0.97
Control Delay	42.6	49.6	21.8	53.4
Queue Delay	50.6	1.2	0.0	0.0
Total Delay	93.2	50.8	21.8	53.4
LOS	F	D	C	D
Approach Delay	93.2	50.8	48.7	
Approach LOS	F	D	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 63.6	Intersection LOS: E
Intersection Capacity Utilization 91.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	736	0	0	776	116	678
Future Volume (veh/h)	736	0	0	776	116	678
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	791	0	0	834	126	587
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	908	0	0	908	713	635
Arrive On Green	0.48	0.00	0.00	0.48	0.39	0.39
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	791	0	0	834	126	587
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	36.1	0.0	0.0	39.6	4.4	33.7
Cycle Q Clear(g_c), s	36.1	0.0	0.0	39.6	4.4	33.7
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	908	0	0	908	713	635
V/C Ratio(X)	0.87	0.00	0.00	0.92	0.18	0.92
Avail Cap(c_a), veh/h	1112	0	0	1112	947	843
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	23.6	19.1	28.0
Incr Delay (d2), s/veh	6.6	0.0	0.0	10.5	0.1	13.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.6	0.0	0.0	17.9	1.9	15.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	29.2	0.0	0.0	34.1	19.3	41.2
LnGrp LOS	C	A	A	C	B	D
Approach Vol, veh/h	791			834	713	
Approach Delay, s/veh	29.2			34.1	37.3	
Approach LOS	C			C	D	

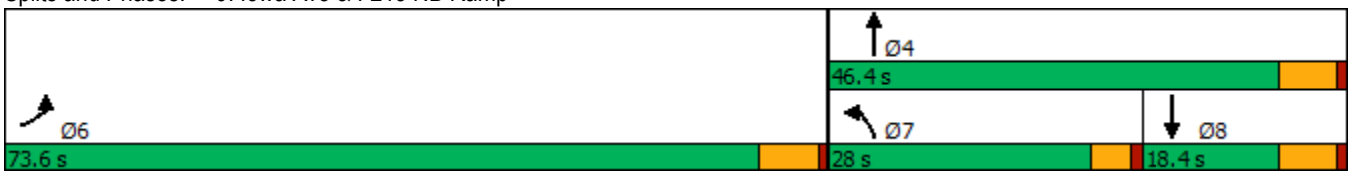
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		52.6		44.5		52.6
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		41.6		35.7		38.1
Green Ext Time (p_c), s		4.8		2.5		4.8

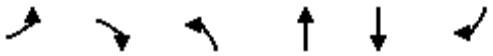
Intersection Summary		
HCM 6th Ctrl Delay		33.4
HCM 6th LOS		C

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	187	437	745	88
Future Volume (vph)	187	437	745	88
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	40.2	12.2
Actuated g/C Ratio	0.56	0.20	0.34	0.10
v/c Ratio	1.34	1.34	1.26	1.60
Control Delay	180.8	208.9	164.1	312.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	180.8	208.9	164.1	312.7
LOS	F	F	F	F
Approach Delay	180.8		180.7	312.7
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.60	
Intersection Signal Delay: 199.4	Intersection LOS: F
Intersection Capacity Utilization 150.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	187	1228	437	745	88	339
Future Volume (veh/h)	187	1228	437	745	88	339
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	1046	470	801	95	306
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	148	772	353	636	40	130
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	264	1374	1810	1900	396	1275
Grp Volume(v), veh/h	1248	0	470	801	0	401
Grp Sat Flow(s),veh/h/ln	1639	0	1810	1900	0	1671
Q Serve(g_s), s	67.4	0.0	23.4	40.2	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.4	40.2	0.0	12.2
Prop In Lane	0.16	0.84	1.00			0.76
Lane Grp Cap(c), veh/h	921	0	353	637	0	170
V/C Ratio(X)	1.36	0.00	1.33	1.26	0.00	2.36
Avail Cap(c_a), veh/h	921	0	353	637	0	170
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.3	39.9	0.0	53.9
Incr Delay (d2), s/veh	167.0	0.0	167.6	128.7	0.0	630.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	65.5	0.0	26.9	41.2	0.0	34.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	193.3	0.0	215.9	168.6	0.0	684.2
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1248			1271	401	
Approach Delay, s/veh	193.3			186.1	684.2	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	42.2	69.4	25.4	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	257.6
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	14	789	547	8	11	16
Future Vol, veh/h	14	789	547	8	11	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	15	867	601	9	12	18

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	601	0	-	0	1498	601
Stage 1	-	-	-	-	601	-
Stage 2	-	-	-	-	897	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*967	-	-	-	*80	*645
Stage 1	-	-	-	-	*608	-
Stage 2	-	-	-	-	*401	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*967	-	-	-	*78	*645
Mov Cap-2 Maneuver	-	-	-	-	*78	-
Stage 1	-	-	-	-	*590	-
Stage 2	-	-	-	-	*401	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	31.9
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 967	-	-	-	163
HCM Lane V/C Ratio	0.016	-	-	-	0.182
HCM Control Delay (s)	8.8	0	-	-	31.9
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	62	5	0	55	2	0
Future Vol, veh/h	62	5	0	55	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	67	5	0	60	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	72	0	130	70
Stage 1	-	-	-	-	70	-
Stage 2	-	-	-	-	60	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1541	-	869	998
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	968	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1541	-	869	998
Mov Cap-2 Maneuver	-	-	-	-	869	-
Stage 1	-	-	-	-	958	-
Stage 2	-	-	-	-	968	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	869	-	-	1541	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕				↱
Traffic Vol, veh/h	0	798	2	7	548	18	1	0	2	0	0	6
Future Vol, veh/h	0	798	2	7	548	18	1	0	2	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	867	2	8	596	20	1	0	2	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	616	0	0	869	0	0	1494	1500	868	-	-	606
Stage 1	-	-	-	-	-	-	868	868	-	-	-	-
Stage 2	-	-	-	-	-	-	626	632	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	964	-	-	784	-	-	61	73	355	0	0	*645
Stage 1	-	-	-	-	-	-	350	372	-	0	0	-
Stage 2	-	-	-	-	-	-	592	516	-	0	0	-
Platoon blocked, %	1	-	-		-	-	1	1				1
Mov Cap-1 Maneuver	964	-	-	784	-	-	60	72	355	-	-	*645
Mov Cap-2 Maneuver	-	-	-	-	-	-	60	72	-	-	-	-
Stage 1	-	-	-	-	-	-	350	372	-	-	-	-
Stage 2	-	-	-	-	-	-	577	508	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	32.3	10.6
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	135	964	-	-	784	-	-	645
HCM Lane V/C Ratio	0.024	-	-	-	0.01	-	-	0.01
HCM Control Delay (s)	32.3	0	-	-	9.6	0	-	10.6
HCM Lane LOS	D	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	793	7	7	572	1	3
Future Vol, veh/h	793	7	7	572	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	862	8	8	622	1	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	870	0	1504	866
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	638	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	783	-	*76	356
Stage 1	-	-	-	-	*415	-
Stage 2	-	-	-	-	*584	-
Platoon blocked, %	-	-		-	1	
Mov Cap-1 Maneuver	-	-	783	-	*75	356
Mov Cap-2 Maneuver	-	-	-	-	*75	-
Stage 1	-	-	-	-	*415	-
Stage 2	-	-	-	-	*574	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	25
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	184	-	-	783	-
HCM Lane V/C Ratio	0.024	-	-	0.01	-
HCM Control Delay (s)	25	-	-	9.6	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	52	10	0	52	3	0
Future Vol, veh/h	52	10	0	52	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	57	11	0	57	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	68	0	120	63
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	57	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1546	-	880	1007
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	971	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1546	-	880	1007
Mov Cap-2 Maneuver	-	-	-	-	880	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	880	-	-	1546	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	788	578	10	5	1
Future Vol, veh/h	8	788	578	10	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	857	628	11	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	639	0	-	0	1509	634
Stage 1	-	-	-	-	634	-
Stage 2	-	-	-	-	875	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	955	-	-	-	134	483
Stage 1	-	-	-	-	532	-
Stage 2	-	-	-	-	411	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	955	-	-	-	132	483
Mov Cap-2 Maneuver	-	-	-	-	132	-
Stage 1	-	-	-	-	522	-
Stage 2	-	-	-	-	411	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	30.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	955	-	-	-	150
HCM Lane V/C Ratio	0.009	-	-	-	0.043
HCM Control Delay (s)	8.8	0	-	-	30.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	168	96	3	1	0
Future Vol, veh/h	0	168	96	3	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	183	104	3	1	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	107	0	-	0	289	106
Stage 1	-	-	-	-	106	-
Stage 2	-	-	-	-	183	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1497	-	-	-	706	954
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1497	-	-	-	706	954
Mov Cap-2 Maneuver	-	-	-	-	706	-
Stage 1	-	-	-	-	923	-
Stage 2	-	-	-	-	853	-

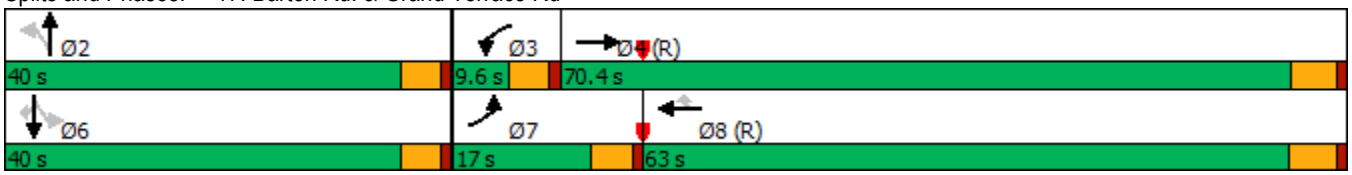
Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

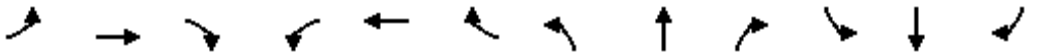
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1497	-	-	-	706
HCM Lane V/C Ratio	-	-	-	-	0.002
HCM Control Delay (s)	0	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	25	768	472	349	106	2	116		
Future Volume (vph)	25	768	472	349	106	2	116		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.6	94.3	86.7	86.7		16.0	16.0		
Actuated g/C Ratio	0.06	0.79	0.72	0.72		0.13	0.13		
v/c Ratio	0.29	0.30	0.20	0.30		0.66	0.39		
Control Delay	79.4	1.5	6.9	1.6		66.0	11.4		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	79.4	1.5	6.9	1.6		66.0	11.4		
LOS	E	A	A	A		E	B		
Approach Delay		3.9	4.7			37.8			
Approach LOS		A	A			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 8.4	Intersection LOS: A
Intersection Capacity Utilization 39.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	768	0	0	472	349	0	0	0	106	2	116
Future Volume (veh/h)	25	768	0	0	472	349	0	0	0	106	2	116
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	26	808	0	0	497	283	0	0	0	112	2	99
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	39	2788	0	1	2574	1148	0	183	0	204	3	155
Arrive On Green	0.02	0.82	0.00	0.00	0.75	0.75	0.00	0.00	0.00	0.10	0.10	0.10
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1420	25	1525
Grp Volume(v), veh/h	26	808	0	0	497	283	0	0	0	114	0	99
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1445	0	1525
Q Serve(g_s), s	1.9	6.9	0.0	0.0	5.0	6.8	0.0	0.0	0.0	9.2	0.0	7.5
Cycle Q Clear(g_c), s	1.9	6.9	0.0	0.0	5.0	6.8	0.0	0.0	0.0	9.2	0.0	7.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	39	2788	0	1	2574	1148	0	183	0	206	0	155
V/C Ratio(X)	0.66	0.29	0.00	0.00	0.19	0.25	0.00	0.00	0.00	0.55	0.00	0.64
Avail Cap(c_a), veh/h	167	2788	0	67	2574	1148	0	531	0	486	0	450
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.1	2.7	0.0	0.0	4.3	4.5	0.0	0.0	0.0	52.6	0.0	51.8
Incr Delay (d2), s/veh	7.0	0.3	0.0	0.0	0.2	0.5	0.0	0.0	0.0	2.3	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	1.7	0.0	0.0	1.6	1.9	0.0	0.0	0.0	3.5	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	2.9	0.0	0.0	4.5	5.0	0.0	0.0	0.0	54.9	0.0	56.2
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	E
Approach Vol, veh/h		834			780			0			213	
Approach Delay, s/veh		4.9			4.7			0.0			55.5	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		16.8	0.0	103.2		16.8	7.5	95.7				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	8.9		11.2	3.9	8.8				
Green Ext Time (p_c), s		0.0	0.0	6.6		0.9	0.0	4.7				

Intersection Summary		
HCM 6th Ctrl Delay		10.7
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

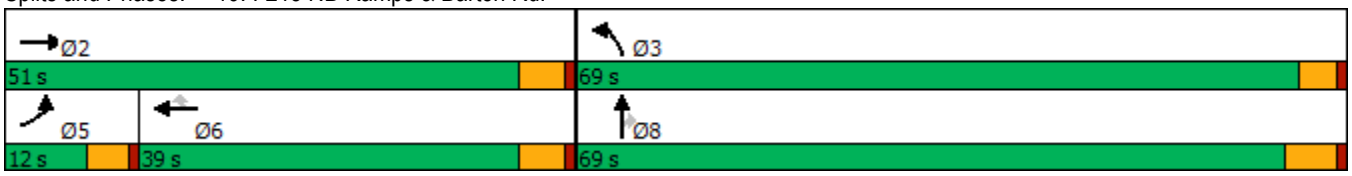
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	950	1226	241	606
Demand Flow Rate, veh/h	950	1226	241	606
Vehicles Circulating, veh/h	431	234	1232	718
Vehicles Exiting, veh/h	893	1239	149	742
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.1	9.7	16.2	11.2
Approach LOS	B	A	C	B

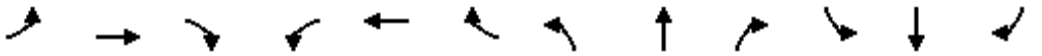
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.469	0.531	0.470	0.530	1.000	0.594	0.406
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	446	504	576	650	241	360	246
Cap Entry Lane, veh/h	908	984	1088	1164	498	697	771
Entry HV Adj Factor	1.001	0.999	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	446	504	576	650	241	360	246
Cap Entry, veh/h	909	983	1089	1164	498	697	771
V/C Ratio	0.491	0.512	0.529	0.558	0.484	0.516	0.319
Control Delay, s/veh	10.2	10.0	9.6	9.7	16.2	13.1	8.4
LOS	B	A	A	A	C	B	A
95th %tile Queue, veh	3	3	3	4	3	3	1

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	279	796	1008	602	0	407	
Future Volume (vph)	279	796	1008	602	0	407	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	12.0	51.0	39.0	39.0	69.0	69.0	69.0
Total Split (%)	10.0%	42.5%	32.5%	32.5%	57.5%	57.5%	58%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	7.4	45.9	33.9	33.9	63.2	63.2	
Actuated g/C Ratio	0.06	0.38	0.28	0.28	0.53	0.53	
v/c Ratio	2.77	0.63	1.09	0.98	76.50	0.51	
Control Delay	840.4	32.8	95.9	51.8	34864.5	18.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	840.4	32.8	95.9	51.8	34864.5	18.0	
LOS	F	C	F	D	F	B	
Approach Delay		242.5	79.4		8903.9		
Approach LOS		F	E		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 76.50	
Intersection Signal Delay: 1624.3	Intersection LOS: F
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





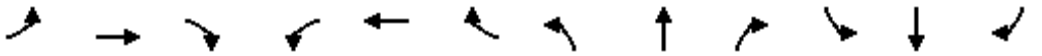
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	279	796	0	0	1008	602	139	0	407	0	0	0
Future Volume (veh/h)	279	796	0	0	1008	602	139	0	407	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	307	875	0	0	1108	514	153	0	354			
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	194	2147	0	0	1519	659	482	0	429			
Arrive On Green	0.11	0.59	0.00	0.00	0.42	0.42	0.27	0.00	0.27			
Sat Flow, veh/h	1810	3705	0	0	3705	1565	1810	0	1610			
Grp Volume(v), veh/h	307	875	0	0	1108	514	153	0	354			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1565	1810	0	1610			
Q Serve(g_s), s	7.4	9.0	0.0	0.0	17.7	19.5	4.7	0.0	14.3			
Cycle Q Clear(g_c), s	7.4	9.0	0.0	0.0	17.7	19.5	4.7	0.0	14.3			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	194	2147	0	0	1519	659	482	0	429			
V/C Ratio(X)	1.58	0.41	0.00	0.00	0.73	0.78	0.32	0.00	0.83			
Avail Cap(c_a), veh/h	194	2401	0	0	1773	769	1691	0	1505			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	30.8	7.5	0.0	0.0	16.7	17.2	20.3	0.0	23.8			
Incr Delay (d2), s/veh	285.2	0.1	0.0	0.0	1.3	4.5	0.4	0.0	4.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	18.4	2.7	0.0	0.0	6.7	6.9	1.8	0.0	5.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	316.0	7.6	0.0	0.0	18.0	21.7	20.7	0.0	27.9			
LnGrp LOS	F	A	A	A	B	C	C	A	C			
Approach Vol, veh/h		1182			1622			507				
Approach Delay, s/veh		87.7			19.2			25.7				
Approach LOS		F			B			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		46.1			12.0	34.1		22.9				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		45.9			7.4	33.9		64.5				
Max Q Clear Time (g_c+I1), s		11.0			9.4	21.5		16.3				
Green Ext Time (p_c), s		7.0			0.0	7.5		2.1				
Intersection Summary												
HCM 6th Ctrl Delay			44.6									
HCM 6th LOS			D									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	431	131	887	710
Future Volume (vph)	1	431	131	887	710
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	31.4	31.4	13.0	77.7	60.2
Actuated g/C Ratio	0.26	0.26	0.11	0.65	0.50
v/c Ratio	0.32	0.86	0.69	0.39	0.53
Control Delay	35.5	45.4	65.0	13.3	23.2
Queue Delay	0.3	0.0	0.0	0.6	0.0
Total Delay	35.8	45.4	65.0	13.9	23.2
LOS	D	D	E	B	C
Approach Delay	43.0			20.5	23.2
Approach LOS	D			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 26.7	Intersection LOS: C
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	148	1	431	131	887	0	0	710	202
Future Volume (veh/h)	0	0	0	148	1	431	131	887	0	0	710	202
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				151	1	335	134	905	0	0	724	156
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				419	3	375	161	2441	0	0	1623	350
Arrive On Green				0.23	0.23	0.23	0.09	0.68	0.00	0.00	0.55	0.55
Sat Flow, veh/h				1798	12	1610	1810	3705	0	0	3049	636
Grp Volume(v), veh/h				152	0	335	134	905	0	0	442	438
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1785
Q Serve(g_s), s				8.4	0.0	24.2	8.7	13.0	0.0	0.0	17.5	17.6
Cycle Q Clear(g_c), s				8.4	0.0	24.2	8.7	13.0	0.0	0.0	17.5	17.6
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.36
Lane Grp Cap(c), veh/h				422	0	375	161	2441	0	0	992	981
V/C Ratio(X)				0.36	0.00	0.89	0.83	0.37	0.00	0.00	0.45	0.45
Avail Cap(c_a), veh/h				652	0	580	264	2441	0	0	992	981
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.54	0.54	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				38.5	0.0	44.6	53.8	8.4	0.0	0.0	16.1	16.1
Incr Delay (d2), s/veh				0.5	0.0	11.0	2.7	0.2	0.0	0.0	1.5	1.5
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				3.7	0.0	10.5	4.1	4.7	0.0	0.0	7.4	7.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				39.1	0.0	55.6	56.4	8.6	0.0	0.0	17.6	17.6
LnGrp LOS				D	A	E	E	A	A	A	B	B
Approach Vol, veh/h					487			1039			880	
Approach Delay, s/veh					50.4			14.8			17.6	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		86.2			15.2	71.0		33.8				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		65.9			17.5	43.9		43.2				
Max Q Clear Time (g_c+I1), s		15.0			10.7	19.6		26.2				
Green Ext Time (p_c), s		7.7			0.1	5.9		1.8				

Intersection Summary		
HCM 6th Ctrl Delay	23.0	
HCM 6th LOS	C	

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	6	354	604	363	496
Future Volume (vph)	6	354	604	363	496
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	41.0	41.0	43.0	36.0	79.0
Total Split (%)	34.2%	34.2%	35.8%	30.0%	65.8%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	32.7	32.7	43.5	28.3	76.4
Actuated g/C Ratio	0.27	0.27	0.36	0.24	0.64
v/c Ratio	0.89	0.59	0.77	0.90	0.23
Control Delay	63.3	14.5	36.5	87.7	8.5
Queue Delay	0.0	0.0	0.0	38.2	0.2
Total Delay	63.3	14.5	36.5	125.9	8.7
LOS	E	B	D	F	A
Approach Delay	40.9		36.5		58.3
Approach LOS	D		D		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 45.0	Intersection LOS: D
Intersection Capacity Utilization 84.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	413	6	354	0	0	0	0	604	351	363	496	0
Future Volume (veh/h)	413	6	354	0	0	0	0	604	351	363	496	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	435	6	284				0	636	280	382	522	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	476	7	429				0	932	410	402	2321	0
Arrive On Green	0.27	0.27	0.27				0.00	0.38	0.38	0.44	1.00	0.00
Sat Flow, veh/h	1786	25	1610				0	2534	1073	1810	3705	0
Grp Volume(v), veh/h	441	0	284				0	471	445	382	522	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1707	1810	1805	0
Q Serve(g_s), s	28.3	0.0	18.9				0.0	26.2	26.2	24.4	0.0	0.0
Cycle Q Clear(g_c), s	28.3	0.0	18.9				0.0	26.2	26.2	24.4	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.63	1.00		0.00
Lane Grp Cap(c), veh/h	482	0	429				0	690	652	402	2321	0
V/C Ratio(X)	0.91	0.00	0.66				0.00	0.68	0.68	0.95	0.22	0.00
Avail Cap(c_a), veh/h	531	0	472				0	690	652	473	2321	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.84	0.84	0.00
Uniform Delay (d), s/veh	42.7	0.0	39.2				0.0	31.0	31.0	32.7	0.0	0.0
Incr Delay (d2), s/veh	19.5	0.0	3.0				0.0	5.4	5.7	22.8	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.8	0.0	7.6				0.0	12.2	11.6	10.7	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.1	0.0	42.2				0.0	36.4	36.7	55.5	0.2	0.0
LnGrp LOS	E	A	D				A	D	D	E	A	A
Approach Vol, veh/h		725						916			904	
Approach Delay, s/veh		54.3						36.5			23.6	
Approach LOS		D						D			C	

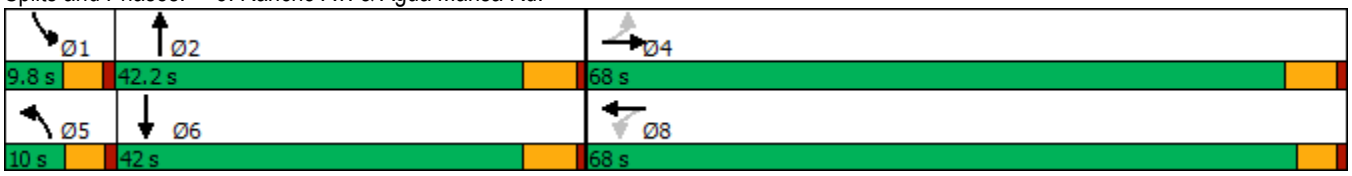
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	31.3	51.0		37.8		82.2
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	31.4	37.9		35.2		73.9
Max Q Clear Time (g_c+I1), s	26.4	28.2		30.3		2.0
Green Ext Time (p_c), s	0.3	4.0		1.6		3.8

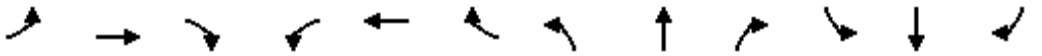
Intersection Summary		
HCM 6th Ctrl Delay		37.0
HCM 6th LOS		D

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	494	94	27	103	500	13	781
Future Volume (vph)	494	94	27	103	500	13	781
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)		62.2	63.4	5.4	42.3	5.1	36.2
Actuated g/C Ratio		0.52	0.53	0.04	0.35	0.04	0.30
v/c Ratio		1.16	0.04	1.53	0.44	0.21	1.02
Control Delay		113.8	10.9	333.8	32.2	62.6	73.4
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		113.8	10.9	333.8	32.2	62.6	73.4
LOS		F	B	F	C	E	E
Approach Delay		113.8	10.9		83.7		73.2
Approach LOS		F	B		F		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.53	
Intersection Signal Delay: 88.0	Intersection LOS: F
Intersection Capacity Utilization 102.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	494	94	190	0	27	10	103	500	2	13	781	193
Future Volume (veh/h)	494	94	190	0	27	10	103	500	2	13	781	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	526	100	175	0	29	9	110	532	2	14	831	158
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	537	93	162	0	683	212	73	1157	4	25	865	164
Arrive On Green	0.52	0.52	0.52	0.00	0.52	0.52	0.05	0.33	0.33	0.02	0.30	0.30
Sat Flow, veh/h	939	179	312	0	1318	409	1619	3495	13	1619	2867	545
Grp Volume(v), veh/h	801	0	0	0	0	38	110	260	274	14	496	493
Grp Sat Flow(s),veh/h/ln	1430	0	0	0	0	1726	1619	1710	1798	1619	1710	1702
Q Serve(g_s), s	60.9	0.0	0.0	0.0	0.0	1.3	5.4	14.4	14.4	1.0	34.2	34.2
Cycle Q Clear(g_c), s	62.2	0.0	0.0	0.0	0.0	1.3	5.4	14.4	14.4	1.0	34.2	34.2
Prop In Lane	0.66		0.22	0.00		0.24	1.00		0.01	1.00		0.32
Lane Grp Cap(c), veh/h	791	0	0	0	0	895	73	566	595	25	516	513
V/C Ratio(X)	1.01	0.00	0.00	0.00	0.00	0.04	1.51	0.46	0.46	0.56	0.96	0.96
Avail Cap(c_a), veh/h	791	0	0	0	0	912	73	566	595	70	516	513
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	0.0	0.0	0.0	14.2	57.3	31.7	31.7	58.7	41.2	41.2
Incr Delay (d2), s/veh	35.1	0.0	0.0	0.0	0.0	0.0	287.7	0.6	0.6	7.0	29.8	29.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.0	0.0	0.0	0.0	0.0	0.5	8.0	5.8	6.1	0.5	18.0	17.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.6	0.0	0.0	0.0	0.0	14.3	345.0	32.2	32.2	65.6	71.1	71.1
LnGrp LOS	F	A	A	A	A	B	F	C	C	E	E	E
Approach Vol, veh/h		801			38			644			1003	
Approach Delay, s/veh		66.6			14.3			85.7			71.0	
Approach LOS		E			B			F			E	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	45.5		68.0	10.0	42.0		68.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	3.0	16.4		64.2	7.4	36.2		3.3				
Green Ext Time (p_c), s	0.0	2.7		0.0	0.0	0.0		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		72.5
HCM 6th LOS		E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	175	811	952	159
Future Vol, veh/h	0	0	175	811	952	159
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	186	863	1013	169

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1902	591	1182	0	-	0
Stage 1	1098	-	-	-	-	-
Stage 2	804	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	62	455	598	-	-	-
Stage 1	285	-	-	-	-	-
Stage 2	406	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	25	455	598	-	-	-
Mov Cap-2 Maneuver	25	-	-	-	-	-
Stage 1	115	-	-	-	-	-
Stage 2	406	-	-	-	-	-

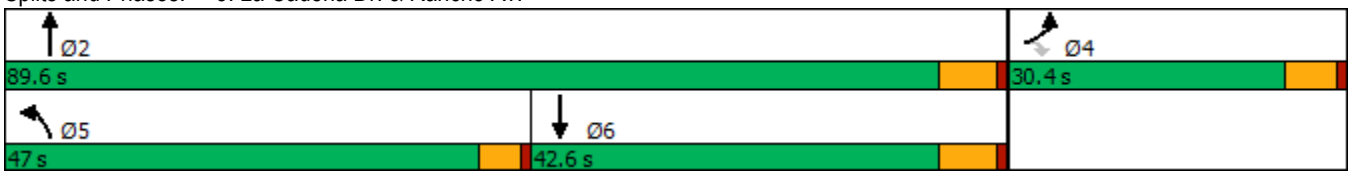
Approach	EB	NB	SB
HCM Control Delay, s	0	4.8	0
HCM LOS	A		

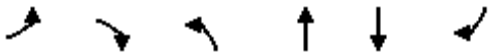
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	598	-	-	-	-
HCM Lane V/C Ratio	0.311	-	-	-	-
HCM Control Delay (s)	13.7	2.9	0	-	-
HCM Lane LOS	B	A	A	-	-
HCM 95th %tile Q(veh)	1.3	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	29	683	445	591	725
Future Volume (vph)	29	683	445	591	725
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.6	13.6	35.2	69.6	29.5
Actuated g/C Ratio	0.14	0.14	0.37	0.73	0.31
v/c Ratio	0.76	0.73	0.86	0.27	0.80
Control Delay	17.4	13.9	46.4	5.0	38.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	13.9	46.4	5.0	38.8
LOS	B	B	D	A	D
Approach Delay	15.7			22.8	38.8
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 95.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 25.5	Intersection LOS: C
Intersection Capacity Utilization 86.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	683	445	591	725	11
Future Volume (veh/h)	29	683	445	591	725	11
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1620	1620	1530	1620	1620	1620
Adj Flow Rate, veh/h	0	603	459	609	747	9
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	362	644	483	2004	860	10
Arrive On Green	0.00	0.23	0.33	0.65	0.28	0.28
Sat Flow, veh/h	1543	2746	1457	3159	3196	38
Grp Volume(v), veh/h	0	603	459	609	369	387
Grp Sat Flow(s),veh/h/ln	1543	1373	1457	1539	1539	1613
Q Serve(g_s), s	0.0	22.6	32.3	9.0	24.0	24.0
Cycle Q Clear(g_c), s	0.0	22.6	32.3	9.0	24.0	24.0
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	362	644	483	2004	425	445
V/C Ratio(X)	0.00	0.94	0.95	0.30	0.87	0.87
Avail Cap(c_a), veh/h	362	644	589	2448	534	560
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	39.4	34.2	8.0	36.2	36.2
Incr Delay (d2), s/veh	0.0	21.3	21.7	0.1	12.0	11.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	17.4	13.4	2.4	9.8	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	60.6	56.0	8.0	48.2	47.7
LnGrp LOS	A	E	E	A	D	D
Approach Vol, veh/h	603			1068	756	
Approach Delay, s/veh	60.6			28.6	47.9	
Approach LOS	E			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		74.5		30.4	39.3	35.2
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		11.0		24.6	34.3	26.0
Green Ext Time (p_c), s		4.0		0.0	0.5	3.0

Intersection Summary	
HCM 6th Ctrl Delay	42.6
HCM 6th LOS	D

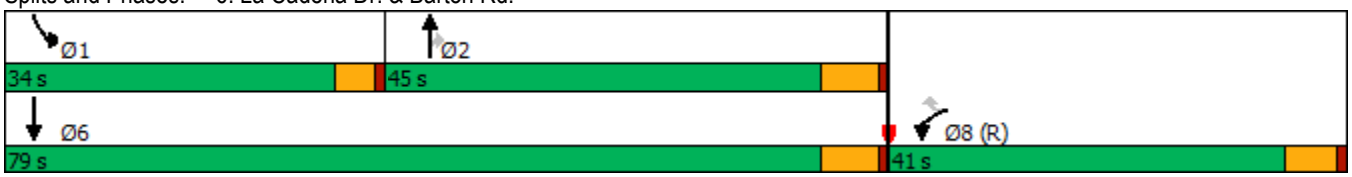
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	410	442	884	275	431	1162
Future Volume (vph)	410	442	884	275	431	1162
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	37.1	37.1	36.9	36.9	29.4	70.9
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.24	0.59
v/c Ratio	0.80	0.80	0.87	0.43	1.06	0.59
Control Delay	58.3	47.9	48.9	5.5	105.2	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	47.9	48.9	5.5	105.2	16.7
LOS	E	D	D	A	F	B
Approach Delay	52.9		38.6			40.7
Approach LOS	D		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.06	
Intersection Signal Delay: 42.9	Intersection LOS: D
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	410	442	884	275	431	1162
Future Volume (veh/h)	410	442	884	275	431	1162
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	423	0	911	251	444	1198
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		1021	456	420	1990
Arrive On Green	0.29	0.00	0.30	0.30	0.25	0.58
Sat Flow, veh/h	1714	1525	3510	1525	1714	3510
Grp Volume(v), veh/h	423	0	911	251	444	1198
Grp Sat Flow(s),veh/h/ln	1714	1525	1710	1525	1714	1710
Q Serve(g_s), s	27.8	0.0	30.6	16.6	29.4	27.0
Cycle Q Clear(g_c), s	27.8	0.0	30.6	16.6	29.4	27.0
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		1021	456	420	1990
V/C Ratio(X)	0.84		0.89	0.55	1.06	0.60
Avail Cap(c_a), veh/h	503		1106	493	420	2075
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.24	0.24	0.54	0.54
Uniform Delay (d), s/veh	39.8	0.0	40.2	35.3	45.3	16.1
Incr Delay (d2), s/veh	15.6	0.0	2.4	0.3	48.4	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.7	0.0	12.5	5.9	17.5	9.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	55.3	0.0	42.6	35.6	93.7	16.4
LnGrp LOS	E		D	D	F	B
Approach Vol, veh/h	423	A	1162			1642
Approach Delay, s/veh	55.3		41.1			37.3
Approach LOS	E		D			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	34.0	42.0				76.0	41.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8				72.8	35.2
Max Q Clear Time (g_c+I1), s	31.4	32.6				29.0	29.8
Green Ext Time (p_c), s	0.0	3.3				9.9	0.4

Intersection Summary		
HCM 6th Ctrl Delay		41.0
HCM 6th LOS		D

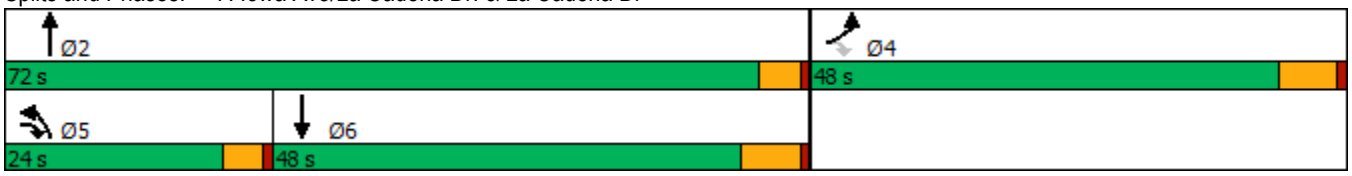
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	566	226	272	813	411	1220
Future Volume (vph)	566	226	272	813	411	1220
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	48.0	24.0	24.0	72.0	48.0	
Total Split (%)	40.0%	20.0%	20.0%	60.0%	40.0%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	42.0	67.8	19.5	57.8	32.0	110.7
Actuated g/C Ratio	0.38	0.61	0.18	0.52	0.29	1.00
v/c Ratio	0.96	0.25	1.00	0.90	0.82	0.50
Control Delay	63.9	12.2	99.6	37.7	50.0	0.7
Queue Delay	0.0	0.0	0.0	49.5	0.0	0.0
Total Delay	63.9	12.2	99.6	87.2	50.0	0.7
LOS	E	B	F	F	D	A
Approach Delay	49.2			90.3	13.1	
Approach LOS	D			F	B	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 110.7			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 45.1		Intersection LOS: D	
Intersection Capacity Utilization 89.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	566	226	272	813	411	1220
Future Volume (veh/h)	566	226	272	813	411	1220
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1700	1800	1700	1800	1800	1700
Adj Flow Rate, veh/h	590	192	283	847	428	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	613	852	291	911	511	
Arrive On Green	0.38	0.38	0.18	0.51	0.28	0.00
Sat Flow, veh/h	1619	1525	1619	1800	1800	2536
Grp Volume(v), veh/h	590	192	283	847	428	0
Grp Sat Flow(s),veh/h/ln	1619	1525	1619	1800	1800	1268
Q Serve(g_s), s	38.4	6.9	18.8	47.4	24.1	0.0
Cycle Q Clear(g_c), s	38.4	6.9	18.8	47.4	24.1	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	613	852	291	911	511	
V/C Ratio(X)	0.96	0.23	0.97	0.93	0.84	
Avail Cap(c_a), veh/h	627	865	291	1124	697	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.8	12.0	44.0	24.9	36.3	0.0
Incr Delay (d2), s/veh	26.4	0.1	44.9	11.7	6.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.3	0.0	10.8	20.6	10.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	59.2	12.2	88.9	36.5	42.9	0.0
LnGrp LOS	E	B	F	D	D	
Approach Vol, veh/h	782			1130	428	A
Approach Delay, s/veh	47.6			49.6	42.9	
Approach LOS	D			D	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		60.8		47.1	24.0	36.8
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 67		41.8	19.4	41.8
Max Q Clear Time (g_c+I1), s		49.4		40.4	20.8	26.1
Green Ext Time (p_c), s		5.3		0.5	0.0	2.0

Intersection Summary		
HCM 6th Ctrl Delay	47.7	
HCM 6th LOS	D	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	585	935	151	615
Future Volume (vph)	585	935	151	615
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	56.7	56.7	30.6	30.6
Actuated g/C Ratio	0.56	0.56	0.30	0.30
v/c Ratio	0.56	0.90	0.28	0.91
Control Delay	16.4	32.1	31.2	38.2
Queue Delay	1.1	0.3	0.0	0.0
Total Delay	17.6	32.4	31.2	38.2
LOS	B	C	C	D
Approach Delay	17.6	32.4	36.8	
Approach LOS	B	C	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 30.1	Intersection LOS: C
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	585	0	0	935	151	615
Future Volume (veh/h)	585	0	0	935	151	615
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	603	0	0	964	156	516
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1042	0	0	1042	605	539
Arrive On Green	0.55	0.00	0.00	0.55	0.33	0.33
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	603	0	0	964	156	516
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	22.2	0.0	0.0	49.3	6.6	33.2
Cycle Q Clear(g_c), s	22.2	0.0	0.0	49.3	6.6	33.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1042	0	0	1042	605	539
V/C Ratio(X)	0.58	0.00	0.00	0.93	0.26	0.96
Avail Cap(c_a), veh/h	1288	0	0	1288	612	544
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.8	0.0	0.0	21.9	25.7	34.5
Incr Delay (d2), s/veh	0.5	0.0	0.0	10.0	0.2	28.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.6	0.0	0.0	21.5	2.9	17.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.3	0.0	0.0	31.9	25.9	62.6
LnGrp LOS	B	A	A	C	C	E
Approach Vol, veh/h	603			964	672	
Approach Delay, s/veh	16.3			31.9	54.1	
Approach LOS	B			C	D	

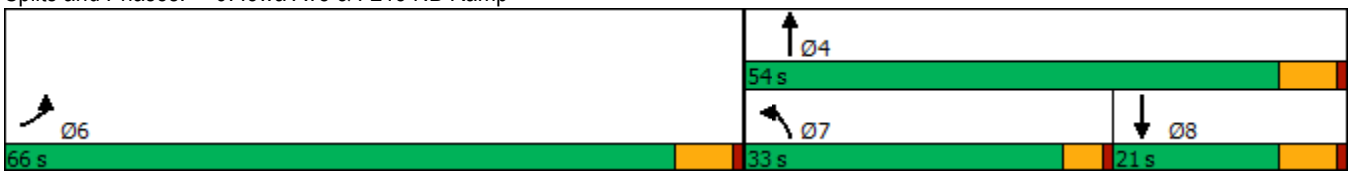
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		64.3		41.6		64.3
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		51.3		35.2		24.2
Green Ext Time (p_c), s		6.8		0.2		3.9

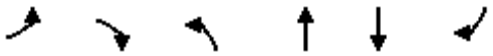
Intersection Summary		
HCM 6th Ctrl Delay		34.4
HCM 6th LOS		C

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	197	496	842	71
Future Volume (vph)	197	496	842	71
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	28.4	47.8	14.8
Actuated g/C Ratio	0.50	0.24	0.40	0.12
v/c Ratio	1.20	1.19	1.14	1.32
Control Delay	124.3	145.3	111.5	187.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	124.3	145.3	111.5	187.1
LOS	F	F	F	F
Approach Delay	124.3		124.0	187.1
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.32	
Intersection Signal Delay: 134.8	Intersection LOS: F
Intersection Capacity Utilization 142.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	197	958	496	842	71	439
Future Volume (veh/h)	197	958	496	842	71	439
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	799	506	859	72	361
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	165	655	428	757	34	170
Arrive On Green	0.50	0.50	0.24	0.40	0.12	0.12
Sat Flow, veh/h	331	1315	1810	1900	275	1377
Grp Volume(v), veh/h	1001	0	506	859	0	433
Grp Sat Flow(s),veh/h/ln	1647	0	1810	1900	0	1652
Q Serve(g_s), s	59.8	0.0	28.4	47.8	0.0	14.8
Cycle Q Clear(g_c), s	59.8	0.0	28.4	47.8	0.0	14.8
Prop In Lane	0.20	0.80	1.00			0.83
Lane Grp Cap(c), veh/h	821	0	428	757	0	204
V/C Ratio(X)	1.22	0.00	1.18	1.13	0.00	2.13
Avail Cap(c_a), veh/h	821	0	428	757	0	204
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	45.8	36.1	0.0	52.6
Incr Delay (d2), s/veh	109.8	0.0	103.3	76.6	0.0	522.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	46.2	0.0	24.9	37.7	0.0	35.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	139.9	0.0	149.1	112.7	0.0	575.1
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1001			1365	433	
Approach Delay, s/veh	139.9			126.2	575.1	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	54.0	66.0	33.0	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	49.8	61.8	30.4	16.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	200.6
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	693	807	14	14	23
Future Vol, veh/h	15	693	807	14	14	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	15	714	832	14	14	24

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	832	0	-	0	1576	832
Stage 1	-	-	-	-	832	-
Stage 2	-	-	-	-	744	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	809	-	-	-	122	372
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	473	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	809	-	-	-	118	372
Mov Cap-2 Maneuver	-	-	-	-	118	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	473	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	26.5
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	809	-	-	-	205
HCM Lane V/C Ratio	0.019	-	-	-	0.186
HCM Control Delay (s)	9.5	0	-	-	26.5
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	57	2	0	64	6	0
Future Vol, veh/h	57	2	0	64	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	62	2	0	70	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	64	0	133	63
Stage 1	-	-	-	-	63	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1551	-	866	1007
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1551	-	866	1007
Mov Cap-2 Maneuver	-	-	-	-	866	-
Stage 1	-	-	-	-	965	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	866	-	-	1551	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕				↱
Traffic Vol, veh/h	0	706	1	3	798	8	4	0	8	0	0	19
Future Vol, veh/h	0	706	1	3	798	8	4	0	8	0	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	767	1	3	867	9	4	0	9	0	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	876	0	0	768	0	0	1656	1650	768	-	-	872
Stage 1	-	-	-	-	-	-	768	768	-	-	-	-
Stage 2	-	-	-	-	-	-	888	882	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	779	-	-	855	-	-	79	100	405	0	0	353
Stage 1	-	-	-	-	-	-	397	414	-	0	0	-
Stage 2	-	-	-	-	-	-	341	367	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	779	-	-	855	-	-	74	99	405	-	-	353
Mov Cap-2 Maneuver	-	-	-	-	-	-	74	99	-	-	-	-
Stage 1	-	-	-	-	-	-	397	414	-	-	-	-
Stage 2	-	-	-	-	-	-	319	364	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	29	15.8
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	163	779	-	-	855	-	-	353
HCM Lane V/C Ratio	0.08	-	-	-	0.004	-	-	0.059
HCM Control Delay (s)	29	0	-	-	9.2	0	-	15.8
HCM Lane LOS	D	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	711	3	3	806	3	12
Future Vol, veh/h	711	3	3	806	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	773	3	3	876	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	776	0	1657	775
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	882	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	849	-	109	401
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	408	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	849	-	108	401
Mov Cap-2 Maneuver	-	-	-	-	108	-
Stage 1	-	-	-	-	458	-
Stage 2	-	-	-	-	405	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	260	-	-	849	-
HCM Lane V/C Ratio	0.063	-	-	0.004	-
HCM Control Delay (s)	19.8	-	-	9.3	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	52	5	0	52	12	0
Future Vol, veh/h	52	5	0	52	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	57	5	0	57	13	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	62	0	117	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	57	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1554	-	884	1011
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	971	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1554	-	884	1011
Mov Cap-2 Maneuver	-	-	-	-	884	-
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	971	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	884	-	-	1554	-
HCM Lane V/C Ratio	0.015	-	-	-	-
HCM Control Delay (s)	9.1	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	719	805	4	15	4
Future Vol, veh/h	4	719	805	4	15	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	782	875	4	16	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	879	0	-	0	1667	877
Stage 1	-	-	-	-	877	-
Stage 2	-	-	-	-	790	-
Critical Hdwy	4.1	-	-	-	6	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	777	-	-	-	129	351
Stage 1	-	-	-	-	410	-
Stage 2	-	-	-	-	451	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	777	-	-	-	128	351
Mov Cap-2 Maneuver	-	-	-	-	128	-
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	451	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	33.2
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	777	-	-	-	148
HCM Lane V/C Ratio	0.006	-	-	-	0.14
HCM Control Delay (s)	9.7	0	-	-	33.2
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0	-	-	-	0.5

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	147	202	1	3	0
Future Vol, veh/h	0	147	202	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	160	220	1	3	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	221	0	-	0	381	221
Stage 1	-	-	-	-	221	-
Stage 2	-	-	-	-	160	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1360	-	-	-	625	824
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	874	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	625	824
Mov Cap-2 Maneuver	-	-	-	-	625	-
Stage 1	-	-	-	-	821	-
Stage 2	-	-	-	-	874	-

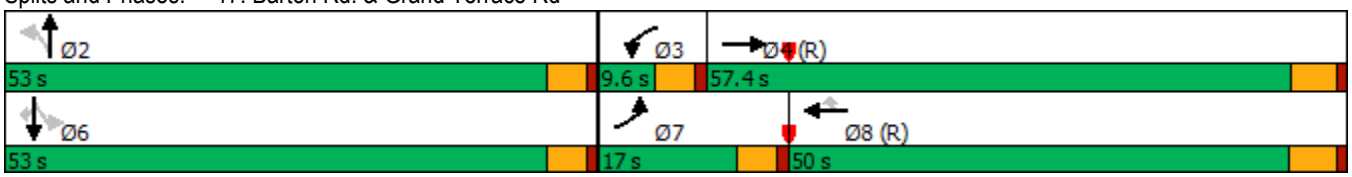
Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

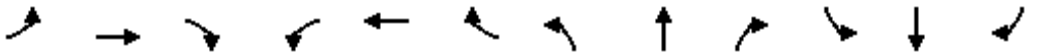
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1360	-	-	-	625
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	10.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	34	700	647	263	206	3	161		
Future Volume (vph)	34	700	647	263	206	3	161		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.4	83.2	75.0	75.0		27.1	27.1		
Actuated g/C Ratio	0.06	0.69	0.62	0.62		0.23	0.23		
v/c Ratio	0.37	0.32	0.33	0.28		0.77	0.36		
Control Delay	40.9	15.2	13.5	6.1		59.5	6.8		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	40.9	15.2	13.5	6.1		59.5	6.8		
LOS	D	B	B	A		E	A		
Approach Delay		16.4	11.4			36.6			
Approach LOS		B	B			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 48.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	34	700	0	0	647	263	0	0	0	206	3	161
Future Volume (veh/h)	34	700	0	0	647	263	0	0	0	206	3	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1700	1800	1800	1700	1800	1800	1800	1800	1800	1800	1800	1800
Adj Flow Rate, veh/h	37	761	0	0	703	226	0	0	0	224	3	148
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	48	2502	0	1	2270	1013	0	333	0	323	4	282
Arrive On Green	0.03	0.73	0.00	0.00	0.66	0.66	0.00	0.00	0.00	0.18	0.18	0.18
Sat Flow, veh/h	1619	3510	0	1619	3420	1525	0	1800	0	1425	19	1525
Grp Volume(v), veh/h	37	761	0	0	703	226	0	0	0	227	0	148
Grp Sat Flow(s),veh/h/ln	1619	1710	0	1619	1710	1525	0	1800	0	1444	0	1525
Q Serve(g_s), s	2.7	9.2	0.0	0.0	10.4	7.0	0.0	0.0	0.0	18.2	0.0	10.5
Cycle Q Clear(g_c), s	2.7	9.2	0.0	0.0	10.4	7.0	0.0	0.0	0.0	18.2	0.0	10.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	48	2502	0	1	2270	1013	0	333	0	327	0	282
V/C Ratio(X)	0.77	0.30	0.00	0.00	0.31	0.22	0.00	0.00	0.00	0.69	0.00	0.52
Avail Cap(c_a), veh/h	167	2502	0	67	2270	1013	0	726	0	642	0	615
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	5.6	0.0	0.0	8.5	8.0	0.0	0.0	0.0	47.3	0.0	44.1
Incr Delay (d2), s/veh	9.5	0.3	0.0	0.0	0.4	0.5	0.0	0.0	0.0	2.7	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	3.0	0.0	0.0	3.7	2.3	0.0	0.0	0.0	6.8	0.0	4.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.3	5.9	0.0	0.0	8.9	8.5	0.0	0.0	0.0	50.0	0.0	45.7
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	D
Approach Vol, veh/h		798			929			0			375	
Approach Delay, s/veh		8.7			8.8			0.0			48.3	
Approach LOS		A			A						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		26.8	0.0	93.2		26.8	8.1	85.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	11.2		20.2	4.7	12.4				
Green Ext Time (p_c), s		0.0	0.0	6.0		1.9	0.0	6.2				

Intersection Summary												
HCM 6th Ctrl Delay			15.8									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	953	1085	113	724
Demand Flow Rate, veh/h	953	1085	113	724
Vehicles Circulating, veh/h	501	200	1370	735
Vehicles Exiting, veh/h	958	1283	84	550
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.3	8.1	12.2	14.2
Approach LOS	B	A	B	B

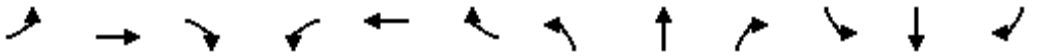
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.606	0.394
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	448	505	510	575	113	439	285
Cap Entry Lane, veh/h	851	928	1123	1198	443	687	760
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	448	505	510	575	113	439	285
Cap Entry, veh/h	851	928	1123	1198	443	687	760
V/C Ratio	0.526	0.544	0.454	0.480	0.255	0.639	0.375
Control Delay, s/veh	11.5	11.1	8.1	8.1	12.2	17.3	9.4
LOS	B	B	A	A	B	C	A
95th %tile Queue, veh	3	3	2	3	1	5	2

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	265	989	927	408	0	543	
Future Volume (vph)	265	989	927	408	0	543	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	13.0	43.0	30.0	30.0	77.0	77.0	77.0
Total Split (%)	10.8%	35.8%	25.0%	25.0%	64.2%	64.2%	64%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	8.4	37.9	24.9	24.9	71.2	71.2	
Actuated g/C Ratio	0.07	0.32	0.21	0.21	0.59	0.59	
v/c Ratio	2.17	0.89	1.28	0.85	328.00	0.57	
Control Delay	577.1	50.5	174.0	38.1	148047.5	15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	577.1	50.5	174.0	38.1	148047.5	15.9	
LOS	F	D	F	D	F	B	
Approach Delay		161.7	132.4		79875.0		
Approach LOS		F	F		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 328.00	
Intersection Signal Delay: 25095.1	Intersection LOS: F
Intersection Capacity Utilization 70.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	265	989	0	0	927	408	164	0	543	0	0	0
Future Volume (veh/h)	265	989	0	0	927	408	164	0	543	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	273	1020	0	0	956	343	656	0	447			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	184	1634	0	0	1065	460	780	0	694			
Arrive On Green	0.10	0.45	0.00	0.00	0.29	0.29	0.43	0.00	0.43			
Sat Flow, veh/h	1810	3705	0	0	3705	1560	1810	0	1610			
Grp Volume(v), veh/h	273	1020	0	0	956	343	656	0	447			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1560	1810	0	1610			
Q Serve(g_s), s	8.4	17.8	0.0	0.0	20.9	16.4	26.7	0.0	18.0			
Cycle Q Clear(g_c), s	8.4	17.8	0.0	0.0	20.9	16.4	26.7	0.0	18.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	184	1634	0	0	1065	460	780	0	694			
V/C Ratio(X)	1.48	0.62	0.00	0.00	0.90	0.75	0.84	0.00	0.64			
Avail Cap(c_a), veh/h	184	1660	0	0	1091	471	1592	0	1416			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	37.0	17.2	0.0	0.0	27.9	26.3	20.9	0.0	18.5			
Incr Delay (d2), s/veh	243.0	0.7	0.0	0.0	9.9	6.2	2.6	0.0	1.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	16.0	6.9	0.0	0.0	9.9	6.5	10.3	0.0	6.1			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	280.0	17.9	0.0	0.0	37.8	32.5	23.5	0.0	19.5			
LnGrp LOS	F	B	A	A	D	C	C	A	B			
Approach Vol, veh/h		1293			1299			1103				
Approach Delay, s/veh		73.3			36.4			21.9				
Approach LOS		E			D			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		42.4			13.0	29.4		40.0				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		37.9			8.4	24.9		72.5				
Max Q Clear Time (g_c+I1), s		19.8			10.4	22.9		28.7				
Green Ext Time (p_c), s		6.9			0.0	1.4		6.8				
Intersection Summary												
HCM 6th Ctrl Delay			44.9									
HCM 6th LOS			D									

APPENDIX 6.3:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

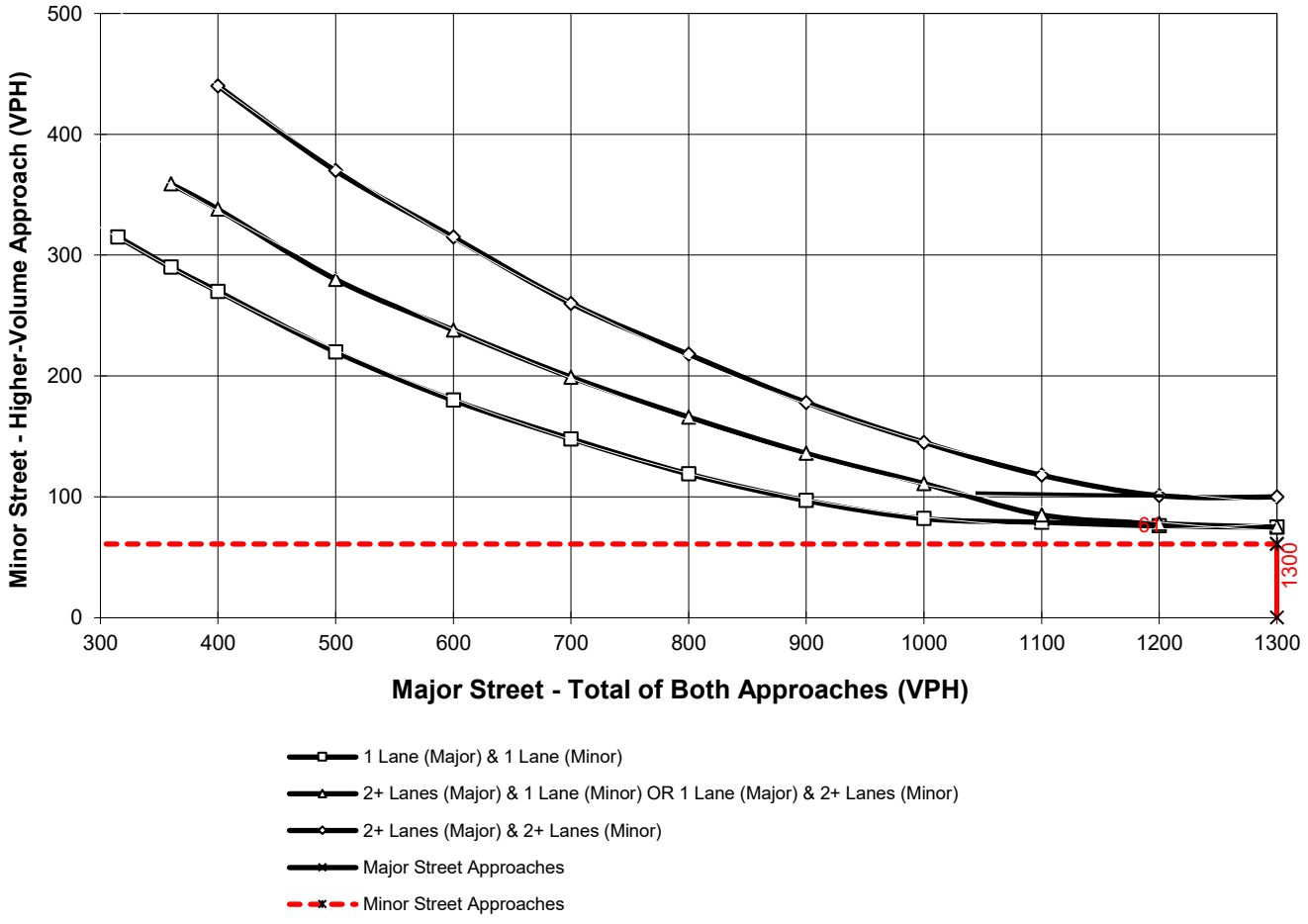
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **2022 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **Barton Rd.** Total of Both Approaches (VPH) = **1344**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave** High Volume Approach (VPH) = **61**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

This Page Intentionally Left Blank

APPENDIX 6.4:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

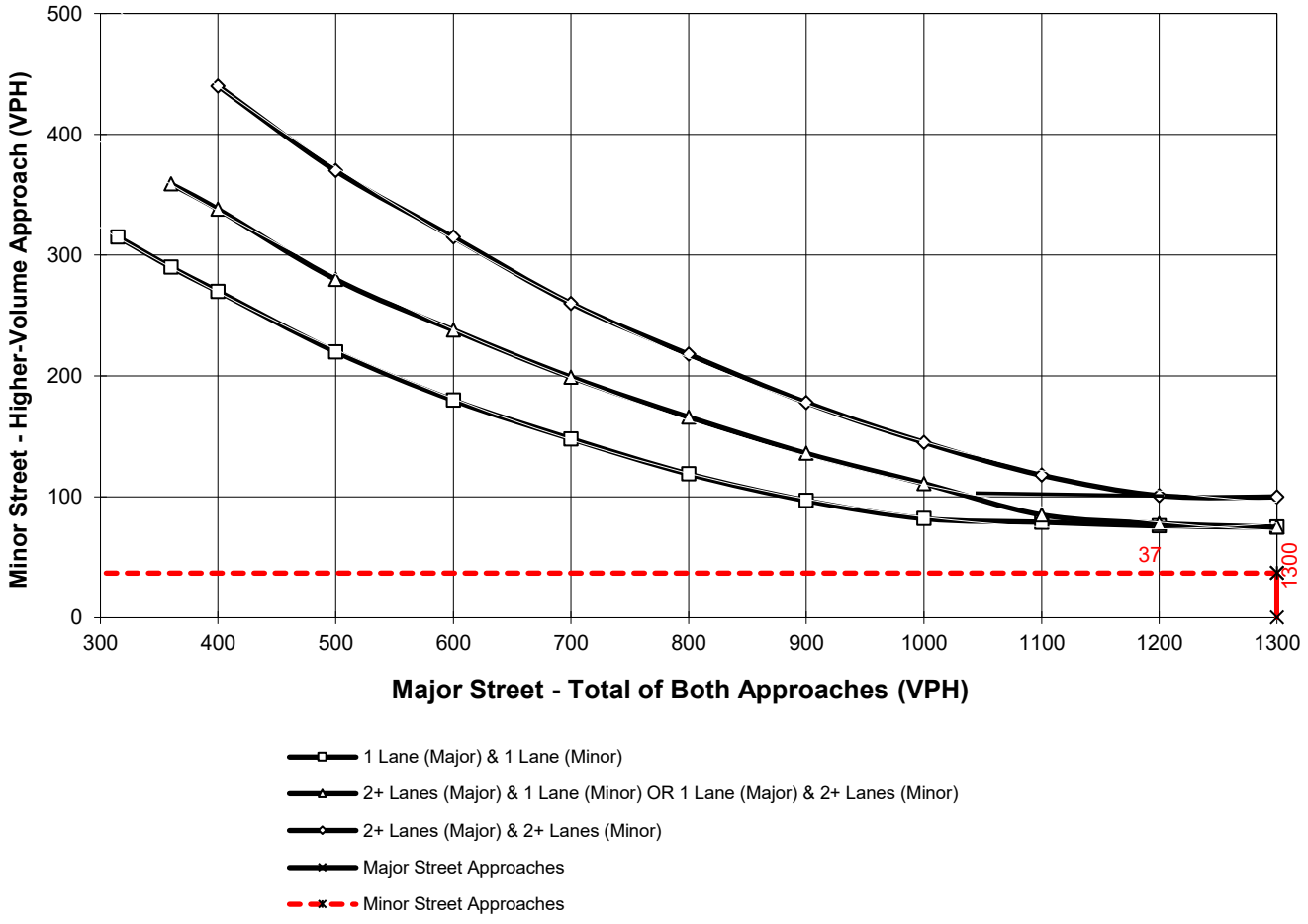
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **2022 With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Barton Rd.**
Total of Both Approaches (VPH) = **1528**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave**
High Volume Approach (VPH) = **37**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 1				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,444** vpd Minor Street Future ADT = **57** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,444**	*1* **57**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,444**	*1* **57**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 2% **B** 5%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Barton Rd.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 3				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **17,465** vpd Minor Street Future ADT = **140** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
CONDITION A - Minimum Vehicular Volume	Urban	Rural	Urban	Rural
XX Satisfied / XX Not Satisfied				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1 **17,465** / *1* **140**	8,000 *	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / XX Not Satisfied				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 **17,465** / *1* **140**	12,000 *	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / XX Not Satisfied				
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 6% B: 12%	2 CONDITIONS 80%		2 CONDITIONS 80%	

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 4				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **1,274** vpd Minor Street Future ADT = **113** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume				
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1 **1,274** / 1 **113**	8,000	5,600	2,400	1,680
2 + / 1	9,600	6,720	2,400	1,680
2 + / 2 +	9,600	6,720	3,200	2,240
1 / 2 +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 **1,274** / 1 **113**	12,000	8,400	1,200	850
2 + / 1	14,400	10,080	1,200	850
2 + / 2 +	14,400	10,080	1,600	1,120
1 / 2 +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 5% B: 9%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Barton Rd.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 5				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **17,566** vpd Minor Street Future ADT = **180** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
CONDITION A - Minimum Vehicular Volume	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **17,566** / *1* **180**	8,000 *	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **17,566** / *1* **180**	12,000 *	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 8% B: 15%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2022 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Driveway 7 / De Berry St.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 6				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **710** vpd Minor Street Future ADT = **28** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume				
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **710** / *1* **28**	8,000	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach: Major Street / Minor Street				
1 **710** / *1* **28**	12,000	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 1% B: 2%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 6.5:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	287	391	115	422	1127
v/c Ratio	0.76	0.60	0.64	0.17	0.57
Control Delay	56.9	7.7	88.4	1.4	18.6
Queue Delay	0.8	0.0	0.0	0.0	0.0
Total Delay	57.7	7.7	88.4	1.4	18.6
Queue Length 50th (ft)	211	0	85	4	262
Queue Length 95th (ft)	285	76	159	17	413
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	729	248	2523	1971
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	56	0	0	0	51
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.54	0.46	0.17	0.59

Intersection Summary



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	157	368	603	401	726
v/c Ratio	0.59	0.81	0.37	0.85	0.26
Control Delay	55.7	29.4	22.1	54.6	5.3
Queue Delay	0.0	0.0	0.0	2.2	0.5
Total Delay	55.7	29.4	22.1	56.7	5.7
Queue Length 50th (ft)	117	87	135	269	47
Queue Length 95th (ft)	164	173	237	418	163
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	607	1618	652	2751
Starvation Cap Reductn	0	0	0	135	1474
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.61	0.37	0.78	0.57

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	791	825	126	729
v/c Ratio	0.90	0.94	0.16	0.96
Control Delay	43.2	48.7	21.7	52.5
Queue Delay	50.6	1.0	0.0	0.0
Total Delay	93.8	49.6	21.7	52.5
Queue Length 50th (ft)	539	580	59	478
Queue Length 95th (ft)	#790	#848	101	#749
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	961	961	817	796
Starvation Cap Reductn	345	31	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.28	0.89	0.15	0.92

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1521	470	801	450
v/c Ratio	1.34	1.34	1.26	1.58
Control Delay	180.8	208.9	164.1	305.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	180.8	208.9	164.1	305.2
Queue Length 50th (ft)	~1386	~474	~778	~407
Queue Length 95th (ft)	#1654	#682	#1018	#615
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1132	351	636	284
Starvation Cap Reductn	5	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.35	1.34	1.26	1.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1033	1214	44	581
Demand Flow Rate, veh/h	1033	1214	44	581
Vehicles Circulating, veh/h	396	207	1354	686
Vehicles Exiting, veh/h	871	1191	75	735
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.4	9.2	9.4	10.6
Approach LOS	B	A	A	B

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.616	0.384
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	486	547	571	643	44	358	223
Cap Entry Lane, veh/h	938	1014	1116	1191	449	718	793
Entry HV Adj Factor	0.999	1.001	0.999	1.001	1.000	1.000	1.000
Flow Entry, veh/h	486	547	571	643	44	358	223
Cap Entry, veh/h	937	1015	1115	1192	449	718	793
V/C Ratio	0.518	0.539	0.512	0.540	0.098	0.498	0.281
Control Delay, s/veh	10.5	10.3	9.1	9.2	9.4	12.4	7.7
LOS	B	B	A	A	A	B	A
95th %tile Queue, veh	3	3	3	3	0	3	1



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	299	873	1102	662	126	447
v/c Ratio	2.69	0.63	1.08	0.98	63.00	0.51
Control Delay	808.9	32.7	93.9	51.3	28787.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	808.9	32.7	93.9	51.3	28787.3	18.0
Queue Length 50th (ft)	~392	286	~502	294	~202	185
Queue Length 95th (ft)	#571	356	#637	#555	#330	276
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	111	1380	1019	677	6	879
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.69	0.63	1.08	0.98	21.00	0.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	152	440	131	902	929
v/c Ratio	0.32	0.86	0.68	0.39	0.52
Control Delay	35.5	45.4	64.6	13.4	23.0
Queue Delay	0.3	0.0	0.0	0.6	0.0
Total Delay	35.9	45.4	64.6	14.0	23.1
Queue Length 50th (ft)	95	240	109	174	241
Queue Length 95th (ft)	134	327	m138	208	388
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	661	263	2339	1772
Starvation Cap Reductn	0	0	0	971	0
Spillback Cap Reductn	190	0	0	0	47
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.67	0.50	0.66	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	441	372	998	382	521
v/c Ratio	0.89	0.59	0.77	0.90	0.23
Control Delay	63.3	14.5	36.1	87.4	8.5
Queue Delay	0.0	0.0	0.0	37.2	0.2
Total Delay	63.3	14.5	36.1	124.6	8.8
Queue Length 50th (ft)	319	63	343	292	61
Queue Length 95th (ft)	#486	162	#443	#443	92
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	531	661	1303	472	2298
Starvation Cap Reductn	0	0	0	110	1005
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.56	0.77	1.06	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	603	960	156	634
v/c Ratio	0.56	0.90	0.28	0.91
Control Delay	16.4	31.9	31.1	38.0
Queue Delay	1.1	0.3	0.0	0.0
Total Delay	17.5	32.2	31.1	38.0
Queue Length 50th (ft)	259	569	81	245
Queue Length 95th (ft)	357	792	152	#525
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1389	1389	686	796
Starvation Cap Reductn	521	86	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.69	0.74	0.23	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1179	506	859	516
v/c Ratio	1.20	1.19	1.14	1.32
Control Delay	124.3	145.3	111.5	184.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	124.3	145.3	111.5	184.4
Queue Length 50th (ft)	~994	~471	~775	~365
Queue Length 95th (ft)	#1257	#684	#1020	#583
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	980	427	756	392
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.20	1.19	1.14	1.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	946	1136	69	713
Demand Flow Rate, veh/h	946	1136	69	713
Vehicles Circulating, veh/h	491	155	1374	764
Vehicles Exiting, veh/h	986	1288	63	527
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.0	8.0	10.4	14.9
Approach LOS	B	A	B	B

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.614	0.386
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	445	501	534	602	69	438	275
Cap Entry Lane, veh/h	859	935	1170	1245	442	668	742
Entry HV Adj Factor	0.999	1.001	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	445	501	534	602	69	438	275
Cap Entry, veh/h	859	936	1170	1245	442	668	742
V/C Ratio	0.518	0.536	0.456	0.484	0.156	0.655	0.371
Control Delay, s/veh	11.2	10.9	7.9	8.0	10.4	18.3	9.5
LOS	B	B	A	A	B	C	A
95th %tile Queue, veh	3	3	2	3	1	5	2



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	247	1013	954	421	612	560
v/c Ratio	1.96	0.89	1.27	0.85	306.00	0.57
Control Delay	489.1	49.9	172.9	38.1	13814	7.3 15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	489.1	49.9	172.9	38.1	13814	7.3 15.9
Queue Length 50th (ft)	~296	392	~491	156	~998	223
Queue Length 95th (ft)	#462	#508	#623	#332	#1228	328
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	126	1140	749	497	6	983
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.96	0.89	1.27	0.85	102.00	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 6.6:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	287	391	116	423	1130
v/c Ratio	0.76	0.60	0.64	0.17	0.57
Control Delay	56.9	7.7	88.6	1.3	18.7
Queue Delay	0.8	0.0	0.0	0.0	0.0
Total Delay	57.7	7.7	88.6	1.3	18.7
Queue Length 50th (ft)	211	0	85	4	264
Queue Length 95th (ft)	285	76	160	17	416
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	729	248	2523	1969
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	57	0	0	0	51
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.65	0.54	0.47	0.17	0.59

Intersection Summary



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	157	370	606	401	728
v/c Ratio	0.59	0.82	0.38	0.85	0.26
Control Delay	55.4	29.9	22.3	54.6	5.4
Queue Delay	0.0	0.0	0.0	2.2	0.5
Total Delay	55.4	29.9	22.3	56.9	5.8
Queue Length 50th (ft)	117	90	136	270	48
Queue Length 95th (ft)	164	176	240	419	166
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	607	1615	652	2749
Starvation Cap Reductn	0	0	0	136	1472
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.61	0.38	0.78	0.57

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	791	834	126	729
v/c Ratio	0.90	0.94	0.16	0.97
Control Delay	42.6	49.6	21.8	53.4
Queue Delay	50.6	1.2	0.0	0.0
Total Delay	93.2	50.8	21.8	53.4
Queue Length 50th (ft)	539	591	59	478
Queue Length 95th (ft)	#790	#863	101	#749
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	955	955	811	791
Starvation Cap Reductn	345	31	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.30	0.90	0.16	0.92

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1521	470	801	460
v/c Ratio	1.34	1.34	1.26	1.60
Control Delay	180.8	208.9	164.1	312.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	180.8	208.9	164.1	312.7
Queue Length 50th (ft)	~1386	~474	~778	~419
Queue Length 95th (ft)	#1654	#682	#1018	#628
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1132	351	636	287
Starvation Cap Reductn	5	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.35	1.34	1.26	1.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	950	1226	241	606
Demand Flow Rate, veh/h	950	1226	241	606
Vehicles Circulating, veh/h	431	234	1232	718
Vehicles Exiting, veh/h	893	1239	149	742
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	10.1	9.7	16.2	11.2
Approach LOS	B	A	C	B

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.469	0.531	0.470	0.530	1.000	0.594	0.406
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	446	504	576	650	241	360	246
Cap Entry Lane, veh/h	908	984	1088	1164	498	697	771
Entry HV Adj Factor	1.001	0.999	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	446	504	576	650	241	360	246
Cap Entry, veh/h	909	983	1089	1164	498	697	771
V/C Ratio	0.491	0.512	0.529	0.558	0.484	0.516	0.319
Control Delay, s/veh	10.2	10.0	9.6	9.7	16.2	13.1	8.4
LOS	B	A	A	A	C	B	A
95th %tile Queue, veh	3	3	3	4	3	3	1



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	307	875	1108	662	153	447
v/c Ratio	2.77	0.63	1.09	0.98	76.50	0.51
Control Delay	840.4	32.8	95.9	51.8	34864.5	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	840.4	32.8	95.9	51.8	34864.5	18.0
Queue Length 50th (ft)	~405	287	~507	296	~247	185
Queue Length 95th (ft)	#586	357	#642	#558	#386	276
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	111	1380	1019	676	6	879
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.77	0.63	1.09	0.98	25.50	0.51

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	152	440	134	905	930
v/c Ratio	0.32	0.86	0.69	0.39	0.53
Control Delay	35.5	45.4	65.0	13.3	23.2
Queue Delay	0.3	0.0	0.0	0.6	0.0
Total Delay	35.8	45.4	65.0	13.9	23.2
Queue Length 50th (ft)	95	241	111	173	242
Queue Length 95th (ft)	134	327	m140	207	389
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	660	263	2336	1767
Starvation Cap Reductn	0	0	0	970	0
Spillback Cap Reductn	191	0	0	0	47
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.67	0.51	0.66	0.54

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	441	373	1005	382	522
v/c Ratio	0.89	0.59	0.77	0.90	0.23
Control Delay	63.3	14.5	36.5	87.7	8.5
Queue Delay	0.0	0.0	0.0	38.2	0.2
Total Delay	63.3	14.5	36.5	125.9	8.7
Queue Length 50th (ft)	319	63	348	293	61
Queue Length 95th (ft)	#486	162	#454	#442	92
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	531	661	1301	472	2298
Starvation Cap Reductn	0	0	0	111	1006
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.83	0.56	0.77	1.06	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	603	964	156	634
v/c Ratio	0.56	0.90	0.28	0.91
Control Delay	16.4	32.1	31.2	38.2
Queue Delay	1.1	0.3	0.0	0.0
Total Delay	17.6	32.4	31.2	38.2
Queue Length 50th (ft)	259	574	81	247
Queue Length 95th (ft)	357	801	152	#525
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1385	1385	683	794
Starvation Cap Reductn	523	88	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.70	0.74	0.23	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1179	506	859	520
v/c Ratio	1.20	1.19	1.14	1.32
Control Delay	124.3	145.3	111.5	187.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	124.3	145.3	111.5	187.1
Queue Length 50th (ft)	~994	~471	~775	~369
Queue Length 95th (ft)	#1257	#684	#1020	#587
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	980	427	756	393
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.20	1.19	1.14	1.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	953	1085	113	724
Demand Flow Rate, veh/h	953	1085	113	724
Vehicles Circulating, veh/h	501	200	1370	735
Vehicles Exiting, veh/h	958	1283	84	550
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.3	8.1	12.2	14.2
Approach LOS	B	A	B	B

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.606	0.394
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	448	505	510	575	113	439	285
Cap Entry Lane, veh/h	851	928	1123	1198	443	687	760
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	448	505	510	575	113	439	285
Cap Entry, veh/h	851	928	1123	1198	443	687	760
V/C Ratio	0.526	0.544	0.454	0.480	0.255	0.639	0.375
Control Delay, s/veh	11.5	11.1	8.1	8.1	12.2	17.3	9.4
LOS	B	B	A	A	B	C	A
95th %tile Queue, veh	3	3	2	3	1	5	2



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	273	1020	956	421	656	560
v/c Ratio	2.17	0.89	1.28	0.85	328.00	0.57
Control Delay	577.1	50.5	174.0	38.1	48047.5	15.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	577.1	50.5	174.0	38.1	48047.5	15.9
Queue Length 50th (ft)	~338	395	~493	156	~1071	223
Queue Length 95th (ft)	#511	#514	#625	#332	#1303	328
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	126	1140	749	497	6	983
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	2.17	0.89	1.28	0.85	109.33	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 6.7:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 NP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4726	7161	0.66	67.4	23.4	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.926	4726	439	7200	2100	0.66	0.21	64.6	60.5	24.4	28.3	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4304	7161	0.60	68.3	21.0	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	5019	715	7200	2100	0.70	0.34	61.2	59.1	27.3	28.3	D

Segment 5: Basic

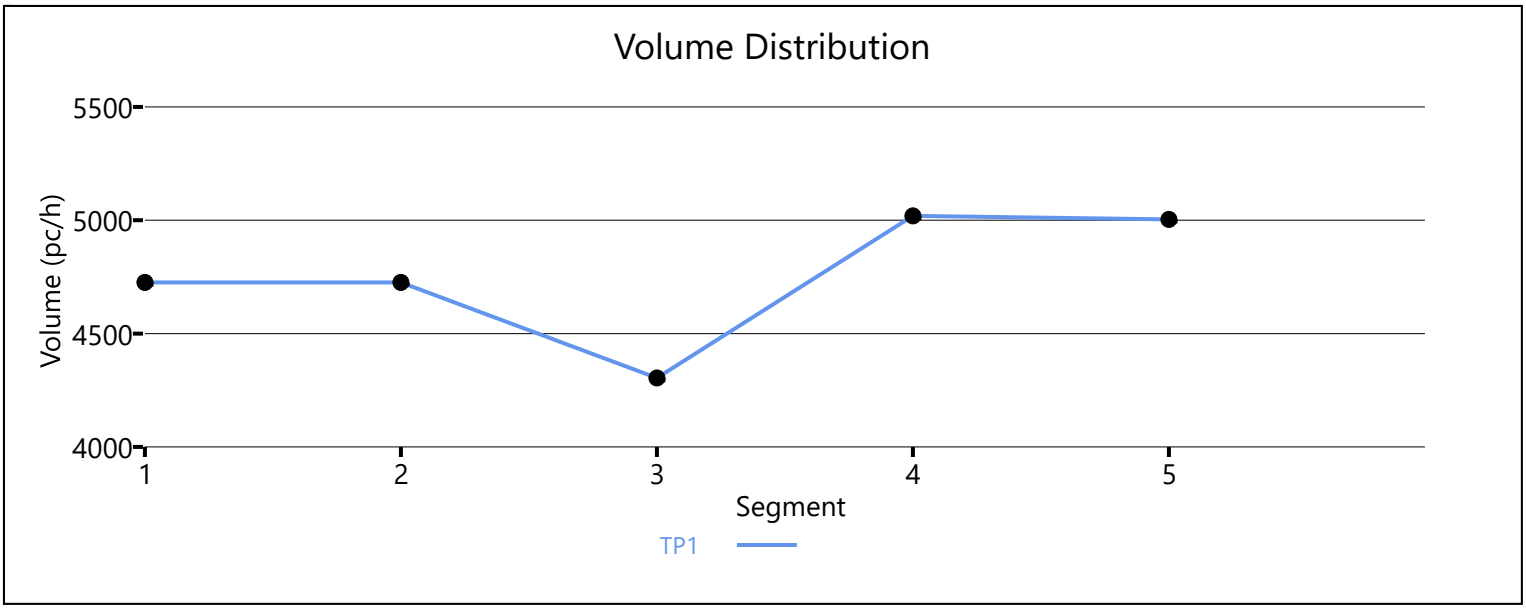
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5004	7161	0.70	66.6	25.0	C

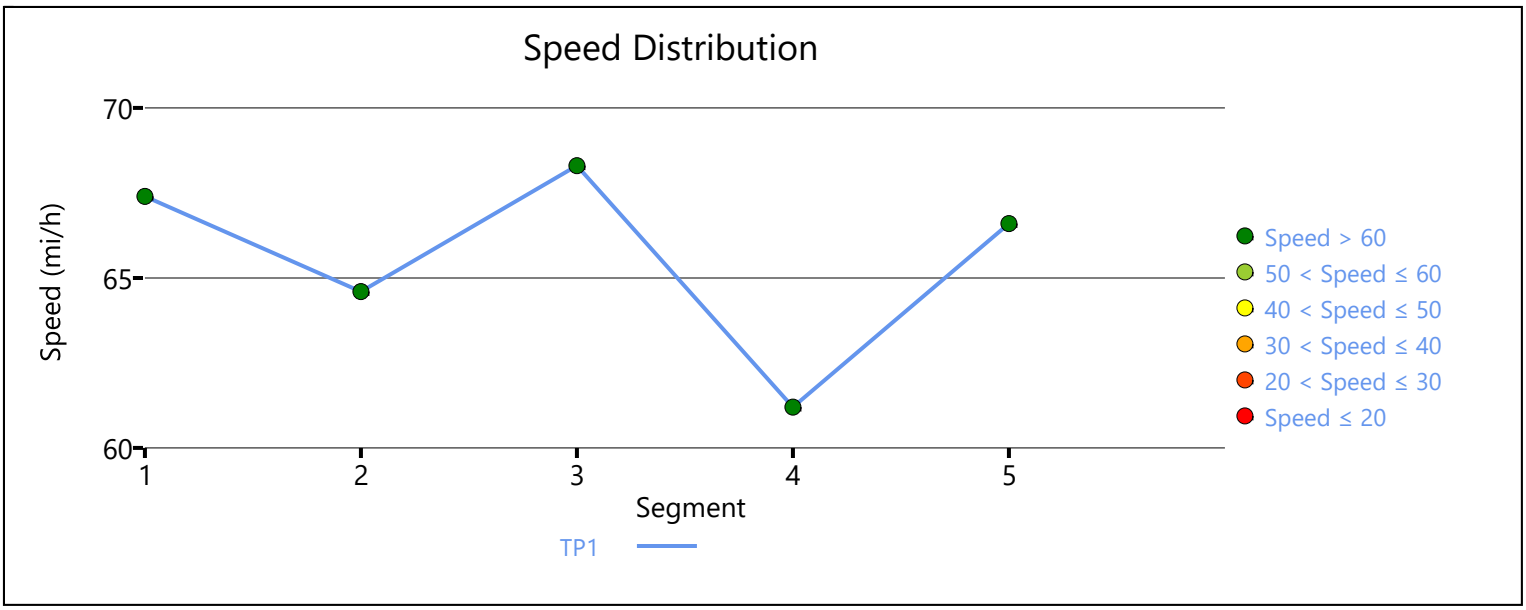
Facility Time Period Results

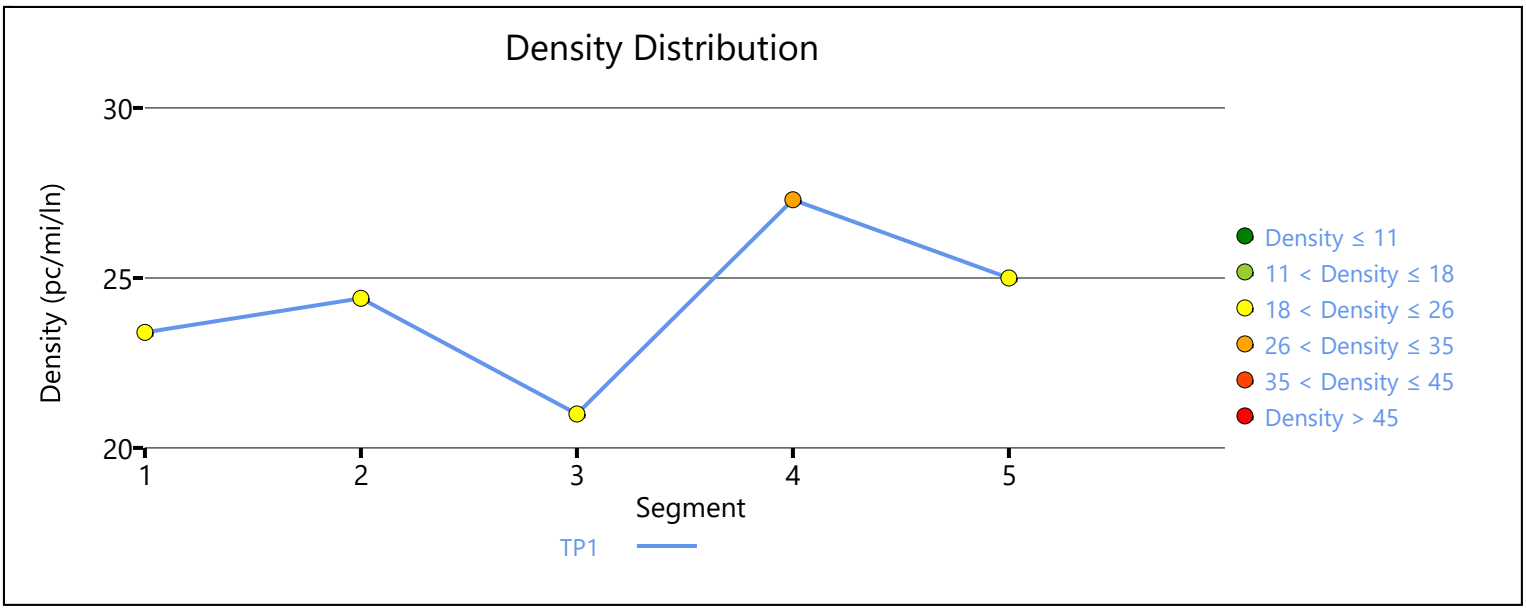
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.9	24.3	23.4	2.0	C

Facility Overall Results

Space Mean Speed, mi/h	65.9	Density, veh/mi/ln	23.4
Average Travel Time, min	2.0	Density, pc/mi/ln	24.3







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 NP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3905	7161	0.55	68.7	19.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.893	3905	456	7200	2100	0.54	0.22	64.7	60.5	20.1	25.8	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	3453	7161	0.48	68.7	16.8	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.909	4015	562	7200	2100	0.56	0.27	62.6	60.6	21.4	23.0	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4011	7161	0.56	68.6	19.5	C

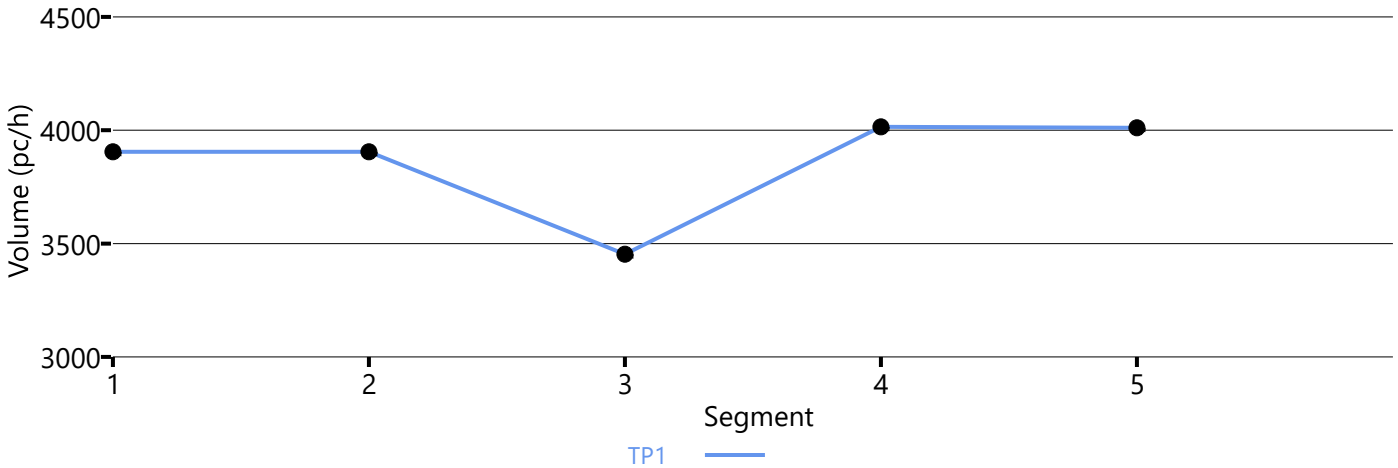
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.4	19.3	18.7	2.1	C

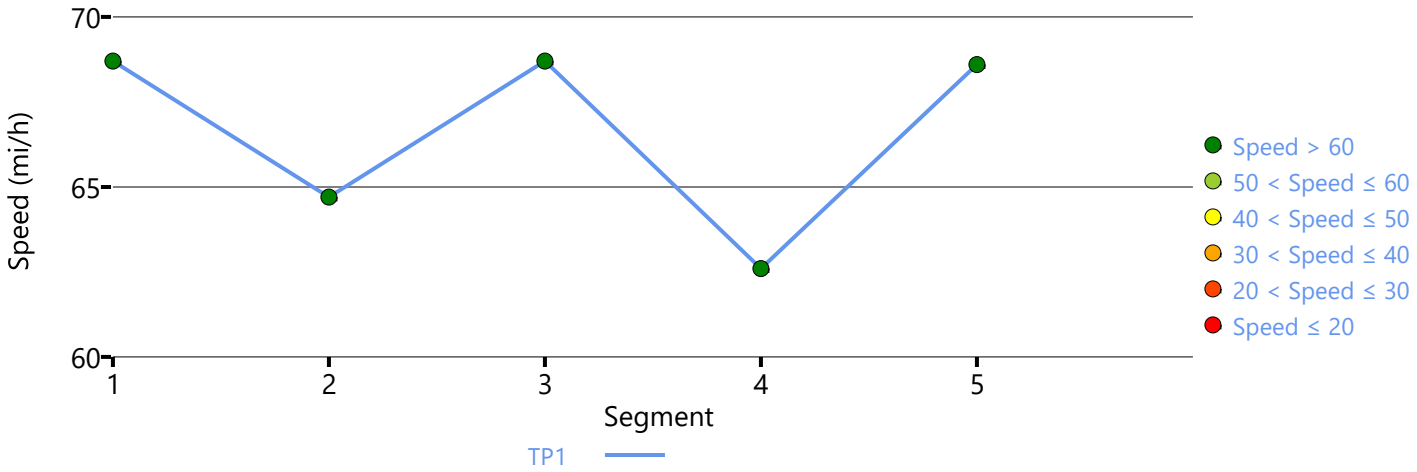
Facility Overall Results

Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	18.7
Average Travel Time, min	2.1	Density, pc/mi/ln	19.3

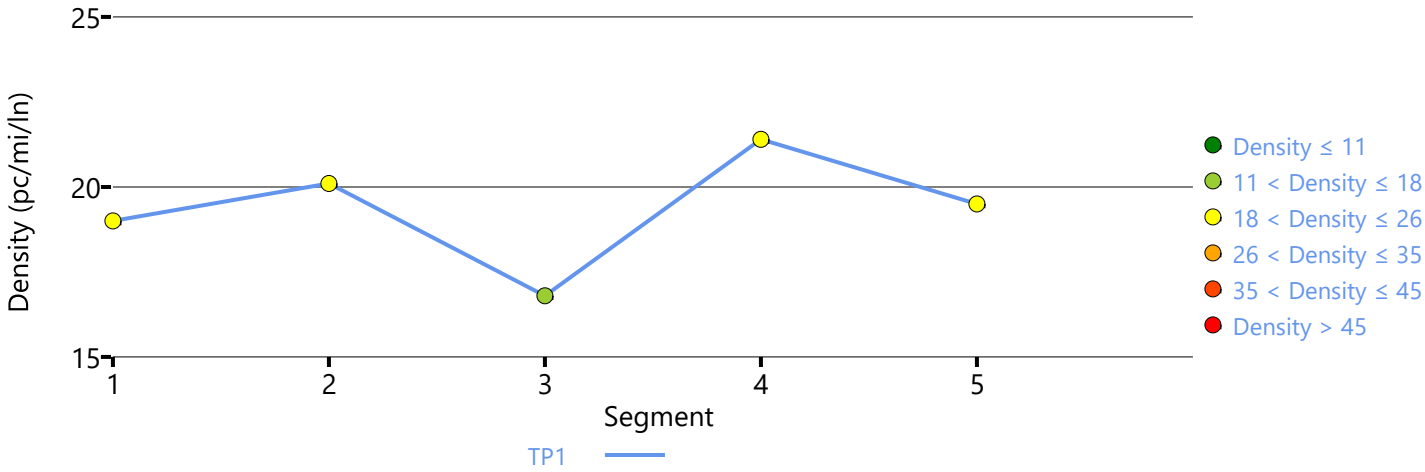
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 NP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4518	7161	0.63	67.9	22.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.971	4518	538	6600	2100	0.68	0.26	64.5	60.3	23.3	27.5	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	3975	7161	0.56	68.6	19.3	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4455	480	6600	2100	0.68	0.23	62.1	60.1	23.9	25.1	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4445	7161	0.62	68.1	21.8	C

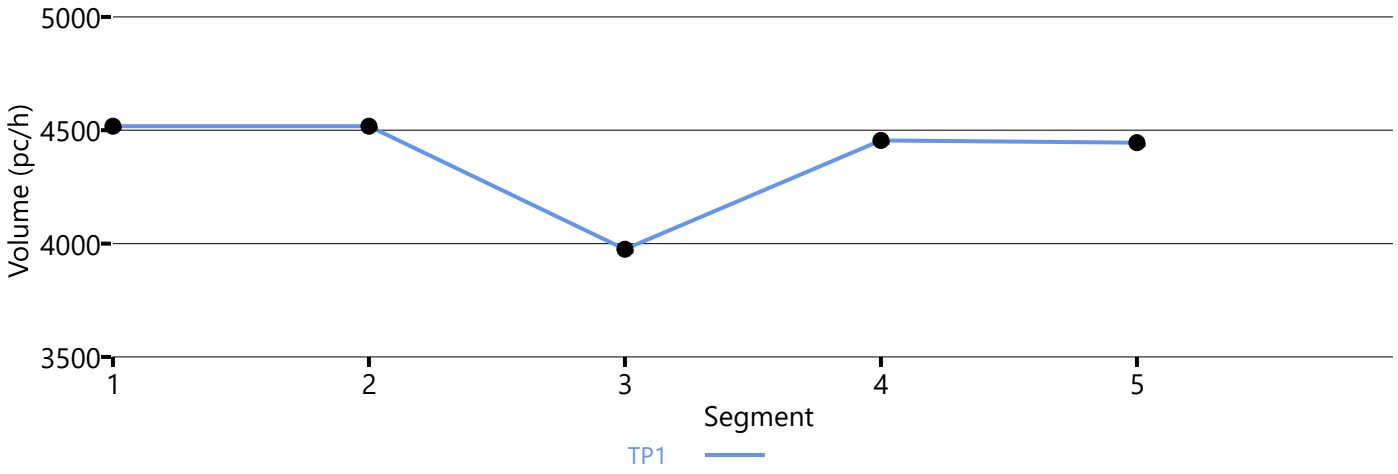
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.8	22.0	21.2	2.0	C

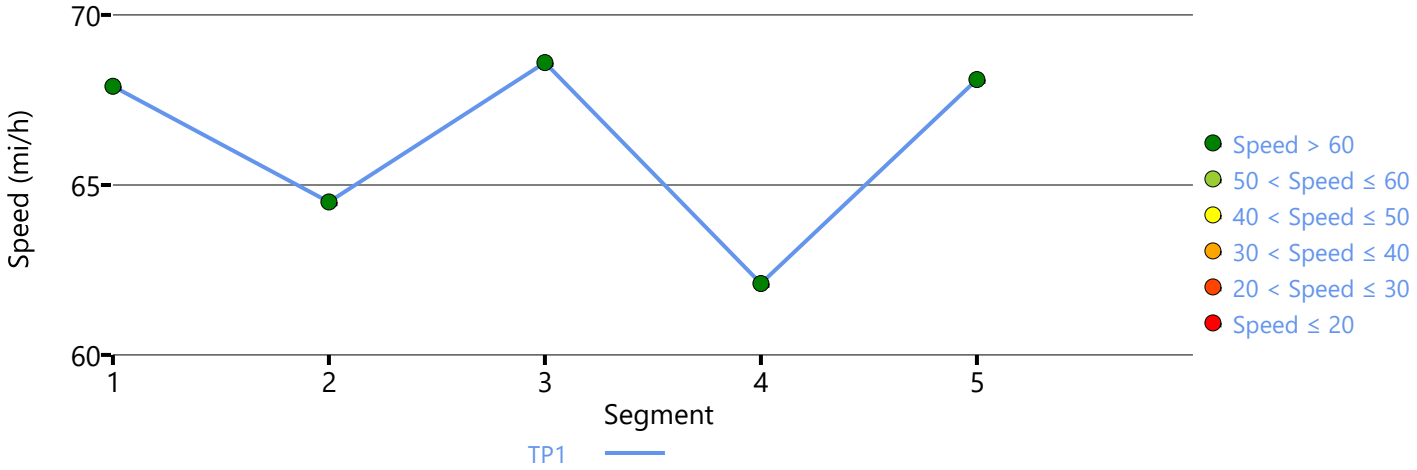
Facility Overall Results

Space Mean Speed, mi/h	66.8	Density, veh/mi/ln	21.2
Average Travel Time, min	2.0	Density, pc/mi/ln	22.0

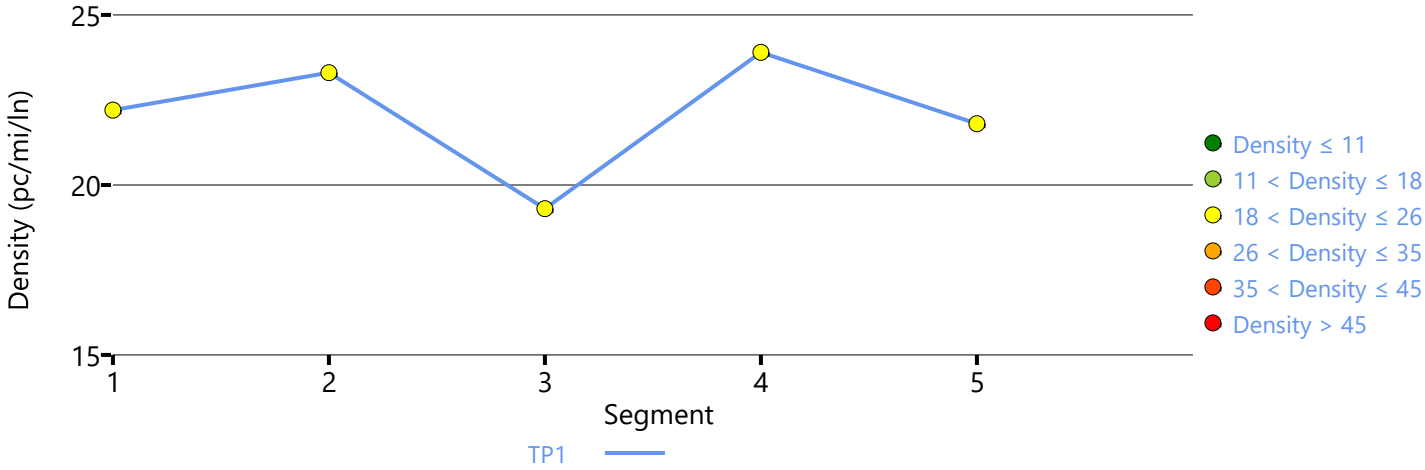
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 NP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3706	7161	0.52	68.7	18.0	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3706	529	7200	2100	0.51	0.25	64.4	60.3	19.2	25.0	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3188	7161	0.45	68.7	15.5	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3577	389	7200	2100	0.50	0.19	63.1	61.0	18.9	20.5	C

Segment 5: Basic

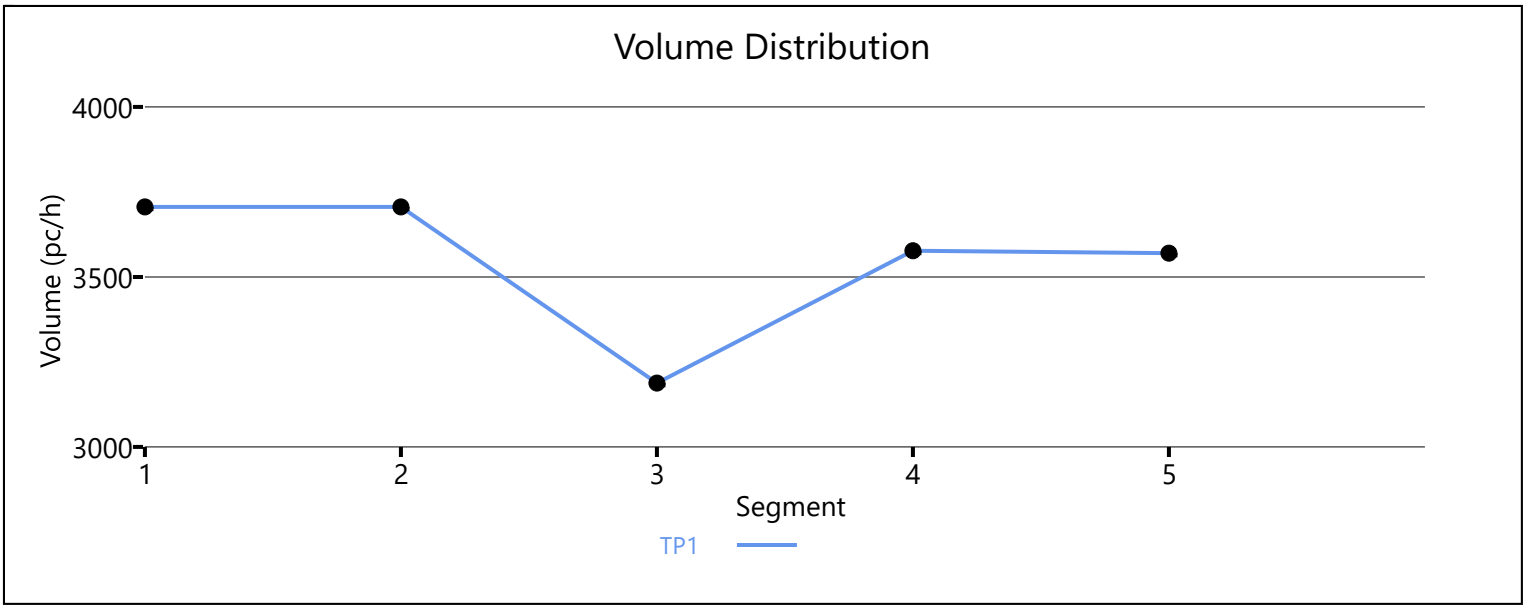
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3570	7161	0.50	68.7	17.3	B

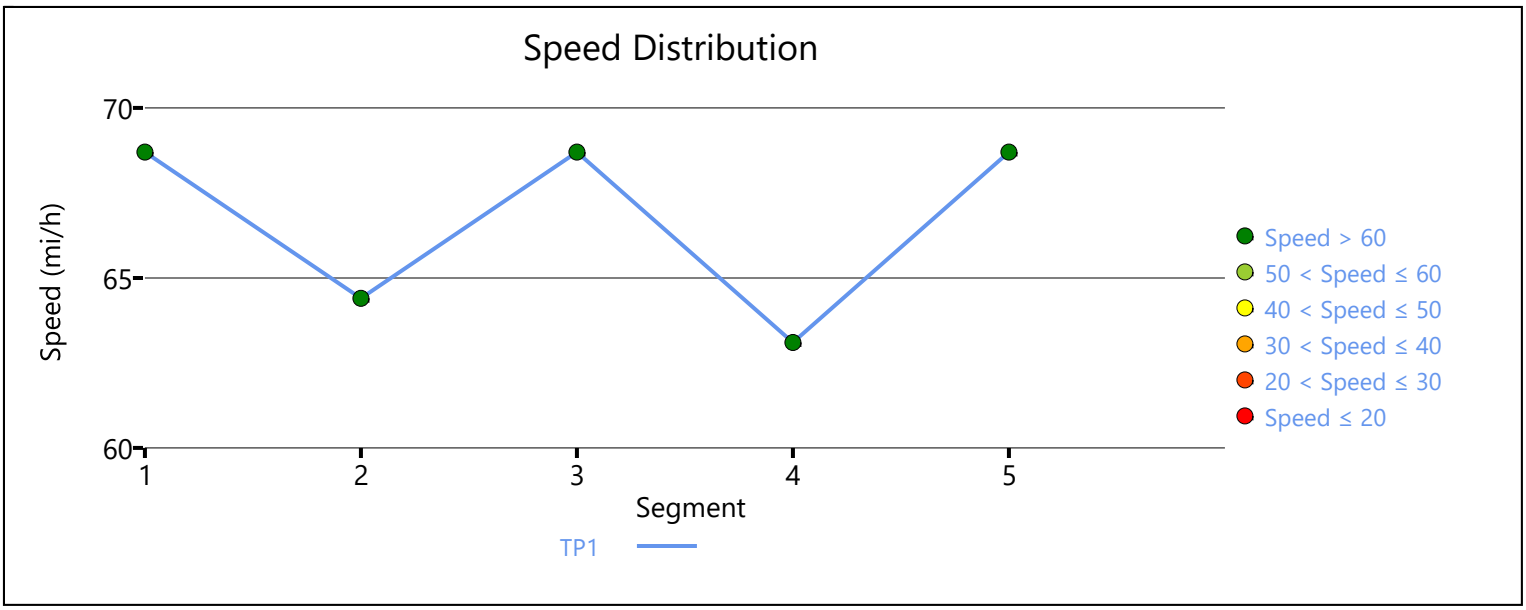
Facility Time Period Results

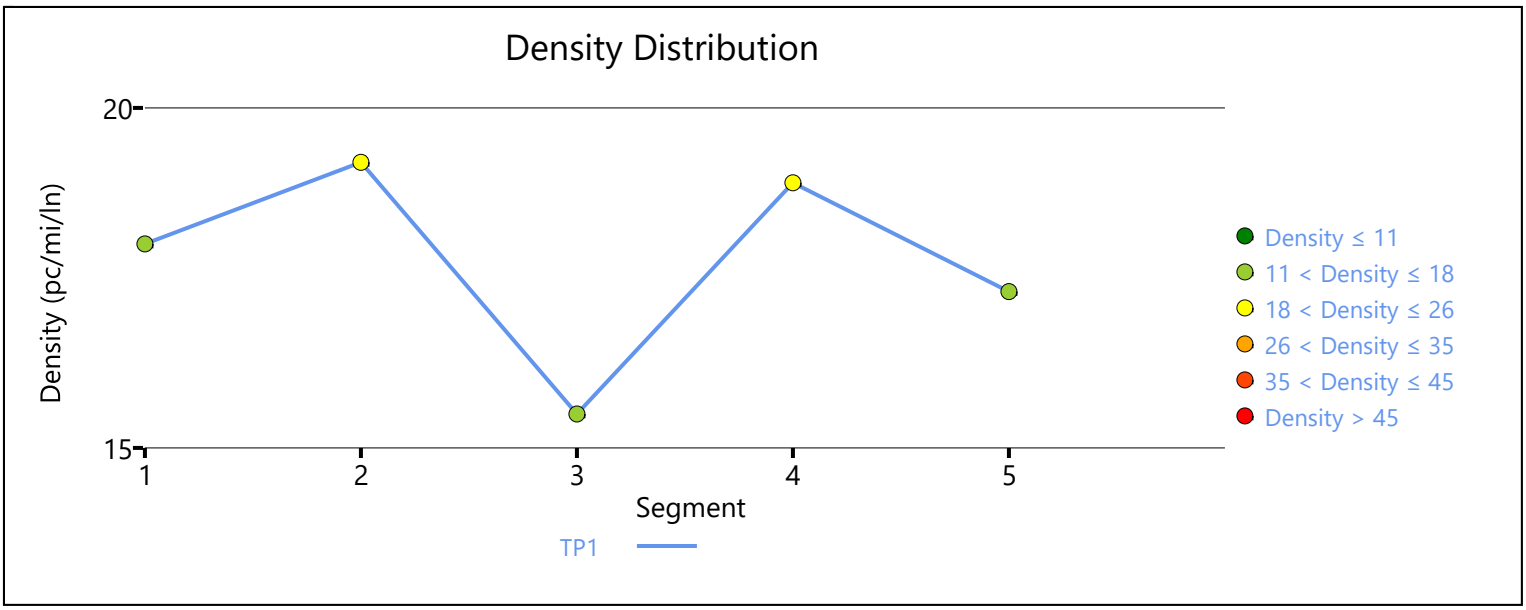
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.4	17.8	17.3	2.1	B

Facility Overall Results

Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	17.3
Average Travel Time, min	2.1	Density, pc/mi/ln	17.8







Copyright © 2020 University of Florida. All Rights Reserved.

APPENDIX 6.8:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 WP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	4795	7161	0.67	67.2	23.8	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.926	4795	459	7200	2100	0.67	0.22	64.6	60.5	24.7	28.6	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4304	7161	0.60	68.3	21.0	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	5026	722	7200	2100	0.70	0.34	61.2	59.1	27.4	28.4	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5011	7161	0.70	66.6	25.1	C

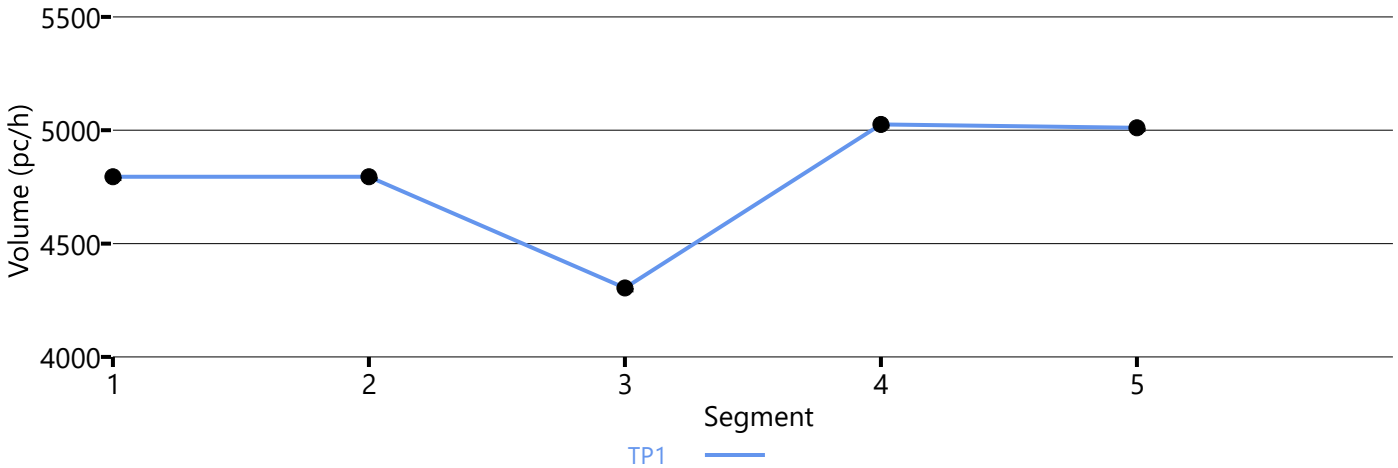
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.9	24.5	23.5	2.0	C

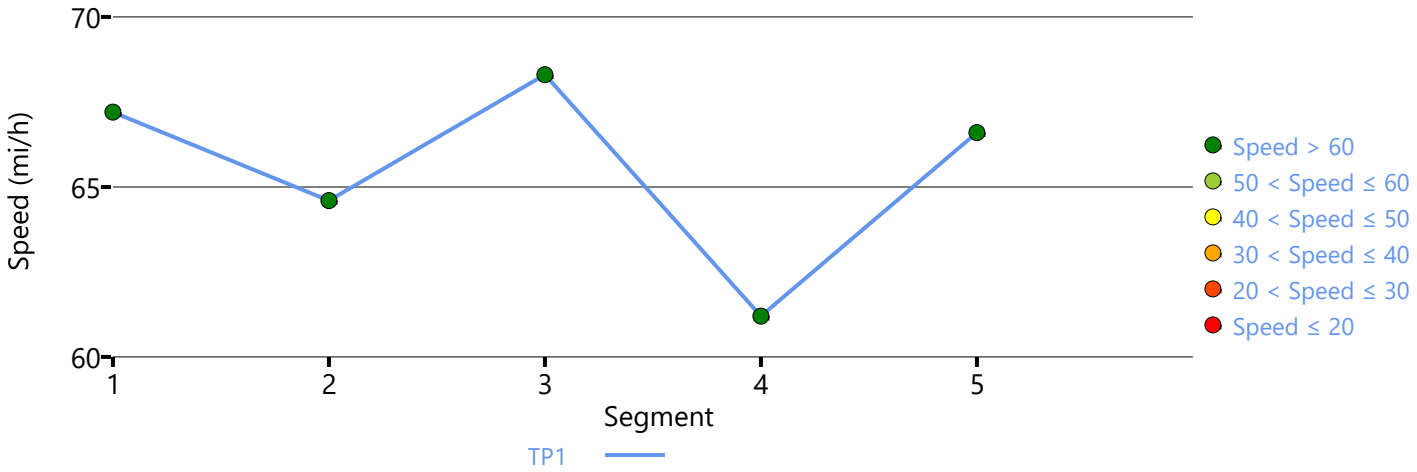
Facility Overall Results

Space Mean Speed, mi/h	65.9	Density, veh/mi/ln	23.5
Average Travel Time, min	2.0	Density, pc/mi/ln	24.5

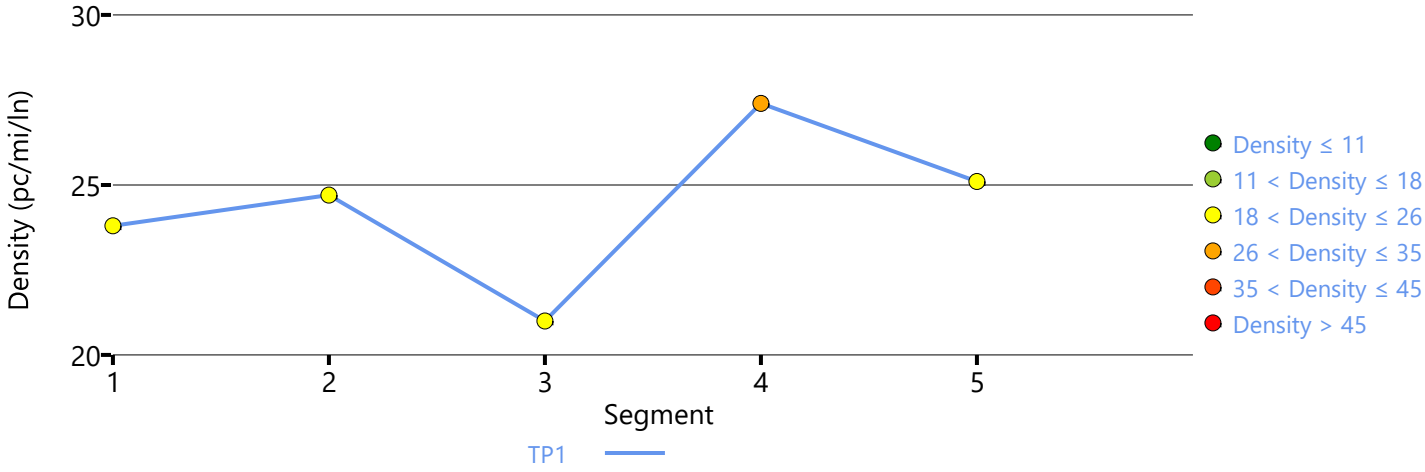
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 WP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3924	7161	0.55	68.7	19.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.885	3924	481	7200	2100	0.55	0.23	64.6	60.5	20.2	26.0	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	3453	7161	0.48	68.7	16.8	B

Segment 4: Merge

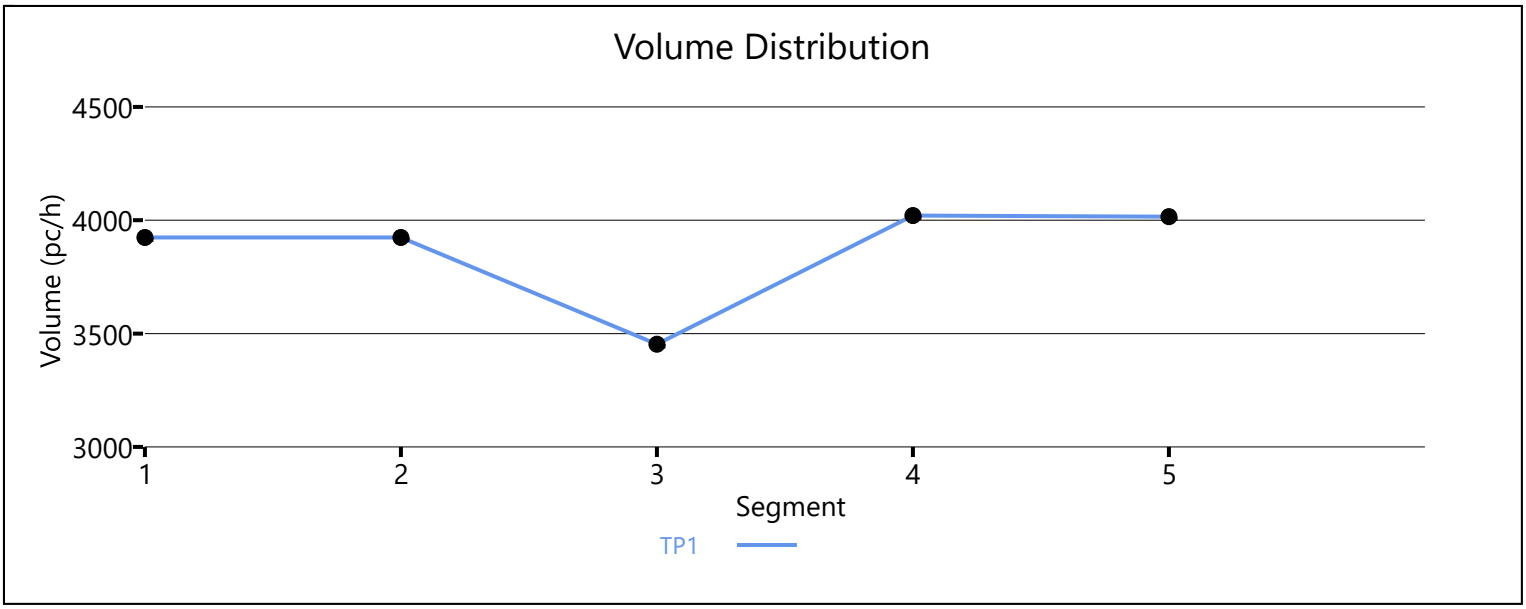
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.909	4021	568	7200	2100	0.56	0.27	62.6	60.5	21.4	23.1	C

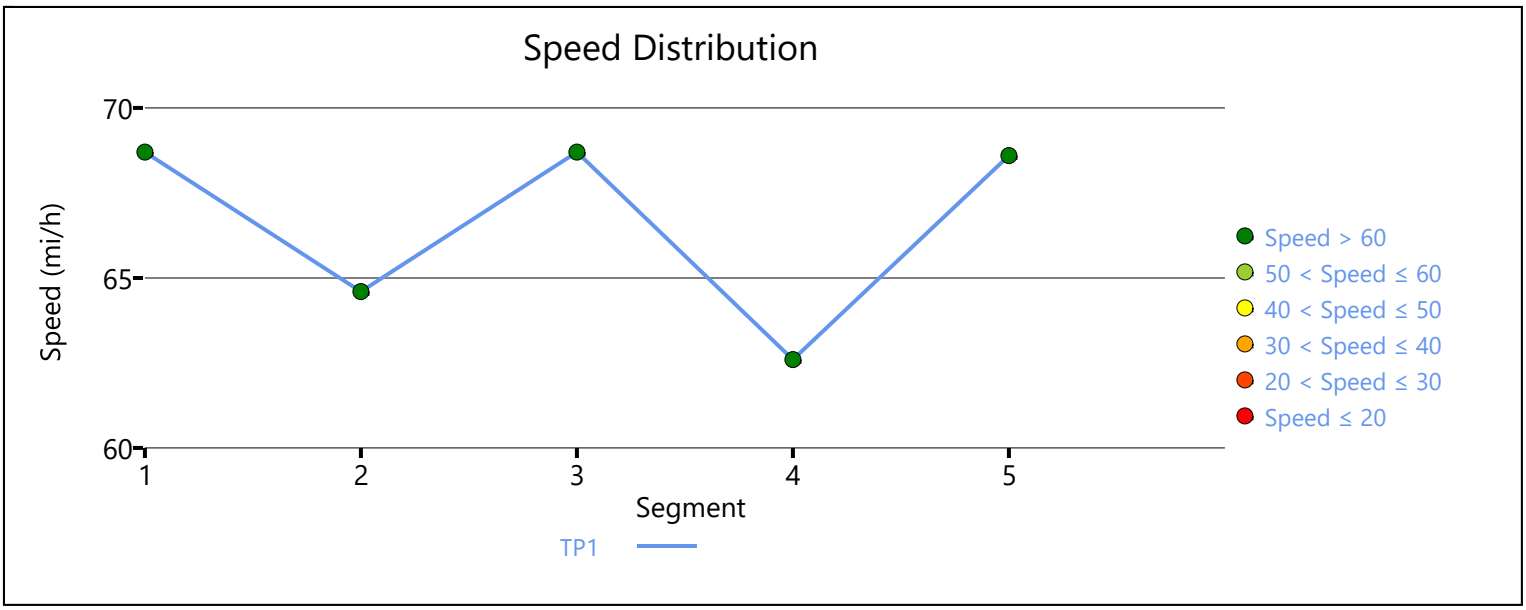
Segment 5: Basic

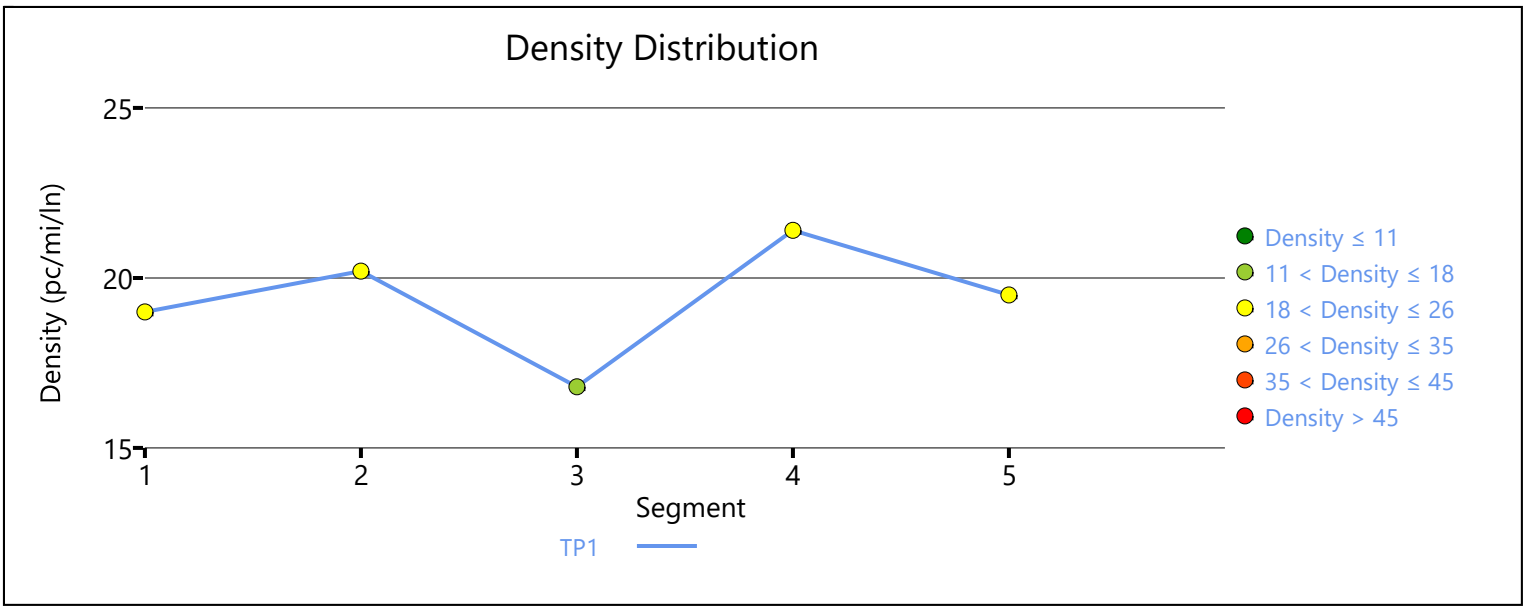
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4016	7161	0.56	68.6	19.5	C

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	67.4	19.3	18.7	2.1	C

Facility Overall Results			
Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	18.7
Average Travel Time, min	2.1	Density, pc/mi/ln	19.3







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 WP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4527	7161	0.63	67.9	22.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.962	4527	553	6600	2100	0.69	0.26	64.5	60.3	23.4	27.5	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	3975	7161	0.56	68.6	19.3	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.943	4476	501	6600	2100	0.68	0.24	62.0	60.0	24.1	25.2	C

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4466	7161	0.62	68.0	21.9	C

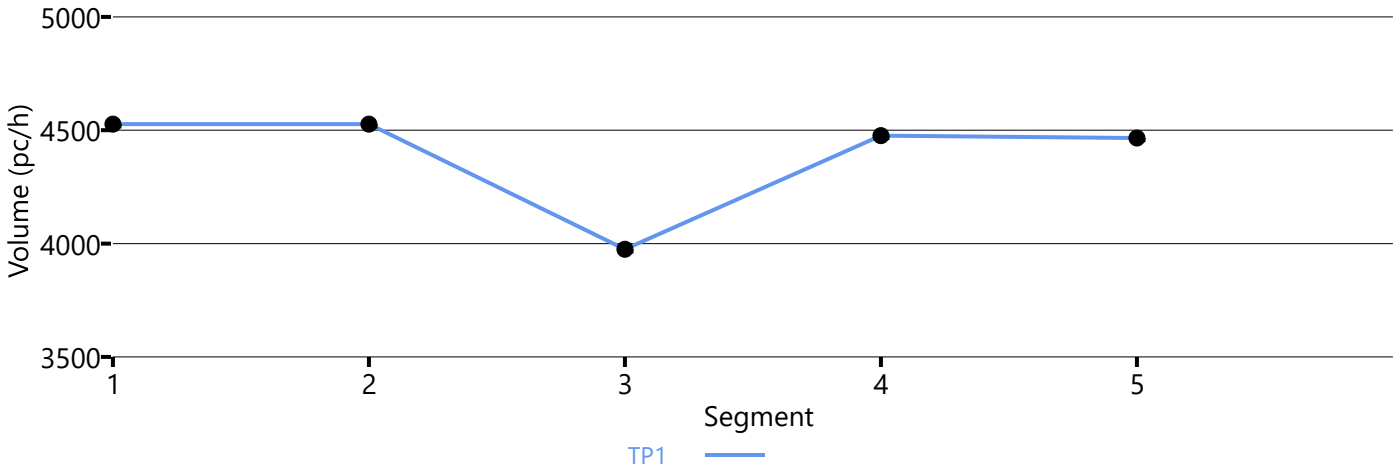
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	66.7	22.1	21.3	2.0	C

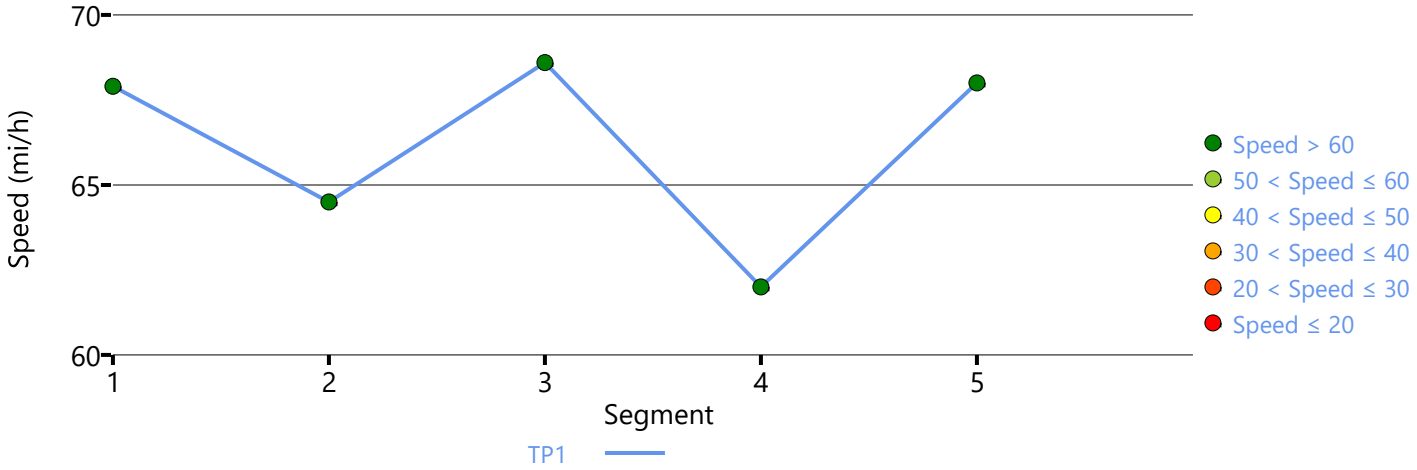
Facility Overall Results

Space Mean Speed, mi/h	66.7	Density, veh/mi/ln	21.3
Average Travel Time, min	2.0	Density, pc/mi/ln	22.1

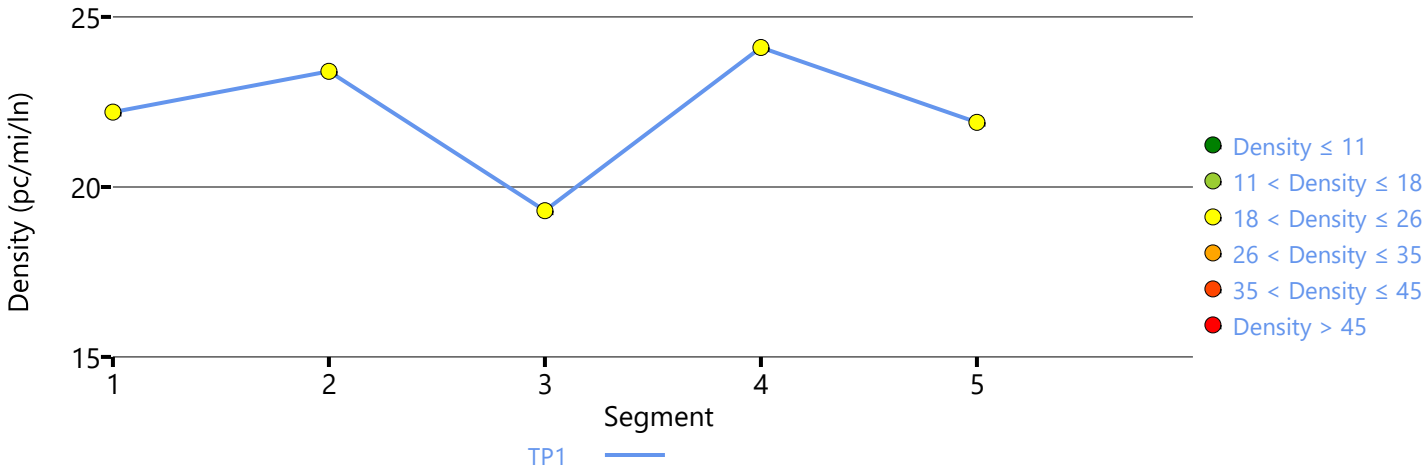
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 WP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3714	7161	0.52	68.7	18.0	B

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3714	537	7200	2100	0.52	0.26	64.4	60.3	19.2	25.1	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3188	7161	0.45	68.7	15.5	B

Segment 4: Merge

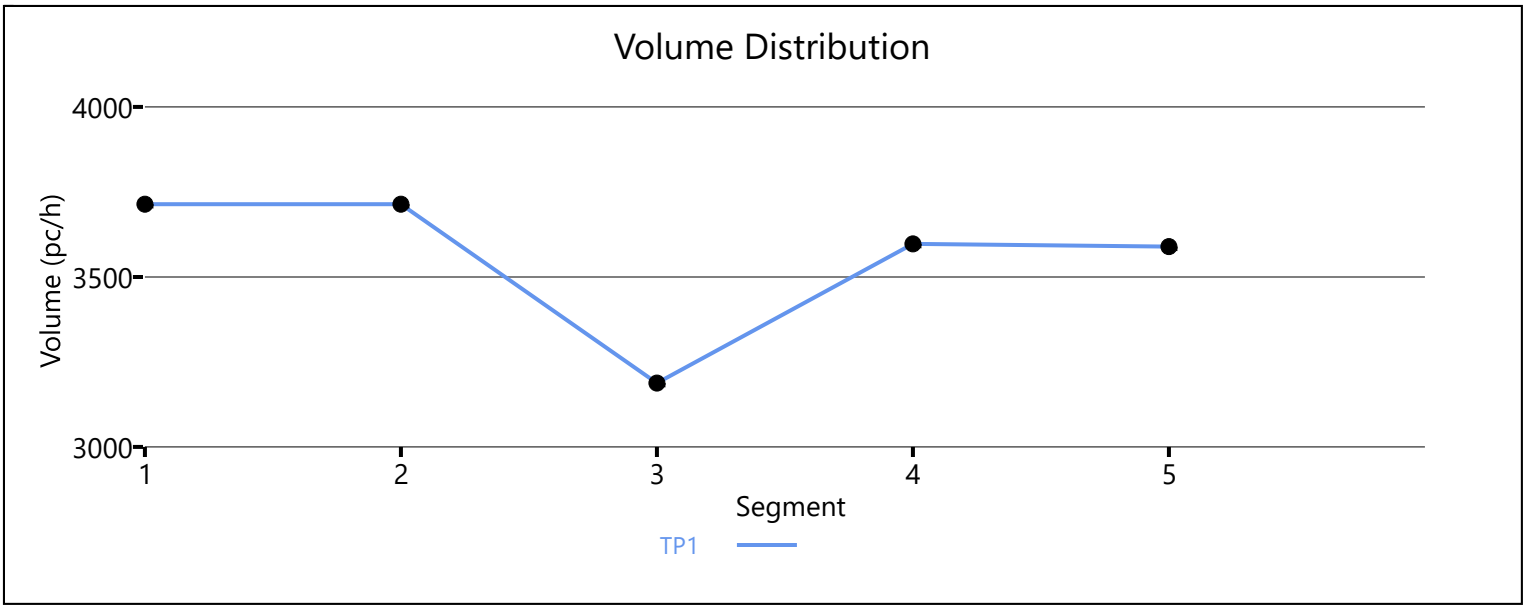
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.952	3597	409	7200	2100	0.50	0.19	63.1	61.0	19.0	20.7	C

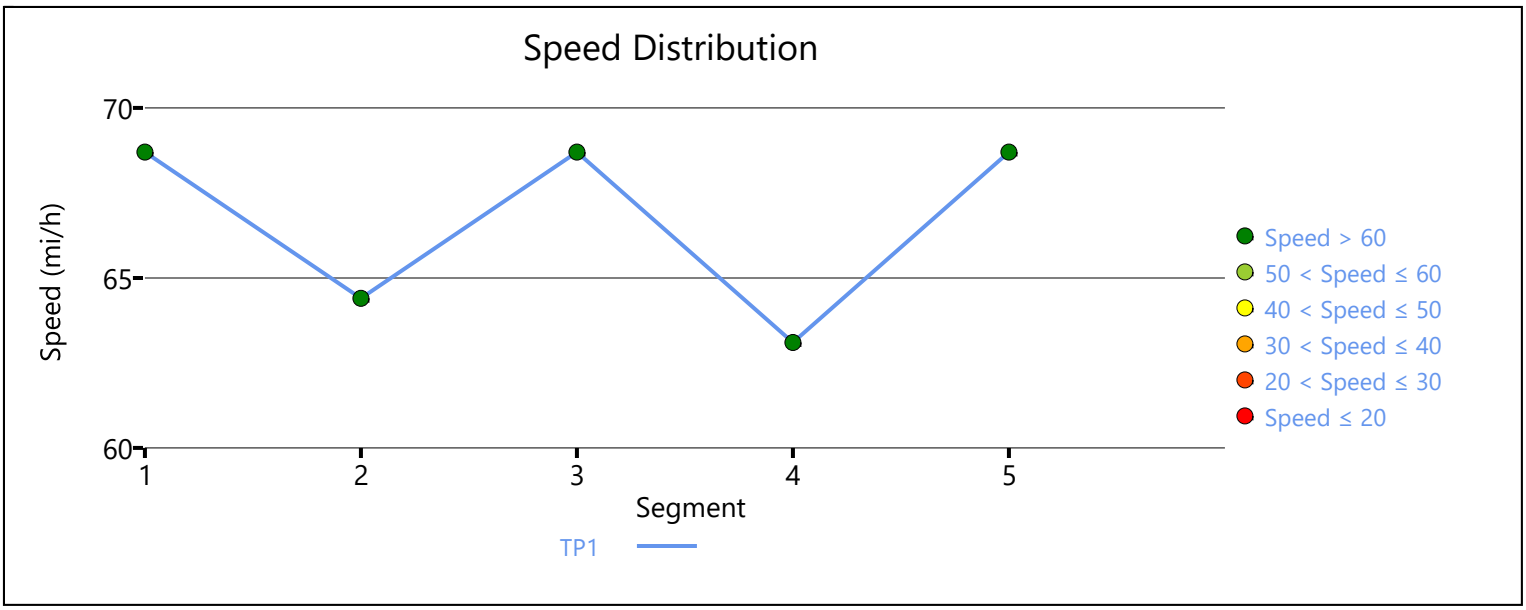
Segment 5: Basic

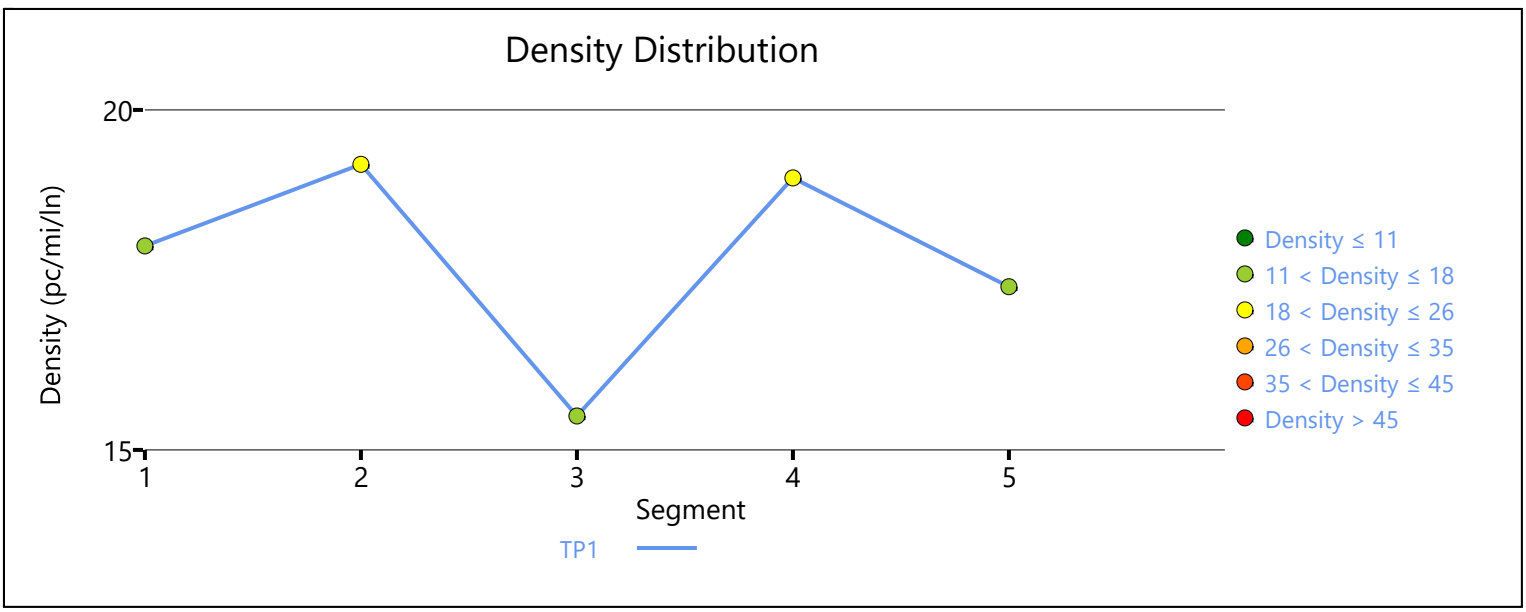
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3589	7161	0.50	68.7	17.4	B

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	67.4	17.8	17.3	2.1	B

Facility Overall Results			
Space Mean Speed, mi/h	67.4	Density, veh/mi/ln	17.3
Average Travel Time, min	2.1	Density, pc/mi/ln	17.8







Copyright © 2020 University of Florida. All Rights Reserved.

APPENDIX 6.9:

OPENING YEAR CUMULATIVE (2022) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

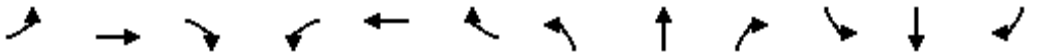
This Page Intentionally Left Blank

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	197	18	32	154	397	33	809
Future Volume (vph)	197	18	32	154	397	33	809
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	30.0	30.0	30.0	21.0	78.0	12.0	69.0
Total Split (%)	25.0%	25.0%	25.0%	17.5%	65.0%	10.0%	57.5%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	22.0	22.0	23.3	14.7	70.9	6.6	58.1
Actuated g/C Ratio	0.20	0.20	0.21	0.13	0.64	0.06	0.52
v/c Ratio	0.86	0.29	0.13	0.81	0.21	0.39	0.92
Control Delay	74.5	14.2	31.0	77.4	9.7	66.4	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.5	14.2	31.0	77.4	9.7	66.4	30.7
LOS	E	B	C	E	A	E	C
Approach Delay		54.4	31.0		28.4		31.5
Approach LOS		D	C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 33.6	Intersection LOS: C
Intersection Capacity Utilization 87.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	18	80	0	32	12	154	397	5	33	809	660
Future Volume (veh/h)	197	18	80	0	32	12	154	397	5	33	809	660
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	221	20	80	0	36	11	173	446	5	37	909	569
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	317	63	254	0	267	82	200	2118	24	51	1061	645
Arrive On Green	0.20	0.20	0.20	0.00	0.20	0.20	0.12	0.61	0.61	0.03	0.52	0.52
Sat Flow, veh/h	1380	315	1259	0	1323	404	1619	3464	39	1619	2043	1243
Grp Volume(v), veh/h	221	0	100	0	0	47	173	220	231	37	757	721
Grp Sat Flow(s),veh/h/ln	1380	0	1573	0	0	1727	1619	1710	1793	1619	1710	1576
Q Serve(g_s), s	16.3	0.0	5.7	0.0	0.0	2.3	10.9	6.0	6.0	2.4	39.8	42.4
Cycle Q Clear(g_c), s	18.7	0.0	5.7	0.0	0.0	2.3	10.9	6.0	6.0	2.4	39.8	42.4
Prop In Lane	1.00		0.80	0.00		0.23	1.00		0.02	1.00		0.79
Lane Grp Cap(c), veh/h	317	0	317	0	0	348	200	1046	1096	51	888	818
V/C Ratio(X)	0.70	0.00	0.31	0.00	0.00	0.13	0.86	0.21	0.21	0.73	0.85	0.88
Avail Cap(c_a), veh/h	358	0	365	0	0	420	254	1183	1241	115	1036	955
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.8	0.0	35.5	0.0	0.0	34.2	44.8	9.0	9.0	50.1	21.6	22.2
Incr Delay (d2), s/veh	5.1	0.0	0.6	0.0	0.0	0.2	18.0	0.1	0.1	7.1	6.2	8.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	2.1	0.0	0.0	1.0	5.2	2.0	2.1	1.0	15.6	15.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.9	0.0	36.1	0.0	0.0	34.4	62.8	9.1	9.1	57.1	27.8	30.9
LnGrp LOS	D	A	D	A	A	C	E	A	A	E	C	C
Approach Vol, veh/h		321			47			624			1515	
Approach Delay, s/veh		43.5			34.4			24.0			30.0	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	69.6		26.9	17.5	60.0		26.9				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	72.2		24.2	16.4	63.2		* 25				
Max Q Clear Time (g_c+I1), s	4.4	8.0		20.7	12.9	44.4		4.3				
Green Ext Time (p_c), s	0.0	2.5		0.4	0.1	9.8		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		30.3	
HCM 6th LOS		C	

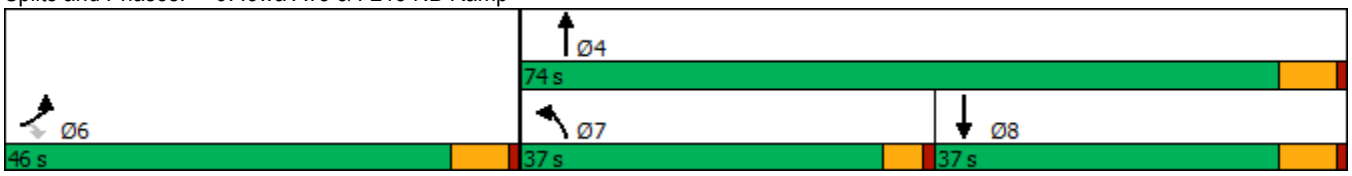
Notes

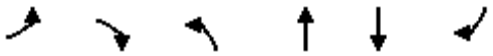
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	187	1228	437	745	88
Future Volume (vph)	187	1228	437	745	88
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	46.0	46.0	37.0	74.0	37.0
Total Split (%)	38.3%	38.3%	30.8%	61.7%	30.8%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.0	19.0	29.7	57.5	23.0
Actuated g/C Ratio	0.21	0.21	0.33	0.64	0.26
v/c Ratio	0.52	0.80	0.78	0.66	0.82
Control Delay	38.1	6.3	40.0	13.6	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	6.3	40.0	13.6	34.8
LOS	D	A	D	B	C
Approach Delay	10.5			23.4	34.8
Approach LOS	B			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 89.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 78.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	187	1228	437	745	88	330
Future Volume (veh/h)	187	1228	437	745	88	330
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	971	470	801	95	269
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	622	973	494	1044	104	293
Arrive On Green	0.34	0.34	0.27	0.55	0.24	0.24
Sat Flow, veh/h	1810	2834	1810	1900	438	1239
Grp Volume(v), veh/h	201	971	470	801	0	364
Grp Sat Flow(s),veh/h/ln	1810	1417	1810	1900	0	1677
Q Serve(g_s), s	9.5	39.7	29.6	38.0	0.0	24.5
Cycle Q Clear(g_c), s	9.5	39.7	29.6	38.0	0.0	24.5
Prop In Lane	1.00	1.00	1.00			0.74
Lane Grp Cap(c), veh/h	622	973	494	1044	0	397
V/C Ratio(X)	0.32	1.00	0.95	0.77	0.00	0.92
Avail Cap(c_a), veh/h	622	973	506	1112	0	446
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.1	38.0	41.3	20.3	0.0	43.1
Incr Delay (d2), s/veh	0.3	28.2	27.4	3.1	0.0	22.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	29.7	16.8	17.0	0.0	12.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.4	66.2	68.7	23.4	0.0	65.5
LnGrp LOS	C	E	E	C	A	E
Approach Vol, veh/h	1172			1271	364	
Approach Delay, s/veh	59.7			40.2	65.5	
Approach LOS	E			D	E	

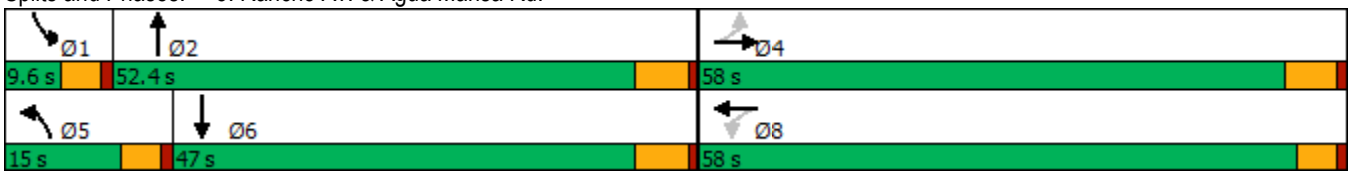
Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	69.9	46.0	36.2	33.6
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	67.8	39.8	32.4	30.8
Max Q Clear Time (g_c+I1), s	40.0	41.7	31.6	26.5
Green Ext Time (p_c), s	6.7	0.0	0.1	0.9

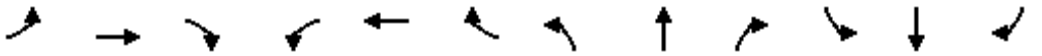
Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	494	94	27	100	494	13	779
Future Volume (vph)	494	94	27	100	494	13	779
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	58.0	58.0	58.0	15.0	52.4	9.6	47.0
Total Split (%)	48.3%	48.3%	48.3%	12.5%	43.7%	8.0%	39.2%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	48.1	48.1	49.3	9.8	49.3	5.1	38.5
Actuated g/C Ratio	0.43	0.43	0.44	0.09	0.44	0.05	0.34
v/c Ratio	0.94	0.40	0.05	0.76	0.35	0.19	0.90
Control Delay	58.0	16.0	15.1	85.4	23.4	61.9	46.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	16.0	15.1	85.4	23.4	61.9	46.5
LOS	E	B	B	F	C	E	D
Approach Delay		42.7	15.1		33.8		46.7
Approach LOS		D	B		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 41.7	Intersection LOS: D
Intersection Capacity Utilization 84.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	494	94	189	0	27	10	100	494	2	13	779	193
Future Volume (veh/h)	494	94	189	0	27	10	100	494	2	13	779	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	526	100	174	0	29	9	106	526	2	14	829	158
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	639	248	432	0	554	172	130	1400	5	26	965	184
Arrive On Green	0.42	0.42	0.42	0.00	0.42	0.42	0.08	0.40	0.40	0.02	0.34	0.34
Sat Flow, veh/h	1391	590	1026	0	1318	409	1619	3494	13	1619	2866	546
Grp Volume(v), veh/h	526	0	274	0	0	38	106	257	271	14	495	492
Grp Sat Flow(s),veh/h/ln	1391	0	1615	0	0	1726	1619	1710	1798	1619	1710	1702
Q Serve(g_s), s	35.9	0.0	11.8	0.0	0.0	1.3	6.4	10.6	10.6	0.9	26.9	26.9
Cycle Q Clear(g_c), s	37.2	0.0	11.8	0.0	0.0	1.3	6.4	10.6	10.6	0.9	26.9	26.9
Prop In Lane	1.00		0.64	0.00		0.24	1.00		0.01	1.00		0.32
Lane Grp Cap(c), veh/h	639	0	680	0	0	726	130	685	720	26	576	573
V/C Ratio(X)	0.82	0.00	0.40	0.00	0.00	0.05	0.82	0.38	0.38	0.54	0.86	0.86
Avail Cap(c_a), veh/h	782	0	845	0	0	924	169	799	840	81	706	703
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.1	0.0	20.2	0.0	0.0	17.1	45.2	21.1	21.1	48.7	30.9	30.9
Incr Delay (d2), s/veh	5.9	0.0	0.4	0.0	0.0	0.0	16.3	0.3	0.3	6.2	8.9	8.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.9	0.0	4.2	0.0	0.0	0.5	3.1	4.0	4.2	0.4	11.7	11.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.1	0.0	20.5	0.0	0.0	17.1	61.4	21.4	21.4	54.9	39.8	39.8
LnGrp LOS	C	A	C	A	A	B	E	C	C	D	D	D
Approach Vol, veh/h		800			38			634			1001	
Approach Delay, s/veh		29.4			17.1			28.1			40.0	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	45.8		47.8	12.6	39.4		47.8				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.0	46.6		52.2	10.4	41.2		* 53				
Max Q Clear Time (g_c+I1), s	2.9	12.6		39.2	8.4	28.9		3.3				
Green Ext Time (p_c), s	0.0	3.0		2.8	0.0	4.7		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		33.2
HCM 6th LOS		C

Notes

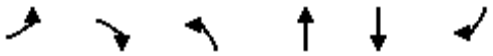
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	197	958	496	842	71
Future Volume (vph)	197	958	496	842	71
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	33.0	33.0	47.0	87.0	40.0
Total Split (%)	27.5%	27.5%	39.2%	72.5%	33.3%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	Max	Max	None	Min	Min
Act Effct Green (s)	27.7	27.7	32.0	60.1	23.3
Actuated g/C Ratio	0.28	0.28	0.32	0.60	0.23
v/c Ratio	0.40	0.66	0.88	0.76	0.88
Control Delay	37.5	4.8	51.3	18.8	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	4.8	51.3	18.8	35.8
LOS	D	A	D	B	D
Approach Delay	10.4			30.8	35.8
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 23.8	Intersection LOS: C
Intersection Capacity Utilization 83.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	197	958	496	842	71	435
Future Volume (veh/h)	197	958	496	842	71	435
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	748	506	859	72	332
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	476	746	541	1169	80	369
Arrive On Green	0.26	0.26	0.30	0.62	0.27	0.27
Sat Flow, veh/h	1810	2834	1810	1900	295	1360
Grp Volume(v), veh/h	201	748	506	859	0	404
Grp Sat Flow(s),veh/h/ln	1810	1417	1810	1900	0	1655
Q Serve(g_s), s	9.4	26.8	27.7	32.3	0.0	24.0
Cycle Q Clear(g_c), s	9.4	26.8	27.7	32.3	0.0	24.0
Prop In Lane	1.00	1.00	1.00			0.82
Lane Grp Cap(c), veh/h	476	746	541	1169	0	449
V/C Ratio(X)	0.42	1.00	0.94	0.74	0.00	0.90
Avail Cap(c_a), veh/h	476	746	754	1508	0	549
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.1	37.5	34.8	13.8	0.0	35.8
Incr Delay (d2), s/veh	2.7	33.6	13.2	1.4	0.0	15.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	3.5	13.9	13.0	0.0	11.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	33.8	71.2	48.0	15.1	0.0	51.5
LnGrp LOS	C	F	D	B	A	D
Approach Vol, veh/h	949			1365	404	
Approach Delay, s/veh	63.2			27.3	51.5	
Approach LOS	E			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	68.8	33.0	35.0	33.8
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	80.8	26.8	42.4	33.8
Max Q Clear Time (g_c+I1), s	34.3	28.8	29.7	26.0
Green Ext Time (p_c), s	8.3	0.0	0.7	1.6

Intersection Summary	
HCM 6th Ctrl Delay	43.5
HCM 6th LOS	D

APPENDIX 6.10:

OPENING YEAR CUMULATIVE (2022) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

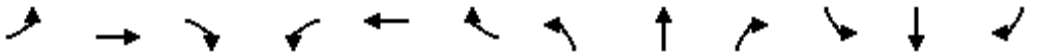
This Page Intentionally Left Blank

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	197	18	32	155	399	33	814
Future Volume (vph)	197	18	32	155	399	33	814
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	30.0	30.0	30.0	21.0	78.0	12.0	69.0
Total Split (%)	25.0%	25.0%	25.0%	17.5%	65.0%	10.0%	57.5%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	22.1	22.1	23.3	14.8	71.3	6.6	58.5
Actuated g/C Ratio	0.20	0.20	0.21	0.13	0.64	0.06	0.52
v/c Ratio	0.86	0.29	0.13	0.82	0.21	0.39	0.93
Control Delay	74.8	14.0	31.1	78.1	9.7	66.5	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.8	14.0	31.1	78.1	9.7	66.5	31.1
LOS	E	B	C	E	A	E	C
Approach Delay		54.3	31.1		28.6		31.9
Approach LOS		D	C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 33.9	Intersection LOS: C
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	18	82	0	32	12	155	399	5	33	814	660
Future Volume (veh/h)	197	18	82	0	32	12	155	399	5	33	814	660
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	221	20	82	0	36	11	174	448	5	37	915	569
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	316	62	255	0	267	81	201	2123	24	51	1065	644
Arrive On Green	0.20	0.20	0.20	0.00	0.20	0.20	0.12	0.61	0.61	0.03	0.52	0.52
Sat Flow, veh/h	1380	308	1264	0	1323	404	1619	3464	39	1619	2049	1238
Grp Volume(v), veh/h	221	0	102	0	0	47	174	221	232	37	759	725
Grp Sat Flow(s),veh/h/ln	1380	0	1572	0	0	1727	1619	1710	1793	1619	1710	1577
Q Serve(g_s), s	16.4	0.0	5.8	0.0	0.0	2.3	11.1	6.0	6.0	2.4	40.3	42.9
Cycle Q Clear(g_c), s	18.8	0.0	5.8	0.0	0.0	2.3	11.1	6.0	6.0	2.4	40.3	42.9
Prop In Lane	1.00		0.80	0.00		0.23	1.00		0.02	1.00		0.78
Lane Grp Cap(c), veh/h	316	0	317	0	0	348	201	1048	1099	51	889	820
V/C Ratio(X)	0.70	0.00	0.32	0.00	0.00	0.13	0.86	0.21	0.21	0.73	0.85	0.88
Avail Cap(c_a), veh/h	356	0	362	0	0	418	253	1175	1233	114	1029	949
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	0.0	35.8	0.0	0.0	34.4	45.1	9.0	9.0	50.4	21.8	22.4
Incr Delay (d2), s/veh	5.2	0.0	0.6	0.0	0.0	0.2	18.6	0.1	0.1	7.1	6.4	9.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	2.2	0.0	0.0	1.0	5.3	2.0	2.1	1.0	15.8	16.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.3	0.0	36.4	0.0	0.0	34.6	63.7	9.1	9.1	57.6	28.1	31.4
LnGrp LOS	D	A	D	A	A	C	E	A	A	E	C	C
Approach Vol, veh/h		323			47			627			1521	
Approach Delay, s/veh		43.9			34.6			24.3			30.4	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.9	70.2		27.0	17.7	60.4		27.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	72.2		24.2	16.4	63.2		* 25				
Max Q Clear Time (g_c+I1), s	4.4	8.0		20.8	13.1	44.9		4.3				
Green Ext Time (p_c), s	0.0	2.6		0.4	0.1	9.7		0.2				

Intersection Summary			
HCM 6th Ctrl Delay		30.7	
HCM 6th LOS		C	

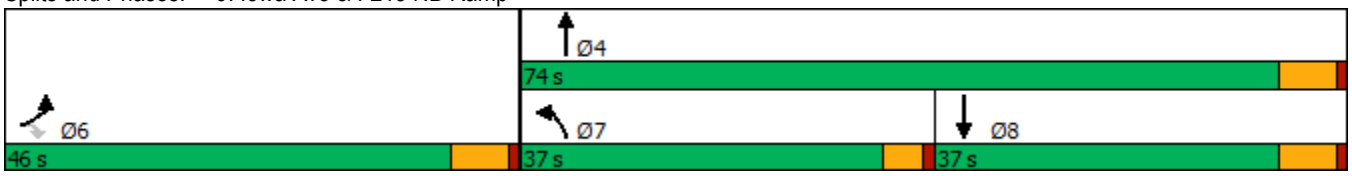
Notes

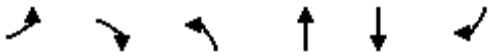
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	187	1228	437	745	88
Future Volume (vph)	187	1228	437	745	88
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	46.0	46.0	37.0	74.0	37.0
Total Split (%)	38.3%	38.3%	30.8%	61.7%	30.8%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.1	19.1	29.8	58.1	23.5
Actuated g/C Ratio	0.21	0.21	0.33	0.65	0.26
v/c Ratio	0.53	0.80	0.79	0.65	0.83
Control Delay	38.4	6.4	40.4	13.5	35.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.4	6.4	40.4	13.5	35.0
LOS	D	A	D	B	C
Approach Delay	10.6			23.5	35.0
Approach LOS	B			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 90	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 19.1	Intersection LOS: B
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	187	1228	437	745	88	339
Future Volume (veh/h)	187	1228	437	745	88	339
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	971	470	801	95	279
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	616	964	494	1052	103	302
Arrive On Green	0.34	0.34	0.27	0.55	0.24	0.24
Sat Flow, veh/h	1810	2834	1810	1900	425	1250
Grp Volume(v), veh/h	201	971	470	801	0	374
Grp Sat Flow(s),veh/h/ln	1810	1417	1810	1900	0	1675
Q Serve(g_s), s	9.6	39.8	29.8	38.0	0.0	25.5
Cycle Q Clear(g_c), s	9.6	39.8	29.8	38.0	0.0	25.5
Prop In Lane	1.00	1.00	1.00			0.75
Lane Grp Cap(c), veh/h	616	964	494	1052	0	405
V/C Ratio(X)	0.33	1.01	0.95	0.76	0.00	0.92
Avail Cap(c_a), veh/h	616	964	501	1101	0	441
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.6	38.6	41.8	20.1	0.0	43.3
Incr Delay (d2), s/veh	0.3	30.7	27.9	3.0	0.0	24.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	30.1	17.0	17.0	0.0	13.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	28.9	69.2	69.7	23.2	0.0	67.5
LnGrp LOS	C	F	E	C	A	E
Approach Vol, veh/h	1172			1271	374	
Approach Delay, s/veh	62.3			40.4	67.5	
Approach LOS	E			D	E	

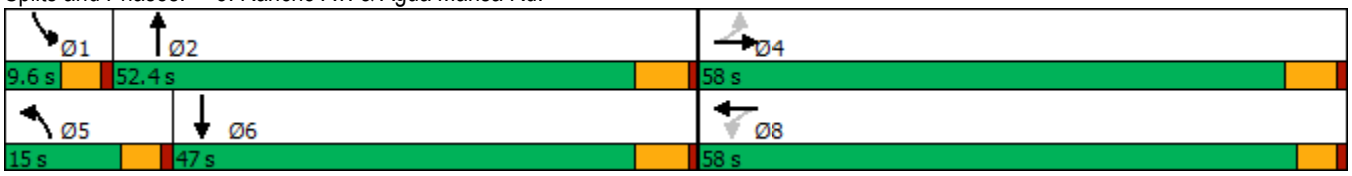
Timer - Assigned Phs			4		6	7	8
Phs Duration (G+Y+Rc), s			71.0		46.0	36.5	34.4
Change Period (Y+Rc), s			6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s			67.8		39.8	32.4	30.8
Max Q Clear Time (g_c+I1), s			40.0		41.8	31.8	27.5
Green Ext Time (p_c), s			6.7		0.0	0.1	0.7

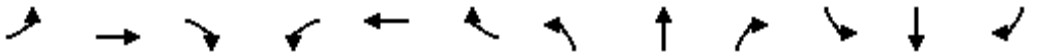
Intersection Summary	
HCM 6th Ctrl Delay	53.1
HCM 6th LOS	D

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	494	94	27	103	500	13	781
Future Volume (vph)	494	94	27	103	500	13	781
Turn Type	Perm	NA	NA	Prot	NA	Prot	NA
Protected Phases		4	8	5	2	1	6
Permitted Phases	4						
Detector Phase	4	4	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	9.6	20.8	9.6	20.8
Total Split (s)	58.0	58.0	58.0	15.0	52.4	9.6	47.0
Total Split (%)	48.3%	48.3%	48.3%	12.5%	43.7%	8.0%	39.2%
Yellow Time (s)	4.8	4.8	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	4.6	5.8	4.6	5.8
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?				Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	Min	None	Min
Act Effct Green (s)	48.1	48.1	49.3	9.9	49.5	5.1	38.6
Actuated g/C Ratio	0.43	0.43	0.44	0.09	0.44	0.05	0.34
v/c Ratio	0.94	0.40	0.05	0.79	0.36	0.19	0.90
Control Delay	58.1	16.0	15.1	88.2	23.5	62.0	46.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	16.0	15.1	88.2	23.5	62.0	46.7
LOS	E	B	B	F	C	E	D
Approach Delay		42.7	15.1		34.5		46.9
Approach LOS		D	B		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 42.0	Intersection LOS: D
Intersection Capacity Utilization 84.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	494	94	190	0	27	10	103	500	2	13	781	193
Future Volume (veh/h)	494	94	190	0	27	10	103	500	2	13	781	193
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1800	1800	1800	1800	1700	1800	1800	1700	1800	1800
Adj Flow Rate, veh/h	526	100	175	0	29	9	110	532	2	14	831	158
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	638	247	432	0	554	172	134	1408	5	26	964	183
Arrive On Green	0.42	0.42	0.42	0.00	0.42	0.42	0.08	0.40	0.40	0.02	0.34	0.34
Sat Flow, veh/h	1391	587	1028	0	1318	409	1619	3495	13	1619	2867	545
Grp Volume(v), veh/h	526	0	275	0	0	38	110	260	274	14	496	493
Grp Sat Flow(s),veh/h/ln	1391	0	1615	0	0	1726	1619	1710	1798	1619	1710	1702
Q Serve(g_s), s	36.3	0.0	12.0	0.0	0.0	1.3	6.7	10.8	10.8	0.9	27.3	27.3
Cycle Q Clear(g_c), s	37.6	0.0	12.0	0.0	0.0	1.3	6.7	10.8	10.8	0.9	27.3	27.3
Prop In Lane	1.00		0.64	0.00		0.24	1.00		0.01	1.00		0.32
Lane Grp Cap(c), veh/h	638	0	679	0	0	726	134	689	724	26	575	572
V/C Ratio(X)	0.82	0.00	0.41	0.00	0.00	0.05	0.82	0.38	0.38	0.54	0.86	0.86
Avail Cap(c_a), veh/h	774	0	836	0	0	914	167	790	831	80	699	695
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	0.0	20.4	0.0	0.0	17.3	45.5	21.2	21.2	49.2	31.3	31.3
Incr Delay (d2), s/veh	6.1	0.0	0.4	0.0	0.0	0.0	18.5	0.3	0.3	6.3	9.3	9.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	0.0	4.3	0.0	0.0	0.5	3.3	4.1	4.3	0.4	12.0	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	34.6	0.0	20.8	0.0	0.0	17.4	64.0	21.5	21.5	55.5	40.6	40.6
LnGrp LOS	C	A	C	A	A	B	E	C	C	E	D	D
Approach Vol, veh/h		801			38			644			1003	
Approach Delay, s/veh		29.9			17.4			28.8			40.8	
Approach LOS		C			B			C			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	46.4		48.2	13.0	39.7		48.2				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.0	46.6		52.2	10.4	41.2		* 53				
Max Q Clear Time (g_c+I1), s	2.9	12.8		39.6	8.7	29.3		3.3				
Green Ext Time (p_c), s	0.0	3.0		2.7	0.0	4.6		0.2				

Intersection Summary		
HCM 6th Ctrl Delay		33.8
HCM 6th LOS		C

Notes

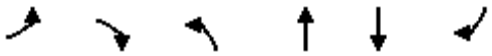
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	197	958	496	842	71
Future Volume (vph)	197	958	496	842	71
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	6		7	4	8
Permitted Phases		6			
Detector Phase	6	6	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	24.2	9.6	16.2	16.2
Total Split (s)	33.0	33.0	47.0	87.0	40.0
Total Split (%)	27.5%	27.5%	39.2%	72.5%	33.3%
Yellow Time (s)	5.2	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	Max	Max	None	Min	Min
Act Effct Green (s)	27.7	27.7	32.1	60.4	23.6
Actuated g/C Ratio	0.27	0.27	0.32	0.60	0.23
v/c Ratio	0.41	0.66	0.88	0.76	0.88
Control Delay	37.7	4.9	51.4	18.7	35.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.7	4.9	51.4	18.7	35.9
LOS	D	A	D	B	D
Approach Delay	10.4			30.8	35.9
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 101	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 23.9	Intersection LOS: C
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	197	958	496	842	71	439
Future Volume (veh/h)	197	958	496	842	71	439
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	201	748	506	859	72	336
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	474	743	540	1172	80	372
Arrive On Green	0.26	0.26	0.30	0.62	0.27	0.27
Sat Flow, veh/h	1810	2834	1810	1900	292	1363
Grp Volume(v), veh/h	201	748	506	859	0	408
Grp Sat Flow(s),veh/h/ln	1810	1417	1810	1900	0	1655
Q Serve(g_s), s	9.4	26.8	27.8	32.3	0.0	24.3
Cycle Q Clear(g_c), s	9.4	26.8	27.8	32.3	0.0	24.3
Prop In Lane	1.00	1.00	1.00			0.82
Lane Grp Cap(c), veh/h	474	743	540	1172	0	452
V/C Ratio(X)	0.42	1.01	0.94	0.73	0.00	0.90
Avail Cap(c_a), veh/h	474	743	750	1501	0	547
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	31.3	37.7	34.9	13.7	0.0	35.9
Incr Delay (d2), s/veh	2.8	34.8	13.4	1.4	0.0	16.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	21.9	14.0	13.0	0.0	11.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	34.1	72.6	48.3	15.1	0.0	52.1
LnGrp LOS	C	F	D	B	A	D
Approach Vol, veh/h	949			1365	408	
Approach Delay, s/veh	64.4			27.4	52.1	
Approach LOS	E			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	69.3	33.0	35.1	34.1
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	80.8	26.8	42.4	33.8
Max Q Clear Time (g_c+I1), s	34.3	28.8	29.8	26.3
Green Ext Time (p_c), s	8.3	0.0	0.7	1.6

Intersection Summary	
HCM 6th Ctrl Delay	44.0
HCM 6th LOS	D

APPENDIX 7.1:

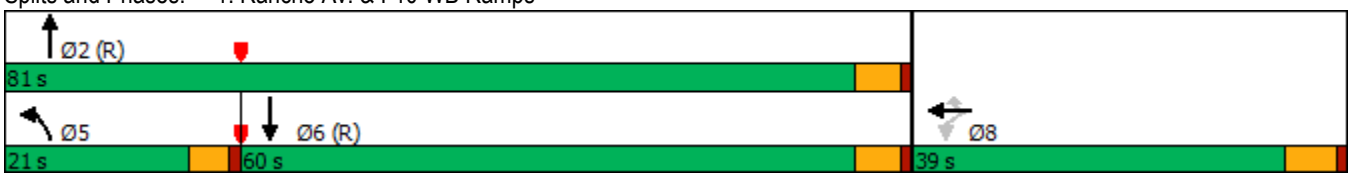
HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

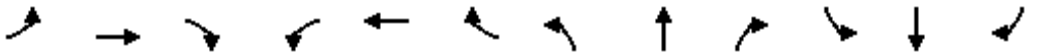
This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	444	131	466	879
Future Volume (vph)	0	444	131	466	879
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	28.4	28.4	13.2	80.7	63.0
Actuated g/C Ratio	0.24	0.24	0.11	0.67	0.52
v/c Ratio	0.82	0.70	0.71	0.21	0.74
Control Delay	59.1	13.7	93.4	2.2	25.5
Queue Delay	9.3	0.0	0.0	0.2	0.2
Total Delay	68.3	13.7	93.4	2.3	25.7
LOS	E	B	F	A	C
Approach Delay	36.8			22.3	25.7
Approach LOS	D			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 75.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	326	0	444	131	466	0	0	879	397
Future Volume (veh/h)	0	0	0	326	0	444	131	466	0	0	879	397
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				351	0	369	141	501	0	0	945	346
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				455	0	404	168	2375	0	0	1367	497
Arrive On Green				0.25	0.00	0.25	0.09	0.66	0.00	0.00	0.53	0.53
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2687	943
Grp Volume(v), veh/h				351	0	369	141	501	0	0	656	635
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1730
Q Serve(g_s), s				21.6	0.0	26.7	9.2	6.6	0.0	0.0	32.4	32.9
Cycle Q Clear(g_c), s				21.6	0.0	26.7	9.2	6.6	0.0	0.0	32.4	32.9
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.54
Lane Grp Cap(c), veh/h				455	0	404	168	2375	0	0	952	912
V/C Ratio(X)				0.77	0.00	0.91	0.84	0.21	0.00	0.00	0.69	0.70
Avail Cap(c_a), veh/h				501	0	445	249	2375	0	0	952	912
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.84	0.84	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				41.7	0.0	43.6	53.5	8.2	0.0	0.0	21.1	21.2
Incr Delay (d2), s/veh				6.7	0.0	21.8	8.4	0.2	0.0	0.0	4.1	4.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.2	0.0	12.7	4.5	2.5	0.0	0.0	14.1	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				48.4	0.0	65.4	61.9	8.3	0.0	0.0	25.1	25.5
LnGrp LOS				D	A	E	E	A	A	A	C	C
Approach Vol, veh/h					720			642			1291	
Approach Delay, s/veh					57.1			20.1			25.3	
Approach LOS					E			C			C	

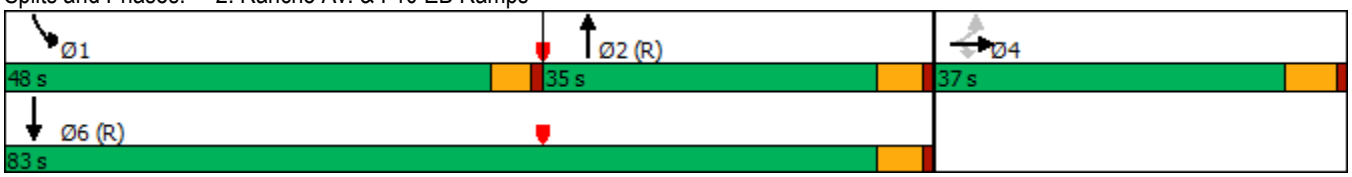
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		84.1			15.7	68.4		35.9				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		8.6			11.2	34.9		28.7				
Green Ext Time (p_c), s		3.7			0.1	9.0		1.4				

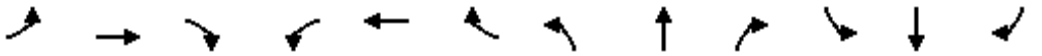
Intersection Summary												
HCM 6th Ctrl Delay			32.7									
HCM 6th LOS			C									

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	396	429	431	774
Future Volume (vph)	1	396	429	431	774
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	24.0	24.0	45.0	35.5	85.1
Actuated g/C Ratio	0.20	0.20	0.38	0.30	0.71
v/c Ratio	0.51	0.89	0.52	0.88	0.33
Control Delay	46.3	45.3	30.7	54.9	9.9
Queue Delay	0.0	0.0	0.0	33.8	0.9
Total Delay	46.3	45.3	30.7	88.7	10.8
LOS	D	D	C	F	B
Approach Delay	45.6		30.7		38.7
Approach LOS	D		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 75.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	1	396	0	0	0	0	429	207	431	774	0
Future Volume (veh/h)	168	1	396	0	0	0	0	429	207	431	774	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	183	1	348				0	466	182	468	841	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	423	2	378				0	933	362	487	2434	0
Arrive On Green	0.23	0.23	0.23				0.00	0.37	0.37	0.54	1.00	0.00
Sat Flow, veh/h	1800	10	1610				0	2637	986	1810	3705	0
Grp Volume(v), veh/h	184	0	348				0	330	318	468	841	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1723	1810	1805	0
Q Serve(g_s), s	10.4	0.0	25.3				0.0	17.0	17.2	29.7	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	25.3				0.0	17.0	17.2	29.7	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.57	1.00		0.00
Lane Grp Cap(c), veh/h	425	0	378				0	662	632	487	2434	0
V/C Ratio(X)	0.43	0.00	0.92				0.00	0.50	0.50	0.96	0.35	0.00
Avail Cap(c_a), veh/h	471	0	419				0	662	632	654	2434	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.59	0.59	0.00
Uniform Delay (d), s/veh	39.1	0.0	44.8				0.0	29.4	29.5	27.1	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	24.2				0.0	2.7	2.8	14.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	12.3				0.0	7.7	7.5	10.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.8	0.0	69.0				0.0	32.1	32.3	41.3	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		532						648			1309	
Approach Delay, s/veh		58.9						32.2			14.9	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	36.9	49.1		34.0		86.0
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9
Max Q Clear Time (g_c+I1), s	31.7	19.2		27.3		2.0
Green Ext Time (p_c), s	0.6	2.9		0.9		7.0

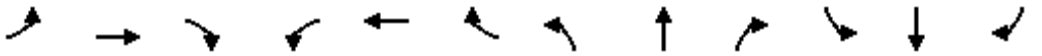
Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	237	22	5	39	169	473	40	982
Future Volume (vph)	237	22	5	39	169	473	40	982
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8		4.6	4.6	5.8	4.6	5.8
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		31.2		32.4	8.8	67.9	6.7	63.8
Actuated g/C Ratio		0.26		0.27	0.07	0.57	0.06	0.53
v/c Ratio		1.00		0.13	1.47	0.26	0.46	1.01
Control Delay		88.8		27.3	289.2	14.1	70.1	48.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		88.8		27.3	289.2	14.1	70.1	48.6
LOS		F		C	F	B	E	D
Approach Delay		88.8		27.3		85.8		49.0
Approach LOS		F		C		F		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.47	
Intersection Signal Delay: 61.7	Intersection LOS: E
Intersection Capacity Utilization 102.6%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	22	89	5	39	15	169	473	7	40	982	801
Future Volume (veh/h)	237	22	89	5	39	15	169	473	7	40	982	801
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	258	24	87	5	42	14	184	514	7	43	1067	704
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	321	25	91	51	348	109	126	2090	28	54	1143	701
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.07	0.57	0.57	0.03	0.53	0.53
Sat Flow, veh/h	1038	97	350	71	1337	419	1714	3646	50	1714	2150	1318
Grp Volume(v), veh/h	369	0	0	61	0	0	184	254	267	43	883	888
Grp Sat Flow(s),veh/h/ln	1485	0	0	1826	0	0	1714	1805	1891	1714	1805	1663
Q Serve(g_s), s	26.2	0.0	0.0	0.0	0.0	0.0	8.8	8.4	8.4	3.0	53.8	63.8
Cycle Q Clear(g_c), s	29.3	0.0	0.0	3.1	0.0	0.0	8.8	8.4	8.4	3.0	53.8	63.8
Prop In Lane	0.70		0.24	0.08		0.23	1.00		0.03	1.00		0.79
Lane Grp Cap(c), veh/h	437	0	0	507	0	0	126	1035	1084	54	960	884
V/C Ratio(X)	0.84	0.00	0.00	0.12	0.00	0.00	1.46	0.25	0.25	0.79	0.92	1.00
Avail Cap(c_a), veh/h	437	0	0	525	0	0	126	1035	1084	106	960	884
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.3	0.0	0.0	34.0	0.0	0.0	55.6	12.7	12.7	57.7	25.8	28.1
Incr Delay (d2), s/veh	14.1	0.0	0.0	0.1	0.0	0.0	246.8	0.1	0.1	9.1	13.7	31.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	0.0	0.0	1.4	0.0	0.0	12.3	3.2	3.3	1.4	24.5	30.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	57.4	0.0	0.0	34.1	0.0	0.0	302.4	12.8	12.8	66.8	39.5	59.5
LnGrp LOS	E	A	A	C	A	A	F	B	B	E	D	F
Approach Vol, veh/h		369			61			705			1814	
Approach Delay, s/veh		57.4			34.1			88.4			49.9	
Approach LOS		E			C			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	74.6		37.0	13.4	69.6		37.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	5.0	10.4		31.3	10.8	65.8		5.1				
Green Ext Time (p_c), s	0.0	3.0		0.0	0.0	0.0		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	59.7
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	175	618	971	221
Future Vol, veh/h	0	0	175	618	971	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	190	672	1055	240

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1891	648	1295	0	-	0
Stage 1	1175	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	63	418	542	-	-	-
Stage 1	260	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	28	418	542	-	-	-
Mov Cap-2 Maneuver	28	-	-	-	-	-
Stage 1	115	-	-	-	-	-
Stage 2	450	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.5	0
HCM LOS	A		

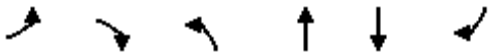
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	542	-	-	-	-
HCM Lane V/C Ratio	0.351	-	-	-	-
HCM Control Delay (s)	15.2	2.7	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	1.6	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	19	664	492	666	696
Future Volume (vph)	19	664	492	666	696
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.6	12.6	38.4	70.0	26.9
Actuated g/C Ratio	0.13	0.13	0.41	0.74	0.28
v/c Ratio	0.73	0.72	0.80	0.28	0.78
Control Delay	15.5	13.6	38.6	4.7	37.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	13.6	38.6	4.7	37.8
LOS	B	B	D	A	D
Approach Delay	14.6			19.1	37.8
Approach LOS	B			B	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 94.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	664	492	666	696	6
Future Volume (veh/h)	19	664	492	666	696	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	581	502	680	710	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	367	654	529	2113	858	7
Arrive On Green	0.00	0.23	0.34	0.65	0.26	0.26
Sat Flow, veh/h	1629	2898	1543	3335	3387	28
Grp Volume(v), veh/h	0	581	502	680	349	367
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1705
Q Serve(g_s), s	0.0	18.8	30.7	9.0	19.6	19.6
Cycle Q Clear(g_c), s	0.0	18.8	30.7	9.0	19.6	19.6
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	367	654	529	2113	422	443
V/C Ratio(X)	0.00	0.89	0.95	0.32	0.83	0.83
Avail Cap(c_a), veh/h	424	755	629	2782	652	684
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	36.3	31.0	7.5	33.7	33.7
Incr Delay (d2), s/veh	0.0	11.4	20.9	0.1	5.2	5.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	14.9	13.4	2.4	7.8	8.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	47.7	51.9	7.6	38.9	38.7
LnGrp LOS	A	D	D	A	D	D
Approach Vol, veh/h	581			1182	716	
Approach Delay, s/veh	47.7			26.4	38.8	
Approach LOS	D			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		69.1		27.6	37.7	31.3
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		11.0		20.8	32.7	21.6
Green Ext Time (p_c), s		4.6		1.0	0.5	3.5

Intersection Summary		
HCM 6th Ctrl Delay		35.0
HCM 6th LOS		C

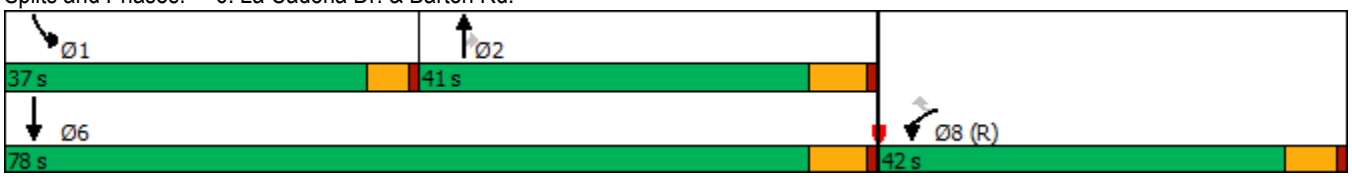
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	318	370	790	385	557	1399
Future Volume (vph)	318	370	790	385	557	1399
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	42.0	42.0	41.0	41.0	37.0	78.0
Total Split (%)	35.0%	35.0%	34.2%	34.2%	30.8%	65.0%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	37.9	37.9	33.1	33.1	32.4	70.1
Actuated g/C Ratio	0.32	0.32	0.28	0.28	0.27	0.58
v/c Ratio	0.63	0.64	0.84	0.55	1.29	0.71
Control Delay	36.8	22.4	49.7	6.2	181.3	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.8	22.4	49.7	6.2	181.3	19.7
LOS	D	C	D	A	F	B
Approach Delay	29.1		35.4			65.8
Approach LOS	C		D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.29	
Intersection Signal Delay: 49.8	Intersection LOS: D
Intersection Capacity Utilization 86.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	318	370	790	385	557	1399
Future Volume (veh/h)	318	370	790	385	557	1399
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	338	0	840	373	593	1488
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	517		961	429	463	2074
Arrive On Green	0.30	0.00	0.27	0.27	0.27	0.57
Sat Flow, veh/h	1714	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	338	0	840	373	593	1488
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1610	1714	1805
Q Serve(g_s), s	20.6	0.0	26.7	26.6	32.4	35.8
Cycle Q Clear(g_c), s	20.6	0.0	26.7	26.6	32.4	35.8
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	517		961	429	463	2074
V/C Ratio(X)	0.65		0.87	0.87	1.28	0.72
Avail Cap(c_a), veh/h	517		1047	467	463	2160
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.51	0.51	0.57	0.57
Uniform Delay (d), s/veh	36.4	0.0	42.1	42.1	43.8	18.5
Incr Delay (d2), s/veh	6.3	0.0	4.3	8.6	135.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	0.0	11.9	11.1	30.5	13.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	42.8	0.0	46.4	50.6	179.7	19.1
LnGrp LOS	D		D	D	F	B
Approach Vol, veh/h	338	A	1213			2081
Approach Delay, s/veh	42.8		47.7			64.9
Approach LOS	D		D			E

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	37.0	38.1			75.1	42.0
Change Period (Y+Rc), s	4.6	6.2			6.2	5.8
Max Green Setting (Gmax), s	32.4	34.8			71.8	36.2
Max Q Clear Time (g_c+I1), s	34.4	28.7			37.8	22.6
Green Ext Time (p_c), s	0.0	3.2			13.1	0.4

Intersection Summary	
HCM 6th Ctrl Delay	57.1
HCM 6th LOS	E

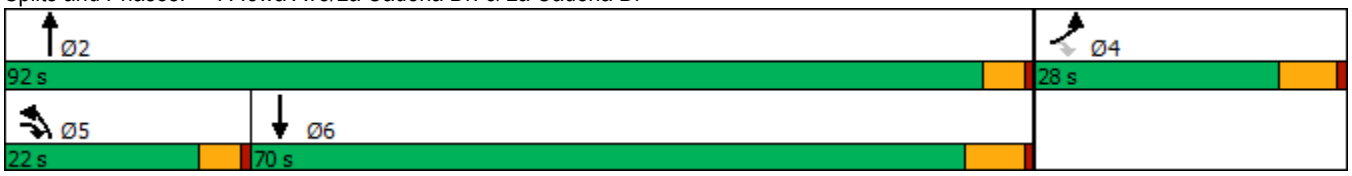
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	398	217	233	797	712	1195
Future Volume (vph)	398	217	233	797	712	1195
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	22.1	45.8	17.4	67.7	44.1	100.8
Actuated g/C Ratio	0.22	0.45	0.17	0.67	0.44	1.00
v/c Ratio	1.10	0.31	0.81	0.64	0.88	0.46
Control Delay	113.9	21.6	64.8	11.9	38.8	0.6
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	113.9	21.6	64.8	12.9	38.8	0.6
LOS	F	C	E	B	D	A
Approach Delay	81.3			24.6	14.8	
Approach LOS	F			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 100.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 29.2	Intersection LOS: C
Intersection Capacity Utilization 88.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	398	217	233	797	712	1195
Future Volume (veh/h)	398	217	233	797	712	1195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	410	198	240	822	734	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	395	627	272	1213	819	
Arrive On Green	0.23	0.23	0.16	0.64	0.43	0.00
Sat Flow, veh/h	1714	1610	1714	1900	1900	2685
Grp Volume(v), veh/h	410	198	240	822	734	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1900	1900	1342
Q Serve(g_s), s	21.8	8.1	12.9	26.1	33.9	0.0
Cycle Q Clear(g_c), s	21.8	8.1	12.9	26.1	33.9	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	395	627	272	1213	819	
V/C Ratio(X)	1.04	0.32	0.88	0.68	0.90	
Avail Cap(c_a), veh/h	395	627	316	1757	1282	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.4	20.1	38.9	10.9	25.0	0.0
Incr Delay (d2), s/veh	55.2	0.3	20.1	0.7	5.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.5	0.0	6.6	8.5	14.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	91.6	20.4	59.0	11.6	30.6	0.0
LnGrp LOS	F	C	E	B	C	
Approach Vol, veh/h	608			1062	734	A
Approach Delay, s/veh	68.4			22.3	30.6	
Approach LOS	E			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		66.5		28.0	19.6	46.9
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		28.1		23.8	14.9	35.9
Green Ext Time (p_c), s		6.3		0.0	0.1	4.9

Intersection Summary	
HCM 6th Ctrl Delay	36.5
HCM 6th LOS	D

Notes

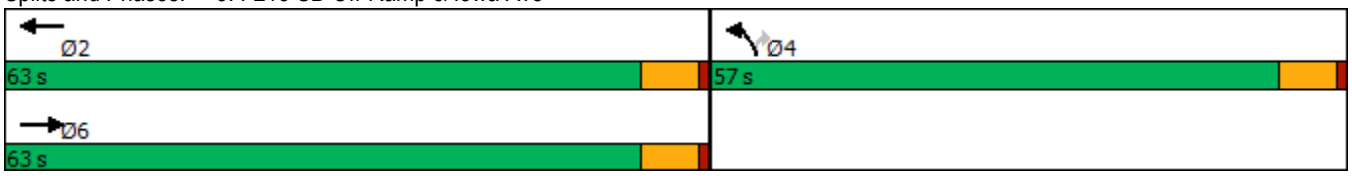
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	929	907	123	805
Future Volume (vph)	929	907	123	805
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	56.8	56.8	50.8	50.8
Actuated g/C Ratio	0.47	0.47	0.42	0.42
v/c Ratio	1.11	1.08	0.18	1.20
Control Delay	96.5	87.0	22.4	133.7
Queue Delay	2.2	6.4	0.0	0.0
Total Delay	98.7	93.4	22.4	133.7
LOS	F	F	C	F
Approach Delay	98.7	93.4	118.8	
Approach LOS	F	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 103.7	Intersection LOS: F
Intersection Capacity Utilization 109.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	929	0	0	907	123	805
Future Volume (veh/h)	929	0	0	907	123	805
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	999	0	0	975	134	724
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	899	0	0	899	766	682
Arrive On Green	0.47	0.00	0.00	0.47	0.42	0.42
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	999	0	0	975	134	724
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	56.8	0.0	0.0	56.8	5.5	50.8
Cycle Q Clear(g_c), s	56.8	0.0	0.0	56.8	5.5	50.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	899	0	0	899	766	682
V/C Ratio(X)	1.11	0.00	0.00	1.08	0.17	1.06
Avail Cap(c_a), veh/h	899	0	0	899	766	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	0.0	31.6	21.5	34.6
Incr Delay (d2), s/veh	65.2	0.0	0.0	55.5	0.1	52.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	39.8	0.0	0.0	37.3	2.4	29.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	96.8	0.0	0.0	87.1	21.7	86.8
LnGrp LOS	F	A	A	F	C	F
Approach Vol, veh/h	999			975	858	
Approach Delay, s/veh	96.8			87.1	76.6	
Approach LOS	F			F	E	

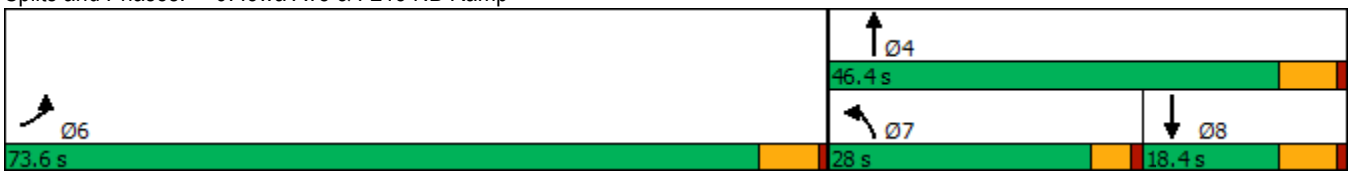
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		63.0		57.0		63.0
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		58.8		52.8		58.8
Green Ext Time (p_c), s		0.0		0.0		0.0

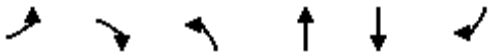
Intersection Summary	
HCM 6th Ctrl Delay	87.3
HCM 6th LOS	F

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	266	512	877	97
Future Volume (vph)	266	512	877	97
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	40.2	12.2
Actuated g/C Ratio	0.56	0.20	0.34	0.10
v/c Ratio	1.69	1.57	1.48	1.80
Control Delay	335.0	303.3	256.9	396.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	335.0	303.3	256.9	396.7
LOS	F	F	F	F
Approach Delay	335.0		274.0	396.7
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.80	
Intersection Signal Delay: 319.9	Intersection LOS: F
Intersection Capacity Utilization 177.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	266	1468	512	877	97	395
Future Volume (veh/h)	266	1468	512	877	97	395
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	286	1304	551	943	104	366
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	166	756	353	636	37	132
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	295	1347	1810	1900	369	1298
Grp Volume(v), veh/h	1591	0	551	943	0	470
Grp Sat Flow(s),veh/h/ln	1643	0	1810	1900	0	1666
Q Serve(g_s), s	67.4	0.0	23.4	40.2	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.4	40.2	0.0	12.2
Prop In Lane	0.18	0.82	1.00			0.78
Lane Grp Cap(c), veh/h	923	0	353	637	0	169
V/C Ratio(X)	1.72	0.00	1.56	1.48	0.00	2.77
Avail Cap(c_a), veh/h	923	0	353	637	0	169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.3	39.9	0.0	53.9
Incr Delay (d2), s/veh	330.5	0.0	266.2	225.1	0.0	814.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	107.5	0.0	36.6	58.2	0.0	43.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	356.8	0.0	314.5	265.0	0.0	868.6
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1591			1494	470	
Approach Delay, s/veh	356.8			283.2	868.6	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	42.2	69.4	25.4	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	393.5
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	5	893	44	31	649	4	22	0	52	10	0	17
Future Vol, veh/h	5	893	44	31	649	4	22	0	52	10	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	971	48	34	705	4	24	0	57	11	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	705	0	0	1019	0	0	1787	-	995	1807	1802	705
Stage 1	-	-	-	-	-	-	1005	-	-	773	773	-
Stage 2	-	-	-	-	-	-	782	-	-	1034	1029	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	*812	-	-	689	-	-	~ 20	0	300	18	26	*542
Stage 1	-	-	-	-	-	-	294	0	-	489	431	-
Stage 2	-	-	-	-	-	-	478	0	-	283	314	-
Platoon blocked, %	1	-	-		-	-	1			1	1	1
Mov Cap-1 Maneuver	*812	-	-	689	-	-	~ 18	-	300	14	24	*542
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 18	-	-	14	24	-
Stage 1	-	-	-	-	-	-	290	-	-	482	410	-
Stage 2	-	-	-	-	-	-	439	-	-	226	310	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.5	202	259.4
HCM LOS			F	F

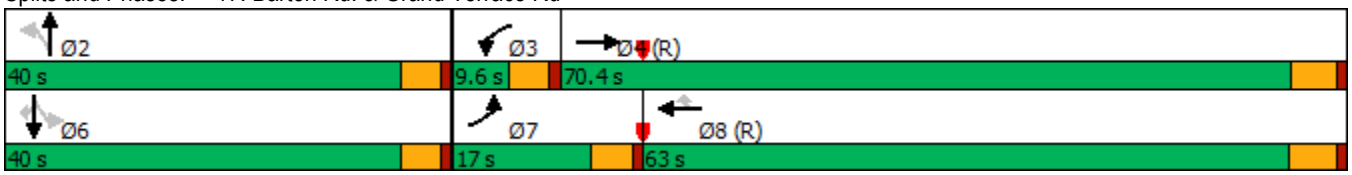
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	18	300	* 812	-	-	689	-	-	36
HCM Lane V/C Ratio	1.329	0.188	0.007	-	-	0.049	-	-	0.815
HCM Control Delay (s)	$ 632.5	19.8	9.5	0	-	10.5	-	-	259.4
HCM Lane LOS	F	C	A	A	-	B	-	-	F
HCM 95th %tile Q(veh)	3.4	0.7	0	-	-	0.2	-	-	2.9

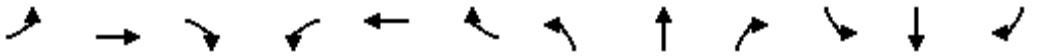
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	30	925	523	424	128	3	161		
Future Volume (vph)	30	925	523	424	128	3	161		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.9	92.8	85.0	85.0		17.5	17.5		
Actuated g/C Ratio	0.06	0.77	0.71	0.71		0.15	0.15		
v/c Ratio	0.33	0.35	0.22	0.35		0.68	0.45		
Control Delay	78.3	1.7	7.7	1.8		64.8	9.9		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	78.3	1.7	7.7	1.8		64.8	9.9		
LOS	E	A	A	A		E	A		
Approach Delay		4.2	5.1			34.6			
Approach LOS		A	A			C			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 42.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	925	0	0	523	424	0	0	0	128	3	161
Future Volume (veh/h)	30	925	0	0	523	424	0	0	0	128	3	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	32	974	0	0	551	362	0	0	0	135	3	146
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	47	2877	0	1	2640	1177	0	228	0	229	4	193
Arrive On Green	0.03	0.80	0.00	0.00	0.73	0.73	0.00	0.00	0.00	0.12	0.12	0.12
Sat Flow, veh/h	1714	3705	0	1714	3610	1610	0	1900	0	1416	31	1610
Grp Volume(v), veh/h	32	974	0	0	551	362	0	0	0	138	0	146
Grp Sat Flow(s),veh/h/ln	1714	1805	0	1714	1805	1610	0	1900	0	1448	0	1610
Q Serve(g_s), s	2.2	9.0	0.0	0.0	5.8	9.4	0.0	0.0	0.0	11.1	0.0	10.5
Cycle Q Clear(g_c), s	2.2	9.0	0.0	0.0	5.8	9.4	0.0	0.0	0.0	11.1	0.0	10.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	47	2877	0	1	2640	1177	0	228	0	233	0	193
V/C Ratio(X)	0.68	0.34	0.00	0.00	0.21	0.31	0.00	0.00	0.00	0.59	0.00	0.76
Avail Cap(c_a), veh/h	177	2877	0	71	2640	1177	0	561	0	486	0	475
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	3.4	0.0	0.0	5.1	5.6	0.0	0.0	0.0	51.4	0.0	51.1
Incr Delay (d2), s/veh	6.4	0.3	0.0	0.0	0.2	0.7	0.0	0.0	0.0	2.4	0.0	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.6	0.0	0.0	2.0	3.0	0.0	0.0	0.0	4.2	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	3.7	0.0	0.0	5.3	6.3	0.0	0.0	0.0	53.8	0.0	57.1
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	E
Approach Vol, veh/h		1006			913			0			284	
Approach Delay, s/veh		5.6			5.7			0.0			55.5	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	0.0	101.0		19.0	7.9	93.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	11.0		13.1	4.2	11.4				
Green Ext Time (p_c), s		0.0	0.0	8.6		1.3	0.0	5.6				

Intersection Summary		
HCM 6th Ctrl Delay		12.1
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1145	1435	56	698
Demand Flow Rate, veh/h	1145	1435	56	698
Vehicles Circulating, veh/h	466	221	1524	797
Vehicles Exiting, veh/h	1029	1359	87	859
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.3	11.5	11.5	15.2
Approach LOS	B	B	B	C

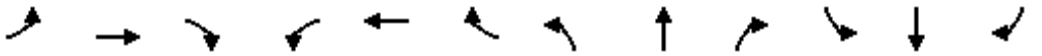
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.606	0.394
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	538	607	674	761	56	423	275
Cap Entry Lane, veh/h	879	956	1102	1177	389	648	721
Entry HV Adj Factor	1.000	1.000	1.001	0.999	1.000	1.000	1.000
Flow Entry, veh/h	538	607	674	761	56	423	275
Cap Entry, veh/h	880	955	1102	1176	389	648	721
V/C Ratio	0.612	0.635	0.612	0.647	0.144	0.652	0.381
Control Delay, s/veh	13.4	13.3	11.3	11.7	11.5	18.6	9.9
LOS	B	B	B	B	B	C	A
95th %tile Queue, veh	4	5	4	5	0	5	2

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	292	919	1196	726	0	484	
Future Volume (vph)	292	919	1196	726	0	484	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	26.0	68.0	42.0	42.0	52.0	52.0	52.0
Total Split (%)	21.7%	56.7%	35.0%	35.0%	43.3%	43.3%	43%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	21.4	62.9	36.9	36.9	46.2	46.2	
Actuated g/C Ratio	0.18	0.52	0.31	0.31	0.38	0.38	
v/c Ratio	0.99	0.53	1.17	1.10	136.00	0.78	
Control Delay	96.8	20.1	124.6	86.1	62512.7	36.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	96.8	20.1	124.6	86.1	62512.7	36.2	
LOS	F	C	F	F	F	D	
Approach Delay		38.5	110.1		12871.2		
Approach LOS		D	F		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 136.00	
Intersection Signal Delay: 2164.1	Intersection LOS: F
Intersection Capacity Utilization 83.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	919	0	0	1196	726	125	0	484	0	0	0
Future Volume (veh/h)	292	919	0	0	1196	726	125	0	484	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	317	999	0	0	1300	642	136	0	434			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	348	2184	0	0	1324	573	542	0	482			
Arrive On Green	0.19	0.60	0.00	0.00	0.37	0.37	0.30	0.00	0.30			
Sat Flow, veh/h	1810	3705	0	0	3705	1563	1810	0	1610			
Grp Volume(v), veh/h	317	999	0	0	1300	642	136	0	434			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1563	1810	0	1610			
Q Serve(g_s), s	17.3	15.2	0.0	0.0	35.9	36.9	5.7	0.0	26.0			
Cycle Q Clear(g_c), s	17.3	15.2	0.0	0.0	35.9	36.9	5.7	0.0	26.0			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	348	2184	0	0	1324	573	542	0	482			
V/C Ratio(X)	0.91	0.46	0.00	0.00	0.98	1.12	0.25	0.00	0.90			
Avail Cap(c_a), veh/h	385	2257	0	0	1324	573	854	0	760			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.8	10.9	0.0	0.0	31.5	31.9	26.7	0.0	33.8			
Incr Delay (d2), s/veh	22.6	0.2	0.0	0.0	20.4	75.0	0.2	0.0	9.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.7	5.5	0.0	0.0	18.6	25.2	2.4	0.0	10.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	11.0	0.0	0.0	52.0	106.8	26.9	0.0	42.9			
LnGrp LOS	E	B	A	A	D	F	C	A	D			
Approach Vol, veh/h		1316			1942			570				
Approach Delay, s/veh		23.4			70.1			39.1				
Approach LOS		C			E			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		66.0			24.0	42.0		34.6				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		62.9			21.4	36.9		47.5				
Max Q Clear Time (g_c+I1), s		17.2			19.3	38.9		28.0				
Green Ext Time (p_c), s		8.8			0.1	0.0		2.1				
Intersection Summary												
HCM 6th Ctrl Delay			49.4									
HCM 6th LOS			D									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	527	178	1070	853
Future Volume (vph)	1	527	178	1070	853
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	39.5	39.5	15.2	69.6	49.9
Actuated g/C Ratio	0.33	0.33	0.13	0.58	0.42
v/c Ratio	0.31	0.92	0.79	0.52	0.76
Control Delay	30.7	55.4	61.8	16.4	34.7
Queue Delay	0.6	0.0	0.0	1.7	0.8
Total Delay	31.3	55.4	61.8	18.1	35.5
LOS	C	E	E	B	D
Approach Delay	49.2			24.3	35.5
Approach LOS	D			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 34.1	Intersection LOS: C
Intersection Capacity Utilization 100.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	181	1	527	178	1070	0	0	853	247
Future Volume (veh/h)	0	0	0	181	1	527	178	1070	0	0	853	247
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				185	1	433	182	1092	0	0	870	202
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				527	3	471	210	2226	0	0	1347	313
Arrive On Green				0.29	0.29	0.29	0.12	0.62	0.00	0.00	0.46	0.46
Sat Flow, veh/h				1800	10	1610	1810	3705	0	0	3003	675
Grp Volume(v), veh/h				186	0	433	182	1092	0	0	540	532
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1778
Q Serve(g_s), s				9.7	0.0	31.2	11.9	20.0	0.0	0.0	27.5	27.5
Cycle Q Clear(g_c), s				9.7	0.0	31.2	11.9	20.0	0.0	0.0	27.5	27.5
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.38
Lane Grp Cap(c), veh/h				530	0	471	210	2226	0	0	836	824
V/C Ratio(X)				0.35	0.00	0.92	0.87	0.49	0.00	0.00	0.65	0.65
Avail Cap(c_a), veh/h				652	0	580	264	2226	0	0	836	824
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.09	0.09	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				33.5	0.0	41.1	52.1	12.6	0.0	0.0	24.7	24.7
Incr Delay (d2), s/veh				0.4	0.0	17.6	2.1	0.1	0.0	0.0	3.8	3.9
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.2	0.0	14.2	5.5	7.6	0.0	0.0	12.3	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				33.9	0.0	58.7	54.2	12.7	0.0	0.0	28.5	28.6
LnGrp LOS				C	A	E	D	B	A	A	C	C
Approach Vol, veh/h					619			1274			1072	
Approach Delay, s/veh					51.2			18.6			28.5	
Approach LOS					D			B			C	

Timer - Assigned Phs	2		5	6		8						
Phs Duration (G+Y+Rc), s	79.1		18.4	60.7		40.9						
Change Period (Y+Rc), s	5.1		4.5	5.1		5.8						
Max Green Setting (Gmax), s	65.9		17.5	43.9		43.2						
Max Q Clear Time (g_c+I1), s	22.0		13.9	29.5		33.2						
Green Ext Time (p_c), s	9.9		0.1	6.0		1.9						

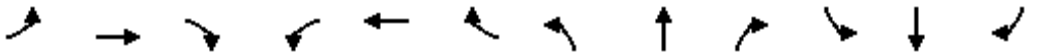
Intersection Summary		
HCM 6th Ctrl Delay		29.0
HCM 6th LOS		C

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	431	744	443	591
Future Volume (vph)	7	431	744	443	591
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	40.0	40.0	45.8	34.2	80.0
Total Split (%)	33.3%	33.3%	38.2%	28.5%	66.7%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	34.2	34.2	40.7	29.6	74.9
Actuated g/C Ratio	0.28	0.28	0.34	0.25	0.62
v/c Ratio	1.04	0.70	1.01	1.05	0.28
Control Delay	93.8	22.2	64.1	110.7	9.6
Queue Delay	0.0	0.0	0.0	21.9	0.5
Total Delay	93.8	22.2	64.1	132.6	10.1
LOS	F	C	E	F	B
Approach Delay	61.1		64.1		62.6
Approach LOS	E		E		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 62.7	Intersection LOS: E
Intersection Capacity Utilization 100.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	505	7	431	0	0	0	0	744	429	443	591	0
Future Volume (veh/h)	505	7	431	0	0	0	0	744	429	443	591	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	532	7	317				0	783	315	466	622	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	509	7	459				0	852	343	446	2253	0
Arrive On Green	0.28	0.28	0.28				0.00	0.34	0.34	0.49	1.00	0.00
Sat Flow, veh/h	1787	24	1610				0	2608	1010	1810	3705	0
Grp Volume(v), veh/h	539	0	317				0	562	536	466	622	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1718	1810	1805	0
Q Serve(g_s), s	34.2	0.0	21.0				0.0	35.9	35.9	29.6	0.0	0.0
Cycle Q Clear(g_c), s	34.2	0.0	21.0				0.0	35.9	35.9	29.6	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.59	1.00		0.00
Lane Grp Cap(c), veh/h	516	0	459				0	612	583	446	2253	0
V/C Ratio(X)	1.04	0.00	0.69				0.00	0.92	0.92	1.04	0.28	0.00
Avail Cap(c_a), veh/h	516	0	459				0	612	583	446	2253	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.56	0.56	0.00
Uniform Delay (d), s/veh	42.9	0.0	38.2				0.0	38.1	38.1	30.4	0.0	0.0
Incr Delay (d2), s/veh	51.7	0.0	4.4				0.0	21.0	22.0	44.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.0	0.0	8.5				0.0	19.0	18.3	14.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.6	0.0	42.6				0.0	59.1	60.1	74.4	0.2	0.0
LnGrp LOS	F	A	D				A	E	E	F	A	A
Approach Vol, veh/h		856						1098			1088	
Approach Delay, s/veh		75.3						59.5			31.9	
Approach LOS		E						E			C	

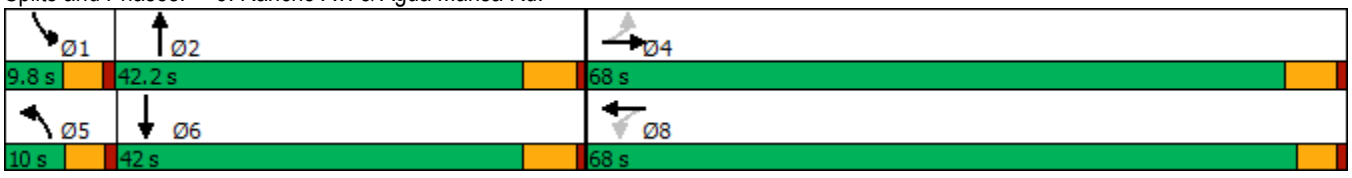
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	34.2	45.8		40.0		80.0
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	29.6	40.7		34.2		74.9
Max Q Clear Time (g_c+I1), s	31.6	37.9		36.2		2.0
Green Ext Time (p_c), s	0.0	1.7		0.0		4.7

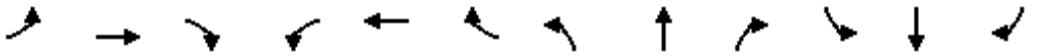
Intersection Summary		
HCM 6th Ctrl Delay		54.1
HCM 6th LOS		D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	598	114	5	32	108	601	16	939
Future Volume (vph)	598	114	5	32	108	601	16	939
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8		4.6	4.6	5.8	4.6	5.8
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		62.2		63.4	5.4	42.3	5.1	36.2
Actuated g/C Ratio		0.52		0.53	0.04	0.35	0.04	0.30
v/c Ratio		1.32		0.06	1.51	0.51	0.23	1.16
Control Delay		179.5		11.2	325.6	33.2	63.4	120.5
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		179.5		11.2	325.6	33.2	63.4	120.5
LOS		F		B	F	C	E	F
Approach Delay		179.5		11.2		77.6		119.8
Approach LOS		F		B		E		F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.51	
Intersection Signal Delay: 126.7	Intersection LOS: F
Intersection Capacity Utilization 111.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	114	212	5	32	12	108	601	3	16	939	233
Future Volume (veh/h)	598	114	212	5	32	12	108	601	3	16	939	233
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	636	121	199	5	34	11	115	639	3	17	999	201
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	563	98	160	101	666	207	77	1211	6	31	904	181
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.05	0.33	0.33	0.02	0.30	0.30
Sat Flow, veh/h	989	188	309	131	1285	399	1714	3685	17	1714	2995	602
Grp Volume(v), veh/h	956	0	0	50	0	0	115	313	329	17	601	599
Grp Sat Flow(s),veh/h/ln	1486	0	0	1814	0	0	1714	1805	1897	1714	1805	1792
Q Serve(g_s), s	60.6	0.0	0.0	0.0	0.0	0.0	5.4	16.9	16.9	1.2	36.2	36.2
Cycle Q Clear(g_c), s	62.2	0.0	0.0	1.6	0.0	0.0	5.4	16.9	16.9	1.2	36.2	36.2
Prop In Lane	0.67		0.21	0.10		0.22	1.00		0.01	1.00		0.34
Lane Grp Cap(c), veh/h	820	0	0	973	0	0	77	593	623	31	545	541
V/C Ratio(X)	1.17	0.00	0.00	0.05	0.00	0.00	1.49	0.53	0.53	0.55	1.10	1.11
Avail Cap(c_a), veh/h	820	0	0	990	0	0	77	593	623	74	545	541
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	0.0	14.3	0.0	0.0	57.3	32.7	32.7	58.4	41.9	41.9
Incr Delay (d2), s/veh	87.5	0.0	0.0	0.0	0.0	0.0	277.3	0.9	0.8	5.6	70.3	71.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	42.8	0.0	0.0	0.7	0.0	0.0	8.2	7.3	7.6	0.5	26.0	26.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	118.1	0.0	0.0	14.3	0.0	0.0	334.6	33.6	33.6	64.0	112.2	113.5
LnGrp LOS	F	A	A	B	A	A	F	C	C	E	F	F
Approach Vol, veh/h		956			50			757			1217	
Approach Delay, s/veh		118.1			14.3			79.3			112.2	
Approach LOS		F			B			E			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	45.2		68.0	10.0	42.0		68.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	3.2	18.9		64.2	7.4	38.2		3.6				
Green Ext Time (p_c), s	0.0	3.2		0.0	0.0	0.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		104.1
HCM 6th LOS		F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	206	963	1123	194
Future Vol, veh/h	0	0	206	963	1123	194
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	219	1024	1195	206

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2248	701	1401	0	-	0
Stage 1	1298	-	-	-	-	-
Stage 2	950	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	36	386	494	-	-	-
Stage 1	224	-	-	-	-	-
Stage 2	341	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	386	494	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	341	-	-	-	-	-

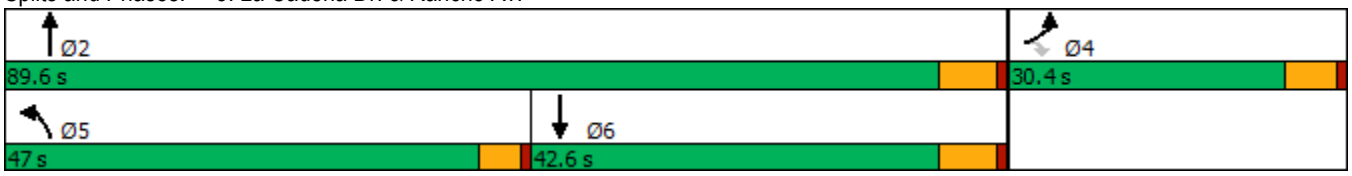
Approach	EB	NB	SB
HCM Control Delay, s	0	8.4	0
HCM LOS	A		

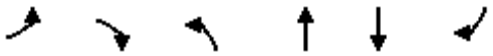
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	494	-	-	-	-
HCM Lane V/C Ratio	0.444	-	-	-	-
HCM Control Delay (s)	18	6.3	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	2.2	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	35	799	510	688	848
Future Volume (vph)	35	799	510	688	848
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.8	13.8	40.5	78.6	33.5
Actuated g/C Ratio	0.13	0.13	0.39	0.75	0.32
v/c Ratio	0.80	0.77	0.88	0.29	0.85
Control Delay	18.9	14.5	49.4	4.9	43.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.9	14.5	49.4	4.9	43.5
LOS	B	B	D	A	D
Approach Delay	16.7			23.8	43.5
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 93.9%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	799	510	688	848	13
Future Volume (veh/h)	35	799	510	688	848	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	730	526	709	874	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	345	615	545	2224	958	12
Arrive On Green	0.00	0.21	0.35	0.68	0.29	0.29
Sat Flow, veh/h	1629	2898	1543	3335	3371	41
Grp Volume(v), veh/h	0	730	526	709	432	453
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1703
Q Serve(g_s), s	0.0	24.6	38.8	10.2	29.8	29.8
Cycle Q Clear(g_c), s	0.0	24.6	38.8	10.2	29.8	29.8
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	345	615	545	2224	474	496
V/C Ratio(X)	0.00	1.19	0.96	0.32	0.91	0.91
Avail Cap(c_a), veh/h	345	615	564	2336	510	534
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	45.7	36.8	7.4	39.7	39.7
Incr Delay (d2), s/veh	0.0	100.1	28.4	0.1	20.0	19.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	8.5	17.9	2.9	13.8	14.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	145.8	65.2	7.5	59.7	59.0
LnGrp LOS	A	F	E	A	E	E
Approach Vol, veh/h	730			1235	885	
Approach Delay, s/veh	145.8			32.1	59.3	
Approach LOS	F			C	E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		85.6		30.4	45.6	40.0
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		12.2		26.6	40.8	31.8
Green Ext Time (p_c), s		4.9		0.0	0.2	2.0

Intersection Summary		
HCM 6th Ctrl Delay		69.7
HCM 6th LOS		E

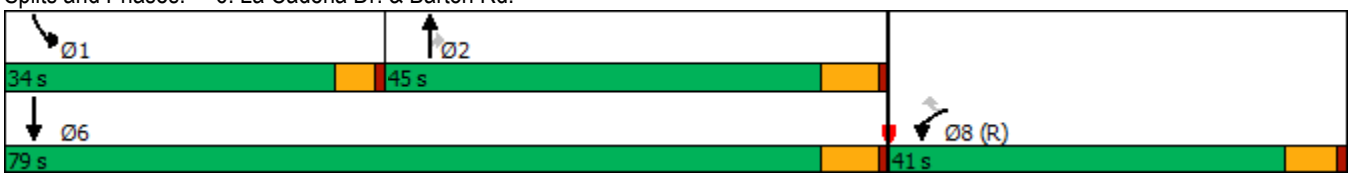
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	496	496	1053	317	496	1384
Future Volume (vph)	496	496	1053	317	496	1384
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	35.5	35.5	38.5	38.5	29.4	72.5
Actuated g/C Ratio	0.30	0.30	0.32	0.32	0.24	0.60
v/c Ratio	1.01	0.90	0.94	0.46	1.22	0.65
Control Delay	94.4	62.9	55.0	8.2	159.2	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.4	62.9	55.0	8.2	159.2	17.3
LOS	F	E	E	A	F	B
Approach Delay	78.7		44.2			54.7
Approach LOS	E		D			D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.22	
Intersection Signal Delay: 56.9	Intersection LOS: E
Intersection Capacity Utilization 101.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	496	496	1053	317	496	1384
Future Volume (veh/h)	496	496	1053	317	496	1384
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	511	0	1086	294	511	1427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		1153	514	420	2176
Arrive On Green	0.29	0.00	0.32	0.32	0.25	0.60
Sat Flow, veh/h	1714	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	511	0	1086	294	511	1427
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1610	1714	1805
Q Serve(g_s), s	35.2	0.0	35.1	18.2	29.4	31.2
Cycle Q Clear(g_c), s	35.2	0.0	35.1	18.2	29.4	31.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		1153	514	420	2176
V/C Ratio(X)	1.02		0.94	0.57	1.22	0.66
Avail Cap(c_a), veh/h	503		1167	521	420	2190
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.09	0.09	0.45	0.45
Uniform Delay (d), s/veh	42.4	0.0	39.8	34.0	45.3	15.7
Incr Delay (d2), s/veh	44.3	0.0	1.9	0.1	107.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.7	0.0	15.0	6.8	24.4	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	86.7	0.0	41.6	34.1	152.6	16.0
LnGrp LOS	F		D	C	F	B
Approach Vol, veh/h	511	A	1380			1938
Approach Delay, s/veh	86.7		40.0			52.0
Approach LOS	F		D			D

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	34.0	44.5			78.5	41.0
Change Period (Y+Rc), s	4.6	6.2			6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8			72.8	35.2
Max Q Clear Time (g_c+I1), s	31.4	37.1			33.2	37.2
Green Ext Time (p_c), s	0.0	1.2			12.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	52.3
HCM 6th LOS	D

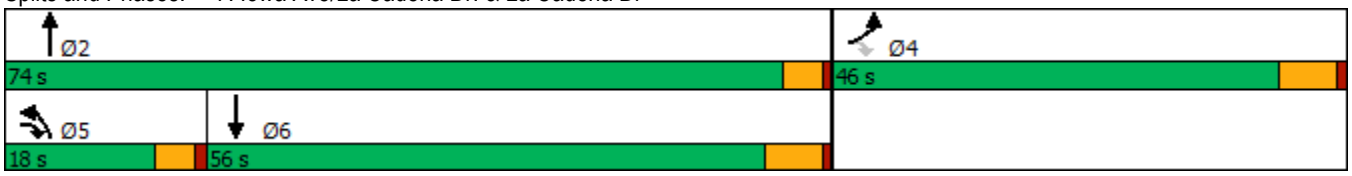
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	641	264	292	966	467	1427
Future Volume (vph)	641	264	292	966	467	1427
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	46.0	18.0	18.0	74.0	56.0	
Total Split (%)	38.3%	15.0%	15.0%	61.7%	46.7%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	40.0	59.7	13.5	63.7	44.0	114.5
Actuated g/C Ratio	0.35	0.52	0.12	0.56	0.38	1.00
v/c Ratio	1.12	0.33	1.52	0.95	0.67	0.55
Control Delay	110.3	18.5	292.1	42.9	33.9	0.8
Queue Delay	0.0	0.0	0.0	48.5	0.0	0.0
Total Delay	110.3	18.5	292.1	91.5	33.9	0.8
LOS	F	B	F	F	C	A
Approach Delay	83.5			138.0	9.0	
Approach LOS	F			F	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.5	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.52	
Intersection Signal Delay: 65.6	Intersection LOS: E
Intersection Capacity Utilization 97.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	641	264	292	966	467	1427
Future Volume (veh/h)	641	264	292	966	467	1427
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	668	232	304	1006	486	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	582	730	196	1055	763	
Arrive On Green	0.34	0.34	0.11	0.56	0.40	0.00
Sat Flow, veh/h	1714	1610	1714	1900	1900	2685
Grp Volume(v), veh/h	668	232	304	1006	486	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1900	1900	1342
Q Serve(g_s), s	39.8	10.8	13.4	58.7	24.1	0.0
Cycle Q Clear(g_c), s	39.8	10.8	13.4	58.7	24.1	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	582	730	196	1055	763	
V/C Ratio(X)	1.15	0.32	1.55	0.95	0.64	
Avail Cap(c_a), veh/h	582	730	196	1124	806	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	38.8	20.5	52.0	24.7	28.2	0.0
Incr Delay (d2), s/veh	85.6	0.2	272.3	16.4	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.4	0.1	20.4	27.7	10.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	124.4	20.7	324.3	41.1	29.8	0.0
LnGrp LOS	F	C	F	D	C	
Approach Vol, veh/h	900			1310	486	A
Approach Delay, s/veh	97.6			106.8	29.8	
Approach LOS	F			F	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		71.3		46.0	18.0	53.3
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 69		39.8	13.4	49.8
Max Q Clear Time (g_c+I1), s		60.7		41.8	15.4	26.1
Green Ext Time (p_c), s		4.4		0.0	0.0	2.7

Intersection Summary		
HCM 6th Ctrl Delay		89.9
HCM 6th LOS		F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	730	1097	162	711
Future Volume (vph)	730	1097	162	711
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	71.8	71.8	35.8	35.8
Actuated g/C Ratio	0.60	0.60	0.30	0.30
v/c Ratio	0.66	1.00	0.31	1.17
Control Delay	19.6	50.3	34.5	118.9
Queue Delay	51.9	36.2	0.0	0.0
Total Delay	71.6	86.5	34.5	118.9
LOS	E	F	C	F
Approach Delay	71.6	86.5	103.3	
Approach LOS	E	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 87.9	Intersection LOS: F
Intersection Capacity Utilization 92.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	730	0	0	1097	162	711
Future Volume (veh/h)	730	0	0	1097	162	711
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	753	0	0	1131	167	615
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1137	0	0	1137	540	480
Arrive On Green	0.60	0.00	0.00	0.60	0.30	0.30
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	753	0	0	1131	167	615
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	31.6	0.0	0.0	70.9	8.6	35.8
Cycle Q Clear(g_c), s	31.6	0.0	0.0	70.9	8.6	35.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1137	0	0	1137	540	480
V/C Ratio(X)	0.66	0.00	0.00	0.99	0.31	1.28
Avail Cap(c_a), veh/h	1137	0	0	1137	540	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	0.0	0.0	23.9	32.5	42.1
Incr Delay (d2), s/veh	1.4	0.0	0.0	25.4	0.3	141.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	0.0	0.0	34.8	3.9	33.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	0.0	0.0	49.3	32.9	183.5
LnGrp LOS	B	A	A	D	C	F
Approach Vol, veh/h	753			1131	782	
Approach Delay, s/veh	17.5			49.3	151.3	
Approach LOS	B			D	F	

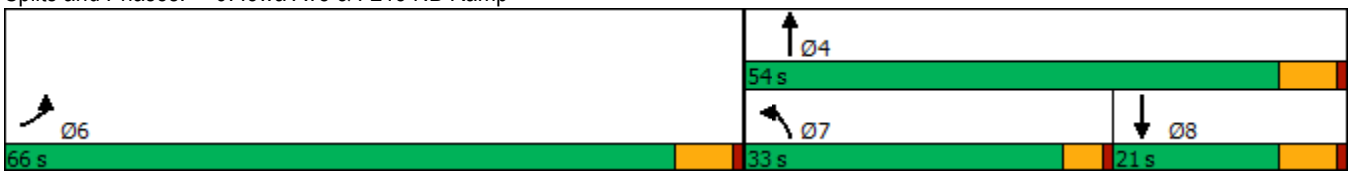
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		78.0		42.0		78.0
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		72.9		37.8		33.6
Green Ext Time (p_c), s		0.0		0.0		5.3

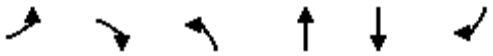
Intersection Summary		
HCM 6th Ctrl Delay		70.2
HCM 6th LOS		E

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	311	584	1003	75
Future Volume (vph)	311	584	1003	75
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	28.4	47.8	14.8
Actuated g/C Ratio	0.50	0.24	0.40	0.12
v/c Ratio	1.55	1.40	1.35	1.46
Control Delay	277.8	227.6	198.9	245.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	277.8	227.6	198.9	245.2
LOS	F	F	F	F
Approach Delay	277.8		209.4	245.2
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.55	
Intersection Signal Delay: 242.5	Intersection LOS: F
Intersection Capacity Utilization 169.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	1130	584	1003	75	513
Future Volume (veh/h)	311	1130	584	1003	75	513
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	317	974	596	1023	77	436
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	202	622	428	757	31	173
Arrive On Green	0.50	0.50	0.24	0.40	0.12	0.12
Sat Flow, veh/h	406	1248	1810	1900	247	1401
Grp Volume(v), veh/h	1292	0	596	1023	0	513
Grp Sat Flow(s),veh/h/ln	1655	0	1810	1900	0	1648
Q Serve(g_s), s	59.8	0.0	28.4	47.8	0.0	14.8
Cycle Q Clear(g_c), s	59.8	0.0	28.4	47.8	0.0	14.8
Prop In Lane	0.25	0.75	1.00			0.85
Lane Grp Cap(c), veh/h	825	0	428	757	0	203
V/C Ratio(X)	1.57	0.00	1.39	1.35	0.00	2.52
Avail Cap(c_a), veh/h	825	0	428	757	0	203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	45.8	36.1	0.0	52.6
Incr Delay (d2), s/veh	260.8	0.0	190.1	166.9	0.0	700.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	81.0	0.0	35.3	56.7	0.0	45.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	290.9	0.0	235.9	203.0	0.0	752.8
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1292			1619	513	
Approach Delay, s/veh	290.9			215.1	752.8	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	54.0	66.0	33.0	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	49.8	61.8	30.4	16.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	324.3
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↰	↑	↱	↰		↱		↕	
Traffic Vol, veh/h	12	789	12	9	945	14	25	0	19	3	0	21
Future Vol, veh/h	12	789	12	9	945	14	25	0	19	3	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	-	-	-	0	-	0	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	813	12	9	974	14	26	0	20	3	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	974	0	0	825	0	0	1846	-	819	1845	1841	974
Stage 1	-	-	-	-	-	-	843	-	-	992	992	-
Stage 2	-	-	-	-	-	-	1003	-	-	853	849	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	-	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	-	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	716	-	-	814	-	-	58	0	379	58	76	308
Stage 1	-	-	-	-	-	-	361	0	-	299	326	-
Stage 2	-	-	-	-	-	-	294	0	-	357	380	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	716	-	-	814	-	-	52	-	379	53	73	308
Mov Cap-2 Maneuver	-	-	-	-	-	-	52	-	-	53	73	-
Stage 1	-	-	-	-	-	-	350	-	-	290	322	-
Stage 2	-	-	-	-	-	-	270	-	-	328	368	-

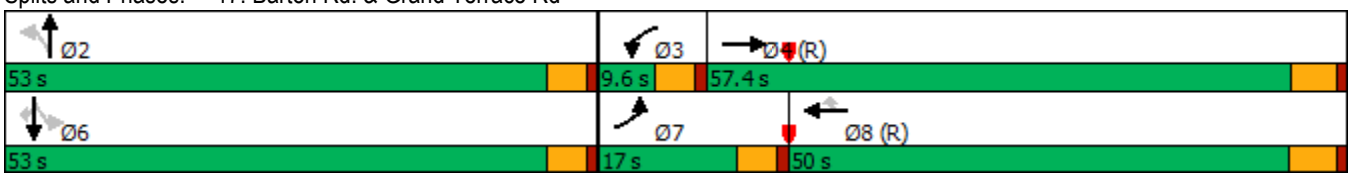
Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	79.8	26.5
HCM LOS			F	D

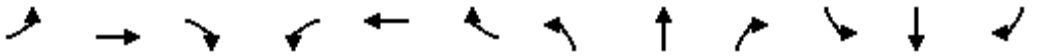
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	52	379	716	-	-	814	-	-	192
HCM Lane V/C Ratio	0.496	0.052	0.017	-	-	0.011	-	-	0.129
HCM Control Delay (s)	129	15	10.1	0	-	9.5	-	-	26.5
HCM Lane LOS	F	C	B	A	-	A	-	-	D
HCM 95th %tile Q(veh)	1.9	0.2	0.1	-	-	0	-	-	0.4

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	42	768	784	318	248	4	184		
Future Volume (vph)	42	768	784	318	248	4	184		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.7	80.0	69.3	69.3		30.3	30.3		
Actuated g/C Ratio	0.06	0.67	0.58	0.58		0.25	0.25		
v/c Ratio	0.42	0.35	0.41	0.34		0.79	0.36		
Control Delay	39.0	17.9	17.1	8.8		56.8	5.8		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	39.0	17.9	17.1	8.8		56.8	5.8		
LOS	D	B	B	A		E	A		
Approach Delay		19.0	14.7			35.3			
Approach LOS		B	B			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	768	0	0	784	318	0	0	0	248	4	184
Future Volume (veh/h)	42	768	0	0	784	318	0	0	0	248	4	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	46	835	0	0	852	286	0	0	0	270	4	173
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	58	2519	0	1	2258	1007	0	416	0	371	5	352
Arrive On Green	0.03	0.70	0.00	0.00	0.63	0.63	0.00	0.00	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1714	3705	0	1714	3610	1610	0	1900	0	1424	21	1610
Grp Volume(v), veh/h	46	835	0	0	852	286	0	0	0	274	0	173
Grp Sat Flow(s),veh/h/ln	1714	1805	0	1714	1805	1610	0	1900	0	1445	0	1610
Q Serve(g_s), s	3.2	10.9	0.0	0.0	13.9	9.7	0.0	0.0	0.0	21.9	0.0	11.3
Cycle Q Clear(g_c), s	3.2	10.9	0.0	0.0	13.9	9.7	0.0	0.0	0.0	21.9	0.0	11.3
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	58	2519	0	1	2258	1007	0	416	0	376	0	352
V/C Ratio(X)	0.79	0.33	0.00	0.00	0.38	0.28	0.00	0.00	0.00	0.73	0.00	0.49
Avail Cap(c_a), veh/h	177	2519	0	71	2258	1007	0	766	0	642	0	649
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.5	7.1	0.0	0.0	11.0	10.2	0.0	0.0	0.0	45.2	0.0	41.0
Incr Delay (d2), s/veh	8.4	0.4	0.0	0.0	0.5	0.7	0.0	0.0	0.0	2.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	3.9	0.0	0.0	5.4	3.5	0.0	0.0	0.0	8.2	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.0	7.5	0.0	0.0	11.5	10.9	0.0	0.0	0.0	47.9	0.0	42.1
LnGrp LOS	E	A	A	A	B	B	A	A	A	D	A	D
Approach Vol, veh/h		881			1138			0			447	
Approach Delay, s/veh		10.5			11.4			0.0			45.7	
Approach LOS		B			B						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		30.9	0.0	89.1		30.9	8.7	80.5				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	12.9		23.9	5.2	15.9				
Green Ext Time (p_c), s		0.0	0.0	6.7		2.3	0.0	7.8				

Intersection Summary												
HCM 6th Ctrl Delay			17.3									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

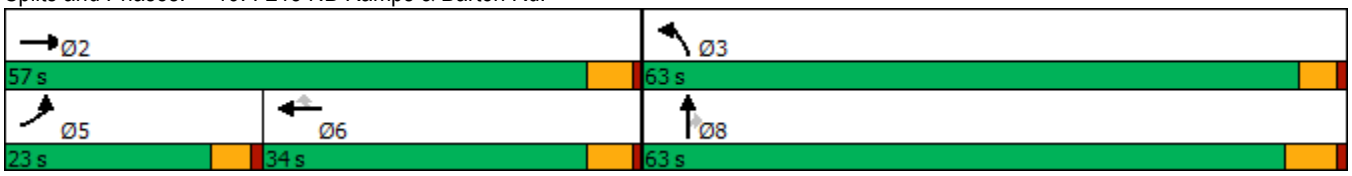
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1070	1290	83	882
Demand Flow Rate, veh/h	1070	1290	83	882
Vehicles Circulating, veh/h	571	168	1576	849
Vehicles Exiting, veh/h	1160	1491	65	609
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.8	9.2	13.6	24.7
Approach LOS	B	A	B	C

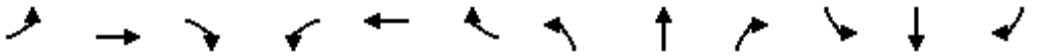
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.585	0.415
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	503	567	606	684	83	516	366
Cap Entry Lane, veh/h	798	874	1157	1231	372	618	690
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	503	567	606	684	83	516	366
Cap Entry, veh/h	798	874	1157	1231	372	618	690
V/C Ratio	0.630	0.649	0.524	0.556	0.223	0.835	0.530
Control Delay, s/veh	15.0	14.6	9.1	9.3	13.6	32.6	13.6
LOS	C	B	A	A	B	D	B
95th %tile Queue, veh	5	5	3	4	1	9	3

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	267	1150	1064	479	0	644	
Future Volume (vph)	267	1150	1064	479	0	644	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	23.0	57.0	34.0	34.0	63.0	63.0	63.0
Total Split (%)	19.2%	47.5%	28.3%	28.3%	52.5%	52.5%	53%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	18.4	51.9	28.9	28.9	57.2	57.2	
Actuated g/C Ratio	0.15	0.43	0.24	0.24	0.48	0.48	
v/c Ratio	1.00	0.76	1.26	0.89	320.00	0.83	
Control Delay	104.4	32.7	165.7	42.7	144447.4	35.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	104.4	32.7	165.7	42.7	144447.4	35.1	
LOS	F	C	F	D	F	D	
Approach Delay		46.2	127.5		70912.3		
Approach LOS		D	F		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 320.00	
Intersection Signal Delay: 21290.2	Intersection LOS: F
Intersection Capacity Utilization 80.7%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	267	1150	0	0	1064	479	160	0	644	0	0	0
Future Volume (veh/h)	267	1150	0	0	1064	479	160	0	644	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	275	1186	0	0	1097	416	640	0	551			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	306	1798	0	0	1024	442	738	0	657			
Arrive On Green	0.17	0.50	0.00	0.00	0.28	0.28	0.41	0.00	0.41			
Sat Flow, veh/h	1810	3705	0	0	3705	1559	1810	0	1610			
Grp Volume(v), veh/h	275	1186	0	0	1097	416	640	0	551			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1559	1810	0	1610			
Q Serve(g_s), s	15.2	25.0	0.0	0.0	28.9	26.6	33.0	0.0	31.4			
Cycle Q Clear(g_c), s	15.2	25.0	0.0	0.0	28.9	26.6	33.0	0.0	31.4			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	306	1798	0	0	1024	442	738	0	657			
V/C Ratio(X)	0.90	0.66	0.00	0.00	1.07	0.94	0.87	0.00	0.84			
Avail Cap(c_a), veh/h	327	1839	0	0	1024	442	1039	0	925			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	41.5	19.1	0.0	0.0	36.5	35.6	27.6	0.0	27.2			
Incr Delay (d2), s/veh	24.2	0.9	0.0	0.0	49.2	28.3	5.8	0.0	4.9			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	8.7	10.0	0.0	0.0	19.3	13.2	14.3	0.0	11.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.6	20.0	0.0	0.0	85.7	64.0	33.4	0.0	32.1			
LnGrp LOS	E	B	A	A	F	E	C	A	C			
Approach Vol, veh/h		1461			1513			1191				
Approach Delay, s/veh		28.6			79.7			32.8				
Approach LOS		C			E			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		55.8			21.8	34.0		46.0				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		51.9			18.4	28.9		58.5				
Max Q Clear Time (g_c+I1), s		27.0			17.2	30.9		35.0				
Green Ext Time (p_c), s		9.5			0.1	0.0		6.5				
Intersection Summary												
HCM 6th Ctrl Delay			48.4									
HCM 6th LOS			D									

APPENDIX 7.2:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	0	444	132	467	881
Future Volume (vph)	0	444	132	467	881
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	39.0	39.0	21.0	81.0	60.0
Total Split (%)	32.5%	32.5%	17.5%	67.5%	50.0%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	28.4	28.4	13.2	80.7	63.0
Actuated g/C Ratio	0.24	0.24	0.11	0.67	0.52
v/c Ratio	0.82	0.70	0.72	0.21	0.75
Control Delay	59.1	13.8	93.9	2.2	25.6
Queue Delay	9.5	0.0	0.0	0.2	0.2
Total Delay	68.6	13.8	93.9	2.3	25.7
LOS	E	B	F	A	C
Approach Delay	37.0			22.5	25.7
Approach LOS	D			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 75.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	326	0	444	132	467	0	0	881	397
Future Volume (veh/h)	0	0	0	326	0	444	132	467	0	0	881	397
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				351	0	369	142	502	0	0	947	346
Peak Hour Factor				0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				455	0	404	169	2375	0	0	1367	496
Arrive On Green				0.25	0.00	0.25	0.09	0.66	0.00	0.00	0.53	0.53
Sat Flow, veh/h				1810	0	1610	1810	3705	0	0	2689	941
Grp Volume(v), veh/h				351	0	369	142	502	0	0	657	636
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1731
Q Serve(g_s), s				21.6	0.0	26.7	9.3	6.6	0.0	0.0	32.5	33.0
Cycle Q Clear(g_c), s				21.6	0.0	26.7	9.3	6.6	0.0	0.0	32.5	33.0
Prop In Lane				1.00		1.00	1.00		0.00	0.00		0.54
Lane Grp Cap(c), veh/h				455	0	404	169	2375	0	0	951	912
V/C Ratio(X)				0.77	0.00	0.91	0.84	0.21	0.00	0.00	0.69	0.70
Avail Cap(c_a), veh/h				501	0	445	249	2375	0	0	951	912
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.84	0.84	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				41.7	0.0	43.6	53.5	8.2	0.0	0.0	21.1	21.2
Incr Delay (d2), s/veh				6.7	0.0	21.8	8.7	0.2	0.0	0.0	4.1	4.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				10.2	0.0	12.7	4.6	2.5	0.0	0.0	14.2	13.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				48.4	0.0	65.4	62.2	8.3	0.0	0.0	25.2	25.7
LnGrp LOS				D	A	E	E	A	A	A	C	C
Approach Vol, veh/h					720			644			1293	
Approach Delay, s/veh					57.1			20.2			25.4	
Approach LOS					E			C			C	

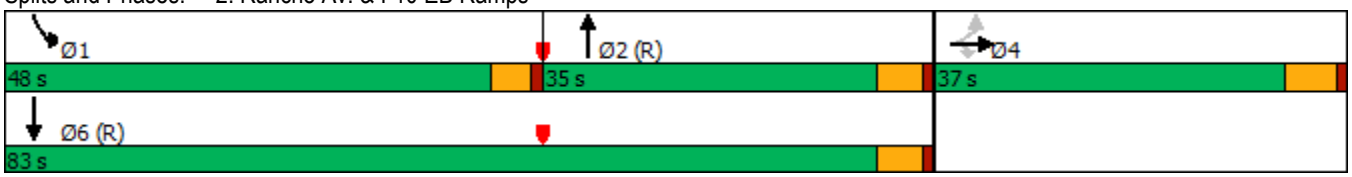
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		84.1			15.7	68.3		35.9				
Change Period (Y+Rc), s		5.1			4.5	5.1		5.8				
Max Green Setting (Gmax), s		75.9			16.5	54.9		33.2				
Max Q Clear Time (g_c+I1), s		8.6			11.3	35.0		28.7				
Green Ext Time (p_c), s		3.7			0.1	9.0		1.4				

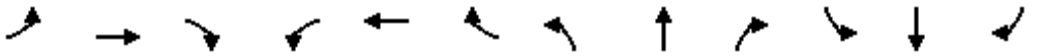
Intersection Summary		
HCM 6th Ctrl Delay	32.8	
HCM 6th LOS	C	

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	1	398	431	431	776
Future Volume (vph)	1	398	431	431	776
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	37.0	37.0	35.0	48.0	83.0
Total Split (%)	30.8%	30.8%	29.2%	40.0%	69.2%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	24.3	24.3	44.7	35.5	84.8
Actuated g/C Ratio	0.20	0.20	0.37	0.30	0.71
v/c Ratio	0.50	0.89	0.53	0.88	0.33
Control Delay	45.9	45.5	31.0	55.0	10.0
Queue Delay	0.0	0.0	0.0	35.4	1.0
Total Delay	45.9	45.5	31.0	90.4	11.0
LOS	D	D	C	F	B
Approach Delay	45.6		31.0		39.3
Approach LOS	D		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 38.6	Intersection LOS: D
Intersection Capacity Utilization 75.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	168	1	398	0	0	0	0	431	207	431	776	0
Future Volume (veh/h)	168	1	398	0	0	0	0	431	207	431	776	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	183	1	351				0	468	182	468	843	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	426	2	381				0	930	359	487	2429	0
Arrive On Green	0.24	0.24	0.24				0.00	0.37	0.37	0.54	1.00	0.00
Sat Flow, veh/h	1800	10	1610				0	2640	983	1810	3705	0
Grp Volume(v), veh/h	184	0	351				0	331	319	468	843	0
Grp Sat Flow(s),veh/h/ln	1810	0	1610				0	1805	1723	1810	1805	0
Q Serve(g_s), s	10.4	0.0	25.5				0.0	17.1	17.3	29.7	0.0	0.0
Cycle Q Clear(g_c), s	10.4	0.0	25.5				0.0	17.1	17.3	29.7	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.57	1.00		0.00
Lane Grp Cap(c), veh/h	428	0	381				0	659	630	487	2429	0
V/C Ratio(X)	0.43	0.00	0.92				0.00	0.50	0.51	0.96	0.35	0.00
Avail Cap(c_a), veh/h	471	0	419				0	659	630	654	2429	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.59	0.59	0.00
Uniform Delay (d), s/veh	38.9	0.0	44.7				0.0	29.6	29.7	27.1	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	24.6				0.0	2.7	2.9	14.2	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	12.4				0.0	7.8	7.6	10.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	39.6	0.0	69.3				0.0	32.3	32.6	41.3	0.2	0.0
LnGrp LOS	D	A	E				A	C	C	D	A	A
Approach Vol, veh/h		535						650			1311	
Approach Delay, s/veh		59.1						32.4			14.9	
Approach LOS		E						C			B	

Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	36.9	48.9		34.2		85.8						
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1						
Max Green Setting (Gmax), s	43.4	29.9		31.2		77.9						
Max Q Clear Time (g_c+I1), s	31.7	19.3		27.5		2.0						
Green Ext Time (p_c), s	0.6	2.9		0.8		7.1						

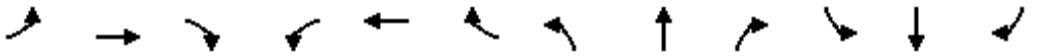
Intersection Summary												
HCM 6th Ctrl Delay			28.9									
HCM 6th LOS			C									

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	237	22	5	39	170	475	40	987
Future Volume (vph)	237	22	5	39	170	475	40	987
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8
Total Split (s)	37.0	37.0	37.0	37.0	13.4	71.0	12.0	69.6
Total Split (%)	30.8%	30.8%	30.8%	30.8%	11.2%	59.2%	10.0%	58.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8		4.6	4.6	5.8	4.6	5.8
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		31.2		32.4	8.8	67.9	6.7	63.8
Actuated g/C Ratio		0.26		0.27	0.07	0.57	0.06	0.53
v/c Ratio		1.00		0.13	1.48	0.26	0.46	1.02
Control Delay		90.1		27.3	292.3	14.1	70.1	49.6
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		90.1		27.3	292.3	14.1	70.1	49.6
LOS		F		C	F	B	E	D
Approach Delay		90.1		27.3		86.7		50.0
Approach LOS		F		C		F		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.48	
Intersection Signal Delay: 62.7	Intersection LOS: E
Intersection Capacity Utilization 102.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	22	91	5	39	15	170	475	7	40	987	801
Future Volume (veh/h)	237	22	91	5	39	15	170	475	7	40	987	801
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	258	24	89	5	42	14	185	516	7	43	1073	704
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	319	25	93	51	348	109	126	2091	28	54	1146	698
Arrive On Green	0.26	0.26	0.26	0.26	0.26	0.26	0.07	0.57	0.57	0.03	0.53	0.53
Sat Flow, veh/h	1033	96	356	71	1337	419	1714	3647	49	1714	2155	1313
Grp Volume(v), veh/h	371	0	0	61	0	0	185	255	268	43	885	892
Grp Sat Flow(s),veh/h/ln	1485	0	0	1826	0	0	1714	1805	1891	1714	1805	1664
Q Serve(g_s), s	26.4	0.0	0.0	0.0	0.0	0.0	8.8	8.4	8.4	3.0	54.1	63.8
Cycle Q Clear(g_c), s	29.5	0.0	0.0	3.1	0.0	0.0	8.8	8.4	8.4	3.0	54.1	63.8
Prop In Lane	0.70		0.24	0.08		0.23	1.00		0.03	1.00		0.79
Lane Grp Cap(c), veh/h	437	0	0	507	0	0	126	1035	1084	54	960	884
V/C Ratio(X)	0.85	0.00	0.00	0.12	0.00	0.00	1.47	0.25	0.25	0.79	0.92	1.01
Avail Cap(c_a), veh/h	437	0	0	525	0	0	126	1035	1084	106	960	884
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.4	0.0	0.0	34.0	0.0	0.0	55.6	12.7	12.7	57.7	25.8	28.1
Incr Delay (d2), s/veh	14.5	0.0	0.0	0.1	0.0	0.0	250.1	0.1	0.1	9.1	14.0	32.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.2	0.0	0.0	1.4	0.0	0.0	12.4	3.2	3.4	1.4	24.6	30.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	0.0	0.0	34.1	0.0	0.0	305.7	12.8	12.8	66.8	39.8	60.4
LnGrp LOS	E	A	A	C	A	A	F	B	B	E	D	F
Approach Vol, veh/h		371			61			708			1820	
Approach Delay, s/veh		58.0			34.1			89.4			50.5	
Approach LOS		E			C			F			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	74.6		37.0	13.4	69.6		37.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	65.2		31.2	8.8	63.8		* 32				
Max Q Clear Time (g_c+I1), s	5.0	10.4		31.5	10.8	65.8		5.1				
Green Ext Time (p_c), s	0.0	3.0		0.0	0.0	0.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		60.4
HCM 6th LOS		E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	176	620	979	221
Future Vol, veh/h	0	0	176	620	979	221
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	191	674	1064	240

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1903	652	1304	0	-	0
Stage 1	1184	-	-	-	-	-
Stage 2	719	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	62	415	538	-	-	-
Stage 1	257	-	-	-	-	-
Stage 2	449	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	27	415	538	-	-	-
Mov Cap-2 Maneuver	27	-	-	-	-	-
Stage 1	111	-	-	-	-	-
Stage 2	449	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	5.6	0
HCM LOS	A		

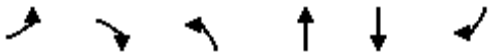
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	538	-	-	-	-
HCM Lane V/C Ratio	0.356	-	-	-	-
HCM Control Delay (s)	15.3	2.8	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	1.6	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	19	671	494	669	704
Future Volume (vph)	19	671	494	669	704
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	31.0	31.0	44.0	89.0	45.0
Total Split (%)	25.8%	25.8%	36.7%	74.2%	37.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.6	12.6	38.8	70.7	27.2
Actuated g/C Ratio	0.13	0.13	0.41	0.74	0.28
v/c Ratio	0.73	0.72	0.81	0.28	0.78
Control Delay	15.6	13.7	38.9	4.7	38.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	13.7	38.9	4.7	38.2
LOS	B	B	D	A	D
Approach Delay	14.7			19.2	38.2
Approach LOS	B			B	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 95.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	671	494	669	704	6
Future Volume (veh/h)	19	671	494	669	704	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	588	504	683	718	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	369	657	530	2117	863	7
Arrive On Green	0.00	0.23	0.34	0.65	0.26	0.26
Sat Flow, veh/h	1629	2898	1543	3335	3387	28
Grp Volume(v), veh/h	0	588	504	683	353	371
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1705
Q Serve(g_s), s	0.0	19.4	31.4	9.1	20.2	20.2
Cycle Q Clear(g_c), s	0.0	19.4	31.4	9.1	20.2	20.2
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	369	657	530	2117	425	446
V/C Ratio(X)	0.00	0.89	0.95	0.32	0.83	0.83
Avail Cap(c_a), veh/h	416	741	617	2730	640	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	37.0	31.5	7.6	34.3	34.4
Incr Delay (d2), s/veh	0.0	12.5	21.9	0.1	5.8	5.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	13.8	2.5	8.1	8.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	49.4	53.5	7.7	40.2	39.9
LnGrp LOS	A	D	D	A	D	D
Approach Vol, veh/h	588			1187	724	
Approach Delay, s/veh	49.4			27.1	40.0	
Approach LOS	D			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		70.4		28.1	38.4	32.0
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		82.8		25.2	39.4	38.8
Max Q Clear Time (g_c+I1), s		11.1		21.4	33.4	22.2
Green Ext Time (p_c), s		4.6		0.9	0.5	3.5

Intersection Summary		
HCM 6th Ctrl Delay		36.1
HCM 6th LOS		D

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	323	375	790	397	572	1399
Future Volume (vph)	323	375	790	397	572	1399
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	47.0	47.0	32.0	32.0	41.0	73.0
Total Split (%)	39.2%	39.2%	26.7%	26.7%	34.2%	60.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	41.2	41.2	25.8	25.8	36.4	66.8
Actuated g/C Ratio	0.34	0.34	0.22	0.22	0.30	0.56
v/c Ratio	0.59	0.61	1.08	0.64	1.18	0.74
Control Delay	32.4	18.6	101.4	9.9	135.8	22.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.4	18.6	101.4	9.9	135.8	22.9
LOS	C	B	F	A	F	C
Approach Delay	25.0		70.8			55.7
Approach LOS	C		E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.18	
Intersection Signal Delay: 54.8	Intersection LOS: D
Intersection Capacity Utilization 88.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	323	375	790	397	572	1399
Future Volume (veh/h)	323	375	790	397	572	1399
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	344	0	840	385	609	1488
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	589		776	346	520	2010
Arrive On Green	0.34	0.00	0.22	0.22	0.30	0.56
Sat Flow, veh/h	1714	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	344	0	840	385	609	1488
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1610	1714	1805
Q Serve(g_s), s	19.8	0.0	25.8	25.8	36.4	37.3
Cycle Q Clear(g_c), s	19.8	0.0	25.8	25.8	36.4	37.3
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	589		776	346	520	2010
V/C Ratio(X)	0.58		1.08	1.11	1.17	0.74
Avail Cap(c_a), veh/h	589		776	346	520	2010
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.50	0.50	0.56	0.56
Uniform Delay (d), s/veh	32.4	0.0	47.1	47.1	41.8	20.1
Incr Delay (d2), s/veh	4.2	0.0	48.6	69.2	88.6	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.8	0.0	16.3	16.5	27.3	14.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.6	0.0	95.7	116.3	130.4	20.9
LnGrp LOS	D		F	F	F	C
Approach Vol, veh/h	344	A	1225			2097
Approach Delay, s/veh	36.6		102.2			52.7
Approach LOS	D		F			D

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	41.0	32.0				73.0	47.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	36.4	25.8				66.8	41.2
Max Q Clear Time (g_c+I1), s	38.4	27.8				39.3	21.8
Green Ext Time (p_c), s	0.0	0.0				12.0	0.5

Intersection Summary	
HCM 6th Ctrl Delay	67.7
HCM 6th LOS	E

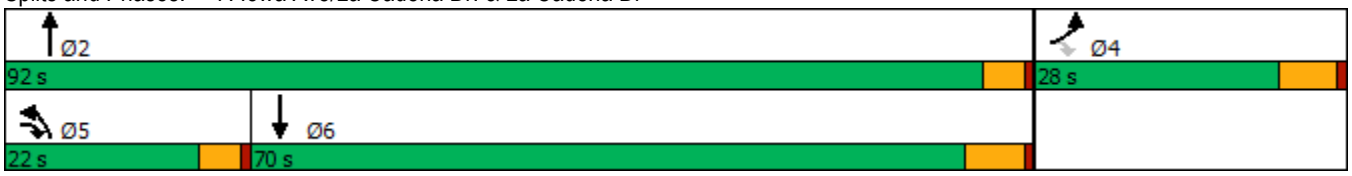
Notes

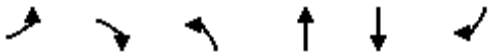
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	398	217	233	809	717	1195
Future Volume (vph)	398	217	233	809	717	1195
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	28.0	22.0	22.0	92.0	70.0	
Total Split (%)	23.3%	18.3%	18.3%	76.7%	58.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	22.1	45.8	17.4	68.2	44.5	101.3
Actuated g/C Ratio	0.22	0.45	0.17	0.67	0.44	1.00
v/c Ratio	1.10	0.31	0.82	0.65	0.89	0.46
Control Delay	115.6	21.8	65.3	12.1	38.9	0.6
Queue Delay	0.0	0.0	0.0	1.0	0.0	0.0
Total Delay	115.6	21.8	65.3	13.1	38.9	0.6
LOS	F	C	E	B	D	A
Approach Delay	82.5			24.8	14.9	
Approach LOS	F			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 101.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.10	
Intersection Signal Delay: 29.4	Intersection LOS: C
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	398	217	233	809	717	1195
Future Volume (veh/h)	398	217	233	809	717	1195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	410	198	240	834	739	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	393	625	272	1216	823	
Arrive On Green	0.23	0.23	0.16	0.64	0.43	0.00
Sat Flow, veh/h	1714	1610	1714	1900	1900	2685
Grp Volume(v), veh/h	410	198	240	834	739	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1900	1900	1342
Q Serve(g_s), s	21.8	8.2	13.0	26.8	34.3	0.0
Cycle Q Clear(g_c), s	21.8	8.2	13.0	26.8	34.3	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	393	625	272	1216	823	
V/C Ratio(X)	1.04	0.32	0.88	0.69	0.90	
Avail Cap(c_a), veh/h	393	625	314	1747	1275	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	36.6	20.3	39.1	11.0	25.0	0.0
Incr Delay (d2), s/veh	57.0	0.3	20.4	0.7	5.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.7	8.5	6.7	8.7	14.8	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	93.6	20.6	59.5	11.7	30.8	0.0
LnGrp LOS	F	C	E	B	C	
Approach Vol, veh/h	608			1074	739	A
Approach Delay, s/veh	69.9			22.4	30.8	
Approach LOS	E			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		67.1		28.0	19.7	47.4
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 87		21.8	17.4	63.8
Max Q Clear Time (g_c+I1), s		28.8		23.8	15.0	36.3
Green Ext Time (p_c), s		6.5		0.0	0.1	4.9

Intersection Summary		
HCM 6th Ctrl Delay		36.9
HCM 6th LOS		D

Notes

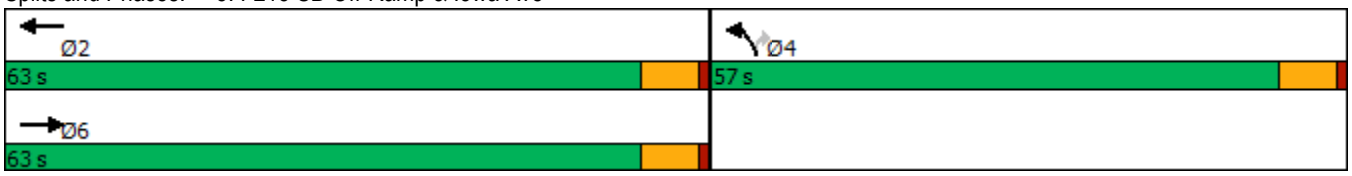
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	929	916	123	805
Future Volume (vph)	929	916	123	805
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	63.0	63.0	57.0	57.0
Total Split (%)	52.5%	52.5%	47.5%	47.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	56.8	56.8	50.8	50.8
Actuated g/C Ratio	0.47	0.47	0.42	0.42
v/c Ratio	1.11	1.10	0.18	1.20
Control Delay	96.5	90.9	22.4	133.7
Queue Delay	2.2	1.9	0.0	0.0
Total Delay	98.7	92.8	22.4	133.7
LOS	F	F	C	F
Approach Delay	98.7	92.8	118.8	
Approach LOS	F	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 103.5	Intersection LOS: F
Intersection Capacity Utilization 109.1%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	929	0	0	916	123	805
Future Volume (veh/h)	929	0	0	916	123	805
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	999	0	0	985	134	724
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	899	0	0	899	766	682
Arrive On Green	0.47	0.00	0.00	0.47	0.42	0.42
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	999	0	0	985	134	724
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	56.8	0.0	0.0	56.8	5.5	50.8
Cycle Q Clear(g_c), s	56.8	0.0	0.0	56.8	5.5	50.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	899	0	0	899	766	682
V/C Ratio(X)	1.11	0.00	0.00	1.10	0.17	1.06
Avail Cap(c_a), veh/h	899	0	0	899	766	682
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	0.0	31.6	21.5	34.6
Incr Delay (d2), s/veh	65.2	0.0	0.0	59.5	0.1	52.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	39.8	0.0	0.0	38.3	2.4	29.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	96.8	0.0	0.0	91.1	21.7	86.8
LnGrp LOS	F	A	A	F	C	F
Approach Vol, veh/h	999			985	858	
Approach Delay, s/veh	96.8			91.1	76.6	
Approach LOS	F			F	E	

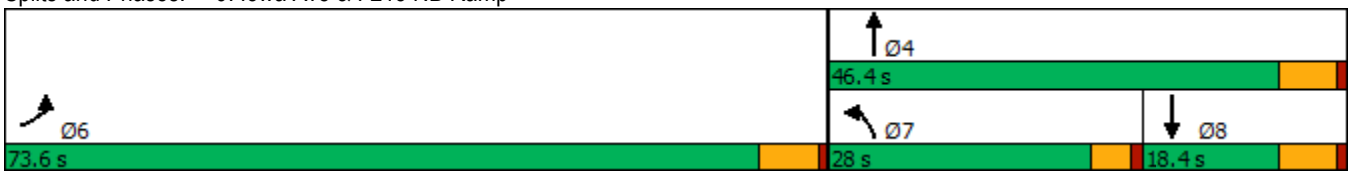
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		63.0		57.0		63.0
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		56.8		50.8		56.8
Max Q Clear Time (g_c+I1), s		58.8		52.8		58.8
Green Ext Time (p_c), s		0.0		0.0		0.0

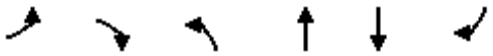
Intersection Summary		
HCM 6th Ctrl Delay		88.7
HCM 6th LOS		F

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	266	512	877	97
Future Volume (vph)	266	512	877	97
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	73.6	28.0	46.4	18.4
Total Split (%)	61.3%	23.3%	38.7%	15.3%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	None	None	Min	Min
Act Effct Green (s)	67.4	23.4	40.2	12.2
Actuated g/C Ratio	0.56	0.20	0.34	0.10
v/c Ratio	1.69	1.57	1.48	1.82
Control Delay	335.0	303.3	256.9	404.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	335.0	303.3	256.9	404.5
LOS	F	F	F	F
Approach Delay	335.0		274.0	404.5
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.82	
Intersection Signal Delay: 321.2	Intersection LOS: F
Intersection Capacity Utilization 177.9%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	266	1468	512	877	97	404
Future Volume (veh/h)	266	1468	512	877	97	404
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	286	1304	551	943	104	375
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	166	756	353	636	37	133
Arrive On Green	0.56	0.56	0.20	0.34	0.10	0.10
Sat Flow, veh/h	295	1347	1810	1900	362	1304
Grp Volume(v), veh/h	1591	0	551	943	0	479
Grp Sat Flow(s),veh/h/ln	1643	0	1810	1900	0	1665
Q Serve(g_s), s	67.4	0.0	23.4	40.2	0.0	12.2
Cycle Q Clear(g_c), s	67.4	0.0	23.4	40.2	0.0	12.2
Prop In Lane	0.18	0.82	1.00			0.78
Lane Grp Cap(c), veh/h	923	0	353	637	0	169
V/C Ratio(X)	1.72	0.00	1.56	1.48	0.00	2.83
Avail Cap(c_a), veh/h	923	0	353	637	0	169
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.3	0.0	48.3	39.9	0.0	53.9
Incr Delay (d2), s/veh	330.5	0.0	266.2	225.1	0.0	839.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	107.5	0.0	36.6	58.2	0.0	44.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	356.8	0.0	314.5	265.0	0.0	893.2
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1591			1494	479	
Approach Delay, s/veh	356.8			283.2	893.2	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	46.4	73.6	28.0	18.4
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	40.2	67.4	23.4	12.2
Max Q Clear Time (g_c+I1), s	42.2	69.4	25.4	14.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	398.0
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	954	657	9	13	19
Future Vol, veh/h	15	954	657	9	13	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	16	1037	714	10	14	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	714	0	-	0	1783	714
Stage 1	-	-	-	-	714	-
Stage 2	-	-	-	-	1069	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*812	-	-	-	*30	*542
Stage 1	-	-	-	-	*511	-
Stage 2	-	-	-	-	*333	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*812	-	-	-	*28	*542
Mov Cap-2 Maneuver	-	-	-	-	*28	-
Stage 1	-	-	-	-	*487	-
Stage 2	-	-	-	-	*333	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	114.4
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 812	-	-	-	64
HCM Lane V/C Ratio	0.02	-	-	-	0.543
HCM Control Delay (s)	9.5	0	-	-	114.4
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0.1	-	-	-	2.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	74	5	0	67	2	0
Future Vol, veh/h	74	5	0	67	2	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	80	5	0	73	2	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	85	0	156	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	73	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1524	-	840	982
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	955	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1524	-	840	982
Mov Cap-2 Maneuver	-	-	-	-	840	-
Stage 1	-	-	-	-	945	-
Stage 2	-	-	-	-	955	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	840	-	-	1524	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕				↱
Traffic Vol, veh/h	0	964	2	7	659	18	1	0	2	0	0	6
Future Vol, veh/h	0	964	2	7	659	18	1	0	2	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	1048	2	8	716	20	1	0	2	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	736	0	0	1050	0	0	1795	1801	1049	-	-	726
Stage 1	-	-	-	-	-	-	1049	1049	-	-	-	-
Stage 2	-	-	-	-	-	-	746	752	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	*812	-	-	671	-	-	*19	*26	279	0	0	*542
Stage 1	-	-	-	-	-	-	*277	*307	-	0	0	-
Stage 2	-	-	-	-	-	-	*510	*447	-	0	0	-
Platoon blocked, %	1	-	-		-	-	1	1				1
Mov Cap-1 Maneuver	*812	-	-	671	-	-	*19	*25	279	-	-	*542
Mov Cap-2 Maneuver	-	-	-	-	-	-	*19	*25	-	-	-	-
Stage 1	-	-	-	-	-	-	*277	*307	-	-	-	-
Stage 2	-	-	-	-	-	-	*494	*438	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	82	11.7
HCM LOS			F	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	50	* 812	-	-	671	-	-	542
HCM Lane V/C Ratio	0.065	-	-	-	0.011	-	-	0.012
HCM Control Delay (s)	82	0	-	-	10.4	0	-	11.7
HCM Lane LOS	F	A	-	-	B	A	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	959	7	7	683	1	3
Future Vol, veh/h	959	7	7	683	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1042	8	8	742	1	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1050	0	1804	1046
Stage 1	-	-	-	-	1046	-
Stage 2	-	-	-	-	758	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	671	-	*26	280
Stage 1	-	-	-	-	*341	-
Stage 2	-	-	-	-	*486	-
Platoon blocked, %	-	-		-	1	
Mov Cap-1 Maneuver	-	-	671	-	*25	280
Mov Cap-2 Maneuver	-	-	-	-	*25	-
Stage 1	-	-	-	-	*341	-
Stage 2	-	-	-	-	*477	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	53.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	79	-	-	671	-
HCM Lane V/C Ratio	0.055	-	-	0.011	-
HCM Control Delay (s)	53.2	-	-	10.4	0
HCM Lane LOS	F	-	-	B	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	64	10	0	64	3	0
Future Vol, veh/h	64	10	0	64	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	70	11	0	70	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	81	0	146	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1529	-	851	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1529	-	851	991
Mov Cap-2 Maneuver	-	-	-	-	851	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	851	-	-	1529	-
HCM Lane V/C Ratio	0.004	-	-	-	-
HCM Control Delay (s)	9.2	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	954	689	10	5	1
Future Vol, veh/h	8	954	689	10	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	1037	749	11	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	760	0	-	0	1810	755
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	1055	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*774	-	-	-	*25	*516
Stage 1	-	-	-	-	*486	-
Stage 2	-	-	-	-	*338	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*774	-	-	-	*24	*516
Mov Cap-2 Maneuver	-	-	-	-	*24	-
Stage 1	-	-	-	-	*473	-
Stage 2	-	-	-	-	*338	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	162
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 774	-	-	-	29
HCM Lane V/C Ratio	0.011	-	-	-	0.225
HCM Control Delay (s)	9.7	0	-	-	162
HCM Lane LOS	A	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.7

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	172	100	3	1	0
Future Vol, veh/h	0	172	100	3	1	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	187	109	3	1	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	112	0	-	0	298	111
Stage 1	-	-	-	-	111	-
Stage 2	-	-	-	-	187	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1490	-	-	-	698	948
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	850	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1490	-	-	-	698	948
Mov Cap-2 Maneuver	-	-	-	-	698	-
Stage 1	-	-	-	-	919	-
Stage 2	-	-	-	-	850	-

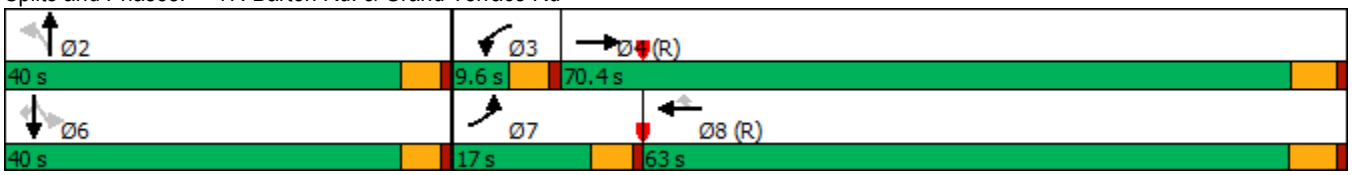
Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

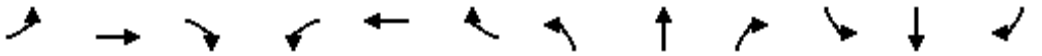
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1490	-	-	-	698
HCM Lane V/C Ratio	-	-	-	-	0.002
HCM Control Delay (s)	0	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	30	929	538	424	128	3	161		
Future Volume (vph)	30	929	538	424	128	3	161		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	70.4	63.0	63.0	40.0	40.0	40.0	40.0	9.6
Total Split (%)	14.2%	58.7%	52.5%	52.5%	33.3%	33.3%	33.3%	33%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	6.9	92.8	85.0	85.0		17.5	17.5		
Actuated g/C Ratio	0.06	0.77	0.71	0.71		0.15	0.15		
v/c Ratio	0.33	0.35	0.22	0.35		0.68	0.45		
Control Delay	79.3	1.5	7.8	1.9		64.8	9.9		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	79.3	1.5	7.8	1.9		64.8	9.9		
LOS	E	A	A	A		E	A		
Approach Delay		4.0	5.2			34.6			
Approach LOS		A	A			C			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 57 (48%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.68	
Intersection Signal Delay: 8.6	Intersection LOS: A
Intersection Capacity Utilization 42.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	929	0	0	538	424	0	0	0	128	3	161
Future Volume (veh/h)	30	929	0	0	538	424	0	0	0	128	3	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	32	978	0	0	566	362	0	0	0	135	3	146
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	47	2877	0	1	2640	1177	0	228	0	229	4	193
Arrive On Green	0.03	0.80	0.00	0.00	0.73	0.73	0.00	0.00	0.00	0.12	0.12	0.12
Sat Flow, veh/h	1714	3705	0	1714	3610	1610	0	1900	0	1416	31	1610
Grp Volume(v), veh/h	32	978	0	0	566	362	0	0	0	138	0	146
Grp Sat Flow(s),veh/h/ln	1714	1805	0	1714	1805	1610	0	1900	0	1448	0	1610
Q Serve(g_s), s	2.2	9.1	0.0	0.0	6.0	9.4	0.0	0.0	0.0	11.1	0.0	10.5
Cycle Q Clear(g_c), s	2.2	9.1	0.0	0.0	6.0	9.4	0.0	0.0	0.0	11.1	0.0	10.5
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.98		1.00
Lane Grp Cap(c), veh/h	47	2877	0	1	2640	1177	0	228	0	233	0	193
V/C Ratio(X)	0.68	0.34	0.00	0.00	0.21	0.31	0.00	0.00	0.00	0.59	0.00	0.76
Avail Cap(c_a), veh/h	177	2877	0	71	2640	1177	0	561	0	486	0	475
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.8	3.4	0.0	0.0	5.1	5.6	0.0	0.0	0.0	51.4	0.0	51.1
Incr Delay (d2), s/veh	6.4	0.3	0.0	0.0	0.2	0.7	0.0	0.0	0.0	2.4	0.0	5.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	2.6	0.0	0.0	2.0	3.0	0.0	0.0	0.0	4.2	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.2	3.7	0.0	0.0	5.3	6.3	0.0	0.0	0.0	53.8	0.0	57.1
LnGrp LOS	E	A	A	A	A	A	A	A	A	D	A	E
Approach Vol, veh/h		1010			928			0			284	
Approach Delay, s/veh		5.6			5.7			0.0			55.5	
Approach LOS		A			A						E	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		19.0	0.0	101.0		19.0	7.9	93.1				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		35.4	5.0	* 65		35.4	12.4	57.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	11.1		13.1	4.2	11.4				
Green Ext Time (p_c), s		0.0	0.0	8.6		1.3	0.0	5.7				

Intersection Summary		
HCM 6th Ctrl Delay		12.0
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	15.6
Intersection LOS	C

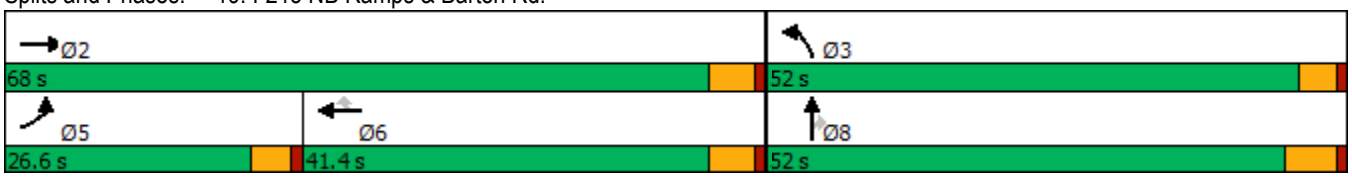
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1149	1445	293	724
Demand Flow Rate, veh/h	1149	1445	293	724
Vehicles Circulating, veh/h	508	252	1480	831
Vehicles Exiting, veh/h	1047	1521	177	866
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.5	12.4	32.9	16.5
Approach LOS	B	B	D	C

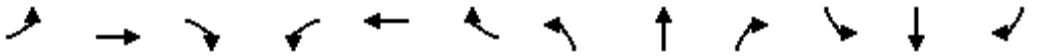
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.588	0.412
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	540	609	679	766	293	426	298
Cap Entry Lane, veh/h	846	922	1071	1146	404	628	701
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	540	609	679	766	293	426	298
Cap Entry, veh/h	846	922	1071	1146	404	628	701
V/C Ratio	0.638	0.660	0.634	0.668	0.726	0.678	0.425
Control Delay, s/veh	14.6	14.5	12.2	12.6	32.9	20.3	11.0
LOS	B	B	B	B	D	C	B
95th %tile Queue, veh	5	5	5	5	6	5	2

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	299	921	1179	726	0	484	
Future Volume (vph)	299	921	1179	726	0	484	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	26.6	68.0	41.4	41.4	52.0	52.0	52.0
Total Split (%)	22.2%	56.7%	34.5%	34.5%	43.3%	43.3%	43%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	22.0	62.9	36.3	36.3	46.2	46.2	
Actuated g/C Ratio	0.18	0.52	0.30	0.30	0.38	0.38	
v/c Ratio	0.98	0.53	1.17	1.11	162.00	0.78	
Control Delay	95.2	20.1	126.1	88.9	74218.4	36.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	95.2	20.1	126.1	88.9	74218.4	36.3	
LOS	F	C	F	F	F	D	
Approach Delay		38.5	111.9		17503.6		
Approach LOS		D	F		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 162.00	
Intersection Signal Delay: 3017.2	Intersection LOS: F
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





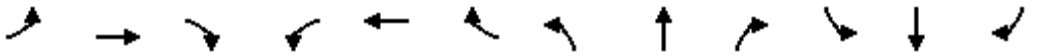
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	299	921	0	0	1179	726	149	0	484	0	0	0
Future Volume (veh/h)	299	921	0	0	1179	726	149	0	484	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	325	1001	0	0	1282	642	162	0	434			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	357	2180	0	0	1303	564	544	0	484			
Arrive On Green	0.20	0.60	0.00	0.00	0.36	0.36	0.30	0.00	0.30			
Sat Flow, veh/h	1810	3705	0	0	3705	1563	1810	0	1610			
Grp Volume(v), veh/h	325	1001	0	0	1282	642	162	0	434			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1563	1810	0	1610			
Q Serve(g_s), s	17.7	15.3	0.0	0.0	35.4	36.3	6.9	0.0	25.9			
Cycle Q Clear(g_c), s	17.7	15.3	0.0	0.0	35.4	36.3	6.9	0.0	25.9			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	357	2180	0	0	1303	564	544	0	484			
V/C Ratio(X)	0.91	0.46	0.00	0.00	0.98	1.14	0.30	0.00	0.90			
Avail Cap(c_a), veh/h	396	2259	0	0	1303	564	855	0	761			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	39.5	10.9	0.0	0.0	31.8	32.1	27.0	0.0	33.7			
Incr Delay (d2), s/veh	22.3	0.2	0.0	0.0	21.0	81.8	0.3	0.0	8.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	9.9	5.6	0.0	0.0	18.5	25.9	2.9	0.0	10.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	11.1	0.0	0.0	52.8	113.9	27.3	0.0	42.5			
LnGrp LOS	E	B	A	A	D	F	C	A	D			
Approach Vol, veh/h		1326			1924			596				
Approach Delay, s/veh		23.5			73.2			38.4				
Approach LOS		C			E			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		65.8			24.4	41.4		34.7				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		62.9			22.0	36.3		47.5				
Max Q Clear Time (g_c+I1), s		17.3			19.7	38.3		27.9				
Green Ext Time (p_c), s		8.8			0.1	0.0		2.3				
Intersection Summary												
HCM 6th Ctrl Delay			50.7									
HCM 6th LOS			D									

Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	1	527	181	1073	854
Future Volume (vph)	1	527	181	1073	854
Turn Type	NA	Perm	Prot	NA	NA
Protected Phases	8		5	2	6
Permitted Phases		8			
Detector Phase	8	8	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.5	22.1	15.1
Total Split (s)	49.0	49.0	22.0	71.0	49.0
Total Split (%)	40.8%	40.8%	18.3%	59.2%	40.8%
Yellow Time (s)	4.8	4.8	3.5	4.1	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.5	5.1	5.1
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	39.5	39.5	15.4	69.6	49.7
Actuated g/C Ratio	0.33	0.33	0.13	0.58	0.41
v/c Ratio	0.31	0.92	0.80	0.52	0.77
Control Delay	30.7	55.4	61.8	16.3	34.9
Queue Delay	0.6	0.0	0.0	1.7	0.8
Total Delay	31.3	55.4	61.8	18.0	35.7
LOS	C	E	E	B	D
Approach Delay	49.2			24.3	35.7
Approach LOS	D			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 34.2	Intersection LOS: C
Intersection Capacity Utilization 100.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 1: Rancho Av. & I-10 WB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	181	1	527	181	1073	0	0	854	247
Future Volume (veh/h)	0	0	0	181	1	527	181	1073	0	0	854	247
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1900	1900	1900	1900	0	0	1900	1900
Adj Flow Rate, veh/h				185	1	433	185	1095	0	0	871	202
Peak Hour Factor				0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				527	3	471	213	2226	0	0	1343	311
Arrive On Green				0.29	0.29	0.29	0.12	0.62	0.00	0.00	0.46	0.46
Sat Flow, veh/h				1800	10	1610	1810	3705	0	0	3004	674
Grp Volume(v), veh/h				186	0	433	185	1095	0	0	540	533
Grp Sat Flow(s),veh/h/ln				1810	0	1610	1810	1805	0	0	1805	1779
Q Serve(g_s), s				9.7	0.0	31.2	12.1	20.0	0.0	0.0	27.6	27.6
Cycle Q Clear(g_c), s				9.7	0.0	31.2	12.1	20.0	0.0	0.0	27.6	27.6
Prop In Lane				0.99		1.00	1.00		0.00	0.00		0.38
Lane Grp Cap(c), veh/h				530	0	471	213	2226	0	0	833	821
V/C Ratio(X)				0.35	0.00	0.92	0.87	0.49	0.00	0.00	0.65	0.65
Avail Cap(c_a), veh/h				652	0	580	264	2226	0	0	833	821
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.09	0.09	0.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				33.5	0.0	41.1	52.0	12.7	0.0	0.0	24.8	24.8
Incr Delay (d2), s/veh				0.4	0.0	17.6	2.2	0.1	0.0	0.0	3.9	4.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.2	0.0	14.2	5.5	7.6	0.0	0.0	12.4	12.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				33.9	0.0	58.7	54.2	12.7	0.0	0.0	28.7	28.8
LnGrp LOS				C	A	E	D	B	A	A	C	C
Approach Vol, veh/h					619			1280			1073	
Approach Delay, s/veh					51.2			18.7			28.8	
Approach LOS					D			B			C	

Timer - Assigned Phs	2		5	6		8						
Phs Duration (G+Y+Rc), s	79.1		18.6	60.5		40.9						
Change Period (Y+Rc), s	5.1		4.5	5.1		5.8						
Max Green Setting (Gmax), s	65.9		17.5	43.9		43.2						
Max Q Clear Time (g_c+I1), s	22.0		14.1	29.6		33.2						
Green Ext Time (p_c), s	10.0		0.1	6.0		1.9						

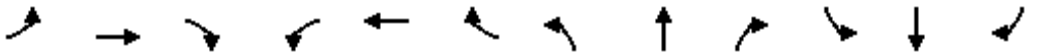
Intersection Summary		
HCM 6th Ctrl Delay		29.1
HCM 6th LOS		C

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	7	432	750	443	592
Future Volume (vph)	7	432	750	443	592
Turn Type	NA	Perm	NA	Prot	NA
Protected Phases	4		2	1	6
Permitted Phases		4			
Detector Phase	4	4	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	15.8	15.8	20.1	9.6	15.1
Total Split (s)	40.0	40.0	45.8	34.2	80.0
Total Split (%)	33.3%	33.3%	38.2%	28.5%	66.7%
Yellow Time (s)	4.8	4.8	4.1	3.6	4.1
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	5.1	4.6	5.1
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	C-Max	None	C-Max
Act Effct Green (s)	34.2	34.2	40.7	29.6	74.9
Actuated g/C Ratio	0.28	0.28	0.34	0.25	0.62
v/c Ratio	1.04	0.70	1.01	1.05	0.28
Control Delay	93.8	22.3	65.6	110.6	9.7
Queue Delay	0.0	0.0	0.0	21.9	0.5
Total Delay	93.8	22.3	65.6	132.6	10.2
LOS	F	C	E	F	B
Approach Delay	61.1		65.6		62.5
Approach LOS	E		E		E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 63.2	Intersection LOS: E
Intersection Capacity Utilization 100.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Rancho Av. & I-10 EB Ramps





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	505	7	432	0	0	0	0	750	429	443	592	0
Future Volume (veh/h)	505	7	432	0	0	0	0	750	429	443	592	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900				0	1900	1900	1900	1900	0
Adj Flow Rate, veh/h	532	7	329				0	789	315	466	623	0
Peak Hour Factor	0.95	0.95	0.95				0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0				0	0	0	0	0	0
Cap, veh/h	509	7	459				0	855	341	446	2253	0
Arrive On Green	0.28	0.28	0.28				0.00	0.34	0.34	0.49	1.00	0.00
Sat Flow, veh/h	1787	24	1610				0	2615	1005	1810	3705	0
Grp Volume(v), veh/h	539	0	329				0	565	539	466	623	0
Grp Sat Flow(s),veh/h/ln	1811	0	1610				0	1805	1719	1810	1805	0
Q Serve(g_s), s	34.2	0.0	22.0				0.0	36.1	36.2	29.6	0.0	0.0
Cycle Q Clear(g_c), s	34.2	0.0	22.0				0.0	36.1	36.2	29.6	0.0	0.0
Prop In Lane	0.99		1.00				0.00		0.58	1.00		0.00
Lane Grp Cap(c), veh/h	516	0	459				0	612	583	446	2253	0
V/C Ratio(X)	1.04	0.00	0.72				0.00	0.92	0.92	1.04	0.28	0.00
Avail Cap(c_a), veh/h	516	0	459				0	612	583	446	2253	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	2.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.55	0.55	0.00
Uniform Delay (d), s/veh	42.9	0.0	38.6				0.0	38.1	38.2	30.4	0.0	0.0
Incr Delay (d2), s/veh	51.7	0.0	5.3				0.0	21.7	22.7	43.7	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.0	0.0	9.1				0.0	19.2	18.5	14.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	94.6	0.0	43.9				0.0	59.8	60.8	74.1	0.2	0.0
LnGrp LOS	F	A	D				A	E	E	F	A	A
Approach Vol, veh/h		868						1104			1089	
Approach Delay, s/veh		75.4						60.3			31.8	
Approach LOS		E						E			C	

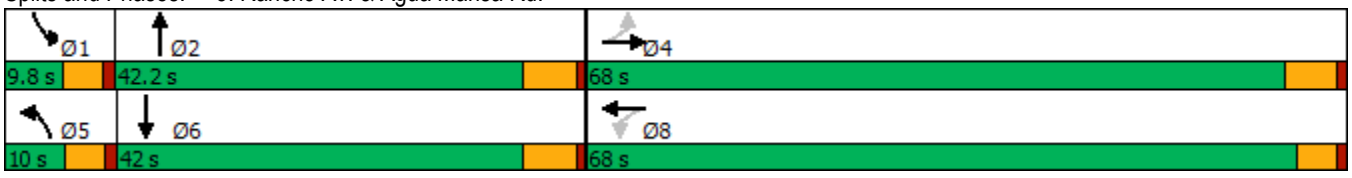
Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	34.2	45.8		40.0		80.0
Change Period (Y+Rc), s	4.6	5.1		5.8		5.1
Max Green Setting (Gmax), s	29.6	40.7		34.2		74.9
Max Q Clear Time (g_c+I1), s	31.6	38.2		36.2		2.0
Green Ext Time (p_c), s	0.0	1.6		0.0		4.8

Intersection Summary		
HCM 6th Ctrl Delay		54.4
HCM 6th LOS		D

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	598	114	5	32	111	607	16	941
Future Volume (vph)	598	114	5	32	111	607	16	941
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA
Protected Phases		4		8	5	2	1	6
Permitted Phases	4		8					
Detector Phase	4	4	8	8	5	2	1	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8
Total Split (s)	68.0	68.0	68.0	68.0	10.0	42.2	9.8	42.0
Total Split (%)	56.7%	56.7%	56.7%	56.7%	8.3%	35.2%	8.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8		4.6	4.6	5.8	4.6	5.8
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)		62.2		63.4	5.4	42.3	5.1	36.2
Actuated g/C Ratio		0.52		0.53	0.04	0.35	0.04	0.30
v/c Ratio		1.32		0.06	1.55	0.51	0.23	1.16
Control Delay		180.1		11.2	340.8	33.3	63.4	121.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		180.1		11.2	340.8	33.3	63.4	121.2
LOS		F		B	F	C	E	F
Approach Delay		180.1		11.2		80.6		120.5
Approach LOS		F		B		F		F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.55	
Intersection Signal Delay: 127.8	Intersection LOS: F
Intersection Capacity Utilization 112.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	114	213	5	32	12	111	607	3	16	941	233
Future Volume (veh/h)	598	114	213	5	32	12	111	607	3	16	941	233
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	636	121	200	5	34	11	118	646	3	17	1001	201
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	562	97	161	101	666	207	77	1211	6	31	904	181
Arrive On Green	0.52	0.52	0.52	0.52	0.52	0.52	0.05	0.33	0.33	0.02	0.30	0.30
Sat Flow, veh/h	988	188	311	131	1284	399	1714	3685	17	1714	2996	601
Grp Volume(v), veh/h	957	0	0	50	0	0	118	316	333	17	602	600
Grp Sat Flow(s),veh/h/ln	1487	0	0	1814	0	0	1714	1805	1897	1714	1805	1792
Q Serve(g_s), s	60.6	0.0	0.0	0.0	0.0	0.0	5.4	17.1	17.1	1.2	36.2	36.2
Cycle Q Clear(g_c), s	62.2	0.0	0.0	1.6	0.0	0.0	5.4	17.1	17.1	1.2	36.2	36.2
Prop In Lane	0.66		0.21	0.10		0.22	1.00		0.01	1.00		0.34
Lane Grp Cap(c), veh/h	820	0	0	973	0	0	77	593	623	31	545	541
V/C Ratio(X)	1.17	0.00	0.00	0.05	0.00	0.00	1.53	0.53	0.53	0.55	1.11	1.11
Avail Cap(c_a), veh/h	820	0	0	990	0	0	77	593	623	74	545	541
HCM 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
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	0.0	0.0	14.3	0.0	0.0	57.3	32.8	32.8	58.4	41.9	41.9
Incr Delay (d2), s/veh	88.0	0.0	0.0	0.0	0.0	0.0	293.1	0.9	0.9	5.6	70.9	72.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	43.0	0.0	0.0	0.7	0.0	0.0	8.6	7.4	7.7	0.5	26.1	26.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	118.6	0.0	0.0	14.3	0.0	0.0	350.4	33.7	33.7	64.0	112.8	114.2
LnGrp LOS	F	A	A	B	A	A	F	C	C	E	F	F
Approach Vol, veh/h		957			50			767			1219	
Approach Delay, s/veh		118.6			14.3			82.4			112.8	
Approach LOS		F			B			F			F	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	45.2		68.0	10.0	42.0		68.0				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.2	36.4		62.2	5.4	36.2		* 63				
Max Q Clear Time (g_c+I1), s	3.2	19.1		64.2	7.4	38.2		3.6				
Green Ext Time (p_c), s	0.0	3.3		0.0	0.0	0.0		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		105.2
HCM 6th LOS		F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	209	969	1127	194
Future Vol, veh/h	0	0	209	969	1127	194
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	0	222	1031	1199	206

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2262	703	1405	0	-	0
Stage 1	1302	-	-	-	-	-
Stage 2	960	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	35	385	492	-	-	-
Stage 1	223	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	385	492	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	337	-	-	-	-	-

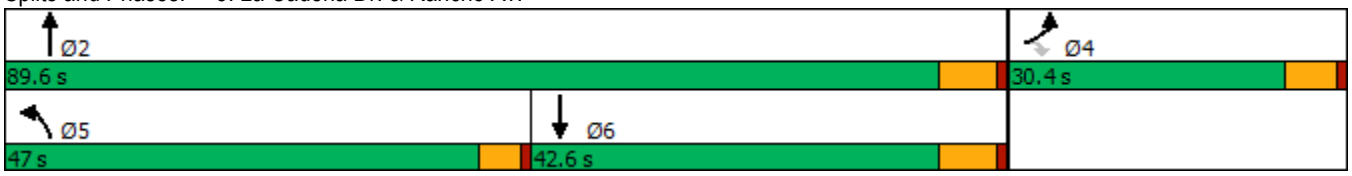
Approach	EB	NB	SB
HCM Control Delay, s	0	8.5	0
HCM LOS	A		

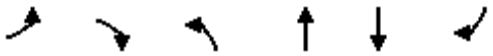
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	492	-	-	-	-
HCM Lane V/C Ratio	0.452	-	-	-	-
HCM Control Delay (s)	18.2	6.4	0	-	-
HCM Lane LOS	C	A	A	-	-
HCM 95th %tile Q(veh)	2.3	-	-	-	-

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	35	802	519	697	852
Future Volume (vph)	35	802	519	697	852
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	30.4	30.4	47.0	89.6	42.6
Total Split (%)	25.3%	25.3%	39.2%	74.7%	35.5%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.8	13.8	41.5	80.0	33.8
Actuated g/C Ratio	0.13	0.13	0.39	0.76	0.32
v/c Ratio	0.81	0.78	0.89	0.29	0.86
Control Delay	19.0	14.6	49.8	4.9	44.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.0	14.6	49.8	4.9	44.2
LOS	B	B	D	A	D
Approach Delay	16.8			24.1	44.2
Approach LOS	B			C	D

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 105.9			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 27.9		Intersection LOS: C	
Intersection Capacity Utilization 94.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	802	519	697	852	13
Future Volume (veh/h)	35	802	519	697	852	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	733	535	719	878	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	341	607	553	2237	957	12
Arrive On Green	0.00	0.21	0.36	0.69	0.29	0.29
Sat Flow, veh/h	1629	2898	1543	3335	3371	41
Grp Volume(v), veh/h	0	733	535	719	434	455
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1703
Q Serve(g_s), s	0.0	24.6	40.0	10.4	30.4	30.4
Cycle Q Clear(g_c), s	0.0	24.6	40.0	10.4	30.4	30.4
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	341	607	553	2237	473	496
V/C Ratio(X)	0.00	1.21	0.97	0.32	0.92	0.92
Avail Cap(c_a), veh/h	341	607	557	2307	503	528
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	46.4	37.0	7.3	40.3	40.3
Incr Delay (d2), s/veh	0.0	108.3	29.8	0.1	21.2	20.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	26.9	18.6	3.0	14.2	14.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	154.8	66.9	7.4	61.5	60.8
LnGrp LOS	A	F	E	A	E	E
Approach Vol, veh/h	733			1254	889	
Approach Delay, s/veh	154.8			32.8	61.1	
Approach LOS	F			C	E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		87.1		30.4	46.7	40.4
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		83.4		24.6	42.4	36.4
Max Q Clear Time (g_c+I1), s		12.4		26.6	42.0	32.4
Green Ext Time (p_c), s		5.0		0.0	0.1	1.8

Intersection Summary	
HCM 6th Ctrl Delay	72.6
HCM 6th LOS	E

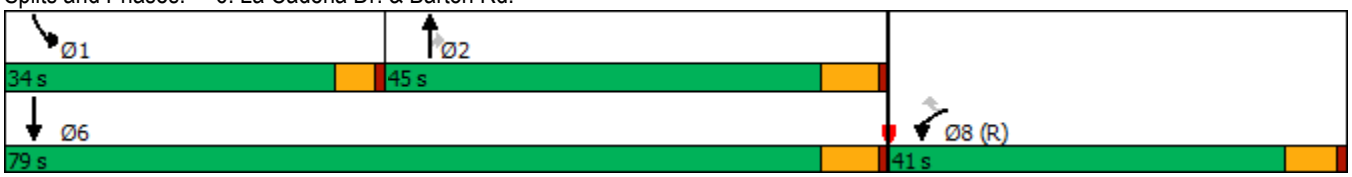
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	514	514	1053	322	503	1384
Future Volume (vph)	514	514	1053	322	503	1384
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	41.0	41.0	45.0	45.0	34.0	79.0
Total Split (%)	34.2%	34.2%	37.5%	37.5%	28.3%	65.8%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	35.5	35.5	38.5	38.5	29.4	72.5
Actuated g/C Ratio	0.30	0.30	0.32	0.32	0.24	0.60
v/c Ratio	1.05	0.94	0.94	0.47	1.24	0.65
Control Delay	102.9	67.5	55.0	8.2	166.4	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	102.9	67.5	55.0	8.2	166.4	17.3
LOS	F	E	E	A	F	B
Approach Delay	85.2		44.1			57.1
Approach LOS	F		D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.24	
Intersection Signal Delay: 59.6	Intersection LOS: E
Intersection Capacity Utilization 102.4%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	514	514	1053	322	503	1384
Future Volume (veh/h)	514	514	1053	322	503	1384
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	530	0	1086	299	519	1427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	503		1153	514	420	2176
Arrive On Green	0.29	0.00	0.32	0.32	0.25	0.60
Sat Flow, veh/h	1714	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	530	0	1086	299	519	1427
Grp Sat Flow(s),veh/h/ln	1714	1610	1805	1610	1714	1805
Q Serve(g_s), s	35.2	0.0	35.1	18.6	29.4	31.2
Cycle Q Clear(g_c), s	35.2	0.0	35.1	18.6	29.4	31.2
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	503		1153	514	420	2176
V/C Ratio(X)	1.05		0.94	0.58	1.24	0.66
Avail Cap(c_a), veh/h	503		1167	521	420	2190
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.09	0.09	0.44	0.44
Uniform Delay (d), s/veh	42.4	0.0	39.8	34.1	45.3	15.7
Incr Delay (d2), s/veh	55.1	0.0	1.9	0.1	115.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.2	0.0	15.0	7.0	25.3	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	97.5	0.0	41.6	34.3	160.5	16.0
LnGrp LOS	F		D	C	F	B
Approach Vol, veh/h	530	A	1385			1946
Approach Delay, s/veh	97.5		40.1			54.5
Approach LOS	F		D			D

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	34.0	44.5			78.5	41.0
Change Period (Y+Rc), s	4.6	6.2			6.2	5.8
Max Green Setting (Gmax), s	29.4	38.8			72.8	35.2
Max Q Clear Time (g_c+I1), s	31.4	37.1			33.2	37.2
Green Ext Time (p_c), s	0.0	1.2			12.9	0.0

Intersection Summary	
HCM 6th Ctrl Delay	55.2
HCM 6th LOS	E

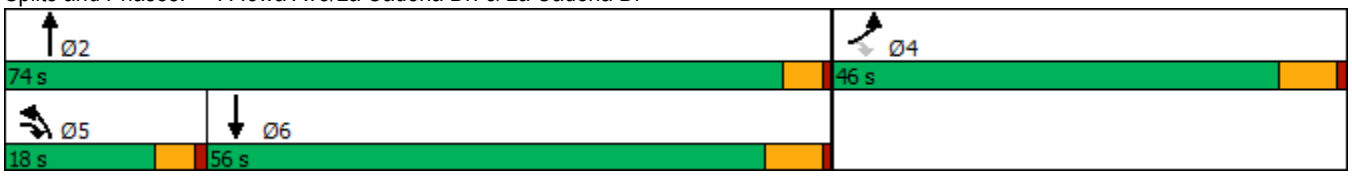
Notes

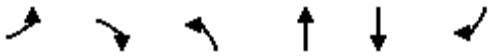
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	641	264	292	971	485	1427
Future Volume (vph)	641	264	292	971	485	1427
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	46.0	18.0	18.0	74.0	56.0	
Total Split (%)	38.3%	15.0%	15.0%	61.7%	46.7%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	40.0	59.7	13.5	64.0	44.3	114.9
Actuated g/C Ratio	0.35	0.52	0.12	0.56	0.39	1.00
v/c Ratio	1.12	0.33	1.52	0.96	0.69	0.55
Control Delay	111.7	18.6	294.7	43.3	34.7	0.8
Queue Delay	0.0	0.0	0.0	48.3	0.0	0.0
Total Delay	111.7	18.6	294.7	91.6	34.7	0.8
LOS	F	B	F	F	C	A
Approach Delay	84.6			138.6	9.4	
Approach LOS	F			F	A	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.9	
Natural Cycle: 120	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.52	
Intersection Signal Delay: 66.1	Intersection LOS: E
Intersection Capacity Utilization 97.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	641	264	292	971	485	1427
Future Volume (veh/h)	641	264	292	971	485	1427
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	668	232	304	1011	505	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	579	728	195	1058	767	
Arrive On Green	0.34	0.34	0.11	0.56	0.40	0.00
Sat Flow, veh/h	1714	1610	1714	1900	1900	2685
Grp Volume(v), veh/h	668	232	304	1011	505	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1900	1900	1342
Q Serve(g_s), s	39.8	10.9	13.4	59.4	25.4	0.0
Cycle Q Clear(g_c), s	39.8	10.9	13.4	59.4	25.4	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	579	728	195	1058	767	
V/C Ratio(X)	1.15	0.32	1.56	0.96	0.66	
Avail Cap(c_a), veh/h	579	728	195	1120	804	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.0	20.7	52.2	24.7	28.5	0.0
Incr Delay (d2), s/veh	87.2	0.3	274.7	16.9	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	29.7	0.1	20.4	28.1	11.2	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	126.2	20.9	326.9	41.6	30.4	0.0
LnGrp LOS	F	C	F	D	C	
Approach Vol, veh/h	900			1315	505	A
Approach Delay, s/veh	99.1			107.6	30.4	
Approach LOS	F			F	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		71.7		46.0	18.0	53.7
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 69		39.8	13.4	49.8
Max Q Clear Time (g_c+I1), s		61.4		41.8	15.4	27.4
Green Ext Time (p_c), s		4.2		0.0	0.0	2.8

Intersection Summary		
HCM 6th Ctrl Delay		90.4
HCM 6th LOS		F

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	730	1101	162	711
Future Volume (vph)	730	1101	162	711
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	78.0	78.0	42.0	42.0
Total Split (%)	65.0%	65.0%	35.0%	35.0%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	71.8	71.8	35.8	35.8
Actuated g/C Ratio	0.60	0.60	0.30	0.30
v/c Ratio	0.66	1.00	0.31	1.17
Control Delay	19.6	51.2	34.5	118.9
Queue Delay	51.9	35.8	0.0	0.0
Total Delay	71.6	87.0	34.5	118.9
LOS	E	F	C	F
Approach Delay	71.6	87.0	103.3	
Approach LOS	E	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 88.1	Intersection LOS: F
Intersection Capacity Utilization 92.8%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	730	0	0	1101	162	711
Future Volume (veh/h)	730	0	0	1101	162	711
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	753	0	0	1135	167	615
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1137	0	0	1137	540	480
Arrive On Green	0.60	0.00	0.00	0.60	0.30	0.30
Sat Flow, veh/h	1900	0	0	1900	1810	1610
Grp Volume(v), veh/h	753	0	0	1135	167	615
Grp Sat Flow(s),veh/h/ln	1900	0	0	1900	1810	1610
Q Serve(g_s), s	31.6	0.0	0.0	71.5	8.6	35.8
Cycle Q Clear(g_c), s	31.6	0.0	0.0	71.5	8.6	35.8
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1137	0	0	1137	540	480
V/C Ratio(X)	0.66	0.00	0.00	1.00	0.31	1.28
Avail Cap(c_a), veh/h	1137	0	0	1137	540	480
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	0.0	0.0	24.0	32.5	42.1
Incr Delay (d2), s/veh	1.4	0.0	0.0	26.3	0.3	141.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.4	0.0	0.0	35.4	3.9	33.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	17.5	0.0	0.0	50.3	32.9	183.5
LnGrp LOS	B	A	A	D	C	F
Approach Vol, veh/h	753			1135	782	
Approach Delay, s/veh	17.5			50.3	151.3	
Approach LOS	B			D	F	

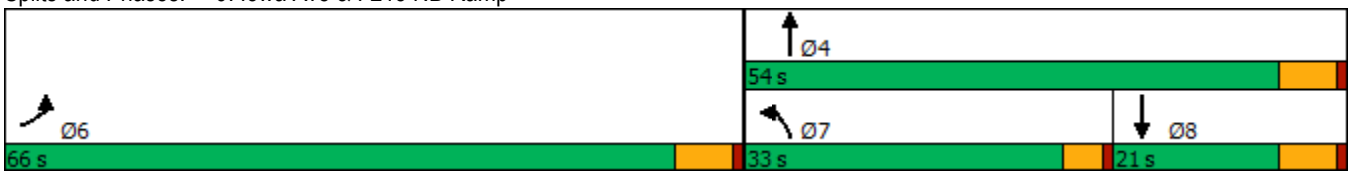
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		78.0		42.0		78.0
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		71.8		35.8		71.8
Max Q Clear Time (g_c+I1), s		73.5		37.8		33.6
Green Ext Time (p_c), s		0.0		0.0		5.3

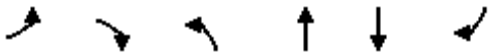
Intersection Summary		
HCM 6th Ctrl Delay	70.6	
HCM 6th LOS	E	

Lane Group	EBL	NBL	NBT	SBT
Lane Configurations				
Traffic Volume (vph)	311	584	1003	75
Future Volume (vph)	311	584	1003	75
Turn Type	Prot	Prot	NA	NA
Protected Phases	6	7	4	8
Permitted Phases				
Detector Phase	6	7	4	8
Switch Phase				
Minimum Initial (s)	10.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	16.2	16.2
Total Split (s)	66.0	33.0	54.0	21.0
Total Split (%)	55.0%	27.5%	45.0%	17.5%
Yellow Time (s)	5.2	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	6.2	6.2
Lead/Lag		Lead		Lag
Lead-Lag Optimize?		Yes		Yes
Recall Mode	Max	None	Min	Min
Act Effct Green (s)	59.8	28.4	47.8	14.8
Actuated g/C Ratio	0.50	0.24	0.40	0.12
v/c Ratio	1.55	1.40	1.35	1.47
Control Delay	277.8	227.6	198.9	247.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	277.8	227.6	198.9	247.2
LOS	F	F	F	F
Approach Delay	277.8		209.4	247.2
Approach LOS	F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.55	
Intersection Signal Delay: 242.8	Intersection LOS: F
Intersection Capacity Utilization 169.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	1130	584	1003	75	517
Future Volume (veh/h)	311	1130	584	1003	75	517
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	317	974	596	1023	77	441
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	202	622	428	757	30	173
Arrive On Green	0.50	0.50	0.24	0.40	0.12	0.12
Sat Flow, veh/h	406	1248	1810	1900	245	1403
Grp Volume(v), veh/h	1292	0	596	1023	0	518
Grp Sat Flow(s),veh/h/ln	1655	0	1810	1900	0	1648
Q Serve(g_s), s	59.8	0.0	28.4	47.8	0.0	14.8
Cycle Q Clear(g_c), s	59.8	0.0	28.4	47.8	0.0	14.8
Prop In Lane	0.25	0.75	1.00			0.85
Lane Grp Cap(c), veh/h	825	0	428	757	0	203
V/C Ratio(X)	1.57	0.00	1.39	1.35	0.00	2.55
Avail Cap(c_a), veh/h	825	0	428	757	0	203
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	30.1	0.0	45.8	36.1	0.0	52.6
Incr Delay (d2), s/veh	260.8	0.0	190.1	166.9	0.0	711.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	81.0	0.0	35.3	56.7	0.0	46.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	290.9	0.0	235.9	203.0	0.0	764.1
LnGrp LOS	F	A	F	F	A	F
Approach Vol, veh/h	1292			1619	518	
Approach Delay, s/veh	290.9			215.1	764.1	
Approach LOS	F			F	F	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	54.0	66.0	33.0	21.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	47.8	59.8	28.4	14.8
Max Q Clear Time (g_c+I1), s	49.8	61.8	30.4	16.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	326.6
HCM 6th LOS	F

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	809	974	16	15	27
Future Vol, veh/h	17	809	974	16	15	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	-	-	-	0	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	18	834	1004	16	15	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1004	0	-	0	1874	1004
Stage 1	-	-	-	-	1004	-
Stage 2	-	-	-	-	870	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	698	-	-	-	80	296
Stage 1	-	-	-	-	357	-
Stage 2	-	-	-	-	413	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	698	-	-	-	76	296
Mov Cap-2 Maneuver	-	-	-	-	76	-
Stage 1	-	-	-	-	340	-
Stage 2	-	-	-	-	413	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	39.7
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	698	-	-	-	146
HCM Lane V/C Ratio	0.025	-	-	-	0.297
HCM Control Delay (s)	10.3	0	-	-	39.7
HCM Lane LOS	B	A	-	-	E
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	69	2	0	76	6	0
Future Vol, veh/h	69	2	0	76	6	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	75	2	0	83	7	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	77	0	159	76
Stage 1	-	-	-	-	76	-
Stage 2	-	-	-	-	83	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1535	-	837	991
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	945	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1535	-	837	991
Mov Cap-2 Maneuver	-	-	-	-	837	-
Stage 1	-	-	-	-	952	-
Stage 2	-	-	-	-	945	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	837	-	-	1535	-
HCM Lane V/C Ratio	0.008	-	-	-	-
HCM Control Delay (s)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				↱
Traffic Vol, veh/h	0	823	1	3	968	8	4	0	8	0	0	19
Future Vol, veh/h	0	823	1	3	968	8	4	0	8	0	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	895	1	3	1052	9	4	0	9	0	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1061	0	0	896	0	0	1969	1963	896	-	-	1057
Stage 1	-	-	-	-	-	-	896	896	-	-	-	-
Stage 2	-	-	-	-	-	-	1073	1067	-	-	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	-	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	-	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	664	-	-	766	-	-	48	64	342	0	0	276
Stage 1	-	-	-	-	-	-	338	362	-	0	0	-
Stage 2	-	-	-	-	-	-	269	301	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	664	-	-	766	-	-	44	63	342	-	-	276
Mov Cap-2 Maneuver	-	-	-	-	-	-	44	63	-	-	-	-
Stage 1	-	-	-	-	-	-	338	362	-	-	-	-
Stage 2	-	-	-	-	-	-	246	298	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	44.1	19.1
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	105	664	-	-	766	-	-	276
HCM Lane V/C Ratio	0.124	-	-	-	0.004	-	-	0.075
HCM Control Delay (s)	44.1	0	-	-	9.7	0	-	19.1
HCM Lane LOS	E	A	-	-	A	A	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	828	3	3	976	3	12
Future Vol, veh/h	828	3	3	976	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	900	3	3	1061	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	903	0	1969	902
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	1067	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	761	-	70	339
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	334	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	761	-	69	339
Mov Cap-2 Maneuver	-	-	-	-	69	-
Stage 1	-	-	-	-	399	-
Stage 2	-	-	-	-	331	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	25.7
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	190	-	-	761	-
HCM Lane V/C Ratio	0.086	-	-	0.004	-
HCM Control Delay (s)	25.7	-	-	9.8	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	64	5	0	64	12	0
Future Vol, veh/h	64	5	0	64	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	70	5	0	70	13	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	75	0	143	73
Stage 1	-	-	-	-	73	-
Stage 2	-	-	-	-	70	-
Critical Hdwy	-	-	4.1	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	1537	-	854	995
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	958	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1537	-	854	995
Mov Cap-2 Maneuver	-	-	-	-	854	-
Stage 1	-	-	-	-	955	-
Stage 2	-	-	-	-	958	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	854	-	-	1537	-
HCM Lane V/C Ratio	0.015	-	-	-	-
HCM Control Delay (s)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	836	975	4	15	4
Future Vol, veh/h	4	836	975	4	15	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	909	1060	4	16	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1064	0	-	0	1979	1062
Stage 1	-	-	-	-	1062	-
Stage 2	-	-	-	-	917	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	662	-	-	-	69	274
Stage 1	-	-	-	-	335	-
Stage 2	-	-	-	-	393	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	662	-	-	-	68	274
Mov Cap-2 Maneuver	-	-	-	-	68	-
Stage 1	-	-	-	-	331	-
Stage 2	-	-	-	-	393	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	64
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	662	-	-	-	81
HCM Lane V/C Ratio	0.007	-	-	-	0.255
HCM Control Delay (s)	10.5	0	-	-	64
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0	-	-	-	0.9

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	151	205	1	3	0
Future Vol, veh/h	0	151	205	1	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	164	223	1	3	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	224	0	-	0	388	224
Stage 1	-	-	-	-	224	-
Stage 2	-	-	-	-	164	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1357	-	-	-	619	820
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	870	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1357	-	-	-	619	820
Mov Cap-2 Maneuver	-	-	-	-	619	-
Stage 1	-	-	-	-	818	-
Stage 2	-	-	-	-	870	-

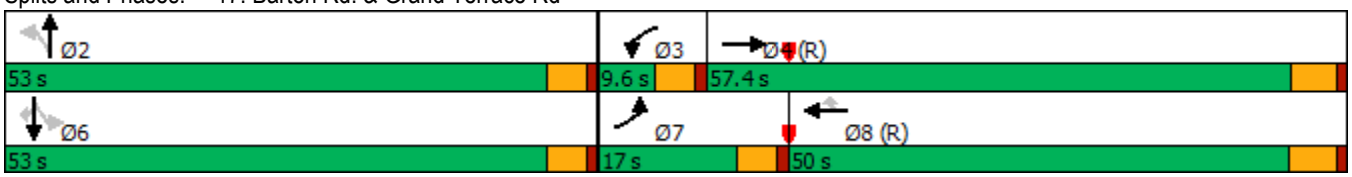
Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

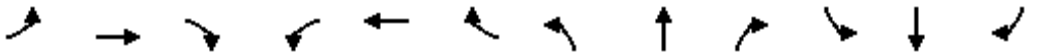
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1357	-	-	-	619
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	10.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	Ø2	Ø3
Lane Configurations									
Traffic Volume (vph)	42	809	795	318	248	4	184		
Future Volume (vph)	42	809	795	318	248	4	184		
Turn Type	Prot	NA	NA	Perm	Perm	NA	Perm		
Protected Phases	7	4	8			6		2	3
Permitted Phases				8	6		6		
Detector Phase	7	4	8	8	6	6	6		
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	20.1	20.4	20.4	24.6	24.6	24.6	24.6	9.6
Total Split (s)	17.0	57.4	50.0	50.0	53.0	53.0	53.0	53.0	9.6
Total Split (%)	14.2%	47.8%	41.7%	41.7%	44.2%	44.2%	44.2%	44%	8%
Yellow Time (s)	3.6	4.1	4.4	4.4	3.6	3.6	3.6	3.6	3.6
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0		
Total Lost Time (s)	4.6	5.1	5.4	5.4		4.6	4.6		
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	C-Max	C-Max	C-Max	None	None	None	None	None
Act Effct Green (s)	7.7	80.0	69.3	69.3		30.3	30.3		
Actuated g/C Ratio	0.06	0.67	0.58	0.58		0.25	0.25		
v/c Ratio	0.42	0.37	0.41	0.34		0.79	0.36		
Control Delay	39.8	18.0	17.1	8.9		56.8	5.8		
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	39.8	18.0	17.1	8.9		56.8	5.8		
LOS	D	B	B	A		E	A		
Approach Delay		19.1	14.8			35.3			
Approach LOS		B	B			D			

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 77.6 (65%), Referenced to phase 4:EBT and 8:WBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 20.0	Intersection LOS: C
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 17: Barton Rd. & Grand Terrace Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	809	0	0	795	318	0	0	0	248	4	184
Future Volume (veh/h)	42	809	0	0	795	318	0	0	0	248	4	184
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	46	879	0	0	864	286	0	0	0	270	4	173
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	58	2519	0	1	2258	1007	0	416	0	371	5	352
Arrive On Green	0.03	0.70	0.00	0.00	0.63	0.63	0.00	0.00	0.00	0.22	0.22	0.22
Sat Flow, veh/h	1714	3705	0	1714	3610	1610	0	1900	0	1424	21	1610
Grp Volume(v), veh/h	46	879	0	0	864	286	0	0	0	274	0	173
Grp Sat Flow(s),veh/h/ln	1714	1805	0	1714	1805	1610	0	1900	0	1445	0	1610
Q Serve(g_s), s	3.2	11.7	0.0	0.0	14.1	9.7	0.0	0.0	0.0	21.9	0.0	11.3
Cycle Q Clear(g_c), s	3.2	11.7	0.0	0.0	14.1	9.7	0.0	0.0	0.0	21.9	0.0	11.3
Prop In Lane	1.00		0.00	1.00		1.00	0.00		0.00	0.99		1.00
Lane Grp Cap(c), veh/h	58	2519	0	1	2258	1007	0	416	0	376	0	352
V/C Ratio(X)	0.79	0.35	0.00	0.00	0.38	0.28	0.00	0.00	0.00	0.73	0.00	0.49
Avail Cap(c_a), veh/h	177	2519	0	71	2258	1007	0	766	0	642	0	649
HCM 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
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	57.5	7.2	0.0	0.0	11.1	10.2	0.0	0.0	0.0	45.2	0.0	41.0
Incr Delay (d2), s/veh	8.4	0.4	0.0	0.0	0.5	0.7	0.0	0.0	0.0	2.7	0.0	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	4.2	0.0	0.0	5.5	3.5	0.0	0.0	0.0	8.2	0.0	4.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.0	7.6	0.0	0.0	11.6	10.9	0.0	0.0	0.0	47.9	0.0	42.1
LnGrp LOS	E	A	A	A	B	B	A	A	A	D	A	D
Approach Vol, veh/h		925			1150			0			447	
Approach Delay, s/veh		10.5			11.4			0.0			45.7	
Approach LOS		B			B						D	

Timer - Assigned Phs		2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s		30.9	0.0	89.1		30.9	8.7	80.5				
Change Period (Y+Rc), s		4.6	4.6	* 5.4		4.6	4.6	5.4				
Max Green Setting (Gmax), s		48.4	5.0	* 52		48.4	12.4	44.6				
Max Q Clear Time (g_c+I1), s		0.0	0.0	13.7		23.9	5.2	16.1				
Green Ext Time (p_c), s		0.0	0.0	7.2		2.3	0.0	7.9				

Intersection Summary												
HCM 6th Ctrl Delay			17.2									
HCM 6th LOS			B									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Intersection Delay, s/veh	16.4
Intersection LOS	C

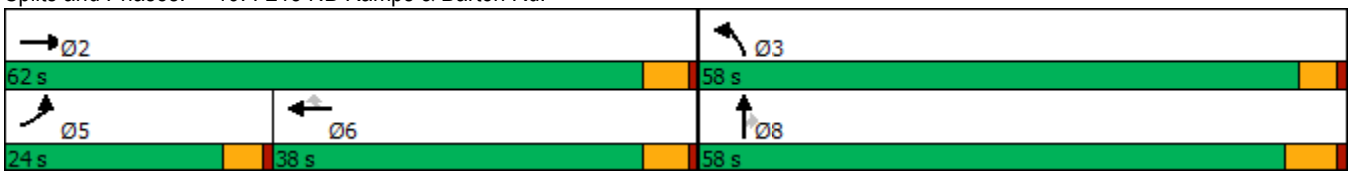
Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1113	1274	137	894
Demand Flow Rate, veh/h	1113	1274	137	894
Vehicles Circulating, veh/h	583	219	1605	861
Vehicles Exiting, veh/h	1172	1523	91	632
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.2	9.9	17.7	25.8
Approach LOS	C	A	C	D

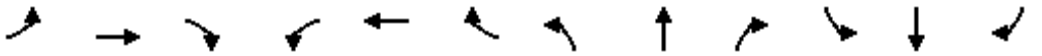
Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.578	0.422
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	523	590	599	675	137	517	377
Cap Entry Lane, veh/h	790	865	1104	1179	363	611	683
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	523	590	599	675	137	517	377
Cap Entry, veh/h	790	865	1103	1179	363	611	683
V/C Ratio	0.662	0.682	0.543	0.573	0.378	0.846	0.552
Control Delay, s/veh	16.3	16.0	9.8	9.9	17.7	34.1	14.3
LOS	C	C	A	A	C	D	B
95th %tile Queue, veh	5	6	3	4	2	9	3

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR	Ø3
Lane Configurations							
Traffic Volume (vph)	292	1155	1040	479	0	644	
Future Volume (vph)	292	1155	1040	479	0	644	
Turn Type	Prot	NA	NA	Perm	NA	Perm	
Protected Phases	5	2	6		8		3
Permitted Phases				6		8	
Detector Phase	5	2	6	6	8	8	
Switch Phase							
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	5.0
Minimum Split (s)	9.6	15.1	24.1	24.1	21.8	21.8	9.5
Total Split (s)	24.0	62.0	38.0	38.0	58.0	58.0	58.0
Total Split (%)	20.0%	51.7%	31.7%	31.7%	48.3%	48.3%	48%
Yellow Time (s)	3.6	4.1	4.1	4.1	4.8	4.8	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	4.6	5.1	5.1	5.1	5.8	5.8	
Lead/Lag	Lead		Lag	Lag			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	19.4	56.9	32.9	32.9	52.2	52.2	
Actuated g/C Ratio	0.16	0.47	0.27	0.27	0.44	0.44	
v/c Ratio	1.03	0.70	1.08	0.81	342.00	0.90	
Control Delay	111.2	27.5	95.6	31.3	154347.6	45.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	111.2	27.5	95.6	31.3	154347.6	45.8	
LOS	F	C	F	C	F	D	
Approach Delay		44.4	75.3		78341.4		
Approach LOS		D	E		F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 342.00	
Intersection Signal Delay: 24010.0	Intersection LOS: F
Intersection Capacity Utilization 80.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: I-215 NB Ramps & Barton Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	292	1155	0	0	1040	479	171	0	644	0	0	0
Future Volume (veh/h)	292	1155	0	0	1040	479	171	0	644	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1900	1900	0	0	1900	1900	1900	1900	1900			
Adj Flow Rate, veh/h	301	1191	0	0	1072	416	684	0	551			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.25	0.97	0.97			
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0			
Cap, veh/h	308	1804	0	0	1043	451	752	0	670			
Arrive On Green	0.17	0.50	0.00	0.00	0.29	0.29	0.42	0.00	0.42			
Sat Flow, veh/h	1810	3705	0	0	3705	1560	1810	0	1610			
Grp Volume(v), veh/h	301	1191	0	0	1072	416	684	0	551			
Grp Sat Flow(s),veh/h/ln	1810	1805	0	0	1805	1560	1810	0	1610			
Q Serve(g_s), s	18.8	28.0	0.0	0.0	32.9	29.4	40.4	0.0	34.6			
Cycle Q Clear(g_c), s	18.8	28.0	0.0	0.0	32.9	29.4	40.4	0.0	34.6			
Prop In Lane	1.00		0.00	0.00		1.00	1.00		1.00			
Lane Grp Cap(c), veh/h	308	1804	0	0	1043	451	752	0	670			
V/C Ratio(X)	0.98	0.66	0.00	0.00	1.03	0.92	0.91	0.00	0.82			
Avail Cap(c_a), veh/h	308	1804	0	0	1043	451	850	0	757			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	47.0	21.2	0.0	0.0	40.5	39.2	31.2	0.0	29.5			
Incr Delay (d2), s/veh	44.4	0.9	0.0	0.0	35.1	24.6	12.7	0.0	6.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	12.2	11.5	0.0	0.0	19.3	14.1	19.0	0.0	13.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	91.4	22.1	0.0	0.0	75.6	63.8	43.9	0.0	36.1			
LnGrp LOS	F	C	A	A	F	E	D	A	D			
Approach Vol, veh/h		1492			1488			1235				
Approach Delay, s/veh		36.1			72.3			40.4				
Approach LOS		D			E			D				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		62.0			24.0	38.0		51.8				
Change Period (Y+Rc), s		5.1			4.6	5.1		4.5				
Max Green Setting (Gmax), s		56.9			19.4	32.9		53.5				
Max Q Clear Time (g_c+I1), s		30.0			20.8	34.9		42.4				
Green Ext Time (p_c), s		9.8			0.0	0.0		4.9				
Intersection Summary												
HCM 6th Ctrl Delay			50.2									
HCM 6th LOS			D									

APPENDIX 7.3:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

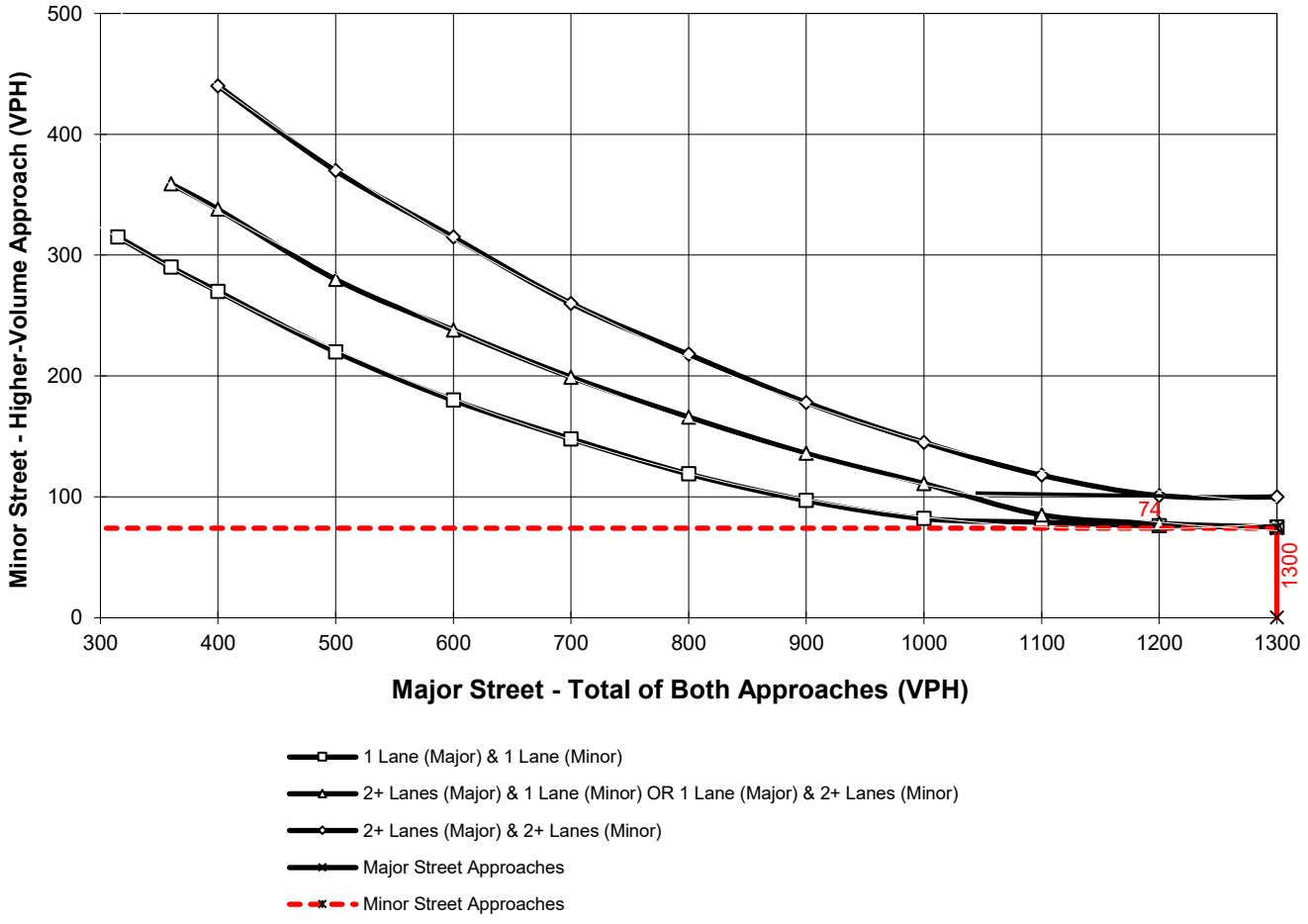
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **2040 Without Project Conditions - Weekday AM Peak Hour**

Major Street Name = **Barton Rd.** Total of Both Approaches (VPH) = **1625**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave** High Volume Approach (VPH) = **74**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

This Page Intentionally Left Blank

APPENDIX 7.4:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)

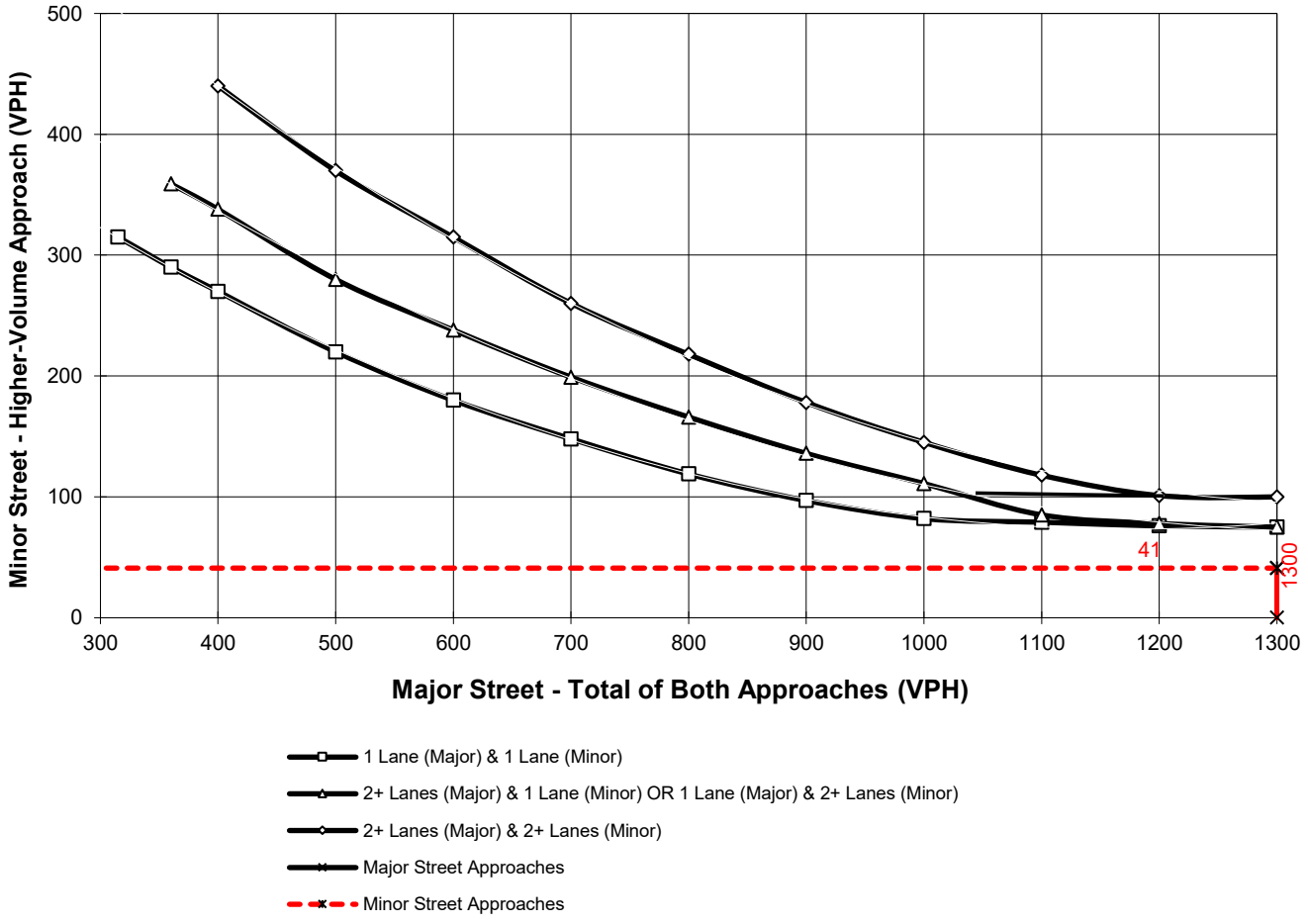
(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 64 km/h OR ABOVE 40 mph ON MAJOR STREET)

Traffic Conditions = **2040 With Project Conditions - Weekday PM Peak Hour**

Major Street Name = **Barton Rd.**
Total of Both Approaches (VPH) = **1816**
Number of Approach Lanes Major Street = **1**

Minor Street Name = **S. Terrace Ave**
High Volume Approach (VPH) = **41**
Number of Approach Lanes Minor Street = **1**

SIGNAL WARRANT NOT SATISFIED



*Note: 100 vph applies as the lower threshold for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold for a minor-street approach with one lane

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2040 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 1				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,701** vpd Minor Street Future ADT = **57** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,701**	*1* **57**	8,000	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **1,701**	*1* **57**	12,000	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	**A** 2% **B** 5%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet (Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2040 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Barton Rd.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 3				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **19,325** vpd Minor Street Future ADT = **140** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **19,325**	*1* **140**	8,000 *	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **19,325**	*1* **140**	12,000 *	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	A 6% B 12%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2040 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Walnut Av.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 4				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **1,531** vpd Minor Street Future ADT = **113** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
	Urban	Rural	Urban	Rural
CONDITION A - Minimum Vehicular Volume				
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street				
1 **1,531** / *1* **113**	8,000	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street / Minor Street	Urban	Rural	Urban	Rural
1 **1,531** / *1* **113**	12,000	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 5% B: 9%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2040 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Barton Rd.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 5				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes = **1** lane

Major Street Future ADT = **19,291** vpd Minor Street Future ADT = **180** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); ……..

or

In built up area of isolated community of < 10,000 population ……..

URBAN (U)

(Based on Estimated Average Daily Traffic - See Note)

URBAN	RURAL	Minimum Requirements EADT			
XX					
CONDITION A - Minimum Vehicular Volume		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **19,291**	*1* **180**	8,000 *	5,600	2,400	1,680
2 +	*1*	9,600	6,720	2,400	1,680
2 +	*2* +	9,600	6,720	3,200	2,240
1	*2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic		Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied	Not Satisfied				
	XX				
Number of lanes for moving traffic on each approach					
Major Street	Minor Street	Urban	Rural	Urban	Rural
1 **19,291**	*1* **180**	12,000 *	8,400	1,200	850
2 +	*1*	14,400	10,080	1,200	850
2 +	*2* +	14,400	10,080	1,600	1,120
1	*2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B					
Satisfied	Not Satisfied				
	XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more …..	A: 8% B: 15%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

Figure 4C-103 (CA). Traffic Signal Warrants Worksheet
(Average Traffic Estimate Form)

DIST	CO	RTE	PM	TRAFFIC CONDITIONS		2040 WP
				CALC CH	DATE	07/30/20
Jurisdiction: City of Grand Terrace				CHK CH	DATE	07/30/20
Major Street: Driveway 7 / De Berry St.				Critical Approach Speed (Major)		25 mph
Minor Street: Driveway 6				Critical Approach Speed (Minor)		25 mph

Major Street Approach Lanes = **1** lane Minor Street Approach Lanes **1** lane

Major Street Future ADT = **848** vpd Minor Street Future ADT = **28** vpd

Speed limit or critical speed on major street traffic > 64 km/h (40 mph); …….. [ ]

or **URBAN (U)**

In built up area of isolated community of < 10,000 population …….. [ ]

(Based on Estimated Average Daily Traffic - See Note)

URBAN / RURAL	Minimum Requirements EADT			
XX	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
CONDITION A - Minimum Vehicular Volume	Urban	Rural	Urban	Rural
Satisfied / Not Satisfied: XX				
Number of lanes for moving traffic on each approach				
Major Street: *1* **848** / Minor Street: *1* **28**	8,000	5,600	2,400	1,680
2 + / *1*	9,600	6,720	2,400	1,680
2 + / *2* +	9,600	6,720	3,200	2,240
1 / *2* +	8,000	5,600	3,200	2,240
CONDITION B - Interruption of Continuous Traffic	Vehicles Per Day on Major Street (Total of Both Approaches)		Vehicles Per Day on Higher-Volume Minor Street Approach (One Direction Only)	
Satisfied / Not Satisfied: XX	Urban	Rural	Urban	Rural
Number of lanes for moving traffic on each approach				
Major Street: *1* **848** / Minor Street: *1* **28**	12,000	8,400	1,200	850
2 + / *1*	14,400	10,080	1,200	850
2 + / *2* +	14,400	10,080	1,600	1,120
1 / *2* +	12,000	8,400	1,600	1,120
Combination of CONDITIONS A + B				
Satisfied / Not Satisfied: XX	2 CONDITIONS 80%		2 CONDITIONS 80%	
No one condition satisfied, but following conditions fulfilled 80% of more ….. A: 1% B: 2%				

Note: To be used only for NEW INTERSECTIONS or other locations where it is not reasonable to count actual traffic volumes.

The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.

APPENDIX 7.5:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	351	477	141	501	1372
v/c Ratio	0.82	0.70	0.71	0.21	0.74
Control Delay	59.1	13.7	93.4	2.2	25.5
Queue Delay	9.3	0.0	0.0	0.2	0.2
Total Delay	68.3	13.7	93.4	2.3	25.7
Queue Length 50th (ft)	254	52	117	11	414
Queue Length 95th (ft)	354	167	185	28	564
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	730	248	2427	1844
Starvation Cap Reductn	0	0	0	1011	0
Spillback Cap Reductn	116	0	0	0	61
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.92	0.65	0.57	0.35	0.77

Intersection Summary

Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	184	430	691	468	841
v/c Ratio	0.51	0.89	0.52	0.88	0.33
Control Delay	46.3	45.3	30.7	54.9	9.9
Queue Delay	0.0	0.0	0.0	33.8	0.9
Total Delay	46.3	45.3	30.7	88.7	10.8
Queue Length 50th (ft)	126	181	202	384	106
Queue Length 95th (ft)	186	299	311	496	247
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	567	1329	652	2560
Starvation Cap Reductn	0	0	0	204	1361
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.76	0.52	1.04	0.70

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	999	975	134	866
v/c Ratio	1.11	1.08	0.18	1.20
Control Delay	96.5	87.0	22.4	133.7
Queue Delay	2.2	6.4	0.0	0.0
Total Delay	98.7	93.4	22.4	133.7
Queue Length 50th (ft)	~885	~847	64	~787
Queue Length 95th (ft)	#1138	#1097	107	#1037
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	899	899	764	721
Starvation Cap Reductn	273	26	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.60	1.12	0.18	1.20

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1864	551	943	529
v/c Ratio	1.69	1.57	1.48	1.80
Control Delay	335.0	303.3	256.9	396.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	335.0	303.3	256.9	396.7
Queue Length 50th (ft)	~1998	~604	~1007	~520
Queue Length 95th (ft)	#2267	#822	#1257	#738
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1103	351	636	294
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.69	1.57	1.48	1.80

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	12.9
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1145	1435	56	698
Demand Flow Rate, veh/h	1145	1435	56	698
Vehicles Circulating, veh/h	466	221	1524	797
Vehicles Exiting, veh/h	1029	1359	87	859
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	13.3	11.5	11.5	15.2
Approach LOS	B	B	B	C

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.606	0.394
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	538	607	674	761	56	423	275
Cap Entry Lane, veh/h	879	956	1102	1177	389	648	721
Entry HV Adj Factor	1.000	1.000	1.001	0.999	1.000	1.000	1.000
Flow Entry, veh/h	538	607	674	761	56	423	275
Cap Entry, veh/h	880	955	1102	1176	389	648	721
V/C Ratio	0.612	0.635	0.612	0.647	0.144	0.652	0.381
Control Delay, s/veh	13.4	13.3	11.3	11.7	11.5	18.6	9.9
LOS	B	B	B	B	B	C	A
95th %tile Queue, veh	4	5	4	5	0	5	2



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	317	999	1300	789	136	526
v/c Ratio	0.99	0.53	1.17	1.10	136.00	0.78
Control Delay	96.8	20.1	124.6	86.1	62512.7	36.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.8	20.1	124.6	86.1	62512.7	36.2
Queue Length 50th (ft)	247	257	~632	~492	~220	301
Queue Length 95th (ft)	#432	317	#770	#736	#353	450
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	321	1892	1110	719	6	675
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.53	1.17	1.10	22.67	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	186	538	182	1092	1122
v/c Ratio	0.31	0.92	0.79	0.52	0.76
Control Delay	30.7	55.4	61.8	16.4	34.7
Queue Delay	0.6	0.0	0.0	1.7	0.8
Total Delay	31.3	55.4	61.8	18.1	35.5
Queue Length 50th (ft)	103	337	151	214	401
Queue Length 95th (ft)	162	#535	m145	m203	504
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	630	263	2093	1469
Starvation Cap Reductn	0	0	0	776	0
Spillback Cap Reductn	217	0	0	0	128
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.43	0.85	0.69	0.83	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	539	454	1235	466	622
v/c Ratio	1.04	0.70	1.01	1.05	0.28
Control Delay	93.8	22.2	64.1	110.7	9.6
Queue Delay	0.0	0.0	0.0	21.9	0.5
Total Delay	93.8	22.2	64.1	132.6	10.1
Queue Length 50th (ft)	~453	133	~478	~406	64
Queue Length 95th (ft)	#669	259	#637	#619	119
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	516	647	1225	445	2253
Starvation Cap Reductn	0	0	0	113	1128
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.04	0.70	1.01	1.40	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	753	1131	167	733
v/c Ratio	0.66	1.00	0.31	1.17
Control Delay	19.6	50.3	34.5	118.9
Queue Delay	51.9	36.2	0.0	0.0
Total Delay	71.6	86.5	34.5	118.9
Queue Length 50th (ft)	366	820	100	~554
Queue Length 95th (ft)	501	#1165	161	#794
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1136	1136	538	629
Starvation Cap Reductn	493	107	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.17	1.10	0.31	1.17

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1470	596	1023	600
v/c Ratio	1.55	1.40	1.35	1.46
Control Delay	277.8	227.6	198.9	245.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	277.8	227.6	198.9	245.2
Queue Length 50th (ft)	~1530	~616	~1039	~472
Queue Length 95th (ft)	#1799	#839	#1292	#700
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	946	427	756	410
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.55	1.40	1.35	1.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1070	1290	83	882
Demand Flow Rate, veh/h	1070	1290	83	882
Vehicles Circulating, veh/h	571	168	1576	849
Vehicles Exiting, veh/h	1160	1491	65	609
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.8	9.2	13.6	24.7
Approach LOS	B	A	B	C

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.585	0.415
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	503	567	606	684	83	516	366
Cap Entry Lane, veh/h	798	874	1157	1231	372	618	690
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	503	567	606	684	83	516	366
Cap Entry, veh/h	798	874	1157	1231	372	618	690
V/C Ratio	0.630	0.649	0.524	0.556	0.223	0.835	0.530
Control Delay, s/veh	15.0	14.6	9.1	9.3	13.6	32.6	13.6
LOS	C	B	A	A	B	D	B
95th %tile Queue, veh	5	5	3	4	1	9	3



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	275	1186	1097	494	640	664
v/c Ratio	1.00	0.76	1.26	0.89	320.00	0.83
Control Delay	104.4	32.7	165.7	42.7	144447.4	35.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.4	32.7	165.7	42.7	144447.4	35.1
Queue Length 50th (ft)	215	401	~562	208	~1045	400
Queue Length 95th (ft)	#393	487	#696	#414	#1276	#589
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	276	1561	869	553	6	801
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.00	0.76	1.26	0.89	106.67	0.83

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 7.6:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS

This Page Intentionally Left Blank



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	351	477	142	502	1374
v/c Ratio	0.82	0.70	0.72	0.21	0.75
Control Delay	59.1	13.8	93.9	2.2	25.6
Queue Delay	9.5	0.0	0.0	0.2	0.2
Total Delay	68.6	13.8	93.9	2.3	25.7
Queue Length 50th (ft)	254	53	117	11	416
Queue Length 95th (ft)	354	168	186	28	566
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	499	729	248	2427	1843
Starvation Cap Reductn	0	0	0	1013	0
Spillback Cap Reductn	117	0	0	0	61
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.92	0.65	0.57	0.36	0.77

Intersection Summary



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	184	433	693	468	843
v/c Ratio	0.50	0.89	0.53	0.88	0.33
Control Delay	45.9	45.5	31.0	55.0	10.0
Queue Delay	0.0	0.0	0.0	35.4	1.0
Total Delay	45.9	45.5	31.0	90.4	11.0
Queue Length 50th (ft)	125	184	204	384	111
Queue Length 95th (ft)	186	303	312	496	249
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	470	567	1319	652	2551
Starvation Cap Reductn	0	0	0	206	1357
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.39	0.76	0.53	1.05	0.71

Intersection Summary



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	999	985	134	866
v/c Ratio	1.11	1.10	0.18	1.20
Control Delay	96.5	90.9	22.4	133.7
Queue Delay	2.2	1.9	0.0	0.0
Total Delay	98.7	92.8	22.4	133.7
Queue Length 50th (ft)	~885	~863	64	~787
Queue Length 95th (ft)	#1138	#1114	107	#1037
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	899	899	764	721
Starvation Cap Reductn	273	25	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.60	1.13	0.18	1.20

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1864	551	943	538
v/c Ratio	1.69	1.57	1.48	1.82
Control Delay	335.0	303.3	256.9	404.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	335.0	303.3	256.9	404.5
Queue Length 50th (ft)	~1998	~604	~1007	~530
Queue Length 95th (ft)	#2267	#822	#1257	#750
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	1103	351	636	296
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.69	1.57	1.48	1.82

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	15.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1149	1445	293	724
Demand Flow Rate, veh/h	1149	1445	293	724
Vehicles Circulating, veh/h	508	252	1480	831
Vehicles Exiting, veh/h	1047	1521	177	866
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	14.5	12.4	32.9	16.5
Approach LOS	B	B	D	C

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.588	0.412
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	540	609	679	766	293	426	298
Cap Entry Lane, veh/h	846	922	1071	1146	404	628	701
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	540	609	679	766	293	426	298
Cap Entry, veh/h	846	922	1071	1146	404	628	701
V/C Ratio	0.638	0.660	0.634	0.668	0.726	0.678	0.425
Control Delay, s/veh	14.6	14.5	12.2	12.6	32.9	20.3	11.0
LOS	B	B	B	B	D	C	B
95th %tile Queue, veh	5	5	5	5	6	5	2



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	325	1001	1282	789	162	526
v/c Ratio	0.98	0.53	1.17	1.11	162.00	0.78
Control Delay	95.2	20.1	126.1	88.9	74218.4	36.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.2	20.1	126.1	88.9	74218.4	36.3
Queue Length 50th (ft)	253	258	~624	~493	~262	302
Queue Length 95th (ft)	#439	318	#762	#737	#405	451
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	330	1892	1092	714	6	674
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.53	1.17	1.11	27.00	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	WBT	WBR	NBL	NBT	SBT
Lane Group Flow (vph)	186	538	185	1095	1123
v/c Ratio	0.31	0.92	0.80	0.52	0.77
Control Delay	30.7	55.4	61.8	16.3	34.9
Queue Delay	0.6	0.0	0.0	1.7	0.8
Total Delay	31.3	55.4	61.8	18.0	35.7
Queue Length 50th (ft)	103	337	154	213	404
Queue Length 95th (ft)	162	#535	m145	m202	504
Internal Link Dist (ft)	1119			278	943
Turn Bay Length (ft)		150	75		
Base Capacity (vph)	651	630	263	2093	1465
Starvation Cap Reductn	0	0	0	775	0
Spillback Cap Reductn	217	0	0	0	126
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.43	0.85	0.70	0.83	0.84

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	NBT	SBL	SBT
Lane Group Flow (vph)	539	455	1241	466	623
v/c Ratio	1.04	0.70	1.01	1.05	0.28
Control Delay	93.8	22.3	65.6	110.6	9.7
Queue Delay	0.0	0.0	0.0	21.9	0.5
Total Delay	93.8	22.3	65.6	132.6	10.2
Queue Length 50th (ft)	~453	134	~488	~406	64
Queue Length 95th (ft)	#669	260	#643	#619	119
Internal Link Dist (ft)	1530		1305		278
Turn Bay Length (ft)		160			
Base Capacity (vph)	516	647	1224	445	2253
Starvation Cap Reductn	0	0	0	113	1130
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.04	0.70	1.01	1.40	0.55

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	WBT	NBL	NBR
Lane Group Flow (vph)	753	1135	167	733
v/c Ratio	0.66	1.00	0.31	1.17
Control Delay	19.6	51.2	34.5	118.9
Queue Delay	51.9	35.8	0.0	0.0
Total Delay	71.6	87.0	34.5	118.9
Queue Length 50th (ft)	366	827	100	~554
Queue Length 95th (ft)	501	#1171	161	#794
Internal Link Dist (ft)	231	721	1033	
Turn Bay Length (ft)			320	
Base Capacity (vph)	1136	1136	538	629
Starvation Cap Reductn	493	107	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.17	1.10	0.31	1.17

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	NBL	NBT	SBT
Lane Group Flow (vph)	1470	596	1023	605
v/c Ratio	1.55	1.40	1.35	1.47
Control Delay	277.8	227.6	198.9	247.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	277.8	227.6	198.9	247.2
Queue Length 50th (ft)	~1530	~616	~1039	~476
Queue Length 95th (ft)	#1799	#839	#1292	#704
Internal Link Dist (ft)	721		1155	1042
Turn Bay Length (ft)		90		
Base Capacity (vph)	946	427	756	412
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	1.55	1.40	1.35	1.47

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Intersection Delay, s/veh	16.4
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1113	1274	137	894
Demand Flow Rate, veh/h	1113	1274	137	894
Vehicles Circulating, veh/h	583	219	1605	861
Vehicles Exiting, veh/h	1172	1523	91	632
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	16.2	9.9	17.7	25.8
Approach LOS	C	A	C	D

Lane	Left	Right	Left	Right	Left	Left	Right
Designated Moves	LT	TR	LT	TR	LTR	LTR	R
Assumed Moves	LT	TR	LT	TR	LTR	LT	R
RT Channelized							
Lane Util	0.470	0.530	0.470	0.530	1.000	0.578	0.422
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.645	4.328
Entry Flow, veh/h	523	590	599	675	137	517	377
Cap Entry Lane, veh/h	790	865	1104	1179	363	611	683
Entry HV Adj Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Flow Entry, veh/h	523	590	599	675	137	517	377
Cap Entry, veh/h	790	865	1103	1179	363	611	683
V/C Ratio	0.662	0.682	0.543	0.573	0.378	0.846	0.552
Control Delay, s/veh	16.3	16.0	9.8	9.9	17.7	34.1	14.3
LOS	C	C	A	A	C	D	B
95th %tile Queue, veh	5	6	3	4	2	9	3



Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Group Flow (vph)	301	1191	1072	494	684	664
v/c Ratio	1.03	0.70	1.08	0.81	342.00	0.90
Control Delay	111.2	27.5	95.6	31.3	15434	7.6 45.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.2	27.5	95.6	31.3	15434	7.6 45.8
Queue Length 50th (ft)	~250	371	~489	184	~1118	435
Queue Length 95th (ft)	#427	451	#623	#364	#1354	#678
Internal Link Dist (ft)		690	473		1059	
Turn Bay Length (ft)	350			150		250
Base Capacity (vph)	291	1711	989	608	6	736
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.70	1.08	0.81	114.00	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

APPENDIX 7.7:

HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 NP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	4971	7161	0.69	66.7	24.8	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.943	4971	702	7200	2100	0.69	0.33	64.1	59.9	25.9	29.7	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	4276	7161	0.60	68.3	20.9	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.962	5433	1157	7200	2100	0.75	0.55	59.9	57.6	30.2	31.4	D

Segment 5: Basic

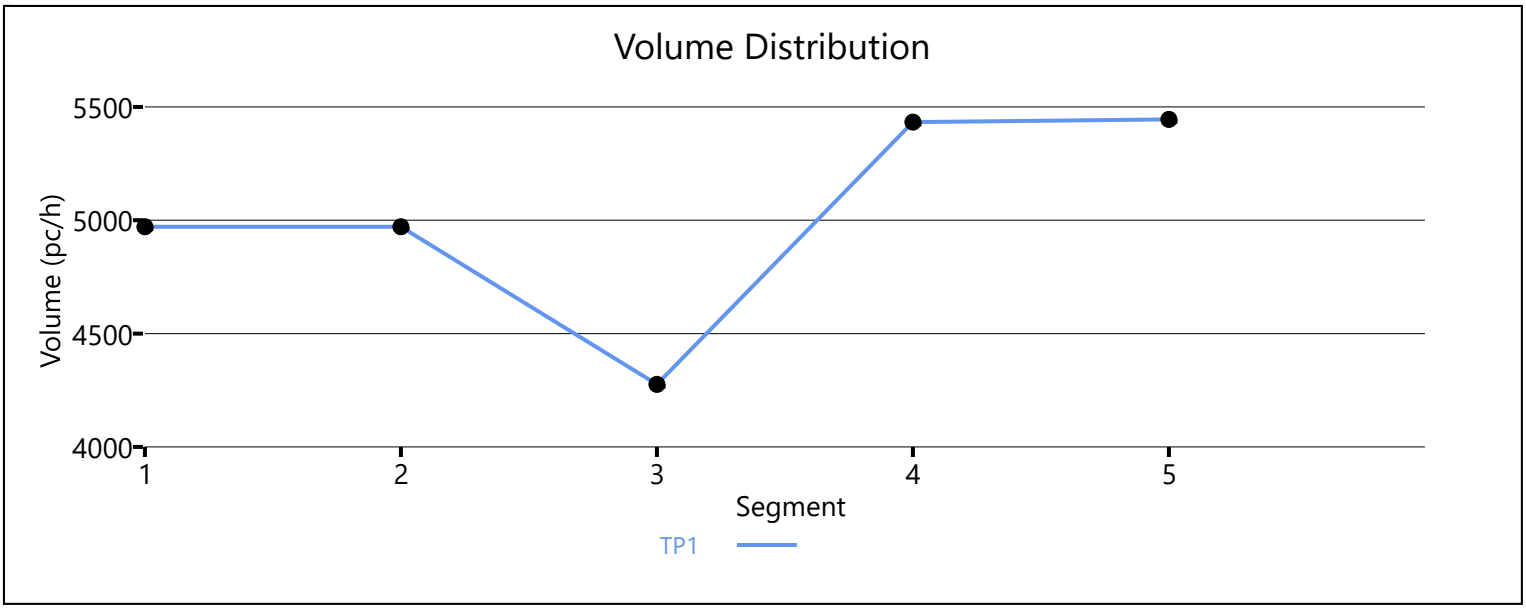
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	5445	7161	0.76	64.8	28.0	D

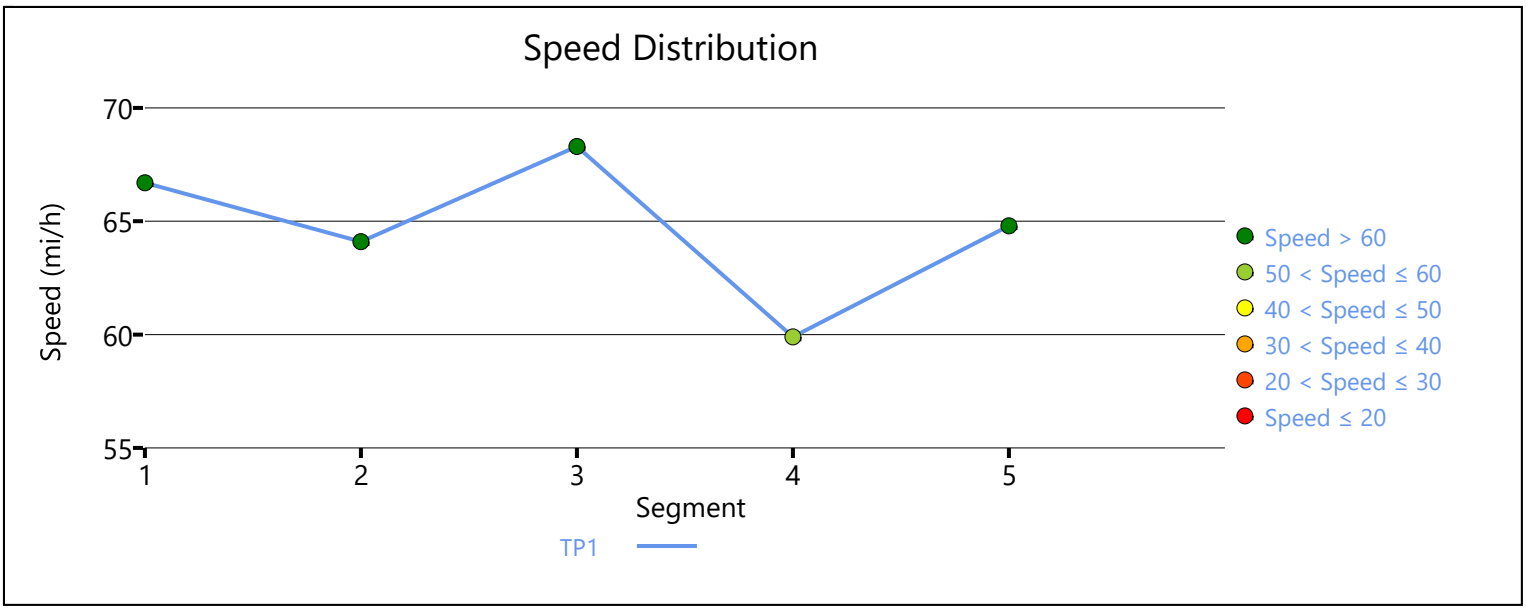
Facility Time Period Results

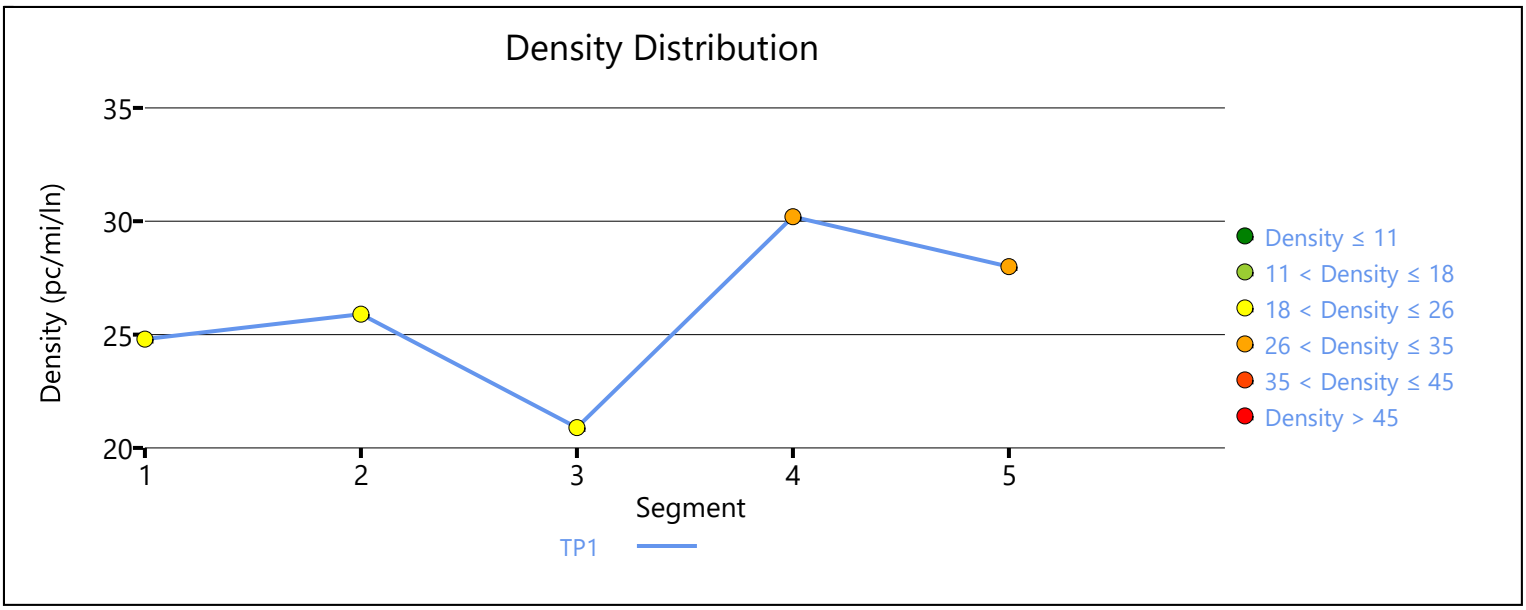
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	64.7	26.3	25.1	2.0	D

Facility Overall Results

Space Mean Speed, mi/h	64.7	Density, veh/mi/ln	25.1
Average Travel Time, min	2.0	Density, pc/mi/ln	26.3







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	np
Agency	Urban Crossroads, Inc.	Analysis Year	2040 NP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4866	7161	0.68	67.0	24.2	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.926	4866	755	7200	2100	0.68	0.36	64.0	59.8	25.3	30.7	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	4108	7161	0.57	68.5	20.0	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.935	5026	918	7200	2100	0.70	0.44	61.0	58.9	27.5	28.7	D

Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	5031	7161	0.70	66.5	25.2	C

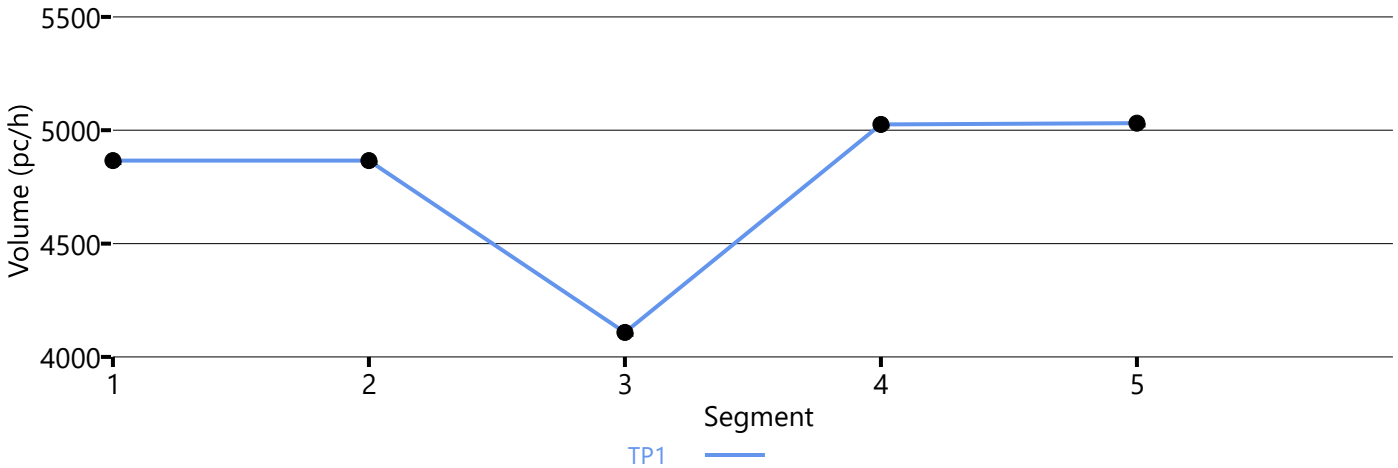
Facility Time Period Results

T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	65.9	24.4	23.8	2.2	C

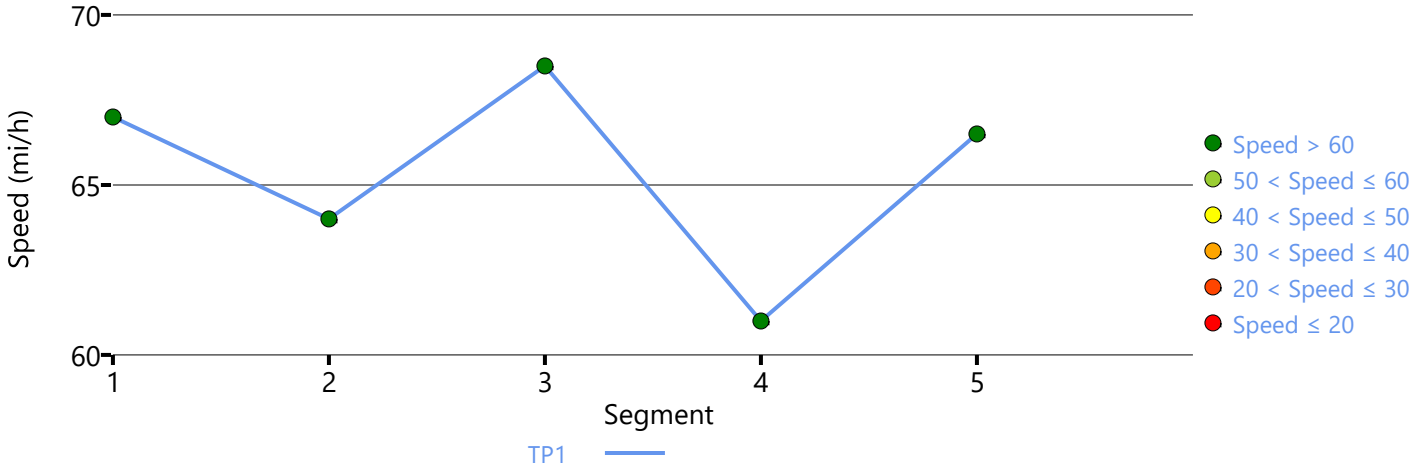
Facility Overall Results

Space Mean Speed, mi/h	65.9	Density, veh/mi/ln	23.8
Average Travel Time, min	2.2	Density, pc/mi/ln	24.4

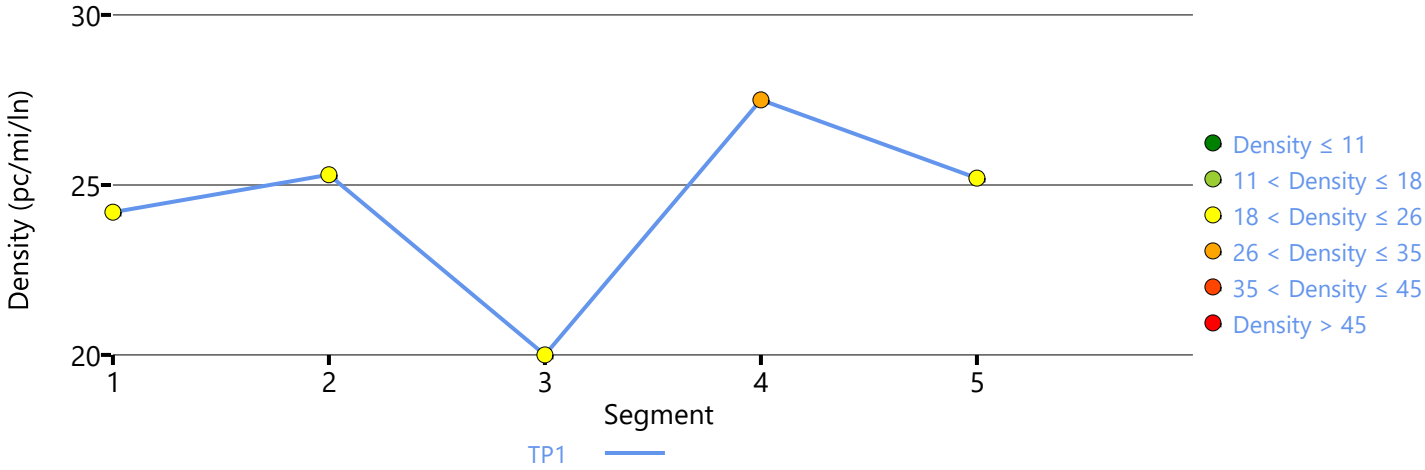
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 NP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5346	7161	0.75	65.3	27.3	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.971	5346	779	6600	2100	0.81	0.37	63.9	59.7	27.9	31.5	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4559	7161	0.64	67.8	22.4	C

Segment 4: Merge

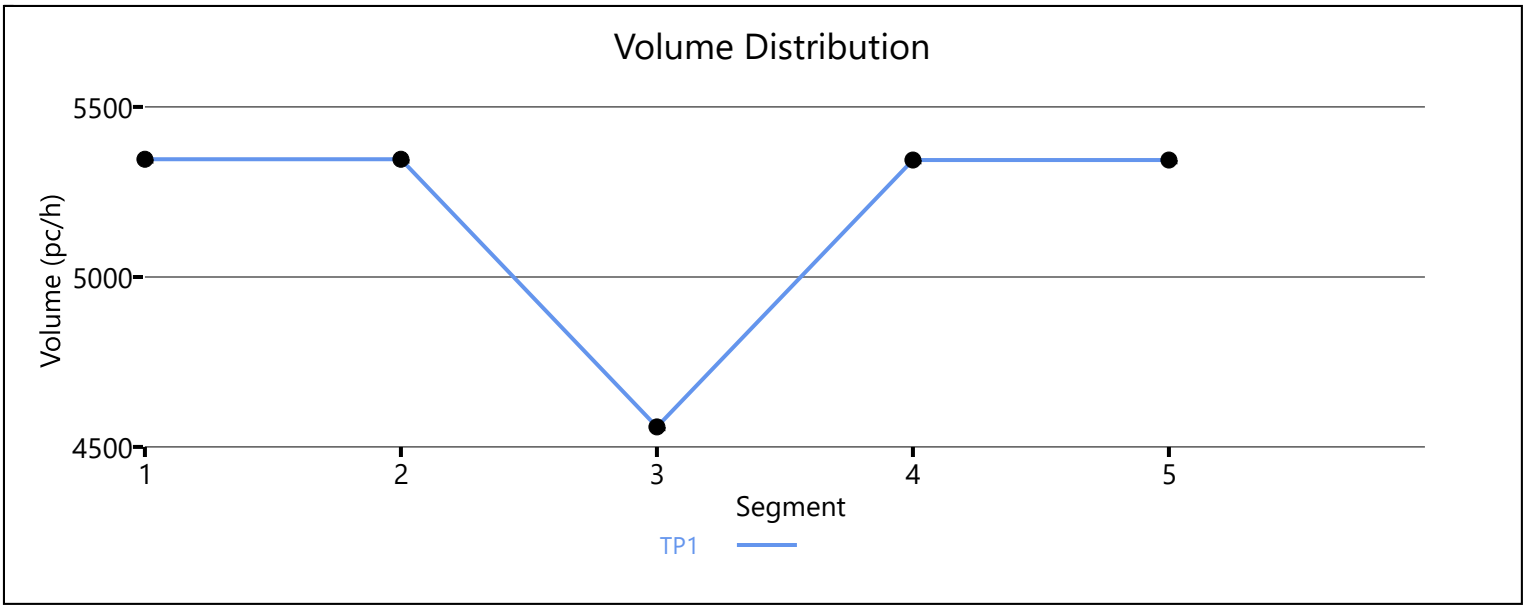
Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.962	5344	785	6600	2100	0.81	0.37	60.6	58.4	29.4	30.0	D

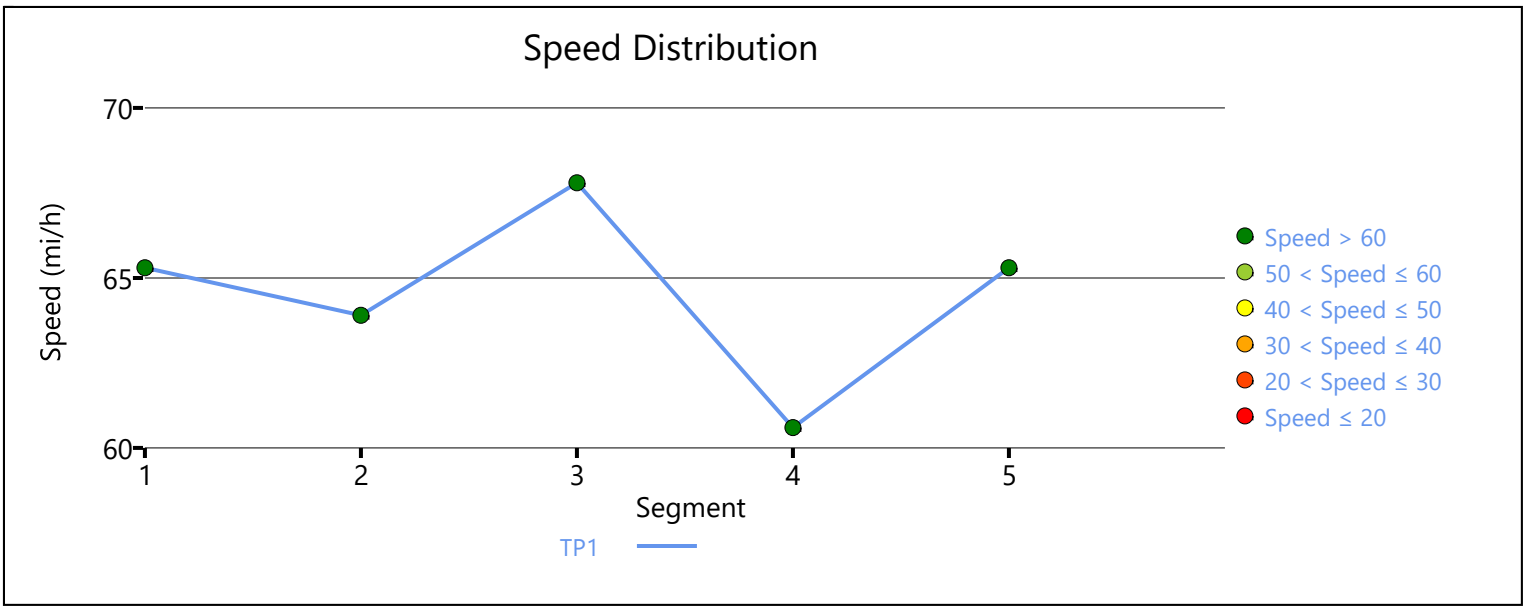
Segment 5: Basic

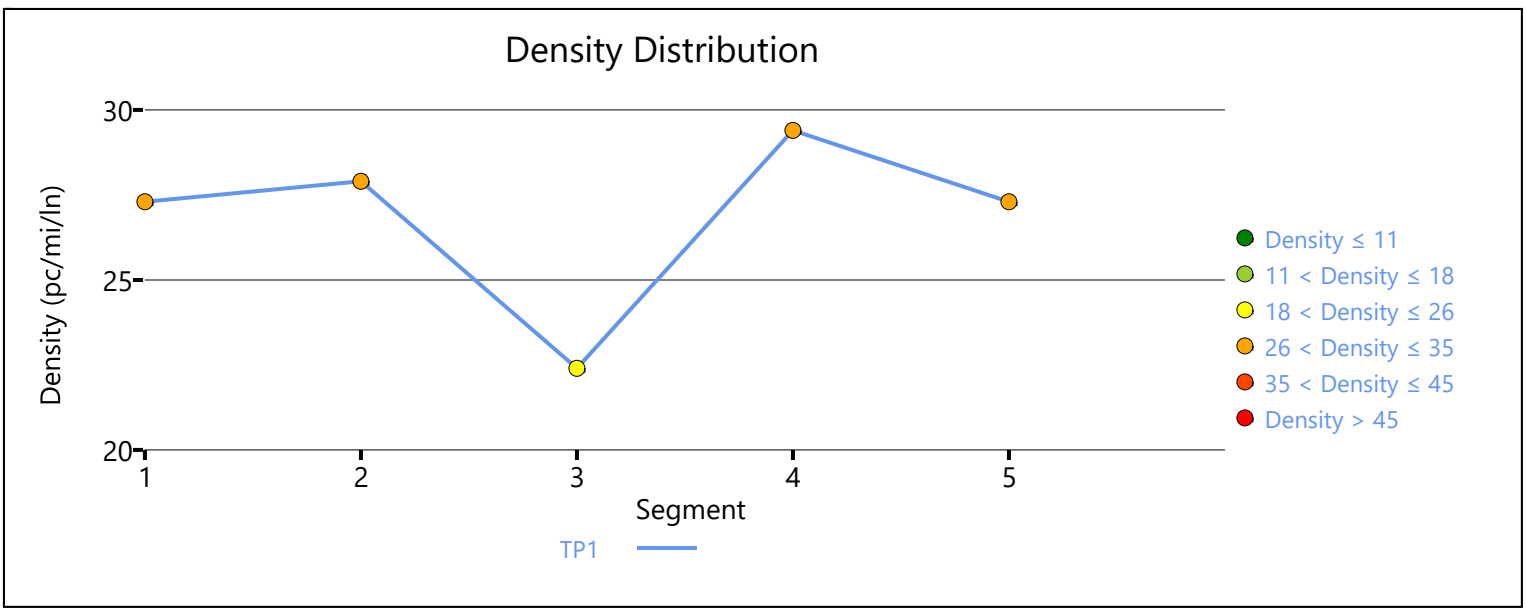
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5344	7161	0.75	65.3	27.3	D

Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	64.7	27.0	25.9	2.0	D

Facility Overall Results			
Space Mean Speed, mi/h	64.7	Density, veh/mi/ln	25.9
Average Travel Time, min	2.0	Density, pc/mi/ln	27.0







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 NP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4068	7161	0.57	68.6	19.8	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.962	4068	793	7200	2100	0.57	0.38	63.8	59.7	21.3	27.2	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3282	7161	0.46	68.7	15.9	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.980	4276	994	7200	2100	0.59	0.47	62.0	60.0	23.0	25.4	C

Segment 5: Basic

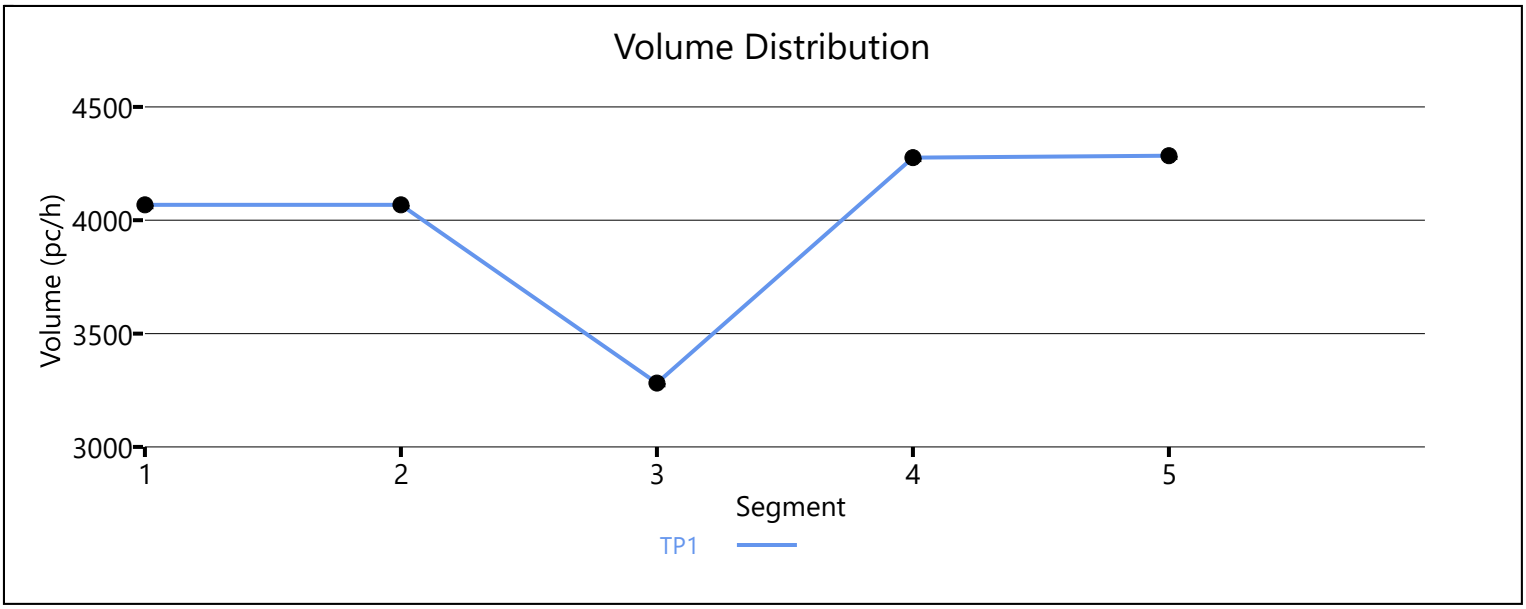
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4285	7161	0.60	68.3	20.9	C

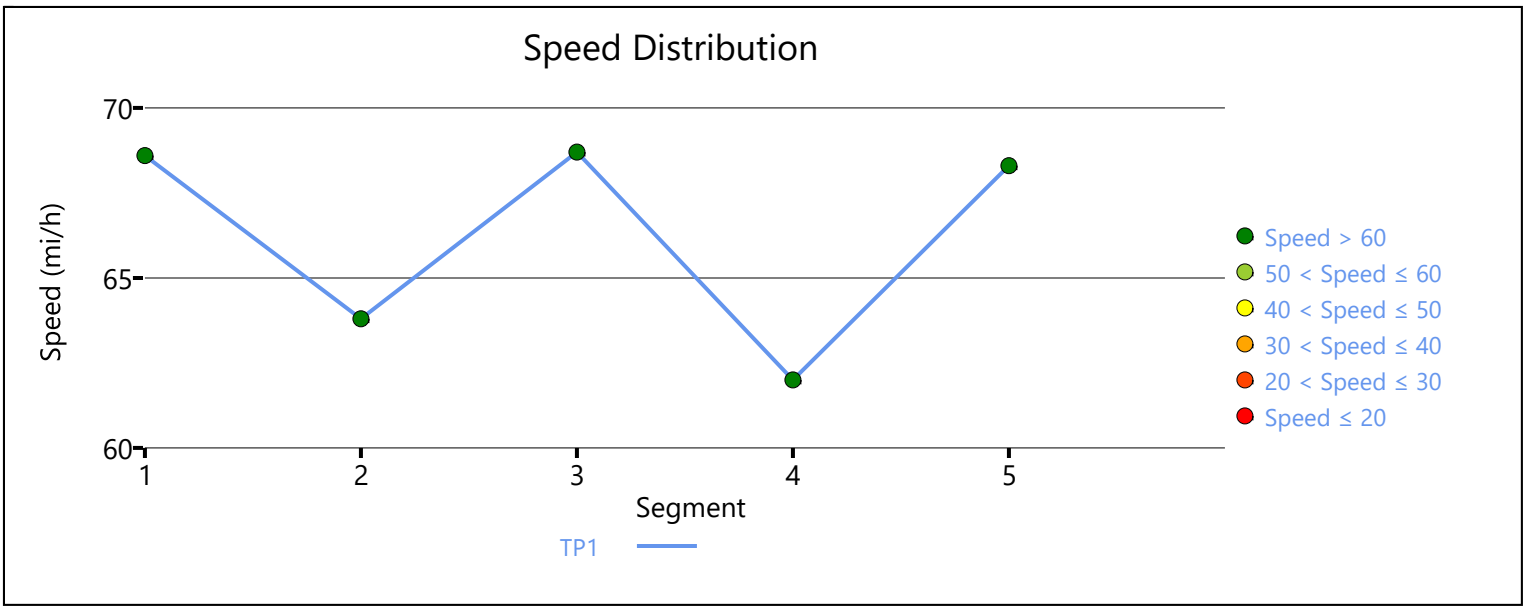
Facility Time Period Results

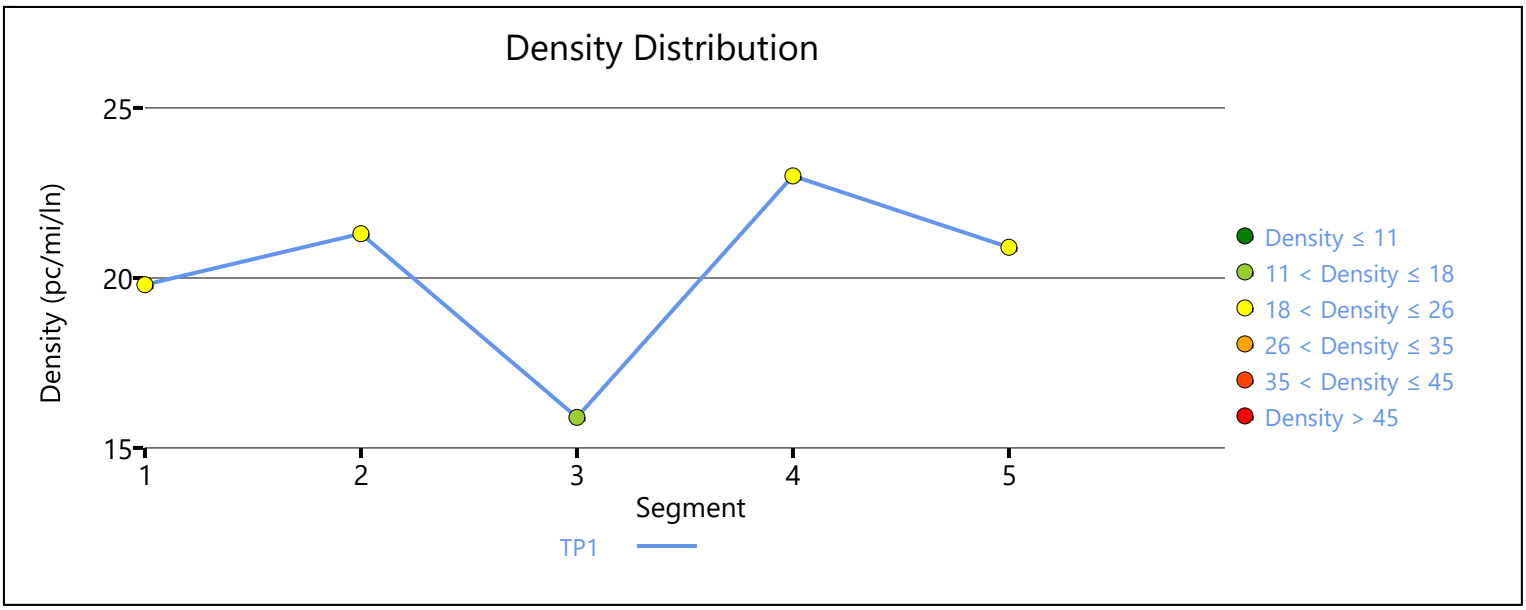
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.0	20.1	19.5	2.1	C

Facility Overall Results

Space Mean Speed, mi/h	67.0	Density, veh/mi/ln	19.5
Average Travel Time, min	2.1	Density, pc/mi/ln	20.1







Copyright © 2020 University of Florida. All Rights Reserved.

APPENDIX 7.8:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS FREEWAY FACILITY ANALYSIS WORKSHEETS

This Page Intentionally Left Blank

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 WP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	4991	7161	0.70	66.6	25.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.943	4991	722	7200	2100	0.69	0.34	64.0	59.8	26.0	29.9	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4231	7161	0.59	68.4	20.6	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.952	0.962	5433	1157	7200	2100	0.75	0.55	59.9	57.6	30.2	31.4	D

Segment 5: Basic

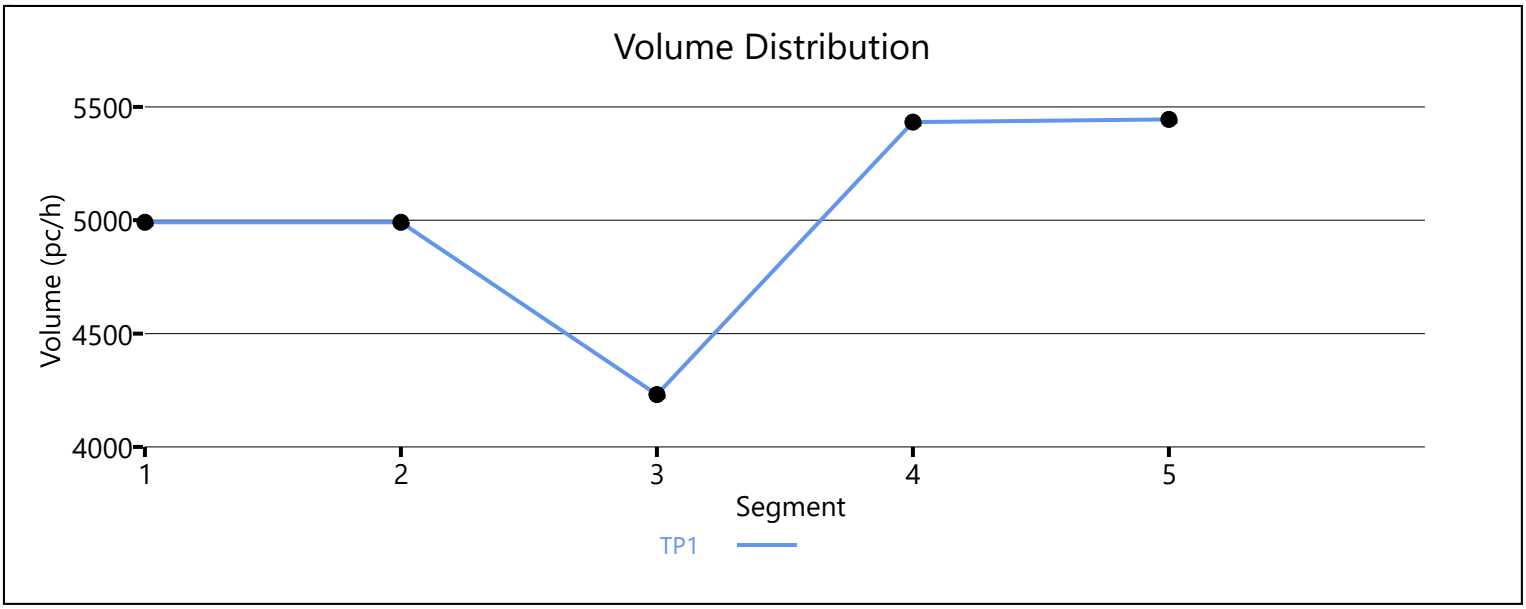
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.952	5445	7161	0.76	64.8	28.0	D

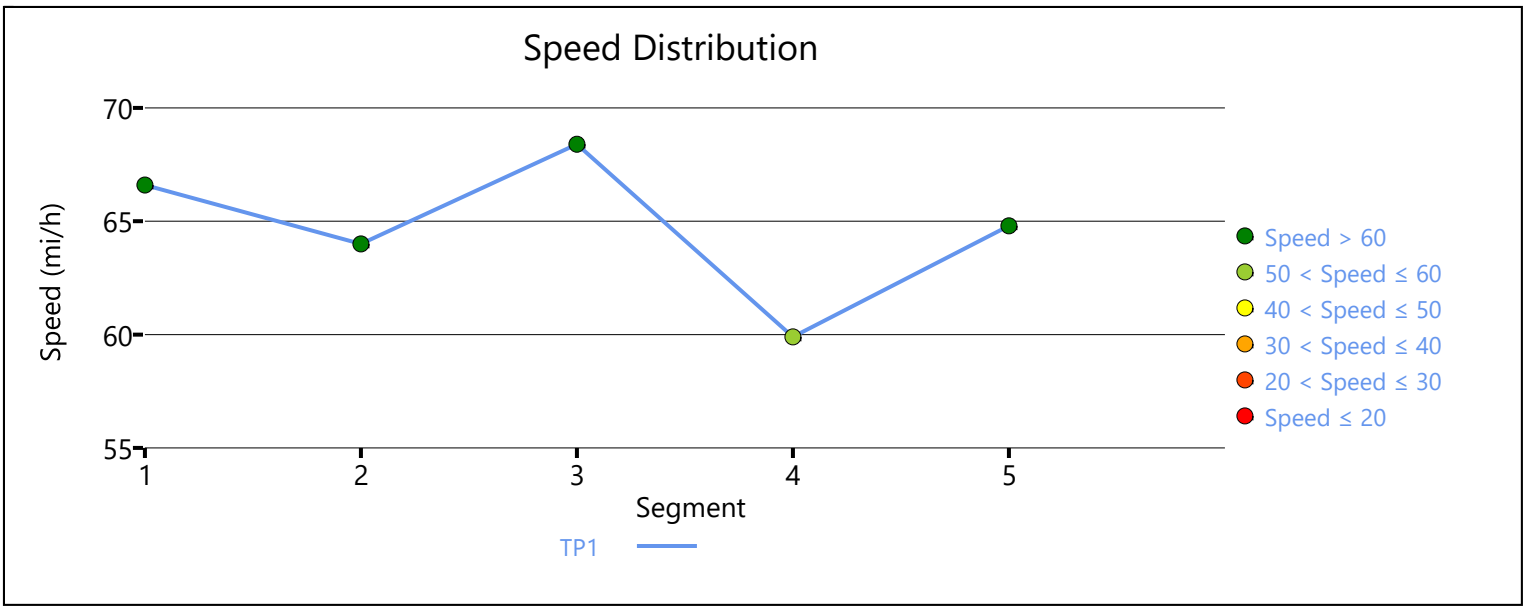
Facility Time Period Results

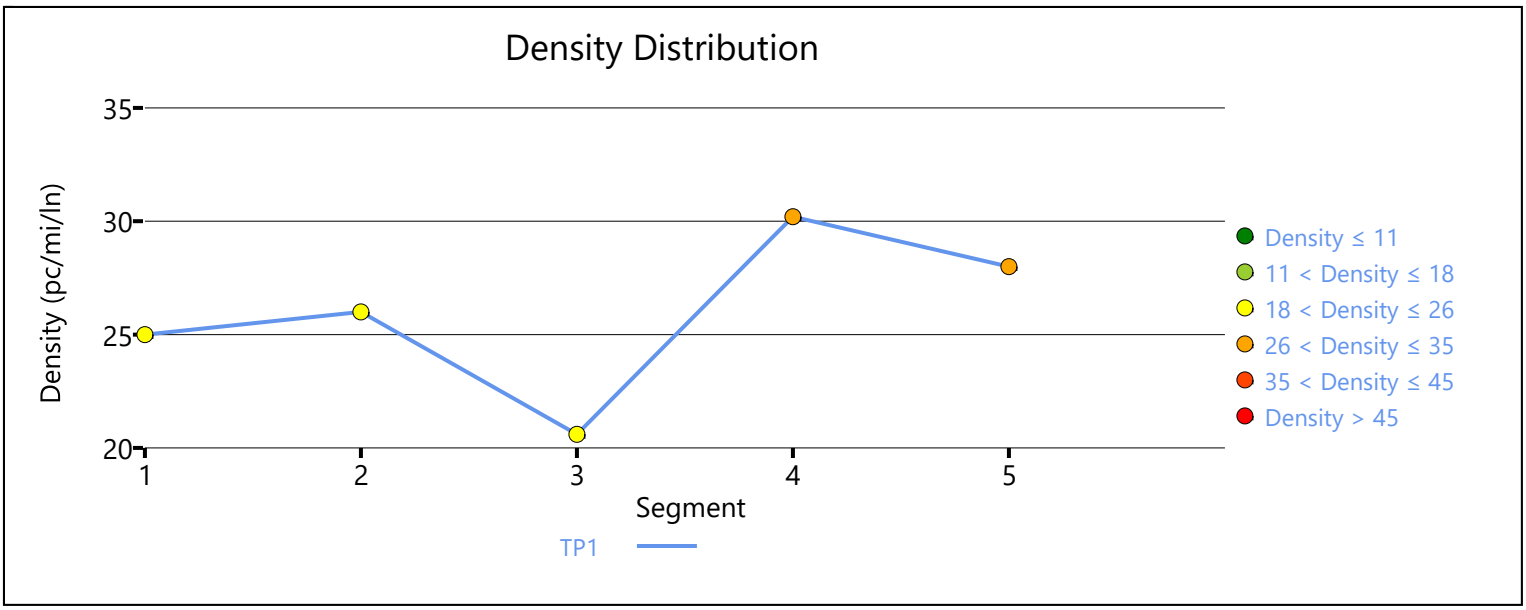
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	64.7	26.4	25.1	2.0	D

Facility Overall Results

Space Mean Speed, mi/h	64.7	Density, veh/mi/ln	25.1
Average Travel Time, min	2.0	Density, pc/mi/ln	26.4







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 WP
Jurisdiction	Caltrans	Time Period Analyzed	AM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4885	7161	0.68	67.0	24.3	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.917	4885	782	7200	2100	0.68	0.37	63.9	59.7	25.5	30.9	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.980	4108	7161	0.57	68.5	20.0	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.980	0.935	5032	924	7200	2100	0.70	0.44	61.0	58.9	27.5	28.7	D

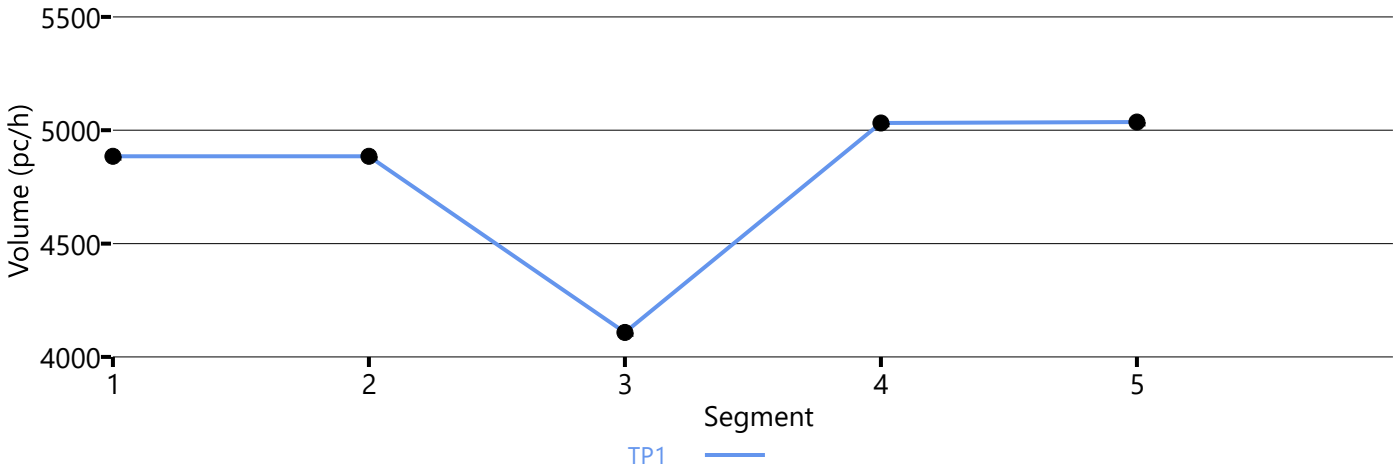
Segment 5: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	5036	7161	0.70	66.5	25.2	C

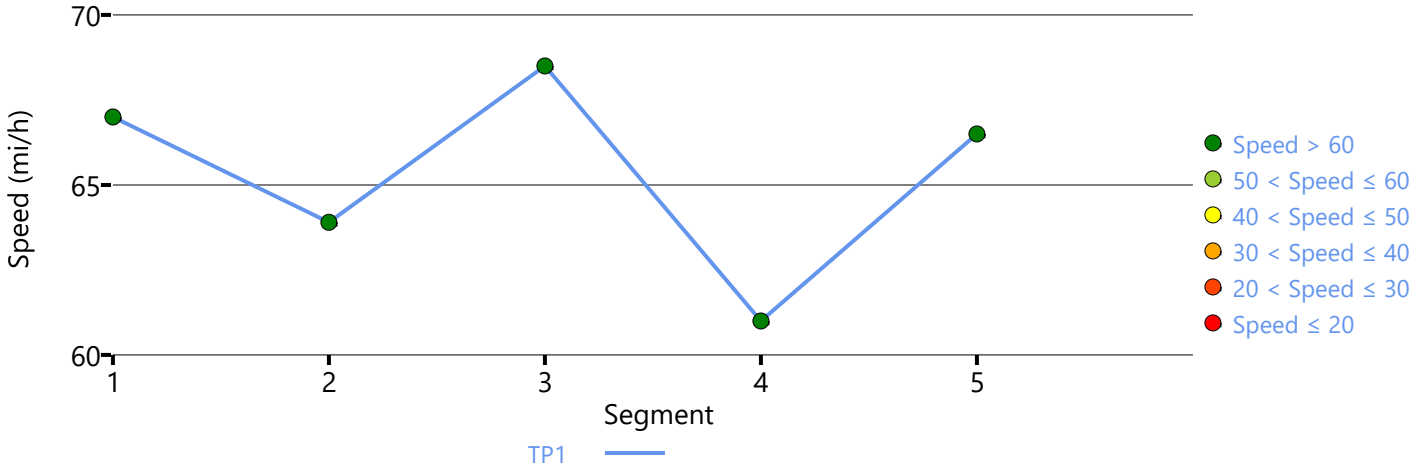
Facility Time Period Results					
T	**Speed, mi/h**	**Density, pc/mi/ln**	**Density, veh/mi/ln**	**Travel Time, min**	**LOS**
1	65.8	24.5	23.9	2.2	C

Facility Overall Results			
Space Mean Speed, mi/h	65.8	Density, veh/mi/ln	23.9
Average Travel Time, min	2.2	Density, pc/mi/ln	24.5

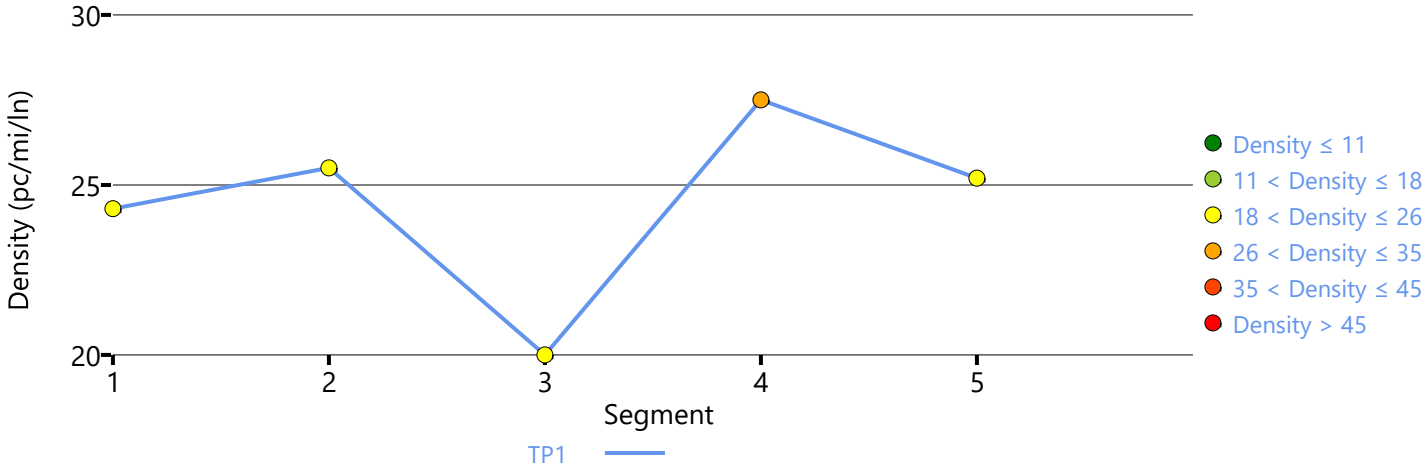
Volume Distribution



Speed Distribution



Density Distribution



Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2022 WP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 NB South of Barton	2350	3
2	Diverge	Diverge	I-215 NB Off-Ramp	1500	3
3	Basic	Basic	Between	1650	3
4	Merge	Merge	I-215 NB On-Ramp	1500	3
5	Basic	Basic	I-215 NB North of Barton	4510	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5355	7161	0.75	65.2	27.4	D

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.971	5355	788	6600	2100	0.81	0.38	63.9	59.7	27.9	31.5	D

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4559	7161	0.64	67.8	22.4	C

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.962	5366	807	6600	2100	0.81	0.38	60.6	58.4	29.5	30.1	D

Segment 5: Basic

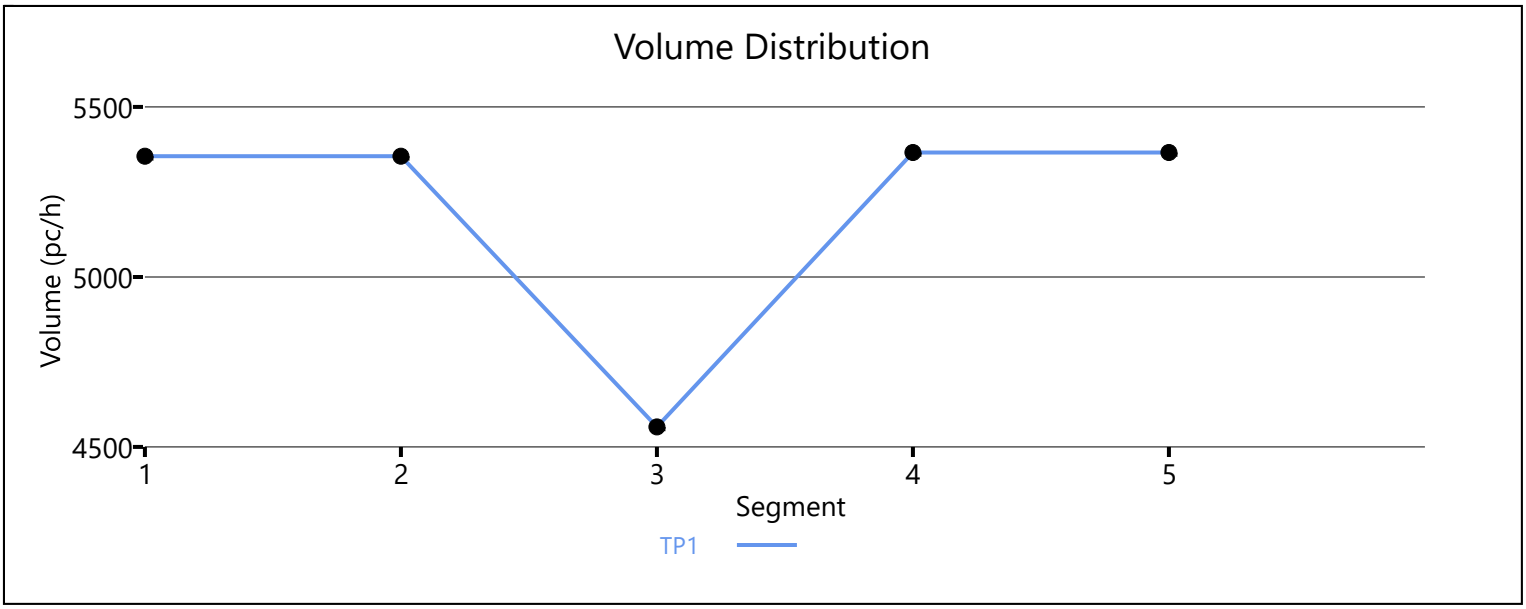
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	5366	7161	0.75	65.2	27.4	D

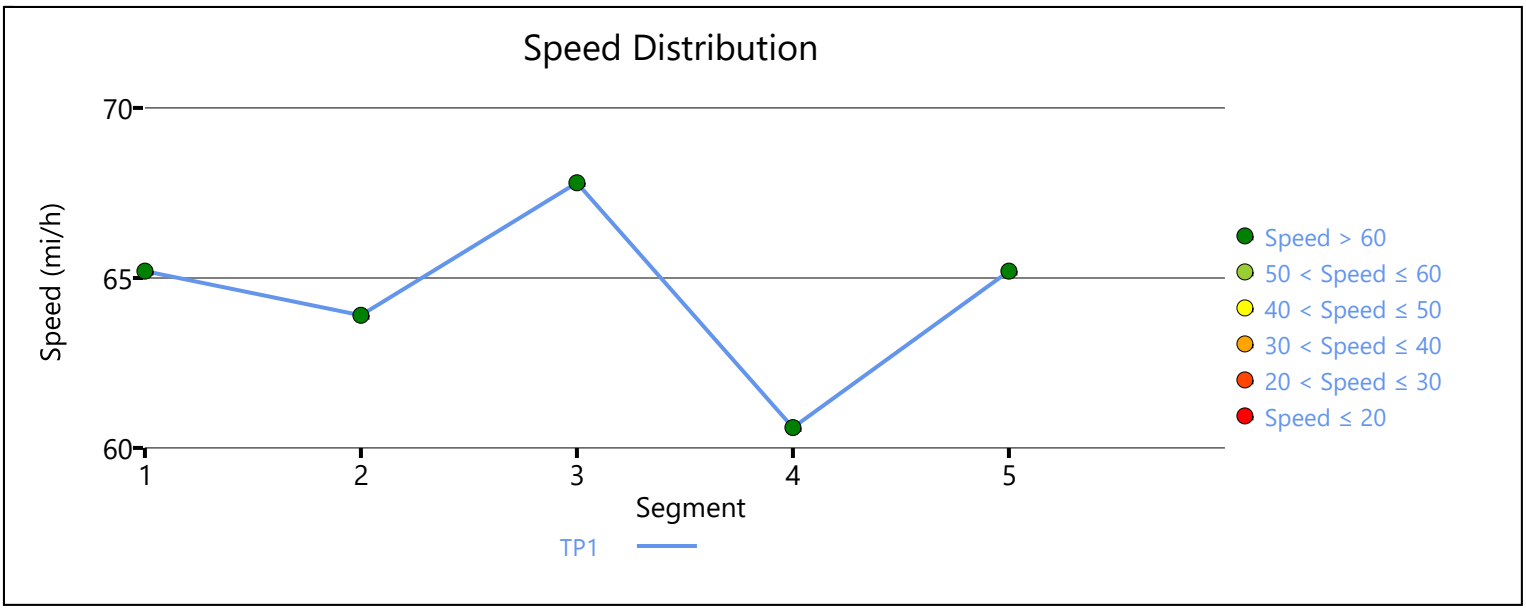
Facility Time Period Results

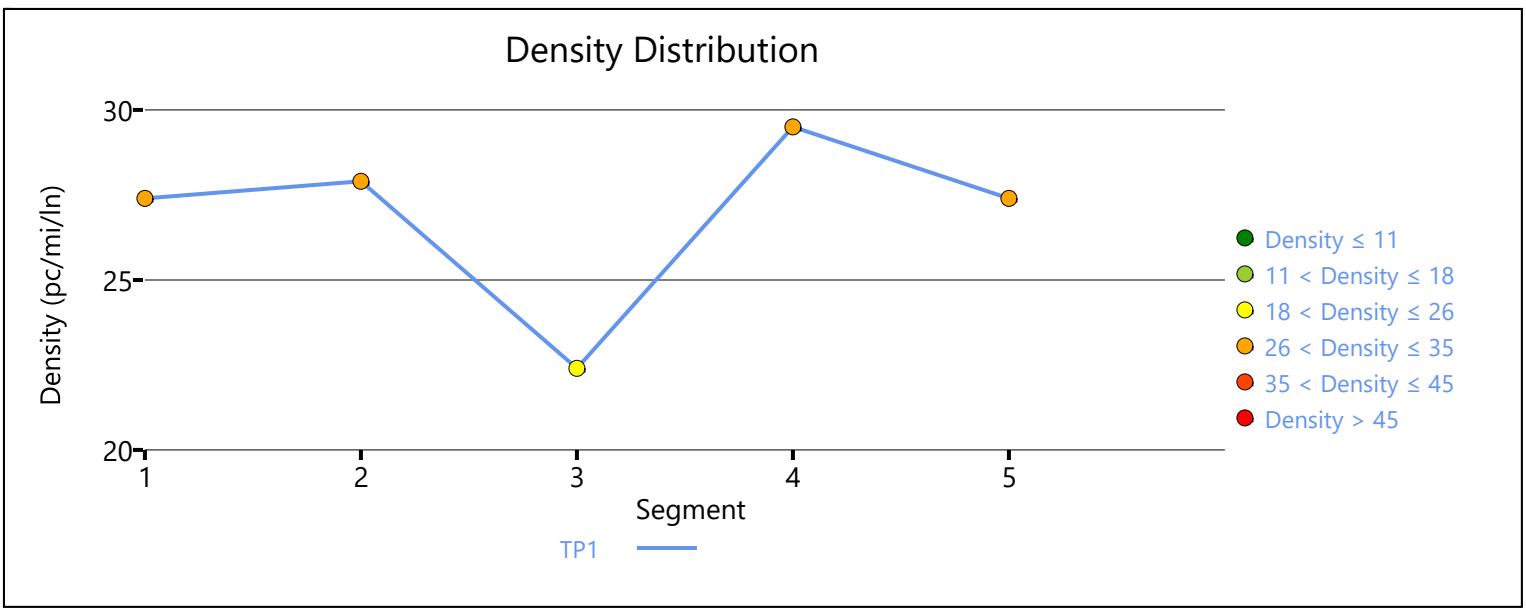
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	64.7	27.0	26.0	2.0	D

Facility Overall Results

Space Mean Speed, mi/h	64.7	Density, veh/mi/ln	26.0
Average Travel Time, min	2.0	Density, pc/mi/ln	27.0







Copyright © 2020 University of Florida. All Rights Reserved.

HCS7 Freeway Facilities Report

Project Information

Analyst	JB	Date	8/10/2020
Agency	Urban Crossroads, Inc.	Analysis Year	2040 WP
Jurisdiction	Caltrans	Time Period Analyzed	PM Peak Hour
Project Description	Barton Logistics (JN 12971)		

Facility Global Input

Jam Density, pc/mi/ln	190.0	Density at Capacity, pc/mi/ln	45.0
Queue Discharge Capacity Drop, %	7	Total Segments	5
Total Time Periods	1	Time Period Duration, min	15

Facility Segment Data

No.	Coded	Analyzed	Name	Length, ft	Lanes
1	Basic	Basic	I-215 SB North of Barton	4770	3
2	Diverge	Diverge	I-215 SB Off-Ramp	1500	3
3	Basic	Basic	Between	1630	3
4	Merge	Merge	I-215 SB On-Ramp	1500	3
5	Basic	Basic	I-215 SB South of Barton	3175	3

Facility Segment Data

Segment 1: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.962	4114	7161	0.57	68.5	20.0	C

Segment 2: Diverge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.962	0.962	4114	801	7200	2100	0.57	0.38	63.8	59.6	21.5	27.5	C

Segment 3: Basic

Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	3282	7161	0.46	68.7	15.9	B

Segment 4: Merge

Time Period	PHF		fHV		Flow Rate (pc/h)		Capacity (pc/h)		d/c Ratio		Speed (mi/h)		Density (pc/mi/ln)		LOS
	F	R	F	R	Freeway	Ramp	Freeway	Ramp	F	R	F	R	Freeway	Ramp	
1	0.92	0.92	0.971	0.980	4295	1013	7200	2100	0.60	0.48	61.9	59.9	23.1	25.6	C

Segment 5: Basic

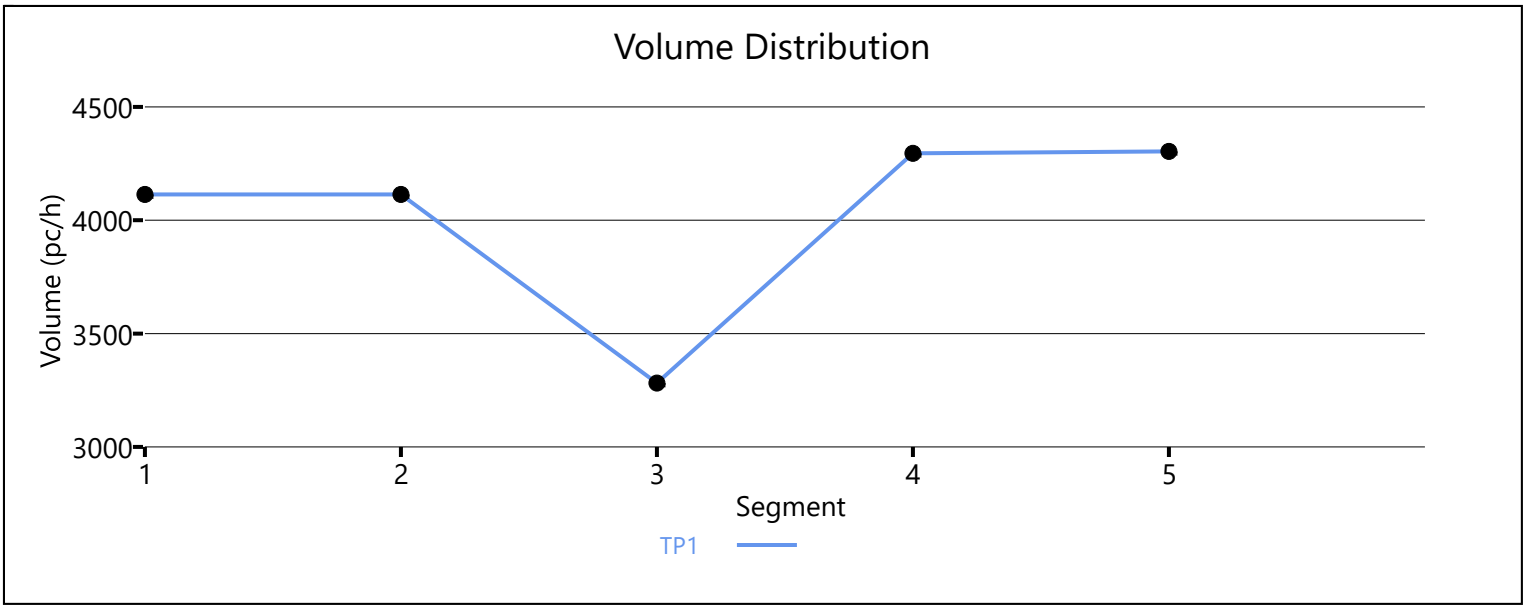
Time Period	PHF	fHV	Flow Rate (pc/h)	Capacity (pc/h)	d/c Ratio	Speed (mi/h)	Density (pc/mi/ln)	LOS
1	0.92	0.971	4304	7161	0.60	68.3	21.0	C

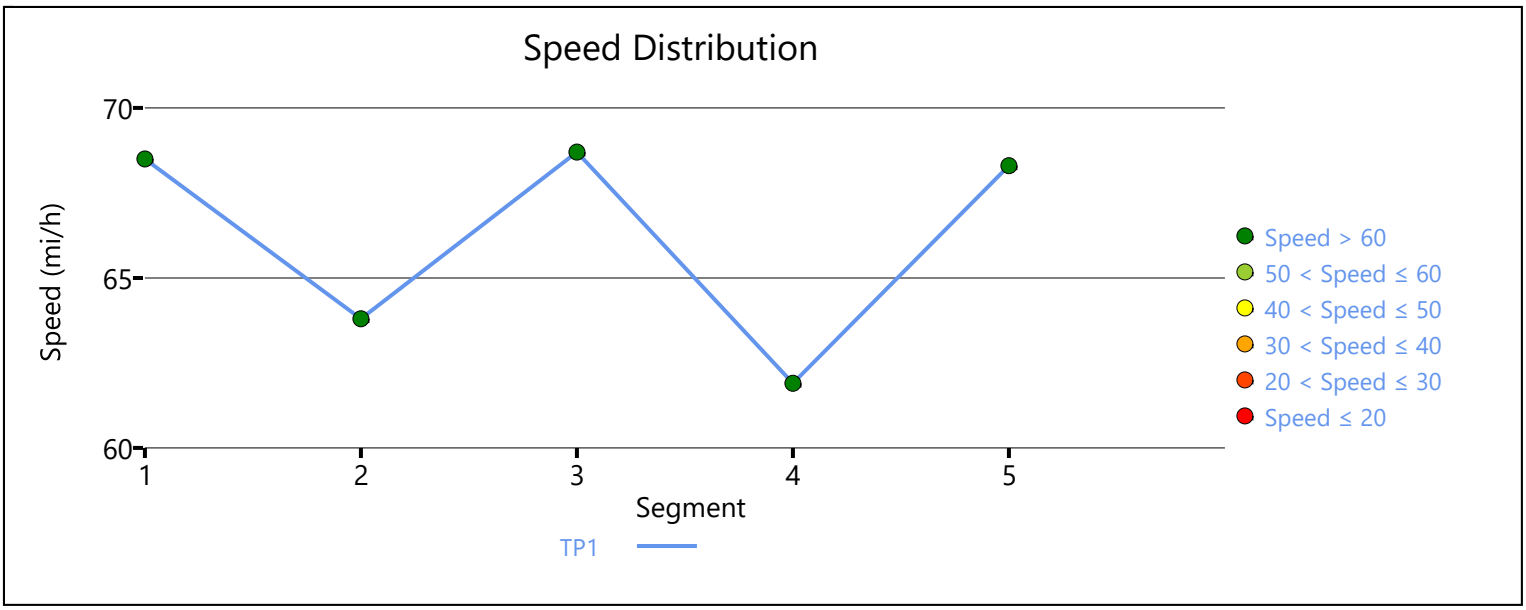
Facility Time Period Results

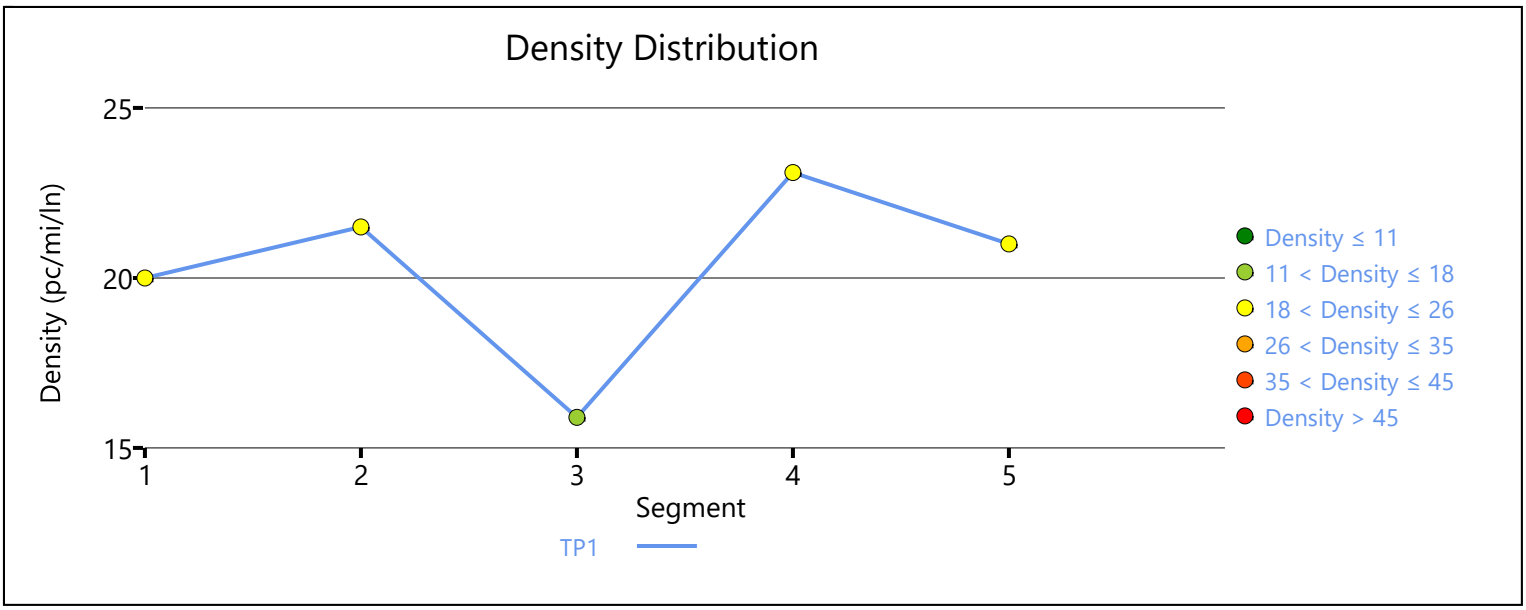
T	Speed, mi/h	Density, pc/mi/ln	Density, veh/mi/ln	Travel Time, min	LOS
1	67.0	20.3	19.6	2.1	C

Facility Overall Results

Space Mean Speed, mi/h	67.0	Density, veh/mi/ln	19.6
Average Travel Time, min	2.1	Density, pc/mi/ln	20.3







Copyright © 2020 University of Florida. All Rights Reserved.

APPENDIX 7.9:

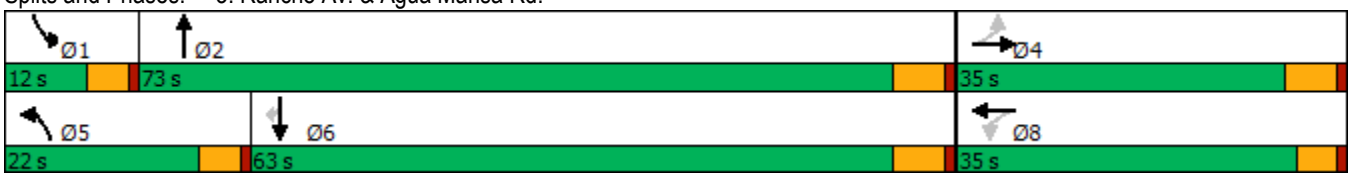
HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

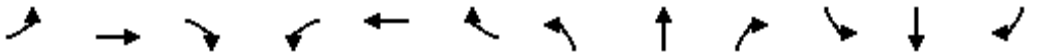
This Page Intentionally Left Blank

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	237	22	5	39	169	473	40	982	801
Future Volume (vph)	237	22	5	39	169	473	40	982	801
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8	20.8
Total Split (s)	35.0	35.0	35.0	35.0	22.0	73.0	12.0	63.0	63.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	18.3%	60.8%	10.0%	52.5%	52.5%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		4.6	4.6	5.8	4.6	5.8	5.8
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	24.5	24.5		25.8	14.8	61.6	6.7	48.2	48.2
Actuated g/C Ratio	0.23	0.23		0.25	0.14	0.59	0.06	0.46	0.46
v/c Ratio	0.81	0.26		0.14	0.76	0.25	0.39	0.64	0.89
Control Delay	60.4	12.7		28.7	67.5	11.9	64.1	23.9	24.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.4	12.7		28.7	67.5	11.9	64.1	23.9	24.8
LOS	E	B		C	E	B	E	C	C
Approach Delay		45.2		28.7		26.4		25.2	
Approach LOS		D		C		C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.6	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 27.9	Intersection LOS: C
Intersection Capacity Utilization 80.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	22	89	5	39	15	169	473	7	40	982	801
Future Volume (veh/h)	237	22	89	5	39	15	169	473	7	40	982	801
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	258	24	87	5	42	14	184	514	7	43	1067	654
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	368	78	282	53	289	89	217	2098	29	62	1750	781
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.13	0.58	0.58	0.04	0.48	0.48
Sat Flow, veh/h	1297	360	1305	52	1336	414	1714	3646	50	1714	3610	1610
Grp Volume(v), veh/h	258	0	111	61	0	0	184	254	267	43	1067	654
Grp Sat Flow(s),veh/h/ln	1297	0	1665	1802	0	0	1714	1805	1891	1714	1805	1610
Q Serve(g_s), s	14.7	0.0	5.3	0.0	0.0	0.0	9.9	6.5	6.5	2.3	20.3	33.1
Cycle Q Clear(g_c), s	17.2	0.0	5.3	2.5	0.0	0.0	9.9	6.5	6.5	2.3	20.3	33.1
Prop In Lane	1.00		0.78	0.08		0.23	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	368	0	360	431	0	0	217	1039	1088	62	1750	781
V/C Ratio(X)	0.70	0.00	0.31	0.14	0.00	0.00	0.85	0.24	0.25	0.70	0.61	0.84
Avail Cap(c_a), veh/h	492	0	518	621	0	0	318	1293	1355	135	2201	982
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.3	0.0	30.9	29.8	0.0	0.0	40.1	9.8	9.8	44.7	17.7	21.0
Incr Delay (d2), s/veh	2.9	0.0	0.5	0.1	0.0	0.0	9.2	0.1	0.1	5.2	0.3	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	2.1	1.1	0.0	0.0	4.5	2.3	2.4	1.0	7.6	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.1	0.0	31.4	30.0	0.0	0.0	49.3	10.0	10.0	49.9	18.0	26.2
LnGrp LOS	D	A	C	C	A	A	D	A	A	D	B	C
Approach Vol, veh/h		369			61			705			1764	
Approach Delay, s/veh		36.1			30.0			20.2			21.8	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	59.8		26.1	16.5	51.3		26.1				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	67.2		29.2	17.4	57.2		* 30				
Max Q Clear Time (g_c+I1), s	4.3	8.5		19.2	11.9	35.1		4.5				
Green Ext Time (p_c), s	0.0	3.0		1.0	0.1	10.4		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		23.4	
HCM 6th LOS		C	

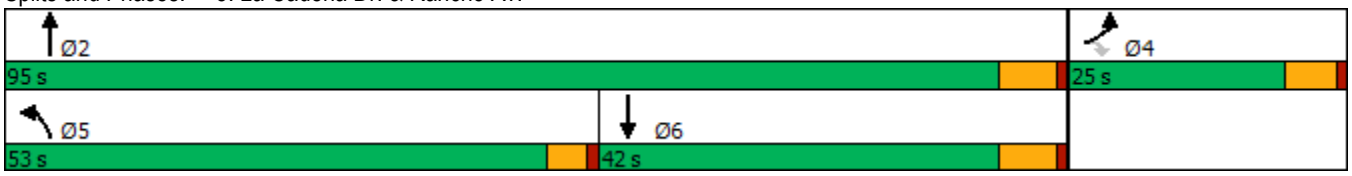
Notes

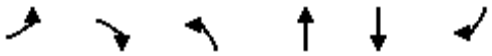
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	19	664	492	666	696
Future Volume (vph)	19	664	492	666	696
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	25.0	25.0	53.0	95.0	42.0
Total Split (%)	20.8%	20.8%	44.2%	79.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.5	12.5	34.7	66.1	26.5
Actuated g/C Ratio	0.14	0.14	0.38	0.72	0.29
v/c Ratio	0.72	0.71	0.86	0.29	0.76
Control Delay	15.7	13.8	42.7	4.6	36.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	13.8	42.7	4.6	36.7
LOS	B	B	D	A	D
Approach Delay	14.7			20.8	36.7
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 91.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 83.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	664	492	666	696	6
Future Volume (veh/h)	19	664	492	666	696	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	581	502	680	710	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	344	612	532	2135	863	7
Arrive On Green	0.00	0.21	0.35	0.66	0.26	0.26
Sat Flow, veh/h	1629	2898	1543	3335	3387	28
Grp Volume(v), veh/h	0	581	502	680	349	367
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1705
Q Serve(g_s), s	0.0	18.0	28.7	8.3	18.4	18.4
Cycle Q Clear(g_c), s	0.0	18.0	28.7	8.3	18.4	18.4
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	344	612	532	2135	425	446
V/C Ratio(X)	0.00	0.95	0.94	0.32	0.82	0.82
Avail Cap(c_a), veh/h	344	612	821	3171	639	671
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	35.4	28.9	6.8	31.6	31.6
Incr Delay (d2), s/veh	0.0	24.6	11.1	0.1	5.3	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	15.2	11.1	2.1	7.2	7.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	60.0	40.1	6.8	36.9	36.7
LnGrp LOS	A	E	D	A	D	D
Approach Vol, veh/h	581			1182	716	
Approach Delay, s/veh	60.0			21.0	36.8	
Approach LOS	E			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		66.0		25.0	36.0	30.0
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		88.8		19.2	48.4	35.8
Max Q Clear Time (g_c+I1), s		10.3		20.0	30.7	20.4
Green Ext Time (p_c), s		4.6		0.0	0.7	3.4

Intersection Summary		
HCM 6th Ctrl Delay		34.7
HCM 6th LOS		C

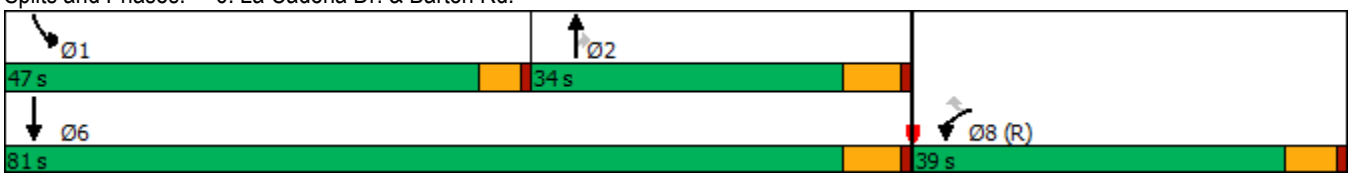
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	318	370	790	385	557	1399
Future Volume (vph)	318	370	790	385	557	1399
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	39.0	39.0	34.0	34.0	47.0	81.0
Total Split (%)	32.5%	32.5%	28.3%	28.3%	39.2%	67.5%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	33.2	33.2	27.8	27.8	42.4	74.8
Actuated g/C Ratio	0.28	0.28	0.23	0.23	0.35	0.62
v/c Ratio	0.37	0.61	1.00	0.60	0.98	0.66
Control Delay	31.3	11.1	78.4	8.5	71.4	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	11.1	78.4	8.5	71.4	16.3
LOS	C	B	E	A	E	B
Approach Delay	20.5		55.5			32.0
Approach LOS	C		E			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 110	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 37.1	Intersection LOS: D
Intersection Capacity Utilization 77.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	318	370	790	385	557	1399
Future Volume (veh/h)	318	370	790	385	557	1399
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	338	0	840	373	593	1488
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	920		836	373	606	2250
Arrive On Green	0.28	0.00	0.23	0.23	0.35	0.62
Sat Flow, veh/h	3326	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	338	0	840	373	593	1488
Grp Sat Flow(s),veh/h/ln	1663	1610	1805	1610	1714	1805
Q Serve(g_s), s	9.8	0.0	27.8	27.8	41.0	31.7
Cycle Q Clear(g_c), s	9.8	0.0	27.8	27.8	41.0	31.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	920		836	373	606	2250
V/C Ratio(X)	0.37		1.00	1.00	0.98	0.66
Avail Cap(c_a), veh/h	920		836	373	606	2250
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.83	0.83	0.59	0.59
Uniform Delay (d), s/veh	34.9	0.0	46.1	46.1	38.4	14.5
Incr Delay (d2), s/veh	1.1	0.0	29.4	42.4	23.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.0	15.3	15.0	20.0	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.1	0.0	75.5	88.5	61.4	14.9
LnGrp LOS	D		F	F	E	B
Approach Vol, veh/h	338	A	1213			2081
Approach Delay, s/veh	36.1		79.5			28.2
Approach LOS	D		E			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	47.0	34.0				81.0	39.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	42.4	27.8				74.8	33.2
Max Q Clear Time (g_c+I1), s	43.0	29.8				33.7	11.8
Green Ext Time (p_c), s	0.0	0.0				13.9	0.6

Intersection Summary		
HCM 6th Ctrl Delay		46.0
HCM 6th LOS		D

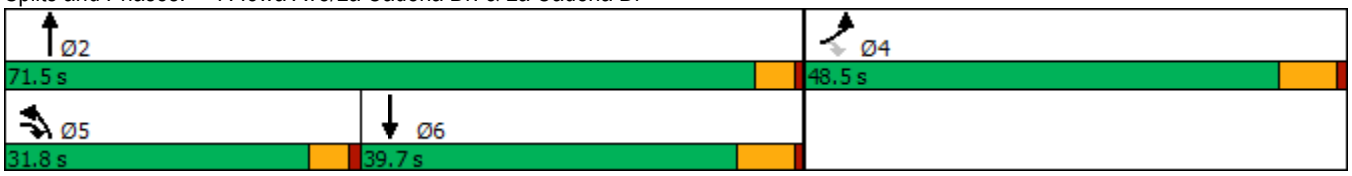
Notes

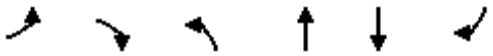
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	398	217	233	797	712	1195
Future Volume (vph)	398	217	233	797	712	1195
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	48.5	31.8	31.8	71.5	39.7	
Total Split (%)	40.4%	26.5%	26.5%	59.6%	33.1%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	27.5	51.7	17.5	48.7	24.5	87.7
Actuated g/C Ratio	0.31	0.59	0.20	0.56	0.28	1.00
v/c Ratio	0.77	0.24	0.70	0.41	0.73	0.46
Control Delay	39.2	9.6	47.4	12.5	35.2	0.6
Queue Delay	0.0	0.0	0.1	0.2	0.0	0.0
Total Delay	39.2	9.6	47.5	12.7	35.2	0.6
LOS	D	A	D	B	D	A
Approach Delay	28.7			20.6	13.5	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 87.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 70.7%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	398	217	233	797	712	1195
Future Volume (veh/h)	398	217	233	797	712	1195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	410	198	240	822	734	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	488	730	289	1884	1018	
Arrive On Green	0.28	0.28	0.17	0.52	0.28	0.00
Sat Flow, veh/h	1714	1610	1714	3705	3705	2685
Grp Volume(v), veh/h	410	198	240	822	734	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1805	1805	1342
Q Serve(g_s), s	14.4	4.9	8.7	9.0	11.8	0.0
Cycle Q Clear(g_c), s	14.4	4.9	8.7	9.0	11.8	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	488	730	289	1884	1018	
V/C Ratio(X)	0.84	0.27	0.83	0.44	0.72	
Avail Cap(c_a), veh/h	1130	1333	727	3764	1885	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.6	10.9	25.8	9.5	20.8	0.0
Incr Delay (d2), s/veh	4.0	0.2	2.4	0.2	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	5.5	3.3	2.6	4.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.5	11.1	28.2	9.7	21.7	0.0
LnGrp LOS	C	B	C	A	C	
Approach Vol, veh/h	608			1062	734	A
Approach Delay, s/veh	20.8			13.8	21.7	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		39.7		24.5	15.4	24.3
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 67		42.3	27.2	33.5
Max Q Clear Time (g_c+I1), s		11.0		16.4	10.7	13.8
Green Ext Time (p_c), s		5.9		1.8	0.3	4.3

Intersection Summary		
HCM 6th Ctrl Delay		18.0
HCM 6th LOS		B

Notes

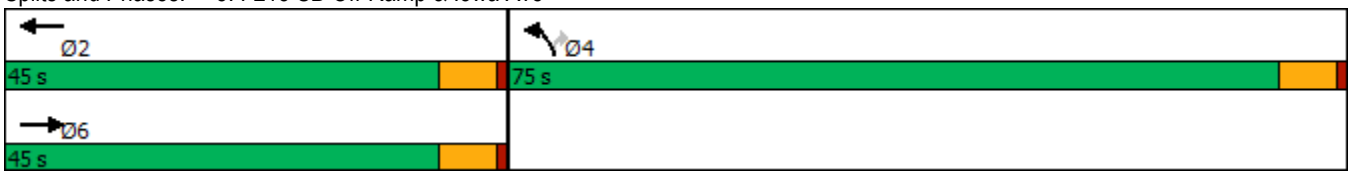
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	929	907	123	805
Future Volume (vph)	929	907	123	805
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	45.0	45.0	75.0	75.0
Total Split (%)	37.5%	37.5%	62.5%	62.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	35.2	35.2	62.1	62.1
Actuated g/C Ratio	0.32	0.32	0.56	0.56
v/c Ratio	0.86	0.84	0.13	0.94
Control Delay	44.9	43.5	12.0	42.0
Queue Delay	49.7	0.0	0.0	0.0
Total Delay	94.7	43.5	12.0	42.0
LOS	F	D	B	D
Approach Delay	94.7	43.5	38.0	
Approach LOS	F	D	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 110	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 58.8	Intersection LOS: E
Intersection Capacity Utilization 85.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	929	0	0	907	123	805
Future Volume (veh/h)	929	0	0	907	123	805
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	999	0	0	975	134	724
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1265	0	0	1265	888	790
Arrive On Green	0.35	0.00	0.00	0.35	0.49	0.49
Sat Flow, veh/h	3800	0	0	3800	1810	1610
Grp Volume(v), veh/h	999	0	0	975	134	724
Grp Sat Flow(s),veh/h/ln	1805	0	0	1805	1810	1610
Q Serve(g_s), s	19.4	0.0	0.0	18.7	3.2	32.4
Cycle Q Clear(g_c), s	19.4	0.0	0.0	18.7	3.2	32.4
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1265	0	0	1265	888	790
V/C Ratio(X)	0.79	0.00	0.00	0.77	0.15	0.92
Avail Cap(c_a), veh/h	1796	0	0	1796	1597	1421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	22.5	10.9	18.4
Incr Delay (d2), s/veh	1.6	0.0	0.0	1.3	0.1	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.0	7.1	1.2	12.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.3	0.0	0.0	23.9	11.0	23.5
LnGrp LOS	C	A	A	C	B	C
Approach Vol, veh/h	999			975	858	
Approach Delay, s/veh	24.3			23.9	21.5	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.5		44.5		33.5
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		38.8		68.8		38.8
Max Q Clear Time (g_c+I1), s		20.7		34.4		21.4
Green Ext Time (p_c), s		5.9		3.8		5.9

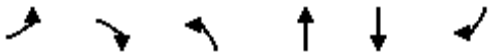
Intersection Summary		
HCM 6th Ctrl Delay		23.3
HCM 6th LOS		C

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	266	1468	512	877	97
Future Volume (vph)	266	1468	512	877	97
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	6	7	7	4	8
Permitted Phases		6			
Detector Phase	6	7	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	9.6	16.2	16.2
Total Split (s)	36.0	38.0	38.0	84.0	46.0
Total Split (%)	30.0%	31.7%	31.7%	70.0%	38.3%
Yellow Time (s)	5.2	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.8	48.9	22.4	53.2	25.9
Actuated g/C Ratio	0.23	0.57	0.26	0.62	0.30
v/c Ratio	0.69	0.73	0.61	0.81	0.83
Control Delay	43.1	4.7	33.3	19.4	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.1	4.7	33.3	19.4	31.9
LOS	D	A	C	B	C
Approach Delay	10.6			24.5	31.9
Approach LOS	B			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 86.5	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 18.8	Intersection LOS: B
Intersection Capacity Utilization 89.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	266	1468	512	877	97	395
Future Volume (veh/h)	266	1468	512	877	97	395
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	286	1175	551	943	104	366
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	567	1409	645	1057	120	421
Arrive On Green	0.31	0.31	0.18	0.56	0.32	0.32
Sat Flow, veh/h	1810	2834	3510	1900	369	1298
Grp Volume(v), veh/h	286	1175	551	943	0	470
Grp Sat Flow(s),veh/h/ln	1810	1417	1755	1900	0	1666
Q Serve(g_s), s	12.3	29.8	14.5	41.6	0.0	25.3
Cycle Q Clear(g_c), s	12.3	29.8	14.5	41.6	0.0	25.3
Prop In Lane	1.00	1.00	1.00			0.78
Lane Grp Cap(c), veh/h	567	1409	645	1057	0	540
V/C Ratio(X)	0.50	0.83	0.85	0.89	0.00	0.87
Avail Cap(c_a), veh/h	567	1409	1233	1554	0	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.6	20.6	37.6	18.6	0.0	30.3
Incr Delay (d2), s/veh	0.7	4.5	1.3	4.9	0.0	9.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.9	6.2	18.0	0.0	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.4	25.0	38.9	23.5	0.0	39.6
LnGrp LOS	C	C	D	C	A	D
Approach Vol, veh/h	1461			1494	470	
Approach Delay, s/veh	25.5			29.2	39.6	
Approach LOS	C			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	59.1	36.0	22.1	37.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	77.8	29.8	33.4	39.8
Max Q Clear Time (g_c+I1), s	43.6	31.8	16.5	27.3
Green Ext Time (p_c), s	9.3	0.0	1.0	2.6

Intersection Summary	
HCM 6th Ctrl Delay	29.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	893	44	31	649	4	22	0	52	10	0	17
Future Vol, veh/h	5	893	44	31	649	4	22	0	52	10	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	100	-	-	0	-	-	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	971	48	34	705	4	24	0	57	11	0	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	705	0	0	1019	0	0	1426	-	510	1271	1804	355
Stage 1	-	-	-	-	-	-	1005	-	-	775	775	-
Stage 2	-	-	-	-	-	-	421	-	-	496	1029	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	*1238	-	-	689	-	-	*173	0	514	243	105	*825
Stage 1	-	-	-	-	-	-	*263	0	-	718	641	-
Stage 2	-	-	-	-	-	-	*778	0	-	529	314	-
Platoon blocked, %	1	-	-		-	-	1			1	1	1
Mov Cap-1 Maneuver	*1238	-	-	689	-	-	*162	-	514	208	99	*825
Mov Cap-2 Maneuver	-	-	-	-	-	-	*162	-	-	208	99	-
Stage 1	-	-	-	-	-	-	*262	-	-	715	610	-
Stage 2	-	-	-	-	-	-	*723	-	-	469	313	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.5	18.3	14.9
HCM LOS			C	B

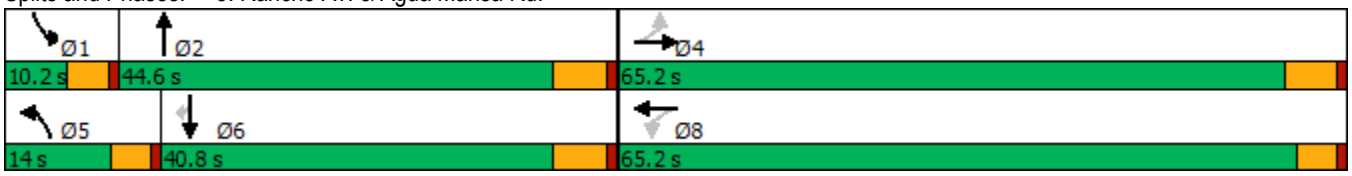
Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	162	514	* 1238	-	-	689	-	-	393
HCM Lane V/C Ratio	0.148	0.11	0.004	-	-	0.049	-	-	0.075
HCM Control Delay (s)	31	12.9	7.9	-	-	10.5	-	-	14.9
HCM Lane LOS	D	B	A	-	-	B	-	-	B
HCM 95th %tile Q(veh)	0.5	0.4	0	-	-	0.2	-	-	0.2

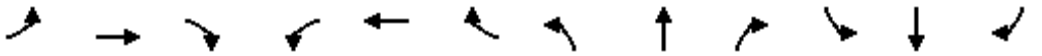
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	598	114	5	32	108	601	16	939	233
Future Volume (vph)	598	114	5	32	108	601	16	939	233
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8	20.8
Total Split (s)	65.2	65.2	65.2	65.2	14.0	44.6	10.2	40.8	40.8
Total Split (%)	54.3%	54.3%	54.3%	54.3%	11.7%	37.2%	8.5%	34.0%	34.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		4.6	4.6	5.8	4.6	5.8	5.8
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	59.4	59.4		60.6	9.3	44.7	5.4	34.9	34.9
Actuated g/C Ratio	0.50	0.50		0.51	0.08	0.37	0.05	0.29	0.29
v/c Ratio	0.99	0.38		0.06	0.87	0.48	0.22	0.95	0.46
Control Delay	63.3	13.8		12.3	104.6	30.9	62.4	60.1	23.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.3	13.8		12.3	104.6	30.9	62.4	60.1	23.3
LOS	E	B		B	F	C	E	E	C
Approach Delay		45.8		12.3		42.1		52.9	
Approach LOS		D		B		D		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.8	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 47.3	Intersection LOS: D
Intersection Capacity Utilization 87.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	114	212	5	32	12	108	601	3	16	939	233
Future Volume (veh/h)	598	114	212	5	32	12	108	601	3	16	939	233
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	636	121	199	5	34	11	115	639	3	17	999	201
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	712	318	524	93	609	189	135	1301	6	31	1054	470
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.08	0.35	0.35	0.02	0.29	0.29
Sat Flow, veh/h	1310	646	1063	120	1236	383	1714	3685	17	1714	3610	1610
Grp Volume(v), veh/h	636	0	320	50	0	0	115	313	329	17	999	201
Grp Sat Flow(s),veh/h/ln	1310	0	1709	1739	0	0	1714	1805	1897	1714	1805	1610
Q Serve(g_s), s	54.3	0.0	13.9	0.0	0.0	0.0	7.9	16.2	16.2	1.2	32.2	12.0
Cycle Q Clear(g_c), s	56.0	0.0	13.9	1.7	0.0	0.0	7.9	16.2	16.2	1.2	32.2	12.0
Prop In Lane	1.00		0.62	0.10		0.22	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	712	0	842	890	0	0	135	637	670	31	1054	470
V/C Ratio(X)	0.89	0.00	0.38	0.06	0.00	0.00	0.85	0.49	0.49	0.55	0.95	0.43
Avail Cap(c_a), veh/h	720	0	853	918	0	0	135	637	670	81	1062	474
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.2	0.0	18.8	15.7	0.0	0.0	54.1	30.1	30.1	58.0	41.2	34.1
Incr Delay (d2), s/veh	13.5	0.0	0.3	0.0	0.0	0.0	35.5	0.6	0.6	5.5	16.5	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.8	0.0	5.3	0.7	0.0	0.0	4.6	6.9	7.2	0.5	16.1	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	0.0	19.1	15.8	0.0	0.0	89.7	30.7	30.7	63.5	57.7	34.7
LnGrp LOS	D	A	B	B	A	A	F	C	C	E	E	C
Approach Vol, veh/h		956			50			757			1217	
Approach Delay, s/veh		34.9			15.8			39.7			54.0	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.7	47.8		64.5	14.0	40.6		64.5				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.6	38.8		59.4	9.4	35.0		* 61				
Max Q Clear Time (g_c+I1), s	3.2	18.2		58.0	9.9	34.2		3.7				
Green Ext Time (p_c), s	0.0	3.4		0.7	0.0	0.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		43.6	
HCM 6th LOS		D	

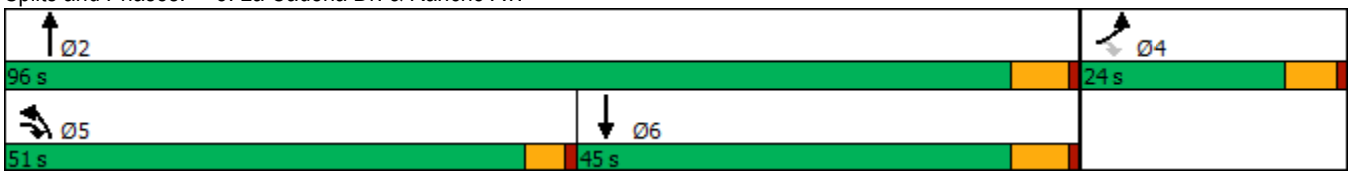
Notes

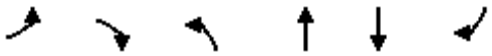
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	35	799	510	688	848
Future Volume (vph)	35	799	510	688	848
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	4	5	5	2	6
Permitted Phases		4			
Detector Phase	4	5	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	15.8	9.6	9.6	16.2	39.2
Total Split (s)	24.0	51.0	51.0	96.0	45.0
Total Split (%)	20.0%	42.5%	42.5%	80.0%	37.5%
Yellow Time (s)	4.8	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.1	58.2	39.1	77.3	33.5
Actuated g/C Ratio	0.13	0.57	0.38	0.75	0.33
v/c Ratio	0.82	0.54	0.90	0.29	0.84
Control Delay	21.4	16.3	50.9	4.4	41.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.4	16.3	50.9	4.4	41.6
LOS	C	B	D	A	D
Approach Delay	18.9			24.2	41.6
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 102.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 27.9	Intersection LOS: C
Intersection Capacity Utilization 93.9%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	799	510	688	848	13
Future Volume (veh/h)	35	799	510	688	848	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	730	526	709	874	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	287	1546	552	2301	1006	13
Arrive On Green	0.00	0.18	0.36	0.71	0.31	0.31
Sat Flow, veh/h	1629	2898	1543	3335	3371	41
Grp Volume(v), veh/h	0	730	526	709	432	453
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1703
Q Serve(g_s), s	0.0	16.2	34.4	8.4	26.0	26.0
Cycle Q Clear(g_c), s	0.0	16.2	34.4	8.4	26.0	26.0
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	287	1546	552	2301	497	521
V/C Ratio(X)	0.00	0.47	0.95	0.31	0.87	0.87
Avail Cap(c_a), veh/h	287	1546	692	2820	609	639
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	15.0	32.4	5.6	33.9	33.9
Incr Delay (d2), s/veh	0.0	0.2	19.4	0.1	11.0	10.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	15.4	14.7	2.1	11.0	11.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	15.3	51.8	5.7	45.0	44.5
LnGrp LOS	A	B	D	A	D	D
Approach Vol, veh/h	730			1235	885	
Approach Delay, s/veh	15.3			25.3	44.7	
Approach LOS	B			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		79.5		24.0	41.6	37.9
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		89.8		18.2	46.4	38.8
Max Q Clear Time (g_c+I1), s		10.4		18.2	36.4	28.0
Green Ext Time (p_c), s		4.9		0.0	0.6	3.6

Intersection Summary	
HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	496	496	1053	317	496	1384
Future Volume (vph)	496	496	1053	317	496	1384
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	38.3	38.3	41.5	41.5	40.2	81.7
Total Split (%)	31.9%	31.9%	34.6%	34.6%	33.5%	68.1%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	32.5	32.5	35.3	35.3	35.6	75.5
Actuated g/C Ratio	0.27	0.27	0.29	0.29	0.30	0.63
v/c Ratio	0.57	0.83	1.02	0.49	1.01	0.63
Control Delay	55.7	50.2	75.7	10.1	84.4	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	50.2	75.7	10.1	84.4	15.2
LOS	E	D	E	B	F	B
Approach Delay	52.9		60.5			33.4
Approach LOS	D		E			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 46.7	Intersection LOS: D
Intersection Capacity Utilization 86.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	496	496	1053	317	496	1384
Future Volume (veh/h)	496	496	1053	317	496	1384
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	511	0	1086	250	511	1427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	901		1062	474	509	2271
Arrive On Green	0.27	0.00	0.29	0.29	0.30	0.63
Sat Flow, veh/h	3326	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	511	0	1086	250	511	1427
Grp Sat Flow(s),veh/h/ln	1663	1610	1805	1610	1714	1805
Q Serve(g_s), s	15.9	0.0	35.3	15.6	35.6	29.1
Cycle Q Clear(g_c), s	15.9	0.0	35.3	15.6	35.6	29.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	901		1062	474	509	2271
V/C Ratio(X)	0.57		1.02	0.53	1.00	0.63
Avail Cap(c_a), veh/h	901		1062	474	509	2271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.61	0.61	0.59	0.59
Uniform Delay (d), s/veh	37.7	0.0	42.3	35.4	42.2	13.6
Incr Delay (d2), s/veh	2.6	0.0	27.5	0.7	31.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	0.0	18.9	5.9	18.7	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.3	0.0	69.8	36.1	74.0	14.0
LnGrp LOS	D		F	D	F	B
Approach Vol, veh/h	511	A	1336			1938
Approach Delay, s/veh	40.3		63.5			29.8
Approach LOS	D		E			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	40.2	41.5				81.7	38.3
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	35.6	35.3				75.5	32.5
Max Q Clear Time (g_c+I1), s	37.6	37.3				31.1	17.9
Green Ext Time (p_c), s	0.0	0.0				13.2	0.9

Intersection Summary	
HCM 6th Ctrl Delay	43.1
HCM 6th LOS	D

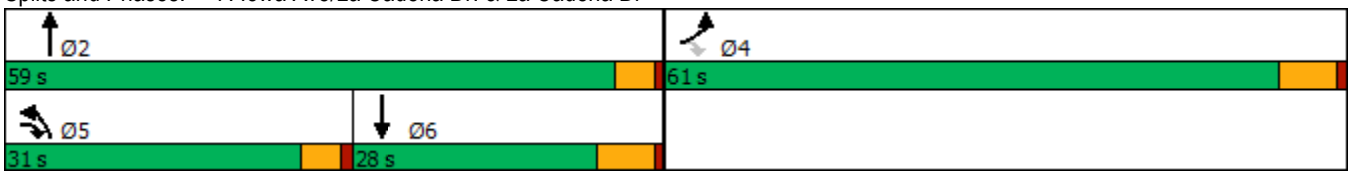
Notes

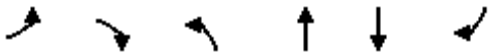
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	641	264	292	966	467	1427
Future Volume (vph)	641	264	292	966	467	1427
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	61.0	31.0	31.0	59.0	28.0	
Total Split (%)	50.8%	25.8%	25.8%	49.2%	23.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	45.0	73.5	22.1	47.2	18.6	103.4
Actuated g/C Ratio	0.44	0.71	0.21	0.46	0.18	1.00
v/c Ratio	0.90	0.24	0.83	0.61	0.75	0.55
Control Delay	44.4	5.8	61.1	24.0	50.1	0.8
Queue Delay	0.0	0.0	3.4	1.8	0.0	0.0
Total Delay	44.4	5.8	64.5	25.8	50.1	0.8
LOS	D	A	E	C	D	A
Approach Delay	33.1			34.8	13.0	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 103.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 81.6%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	641	264	292	966	467	1427
Future Volume (veh/h)	641	264	292	966	467	1427
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	668	232	304	1006	486	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	730	1007	342	1545	628	
Arrive On Green	0.43	0.43	0.20	0.43	0.17	0.00
Sat Flow, veh/h	1714	1610	1714	3705	3705	2685
Grp Volume(v), veh/h	668	232	304	1006	486	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1805	1805	1342
Q Serve(g_s), s	31.0	5.3	14.6	18.7	10.9	0.0
Cycle Q Clear(g_c), s	31.0	5.3	14.6	18.7	10.9	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	730	1007	342	1545	628	
V/C Ratio(X)	0.92	0.23	0.89	0.65	0.77	
Avail Cap(c_a), veh/h	1110	1364	535	2320	930	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	22.9	6.9	33.0	19.2	33.4	0.0
Incr Delay (d2), s/veh	8.3	0.1	7.5	0.5	2.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.3	0.0	6.3	6.8	4.6	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	31.1	7.1	40.5	19.7	35.8	0.0
LnGrp LOS	C	A	D	B	D	
Approach Vol, veh/h	900			1310	486	A
Approach Delay, s/veh	24.9			24.5	35.8	
Approach LOS	C			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		42.4		42.2	21.5	20.9
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 54		54.8	26.4	21.8
Max Q Clear Time (g_c+I1), s		20.7		33.0	16.6	12.9
Green Ext Time (p_c), s		7.4		3.0	0.3	1.9

Intersection Summary		
HCM 6th Ctrl Delay	26.7	
HCM 6th LOS	C	

Notes

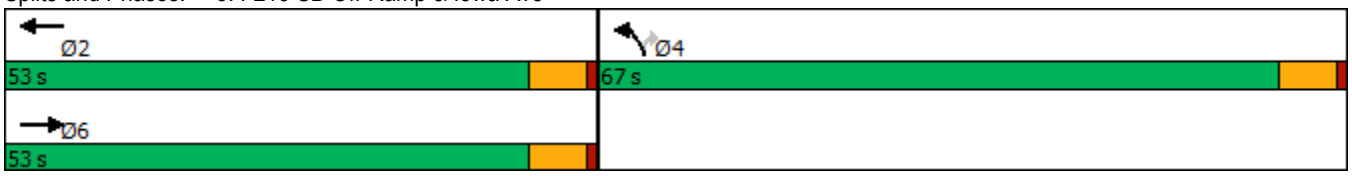
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	730	1097	162	711
Future Volume (vph)	730	1097	162	711
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	53.0	53.0	67.0	67.0
Total Split (%)	44.2%	44.2%	55.8%	55.8%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	37.9	37.9	47.7	47.7
Actuated g/C Ratio	0.38	0.38	0.48	0.48
v/c Ratio	0.54	0.82	0.19	0.89
Control Delay	26.5	34.1	15.9	35.6
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	27.0	34.1	15.9	35.6
LOS	C	C	B	D
Approach Delay	27.0	34.1	32.0	
Approach LOS	C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 98.8	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 31.5	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	730	0	0	1097	162	711
Future Volume (veh/h)	730	0	0	1097	162	711
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	753	0	0	1131	167	615
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1466	0	0	1466	770	685
Arrive On Green	0.41	0.00	0.00	0.41	0.43	0.43
Sat Flow, veh/h	3800	0	0	3800	1810	1610
Grp Volume(v), veh/h	753	0	0	1131	167	615
Grp Sat Flow(s),veh/h/ln	1805	0	0	1805	1810	1610
Q Serve(g_s), s	11.5	0.0	0.0	20.0	4.3	26.2
Cycle Q Clear(g_c), s	11.5	0.0	0.0	20.0	4.3	26.2
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1466	0	0	1466	770	685
V/C Ratio(X)	0.51	0.00	0.00	0.77	0.22	0.90
Avail Cap(c_a), veh/h	2292	0	0	2292	1493	1328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	0.0	0.0	18.9	13.4	19.7
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.1	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.0	7.1	1.7	9.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.7	0.0	0.0	19.8	13.5	24.2
LnGrp LOS	B	A	A	B	B	C
Approach Vol, veh/h	753			1131	782	
Approach Delay, s/veh	16.7			19.8	21.9	
Approach LOS	B			B	C	

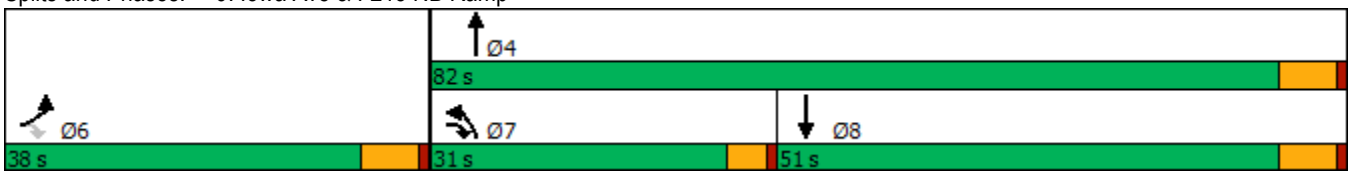
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.1		37.6		36.1
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		46.8		60.8		46.8
Max Q Clear Time (g_c+I1), s		22.0		28.2		13.5
Green Ext Time (p_c), s		8.0		3.2		5.0

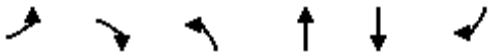
Intersection Summary		
HCM 6th Ctrl Delay		19.6
HCM 6th LOS		B

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	311	1130	584	1003	75
Future Volume (vph)	311	1130	584	1003	75
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	6	7	7	4	8
Permitted Phases		6			
Detector Phase	6	7	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	9.6	16.2	16.2
Total Split (s)	38.0	31.0	31.0	82.0	51.0
Total Split (%)	31.7%	25.8%	25.8%	68.3%	42.5%
Yellow Time (s)	5.2	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	Max	None	None	Min	Min
Act Effct Green (s)	32.2	60.9	22.3	62.9	35.9
Actuated g/C Ratio	0.30	0.57	0.21	0.58	0.33
v/c Ratio	0.59	0.55	0.82	0.92	0.78
Control Delay	40.1	1.9	51.8	34.0	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	1.9	51.8	34.0	21.7
LOS	D	A	D	C	C
Approach Delay	10.1			40.6	21.7
Approach LOS	B			D	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 107.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 84.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	1130	584	1003	75	513
Future Volume (veh/h)	311	1130	584	1003	75	513
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	317	847	596	1023	77	436
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	538	1386	673	1115	87	493
Arrive On Green	0.30	0.30	0.19	0.59	0.35	0.35
Sat Flow, veh/h	1810	2834	3510	1900	247	1401
Grp Volume(v), veh/h	317	847	596	1023	0	513
Grp Sat Flow(s),veh/h/ln	1810	1417	1755	1900	0	1648
Q Serve(g_s), s	16.0	23.3	17.7	51.6	0.0	31.3
Cycle Q Clear(g_c), s	16.0	23.3	17.7	51.6	0.0	31.3
Prop In Lane	1.00	1.00	1.00			0.85
Lane Grp Cap(c), veh/h	538	1386	673	1115	0	580
V/C Ratio(X)	0.59	0.61	0.89	0.92	0.00	0.88
Avail Cap(c_a), veh/h	538	1386	867	1347	0	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.0	19.9	42.1	19.8	0.0	32.6
Incr Delay (d2), s/veh	4.7	2.0	7.7	9.0	0.0	11.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.4	8.3	23.6	0.0	14.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	21.9	49.8	28.8	0.0	44.2
LnGrp LOS	D	C	D	C	A	D
Approach Vol, veh/h	1164			1619	513	
Approach Delay, s/veh	25.9			36.5	44.2	
Approach LOS	C			D	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	68.9	38.0	25.1	43.8
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	75.8	31.8	26.4	44.8
Max Q Clear Time (g_c+I1), s	53.6	25.3	19.7	33.3
Green Ext Time (p_c), s	9.2	2.7	0.8	2.8

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	789	12	9	945	14	25	0	19	3	0	21
Future Vol, veh/h	12	789	12	9	945	14	25	0	19	3	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	None	-	-	None
Storage Length	100	-	-	0	-	-	0	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	92	92	97	97	92	92	92	97	92	97
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	12	813	13	10	974	14	27	0	21	3	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	974	0	0	826	0	0	1351	-	413	1432	1851	494
Stage 1	-	-	-	-	-	-	844	-	-	1001	1001	-
Stage 2	-	-	-	-	-	-	507	-	-	431	850	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.5	-	6.9	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	-	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	-	-	6.5	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	-	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	*1045	-	-	813	-	-	*334	0	594	*272	*119	*696
Stage 1	-	-	-	-	-	-	*328	0	-	*656	*574	-
Stage 2	-	-	-	-	-	-	*656	0	-	*578	*380	-
Platoon blocked, %	1	-	-		-	-	1			1	1	1
Mov Cap-1 Maneuver	*1045	-	-	813	-	-	*318	-	594	*257	*116	*696
Mov Cap-2 Maneuver	-	-	-	-	-	-	*318	-	-	*257	*116	-
Stage 1	-	-	-	-	-	-	*324	-	-	*649	*568	-
Stage 2	-	-	-	-	-	-	*628	-	-	*551	*376	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	14.8	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	318	594	* 1045	-	-	813	-	-	574
HCM Lane V/C Ratio	0.085	0.035	0.012	-	-	0.012	-	-	0.043
HCM Control Delay (s)	17.4	11.3	8.5	-	-	9.5	-	-	11.6
HCM Lane LOS	C	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0.1	0	-	-	0	-	-	0.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX 7.10:

HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION OPERATIONS ANALYSIS WORKSHEETS WITH IMPROVEMENTS

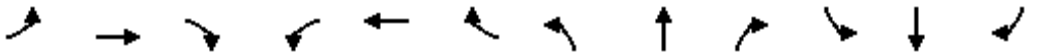
This Page Intentionally Left Blank

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	237	22	5	39	170	475	40	987	801
Future Volume (vph)	237	22	5	39	170	475	40	987	801
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8	20.8
Total Split (s)	35.0	35.0	35.0	35.0	22.0	73.0	12.0	63.0	63.0
Total Split (%)	29.2%	29.2%	29.2%	29.2%	18.3%	60.8%	10.0%	52.5%	52.5%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		4.6	4.6	5.8	4.6	5.8	5.8
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	24.5	24.5		25.8	14.8	61.7	6.7	48.3	48.3
Actuated g/C Ratio	0.23	0.23		0.25	0.14	0.59	0.06	0.46	0.46
v/c Ratio	0.81	0.26		0.14	0.77	0.25	0.39	0.64	0.89
Control Delay	60.5	12.6		28.7	67.8	11.9	64.1	24.0	24.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	12.6		28.7	67.8	11.9	64.1	24.0	24.9
LOS	E	B		C	E	B	E	C	C
Approach Delay		45.1		28.7		26.5		25.3	
Approach LOS		D		C		C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 28.0	Intersection LOS: C
Intersection Capacity Utilization 80.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	237	22	91	5	39	15	170	475	7	40	987	801
Future Volume (veh/h)	237	22	91	5	39	15	170	475	7	40	987	801
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	258	24	89	5	42	14	185	516	7	43	1073	654
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	368	76	283	53	289	89	218	2100	28	61	1750	781
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.13	0.58	0.58	0.04	0.48	0.48
Sat Flow, veh/h	1297	353	1311	52	1336	413	1714	3647	49	1714	3610	1610
Grp Volume(v), veh/h	258	0	113	61	0	0	185	255	268	43	1073	654
Grp Sat Flow(s),veh/h/ln	1297	0	1664	1802	0	0	1714	1805	1891	1714	1805	1610
Q Serve(g_s), s	14.7	0.0	5.4	0.0	0.0	0.0	9.9	6.6	6.6	2.3	20.5	33.1
Cycle Q Clear(g_c), s	17.3	0.0	5.4	2.6	0.0	0.0	9.9	6.6	6.6	2.3	20.5	33.1
Prop In Lane	1.00		0.79	0.08		0.23	1.00		0.03	1.00		1.00
Lane Grp Cap(c), veh/h	368	0	359	430	0	0	218	1040	1089	61	1750	781
V/C Ratio(X)	0.70	0.00	0.31	0.14	0.00	0.00	0.85	0.25	0.25	0.70	0.61	0.84
Avail Cap(c_a), veh/h	490	0	517	619	0	0	317	1289	1351	135	2195	979
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.4	0.0	31.0	29.9	0.0	0.0	40.2	9.8	9.9	44.8	17.8	21.0
Incr Delay (d2), s/veh	2.9	0.0	0.5	0.1	0.0	0.0	9.6	0.1	0.1	5.3	0.4	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	2.1	1.1	0.0	0.0	4.6	2.3	2.4	1.0	7.6	12.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.3	0.0	31.5	30.1	0.0	0.0	49.7	10.0	10.0	50.1	18.1	26.3
LnGrp LOS	D	A	C	C	A	A	D	A	A	D	B	C
Approach Vol, veh/h		371			61			708			1770	
Approach Delay, s/veh		36.2			30.1			20.4			21.9	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.0	60.0		26.1	16.5	51.4		26.1				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	7.4	67.2		29.2	17.4	57.2		* 30				
Max Q Clear Time (g_c+I1), s	4.3	8.6		19.3	11.9	35.1		4.6				
Green Ext Time (p_c), s	0.0	3.0		1.0	0.1	10.5		0.3				

Intersection Summary		
HCM 6th Ctrl Delay		23.5
HCM 6th LOS		C

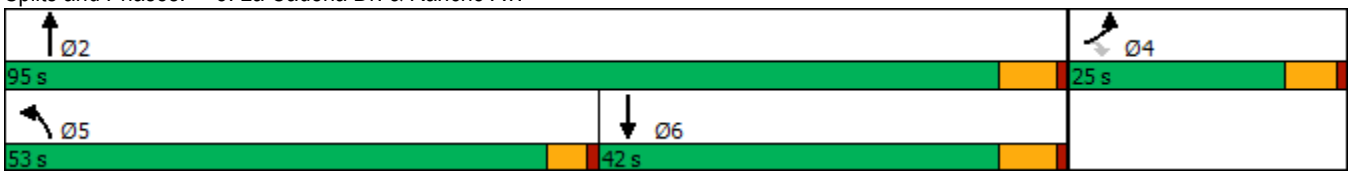
Notes

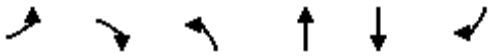
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	19	671	494	669	704
Future Volume (vph)	19	671	494	669	704
Turn Type	Prot	Perm	Prot	NA	NA
Protected Phases	4		5	2	6
Permitted Phases		4			
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	5.0	10.0	10.0
Minimum Split (s)	15.8	15.8	9.6	16.2	39.2
Total Split (s)	25.0	25.0	53.0	95.0	42.0
Total Split (%)	20.8%	20.8%	44.2%	79.2%	35.0%
Yellow Time (s)	4.8	4.8	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	4.6	6.2	6.2
Lead/Lag			Lead		Lag
Lead-Lag Optimize?			Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	12.6	12.6	35.0	66.7	26.8
Actuated g/C Ratio	0.14	0.14	0.38	0.73	0.29
v/c Ratio	0.72	0.71	0.86	0.29	0.76
Control Delay	15.7	13.8	42.9	4.6	37.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	13.8	42.9	4.6	37.0
LOS	B	B	D	A	D
Approach Delay	14.8			20.9	37.0
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 91.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 23.7	Intersection LOS: C
Intersection Capacity Utilization 84.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	671	494	669	704	6
Future Volume (veh/h)	19	671	494	669	704	6
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	588	504	683	718	6
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	341	607	534	2144	870	7
Arrive On Green	0.00	0.21	0.35	0.66	0.26	0.26
Sat Flow, veh/h	1629	2898	1543	3335	3387	28
Grp Volume(v), veh/h	0	588	504	683	353	371
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1705
Q Serve(g_s), s	0.0	18.5	29.1	8.3	18.8	18.8
Cycle Q Clear(g_c), s	0.0	18.5	29.1	8.3	18.8	18.8
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	341	607	534	2144	428	449
V/C Ratio(X)	0.00	0.97	0.94	0.32	0.83	0.83
Avail Cap(c_a), veh/h	341	607	814	3146	634	666
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	36.0	29.1	6.7	31.8	31.8
Incr Delay (d2), s/veh	0.0	28.8	11.6	0.1	5.7	5.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	2.4	11.4	2.1	7.4	7.8
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	64.8	40.7	6.8	37.4	37.2
LnGrp LOS	A	E	D	A	D	D
Approach Vol, veh/h	588			1187	724	
Approach Delay, s/veh	64.8			21.2	37.3	
Approach LOS	E			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		66.7		25.0	36.3	30.4
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		88.8		19.2	48.4	35.8
Max Q Clear Time (g_c+I1), s		10.3		20.5	31.1	20.8
Green Ext Time (p_c), s		4.7		0.0	0.7	3.4

Intersection Summary	
HCM 6th Ctrl Delay	36.1
HCM 6th LOS	D

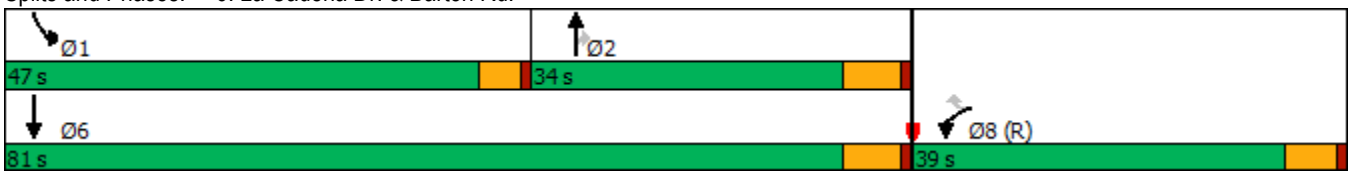
Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	323	375	790	397	572	1399
Future Volume (vph)	323	375	790	397	572	1399
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	39.0	39.0	34.0	34.0	47.0	81.0
Total Split (%)	32.5%	32.5%	28.3%	28.3%	39.2%	67.5%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	33.2	33.2	27.8	27.8	42.4	74.8
Actuated g/C Ratio	0.28	0.28	0.23	0.23	0.35	0.62
v/c Ratio	0.38	0.61	1.00	0.61	1.01	0.66
Control Delay	31.4	11.6	78.4	8.5	77.8	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	11.6	78.4	8.5	77.8	16.3
LOS	C	B	E	A	E	B
Approach Delay	20.7		55.1			34.2
Approach LOS	C		E			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 78 (65%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 38.2	Intersection LOS: D
Intersection Capacity Utilization 78.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	323	375	790	397	572	1399
Future Volume (veh/h)	323	375	790	397	572	1399
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	344	0	840	385	609	1488
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	920		836	373	606	2250
Arrive On Green	0.28	0.00	0.23	0.23	0.35	0.62
Sat Flow, veh/h	3326	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	344	0	840	385	609	1488
Grp Sat Flow(s),veh/h/ln	1663	1610	1805	1610	1714	1805
Q Serve(g_s), s	10.0	0.0	27.8	27.8	42.4	31.7
Cycle Q Clear(g_c), s	10.0	0.0	27.8	27.8	42.4	31.7
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	920		836	373	606	2250
V/C Ratio(X)	0.37		1.00	1.03	1.01	0.66
Avail Cap(c_a), veh/h	920		836	373	606	2250
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.83	0.83	0.58	0.58
Uniform Delay (d), s/veh	35.0	0.0	46.1	46.1	38.8	14.5
Incr Delay (d2), s/veh	1.2	0.0	29.4	51.0	29.2	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.2	0.0	15.3	15.9	21.5	11.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.2	0.0	75.5	97.1	68.0	14.9
LnGrp LOS	D		F	F	F	B
Approach Vol, veh/h	344	A	1225			2097
Approach Delay, s/veh	36.2		82.3			30.3
Approach LOS	D		F			C

Timer - Assigned Phs	1	2				6	8
Phs Duration (G+Y+Rc), s	47.0	34.0				81.0	39.0
Change Period (Y+Rc), s	4.6	6.2				6.2	5.8
Max Green Setting (Gmax), s	42.4	27.8				74.8	33.2
Max Q Clear Time (g_c+I1), s	44.4	29.8				33.7	12.0
Green Ext Time (p_c), s	0.0	0.0				13.9	0.6

Intersection Summary	
HCM 6th Ctrl Delay	48.2
HCM 6th LOS	D

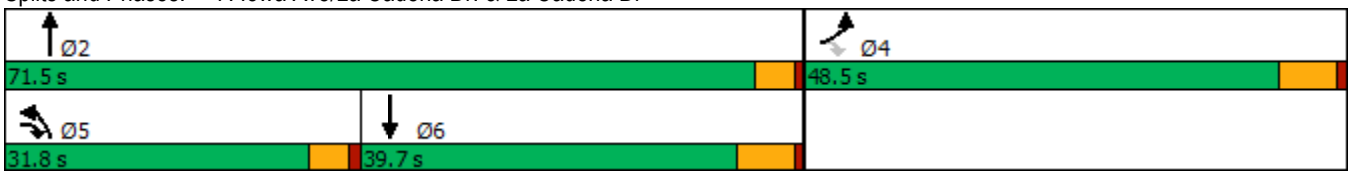
Notes

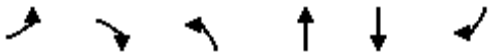
Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	398	217	233	809	717	1195
Future Volume (vph)	398	217	233	809	717	1195
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	48.5	31.8	31.8	71.5	39.7	
Total Split (%)	40.4%	26.5%	26.5%	59.6%	33.1%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	27.6	51.7	17.5	48.8	24.6	87.9
Actuated g/C Ratio	0.31	0.59	0.20	0.56	0.28	1.00
v/c Ratio	0.76	0.24	0.70	0.42	0.73	0.46
Control Delay	39.2	9.6	47.6	12.6	35.3	0.6
Queue Delay	0.0	0.0	0.1	0.2	0.0	0.0
Total Delay	39.2	9.6	47.7	12.8	35.3	0.6
LOS	D	A	D	B	D	A
Approach Delay	28.7			20.6	13.6	
Approach LOS	C			C	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 87.9	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 18.2	Intersection LOS: B
Intersection Capacity Utilization 70.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	398	217	233	809	717	1195
Future Volume (veh/h)	398	217	233	809	717	1195
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	410	198	240	834	739	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	488	729	288	1888	1022	
Arrive On Green	0.28	0.28	0.17	0.52	0.28	0.00
Sat Flow, veh/h	1714	1610	1714	3705	3705	2685
Grp Volume(v), veh/h	410	198	240	834	739	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1805	1805	1342
Q Serve(g_s), s	14.5	4.9	8.7	9.2	11.9	0.0
Cycle Q Clear(g_c), s	14.5	4.9	8.7	9.2	11.9	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	488	729	288	1888	1022	
V/C Ratio(X)	0.84	0.27	0.83	0.44	0.72	
Avail Cap(c_a), veh/h	1126	1328	724	3750	1878	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	21.7	11.0	25.9	9.5	20.8	0.0
Incr Delay (d2), s/veh	4.0	0.2	2.4	0.2	1.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	3.3	2.6	4.3	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	25.6	11.2	28.3	9.7	21.8	0.0
LnGrp LOS	C	B	C	A	C	
Approach Vol, veh/h	608			1074	739	A
Approach Delay, s/veh	20.9			13.9	21.8	
Approach LOS	C			B	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		39.9		24.5	15.4	24.4
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 67		42.3	27.2	33.5
Max Q Clear Time (g_c+I1), s		11.2		16.5	10.7	13.9
Green Ext Time (p_c), s		6.0		1.8	0.3	4.4

Intersection Summary		
HCM 6th Ctrl Delay		18.1
HCM 6th LOS		B

Notes

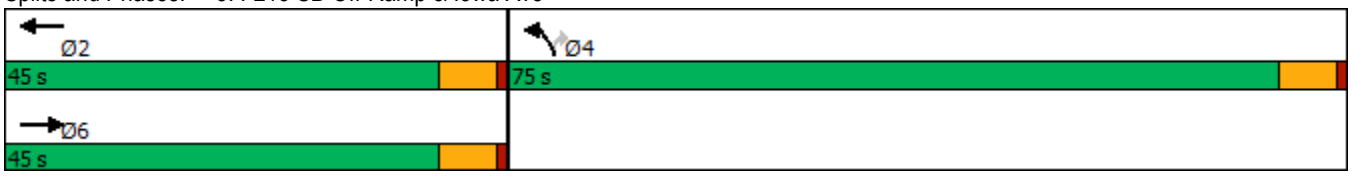
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	929	916	123	805
Future Volume (vph)	929	916	123	805
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	45.0	45.0	75.0	75.0
Total Split (%)	37.5%	37.5%	62.5%	62.5%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	35.2	35.2	62.1	62.1
Actuated g/C Ratio	0.32	0.32	0.56	0.56
v/c Ratio	0.86	0.85	0.13	0.94
Control Delay	44.9	44.1	12.0	42.0
Queue Delay	49.7	0.0	0.0	0.0
Total Delay	94.7	44.1	12.0	42.0
LOS	F	D	B	D
Approach Delay	94.7	44.1	38.0	
Approach LOS	F	D	D	

Intersection Summary			
Cycle Length: 120			
Actuated Cycle Length: 110			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 59.0		Intersection LOS: E	
Intersection Capacity Utilization 85.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	929	0	0	916	123	805
Future Volume (veh/h)	929	0	0	916	123	805
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	999	0	0	985	134	724
Peak Hour Factor	0.93	0.93	0.93	0.93	0.92	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1265	0	0	1265	888	790
Arrive On Green	0.35	0.00	0.00	0.35	0.49	0.49
Sat Flow, veh/h	3800	0	0	3800	1810	1610
Grp Volume(v), veh/h	999	0	0	985	134	724
Grp Sat Flow(s),veh/h/ln	1805	0	0	1805	1810	1610
Q Serve(g_s), s	19.4	0.0	0.0	19.0	3.2	32.4
Cycle Q Clear(g_c), s	19.4	0.0	0.0	19.0	3.2	32.4
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1265	0	0	1265	888	790
V/C Ratio(X)	0.79	0.00	0.00	0.78	0.15	0.92
Avail Cap(c_a), veh/h	1796	0	0	1796	1597	1421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	22.7	0.0	0.0	22.6	10.9	18.4
Incr Delay (d2), s/veh	1.6	0.0	0.0	1.4	0.1	5.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	0.0	0.0	7.2	1.2	12.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.3	0.0	0.0	24.1	11.0	23.5
LnGrp LOS	C	A	A	C	B	C
Approach Vol, veh/h	999			985	858	
Approach Delay, s/veh	24.3			24.1	21.5	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		33.5		44.5		33.5
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		38.8		68.8		38.8
Max Q Clear Time (g_c+I1), s		21.0		34.4		21.4
Green Ext Time (p_c), s		5.9		3.8		5.9

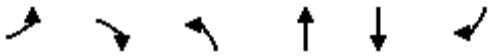
Intersection Summary		
HCM 6th Ctrl Delay		23.4
HCM 6th LOS		C

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	266	1468	512	877	97
Future Volume (vph)	266	1468	512	877	97
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	6	7	7	4	8
Permitted Phases		6			
Detector Phase	6	7	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	9.6	16.2	16.2
Total Split (s)	36.0	38.0	38.0	84.0	46.0
Total Split (%)	30.0%	31.7%	31.7%	70.0%	38.3%
Yellow Time (s)	5.2	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.9	49.2	22.5	54.1	26.6
Actuated g/C Ratio	0.23	0.56	0.26	0.62	0.30
v/c Ratio	0.70	0.73	0.61	0.80	0.83
Control Delay	43.6	4.7	33.7	19.2	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	4.7	33.7	19.2	31.8
LOS	D	A	C	B	C
Approach Delay	10.7			24.6	31.8
Approach LOS	B			C	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 87.5	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 18.9	Intersection LOS: B
Intersection Capacity Utilization 90.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	266	1468	512	877	97	404
Future Volume (veh/h)	266	1468	512	877	97	404
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	286	1175	551	943	104	375
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	567	1409	645	1057	117	423
Arrive On Green	0.31	0.31	0.18	0.56	0.32	0.32
Sat Flow, veh/h	1810	2834	3510	1900	362	1304
Grp Volume(v), veh/h	286	1175	551	943	0	479
Grp Sat Flow(s),veh/h/ln	1810	1417	1755	1900	0	1665
Q Serve(g_s), s	12.3	29.8	14.5	41.6	0.0	26.0
Cycle Q Clear(g_c), s	12.3	29.8	14.5	41.6	0.0	26.0
Prop In Lane	1.00	1.00	1.00			0.78
Lane Grp Cap(c), veh/h	567	1409	645	1057	0	540
V/C Ratio(X)	0.50	0.83	0.85	0.89	0.00	0.89
Avail Cap(c_a), veh/h	567	1409	1233	1554	0	697
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	26.6	20.6	37.6	18.6	0.0	30.5
Incr Delay (d2), s/veh	0.7	4.5	1.3	4.9	0.0	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.9	6.2	18.0	0.0	11.7
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	27.4	25.0	38.9	23.5	0.0	41.5
LnGrp LOS	C	C	D	C	A	D
Approach Vol, veh/h	1461			1494	479	
Approach Delay, s/veh	25.5			29.2	41.5	
Approach LOS	C			C	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	59.1	36.0	22.1	37.0
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	77.8	29.8	33.4	39.8
Max Q Clear Time (g_c+I1), s	43.6	31.8	16.5	28.0
Green Ext Time (p_c), s	9.3	0.0	1.0	2.6

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	15	954	657	9	13	19
Future Vol, veh/h	15	954	657	9	13	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	16	1037	714	10	14	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	714	0	-	0	1270	362
Stage 1	-	-	-	-	719	-
Stage 2	-	-	-	-	551	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*1238	-	-	-	*279	*825
Stage 1	-	-	-	-	*778	-
Stage 2	-	-	-	-	*547	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*1238	-	-	-	*276	*825
Mov Cap-2 Maneuver	-	-	-	-	*276	-
Stage 1	-	-	-	-	*768	-
Stage 2	-	-	-	-	*547	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	13.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 1238	-	-	-	456
HCM Lane V/C Ratio	0.013	-	-	-	0.076
HCM Control Delay (s)	7.9	-	-	-	13.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	964	2	7	659	18	1	0	2	0	0	6
Future Vol, veh/h	0	964	2	7	659	18	1	0	2	0	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	1048	2	8	716	20	1	0	2	0	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1050	0	0	1423	1801	525	-	-	368
Stage 1	-	-	-	-	-	-	1049	1049	-	-	-	-
Stage 2	-	-	-	-	-	-	374	752	-	-	-	-
Critical Hdwy	-	-	-	4.1	-	-	7.5	6.5	6.9	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	671	-	-	*174	105	502	0	0	*825
Stage 1	0	-	-	-	-	-	*247	307	-	0	0	-
Stage 2	0	-	-	-	-	-	*778	661	-	0	0	-
Platoon blocked, %		-	-		-	-	1	1				1
Mov Cap-1 Maneuver	-	-	-	671	-	-	*171	103	502	-	-	*825
Mov Cap-2 Maneuver	-	-	-	-	-	-	*171	103	-	-	-	-
Stage 1	-	-	-	-	-	-	*247	307	-	-	-	-
Stage 2	-	-	-	-	-	-	*762	653	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	16.9	9.4
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	305	-	-	671	-	-	825
HCM Lane V/C Ratio	0.011	-	-	0.011	-	-	0.008
HCM Control Delay (s)	16.9	-	-	10.4	-	-	9.4
HCM Lane LOS	C	-	-	B	-	-	A
HCM 95th %tile Q(veh)	0	-	-	0	-	-	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	959	7	7	683	1	3
Future Vol, veh/h	959	7	7	683	1	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1042	8	8	742	1	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1050	0	1433	525
Stage 1	-	-	-	-	1046	-
Stage 2	-	-	-	-	387	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	671	-	*204	502
Stage 1	-	-	-	-	*304	-
Stage 2	-	-	-	-	*778	-
Platoon blocked, %	-	-		-	1	
Mov Cap-1 Maneuver	-	-	671	-	*201	502
Mov Cap-2 Maneuver	-	-	-	-	*201	-
Stage 1	-	-	-	-	*304	-
Stage 2	-	-	-	-	*768	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	365	-	-	671	-
HCM Lane V/C Ratio	0.012	-	-	0.011	-
HCM Control Delay (s)	15	-	-	10.4	-
HCM Lane LOS	C	-	-	B	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	954	689	10	5	1
Future Vol, veh/h	8	954	689	10	5	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	1037	749	11	5	1

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	760	0	-	0	1292	380
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*1199	-	-	-	*289	*799
Stage 1	-	-	-	-	*753	-
Stage 2	-	-	-	-	*556	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*1199	-	-	-	*287	*799
Mov Cap-2 Maneuver	-	-	-	-	*287	-
Stage 1	-	-	-	-	*747	-
Stage 2	-	-	-	-	*556	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	16.4
HCM LOS			C

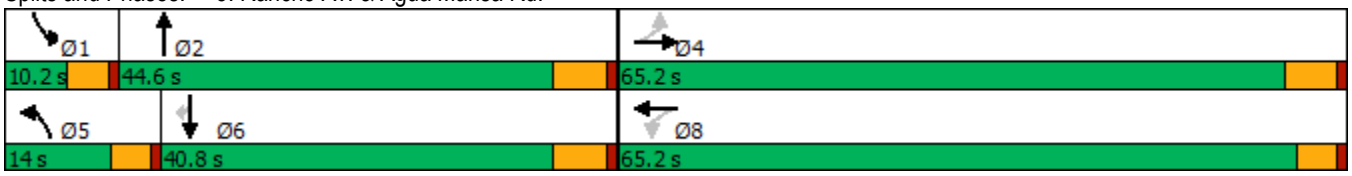
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 1199	-	-	-	321
HCM Lane V/C Ratio	0.007	-	-	-	0.02
HCM Control Delay (s)	8	-	-	-	16.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.1

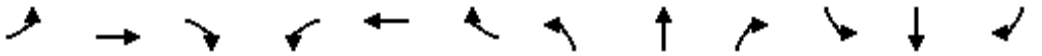
Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	598	114	5	32	111	607	16	941	233
Future Volume (vph)	598	114	5	32	111	607	16	941	233
Turn Type	Perm	NA	Perm	NA	Prot	NA	Prot	NA	Perm
Protected Phases		4		8	5	2	1	6	
Permitted Phases	4		8						6
Detector Phase	4	4	8	8	5	2	1	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0	5.0	10.0	10.0
Minimum Split (s)	23.8	23.8	14.6	14.6	9.6	20.8	9.6	20.8	20.8
Total Split (s)	65.2	65.2	65.2	65.2	14.0	44.6	10.2	40.8	40.8
Total Split (%)	54.3%	54.3%	54.3%	54.3%	11.7%	37.2%	8.5%	34.0%	34.0%
Yellow Time (s)	4.8	4.8	3.6	3.6	3.6	4.8	3.6	4.8	4.8
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8		4.6	4.6	5.8	4.6	5.8	5.8
Lead/Lag					Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min	Min
Act Effct Green (s)	59.4	59.4		60.6	9.4	44.9	5.4	35.0	35.0
Actuated g/C Ratio	0.50	0.50		0.50	0.08	0.37	0.04	0.29	0.29
v/c Ratio	0.99	0.38		0.06	0.89	0.48	0.22	0.95	0.46
Control Delay	63.7	13.8		12.3	107.4	31.0	62.4	60.3	23.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	13.8		12.3	107.4	31.0	62.4	60.3	23.3
LOS	E	B		B	F	C	E	E	C
Approach Delay		46.1		12.3		42.8		53.1	
Approach LOS		D		B		D		D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 47.6	Intersection LOS: D
Intersection Capacity Utilization 87.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 3: Rancho Av. & Agua Mansa Rd.





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	598	114	213	5	32	12	111	607	3	16	941	233
Future Volume (veh/h)	598	114	213	5	32	12	111	607	3	16	941	233
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1900	1900	1800	1900	1900	1800	1900	1900	1800	1900	1900
Adj Flow Rate, veh/h	636	121	200	5	34	11	118	646	3	17	1001	201
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	712	317	525	93	609	189	135	1301	6	31	1055	471
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.08	0.35	0.35	0.02	0.29	0.29
Sat Flow, veh/h	1310	644	1064	120	1236	383	1714	3685	17	1714	3610	1610
Grp Volume(v), veh/h	636	0	321	50	0	0	118	316	333	17	1001	201
Grp Sat Flow(s),veh/h/ln	1310	0	1708	1739	0	0	1714	1805	1897	1714	1805	1610
Q Serve(g_s), s	54.3	0.0	14.0	0.0	0.0	0.0	8.1	16.4	16.4	1.2	32.3	12.0
Cycle Q Clear(g_c), s	56.0	0.0	14.0	1.7	0.0	0.0	8.1	16.4	16.4	1.2	32.3	12.0
Prop In Lane	1.00		0.62	0.10		0.22	1.00		0.01	1.00		1.00
Lane Grp Cap(c), veh/h	712	0	842	890	0	0	135	637	670	31	1055	471
V/C Ratio(X)	0.89	0.00	0.38	0.06	0.00	0.00	0.87	0.50	0.50	0.55	0.95	0.43
Avail Cap(c_a), veh/h	720	0	852	918	0	0	135	637	670	81	1061	473
HCM 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
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.3	0.0	18.9	15.7	0.0	0.0	54.2	30.2	30.2	58.0	41.3	34.1
Incr Delay (d2), s/veh	13.5	0.0	0.3	0.0	0.0	0.0	40.6	0.6	0.6	5.5	16.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	18.8	0.0	5.3	0.7	0.0	0.0	4.9	6.9	7.3	0.5	16.2	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.8	0.0	19.1	15.8	0.0	0.0	94.8	30.8	30.8	63.5	58.0	34.7
LnGrp LOS	D	A	B	B	A	A	F	C	C	E	E	C
Approach Vol, veh/h		957			50			767			1219	
Approach Delay, s/veh		34.9			15.8			40.6			54.2	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.8	47.8		64.5	14.0	40.6		64.5				
Change Period (Y+Rc), s	4.6	5.8		5.8	4.6	5.8		* 5.8				
Max Green Setting (Gmax), s	5.6	38.8		59.4	9.4	35.0		* 61				
Max Q Clear Time (g_c+I1), s	3.2	18.4		58.0	10.1	34.3		3.7				
Green Ext Time (p_c), s	0.0	3.4		0.7	0.0	0.5		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		43.9	
HCM 6th LOS		D	

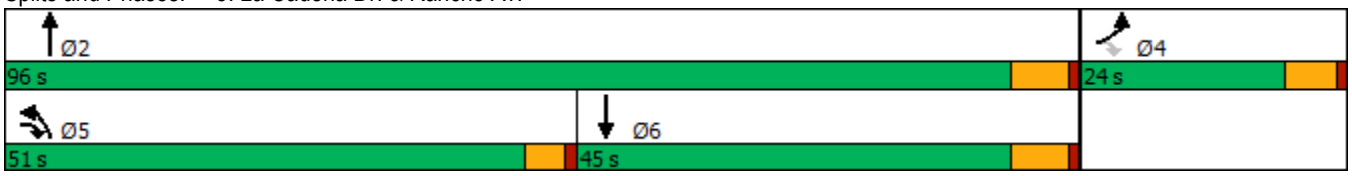
Notes

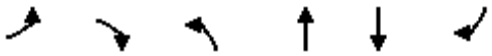
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	35	802	519	697	852
Future Volume (vph)	35	802	519	697	852
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	4	5	5	2	6
Permitted Phases		4			
Detector Phase	4	5	5	2	6
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	15.8	9.6	9.6	16.2	39.2
Total Split (s)	24.0	51.0	51.0	96.0	45.0
Total Split (%)	20.0%	42.5%	42.5%	80.0%	37.5%
Yellow Time (s)	4.8	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	None	None	None	None	None
Act Effct Green (s)	13.1	59.1	40.1	78.6	33.8
Actuated g/C Ratio	0.13	0.57	0.39	0.76	0.32
v/c Ratio	0.82	0.54	0.90	0.29	0.85
Control Delay	21.7	16.3	51.4	4.4	42.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	16.3	51.4	4.4	42.4
LOS	C	B	D	A	D
Approach Delay	19.0			24.4	42.4
Approach LOS	B			C	D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 94.7%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: La Cadena Dr. & Rancho Av.





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	802	519	697	852	13
Future Volume (veh/h)	35	802	519	697	852	13
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1710	1710	1620	1710	1710	1710
Adj Flow Rate, veh/h	0	733	535	719	878	11
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	282	1554	560	2315	1005	13
Arrive On Green	0.00	0.17	0.36	0.71	0.31	0.31
Sat Flow, veh/h	1629	2898	1543	3335	3371	41
Grp Volume(v), veh/h	0	733	535	719	434	455
Grp Sat Flow(s),veh/h/ln	1629	1449	1543	1625	1625	1703
Q Serve(g_s), s	0.0	16.5	35.5	8.6	26.6	26.6
Cycle Q Clear(g_c), s	0.0	16.5	35.5	8.6	26.6	26.6
Prop In Lane	1.00	1.00	1.00			0.02
Lane Grp Cap(c), veh/h	282	1554	560	2315	497	521
V/C Ratio(X)	0.00	0.47	0.96	0.31	0.87	0.87
Avail Cap(c_a), veh/h	282	1554	681	2777	600	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	0.0	15.1	32.6	5.6	34.5	34.5
Incr Delay (d2), s/veh	0.0	0.2	20.6	0.1	11.7	11.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	15.7	15.3	2.2	11.4	11.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	0.0	15.4	53.2	5.6	46.3	45.8
LnGrp LOS	A	B	D	A	D	D
Approach Vol, veh/h	733			1254	889	
Approach Delay, s/veh	15.4			26.0	46.0	
Approach LOS	B			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		81.1		24.0	42.7	38.3
Change Period (Y+Rc), s		6.2		5.8	4.6	6.2
Max Green Setting (Gmax), s		89.8		18.2	46.4	38.8
Max Q Clear Time (g_c+I1), s		10.6		18.5	37.5	28.6
Green Ext Time (p_c), s		5.0		0.0	0.6	3.6

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

Notes

User approved volume balancing among the lanes for turning movement.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	514	514	1053	322	503	1384
Future Volume (vph)	514	514	1053	322	503	1384
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	10.0
Minimum Split (s)	37.8	37.8	16.2	16.2	9.6	16.2
Total Split (s)	38.3	38.3	41.5	41.5	40.2	81.7
Total Split (%)	31.9%	31.9%	34.6%	34.6%	33.5%	68.1%
Yellow Time (s)	4.8	4.8	5.2	5.2	3.6	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.8	5.8	6.2	6.2	4.6	6.2
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	C-Max	C-Max	Min	Min	None	Min
Act Effct Green (s)	32.5	32.5	35.3	35.3	35.6	75.5
Actuated g/C Ratio	0.27	0.27	0.29	0.29	0.30	0.63
v/c Ratio	0.59	0.87	1.02	0.50	1.02	0.63
Control Delay	55.7	52.9	75.7	10.1	88.1	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.7	52.9	75.7	10.1	88.1	15.2
LOS	E	D	E	B	F	B
Approach Delay	54.3		60.3			34.7
Approach LOS	D		E			C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 62.2 (52%), Referenced to phase 8:WBL, Start of Green	
Natural Cycle: 120	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.02	
Intersection Signal Delay: 47.6	Intersection LOS: D
Intersection Capacity Utilization 87.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 6: La Cadena Dr. & Barton Rd.





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	514	514	1053	322	503	1384
Future Volume (veh/h)	514	514	1053	322	503	1384
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00		1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No		No			No
Adj Sat Flow, veh/h/ln	1800	1900	1900	1900	1800	1900
Adj Flow Rate, veh/h	530	0	1086	255	519	1427
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	901		1062	474	509	2271
Arrive On Green	0.27	0.00	0.29	0.29	0.30	0.63
Sat Flow, veh/h	3326	1610	3705	1610	1714	3705
Grp Volume(v), veh/h	530	0	1086	255	519	1427
Grp Sat Flow(s),veh/h/ln	1663	1610	1805	1610	1714	1805
Q Serve(g_s), s	16.6	0.0	35.3	15.9	35.6	29.1
Cycle Q Clear(g_c), s	16.6	0.0	35.3	15.9	35.6	29.1
Prop In Lane	1.00	1.00		1.00	1.00	
Lane Grp Cap(c), veh/h	901		1062	474	509	2271
V/C Ratio(X)	0.59		1.02	0.54	1.02	0.63
Avail Cap(c_a), veh/h	901		1062	474	509	2271
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.61	0.61	0.58	0.58
Uniform Delay (d), s/veh	37.9	0.0	42.3	35.5	42.2	13.6
Incr Delay (d2), s/veh	2.8	0.0	27.5	0.7	35.7	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	18.9	6.1	19.2	10.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.8	0.0	69.8	36.3	77.9	14.0
LnGrp LOS	D		F	D	F	B
Approach Vol, veh/h	530	A	1341			1946
Approach Delay, s/veh	40.8		63.5			31.0
Approach LOS	D		E			C

Timer - Assigned Phs	1	2			6	8
Phs Duration (G+Y+Rc), s	40.2	41.5			81.7	38.3
Change Period (Y+Rc), s	4.6	6.2			6.2	5.8
Max Green Setting (Gmax), s	35.6	35.3			75.5	32.5
Max Q Clear Time (g_c+I1), s	37.6	37.3			31.1	18.6
Green Ext Time (p_c), s	0.0	0.0			13.2	0.9

Intersection Summary	
HCM 6th Ctrl Delay	43.8
HCM 6th LOS	D

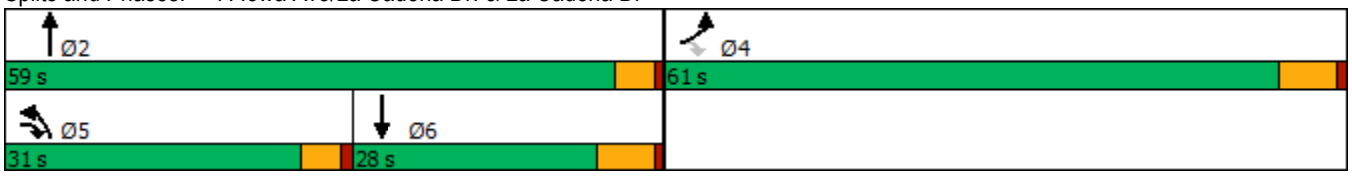
Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	641	264	292	971	485	1427
Future Volume (vph)	641	264	292	971	485	1427
Turn Type	Prot	pm+ov	Prot	NA	NA	Free
Protected Phases	4	5	5	2	6	
Permitted Phases		4				Free
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0	
Minimum Split (s)	16.2	9.6	9.6	14.6	16.2	
Total Split (s)	61.0	31.0	31.0	59.0	28.0	
Total Split (%)	50.8%	25.8%	25.8%	49.2%	23.3%	
Yellow Time (s)	5.2	3.6	3.6	3.6	5.2	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.2	4.6	4.6	4.6	6.2	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	45.2	73.8	22.1	47.6	19.0	104.0
Actuated g/C Ratio	0.43	0.71	0.21	0.46	0.18	1.00
v/c Ratio	0.90	0.24	0.84	0.61	0.77	0.55
Control Delay	44.6	5.9	61.8	24.1	50.9	0.8
Queue Delay	0.0	0.0	3.7	2.1	0.0	0.0
Total Delay	44.6	5.9	65.5	26.2	50.9	0.8
LOS	D	A	E	C	D	A
Approach Delay	33.3			35.3	13.5	
Approach LOS	C			D	B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 24.7	Intersection LOS: C
Intersection Capacity Utilization 82.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Iowa Ave/La Cadena Dr. & La Cadena Dr





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	641	264	292	971	485	1427
Future Volume (veh/h)	641	264	292	971	485	1427
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1800	1900	1800	1900	1900	1800
Adj Flow Rate, veh/h	668	232	304	1011	505	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	728	1005	341	1556	644	
Arrive On Green	0.42	0.42	0.20	0.43	0.18	0.00
Sat Flow, veh/h	1714	1610	1714	3705	3705	2685
Grp Volume(v), veh/h	668	232	304	1011	505	0
Grp Sat Flow(s),veh/h/ln	1714	1610	1714	1805	1805	1342
Q Serve(g_s), s	31.6	5.4	14.9	19.0	11.5	0.0
Cycle Q Clear(g_c), s	31.6	5.4	14.9	19.0	11.5	0.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	728	1005	341	1556	644	
V/C Ratio(X)	0.92	0.23	0.89	0.65	0.78	
Avail Cap(c_a), veh/h	1092	1346	526	2282	915	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	23.3	7.1	33.5	19.3	33.8	0.0
Incr Delay (d2), s/veh	8.7	0.1	8.2	0.5	2.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.6	0.0	6.5	7.0	4.9	0.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	32.0	7.2	41.7	19.8	36.7	0.0
LnGrp LOS	C	A	D	B	D	
Approach Vol, veh/h	900			1315	505	A
Approach Delay, s/veh	25.6			24.9	36.7	
Approach LOS	C			C	D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		43.3		42.8	21.7	21.5
Change Period (Y+Rc), s		* 6.2		6.2	4.6	6.2
Max Green Setting (Gmax), s		* 54		54.8	26.4	21.8
Max Q Clear Time (g_c+I1), s		21.0		33.6	16.9	13.5
Green Ext Time (p_c), s		7.4		3.0	0.3	1.8

Intersection Summary		
HCM 6th Ctrl Delay	27.3	
HCM 6th LOS	C	

Notes

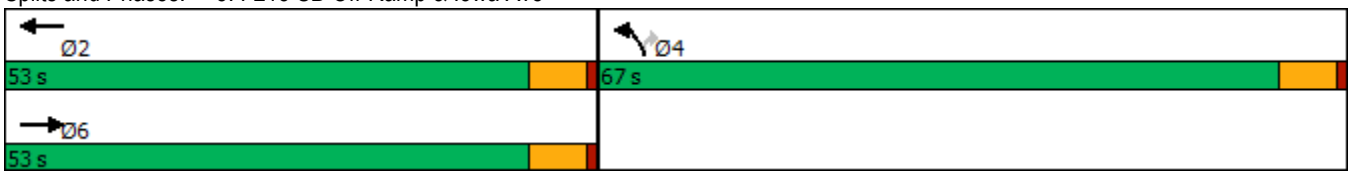
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

Lane Group	EBT	WBT	NBL	NBR
Lane Configurations				
Traffic Volume (vph)	730	1101	162	711
Future Volume (vph)	730	1101	162	711
Turn Type	NA	NA	Prot	Perm
Protected Phases	6	2	4	
Permitted Phases				4
Detector Phase	6	2	4	4
Switch Phase				
Minimum Initial (s)	10.0	10.0	10.0	10.0
Minimum Split (s)	16.2	24.2	16.2	16.2
Total Split (s)	53.0	53.0	67.0	67.0
Total Split (%)	44.2%	44.2%	55.8%	55.8%
Yellow Time (s)	5.2	5.2	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	6.2	6.2	6.2
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	Min	Min	None	None
Act Effct Green (s)	38.0	38.0	47.8	47.8
Actuated g/C Ratio	0.38	0.38	0.48	0.48
v/c Ratio	0.54	0.82	0.19	0.89
Control Delay	26.5	34.2	15.9	35.7
Queue Delay	0.6	0.0	0.0	0.0
Total Delay	27.1	34.2	15.9	35.7
LOS	C	C	B	D
Approach Delay	27.1	34.2	32.0	
Approach LOS	C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 98.9	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: I-215 SB Off-Ramp & Iowa Ave





Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	730	0	0	1101	162	711
Future Volume (veh/h)	730	0	0	1101	162	711
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		1.00	1.00		1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	0	0	1900	1900	1900
Adj Flow Rate, veh/h	753	0	0	1135	167	615
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	1469	0	0	1469	770	685
Arrive On Green	0.41	0.00	0.00	0.41	0.43	0.43
Sat Flow, veh/h	3800	0	0	3800	1810	1610
Grp Volume(v), veh/h	753	0	0	1135	167	615
Grp Sat Flow(s),veh/h/ln	1805	0	0	1805	1810	1610
Q Serve(g_s), s	11.6	0.0	0.0	20.1	4.3	26.3
Cycle Q Clear(g_c), s	11.6	0.0	0.0	20.1	4.3	26.3
Prop In Lane		0.00	0.00		1.00	1.00
Lane Grp Cap(c), veh/h	1469	0	0	1469	770	685
V/C Ratio(X)	0.51	0.00	0.00	0.77	0.22	0.90
Avail Cap(c_a), veh/h	2284	0	0	2284	1487	1323
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.4	0.0	0.0	19.0	13.5	19.8
Incr Delay (d2), s/veh	0.3	0.0	0.0	0.9	0.1	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	0.0	7.1	1.7	10.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	16.7	0.0	0.0	19.9	13.6	24.3
LnGrp LOS	B	A	A	B	B	C
Approach Vol, veh/h	753			1135	782	
Approach Delay, s/veh	16.7			19.9	22.0	
Approach LOS	B			B	C	

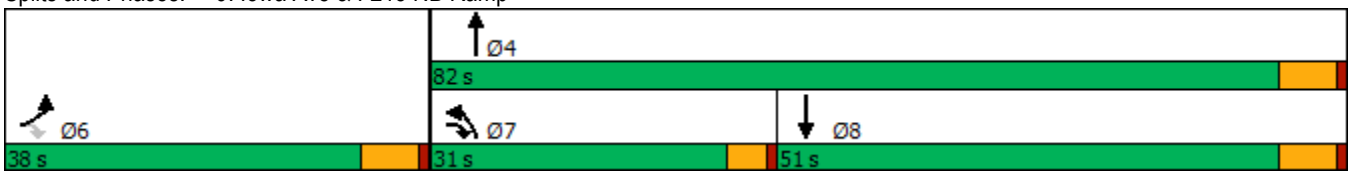
Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		36.3		37.7		36.3
Change Period (Y+Rc), s		6.2		6.2		6.2
Max Green Setting (Gmax), s		46.8		60.8		46.8
Max Q Clear Time (g_c+I1), s		22.1		28.3		13.6
Green Ext Time (p_c), s		8.0		3.2		5.0

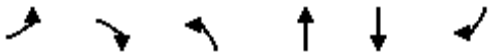
Intersection Summary		
HCM 6th Ctrl Delay	19.6	
HCM 6th LOS	B	

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	311	1130	584	1003	75
Future Volume (vph)	311	1130	584	1003	75
Turn Type	Prot	pm+ov	Prot	NA	NA
Protected Phases	6	7	7	4	8
Permitted Phases		6			
Detector Phase	6	7	7	4	8
Switch Phase					
Minimum Initial (s)	10.0	5.0	5.0	10.0	10.0
Minimum Split (s)	24.2	9.6	9.6	16.2	16.2
Total Split (s)	38.0	31.0	31.0	82.0	51.0
Total Split (%)	31.7%	25.8%	25.8%	68.3%	42.5%
Yellow Time (s)	5.2	3.6	3.6	5.2	5.2
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.2	4.6	4.6	6.2	6.2
Lead/Lag		Lead	Lead		Lag
Lead-Lag Optimize?		Yes	Yes		Yes
Recall Mode	Max	None	None	Min	Min
Act Effct Green (s)	32.2	60.9	22.3	62.9	35.9
Actuated g/C Ratio	0.30	0.57	0.21	0.58	0.33
v/c Ratio	0.59	0.55	0.82	0.92	0.78
Control Delay	40.1	1.9	51.8	34.0	21.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.1	1.9	51.8	34.0	21.9
LOS	D	A	D	C	C
Approach Delay	10.1			40.6	21.9
Approach LOS	B			D	C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 107.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 25.4	Intersection LOS: C
Intersection Capacity Utilization 84.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 9: Iowa Ave & I-215 NB Ramp





Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	311	1130	584	1003	75	517
Future Volume (veh/h)	311	1130	584	1003	75	517
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900
Adj Flow Rate, veh/h	317	847	596	1023	77	441
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Percent Heavy Veh, %	0	0	0	0	0	0
Cap, veh/h	538	1386	673	1115	86	494
Arrive On Green	0.30	0.30	0.19	0.59	0.35	0.35
Sat Flow, veh/h	1810	2834	3510	1900	245	1403
Grp Volume(v), veh/h	317	847	596	1023	0	518
Grp Sat Flow(s),veh/h/ln	1810	1417	1755	1900	0	1648
Q Serve(g_s), s	16.0	23.3	17.7	51.6	0.0	31.8
Cycle Q Clear(g_c), s	16.0	23.3	17.7	51.6	0.0	31.8
Prop In Lane	1.00	1.00	1.00			0.85
Lane Grp Cap(c), veh/h	538	1386	673	1115	0	580
V/C Ratio(X)	0.59	0.61	0.89	0.92	0.00	0.89
Avail Cap(c_a), veh/h	538	1386	867	1347	0	690
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	32.0	19.9	42.1	19.8	0.0	32.7
Incr Delay (d2), s/veh	4.7	2.0	7.7	9.0	0.0	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.3	0.4	8.3	23.6	0.0	14.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.7	21.9	49.8	28.8	0.0	45.3
LnGrp LOS	D	C	D	C	A	D
Approach Vol, veh/h	1164			1619	518	
Approach Delay, s/veh	25.9			36.5	45.3	
Approach LOS	C			D	D	

Timer - Assigned Phs	4	6	7	8
Phs Duration (G+Y+Rc), s	68.9	38.0	25.1	43.8
Change Period (Y+Rc), s	6.2	6.2	4.6	6.2
Max Green Setting (Gmax), s	75.8	31.8	26.4	44.8
Max Q Clear Time (g_c+I1), s	53.6	25.3	19.7	33.8
Green Ext Time (p_c), s	9.2	2.7	0.8	2.8

Intersection Summary	
HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	17	809	974	16	15	27
Future Vol, veh/h	17	809	974	16	15	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	Yield	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	18	834	1004	16	15	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1004	0	-	0	1465	510
Stage 1	-	-	-	-	1012	-
Stage 2	-	-	-	-	453	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	698	-	-	-	121	514
Stage 1	-	-	-	-	317	-
Stage 2	-	-	-	-	613	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	698	-	-	-	118	514
Mov Cap-2 Maneuver	-	-	-	-	118	-
Stage 1	-	-	-	-	309	-
Stage 2	-	-	-	-	613	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	23.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	698	-	-	-	234
HCM Lane V/C Ratio	0.025	-	-	-	0.185
HCM Control Delay (s)	10.3	-	-	-	23.8
HCM Lane LOS	B	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	823	1	3	968	8	4	0	8	0	0	19
Future Vol, veh/h	0	823	1	3	968	8	4	0	8	0	0	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	0	895	1	3	1052	9	4	0	9	0	0	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	896	0	0	1428	1963	448	-	-	531
Stage 1	-	-	-	-	-	-	896	896	-	-	-	-
Stage 2	-	-	-	-	-	-	532	1067	-	-	-	-
Critical Hdwy	-	-	-	4.1	-	-	7.5	6.5	6.9	-	-	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.5	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.5	-	-	-	-
Follow-up Hdwy	-	-	-	2.2	-	-	3.5	4	3.3	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	766	-	-	97	64	564	0	0	498
Stage 1	0	-	-	-	-	-	306	362	-	0	0	-
Stage 2	0	-	-	-	-	-	504	301	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	766	-	-	93	64	564	-	-	498
Mov Cap-2 Maneuver	-	-	-	-	-	-	93	64	-	-	-	-
Stage 1	-	-	-	-	-	-	306	362	-	-	-	-
Stage 2	-	-	-	-	-	-	481	300	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	23.3	12.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	210	-	-	766	-	-	498
HCM Lane V/C Ratio	0.062	-	-	0.004	-	-	0.041
HCM Control Delay (s)	23.3	-	-	9.7	-	-	12.5
HCM Lane LOS	C	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	828	3	3	976	3	12
Future Vol, veh/h	828	3	3	976	3	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	900	3	3	1061	3	13

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	903	0	1439	452
Stage 1	-	-	-	-	902	-
Stage 2	-	-	-	-	537	-
Critical Hdwy	-	-	4.1	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	-	-	2.2	-	3.5	3.3
Pot Cap-1 Maneuver	-	-	761	-	126	560
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	556	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	761	-	125	560
Mov Cap-2 Maneuver	-	-	-	-	125	-
Stage 1	-	-	-	-	361	-
Stage 2	-	-	-	-	554	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	330	-	-	761	-
HCM Lane V/C Ratio	0.049	-	-	0.004	-
HCM Control Delay (s)	16.5	-	-	9.8	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	836	975	4	15	4
Future Vol, veh/h	4	836	975	4	15	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	50	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	4	909	1060	4	16	4

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1064	0	-	0	1525	532
Stage 1	-	-	-	-	1062	-
Stage 2	-	-	-	-	463	-
Critical Hdwy	4.1	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	*1045	-	-	-	*245	*696
Stage 1	-	-	-	-	*656	-
Stage 2	-	-	-	-	*606	-
Platoon blocked, %	1	-	-	-	1	1
Mov Cap-1 Maneuver	*1045	-	-	-	*244	*696
Mov Cap-2 Maneuver	-	-	-	-	*244	-
Stage 1	-	-	-	-	*654	-
Stage 2	-	-	-	-	*606	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	18.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	* 1045	-	-	-	283
HCM Lane V/C Ratio	0.004	-	-	-	0.073
HCM Control Delay (s)	8.5	-	-	-	18.7
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	0.2

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

J.3 - Vehicle Miles Traveled Analysis

THIS PAGE INTENTIONALLY LEFT BLANK

September 18, 2020

Ms. Cecilia So
First Carbon Solutions
250 Commerce, Suite 250
Irvine, CA 92602

SUBJECT: BARTON ROAD LOGISTICS CENTER VEHICLE MILES TRAVELLED (VMT) ANALYSIS

Dear Ms. Cecilia So:

The following Vehicle Miles Travelled (VMT) Analysis has been prepared for the proposed Barton Road Logistics Center (**Project**), which is located east of Terrace Avenue at Barton Road in the City of Colton.

PROJECT OVERVIEW

The Project consists of 960,040 square feet of High-Cube Transload Short-Term Storage Warehouse use within two buildings. There are currently existing uses on the site of the proposed Project which are to be demolished. In an effort to conduct a conservative analysis, no credit has been taken for the existing uses in order to evaluate the worst-case/highest generation for the Project.

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, 2017. (1) The proposed Project is anticipated to generate a total of 1,348 vehicle trip-ends per day (in actual vehicles). (See Attachment A)

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which requires all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate went into effect July 1, 2020. To aid in this transition, the Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (December of 2018) (**Technical Advisory**). (2)

In February 2020, the San Bernardino County Transportation Authority (SBCTA) released the SBCTA Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service

Assessment (**SBCTA Guidelines**) that address both traditional automobile delay-based level of service (LOS) and new VMT analysis requirements. (3) Using the SBCTA Guidelines as a reference document, the City of Colton adopted the City of Colton VMT (Vehicle Miles Traveled) Guidelines in June 2020 (**City Guidelines**). (4) These guidelines have been used to conduct this analysis.

PROJECT SCREENING

The City Guidelines describe specific "screening thresholds" that can be used to identify when a proposed land use project is anticipated to result in a less than significant impact without conducting a more detailed project level VMT analysis. Screening thresholds are described in the following three steps:

- Trip Screening
- Land Use Type Screening
- Transit Priority Area (TPA) Screening
- Low VMT Area Screening

Consistent with City Guidelines a land use project needs only to satisfy one of the above screening thresholds to result in a less than significant impact.

For the purposes of this analysis, the initial VMT screening process has been conducted with using the SBCTA VMT Screening Tool (**Screening Tool**), which uses screening criteria consistent with the screening thresholds recommended in the Technical Advisory and City Guidelines.

TRIP SCREENING

Projects that generate fewer than 110 daily vehicle trips also may be presumed to have a less than significant impact on VMT. The Project is forecast to generate more than 110 daily vehicle trips; therefore, the Project would not be eligible to screen out based on project type screening.

The Trip screening threshold is not met.

LAND USE TYPE SCREENING

The City Guidelines identifies local serving retail projects less than 50,000 square feet or other local serving uses (e.g., day care centers, student housing, public facilities, places of worship, etc.) may be presumed to have a less than significant impact absent substantial evidence to the contrary.

The Project Type screening threshold is not met.

TPA SCREENING

Projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary.

However, the presumption may NOT be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Constructs a smaller number of moderate or high-income residential units than the existing number of affordable residential units

Based on the Southern California Association of Governments (SCAG) High Quality Transit Area (HQTA) Map results presented in Attachment B, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

LOW VMT AREA SCREENING

City Guidelines state that a project's VMT generation due to being located in an already low VMT area is assumed to be negligible. A low VMT area is defined as an individual traffic analysis zone (TAZ) where VMT is determined to be 15% below the City of Colton's average from the 2016 Base year of 23.30 VMT. The City Guidelines also include a low VMT TAZ map of the City of Colton that illustrates the areas of the City that would meet the stated threshold. The Project's physical location was selected within the Low VMT Map to determine the TAZ's VMT as compared to the City average (see Attachment C). The Project is not located within a low VMT generating TAZ as compared to the City average.

The Low VMT Area screening threshold is not met.

VMT METHODOLOGY

As described in the City Guidelines, "projects not screened through one of the screening steps described above or exempt under CEQA will be required to complete a VMT analysis and forecasting through the SBTAM model to determine if they have a significant VMT impact." This analysis is to include 'project generated VMT' which uses tour-based assessment with a focus on home-based-work trips for all employees. These trips are designated as attractions of the Production/Attraction (PA) analysis

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

methodology. The PA method for calculating VMT sums all weekday VMT generated by trips with at least one trip end in the study area. Productions are land use types that generate trips (residences) and attractions are land use that attract trips (employment). Distribution centers, warehouse, and logistics center projects VMT impacts will be analyzed via "the amount of VMT generated per employee."[3]

PROJECT GENERATED VMT

Project generated VMT has been calculated using the SBTAM model. Adjustments in socio-economic data (SED) (i.e., employment) has been made to a separate TAZ to reflect the Project's proposed land use (i.e., industrial/warehouse uses). A separate TAZ is utilized to more easily be able to isolate the VMT generated by the Project. Table 1 summarizes the employment factors for the Project.

TABLE 1: EMPLOYMENT FACTORS

	Project
Building Square Footage (sf)	960,040 sf
Employment Factor[4]	1 emp per 1,195 sf
Employees	803

Adjustments to SED to represent Project employment were made for a separate TAZ in the base year (2016) SBTAM model and cumulative (2040) SBTAM model. Project generated VMT was then calculated using the PA trip matrix for both base year (2016) and cumulative (2040) model runs and linear interpolation was used to determine the baseline (2020) project generated VMT. Lastly, Project generated VMT is divided by the Project's employment, which includes 803 employees. Dividing by the Project's employment provides a transportation efficiency metric in which the analysis can be based. Using this efficiency metric allows the project to be compared to the remainder of the City of Colton for purposes of identifying transportation impacts. Use of employment efficiency metric is consistent with City Guidelines. Table 2 presents the base year (2016) Project VMT per employee, the cumulative (2040) Project VMT per employee, and the baseline (2020) Project VMT per employee.

TABLE 2: PROJECT VMT PER EMPLOYEE

	Base Year 2016	Cumulative 2040	Baseline 2020
Project VMT	16,699	15,877	16,464
Project Employees	803	803	803
VMT per Employee	20.80	19.77	20.50

[3] Page 27 of the City Guidelines.
[4] Table 2 of the City Guidelines.

CITY OF COLTON VMT

The City Guidelines provides VMT calculations for base year and cumulative model conditions. The City of Colton's base year VMT per employee threshold is 15.69 and the cumulative VMT per employee threshold is 14.86. Using linear interpolation, the baseline (2020) Project VMT per employee is 15.45.

PROJECT GENERATED VMT ASSESSMENT

As noted in the City Guidelines, the Project results in a significant project generated VMT impact if the baseline project generated VMT per employee exceeds the threshold of 15% below the City of Colton baseline VMT per employee.

Table 3 provides a comparison of the Project generated VMT per employee as compared to the City's threshold.

TABLE 3: PROJECT VMT PER EMPLOYEE COMPARISON

	Baseline 2020
City Threshold	15.45
Project VMT per Employee	20.50
Percent Change	+24.5%
Potentially Significant?	Yes

As shown in Table 3, the baseline (2020) Project generated VMT per employee values would exceed the City's adopted threshold by 24.5% for baseline (2020) conditions. The transportation impact based on the assessment of Project generated VMT as compared to the City's adopted threshold is potentially significant.

POTENTIAL VMT REDUCTION STRATEGIES

Consistent with City Guidelines, VMT reduction strategies should be considered to address project generated VMT that exceeds the City's threshold. Transportation demand management (TDM) strategies have been evaluated for the purpose of reducing VMT impacts determined to be potentially significant. The effectiveness of TDM strategies to reduce VMT has been determined based on the SB 743 Implementation Mitigation and TDM Strategy Assessment (November 11, 2019, Fehr & Peers) prepared for SBCTA (**SBCTA TDM Report**), which was based on a current assessment of the previously published Quantifying Greenhouse Gas Mitigation Measures (CAPCOA, 2010) for applicability to projects in the SBCTA region. The SBCTA TDM Report indicates that of the 50 transportation measures presented by

CAPCOA, only 41 of those measures are applicable at a building and site level. The remaining 9 measures are functions of, or depend on, site location and/or actions by local and regional agencies or funders.[5]

Based on a review of the 41 transportation measures identified by CAPCOA, the SBCTA TDM Report identifies that only 7 of those measures may be effective at the project level. Land use context is a major factor relevant to the potential application and effectiveness of TDM measures. More specifically, the land use context of the Project is characteristically suburban[6]. Based on a review of the potentially relevant TDM measures presented in the SBCTA TDM Report, the following TDM measures were evaluated for their applicability to the Project based on its suburban context and their ability to reduce project generated VMT:

- *Measure 1: Increase Diversity of Land Uses (LUT-3).* Having different types of land uses near one another can decrease VMT since trips between land use types are shorter and may be accommodated by non-auto modes of transportation. For example, when residential areas are in the same neighborhood as retail and office buildings, a resident does not need to travel outside of the neighborhood to meet his/her trip needs.

  Remarks: The Project proposes the construction of 960,040 square feet of industrial warehouse use. In order for the above measure to apply, at least 3 of the following land uses should be located on-site, or if not on-site then within ¼ mile or less of the Project: residential development, retail development, office development, park, or open space. As the proposed Project does not include a mix of land uses on-site, and is instead located within a ¼ mile to other industrial uses and low density residential, this particular TDM measure is therefore not evaluated further as a means of providing a reduction in Project VMT.

- *Measure 2: Provide Pedestrian Network Improvements (SDT-1).* Providing on-site pedestrian access network to link areas of the Project to the off-site pedestrian network encourages people to walk for short trips instead of drive. This mode shift results in people driving less for nearby trips (typically less than ¼ mile and no greater than ½ mile) and thus a reduction in VMT.

  Remarks: The Project would provide for on-site pedestrian connections linking the site to existing pedestrian network along Barton Road, S. Terrace Avenue, Walnut Avenue, and De Berry Street that would provide pedestrian connectivity to other nearby industrial uses and residential homes to the north. In a suburban context, a maximum 2.0% reduction in Project VMT may be achieved through this measure, as noted by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 186).

- *Measure 3: Provide Traffic Calming Measure (SDT-2).* Providing traffic calming measures encourages people to walk or bike instead of using a passenger car. This mode shift would result in a decrease in VMT. Traffic calming features may include: marked crosswalks, count-down signal timers, curb extensions, speed tables, raised crosswalks, raised intersections, median islands, tight corner radii, roundabouts or mini-circles, on-street parking, planter strips with street trees, chicanes/chokers, and others.

[5] Measures obtained from SBCTA TDM report, p. 5.
[6] ***Suburban:*** Characterized by dispersed, low intensity, single use, automobile dependent land use patterns, usually outside of the central city (a suburb). (*Quantifying Greenhouse Gas Mitigation Measures,* p. 60).

Remarks: There is limited opportunity for the Project to implement meaningful enhanced traffic calming measures in the area. Therefore, this measure is not evaluated further as a means of providing a reduction in Project VMT.

- *Measure 4: Implement Car-Sharing Program (TRT-9).* Implementing a car-sharing program would allow individuals to have on-demand access to a shared fleet of vehicles on an as-needed basis. User costs are typically determined through mileage or hourly rates, with deposits and/or annual membership fees.

  Remarks: This measure would likely require the Project to pay fees toward its inclusion in an existing car sharing program – which may not be feasible for a project of this size. The potential reduction in VMT is also extremely limited with a maximum reduction in VMT between 0.4% and .07% as noted by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 245), therefore, this measure is not evaluated further as a means of providing a reduction in Project VMT.

- *Measure 5: Increase Transit Service Frequency and Speed (TST-4).* This measure serves to reduce transit-passenger travel time through more reduced headways and increased speed and reliability. This makes transit service more attractive and may result in a mode shift from auto to transit which reduces VMT.

  Remarks: The area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Route 215 provides service in the area but there is not currently a Route that provides a transit stop within ¼ mile to the Project, therefore, this measure is not evaluated further as a means of providing a reduction in Project VMT.

- *Measure 6: Encourage Telecommuting and Alternative Work Schedule (TRT-6).* Encouraging telecommuting and alternative work schedules reduces the number of commute trips and therefore VMT traveled by employees. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks.

  Remarks: The effectiveness of this strategy depends on the ultimate building tenant(s) and is a factor in considering any potential VMT reduction. As the future building tenant(s) are unknown, this measure is not evaluated further as means of providing a reduction in Project VMT.

- *Measure 7: Provide Ride-Sharing Programs (TRT-3).* This strategy focuses on encouraging carpooling and vanpooling, but its ultimate implementation is limited as Measure 6 above.

  Remarks: Vanpool and carpool parking spaces will be provided at each on-site building per the City's development code. The potential reduction in VMT is between 1.0% and 15.0% as noted by CAPCOA (Quantifying Greenhouse Gas Mitigation Measures, p. 228). The effectiveness of this strategy depends on the ultimate building tenant(s) and is a factor in considering any potential VMT reduction. As the future building tenant(s) are unknown, the low range of 1.0% reduction in Project VMT may be achieved through this measure.

CONCLUSION

In summary, the baseline Project VMT per employee was found to exceed the City of Colton baseline VMT per employee threshold by about 25%. With implementation of the limited feasible TDM measures

discussed above, a potential reduction in Project VMT of 3.0% would not be enough to reduce project generated VMT to a level of less than significant.

If you have any questions, please contact me directly at aevatt@urbanxroads.com.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP
President

Robert Vu, PE
Transportation Engineer

REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
2. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
3. **San Bernardino County Transportation Authority (SBCTA).** *Recommended Traffic Impact Analysis Guidelines for Vehicle Miles Traveled and Level of Service Assessment.* February 2020.
4. **City of Colton.** *City of Colton VMT (Vehicles Miles Traveled) Guidelines.* City of Colton : s.n., June 2020.

ATTACHMENT A:
PROJECT TRIP GENERATION

Project Trip Generation Summary

Project Trip Generation Rates									
Land Use[1]	ITE LU Code	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (80.0% AM, 84.0% PM/Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (3.34% AM, 2.67% PM/Daily)			0.002	0.001	0.003	0.001	0.002	0.003	0.037
3-Axle Trucks (4.14% AM, 3.31% PM/Daily)			0.003	0.001	0.003	0.001	0.002	0.003	0.046
4-Axle+ Trucks (12.52% AM, 10.02% PM/Daily)			0.008	0.002	0.010	0.003	0.007	0.010	0.140
Passenger Car Equivalent									
High-Cube Transload Short-Term Warehouse without Cold Storage[3,4]	154	TSF	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars (69.2% AM, 78.3% PM, 67.8% Daily)			0.049	0.015	0.064	0.024	0.060	0.084	1.176
2-Axle Trucks (5.14% AM, 3.62% PM, 5.38% Daily, PCE = 1.5)[5]			0.003	0.001	0.004	0.001	0.003	0.004	0.056
3-Axle Trucks (6.38% AM, 4.49% PM, 6.66% Daily, PCE = 2.0)[5]			0.005	0.002	0.007	0.002	0.005	0.007	0.093
4-Axle+ Trucks (19.28% AM, 13.59% PM, 20.16% Daily, PCE = 3.0)[5]			0.023	0.007	0.030	0.008	0.022	0.030	0.421

Project Trip Generation									
Project	Quantity	Units[2]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			2	1	3	1	2	3	36
3-axle:			3	1	4	1	3	4	46
4+-axle:			8	3	11	3	7	10	136
- Net Truck Trips (Actual Vehicles)			*13*	*5*	*18*	*5*	*12*	*17*	*218*
TOTAL NET TRIPS (Actual Vehicles)			***61***	***20***	***81***	***28***	***71***	***99***	***1,348***
Passenger Car Equivalent[5]									
High-Cube Transload Short-Term Warehouse without Cold Storage	960.040	TSF							
Passenger Cars:			48	15	63	23	59	82	1,130
Truck Trips:									
2-axle:			3	1	4	2	3	5	54
3-axle:			5	2	7	2	5	7	90
4+-axle:			23	7	30	9	21	30	404
- Net Truck Trips			*31*	*10*	*41*	*13*	*29*	*42*	*548*
TOTAL NET TRIPS			***79***	***25***	***104***	***36***	***88***	***124***	***1,678***

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Tenth Edition (2017).

[2] TSF = thousand square feet

[3] Vehicle Mix Source: Institute of Transportation Engineers (ITE) Trip Generation 10th Edition Supplement (February 2020).

[4] Truck Mix Source: SCAQMD Warehouse Truck Trip Study Data Results and Usage (2014).

Normalized % - Without Cold Storage:

16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks

[5] PCE rates are per San Bernardino County Transportation Authority (SBCTA) Congestion Management Program (CMP) Guidelines.

ATTACHMENT B:
SCAG HIGH QUALITY TRANSIT AREA MAP

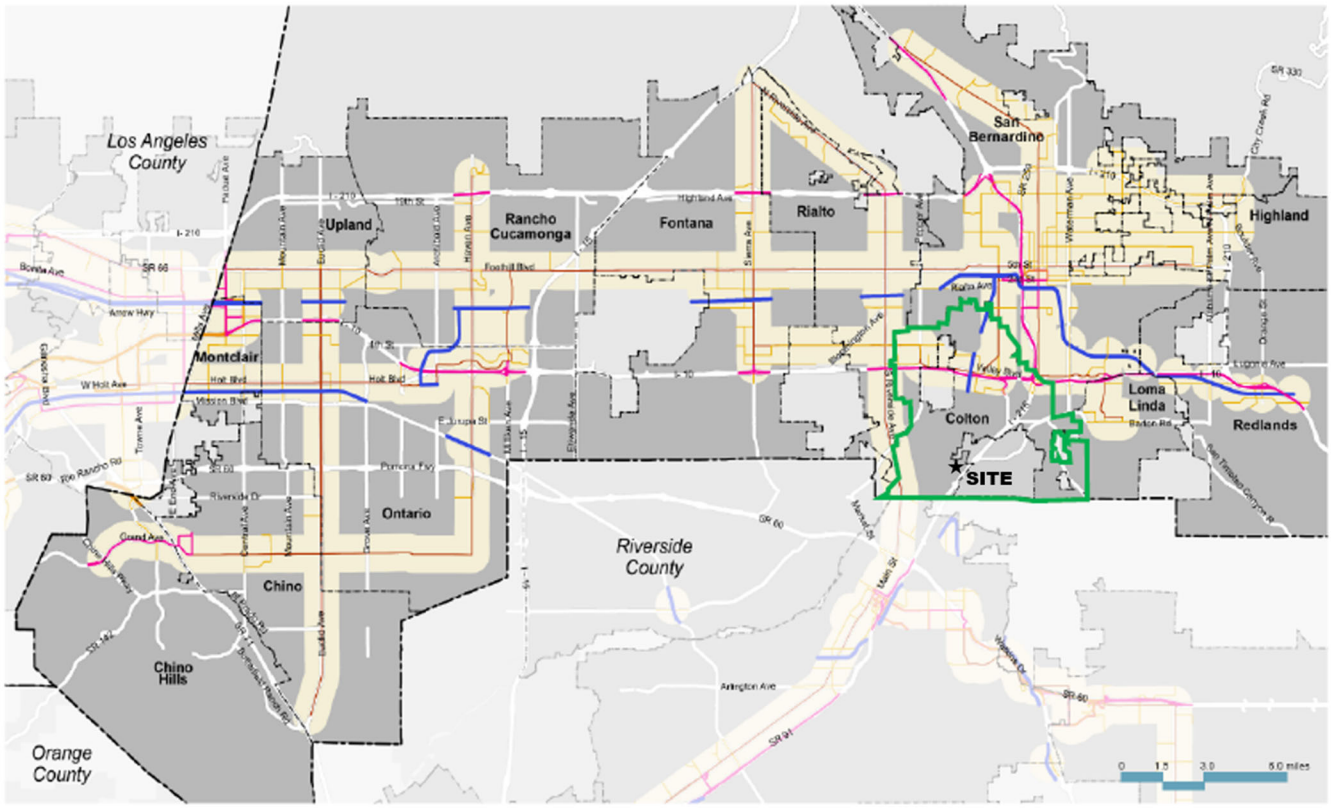


Figure 10: Southern California Association of Governments (SCAG) High Quality Transit Area (HQTA) Map

ATTACHMENT C:
LOW VEHICLE MILES TRAVELED MAP

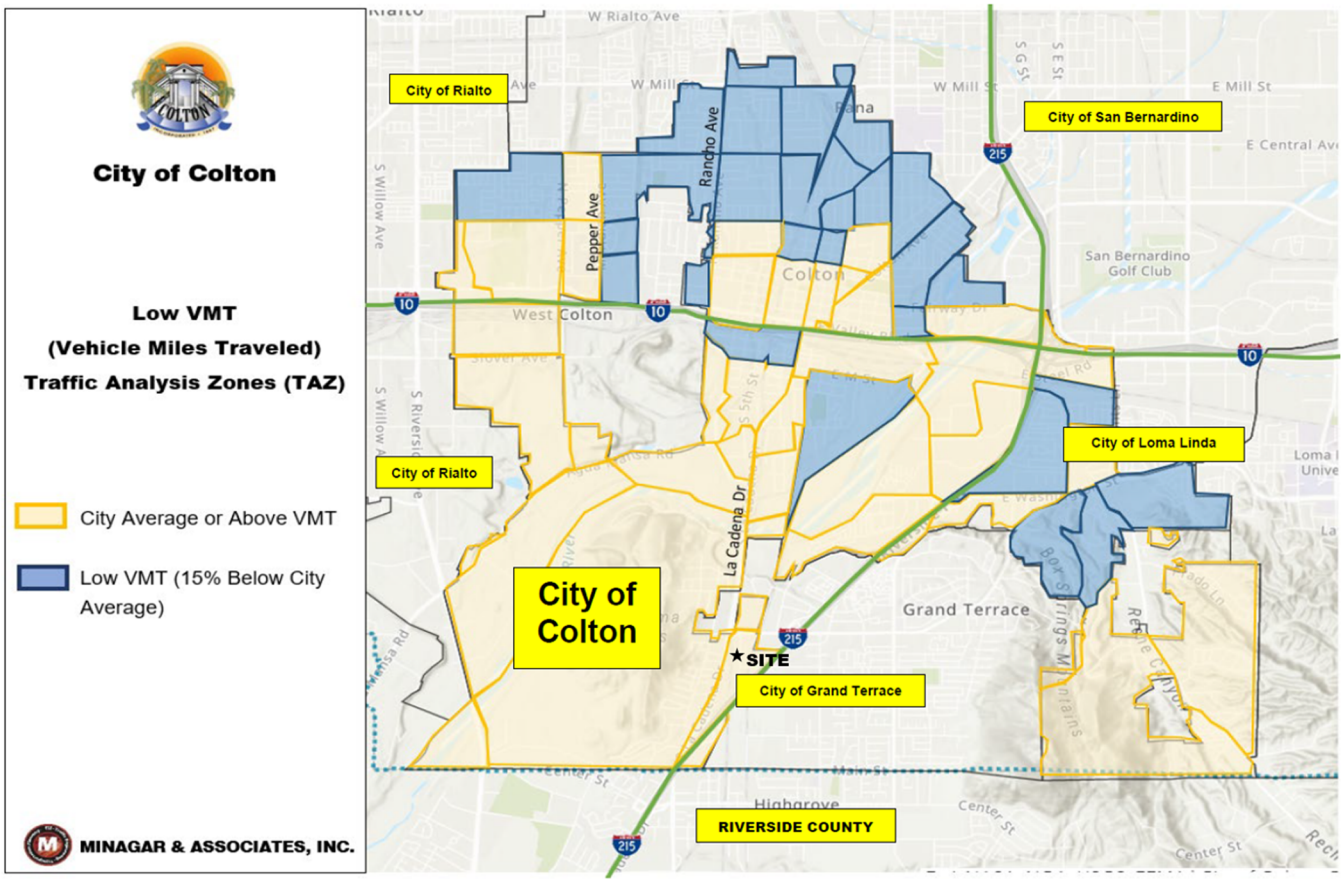


Figure 12: City of Colton Low Vehicle Miles Traveled, Traffic Analysis Zone

THIS PAGE INTENTIONALLY LEFT BLANK