



Roquet Ranch Specific Plan

TRAFFIC IMPACT ANALYSIS

CITY OF COLTON

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TABLE OF CONTENTS

TABLE OF CONTENTS I

APPENDICES III

LIST OF EXHIBITS..... V

LIST OF TABLES VII

LIST OF ABBREVIATED TERMS..... IX

1 INTRODUCTION 1

1.1 Project Overview 1

1.2 Analysis Scenarios 3

1.3 Study Area 4

1.4 Analysis Findings 11

1.5 Recommended Improvements..... 14

1.6 Local and Regional Funding Mechanisms 19

1.7 On-Site Roadway and Site Access Improvements..... 20

1.8 Pedestrian and Bicycle Accommodations 26

2 METHODOLOGIES..... 27

2.1 Level of Service..... 27

2.2 Intersection Capacity Analysis..... 27

2.3 Roadway Segment Capacity Analysis Methodology 30

2.4 Traffic Signal Warrant Analysis Methodology..... 30

2.5 Freeway Off-Ramp Queuing Analysis..... 32

2.6 Freeway Mainline Segment Analysis..... 32

2.7 Freeway Merge/Diverge Ramp Junction Analysis..... 33

2.8 Minimum LOS..... 34

2.9 Deficiency Criteria 35

2.10 Project Fair Share Calculation Methodology 36

3 AREA CONDITIONS 39

3.1 Existing Circulation Network 39

3.2 General Plan Circulation Element 39

3.3 Transit Service 39

3.4 Bicycle & Pedestrian Facilities..... 55

3.5 Existing (2016) Traffic Counts..... 55

3.6 Existing (2016) Conditions Intersection Operations Analysis 64

3.7 Existing (2016) Conditions Roadway Segment Analysis..... 69

3.8 Existing (2016) Conditions Traffic Signal Warrants Analysis 69

3.9 Existing (2016) Conditions Off-Ramp Queuing Analysis 71

3.10 Existing (2016) Conditions Basic Freeway Segment Analysis..... 71

3.11 Existing (2016) Conditions Freeway Merge/Diverge Analysis 71

3.12 Recommended Improvements..... 76

4 PROJECTED FUTURE TRAFFIC 79

4.1 Project Trip Generation..... 79

4.2 Project Trip Distribution 81

4.3 Modal Split 81

4.4 Project Trip Assignment 87

4.5 Background Traffic 87

4.6 Cumulative Development Traffic 88

4.7 Traffic Forecasts 88

4.8 Opening Year Cumulative Conditions 88

4.9 Horizon Year (2040) Volume Development 95

5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS 97

5.1 Roadway Improvements 97

5.2 Existing plus Project Traffic Volume Forecasts 97

5.3 Intersection Operations Analysis 97

5.4 Roadway Segment Analysis..... 97

5.5 Traffic Signal Warrants Analysis..... 105

5.6 Off-Ramp Queuing Analysis 105

5.7 Basic Freeway Segment Analysis..... 107

5.8 Freeway Merge/Diverge Analysis 107

5.9 Recommended Improvements..... 107

6 OPENING YEAR CUMULATIVE (2020) TRAFFIC ANALYSIS115

6.1 Roadway Improvements 115

6.2 Opening Year Cumulative (2020) Without Project Traffic Volume Forecasts 115

6.3 Opening Year Cumulative (2020) With Project Traffic Volume Forecasts..... 115

6.4 Intersection Operations Analysis 122

6.5 Roadway Segment Analysis..... 122

6.6 Traffic Signal Warrants Analysis..... 129

6.7 Off-Ramp Queuing Analysis 129

6.8 Basic Freeway Segment Analysis..... 131

6.9 Freeway Merge/Diverge Analysis 135

6.10 Near-Term Deficiencies and Recommended Improvements..... 135

7 HORIZON YEAR (2040) TRAFFIC ANALYSIS141

7.1 Roadway Improvements 141

7.2 Horizon Year (2040) Without Project Traffic Volume Forecasts..... 141

7.3 Horizon Year (2040) With Project Traffic Volume Forecasts 141

7.4 Intersection Operations Analysis 148

7.5 Roadway Segment Analysis..... 154

7.6 Traffic Signal Warrants Analysis..... 156

7.7 Off-Ramp Queuing Analysis 156

7.8 Basic Freeway Segment Analysis..... 158

7.9 Freeway Merge/Diverge Analysis 158

7.10 Long-Term Deficiencies and Recommended Improvements..... 158

8 REFERENCES169

APPENDICES

- APPENDIX 1.1: APPROVED TRAFFIC STUDY SCOPING AGREEMENT**
- APPENDIX 1.2: PROJECT DRIVEWAY QUEUING ANALYSIS**
- APPENDIX 3.1: EXISTING TRAFFIC COUNTS – FEBRUARY 2016**
- APPENDIX 3.2: EXISTING (2016) CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 3.3: EXISTING (2016) CONDITIONS TRAFFIC SIGNAL WARRANT WORKSHEETS**
- APPENDIX 3.4: EXISTING (2016) CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS**
- APPENDIX 3.5: EXISTING (2016) CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 3.6: EXISTING (2016) CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 3.7: EXISTING (2016) CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS THIS PAGE IS INTENTIONALLY LEFT BLANK**
- APPENDIX 4.1: DOCUMENTATION FOR CUMULATIVE DEVELOPMENT PROJECT LIST**
- APPENDIX 4.2: HORIZON YEAR (2040) WITHOUT PROJECT POST PROCESSING WORKSHEETS**
- APPENDIX 5.1: E+P CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 5.2: E+P CONDITIONS TRAFFIC SIGNAL WARRANT WORKSHEETS**
- APPENDIX 5.3: E+P CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS**
- APPENDIX 5.4: E+P CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 5.5: E+P CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 5.6: E+P CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 6.1: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 6.2: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 6.3: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT WORKSHEETS**
- APPENDIX 6.4: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT WORKSHEETS**
- APPENDIX 6.5: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS**
- APPENDIX 6.6: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS OFF-RAMP QUEUING ANALYSIS WORKSHEETS**
- APPENDIX 6.7: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 6.8: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 6.9: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 6.10: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 6.11: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS**

- APPENDIX 6.12: OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.1: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 7.2: HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION WORKSHEETS**
- APPENDIX 7.3: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT WORKSHEETS**
- APPENDIX 7.4: HORIZON YEAR (2040) WITH PROJECT CONDITIONS TRAFFIC SIGNAL WARRANT 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 BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 7.8: HORIZON YEAR (2040) WITH PROJECT CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS**
- APPENDIX 7.9: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 7.10: HORIZON YEAR (2040) WITH PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS**
- APPENDIX 7.11: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.12: HORIZON YEAR (2040) WITH PROJECT CONDITIONS INTERSECTION WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.13: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.14: HORIZON YEAR (2040) WITH PROJECT CONDITIONS BASIC FREEWAY SEGMENT WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.15: HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS WITH IMPROVEMENTS**
- APPENDIX 7.16: HORIZON YEAR (2040) WITH PROJECT CONDITIONS FREEWAY RAMP JUNCTION MERGE/DIVERGE WORKSHEETS WITH IMPROVEMENTS**

LIST OF EXHIBITS

EXHIBIT 1-1: PRELIMINARY LAND USE PLAN 2

EXHIBIT 1-2 LOCATION MAP 7

EXHIBIT 1-3: SITE ADJACENT ROADWAY AND ON-SITE CIRCULATION RECOMMENDATIONS.. 22

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS..... 40

EXHIBIT 3-2: CITY OF COLTON GENERAL PLAN CIRCULATION ELEMENT 43

EXHIBIT 3-3: CITY OF COLTON GENERAL PLAN CROSS-SECTIONS..... 44

EXHIBIT 3-4: CITY OF GRAND TERRACE GENERAL PLAN CIRCULATION ELEMENT 46

EXHIBIT 3-5: CITY OF GRAND TERRACE GENERAL PLAN ROADWAY CROSS-SECTIONS 47

EXHIBIT 3-6: CITY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT 48

EXHIBIT 3-7: CITY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS..... 49

EXHIBIT 3-8: COUNTY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT..... 50

EXHIBIT 3-9: COUNTY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS 51

EXHIBIT 3-10: EXISTING TRANSIT ROUTES..... 52

EXHIBIT 3-11: CITY OF COLTON TRANSIT PLAN..... 53

EXHIBIT 3-12: CITY OF RIVERSIDE TRANSIT FACILITIES..... 54

EXHIBIT 3-13: CITY OF COLTON GENERAL PLAN BICYCLE PLAN..... 56

EXHIBIT 3-14: CITY OF GRAND TERRACE BIKEWAY PLAN 57

EXHIBIT 3-15: CITY OF RIVERSIDE MASTER PLAN TRAILS AND BIKEWAYS..... 58

EXHIBIT 3-16: COUNTY OF RIVERSIDE TRAILS AND BIKEWAY SYSTEM 59

EXHIBIT 3-17: EXISTING PEDESTRIAN FACILITIES 60

EXHIBIT 3-18: EXISTING (2016) CONDITIONS AVERAGE DAILY TRAFFIC (ADT) 62

EXHIBIT 3-19: EXISTING (2016) TRAFFIC VOLUMES 65

EXHIBIT 3-20: EXISTING (2016) SUMMARY OF LOS..... 66

EXHIBIT 3-21: EXISTING (2016) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)..... 73

EXHIBIT 4-1: PROJECT (RESIDENTIAL) TRIP DISTRIBUTION 83

EXHIBIT 4-2: PROJECT (COMMERCIAL RETAIL) TRIP DISTRIBUTION 85

EXHIBIT 4-3: PROJECT AVERAGE DAILY TRAFFIC (ADT)..... 89

EXHIBIT 4-4: PROJECT TRAFFIC VOLUMES 91

EXHIBIT 4-5: CUMULATIVE DEVELOPMENT PROJECT LOCATION MAP 92

EXHIBIT 5-1: E+P AVERAGE DAILY TRAFFIC (ADT) 98

EXHIBIT 5-2: E+P TRAFFIC VOLUMES100

EXHIBIT 5-3: E+P SUMMARY OF LOS101

EXHIBIT 5-4: E+P FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)108

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)116

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES ...118

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2020) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)119

EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES121

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT SUMMARY OF LOS ...125

EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2020) WITH PROJECT SUMMARY OF LOS127

EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES).....132
EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2020) WITH PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES).....133
EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT).....142
EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES.....144
EXHIBIT 7-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT).....145
EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES.....147
EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS150
EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS152
EXHIBIT 7-7: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)159
EXHIBIT 7-8: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)160

LIST OF TABLES

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS..... 5

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS 9

TABLE 1-3: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS 10

TABLE 1-4: FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS LOCATIONS..... 11

TABLE 1-5: SUMMARY OF INTERSECTION IMPROVEMENTS 15

TABLE 1-6: SUMMARY OF ROADWAY SEGMENT IMPROVEMENTS..... 18

TABLE 1-7: PROJECT FAIR SHARE CALCULATIONS..... 21

TABLE 2-1: DESCRIPTION OF SIGNALIZED INTERSECTION LOS 27

TABLE 2-2: DESCRIPTION OF UNSIGNALIZED INTERSECTION LOS 30

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS..... 31

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS..... 33

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS 34

TABLE 2-6: THRESHOLDS OF SIGNIFICANCE..... 36

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2016) CONDITIONS 68

TABLE 3-2: ROADWAY VOLUME/CAPACITY ANALYSIS FOR EXISTING (2016) CONDITIONS 70

TABLE 3-3: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR EXISTING (2016) CONDITIONS..... 72

TABLE 3-4: BASIC FREEWAY SEGMENT ANALYSIS FOR EXISTING (2016) CONDITIONS 74

TABLE 3-5: FREEWAY RAMP JUNCTION MERGE/DIVERGE ANALYSIS FOR EXISTING (2016) CONDITIONS..... 75

TABLE 3-6: INTERSECTION ANALYSIS FOR EXISTING (2016) CONDITIONS WITH IMPROVEMENTS..... 77

TABLE 4-1: PROJECT TRIP GENERATION RATES 80

TABLE 4-2: PROJECT TRIP GENERATION SUMMARY 82

TABLE 4-3: CUMULATIVE DEVELOPMENT LAND USE SUMMARY 93

TABLE 5-1: INTERSECTION ANALYSIS FOR E+P CONDITIONS.....103

TABLE 5-2: ROADWAY VOLUME/CAPACITY ANALYSIS FOR E+P CONDITIONS.....104

TABLE 5-3: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR E+P CONDITIONS ..106

TABLE 5-4: BASIC FREEWAY SEGMENT ANALYSIS FOR E+P CONDITIONS109

TABLE 5-5: FREEWAY RAMP JUNCTION MERGE/DIVERGE ANALYSIS FOR E+P CONDITIONS ..110

TABLE 5-6: INTERSECTION ANALYSIS FOR E+P CONDITIONS WITH IMPROVEMENTS111

TABLE 5-7: ROADWAY VOLUME/CAPACITY ANALYSIS (FLORIDA METHOD) FOR E+P CONDITIONS.....113

TABLE 6-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS.....123

TABLE 6-2: ROADWAY VOLUME/CAPACITY ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS.....124

TABLE 6-3: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS130

TABLE 6-4: BASIC FREEWAY SEGMENT ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS.....134

TABLE 6-5: FREEWAY RAMP JUNCTION MERGE/DIVERGE ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS136

TABLE 6-6: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS WITH IMPROVEMENTS137

TABLE 6-7: ROADWAY VOLUME/CAPACITY ANALYSIS FOR OPENING YEAR CUMULATIVE (2020) CONDITIONS WITH IMPROVEMENTS139

TABLE 7-1: INTERSECTION ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS.....149

TABLE 7-2: ROADWAY VOLUME/CAPACITY ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS.....155

TABLE 7-3: PEAK HOUR FREEWAY OFF-RAMP QUEUING SUMMARY FOR HORIZON YEAR (2040) CONDITIONS.....157

TABLE 7-4: BASIC FREEWAY SEGMENT ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS..161

TABLE 7-5: FREEWAY RAMP JUNCTION MERGE/DIVERGE ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS.....162

TABLE 7-6: INTERSECTION ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS WITH IMPROVEMENTS.....163

TABLE 7-7: ROADWAY VOLUME/CAPACITY ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS WITH IMPROVEMENTS165

TABLE 7-8: BASIC FREEWAY SEGMENT ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS WITH IMPROVEMENTS166

TABLE 7-9: FREEWAY RAMP JUNCTION MERGE/DIVERGE ANALYSIS FOR HORIZON YEAR (2040) CONDITIONS WITH IMPROVEMENTS167

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CCI	Construction Cost Index
CMP	Congestion Management Program
CTP	California Transportation Plan
DIF	Development Impact Fee
E+P	Existing Plus Project
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
LOS	Level of Service
MOE	Measure of Effectiveness
MUTCD	Manual on Uniform Traffic Control Devices
N/A	Not Applicable
NCHRP	National Cooperative Highway Research Program
NOP	Notice of Preparation
PCE	Passenger Car Equivalent
PEIR	Program Environmental Impact Report
PeMS	Caltrans Performance Measurement System
PHF	Peak Hour Factor
Project	Roquet Ranch Specific Plan
RCTC	Riverside County Transportation Commission
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
SANBAG	San Bernardino Association of Governments
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
SHS	State Highway System
TIA	Traffic Impact Analysis
vphpl	Vehicles per Hour per Green per Lane

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1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Roquet Ranch Specific Plan (“Project”) located west of La Cadena Drive and north of the future Pellissier Road in the City of Colton. The Project’s preliminary land use plan is shown on Exhibit 1-1.

The purpose of this TIA is to evaluate the potential deficiencies to traffic and circulation associated with the development of the proposed Project, and to recommend improvements necessary to address peak hour operational deficiencies. As directed by City of Colton staff, this traffic study 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 California Department of Transportation (Caltrans) *Guide for the Preparation of Traffic Impact Studies*, County of Riverside County CMP, County of Riverside Traffic Study Guidelines, City of Riverside Traffic Study Guidelines, and consultation with City staff during the scoping process. (1) (2) (3) (4) (5) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

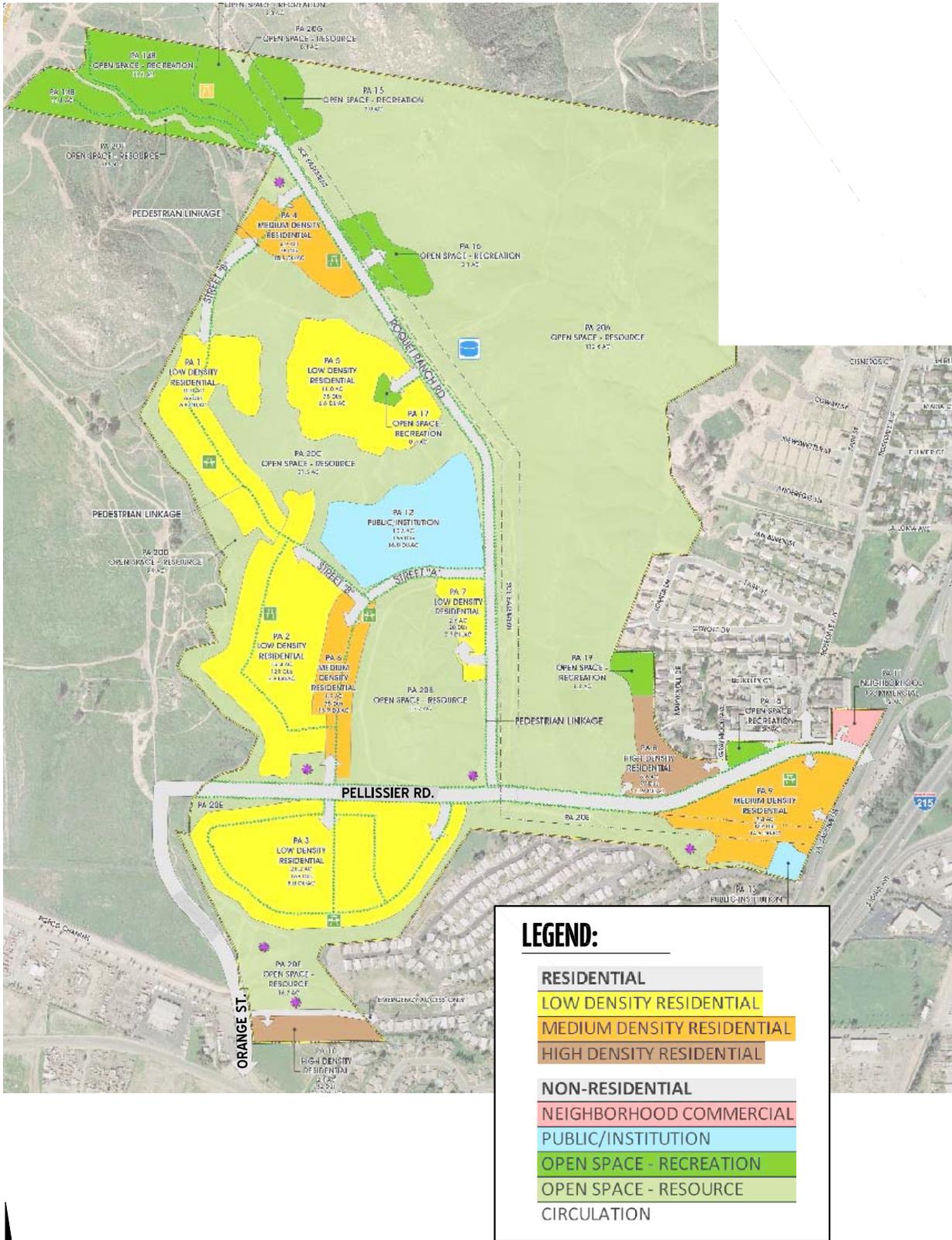
1.1 PROJECT OVERVIEW

The Project is proposed to consist of 754 single-family residential units, 244 condo/townhomes, 52 active adult attached units, 6,500 square feet of commercial retail use, a 1,500 square foot coffee shop with drive-through window, a 4,000 square foot fast-food restaurant with drive-through window, an 11.1-acre community park, and 8.4 acres of passive parks. Planning Area 12 and Planning Area 13 both include Public/Institution uses, however, it has been determined that the residential dwelling unit overlay would generate more off-site trips. As such, the dwelling unit overlay has been evaluated for both Planning Areas 12 and 13 for the purposes of this traffic study. The anticipated Opening Year for the proposed Project is 2020.

Main access to the Project site will be provided via the future Pellissier Road, which will align with the existing W. Maryknoll Drive at La Cadena Drive and secondary access via an extension of Orange Street, north of West Center Street. All proposed access points are assumed to allow for full access.

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) as presented in ITE’s most current edition of *Trip Generation* (9th Edition, 2012) (6). The Project is estimated to generate a net total of 10,021 trip-ends per day on a typical weekday with 819 AM peak hour trips and 991 PM peak hour trips. The assumptions and methods used to estimate the Project’s trip generation characteristics are discussed in detail in Section 4.1 *Project Trip Generation* of this report.

EXHIBIT 1-1: PRELIMINARY LAND USE PLAN



1.2 ANALYSIS SCENARIOS

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

- Existing (2016) Conditions
- Existing plus Project Conditions
- Opening Year Cumulative (2020) Without and With Project Conditions
- Horizon Year (2040) Without and With Project Conditions

1.2.1 EXISTING (2016) CONDITIONS

Information for Existing conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.2.2 EXISTING PLUS PROJECT CONDITIONS

The Existing Plus Project (E+P) conditions analysis determines traffic deficiencies that would occur on the existing roadway system in the theoretical scenario of the Project being placed upon Existing conditions.

1.2.3 OPENING YEAR CUMULATIVE CONDITIONS

The Opening Year Cumulative (2020) conditions analysis determines the potential near-term cumulative circulation system deficiencies. The Opening Year Cumulative traffic forecasts were developed by applying an ambient growth factor to Existing conditions of 4.06 (e.g., 1 percent per year over 4 years, compounded annually). In addition, traffic associated with other cumulative projects that were determined to be in process was also added in conjunction with Project traffic, in an effort to identify cumulative traffic deficiencies.

The Opening Year Cumulative conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City of Colton Development Impact Fee (DIF) program, or other approved funding mechanism can accommodate the near-term cumulative traffic at the target level of service (LOS) identified by the City of Colton (lead agency). It should be noted that the City of Colton has updated their DIF program to also include appropriate contributions towards regionally significant improvements that have been identified via the San Bernardino County CMP regional fee program study. If the planned and funded improvements can provide the target LOS, then the Project’s payment into established fee programs will be considered as feasible cumulative mitigation. Other improvements needed beyond the “funded” improvements (such as localized improvements to non-DIF facilities) are identified as such.

1.2.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) Without Project conditions were derived from the San Bernardino County Transportation Analysis Model (SBTAM), the sub-regional model for San Bernardino County. The initial estimate of the future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Post-processing worksheets for Horizon Year (2040) Without

and With Project traffic conditions are provided in Appendix 4.2. Project traffic was then added to determine Horizon Year (2040) With Project traffic forecasts.

The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the City's DIF program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target LOS identified by the City of Colton (lead agency). It should be noted that the City of Colton has updated their DIF program to also include appropriate contributions towards regionally significant improvements that have been identified via the San Bernardino County CMP regional fee program study. If the planned and funded improvements can provide the target LOS, then the Project's payment into established fee programs will be considered as cumulative mitigation. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-DIF facilities) are identified as such.

1.3 STUDY AREA

To ensure that this TIA satisfies the City of Colton's traffic study requirements, Urban Crossroads, Inc. prepared a Project traffic study scoping package for review by City of Colton 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 Agreement approved by the City of Colton is included in Appendix 1.1.

1.3.1 INTERSECTIONS

The following 39 study area intersections shown in Table 1-1 were selected for this TIA based on the City of Colton's traffic study guidelines that require analysis of intersection locations in which the proposed Project is anticipated to contribute 50 or more peak-hour trips. The intersection locations are also indicated on Exhibit 1-2. The "50 peak hour trip" criterion utilized by the City of Colton is consistent with the methodology employed by the County of San Bernardino, and generally represents a minimum number of trips at which a typical intersection would have the potential to be substantively impacted 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 impact (i.e., study area).

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	S. Riverside Av. / Main St. / Placentia Ln.	City of Colton, City of Riverside
2	Main St. / Columbia Av.	City of Riverside
3	Main St. / Strong St.	City of Riverside
4	Orange St. / Pellissier Rd. – Future Intersection	City of Colton
5	Orange St. / W. Center St.	City of Riverside
6	Orange St. / Columbia Av.	City of Riverside
7	Street "C" / Street "A" – Future Intersection	City of Colton
8	Street "A" / Pellissier Rd. – Future Intersection	City of Colton
9	Roquet Ranch Rd. / Street "A" – Future Intersection	City of Colton
10	Roquet Ranch Rd. / Pellissier Rd. – Future Intersection	City of Colton
11	S. Graymoor Av. / W. Maryknoll Dr.	City of Colton
12	S. Graymoor Av. / Pellissier Rd. – Future Intersection	City of Colton
13	S. Rosedale Av. / W. Maryknoll Dr.	City of Colton
14	Stephens Av. / W. Center St.	County of Riverside
15	S. Rancho Av. / Agua Mansa Rd.	City of Colton
16	La Cadena Dr. / W. N. St.	City of Colton
17	S. La Cadena Dr. / S. Rancho Av. (San Bernardino CMP Intersection)	City of Colton
18	S. La Cadena Dr. / W. Litton Av.	City of Colton
19	S. La Cadena Dr. / Barton Rd.	City of Colton
20	S. La Cadena Dr. / S. Iowa Av.	City of Colton
21	S. La Cadena Dr. / W. Maryknoll Dr.	City of Colton
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp (San Bernardino CMP intersection)	City of Colton, Caltrans
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps (Riverside CMP Intersection)	County of Riverside, Caltrans
24	La Crosse Av. / I-215 SB Off-Ramp (San Bernardino CMP intersection)	City of Grand Terrace, Caltrans
25	La Crosse Av. / Barton Rd.	City of Grand Terrace
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd. (San Bernardino CMP intersection)	City of Grand Terrace, Caltrans
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp (Riverside CMP Intersection)	City of Colton, Caltrans
28	I-215 NB Ramps / Barton Rd. (San Bernardino CMP intersection)	City of Grand Terrace, Caltrans
29	S. Iowa Av. / I-215 NB Ramps (Riverside CMP Intersection)	City of Colton, Caltrans
30	Iowa Av. / W. Main St.	City of Colton, County of Riverside
31	Iowa Av. / E. La Cadena Dr.	County of Riverside
32	Iowa Av. / Center St.	County of Riverside
33	Iowa Av. / W. Citrus St.	City of Riverside
34	Iowa Av. / E. Citrus St.	City of Riverside
35	Michigan Av. / Barton Rd. (San Bernardino CMP Intersection)	City of Grand Terrace

ID	Intersection Location	Jurisdiction
36	Michigan Av. / W. Main St.	City of Grand Terrace
37	Mt. Vernon Av. / Barton Rd. (San Bernardino CMP Intersection)	City of Grand Terrace
38	Mt. Vernon Av. / Main St.	City of Grand Terrace
39	Palm Av. / Barton Rd.	City of Grand Terrace

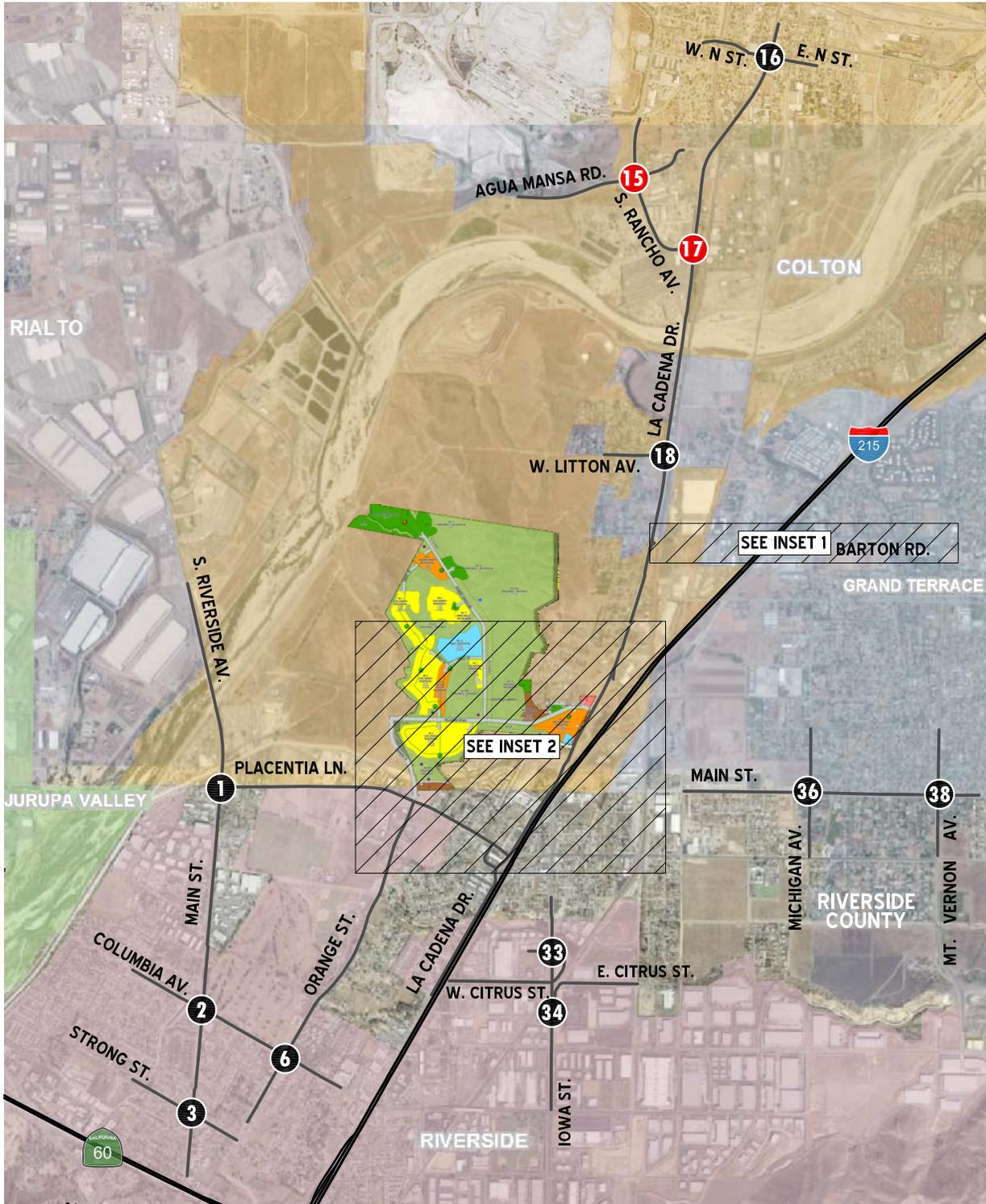
Note: Intersections located within multiple jurisdictions have been noted.

The “50 peak hour trip” criterion is also utilized by Caltrans and the County of Riverside, including the City of Riverside, and the adjacent City of Grand Terrace.

The intent of the 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 impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The San Bernardino County CMP was originally adopted in 1992 and updated in 1993, 1995, 1997, 1999, 2001, 2003, and 2005 and most recently updated in 2007 (although various sections/appendices have been updated as recently as 2011). (1) This revision to the CMP was developed in cooperation with the California Transportation Plan (CTP) Technical Advisory Committee, and was recommended for approval by the Plans and Programs Policy Committee of San Bernardino Associated Governments (SANBAG), prior to its approval by the full Board of Directors. There are seven study area intersections that are ramp-to-arterial intersections with the I-215 Freeway or are located along S. Rancho Avenue (at Agua Mansa Road and S. La Cadena Drive) or Barton Road (at Michigan Avenue and Mt. Vernon Avenue), which are all identified as San Bernardino County CMP facilities.

The Riverside County CMP was first established in 1990 under Proposition 111. (3) Proposition 111 established a process for each metropolitan county in California to designate a Congestion Management Agency that would be responsible for development and implementation of the CMP within county boundaries. Riverside County Transportation Commission (RCTC) was designated as the CMA in 1990, and therefore, prepares the CMP updates in consultation with the Technical Advisory Committee, which consists of local agencies, the County of Riverside, transit agencies, and sub-regional agencies. There are three study area intersections that are ramp-to-arterial intersections with the I-215 Freeway, which is identified as a Riverside County CMP facility.

EXHIBIT 1-2 (1 OF 2): LOCATION MAP

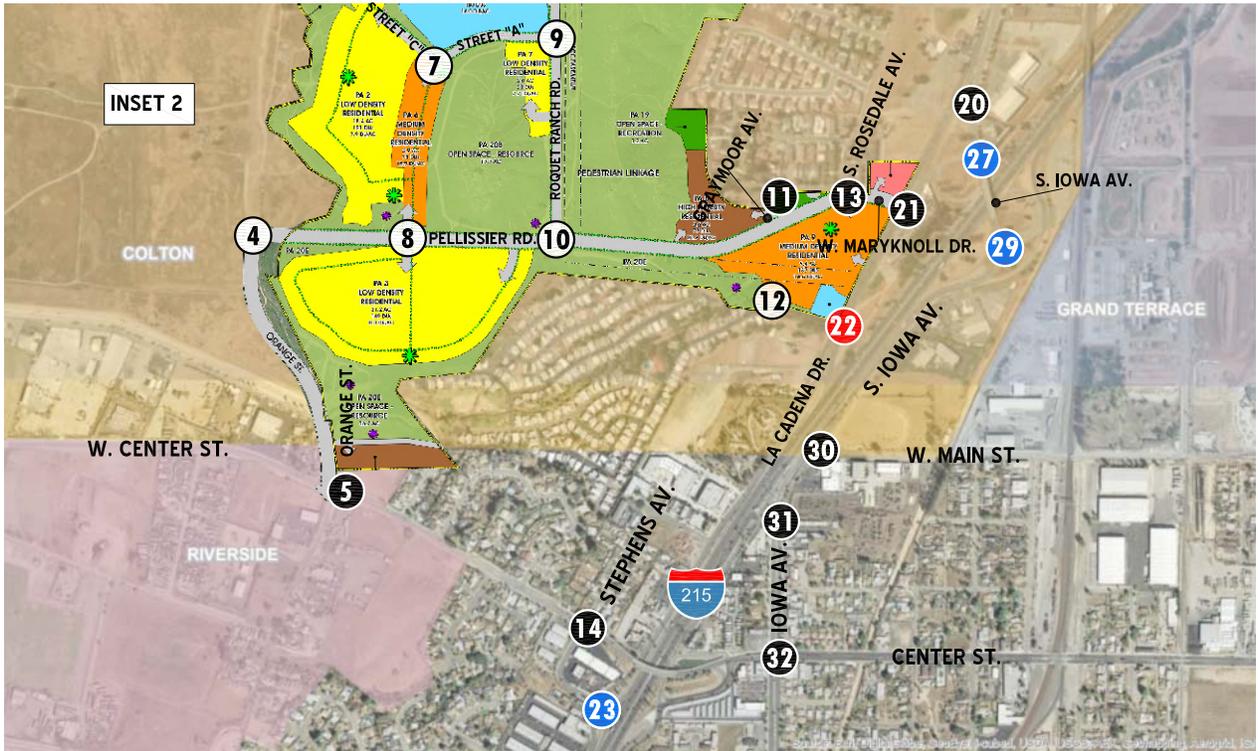


LEGEND:



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

EXHIBIT 1-2 (2 OF 2): LOCATION MAP



LEGEND:



- 0 = EXISTING INTERSECTION ANALYSIS LOCATION
- 0 = FUTURE INTERSECTION ANALYSIS LOCATION
- 0 = SANBAG CMP INTERSECTION ANALYSIS LOCATION
- 0 = RIVERSIDE COUNTY CMP INTERSECTION ANALYSIS LOCATION

1.3.2 ROADWAY SEGMENTS

The roadway segment study area utilized for this analysis is based on a review of the key roadway segments in which the Project is anticipated to contribute 50 or more peak hour trips as shown on Table 1-2. The study area identifies a total of 35 existing/future roadway segments.

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS

ID	Roadway Segment Location	Jurisdiction
1	S. Rancho Av., Agua Mansa Rd. to La Cadena Dr.	City of Colton
2	La Cadena Dr., N. St. to S. Rancho Av.	City of Colton
3	La Cadena Dr., South of S. Rancho Av.	City of Colton
4	La Cadena Dr., North of W. Litton Av.	City of Colton, City of Grand Terrace
5	La Cadena Dr., between W. Litton Av. and Barton Rd.	City of Grand Terrace
6	La Cadena Dr., South of Barton Rd.	City of Colton
7	La Cadena Dr., North of S. Iowa Av.	City of Colton
8	La Cadena Dr., between S. Iowa Av. and Maryknoll Dr.	City of Colton
9	La Cadena Dr., between W. Maryknoll Dr. and Pellissier Rd.	City of Colton
10	Barton Rd., East of La Cadena Dr.	City of Grand Terrace
11	Barton Rd., West of La Crosse Av.	City of Grand Terrace
12	Barton Rd., between La Crosse Av. and I-215 SB Ramps	City of Grand Terrace
13	Barton Rd., between I-215 SB Ramps and I-215 NB Ramps	City of Grand Terrace
14	Barton Rd., between I-215 NB Ramps and Michigan Av.	City of Grand Terrace
15	Barton Rd., East of Michigan Av.	City of Grand Terrace
16	Barton Rd., West of Mt. Vernon Av.	City of Grand Terrace
17	Barton Rd., Mt. Vernon Av. to Palm Av.	City of Grand Terrace
18	Placentia Ln./W. Center St., East of S. Riverside Av./Main St.	City of Colton, County of Riverside
19	Placentia Ln./W. Center St., West of Orange St.	City of Riverside
20	Main St., South of Placentia Ln.	County of Riverside
21	Main St., North of Columbia Av.	City of Riverside
22	Main St., Columbia Av. to Strong St.	City of Riverside
23	Orange St., South of Pellissier Rd.	City of Colton
24	Orange St., North of W. Center St.	City of Colton, City of Riverside
25	Orange St., South of W. Center St.	City of Riverside
26	Orange St., North of Columbia Av.	City of Riverside
27	Pellissier Rd., between Orange St. and St. "A"	City of Colton
28	Pellissier Rd., between St. "A" and Roquet Ranch Rd.	City of Colton
29	Pellissier Rd., East of Roquet Ranch Rd.	City of Colton
30	Pellissier Rd., West of Graymoor Av.	City of Colton
31	W. Maryknoll Dr., between Graymoor Av. and Rosedale Av.	City of Colton
32	W. Maryknoll Dr., between Rosedale Av. and La Cadena Dr.	City of Colton
33	S. Iowa Av., between La Cadena Dr. and I-215 SB Off-Ramp	City of Colton

ID	Roadway Segment Location	Jurisdiction
34	S. Iowa Av., between I-215 SB Off-Ramp and I-215 NB Ramps	City of Colton
35	S. Iowa Av., South of I-215 NB Ramps	City of Colton
36	S. Iowa Av., North of W. Main St.	City of Colton
37	W. Main St., East of S. Iowa Av.	City of Grand Terrace, County of Riverside
38	W. Main St., West of Michigan Av.	City of Grand Terrace, County of Riverside

Note: Roadway segments located within multiple jurisdictions have been noted.

1.3.3 FREEWAY MAINLINE SEGMENTS

Study area freeway mainline analysis locations were selected based on Caltrans traffic study guidelines, which may require the analysis of State highway facilities. (2) Consistent with recent Caltrans guidance, and because impacts 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. As such, this study evaluates the following freeway segments adjacent to the point of entry to the SHS, where the Project is anticipated to contribute 50 or more peak hour trips (see Table 1-3):

TABLE 1-3: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS

ID	Freeway Mainline Segments
1	I-215 Freeway Southbound, North of Barton Rd.
2	I-215 Freeway Southbound, between Barton Rd. and La Cadena Dr.
3	I-215 Freeway Southbound, South of La Cadena Dr.
4	I-215 Freeway Northbound, North of Barton Rd.
5	I-215 Freeway Northbound, between Barton Rd. and La Cadena Dr.
6	I-215 Freeway Northbound, South of La Cadena Dr.

The I-215 Freeway, north of Center Street, is identified as a CMP facility in the San Bernardino County CMP. (1)

1.3.4 FREEWAY MERGE/DIVERGE RAMP JUNCTIONS

The study area freeway merge/diverge ramp junction analysis locations include the following freeway ramp junctions for each direction of flow as shown on Table 1-4, where the Project is anticipated to contribute 50 or more peak hour trips:

TABLE 1-4: FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS LOCATIONS

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Barton Rd. (Diverge)
2	I-215 Freeway – Southbound, Off-Ramp at S. Iowa Av. (Diverge)
3	I-215 Freeway – Southbound, On-Ramp at S. La Cadena Dr. (Merge)
4	I-215 Freeway – Northbound, On-Ramp at Barton Rd. (Merge)
5	I-215 Freeway – Northbound, On-Ramp at S. Iowa Av. (Merge)
6	I-215 Freeway – Northbound, Off-Ramp at S. Iowa Av. (Diverge)

1.4 ANALYSIS FINDINGS

This section provides a summary of the analysis results for Existing (2016), E+P, Opening Year Cumulative (2020), and Horizon Year traffic conditions.

1.4.1 INTERSECTIONS

Existing (2016) Conditions

For Existing (2016) traffic conditions, the following 5 intersections were found to operate at an unacceptable LOS (i.e., LOS E or worse) during one or both the AM and PM peak hours:

ID	Intersection Location
3	Main St. / Strong St. – LOS E PM peak hour only
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps – LOS E PM peak hour only
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp – LOS E AM peak hour only
29	S. Iowa Av. / I-215 NB Ramps – LOS E AM peak hour only
36	Michigan Av. / W. Main St. – LOS E AM peak hour only

E+P Conditions

The intersection analysis results indicate that the addition of Project traffic is anticipated to result in the following additional LOS deficiency, in addition to those previously identified for Existing traffic conditions:

ID	Intersection Location
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F AM and PM peak hours

Improvements needed to address E+P traffic conditions were the same as those identified for Existing traffic conditions, with the exception of the intersection of S. La Cadena Drive and W. Maryknoll Drive.

Opening Year Cumulative (2020) Conditions

Based on a comparison of Existing and Opening Year Cumulative (2020) Without Project traffic conditions, the addition of 4.06% ambient growth along with cumulative development traffic is anticipated to result in the following additional LOS deficiencies, in addition to those previously identified for Existing traffic conditions:

ID	Intersection Location
1	S. Riverside Av. / Main St. / Placentia Ln. – LOS E AM peak hour; LOS F PM peak hour
14	Stephens Av. / W. Center St. – LOS F AM peak hour only
38	Mt. Vernon Av. / Main St. – LOS E AM peak hour only

The following additional study area intersections are anticipated to experience unacceptable LOS (i.e., LOS E or worse) with the addition of Project traffic during one or more peak hours, in addition to those previously identified under Opening Year Cumulative (2020) Without Project conditions:

ID	Intersection Location
5	Orange St. / W. Center St. – LOS E PM peak hour only
20	S. La Cadena Dr. / S. Iowa Av. – LOS F PM peak hour only
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F AM and PM peak hours

Horizon Year (2040) Conditions

Based on a comparison of Opening Year Cumulative (2020) and Horizon Year (2040) Without Project traffic conditions, the following additional LOS deficiency is anticipated during the AM and PM peak hours for Horizon Year (2040) Without Project traffic conditions, in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

ID	Intersection Location
2	Main St. / Columbia Av. – LOS F AM and PM peak hours
17	S. La Cadena Dr. / S. Rancho Av. – LOS F AM and PM peak hours
18	S. La Cadena Dr. / W. Litton Av. – LOS E AM peak hour only
20	S. La Cadena Dr. / S. Iowa Av. – LOS F PM peak hour only
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F PM peak hour only
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp – LOS E PM peak hour only
28	I-215 NB Ramps / Barton Rd. – LOS F PM peak hour only
31	Iowa Av. / E. La Cadena Dr. – LOS F PM peak hour only
32	Iowa Av. / Center St – LOS F AM and PM peak hours

The following additional study area intersection is anticipated to experience unacceptable LOS (i.e., LOS E or worse) with the addition of Project traffic during one or more peak hours, in addition to those previously identified under Horizon Year (2040) Without Project conditions:

ID	Intersection Location
5	Orange St. / W. Center St. – LOS F PM peak hour only

1.4.2 FREEWAY MAINLINE AND RAMP JUNCTIONS

Existing (2016) Conditions

The I-215 Freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing traffic conditions, with the exception of the following:

ID	Freeway Mainline Segments
4	I-215 Freeway Northbound, North of Barton Rd. – LOS E AM peak hour only
5	I-215 Freeway Northbound, between Barton Rd. and La Cadena Dr. – LOS E AM peak hour only

The freeway ramp merge and diverge areas currently operate at LOS D or better, with the exception of the following:

ID	Freeway Merge/Diverge Ramp Junctions
4	I-215 Freeway – Northbound, On-Ramp at Barton Rd. – LOS E AM peak hour only
6	I-215 Freeway – Northbound, Off-Ramp at S. Iowa Av. – LOS E AM peak hour only

E+P Conditions

The addition of Project traffic is not anticipated to result in any additional freeway segment LOS deficiencies, in addition to those previously identified for Existing traffic conditions.

The addition of Project traffic is not anticipated to result in any additional freeway ramp merge and diverge junction LOS deficiencies, in addition to those previously identified for Existing traffic conditions.

Opening Year Cumulative (2020) Conditions

The I-215 Freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours, consistent with Existing traffic conditions, with the exception of the following additional deficiency:

ID	Freeway Mainline Segments
6	I-215 Freeway Northbound, South of La Cadena Dr. – LOS E AM peak hour only

There are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Opening Year Cumulative (2020) Without Project conditions.

The following freeway ramp merge and diverge areas are anticipated to operate at unacceptable LOS under Opening Year Cumulative (2020) Without Project conditions, in addition to those previously identified for Existing traffic conditions:

ID	Freeway Merge/Diverge Ramp Junctions
2	I-215 Freeway – Southbound, Off-Ramp at S. Iowa Av. – LOS E AM peak hour only
5	I-215 Freeway – Northbound, On-Ramp at S. Iowa Av. – LOS E AM and PM peak hours

The addition of Project traffic is anticipated to result in the following additional freeway ramp merge and diverge junction LOS deficiency, in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Barton Rd. – LOS E AM and PM peak hours

Horizon Year (2040) Conditions

All of the I-215 Freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) for Horizon Year (2040) Without Project traffic conditions. There are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year (2040) Without Project conditions.

All of the I-215 Freeway ramp merge and diverge areas are anticipated to operate at unacceptable LOS (i.e., LOS E or worse) for Horizon Year (2040) Without Project traffic conditions. There are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year (2040) Without Project conditions.

1.5 RECOMMENDED IMPROVEMENTS

1.5.1 INTERSECTIONS

Table 1-5 lists the recommended intersection improvements necessary to reduce the identified intersection LOS deficiencies by traffic condition. In addition, Table 1-5 also indicates those improvements currently included in either the City of Colton or Regional DIF. In instances where improvement needs are not covered by DIF, the Project's fair share percentage has been calculated.

1.5.2 ROADWAY SEGMENTS

Table 1-6 lists the recommended roadway improvements consistent with the identified intersection improvements shown previously in Table 1-5, by traffic condition. In addition, Table 1-6 also indicates those improvements currently included in either the City of Colton or Regional DIF fee program. In instances where improvement needs are not covered by DIF, the Project's fair share percentage has been calculated. The following 5 study area intersections are located adjacent to the deficient roadway segments for E+P traffic conditions:

- La Crosse Avenue / I-215 Southbound On-Ramp/Barton Road (#26)
- S. Iowa Avenue/S. La Cadena Drive / I-215 Southbound Off-Ramp (#27)
- I-215 Northbound Ramps / Barton Road (#28)
- S. Iowa Avenue / I-215 Northbound Ramps (#29)
- Iowa Avenue / W. Main Street (#30)

These intersections are anticipated to operate at acceptable LOS with either existing lanes and intersection controls or with the implementation of the recommended improvements shown previously on Table 1-5 for E+P traffic conditions. As such, additional roadway widening has not been recommended as the more detailed peak hour intersection operations analysis demonstrates that the adjacent study area intersections are anticipated to adequately process the peak hour traffic flows and demonstrates that roadway widening is not necessary. The roadway segment deficiencies would be less than significant with the implementation of the recommended intersection improvements shown on Table 1-5 for E+P traffic conditions.

Table 1-5
Page 1 of 3

Summary of Intersection Improvements and Project Fair Share

#	Intersection Location	Jurisdiction	Existing	E+P (Project Buildout)	Analysis Scenarios				Improvements included in City or Regional DIF?	Fair Share % ¹			
					2020 Without Project	2020 With Project	2040 Without Project	2040 With Project					
1	S. Riverside Av. / Main St. / Placentia Ln.	Colton/County of Riverside Colton			Install a traffic signal	Same	Same	Same	No	8.8%			
					Add 2nd WB left turn lane	Same	Same	Same	No				
2	Main St. / Columbia Av.	City of Riverside				Add 2nd WB left turn lane	Same		No	7.2%			
3	Main St. / Strong St.	City of Riverside	Restripe EB approach to provide for a dedicated left turn lane and a shared through-right turn lane	Same	Same	Same	Same	Same	No	9.7%			
5	Orange St. / W. Center St.	City of Riverside				Install a traffic signal		None	No	35.9%			
									Add NB left turn lane				
									Add 2nd SB left turn lane				
									Add EB left turn lane				
14	Stephens Av. / W. Center St.	County of Riverside			Add WB left turn lane	Same	Same	Same	No	2.9%			
									Add NB left turn lane				
									Add 2nd WB through lane				
17	S. La Cadena Dr. / S. Rancho Av.	Colton				Install a traffic signal	Implement overlap phasing to EB right turn lane	Same	City of Colton Capital Improvement Program	10.9%			

Table 1-5
Page 2 of 3

Summary of Intersection Improvements and Project Fair Share

#	Intersection Location	Jurisdiction	Existing	E+P (Project Buildout)	Analysis Scenarios						Improvements included in City or Regional DIF?	Fair Share % ¹
					2020 Without Project	2020 With Project	2040 Without Project	2040 With Project	2040 Without Project	2040 With Project		
18	S. La Cadena Dr. / W. Litton Av.	Colton/Grand Terrace							Install a traffic signal	Same	No	24.1%
20	S. La Cadena Dr. / S. Iowa Av.	Colton							Add NB through lane Add SB through lane	Same Same	No No	27.3%
21	S. La Cadena Dr. / W. Maryknoll Dr.	Colton			None	Install a traffic signal	Restripe EB approach to provide for a dedicated left turn lane and a shared through-right turn lane	Same	Same	Same	No	44.6%
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	Colton							Install a traffic signal	Same	No	21.5%
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	County of Riverside	Install a traffic signal	Same	Same	Same	Same	Same	Same	Same	No	0.4%
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd.	Grand Terrace/Caltrans			Implement Roundabout	Same	Same	Same	Same	Same	No	12.2%
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	Colton/Caltrans	Install a traffic signal	Same	Same	Same	Same	Same	Same	Same	No	11.7%
29	S. Iowa Av. / I-215 NB Ramps	Colton/Caltrans	Add SB right turn lane	Same	Same	Same	Same	Same	Add 2nd EB left turn lane Add 2nd NB through lane	Same Same	No No	3.1%
		Colton			Add 2nd EB left turn lane	Same	Same	Same	Same	Same	No	

Summary of Intersection Improvements and Project Fair Share

#	Intersection Location	Jurisdiction	Existing	Analysis Scenarios						Improvements included in City or Regional DIF?	Fair Share % ¹
				E+P (Project Buildout)	2020 Without Project	2020 With Project	2040 Without Project	2040 With Project	2040 With Project		
31	Iowa Av. / E. La Cadena Dr.	County of Riverside					Install a traffic signal	Same		No	2.8%
32	Iowa Av. / Center St.	County of Riverside					Implement protected phasing on eastbound and westbound left turns	Same		No	4.9%
36	Michigan Av. / W. Main St.	Grand Terrace	Add SB right turn lane	Same			Eliminate crosswalk on the east leg	Same		No	4.9%
38	Mt. Vernon Av. / Main St.	Grand Terrace/ County of Riverside County of Riverside		Install a traffic signal	Same	Same	Same	Same		No	3.0%

There are no recommended improvements included in any fee programs based on review of the following documents: Measure I City of Colton, County of San Bernardino Regional Transpiration Development Mitigation Plan Report, and Appendix K of the SANBAG Congestion Management Program for the City of Colton and Colton Sphere Tables shown in Attachment 1.

¹ Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 1-7 for Fair Share Calculations.

² Interchange redesign includes a roundabout to provide access to the I-215 and La Crosse Avenue at Barton Road. Costs for the Project Approval/Environmental Document phase are funded by SANBAG and Federal Demonstration Funds. The project cost through construction will be provided by Measure I. SANBAG has secured state and federal funding sources as well.



Table 1-6

Summary of Roadway Segment Improvements

#	Roadway	Segment Limits	Jurisdiction	Analysis Scenarios						Improvements included in City or Regional DIF? ¹	Fair Share
				Existing	E+P (Project Buildout)	2020 Without Project	2020 With Project	2040 Without Project	2040 With Project		
33	South Iowa Avenue	Between La Cadena Dr. and I-215 SB Off-Ramp	Colton	None	None	None	Improved to a 4 lane undivided facility	Same	Same	No	19.0%
34		Between I-215 SB Off-Ramp and I-215 NB Ramps	Colton	None	None	None	None	Improved to a 3 lane undivided facility	Same	No	23.0%

¹ All recommended improvements are consistent with the general plan designations of the respective jurisdictions in which they are located.

1.5.3 FREEWAY SEGMENTS

The I-215 Bi-County Gap Closure project includes the construction of an additional high-occupancy vehicle (HOV) lane in each direction of the I-215 Freeway within a 7.5-mile stretch of the I-215 Freeway from north of Orange Show Road in San Bernardino to just south of the SR-60/SR-91 Freeway interchange. The I-215 Bi-County Gap Closure project was completed in late 2015. For Horizon Year traffic conditions only, an additional mixed-flow lane has been assumed in conjunction with the existing three mixed-flow lanes in each direction of travel.

Although there are peak hour operational improvements, several of the I-215 freeway mainline segments and freeway merge and diverge ramp junctions are anticipated to continue to operate at an unacceptable LOS with the improvements discussed above (i.e., LOS E or worse) under Horizon Year traffic conditions.

1.6 LOCAL AND REGIONAL FUNDING MECHANISMS

1.6.1 CITY OF COLTON DEVELOPMENT IMPACT FEE (DIF) 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.

1.6.2 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 SANBAG 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 2013. 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 SANBAG, 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.

1.6.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs, 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 on Table 1-7 for the cumulatively impacted intersections shown on Table 1-5.

Improvements included in a defined program and constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate.

1.7 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

Main access to the Project site will be provided via the future Pellissier Road which is proposed to extend and connect with the existing W. Maryknoll Drive at La Cadena Drive and secondary access via an extension of Orange Street, north of W. Center Street. All proposed access points are assumed to allow for full access. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements should be in place prior to occupancy.

1.7.1 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

The recommended site-adjacent roadway improvements the Project are described below. These improvements need to be incorporated into the project description prior to Project approval or imposed as conditions of approval as part of the Project approval. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations.

Table 1-7

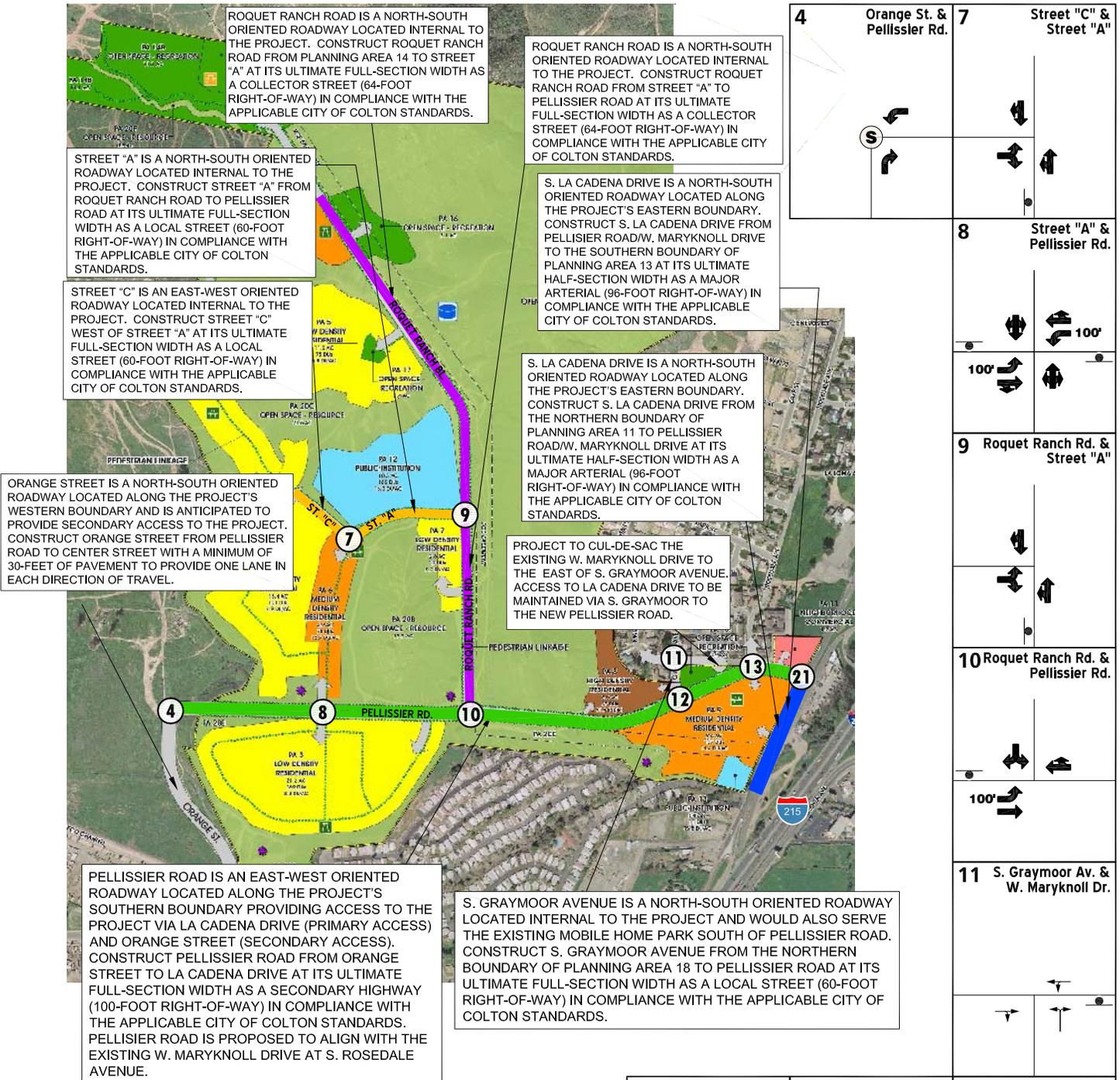
Project Fair Share Calculations

#	Intersection	Existing	Project	2040 WP	Total New Traffic	Project % of New Traffic ¹
1	S. Riverside Av. / Main St. / Placentia Ln.	AM: 1,666	114	2,963	1,297	8.8%
		PM: 2,080	156	3,706	1,626	9.6%
2	Main St. / Columbia Av.	AM: 2,100	66	3,257	1,157	5.7%
		PM: 2,460	92	3,738	1,278	7.2%
3	Main St. / Strong St.	AM: 1,926	50	2,559	633	7.9%
		PM: 2,205	73	2,955	750	9.7%
5	Orange St. / W. Center St.	AM: 272	206	918	646	31.9%
		PM: 598	276	1,367	769	35.9%
14	Stephens Av. / W. Center St.	AM: 872	26	1,588	716	3.6%
		PM: 866	32	1,974	1,108	2.9%
17	S. La Cadena Dr. / S. Rancho Av.	AM: 1,439	121	2,547	1,108	10.9%
		PM: 1,681	166	3,010	1,329	12.5%
18	S. La Cadena Dr. / W. Litton Av.	AM: 1,668	131	2,314	646	20.3%
		PM: 1,756	177	2,490	734	24.1%
20	S. La Cadena Dr. / S. Iowa Av.	AM: 1,760	481	3,086	1,326	36.3%
		PM: 1,892	646	4,261	2,369	27.3%
21	S. La Cadena Dr. / W. Maryknoll Dr.	AM: 913	633	1,878	965	65.6%
		PM: 1,042	729	2,675	1,633	44.6%
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	AM: 874	95	1,315	441	21.5%
		PM: 972	62	1,993	1,021	6.1%
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	AM: 994	5	1,567	573	0.9%
		PM: 1,148	3	1,852	704	0.4%
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	AM: 1,444	165	2,400	956	17.3%
		PM: 1,499	230	3,377	1,878	12.2%
29	S. Iowa Av. / I-215 NB Ramps	AM: 1,868	145	2,955	1,087	13.3%
		PM: 1,979	170	3,435	1,456	11.7%
31	Iowa Av. / E. La Cadena Dr.	AM: 1,675	24	2,459	784	3.1%
		PM: 1,875	30	2,848	973	3.1%
32	Iowa Av. / Center St.	AM: 1,854	43	3,338	1,484	2.9%
		PM: 2,109	57	4,136	2,027	2.8%
36	Michigan Av. / W. Main St.	AM: 1,203	33	1,875	672	4.9%
		PM: 644	21	1,339	695	3.0%
38	Mt. Vernon Av. / Main St.	AM: 940	21	1,637	697	3.0%
		PM: 695	13	1,509	814	1.6%

BOLD Fair share percentage of the deficient peak hour is highlighted. If all peak hours are deficient, the higher Project percentage is highlighted.

¹ Project percentage of new traffic between Existing (2016) and Horizon Year (2040) traffic conditions. Fair Share percentage of most impacted peak hour is highlighted.

EXHIBIT 1-3: SITE ADJACENT ROADWAY & ON-SITE CIRCULATION RECOMMENDATIONS



LEGEND:

- = TRAFFIC SIGNAL
- = ALL WAY STOP
- = STOP SIGN
- = EXISTING LANE
- = LANE IMPROVEMENT
- = 150' MINIMUM STORAGE LENGTH
- = MAJOR (96' R.O.W.)
- = SECONDARY (100' R.O.W.)
- = COLLECTOR (64' R.O.W.)
- = LOCAL (60' R.O.W.)

<p>4 Orange St. & Pellissier Rd.</p>	<p>7 Street "C" & Street "A"</p>
<p>8 Street "A" & Pellissier Rd.</p>	<p>9 Roquet Ranch Rd. & Street "A"</p>
<p>10 Roquet Ranch Rd. & Pellissier Rd.</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p>
<p>12 S. Graymoor Av. & Pellissier Rd.</p>	<p>13 S. Rosendale Av. & W. Maryknoll Dr.</p>
<p>21 La Cadena Dr. S. & W. Maryknoll Dr.</p>	

Exhibit 1-3 also illustrates the on-site and site adjacent intersection improvements. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

Pellissier Road – Pellissier Road is an east-west oriented roadway located along the Project’s southern boundary providing access to the Project via La Cadena Drive (primary access) and Orange Street (secondary access). Construct Pellissier Road from Orange Street to La Cadena Drive at its ultimate full-section width as a Secondary Highway (100-foot right-of-way) in compliance with the applicable City of Colton standards. Pellissier Road is proposed to align with the existing W. Maryknoll Drive at Rosedale Avenue.

Orange Street – Orange Street is a north-south oriented roadway located along the Project’s western boundary and is anticipated to provide secondary access to the Project. Construct Orange Street from Pellissier Road to Center Street with a minimum of 30-feet of pavement to provide one lane in each direction of travel.

Street A – Street A is a north-south oriented roadway located internal to the Project. Construct Street A from Roquet Ranch Road to Pellissier Road at its ultimate full-section width as a Local Street (60-foot right-of-way) in compliance with the applicable City of Colton standards.

Roquet Ranch Road – Roquet Ranch Road is a north-south oriented roadway located internal to the Project. Construct Roquet Ranch Road from Planning Area 14 to Pellissier Road at its ultimate full-section width as a Collector Street (64-foot right-of-way) in compliance with the applicable City of Colton standards.

Street C – Street C is an east-west oriented roadway located internal to the Project. Construct Street C west of Street A at its ultimate full-section width as a Local Street (60-foot right-of-way) in compliance with the applicable City of Colton standards.

S. Graymoor Avenue – S. Graymoor Avenue is a north-south oriented roadway located internal to the Project and would also serve the existing mobile home park south of Pellissier Road. Construct S. Graymoor Avenue from the northern boundary of Planning Area 18 to Pellissier Road at its ultimate full-section width as a Local Street (60-foot right-of-way) in compliance with the applicable City of Colton standards.

W. Maryknoll Drive – W. Maryknoll Drive is an east-west oriented roadway located to the north of Planning Area 18. Project is to cul-de-sac the existing W. Maryknoll Drive to the east of S. Graymoor Avenue. Access to La Cadena Drive to be maintained via S. Graymoor Avenue to the new Pellissier Road.

S. La Cadena Drive – S. La Cadena Drive is a north-south oriented roadway located along the Project’s eastern boundary. Construct S. La Cadena Drive from the northern boundary of Planning Area 11 to the southern boundary of Planning Area 13 at its ultimate half-section width as a Major Arterial (96-foot right-of-way) in compliance with the applicable City of Colton standards.

Orange Street / Pellissier Road – Install a stop control on the northbound and westbound approaches and construct the intersection with the following geometrics:

- Northbound Approach: One right turn lane.
- Southbound Approach: Not Applicable (N/A)
- Eastbound Approach: N/A
- Westbound Approach: One left turn lane.

Street C / Street A – Install a stop control on the southbound approach and construct the intersection with the following geometrics:

- Northbound Approach: N/A
- Southbound Approach: One shared left-right turn lane.
- Eastbound Approach: One shared left-through lane.
- Westbound Approach: One shared through-right turn lane.

Street A / Pellissier Road – Install a stop control on the northbound and southbound approaches and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through-right turn lane.
- Southbound Approach: One shared left-through-right turn lane.
- Eastbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and one shared through-right turn lane.
- Westbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and one shared through-right turn lane.

Roquet Ranch Road / Street A – Install a stop control on the eastbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through lane.
- Southbound Approach: One shared through-right turn lane.
- Eastbound Approach: One shared left-right turn lane.
- Westbound Approach: N/A

Roquet Ranch Road / Pellissier Road – Install a stop control on the southbound approach and construct the intersection with the following geometrics:

- Northbound Approach: N/A
- Southbound Approach: One shared left-right turn lane.
- Eastbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and one through lane.
- Westbound Approach: One shared through-right turn lane.

S. Graymoor Avenue / W. Maryknoll Drive – Install a stop control on the northbound approach and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-right turn lane.
- Southbound Approach: N/A

- Eastbound Approach: One shared through-right turn lane.
- Westbound Approach: One shared left-through lane.

S. Graymoor Avenue / Pellissier Road – This intersection would serve the existing mobile home park to the south on S. Graymoor Avenue. Install a stop control on the northbound and southbound approaches and construct the intersection with the following geometrics:

- Northbound Approach: N/A
- Southbound Approach: One shared left-right turn lane.
- Eastbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and one through lane.
- Westbound Approach: One shared through-right turn lane.

S. Rosedale Avenue / Pellissier Road/W. Maryknoll Drive – Although not a new intersection, Planning Area 9 is proposed to take access via a southern extension of S. Rosedale Avenue. Install a stop control on the northbound approach (and maintain the existing stop control on the southbound approach) and construct the intersection with the following geometrics:

- Northbound Approach: One shared left-through-right turn lane.
- Southbound Approach: One shared left-through-right turn lane.
- Eastbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and a shared through-right turn lane.
- Westbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and a shared through-right turn lane.

La Cadena Drive S. / Pellissier Road/W. Maryknoll Drive – Install a traffic signal and construct the intersection with the following geometrics:

- Northbound Approach: One left turn lane with 100 feet of storage to accommodate 95th percentile queues and one shared through-right turn lane.
- Southbound Approach: One shared left-through lane, one through lane, and one right turn lane.
- Eastbound Approach: One left turn lane with 250 feet of storage to accommodate 95th percentile queues and one shared through-right turn lane.
- Westbound Approach: One shared left-through-right turn lane.

On-site traffic signing and striping should be implemented 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.

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with the recommended roadway classifications and respective cross-sections in the City of Colton General Plan Circulation Element.

1.7.2 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted at the site adjacent and internal intersections for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate long-range 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours. The 95th percentile queues are reported on the LOS worksheets found in Appendix 1.2.

The traffic modeling and signal timing optimization software package Synchro (Version 9.1 Build 904) has been utilized to assess queues at the site adjacent intersections. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the Highway Capacity Manual (HCM). (7) Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections.

The 95th percentile queue has been utilized for purposes of determining the necessary turn pocket storage lengths and represents the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations. However, many jurisdictions utilize the 95th percentile queues for design purposes.

The storage length recommendations for the turning movements at the Project were shown previously on Exhibit 1-3.

1.8 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

1.8.1 PEDESTRIAN ACCOMMODATIONS

The Project will construct the roadway and intersection improvements described previously. In addition, the Project is proposing pedestrian linkages throughout the Specific Plan along Street A, Roque Ranch Road, Street C, Pellissier Road, S. Graymoor Avenue, and within several Planning Areas. The pedestrian linkages provide connections for pedestrians between the internal street system and pocket parks located throughout the community. The pedestrian linkage along Roquet Ranch Road will provide access to the existing Santa Ana River Trail to the north.

2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are generally consistent with City of Colton and Caltrans traffic study guidelines. (1) (2)

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 *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (7) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

City of Colton, City of Grand Terrace, City of Riverside, County of Riverside

The City of Colton, City of Grand Terrace, City of Riverside, and County of Riverside requires signalized intersection operations analysis based on the methodology described in Chapters 18 and 31 of the HCM 2010. (7) 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.

TABLE 2-1: DESCRIPTION OF SIGNALIZED INTERSECTION LOS

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

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 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 2010

The traffic modeling and signal timing optimization software package Synchro (Version 9.1 Build 904) has been utilized to analyze signalized intersections within the study area. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the Chapters 18 and 31 of the HCM 2010. (7) 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 LOS 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. $PHF = \frac{Hourly\ Volume}{4 \times Peak\ 15\text{-minute}\ Flow\ Rate}$). 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, with the exception of Horizon Year traffic conditions. Per Chapter 4 of the HCM 2010, 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. (7) A minimum PHF of 0.92 has been utilized for study area intersections under Horizon Year traffic conditions only.

Consistent with Appendix C, Page C-13 of the San Bernardino County CMP, 2005 Update, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections: (1)

Existing, E+P, 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

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 9.1 Build 904) has been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. I-215 Ramps at Barton Road, I-215 Ramps at Iowa Avenue, and I-215 Ramps at Stephens Avenue). (2) Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the Chapter 18 of 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. Signal timing for the freeway arterial-to-ramp intersections have been obtained from Caltrans District 8 and were utilized for the purposes of this analysis.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Colton, City of Grand Terrace, City of Riverside, and County of Riverside requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM 2010. (7) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

At two-way or side-street stop-controlled intersections, the LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole. For all-way stop controlled intersections, LOS is based solely on control delay for assessment of LOS at the approach and intersection levels.

TABLE 2-2: DESCRIPTION OF UNSIGNALIZED INTERSECTION LOS

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 2010

2.3 ROADWAY SEGMENT CAPACITY ANALYSIS METHODOLOGY

Roadway segment operations have been evaluated using the applicable average daily traffic (ADT) roadway capacity values provided in one of the following documents: *City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets.*

The roadway capacities utilized for the purposes of this analysis are considered “rule of thumb” estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. As such, where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis and progression analysis are undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

2.4 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 TIA uses the signal warrant criteria presented in the latest edition of the Federal Highway Administration’s (FHWA) *Manual on Uniform Traffic Control Devices (MUTCD)*, as amended by the *MUTCD 2014 California Supplement*, for all study area intersections. (8)

The signal warrant criteria for existing intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. Both the FHWA’s *MUTCD* and the *MUTCD 2014 California Supplement* indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (8) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate

representative traffic signal warrant analysis for existing intersections. Warrant 3 criteria are basically identical for both the FHWA’s *MUTCD* and the *MUTCD 2014 California Supplement*. Warrant 3 is appropriate to use for this TIA 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 unsignalized intersections have been assessed regarding the potential need for traffic signals based on future average daily traffic (ADT), using the Caltrans planning level ADT based signal warrant analysis worksheets and the previously mentioned Warrant 3. As shown on Table 2-3, traffic signal warrant analyses were performed for the following unsignalized study area intersections:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
1	S. Riverside Av. / Main St. / Placentia Ln.	City of Colton, City of Riverside
4	Orange St. / Pellissier Rd.	City of Colton
5	Orange St. / W. Center St.	City of Riverside
7	Street C / Street A	City of Colton
8	Street A / Pellissier Rd.	City of Colton
9	Roquet Ranch Road / Street A	City of Colton
10	Roquet Ranch Road / Pellissier Rd.	City of Colton
11	S. Graymoor Av. / W. Maryknoll Dr.	City of Colton
12	S. Graymoor Av. / Pellissier Rd.	City of Colton
13	S. Rosedale Av. / W. Maryknoll Dr.	City of Colton
17	S. La Cadena Dr. / S. Rancho Av.	City of Colton
18	S. La Cadena Dr. / W. Litton Av.	City of Colton
20	S. La Cadena Dr. / S. Iowa Av.	City of Colton
21	S. La Cadena Dr. / W. Maryknoll Dr.	City of Colton
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	City of Colton, Caltrans
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	County of Riverside, Caltrans
24	La Crosse Av. / I-215 SB Off-Ramp	City of Grand Terrace, Caltrans
25	La Crosse Av. / Barton Rd.	City of Grand Terrace
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	City of Colton, Caltrans
31	Iowa Av. / E. La Cadena Dr.	County of Riverside
28	Mt. Vernon Av. / Main St.	City of Grand Terrace
39	Palm Av. / Barton Rd.	City of Grand Terrace

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.

2.5 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TIA includes the freeway-to-arterial interchanges of the I-215 Freeway at Barton Road off-ramps, S. Iowa Avenue off-ramps, and I-215 Freeway at La Cadena Drive W. off-ramps. Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing impacts at the freeway ramp intersections on Barton Road, S. Iowa Avenue, and La Cadena Drive W. Specifically, the queuing analysis is utilized to identify any potential queuing and “spill back” onto the I-215 Freeway from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, SimTraffic, has been used to assess the potential impacts/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 SimTraffic analysis tool. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. The queue length reported is for the lane with the highest queue in the lane group.

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. Although only the 95th percentile queue has been reported in the tables, the 50th percentile queue can be found in the appendix alongside the 95th percentile queue for each ramp location. The 50th percentile maximum queue is the maximum back of queue on a typical cycle during the peak hour, while the 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour. In other words, if traffic were observed for 100 cycles, the 95th percentile queue would be the queue experienced with the 95th busiest cycle (or 5% of the time). The 50th percentile or average queue represents the typical queue length for peak hour traffic conditions, while the 95th percentile queue is derived from the average queue plus 1.65 standard deviations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations.

2.6 FREEWAY MAINLINE SEGMENT ANALYSIS

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 report based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in Chapter 11 of the HCM 2010 and performed using HCS 2010 software. (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 thresholds 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. Demand exceeds capacity.	>45.0

¹ pc/mi/ln = passenger cars per mile per lane. Source: HCM 2010

The number of lanes for Existing conditions has been obtained from field observations conducted by Urban Crossroads in February of 2016. SANBAG and RCTC have recently (in 2015) completed constructing one HOV lane in each direction of the I-215 Freeway through the study area (i.e., the I-215 Bi-County Gap Closure project). The I-215 Bi-County Gap Closure project has added an HOV lane in each direction to a 7.5-mile section of the I-215 freeway from the SR-91 and SR-60 junction to just north of Orange Show Road in San Bernardino.

The I-215 Freeway mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-215 Freeway between the on and off ramps at Barton Road. (9) The data obtained was from the month of February 2016. More recent mainline volume data was not available as the detection loops on this stretch of the I-215 Freeway has been reported by PeMS as not being in service. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the morning (AM) and evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and potential deficiencies. As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the basic freeway segment analysis.

2.7 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 two existing on and off ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study 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 HCS 2010 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 2010

Similar to the basic freeway segment analysis, the I-215 Freeway mainline volume data were obtained from the Caltrans PeMS website for the segments of the I-215 Freeway between the on and off ramps 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 areas with no unexplained loss of vehicles. The data was obtained from February 2016. 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, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and peak hour deficiencies. (9) As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis.

2.8 MINIMUM LOS

The definition of an intersection deficiency has been obtained from each of the applicable surrounding jurisdictions.

2.8.1 CITY OF COLTON

The City of Colton has established LOS D as the minimum level of service for its intersections. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

2.8.2 CITY OF GRAND TERRACE, CITY OF RIVERSIDE, COUNTY OF RIVERSIDE

The City of Grand Terrace, City of Riverside, and County of Riverside have established LOS D as the minimum level of service for its intersections. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

As such, study intersections in the City of Grand Terrace, City of Riverside, and County of Riverside will follow the same LOS criteria as those described for the City of Colton.

2.8.3 CALTRANS

Based on recent guidance from Caltrans District 8, the LOS for operating State highway facilities is based on Measures of Effectiveness (MOE) identified in the HCM. Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State highway 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. If an existing State highway facility is operating at less than this target LOS, the existing MOE should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways, roadways segments, and intersections is D. For undeveloped or not densely developed locations, the goal may be to achieve LOS C.

2.8.4 CONGESTION MANAGEMENT PROGRAM (CMP)

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, except where an existing LOS F condition is identified in either the 2007 San Bernardino CMP document or 2011 Riverside County CMP document. (1) (3) However, in an effort to conduct a conservative analysis and overstate, as opposed to understate potential traffic impacts, the more conservative LOS requirements of the local jurisdictions and Caltrans (i.e., LOS D) has been utilized for the purposes of this analysis.

2.9 DEFICIENCY CRITERIA

2.9.1 CITY OF COLTON, CITY OF GRAND TERRACE, COUNTY OF RIVERSIDE, AND CALTRANS INTERSECTIONS

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

- A significant project-related 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 significant project-related 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.

2.9.2 CITY OF RIVERSIDE INTERSECTIONS

To determine whether the addition of Project traffic (as defined through the comparison of Existing traffic conditions to E+P traffic conditions) at a study intersection would result in a direct project-specific traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D (i.e., unacceptable LOS) or increases to the peak hour delay as defined in Table 2-6, a deficiency is deemed to occur.

TABLE 2-6: THRESHOLDS OF SIGNIFICANCE

Pre-Project LOS	Project-Related Delay Increase	Mitigation Measure
A/B	10.0 Seconds or More	Achieve Pre-project delay or better
C	8.0 Seconds or More	Achieve Pre-project delay or better
D	5.0 Seconds or More	Achieve Pre-project delay or better
E	2.0 Seconds or More	Achieve Pre-project delay or better
F	1.0 Second or More	Achieve Pre-project delay or better

However, when the pre-Project condition is already below LOS D (i.e., unacceptable LOS), the Project will be responsible for mitigating its impact to a level of service equal to or better than it was without the Project for intersections that receive 50 or more peak hour project-related trips. This is a standard protocol in many urban jurisdictions because to require a Project to mitigate to LOS D or better would in effect force the Project to mitigate beyond its Project impacts, which is prohibited under California law. Thus, for intersections currently operating at unacceptable LOS during either the AM and/or PM peak hour under Existing traffic conditions, improvements have been identified to mitigate the impacts of the Project to an intersection LOS that is equal to or better than pre-Project conditions.

2.19.3 CALTRANS FREEWAY MAINLINE

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

- The traffic study finds that the LOS of a segment or ramp junction will degrade from D or better to E or F.
- The traffic study finds that the project will exacerbate an already deficient condition by contributing 50 or more peak hour trips. A segment or ramp junction that is operating at or near capacity is deemed to be deficient.

2.10 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this report identifies that the proposed Project would have a cumulative deficiency to a roadway facility, and the recommended improvement is a fair share monetary contribution, the following methodology was applied to determine the fair share contribution. A project’s fair share contribution at an off-site study area intersection is determined based on the

following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future traffic less existing baseline traffic:

Project Fair Share % = Project Traffic / (Horizon Year With Project Total Traffic – Existing Traffic)

The Project fair share contribution calculations were presented previously in Section 1.6 *Local and Regional Funding Mechanisms* of this report.

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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, roadway segment capacities, freeway mainline operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the Traffic Study Scoping Agreement (Appendix 1.1) and discussion with City of Colton staff, the study area includes a total of 39 existing and future intersections as shown previously on Exhibit 1-2. Of these 39 intersections, the existing study area circulation network includes 27 intersections. The proposed Project's two future driveways are future roadways that do not currently exist.

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 GENERAL PLAN CIRCULATION ELEMENT

As previously noted, the Project site is located 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.

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. Exhibit 3-6 shows the City of Riverside General Plan Circulation Element, and Exhibit 3-7 illustrates the City of Riverside General Plan roadway cross-sections. Exhibit 3-8 shows the County of Riverside General Plan Circulation Element, and Exhibit 3-9 illustrates the County of Riverside General Plan roadway cross-sections.

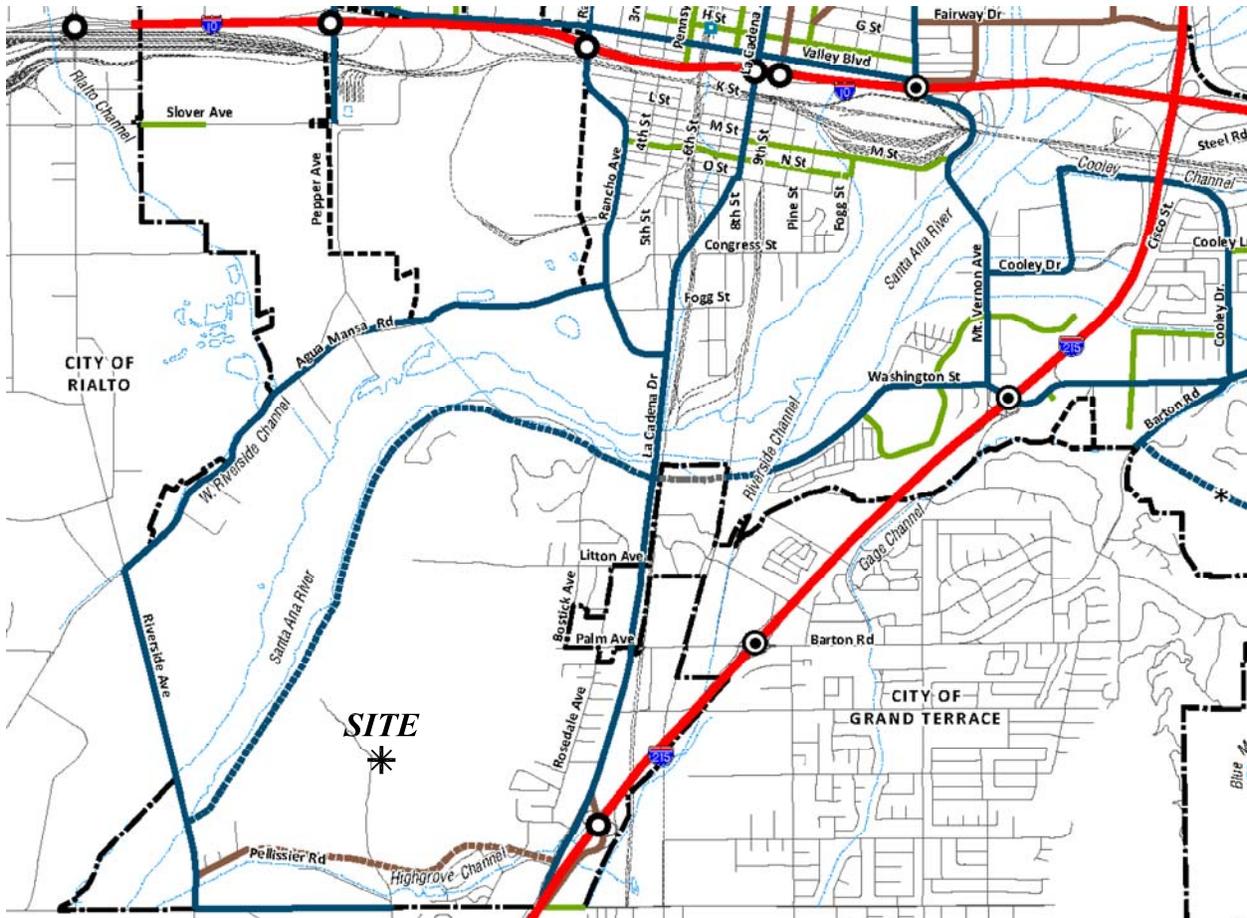
3.3 TRANSIT SERVICE

The study area is currently served by the OmniTrans, OmniGo, and Riverside Transit Authority (RTA), public transit agencies serving the City of Colton, City of Grand Terrace, City of Riverside, and unincorporated Riverside County region, with bus service along Barton Road, Michigan Avenue, Center Street, Iowa Avenue, Main Street, Orange Street, La Cadena Drive, and Columbia Avenue (see Exhibit 3-10). As shown on Exhibit 3-10, the study area is currently served by OmniTrans Route 215, OmniGo Route 325, RTA Route 12, and RTA Route 14. There are no transit routes that serve roadways in the immediate vicinity of the Project. Transit service is reviewed and updated by OmniTrans and RTA 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. Exhibit 3-11 illustrates the City of Colton Transit Plan and City of Riverside Transit facilities are shown on Exhibit 3-12.

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

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p>	<p>2 Main St. & Columbia Av.</p>	<p>3 Main St. & Strong St.</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>5 Orange St. & W. Center St.</p>	<p>6 Orange St. & Columbia Av.</p>	<p>7 Street "C" & Street "A"</p> <p>Future Intersection</p>
<p>8 Street "A" & Pellissier Rd.</p> <p>Future Intersection</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>Future Intersection</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p>	<p>14 Stephens Av. & W. Center St.</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p>	<p>16 La Cadena Dr. & W. N St.</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p>	<p>25 La Crosse Av. & Barton Rd.</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p>	<p>28 I-215 NB Ramps & Barton Rd.</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p>	<p>30 Iowa Av. & W. Main St.</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p>	<p>32 Iowa Av. & Center St.</p>	<p>33 Iowa Av. & W. Citrus St.</p>	<p>34 Iowa Av. & E. Citrus St.</p>	<p>35 Michigan Av. & Barton Rd.</p>
<p>36 Michigan Av. & W. Main St.</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p>	<p>38 Mt. Vernon Av. & Main St.</p>	<p>39 Palm Av. & Barton Rd.</p>	<p>LEGEND:</p> <ul style="list-style-type: none"> = TRAFFIC SIGNAL = ALL WAY STOP = STOP SIGN = FREE RIGHT TURN = CHANNELIZED YIELD = RIGHT TURN OVERLAP = DEFACTO RIGHT TURN 		

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

Freeway Interchanges

- Interchanges
- Interchanges with Planned Improvements

Street Closure

- Street Closure (BSNF Quiet Zone Project)

Boundaries

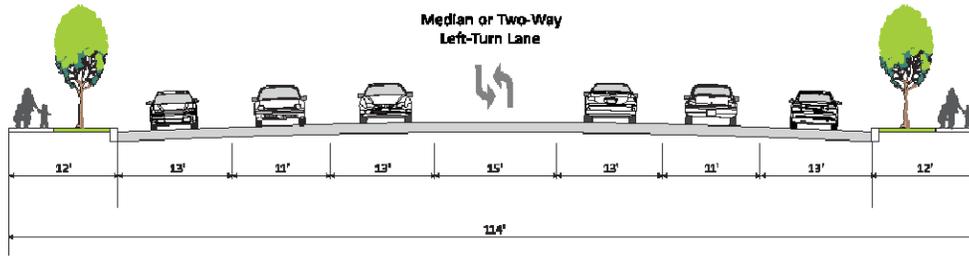
- - - - City Boundary
- - - - Sphere of Influence
- - - - Railroad Tracks
- - - - Watercourse

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

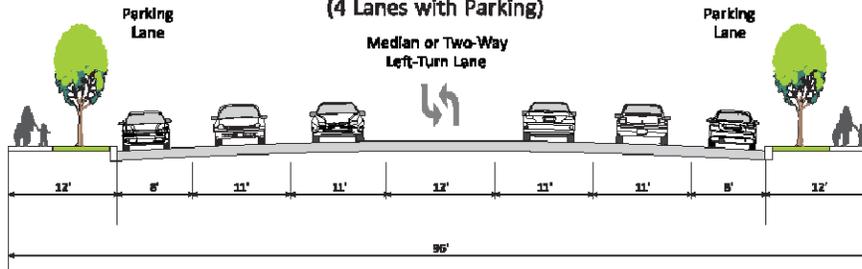


EXHIBIT 3-3 (1 OF 2): CITY OF COLTON GENERAL PLAN CROSS-SECTIONS

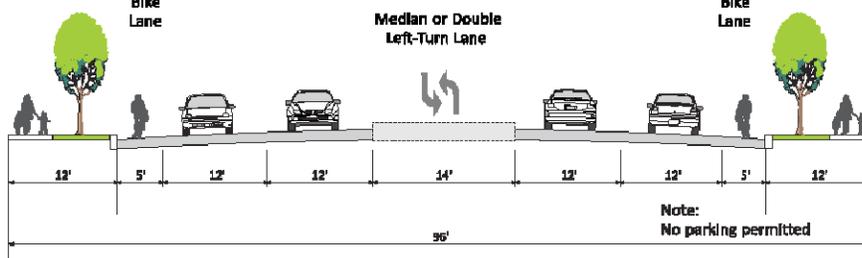
Major Arterial - Six-Lane



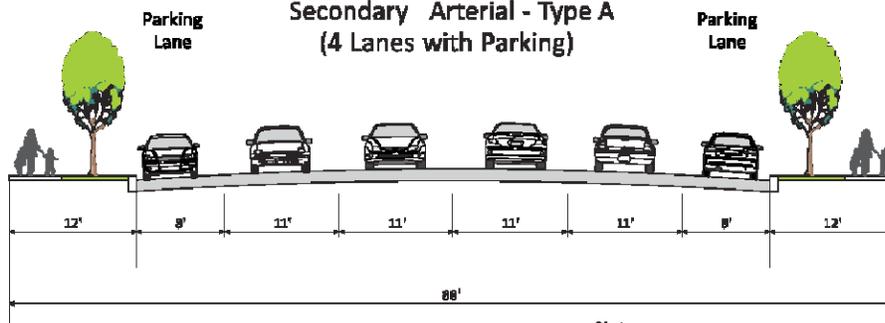
**Major Arterial - Type A
(4 Lanes with Parking)**



**Major Arterial - Type B
(4 Lanes with Median and Bike Lanes)**



**Secondary Arterial - Type A
(4 Lanes with Parking)**



Note:
Parkways may be removed to allow for leftturn lanes

**Secondary Arterial - Type B
(4 Lanes with Median)**

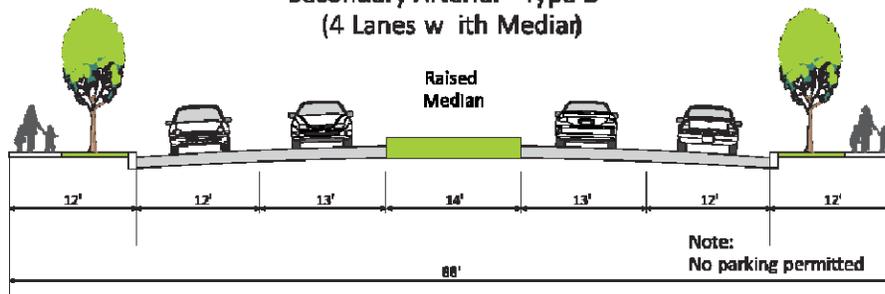
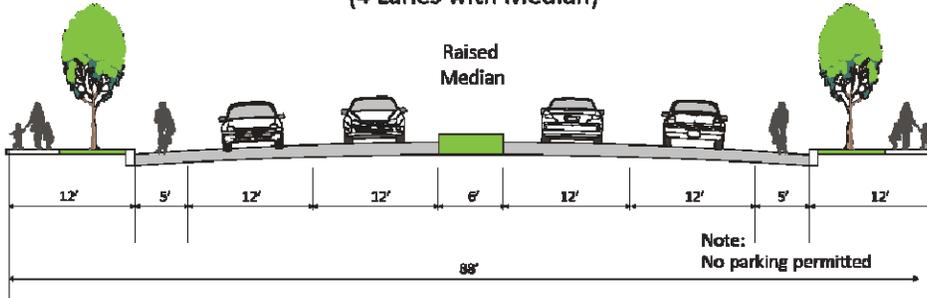
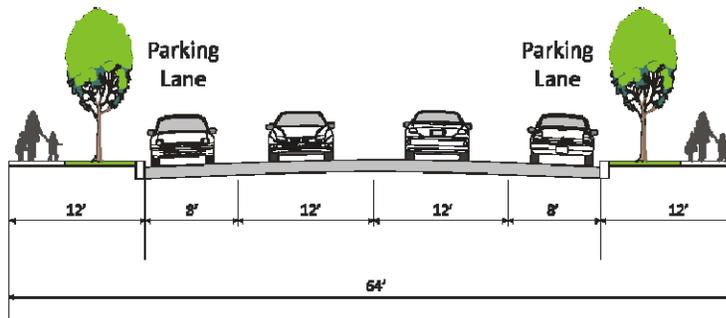


EXHIBIT 3-3 (2 OF 2): CITY OF COLTON GENERAL PLAN CROSS-SECTIONS

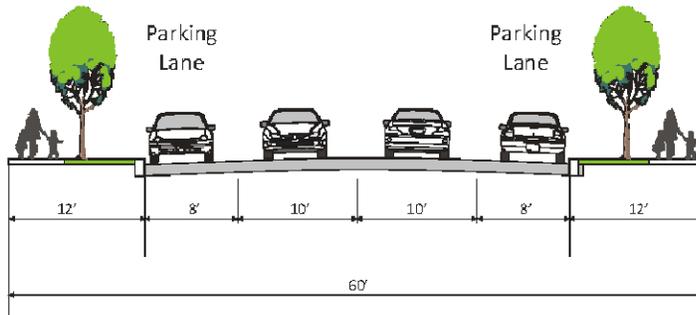
**Secondary Arterial with Bike Lane - Type C
(4 Lanes with Median)**



**Collector Street
(2 Lanes with Parking)**



**Local Street
(2 Lanes with Parking)**



**Hillside Local Street
(2 Lanes)**

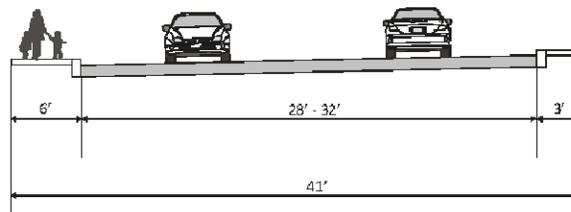
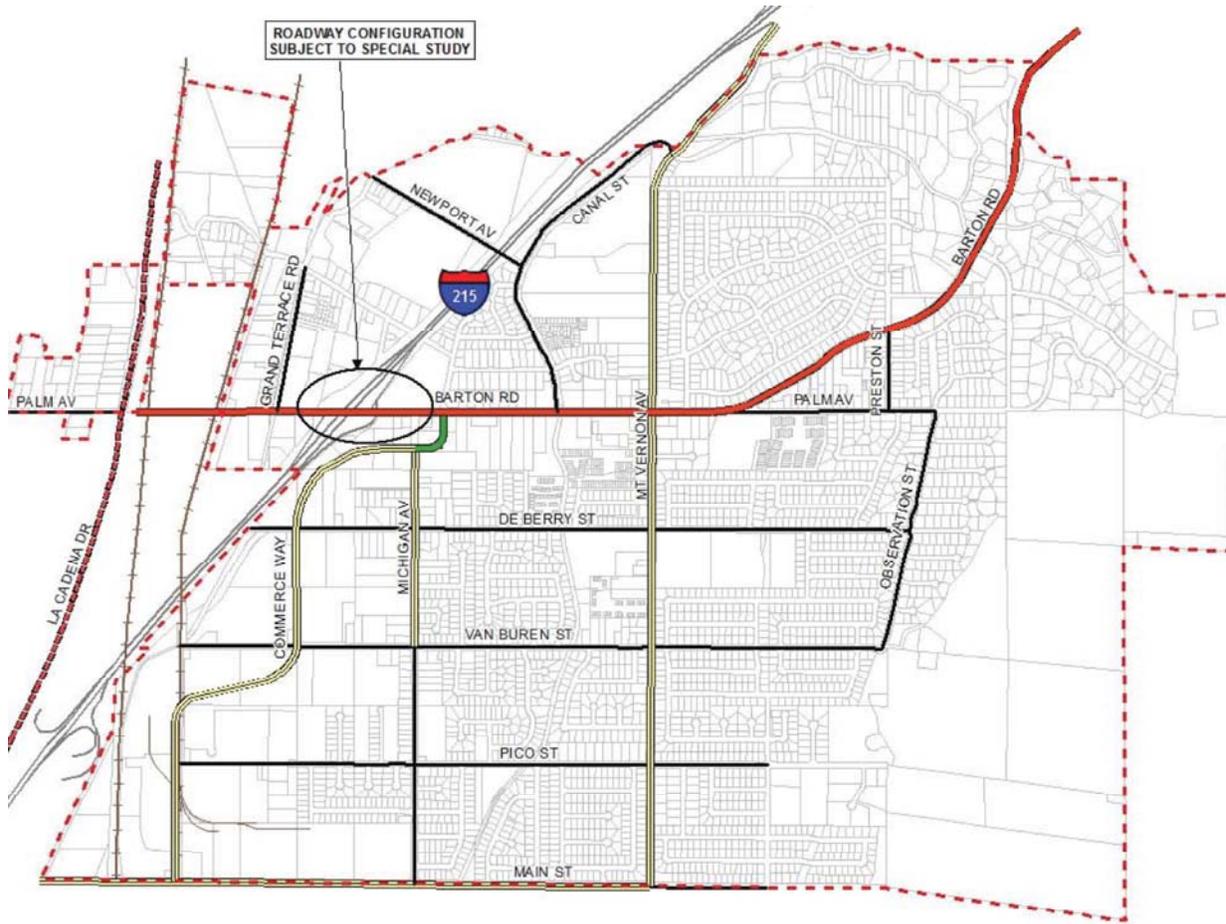


EXHIBIT 3-4: CITY OF GRAND TERRACE GENERAL PLAN CIRCULATION ELEMENT



LEGEND:

- Railroad
- City Boundary
- Collector
- Divided Major Highway
- Major Highway
- Secondary Highway
- Potential Major Highway



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



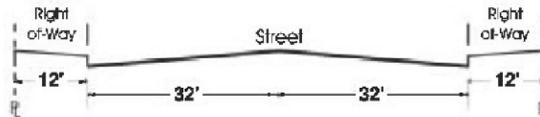
**Divided Major Highway (La Cadena Dr.)
120' Right-of-way**



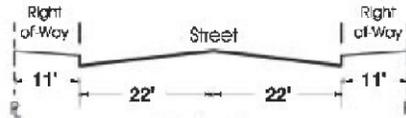
**Modified Major Highways
100' Right-of-way**



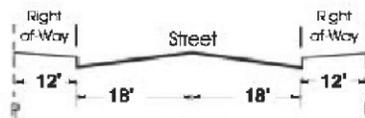
**Major Highways
100' Right-of-way
(4 Lanes Divided)**



**Secondary Highway
88' Right-of-way
(4 Lanes Undivided)**



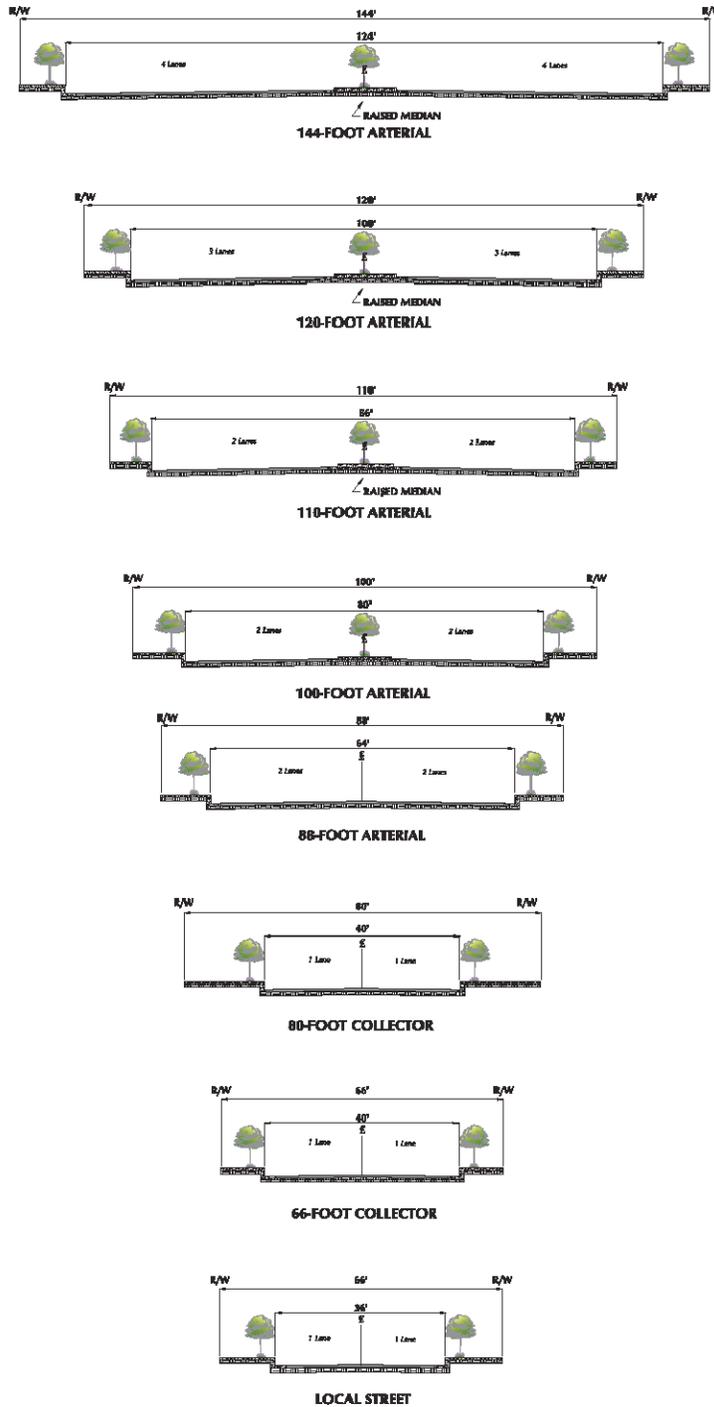
**Collector
66' Right-of-way
(2 Lanes Undivided)**



**Local
60' Right-of-way
(2 Lanes Divided)**



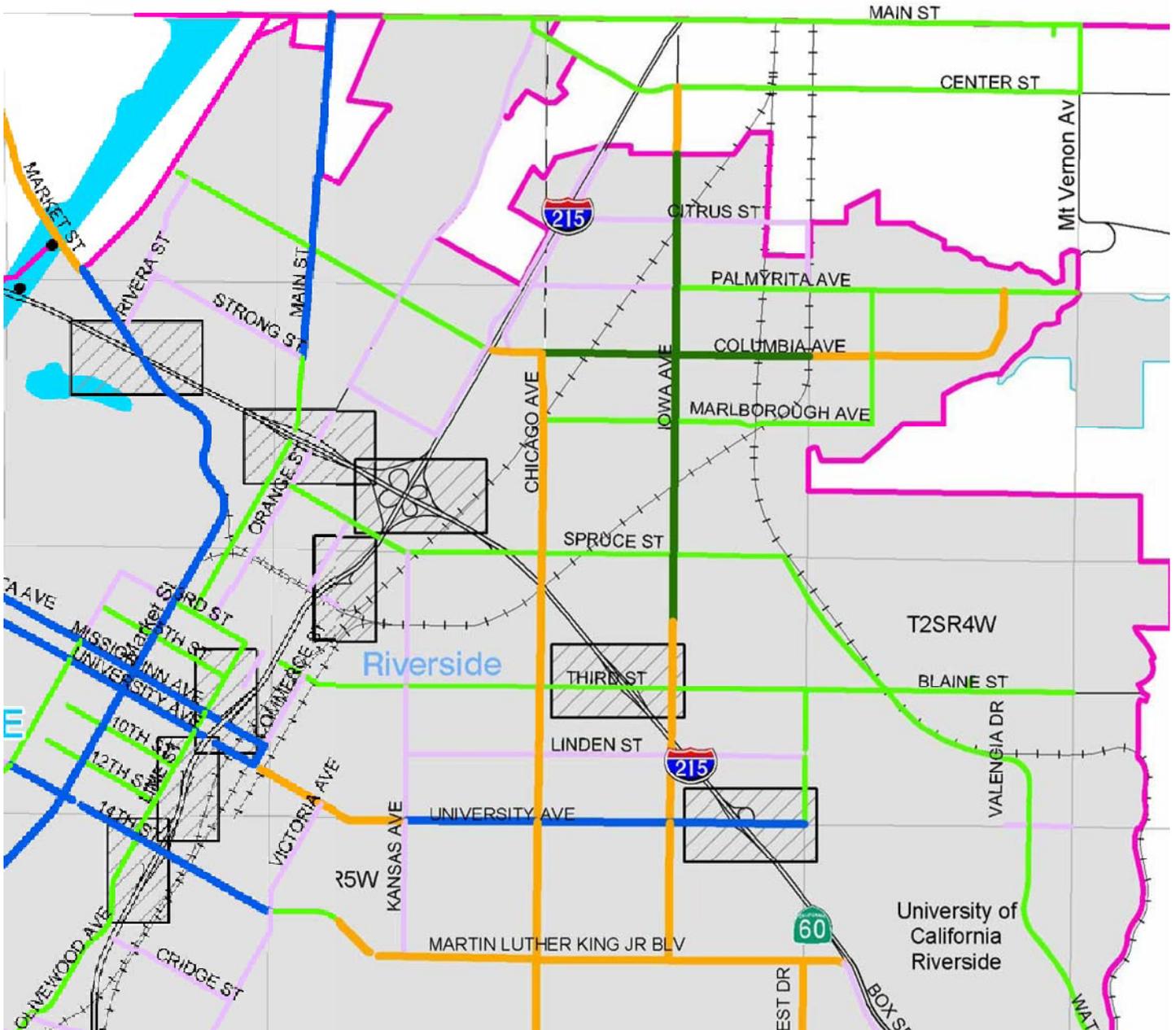
EXHIBIT 3-7: CITY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS



SOURCE: CITY OF RIVERSIDE, 2004



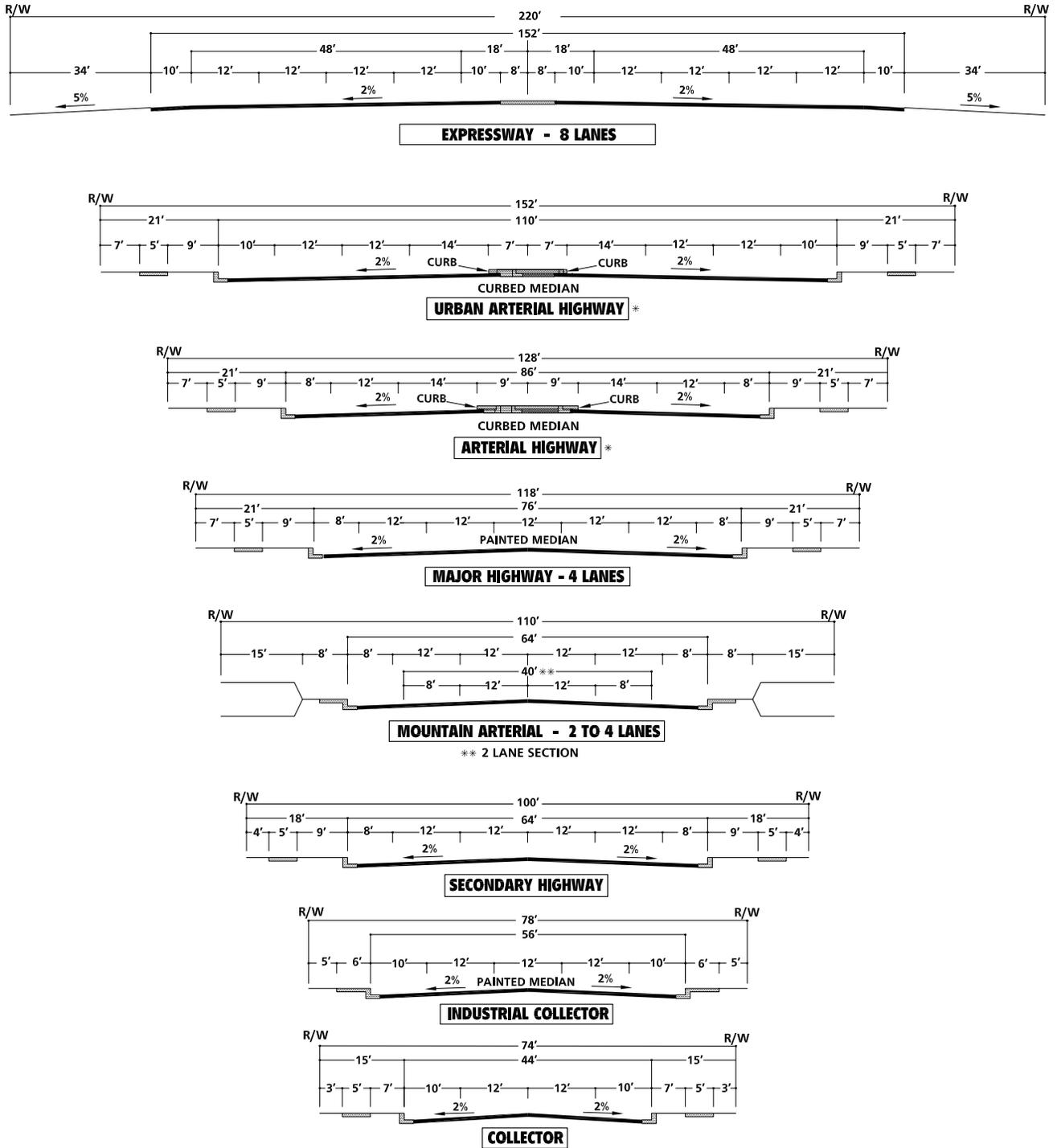
EXHIBIT 3-8: COUNTY OF RIVERSIDE GENERAL PLAN CIRCULATION ELEMENT



- | | | |
|------------------------------|---|--------------------|
| Expressway (184' ROW) | Bridges | Area Plan Boundary |
| Urban Arterial (152' ROW) | Moreno Valley to San Bernardino Corridor Alternatives | Township |
| Arterial (128' ROW) | Hemet to Corona/Lake Elsinore Corridor Alternatives | Section |
| Major (118' ROW) | SR-79 Re-alignment Alternatives | Water |
| Secondary (100' ROW) | Proposed Interchange | City |
| Collector (74' ROW) | Existing Interchange | |
| Mountain Arterial (110' ROW) | | |
| Freeway | | |
| Railroad | | |

SOURCE: RIVERSIDE COUNTY INTEGRATED PROJECT (RCIP) (OCTOBER 7, 2003)

EXHIBIT 3-9: COUNTY OF RIVERSIDE GENERAL PLAN ROADWAY CROSS-SECTIONS



* IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS. ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS. SHALL CONFORM TO CALTRANS DESIGN STANDARDS.

NOT TO SCALE

SOURCE: COUNTY OF RIVERSIDE

EXHIBIT 3-10: EXISTING TRANSIT ROUTES

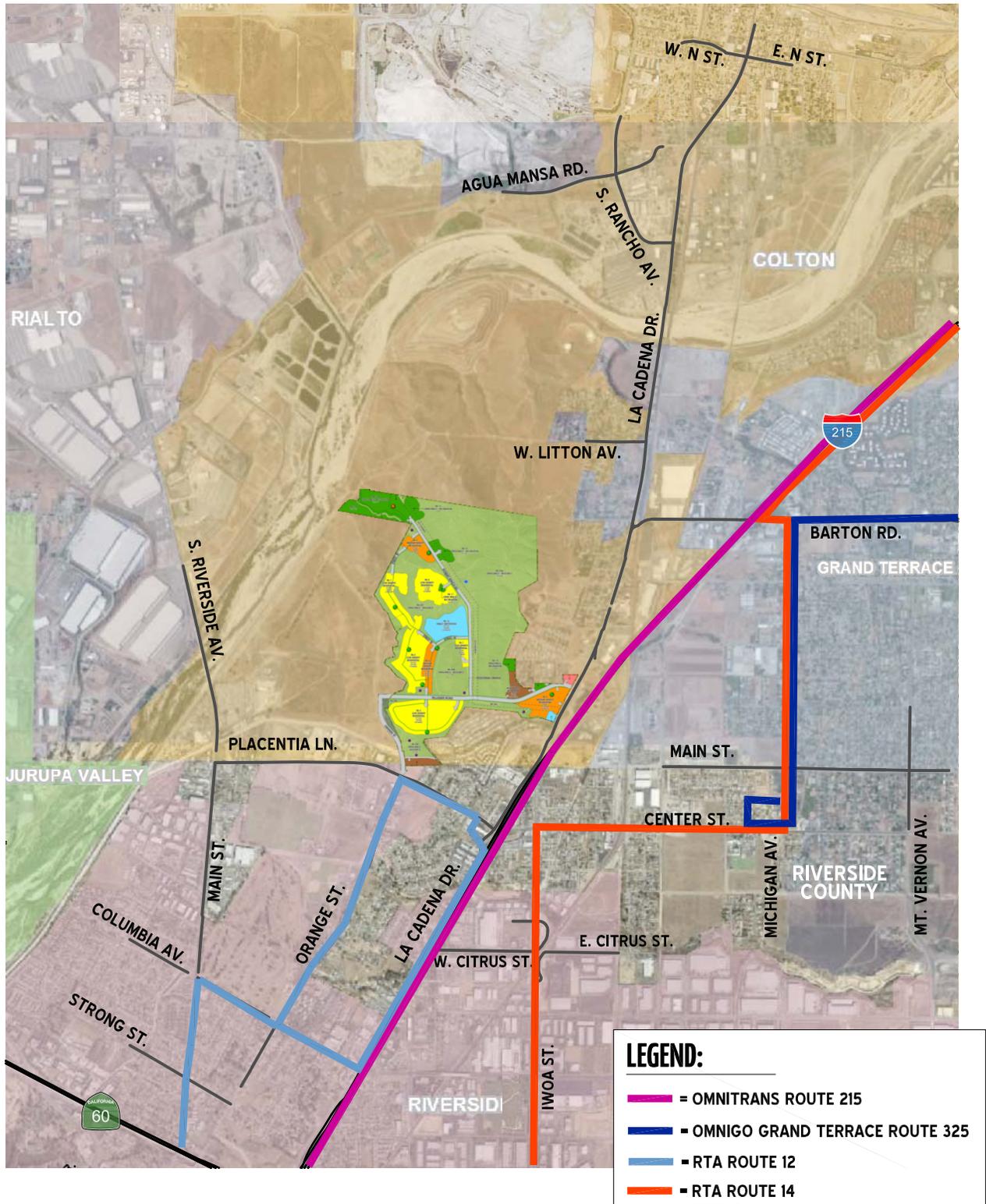
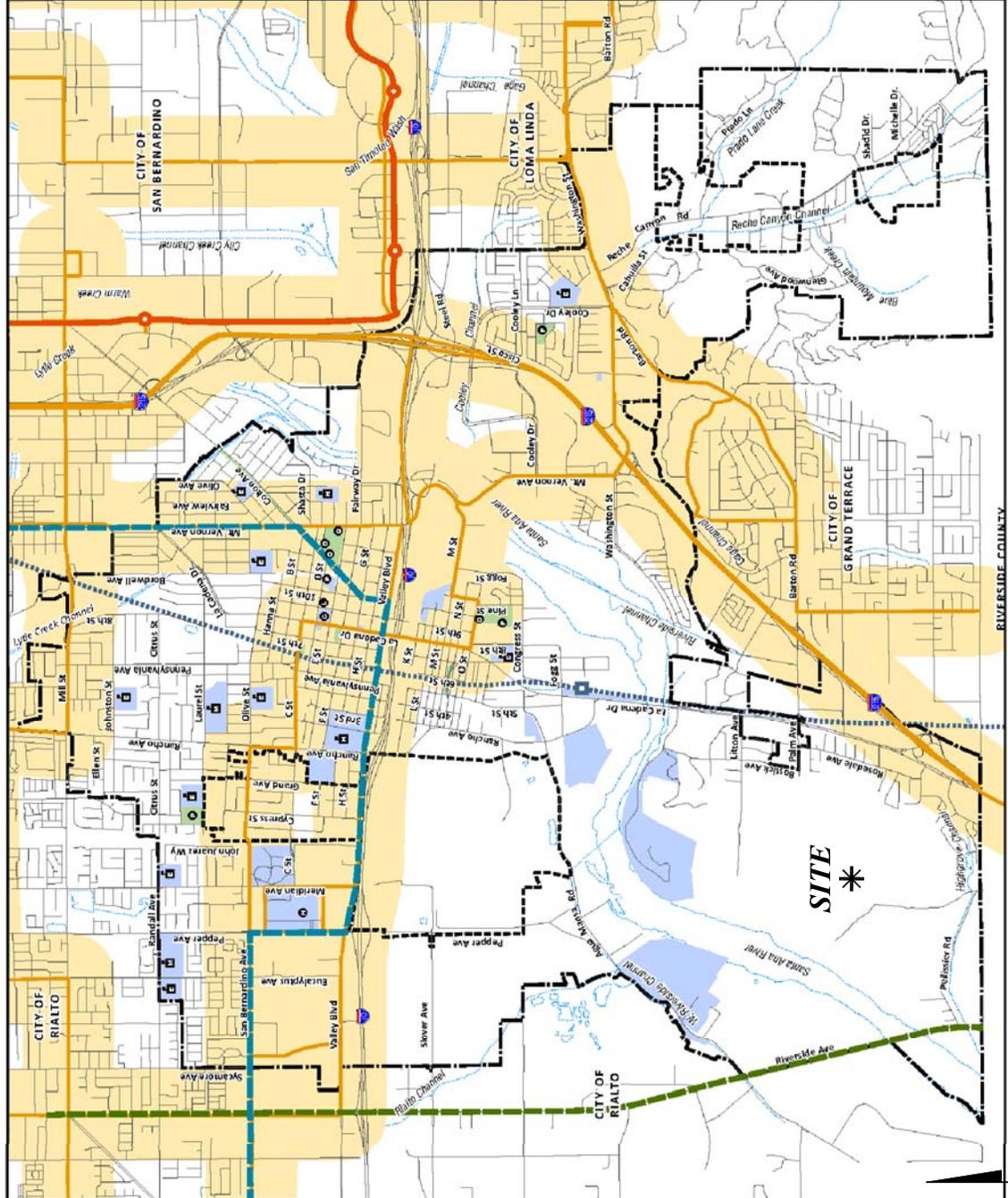


EXHIBIT 3-11: CITY OF COLTON TRANSIT PLAN



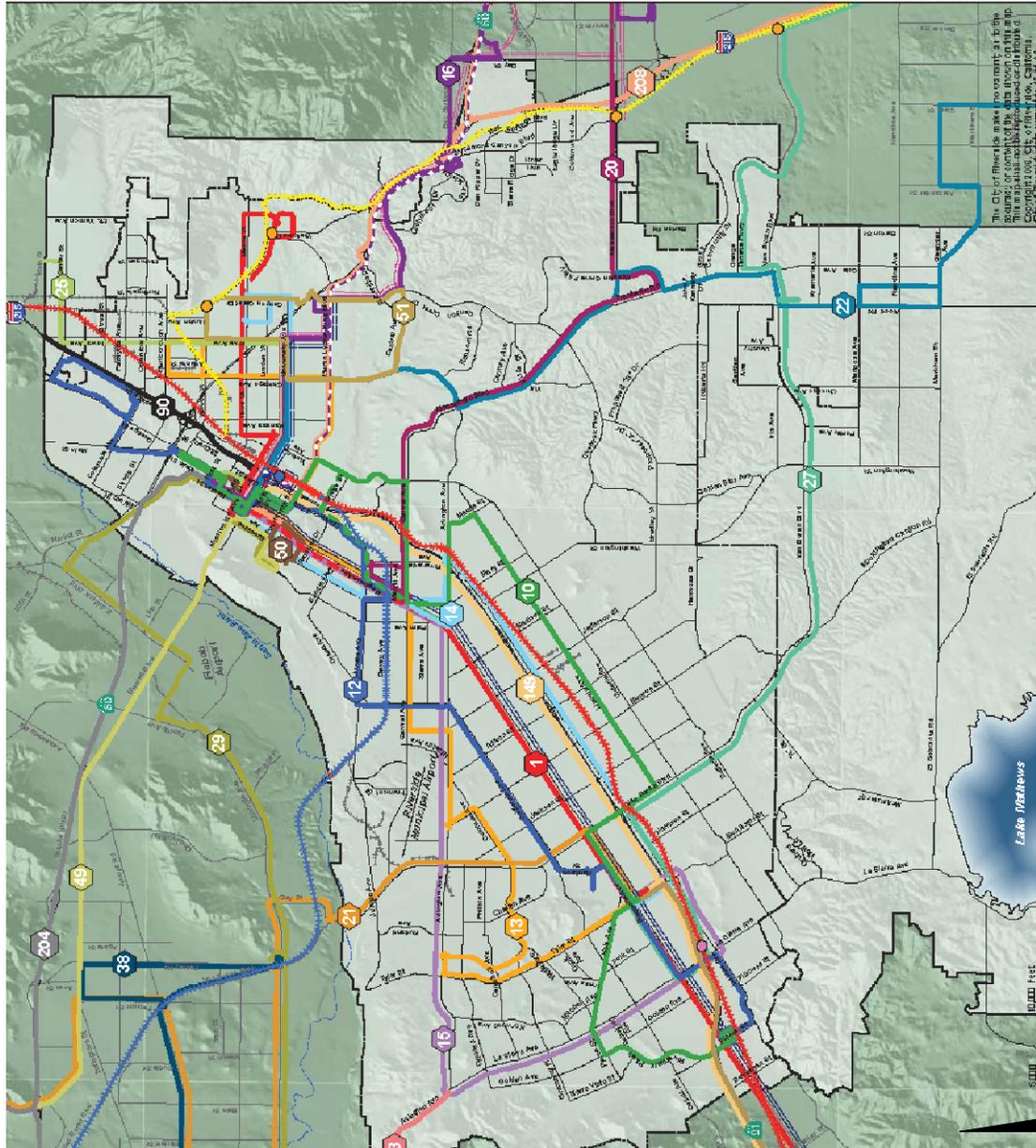
- Transit Lines and facilities**
- Omnitrans**
 - Omnitrans Bus Routes (Routes Subject to Change)
 - Quarter Mile Walking Distance to Bus Route
 - Bus Rapid Transit (BRT)**
 - 60x - 12' Street Line
 - Hot Line (Planned)
 - Rivside (Planned)
 - MetroLink**
 - BRT Stations
 - Potential Station location

- Parks and Schools**
- Land Use**
 - Open Space - Recreation
 - Public/Institution
 - Base Map**
 - City Boundary
 - Sphere of Influence
 - Watersource
 - Public facilities/Institutions**
 - Elementary School
 - Middle School
 - High School
 - Community Center
 - City Hall
 - Hospital (Private)
 - Library
 - Parks

Date: January 5, 2011
 Prepared by: Angelland, Inc.
 Source: San Bernardino County Assessor, 2010 and City of Colton, 2011.



EXHIBIT 3-12: CITY OF RIVERSIDE TRANSIT FACILITIES



LEGEND

- RAIL CORRIDORS
- 91/ORANGE COUNTY/INLAND EMPIRE LINES
- PROPOSED PERRIS VALLEY METROLINK LINE- POTENTIAL ALIGNMENT
- RIVERSIDE METROLINK LINE
- LA SIERRA STATION
- DOWNTOWN STATION
- POTENTIAL METROLINK STATIONS
- DOWNTOWN TERMINAL

RTA BUS ROUTES AS OF DECEMBER 2006

- 1 UIC/DOWNTOWN RIVERSIDE TO WEST CORONA/METROLINK
- 3 ARLINGTON/LA SIERRA TO MAGNOLIA/FULLERTON
- 10 MAIN/RUSSELL TO PIERCE/STERLING
- 12 STEPHENS/CENTER TO PIERCE/STERLING
- 13 CHICAGO/MARLBOROUGH TO GALLERIA AT TYLER
- 14 BLAINE/CANYON CREST TO GALLERIA AT TYLER
- 16 DOWNTOWN TO GALLERIA AT TYLER
- 16 MAIN/RUSSELL TO MARCH RESERVE AIR FORCE BASE
- 20 MAGNOLIA CENTER TO MORENO VALLEY
- 21 COUNTRY VILLAGE TO GALLERIA AT TYLER
- 22 DOWNTOWN TO LAKE ELSINORE OUTLET CENTER
- 26 DOWNTOWN TO LOMA UNDA VA HOSPITAL
- 27 GALLERIA AT TYLER TO HEMET VALLEY MALL
- 29 DOWNTOWN TO ETWANDAR/LEIDOUX
- 38 RCC NORCO TO JURUPA
- 41 MEAD VALLEY TO RCR MED CENTER
- 49 RIVERSIDE TO COUNTRY VILLAGE
- 50 JURY TROLLEY SERVICE
- 51 UCR TO CANYON CREST TOWN CENTER
- 90 RIVERSIDE TO SAN BERNARDINO
- 149 RIVERSIDE TO ORANGE
- 204 RIVERSIDE TO MONTCLAIR
- 208 TEMECULA AND MURRIETA TO CORONA
- 208 TEMECULATO
- 208 RIVERSIDE METROLINK
- 794 GALLERIA AT TYLER TO COSTA MESA

- RIVERSIDE CITY BOUNDARY
- RIVERSIDE PROPOSED SPHERE OF INFLUENCE
- SOURCE: RIVERSIDE TRANSIT AUTHORITY, 2006

The City of Riverside and its consultants are not responsible for the accuracy or content of the data shown on this map. This information is based on data provided by the Riverside Transit Authority, City of Riverside, California.



3.4 BICYCLE & PEDESTRIAN FACILITIES

Field observations conducted in February 2016 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-13 illustrates the City of Colton General Plan Bicycle Plan and Exhibit 3-14 shows the City of Grand Terrace Bikeway Plan. As shown on Exhibit 3-13, there is an existing Regional Class I bikeway along the Santa Ana River. There is also an existing Class III bikeway along Rancho Avenue, west of La Cadena Drive, and along La Cadena Drive from the northern study area to south of Rancho Avenue. A Class II bikeway is proposed along La Cadena Drive, from Barton Avenue to the southern City boundary. As shown on Exhibit 3-14, there are existing bikeways along Barton Road, east of Michigan Avenue, and along Mt. Vernon Avenue. There are planned bikeways along Barton Road from the western City boundary to Michigan Avenue and along Michigan Avenue, south of Barton Road. City of Riverside Master Plan Trails and Bikeways are shown on Exhibit 3-15. County of Riverside Trails and Bikeway System are shown on Exhibit 3-16. Existing pedestrian facilities in the vicinity of the Project site are illustrated on Exhibit 3-17.

3.5 EXISTING (2016) TRAFFIC COUNTS

The AM peak hour traffic volumes were determined by collecting count data over a 2-hour period from 7:00 to 9:00 AM in February 2016. Similarly, the PM peak hour traffic volumes were identified by counting traffic volumes in the 2-hour period from 4:00 to 6:00 PM in February 2016. The weekday AM and 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.

The following peak hours were selected for analysis:

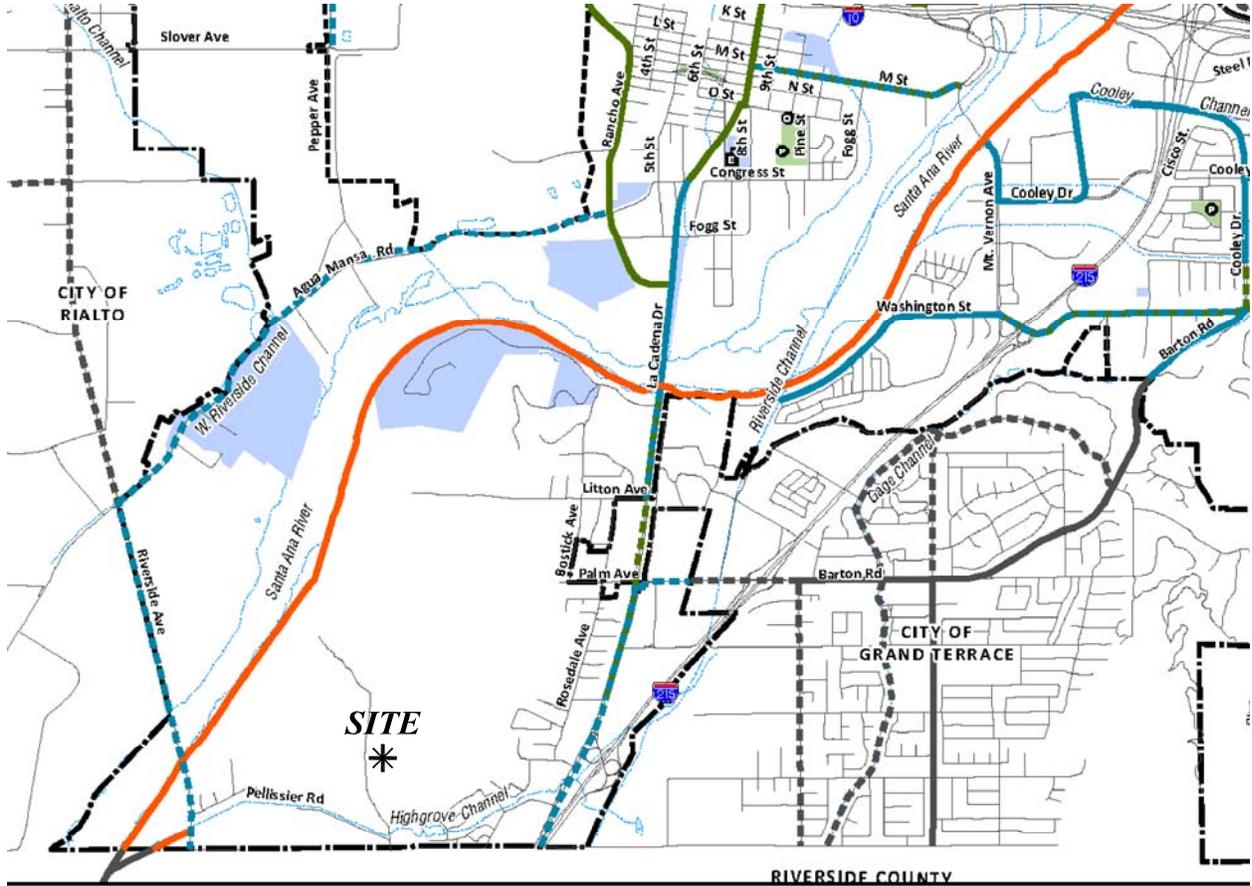
- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited or no access and where there are currently no uses generating traffic.

Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-18. Existing ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

$$\text{PM Peak Hour (Approach Volume + Exit Volume)} \times 11.1584 = \text{Leg Volume}$$

EXHIBIT 3-13: 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



EXHIBIT 3-14: CITY OF GRAND TERRACE BIKEWAY PLAN

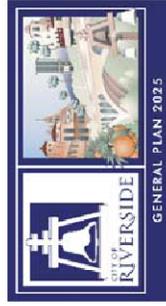
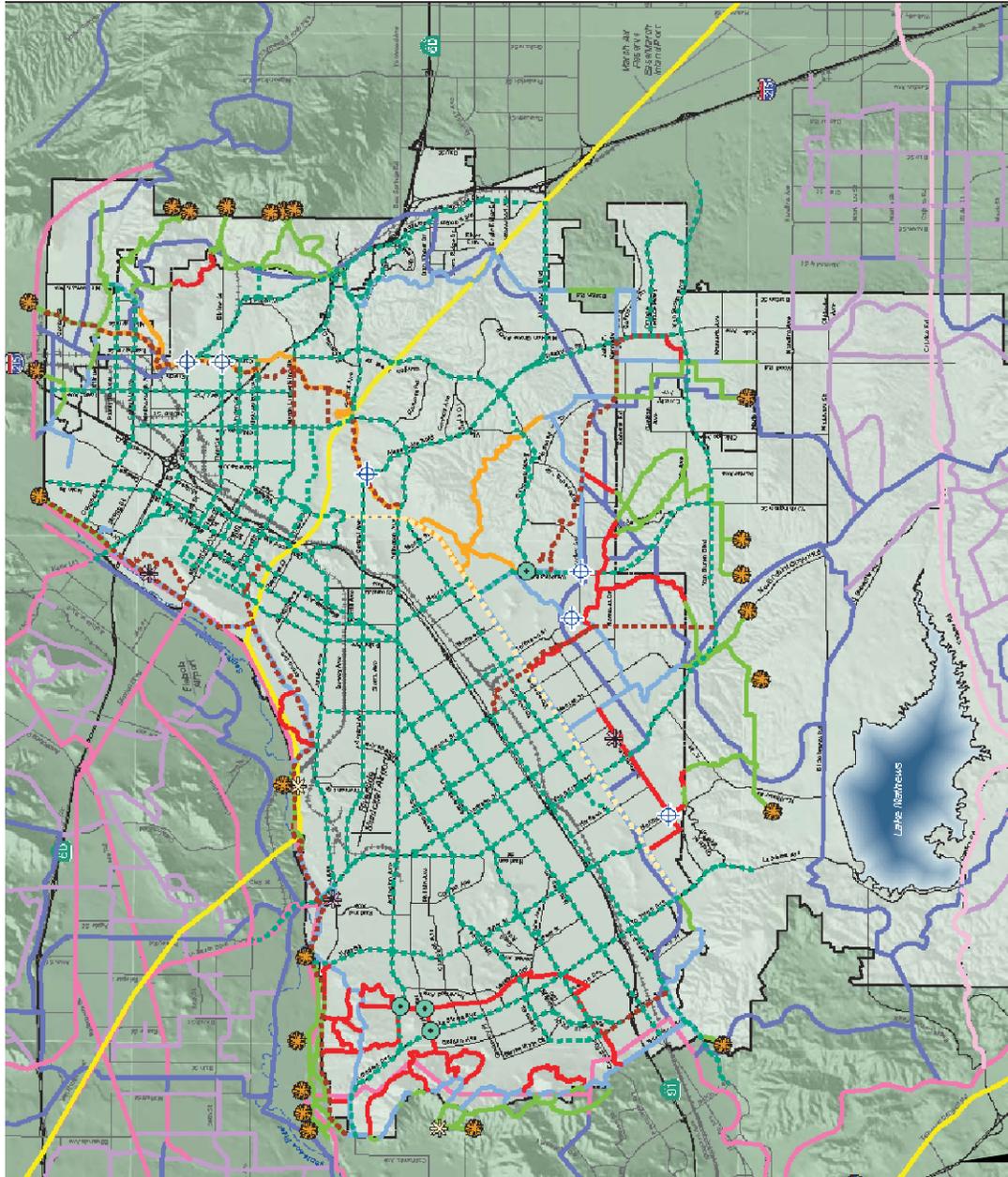


**Existing and Proposed
Bikeway Plan**

- Streets
- +— Railroad
- Proposed Bikeway
- Existing Bikeway
- - - City Boundary



EXHIBIT 3-15: CITY OF RIVERSIDE MASTER PLAN TRAILS AND BIKEWAYS



LEGEND

CITY TRAIL POINTS

- STAGING AREAS EXISTING FACILITIES
- STAGING AREAS PROPOSED FACILITIES
- CONNECTION TO COUNTY DESIGNATED TRAILS
- TRAIL CROSSING PROPOSED STOP SIGN
- TRAIL CROSSING PROPOSED TRAFFIC SIGNAL

CITY TRAILS

- PRIMARY - PEDESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - PEDESTRIAN, BIKE & PEDESTRIAN TRAIL
- SECONDARY - NO EQUESTRIAN IN ADJACENT JURISDICTION

CITY BIKEWAYS

- CLASS 1
- CLASS 1&2
- CLASS 2

RIVERSIDE COUNTY TRAILS

- CLASS 1 BIKE PATH/REGIONAL TRAIL
- COMMUNITY TRAIL
- REGIONAL TRAIL
- HISTORIC TRAIL

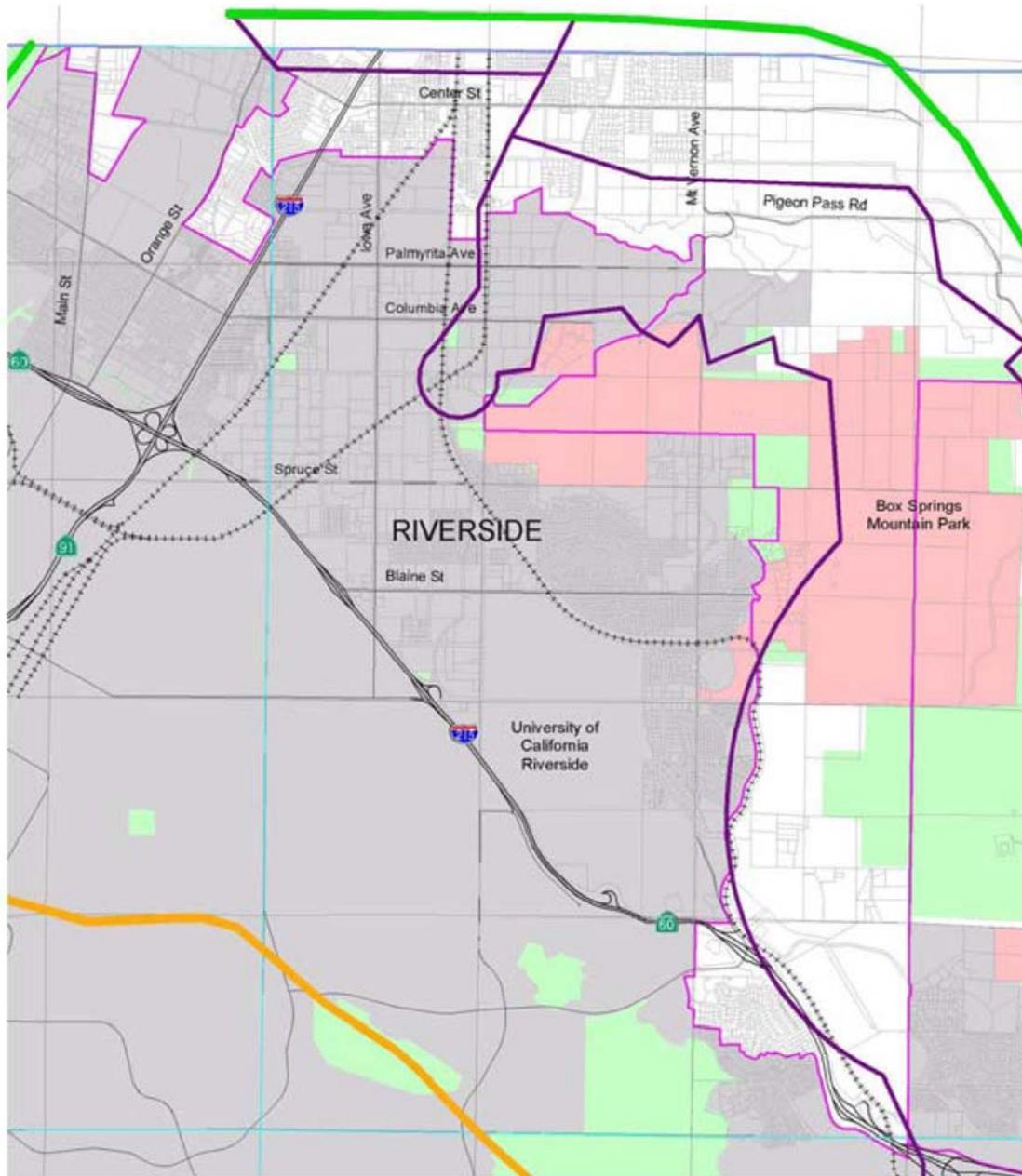
- RIVERSIDE CITY BOUNDARY
- RIVERSIDE PROPOSED SPHERE OF INFLUENCE

SOURCE: CITY OF RIVERSIDE AND RIVERSIDE COUNTY GIS DATA
 COUNTY DESIGNATED TRAILS AND BIKEWAYS ARE CLASSIFIED AS REGIONAL, COMMUNITY, HISTORIC, OR CLASS 1 BIKE PATH/REGIONAL TRAIL. THIS CLASSIFICATION IS BASED ON THE TRAIL'S LOCATION AND CHARACTERISTICS. CLASS 1 BIKEWAYS ARE CLASSIFIED AS REGIONAL TRAIL, COMMUNITY TRAIL, HISTORIC TRAIL, OR CLASS 1 BIKE PATH/REGIONAL TRAIL. CLASS 1&2 BIKEWAYS ARE CLASSIFIED AS CLASS 1 BIKE PATH/REGIONAL TRAIL, COMMUNITY TRAIL, HISTORIC TRAIL, OR CLASS 1 BIKE PATH/REGIONAL TRAIL. CLASS 2 BIKEWAYS ARE CLASSIFIED AS CLASS 1 BIKE PATH/REGIONAL TRAIL, COMMUNITY TRAIL, HISTORIC TRAIL, OR CLASS 1 BIKE PATH/REGIONAL TRAIL.

NOTE: THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. THE CITY OF RIVERSIDE DOES NOT WARRANT THE ACCURACY OF THE INFORMATION SHOWN ON THIS MAP. THE CITY OF RIVERSIDE DOES NOT WARRANT THE ACCURACY OF THE INFORMATION SHOWN ON THIS MAP. THE CITY OF RIVERSIDE DOES NOT WARRANT THE ACCURACY OF THE INFORMATION SHOWN ON THIS MAP.



EXHIBIT 3-16: COUNTY OF RIVERSIDE TRAILS AND BIKEWAY SYSTEM



- | | |
|---|---|
|  Historic Trail |  Regional Parks |
|  Class I Bike Path/Regional Trail |  Public/Quasi-Public Lands |
|  Regional Trail |  Water |
|  Community Trail |  City |
|  Class I Bike Path |  Area Plan Boundary |
|  National Forest or Park/BLM Trails (non-county) | |

Note: Circulation maps are a graphic representation identifying the general location and classification of existing and proposed thoroughfares in the county. Any questions regarding precise alignment or improvement standards should be referred to the regional park and open space district.

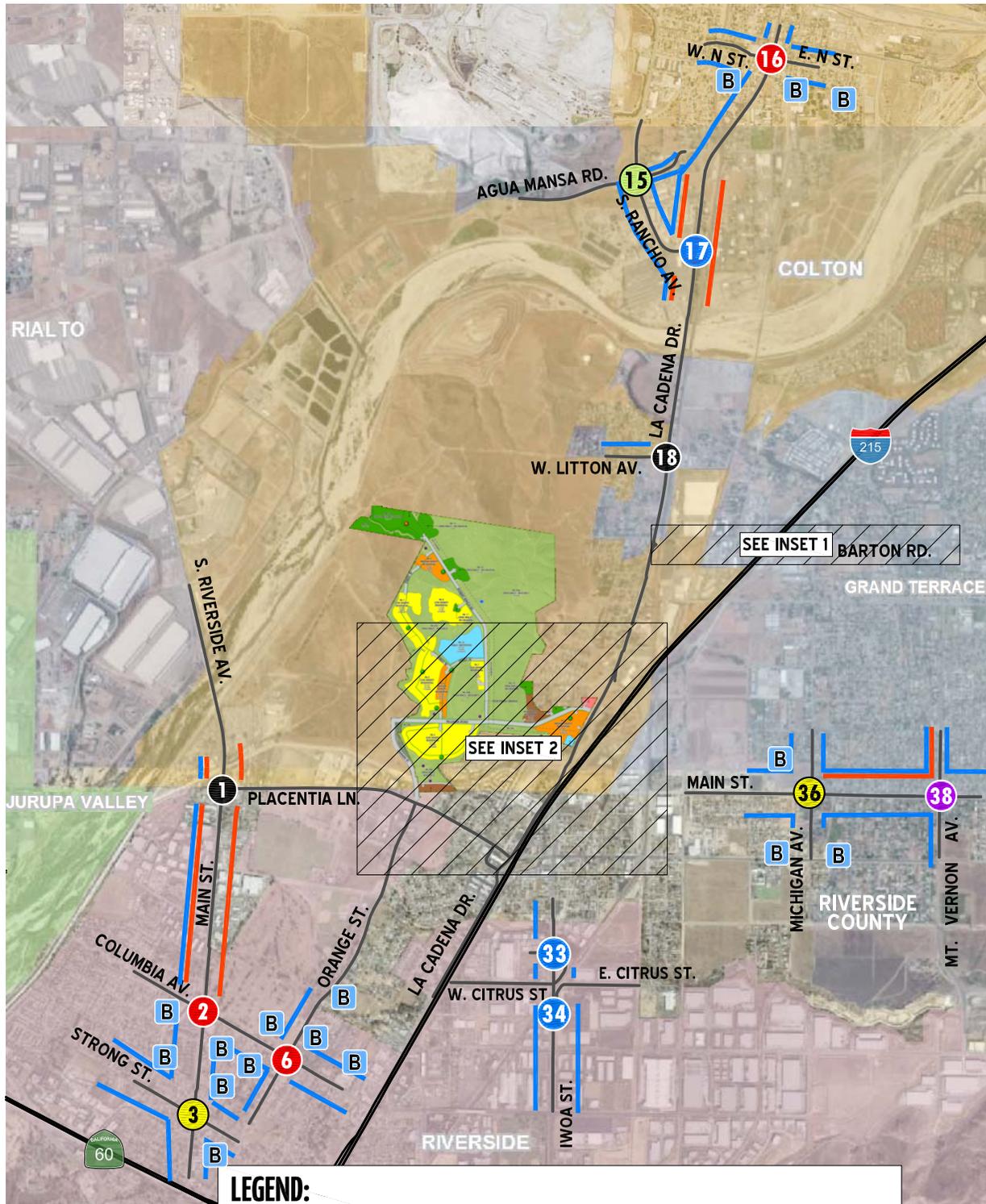
Note: Trail and Bikeway System elements within the cities are shown for reference and to depict system continuity only. Any questions relative to these elements within city boundaries must be addressed to the respective city.

Source Information: Riverside County. The oldest data shown on this map is 1995.

The County of Riverside or the IBCP consultants have no reason or indication to believe that this map contains any inaccuracies, defects or misstatements. The County of Riverside and the IBCP consultants assume no warranties or legal responsibility, however, as to the absolute accuracy of any data or information contained within this map, regardless of the location, subject and size. Data and information represented on this map is subject to update and modification without prior notification. The geographic information system and other sources should be queried for the most current information. This map or any information represented on it, shall not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photo copying and recording, except as expressly permitted in writing by the County of Riverside.

SOURCE: RIVERSIDE COUNTY INTEGRATED PROJECT (RCIP)

EXHIBIT 3-17 (1 OF 2): EXISTING PEDESTRIAN FACILITIES

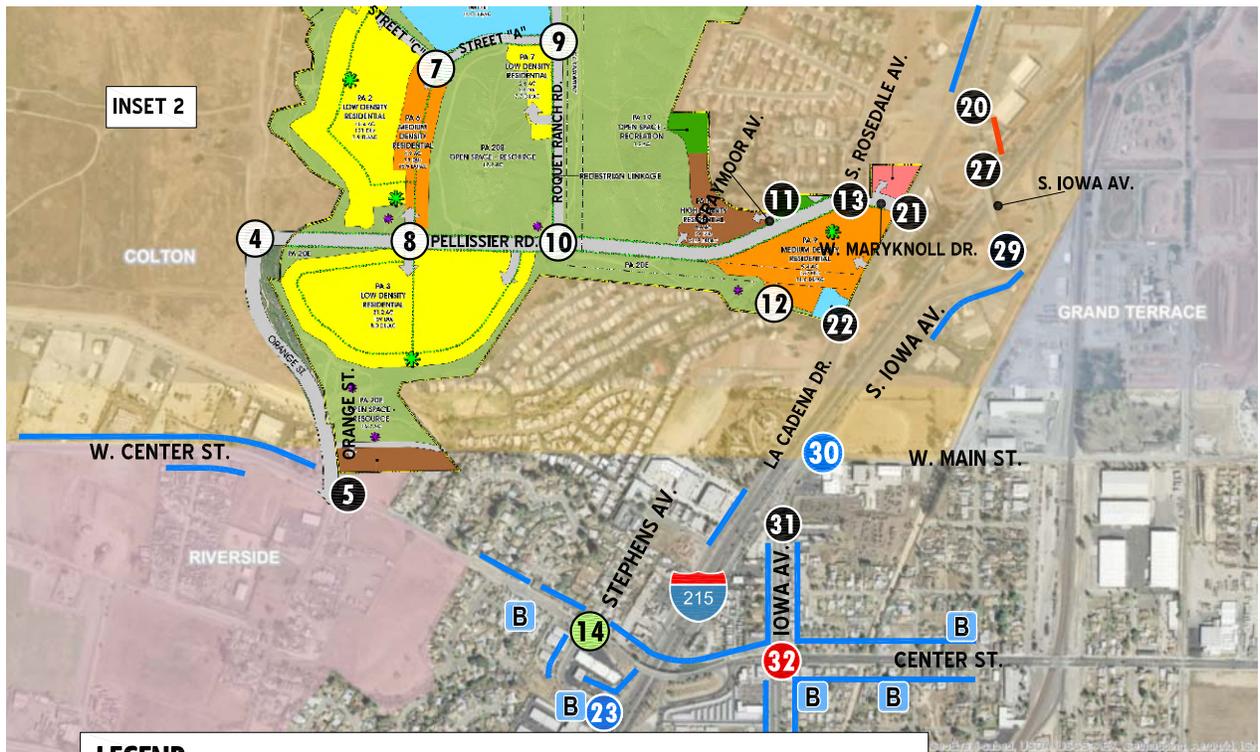


LEGEND:

- | | |
|---|--|
|  = BUS STOP |  = CROSSWALK ON ALL APPROACHES |
|  = SIDEWALK |  = CROSSWALK ON THREE APPROACHES |
|  = CLASS II BIKE LANE |  = CROSSWALK ON TWO APPROACHES |
|  = NO CROSSWALK |  = CROSSWALK ON ONE APPROACH |
|  = FUTURE INTERSECTION |  = SCHOOL CROSSWALK ON ALL APPROACHES |



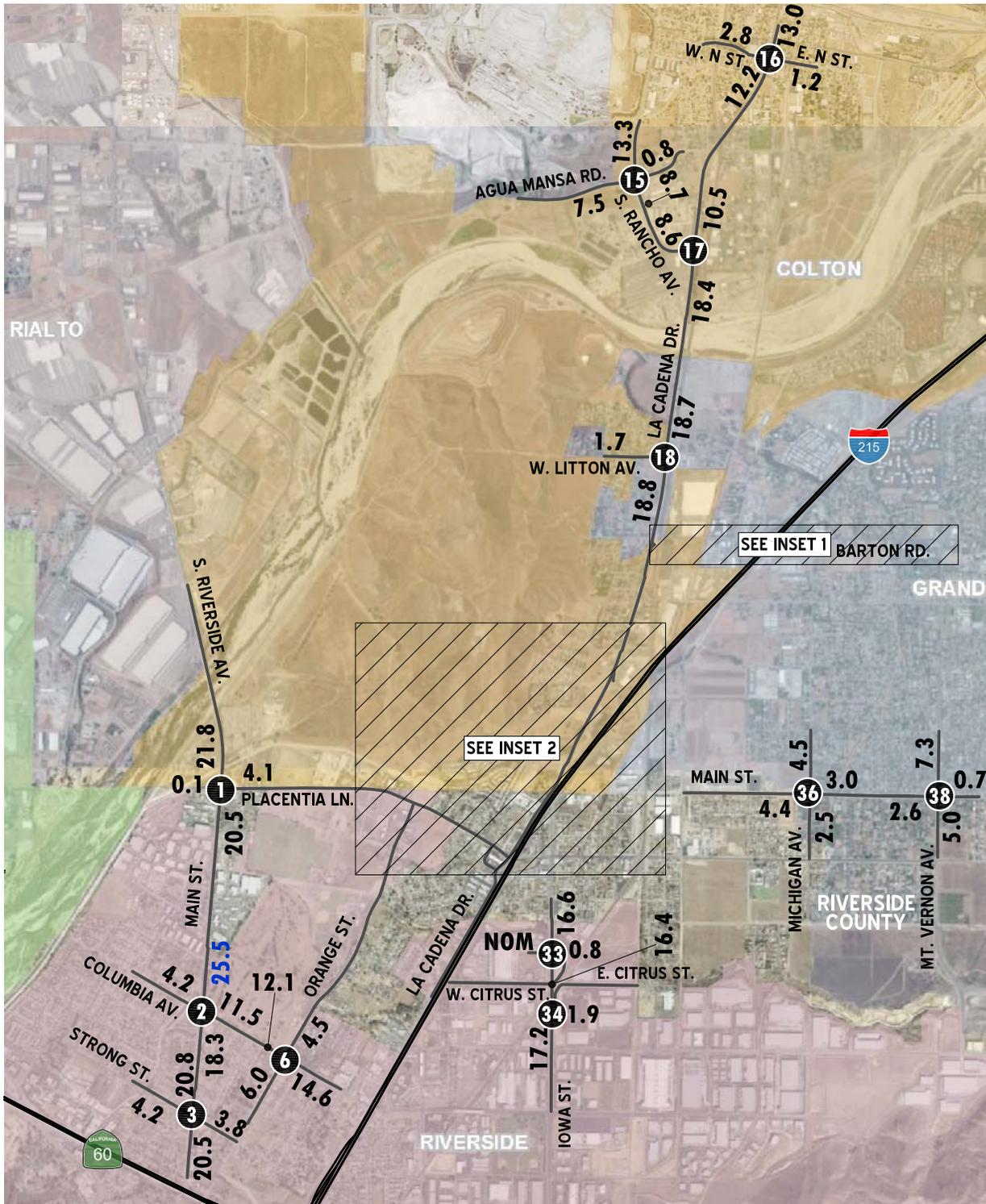
EXHIBIT 3-17 (2 OF 2): EXISTING PEDESTRIAN FACILITIES



LEGEND:

= BUS STOP	= CROSSWALK ON ALL APPROACHES
= SIDEWALK	= CROSSWALK ON THREE APPROACHES
= CLASS II BIKE LANE	= CROSSWALK ON TWO APPROACHES
= NO CROSSWALK	= CROSSWALK ON ONE APPROACH
= FUTURE INTERSECTION	= SCHOOL CROSSWALK ON ALL APPROACHES

EXHIBIT 3-18 (1 OF 2): EXISTING (2016) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- 10.0** = ACTUAL (COUNT-BASED) VEHICLES PER DAY (1000'S)
- 10.0** = ESTIMATED VEHICLES PER DAY (1000'S)
- NOM** = NOMINAL, LESS THAN 50 VEHICLES PER DAY



It should be noted that for those roadway segments for which 24-hour tube count data was collected in close proximity to the Project site, a comparison between the PM peak hour and daily traffic volumes indicated that the peak-to-daily relationship of approximately 8.96 percent would sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. As such, the above equation utilizing a factor of 11.1584 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.96 percent (i.e., $1/0.0896 = 11.1584$). Existing weekday AM and weekday PM peak hour intersection volumes can be found on Exhibit 3-19.

The traffic counts collected in February 2016 for the Caltrans ramp-to-arterial facilities include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 2-Axle Trucks, and 4 or More Axle Trucks.

To represent the impact large trucks, buses and recreational vehicles have on traffic flow at Caltrans intersections; truck traffic has been accounted for in the analysis as a percentage of total traffic. The actual vehicle mix (passenger cars vs. trucks) was taken into consideration at the ramp-to-arterial junctions for the purposes of conducting the freeway mainline analysis. In other words, the basic freeway segment and merge/diverge ramp junction analyses utilize the actual vehicle traffic flow and trucks are reflected in the analysis as a percentage of the total traffic flow, not passenger-car-equivalents (PCE).

3.6 EXISTING (2016) CONDITIONS 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 all existing study area intersections are currently operating at acceptable LOS during the peak hours, with the exception of the following:

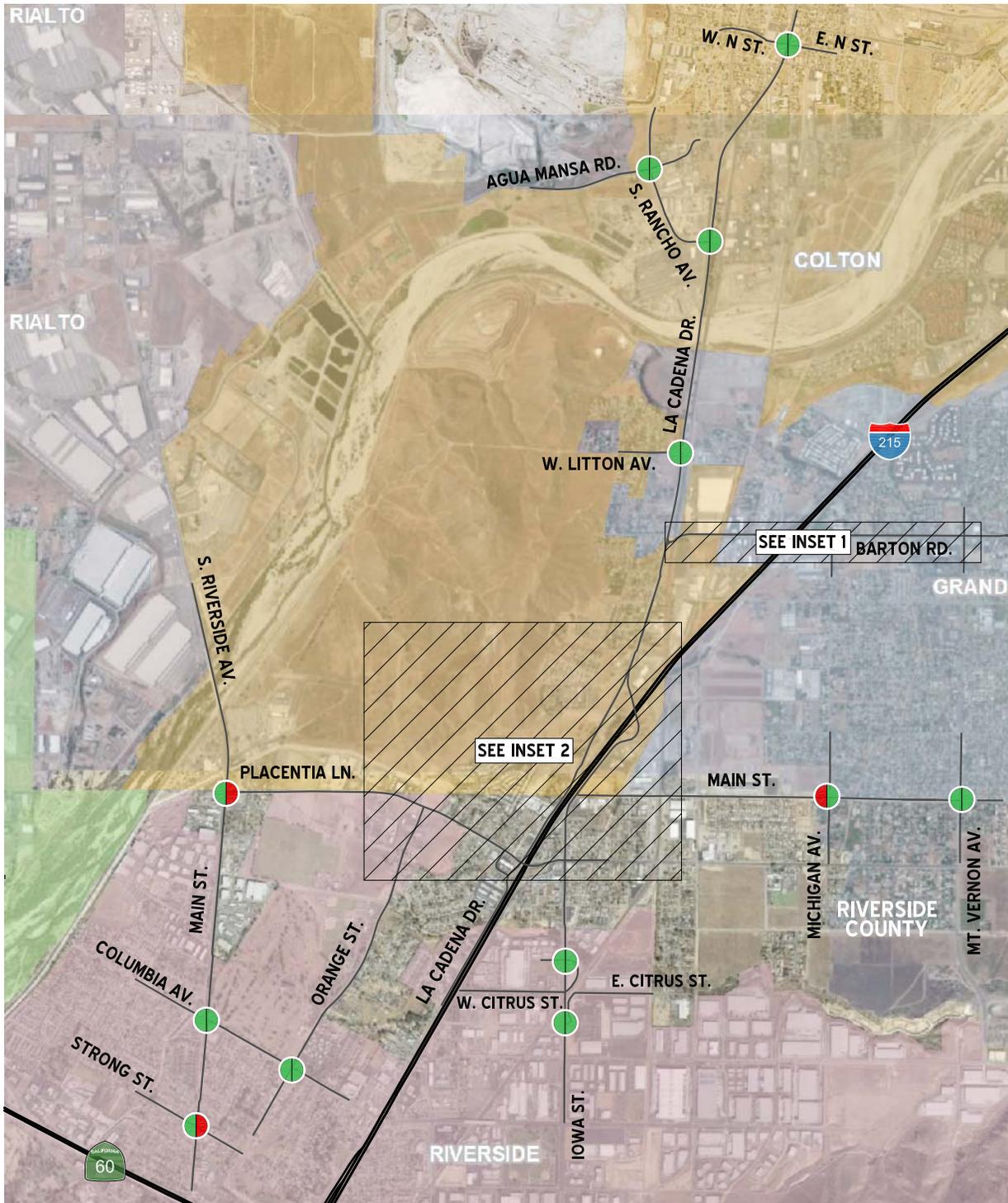
ID	Intersection Location
3	Main St. / Strong St. – LOS E PM peak hour only
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps – LOS E PM peak hour only
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp – LOS E AM peak hour only
29	S. Iowa Av. / I-215 NB Ramps – LOS E AM peak hour only
36	Michigan Av. / W. Main St. – LOS E AM peak hour only

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-20. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

EXHIBIT 3-19: EXISTING (2016) TRAFFIC VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p>	<p>2 Main St. & Columbia Av.</p>	<p>3 Main St. & Strong St.</p>	<p>4 Orange St. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>5 Orange St. & W. Center St.</p>	<p>6 Orange St. & Columbia Av.</p>	<p>7 Street "C" & Street "A"</p> <p style="text-align: center;">Future Intersection</p>
<p>8 Street "A" & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p style="text-align: center;">Future Intersection</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p>	<p>14 Stephens Av. & W. Center St.</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p>	<p>16 La Cadena Dr. & W. N St.</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p>	<p>25 La Crosse Av. & Barton Rd.</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p>	<p>28 I-215 NB Ramps & Barton Rd.</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p>	<p>30 Iowa Av. & W. Main St.</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p>	<p>32 Iowa Av. & Center St.</p>	<p>33 Iowa Av. & W. Citrus St.</p>	<p>34 Iowa Av. & E. Citrus St.</p>	<p>35 Michigan Av. & Barton Rd.</p>
<p>36 Michigan Av. & W. Main St.</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p>	<p>38 Mt. Vernon Av. & Main St.</p>	<p>39 Palm Av. & Barton Rd.</p>	<p style="text-align: center;">LEGEND:</p> <p style="text-align: center;">10(10) = AM(PM) PEAK HOUR VOLUMES</p>		

EXHIBIT 3-20 (1 OF 2): EXISTING (2016) SUMMARY OF LOS

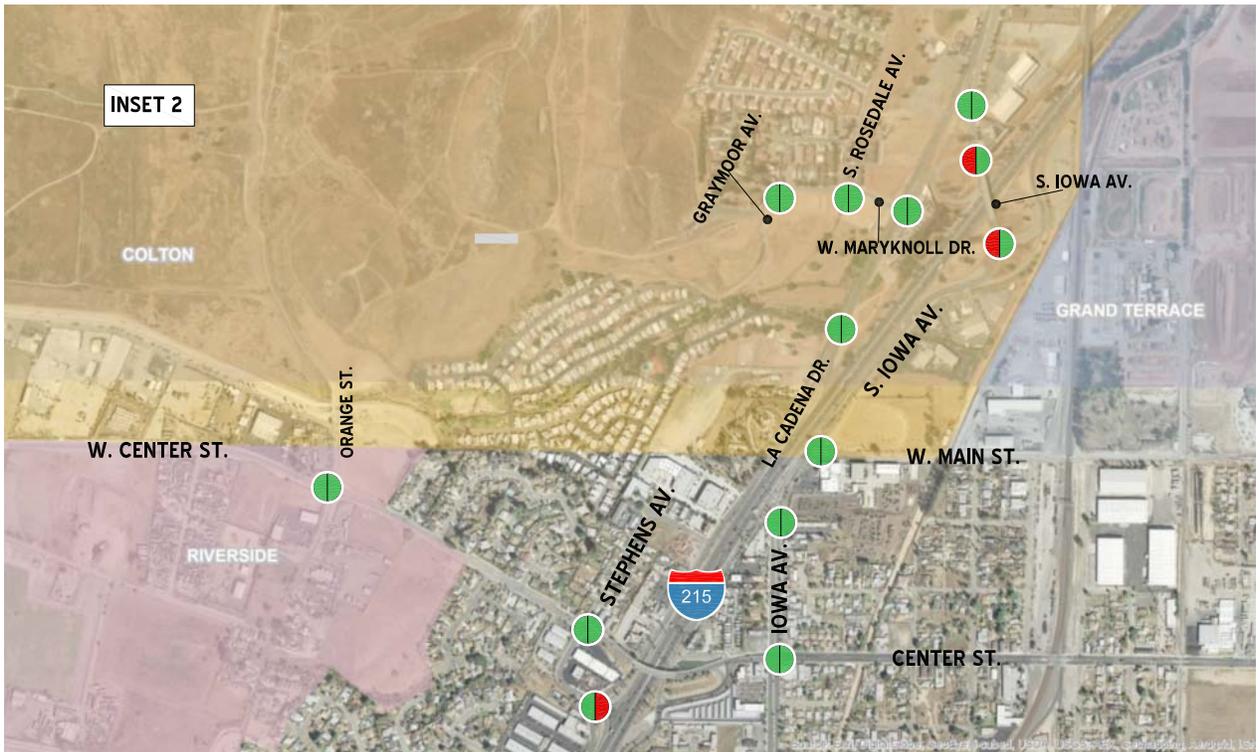


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS



EXHIBIT 3-20 (2 OF 2): EXISTING (2016) SUMMARY OF LOS



LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS



Table 3-1

Intersection Analysis for Existing (2016) Conditions

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	S. Riverside Av. / Main St. / Placentia Ln.	CSS	1	2	d	1	2	d	0	1	0	0	1	0	17.3	21.2	C	C
2	Main St. / Columbia Av.	TS	1	2	1>	2	2	d	1	1	0	1	1	1	22.3	29.4	C	C
3	Main St. / Strong St.	TS	1	2	d	1	2	0	0	1	1	0	1	1	43.3	78.7	D	E
4	Orange St. / Pellissier Rd.		Future Intersection															
5	Orange St. / W. Center St.	AWS	0	1	0	0	1	0	0	1	0	0	1	0	8.2	9.9	A	A
6	Orange St. / Columbia Av.	TS	0	1	0	0	1	0	1	2	0	1	2	0	20.2	18.9	C	B
7	Street "C" / Street "A"		Future Intersection															
8	Street "A" / Pellissier Rd.		Future Intersection															
9	Roquet Ranch Rd. / Street "A"		Future Intersection															
10	Roquet Ranch Rd. / Pellissier Rd.		Future Intersection															
11	S. Graymoor Av. / W. Maryknoll Dr.	CSS	0	1	0	0	0	0	0	1	0	0	1	0	8.4	8.4	A	A
12	S. Graymoor Av. / Pellissier Rd.		Future Intersection															
13	S. Rosedale Av. / W. Maryknoll Dr.	CSS	0	0	0	0	1	0	0	1	0	0	1	0	8.9	8.9	A	A
14	Stephens Av. / W. Center St.	TS	0	1	0	0	1	0	0	1	1	0	1	d	40.5	36.8	D	D
15	S. Rancho Av. / Agua Mansa Rd.	TS	1	2	0	1	2	0	0	1	0	0	1	0	11.9	20.4	B	C
16	La Cadena Dr. / W. N. St.	TS	1	2	d	1	2	d	0	1	0	0	1	0	6.1	6.9	A	A
17	S. La Cadena Dr. / S. Rancho Av.	CSS	1	2	0	0	2	0	1	0	1	0	0	0	18.6	23.7	C	C
18	S. La Cadena Dr. / W. Litton Av.	CSS	1	2	0	0	2	0	0	1	0	0	0	0	21.7	20.3	C	C
19	S. La Cadena Dr. / Barton Rd.	TS	0	2	1	1	2	0	0	0	0	1	0	1	12.7	18.5	B	B
20	S. La Cadena Dr. / S. Iowa Av.	CSS	1	1	0	0	1	2>>	1	0	1	0	0	0	11.6	14.1	B	B
21	S. La Cadena Dr. / W. Maryknoll Dr.	CSS	0	2	0	0	2	1	0	1	d	0	1	0	24.3	23.5	C	C
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	AWS	1	2	0	1	1	0	0	1	0	0	0	0	17.7	13.0	C	B
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	AWS	0	1	1	0	1	0	0	1	0	0	1	1	21.3	38.6	C	E
24	La Crosse Av. / I-215 SB Off-Ramp	CSS	0	1	0	0	1	0	0	0	0	0	1	0	0.0	0.0	A	A
25	La Crosse Av. / Barton Rd.	CSS	0	1	0	0	1	0	0	2	0	0	1	0	10.4	10.5	B	B
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd.	TS	0	0	0	0	1	0	1	1	0	1	1	0	36.2	32.5	D	C
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	CSS	0	1	0	0	1	0	1	0	1	0	0	0	35.2	28.8	E	D
28	I-215 NB Ramps / Barton Rd.	TS	1	0	1>>	0	0	0	1	1	0	0	1	1>>	10.0	11.8	A	B
29	S. Iowa Av. / I-215 NB Ramps	TS	0	0	0	0	1	0	1	1	0	0	1	0	69.0	54.4	E	D
30	Iowa Av. / W. Main St.	TS	0	1	1	1	1	0	0	0	0	1	0	1	35.0	20.8	D	C
31	Iowa Av. / E. La Cadena Dr.	CSS	1	2	0	0	2	1>>	0	1	0	0	0	0	13.8	20.0	B	C
32	Iowa Av. / Center St.	TS	1	2	d	1	2	0	1	2	0	1	1	1	38.9	35.0	D	D
33	Iowa Av. / W. Citrus St.	TS	1	2	1	1	2	d	0	1	0	0	1	1	5.1	6.0	A	A
34	Iowa Av. / E. Citrus St.	TS	0	2	d	1	2	0	0	0	0	1	0	1	6.7	6.6	A	A
35	Michigan Av. / Barton Rd.	TS	1	0	1	0	0	0	0	2	0	1	2	0	28.5	16.0	C	B
36	Michigan Av. / W. Main St.	TS	1	1	0	1	1	0	1	1	1	1	1	0	64.0	25.0	E	C
37	Mt. Vernon Av. / Barton Rd.	TS	1	2	0	1	2	0	1	2	0	2	2	0	39.7	32.1	D	C
38	Mt. Vernon Av. / Main St.	AWS	0	1	d	0	2	0	0	1	d	0	1	0	24.9	10.9	C	B
39	Palm Av. / Barton Rd.	CSS	1	0	1	0	0	0	0	2	0	1	2	0	12.3	12.7	B	B

* **BOLD** = 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 Right Turn Lane

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal

3.7 EXISTING (2016) CONDITIONS ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 3-2 provides a summary of the Existing (2016) conditions roadway segment capacity analysis based on the applicable roadway segment capacities, by jurisdiction. As shown on Table 3-2, all but 3 of the study area roadway segments currently operate at acceptable LOS based on the applicable planning level daily roadway capacity thresholds:

ID	Roadway Segment Location
34	S. Iowa Av., Between I-215 SB Off-Ramp and I-215 NB Ramps – LOS E
35	S. Iowa Av., South of I-215 NB Ramps – LOS E
36	S. Iowa Av., North of W. Main St. – LOS E

As noted in Section 2.3 *Roadway Segment Capacity Analysis Methodology*, daily roadway capacities are “rule of thumb” estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

3.8 EXISTING (2016) CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on peak hour intersection volumes. For Existing conditions, the following intersections appear to currently warrant a traffic signal:

ID	Intersection Location	Jurisdiction
1	S. Riverside Av. / Main St. / Placentia Ln.	City of Colton, City of Riverside
17	S. La Cadena Dr. / S. Rancho Av.	City of Colton
18	S. La Cadena Dr. / W. Litton Av.	City of Colton
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	County of Riverside, Caltrans
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	City of Colton, Caltrans
31	Iowa Av. / E. La Cadena Dr.	County of Riverside
38	Mt. Vernon Av. / Main St.	City of Grand Terrace
39	Palm Av. / Barton Rd.	City of Grand Terrace

Existing traffic signal warrant analysis worksheets are included in Appendix 3.3 of this TIA.

Table 3-2

Roadway Volume/Capacity Analysis for Existing (2016) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	Existing (2016)	V/C ²	LOS ³	Acceptable LOS ³
1	S. Rancho Avenue	Agua Mansa Rd. to La Cadena Dr.	4D	33,000	8,692	0.26	A	D
2	La Cadena Drive	N St. to S. Rancho Av.	4D	33,000	12,152	0.37	A	D
3		South of S. Rancho Av.	4D	33,000	18,411	0.56	A	D
4		North of W. Litton Av.	4D	33,000	18,657	0.57	A	D
5		Between W. Litton Av. and Barton Rd.	4D	33,000	18,813	0.57	A	D
6		South of Barton Rd.	5D	41,250	17,653	0.43	A	D
7		North of S. Iowa Av.	4D	33,000	16,169	0.49	A	D
8		Between S. Iowa Av. and W. Maryknoll Dr.	4D	33,000	11,125	0.34	A	D
9		Between W. Maryknoll Dr. and Pellissier Rd.	4D	33,000	10,322	0.31	A	D
10		Barton Road	East of La Cadena Dr.	2U	18,000	8,190	0.46	A
11	West of La Crosse Av.		2U	18,000	8,860	0.49	A	D
12	Between La Crosse Av. and I-215 SB Ramps		2D	18,000	8,436	0.47	A	D
13	Between I-215 SB Ramps and I-215 NB Ramps		2D	18,000	14,272	0.79	C	D
14	Between I-215 NB Ramps and Michigan Av.		4D	33,000	20,509	0.62	B	D
15	East of Michigan Av.		4D	33,000	15,387	0.47	A	D
16	West of Mt. Vernon Av.		4D	33,000	14,171	0.43	A	D
17	Mt. Vernon Av. to Palm Av.	4D	33,000	15,298	0.46	A	D	
18	Placentia Lane / West Center Street	East of S. Riverside Av. / Main St.	2U	18,000	4,095	0.23	A	D
19		West of Orange St.	2U	18,000	3,972	0.22	A	D
20	Main Street	South of Placentia Ln.	4D	33,000	20,498	0.62	B	D
21		North of Columbia Av.	4D	33,000	25,490	0.77	C	D
22		Columbia Av. to Strong St.	4D	33,000	20,777	0.63	B	D
23	Orange Street	South of Pellissier Rd.	2U	12,500	0	0.00	--	D
24		North of W. Center St.	2U	12,500	424	0.03	A	D
25		South of W. Center St.	2U	12,500	2,633	0.21	A	D
26		North of Columbia Av.	2U	12,500	4,530	0.36	A	D
27	Pellissier Road / Maryknoll Dr.	Between Orange St. and Street "A"	4D	33,000	0	0.00	--	D
28		Between Street "A" and Roquet Ranch Rd.	4D	33,000	0	0.00	--	D
29		East of Roquet Ranch Rd.	4D	33,000	0	0.00	--	D
30		West of Graymoor Av.	4D	33,000	0	0.00	--	D
31		Between Graymoor Av. and Rosedale Av.	2U	12,500	335	0.03	A	D
32		Between Rosedale Av. and La Cadena Dr.	2D	12,500	982	0.08	A	D
33	South Iowa Avenue	Between La Cadena Dr. and I-215 SB Off-Ramp	2U	18,000	12,274	0.68	B	D
34		Between I-215 SB Off-Ramp and I-215 NB Ramps	2U	18,000	16,236	0.90	E	D
35		South of I-215 NB Ramps	2D	18,000	17,407	0.97	E	D
36		North of W. Main St.	2U	18,000	18,300	1.02	F	D
37	West Main Street	East of S. Iowa Av.	2U	18,000	5,501	0.31	A	D
38		West of Michigan Av.	2D	18,000	4,374	0.24	A	D

¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

² V/C = Volume-to-capacity ratio

³ LOS = Level of Service

3.9 EXISTING (2016) CONDITIONS OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Barton Road, Iowa Avenue, and Stephens Avenue interchanges 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-215 Freeway mainline. Queuing analysis findings are presented in Table 3-3. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-3, 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.

3.10 EXISTING (2016) CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS

Existing mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 3-21 for the I-215 Freeway at Barton Road and La Cadena Drive/Iowa Avenue interchanges. As shown on Table 3-4, the I-215 Freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing traffic conditions, with the exception of the following:

ID	Freeway Mainline Segments
4	I-215 Freeway Northbound, North of Barton Rd. – LOS E AM peak hour only
5	I-215 Freeway Northbound, between Barton Rd. and La Cadena Dr. – LOS E AM peak hour only

Existing conditions basic freeway segment analysis worksheets are provided in Appendix 3.5.

3.11 EXISTING (2016) CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing traffic conditions and the results of this analysis are presented in Table 3-5. As shown in Table 3-5, the freeway ramp merge and diverge areas currently operate at LOS D or better, with the exception of the following:

ID	Freeway Merge/Diverge Ramp Junctions
4	I-215 Freeway – Northbound, On-Ramp at Barton Rd. – LOS E AM peak hour only
6	I-215 Freeway – Northbound, Off-Ramp at S. Iowa Av. – LOS E AM peak hour only

Existing freeway ramp junction operations analysis worksheets are provided in Appendix 3.6.

Table 3-3

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2016) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet) ²		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
La Crosse Av. / I-215 SB Off-Ramp	SBT	570	0	0	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	34	32	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	45	67	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	203	173	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	89	105	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 Maximum queue length for the approach reported.

Table 3-4

Basic Freeway Segment Analysis for Existing (2016) Conditions

Freeway	Direction	Mainline Segment	Lanes ¹	Volume		Truck %	Truck %	Density ²		LOS ³	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Barton Road	3	5,125	5,007	4%	2%	29.4	28.0	D	D
		Barton Road to La Cadena Drive	3	5,251	4,899	4%	2%	30.5	27.2	D	D
		South of La Cadena Drive	3	5,177	4,727	4%	2%	29.8	25.9	D	C
	NB	North of Barton Road	3	6,023	5,545	3%	3%	38.2	33.0	E	D
		Barton Road to La Cadena Drive	3	5,806	5,606	3%	3%	35.7	33.6	E	D
		South of La Cadena Drive	3	5,532	5,319	2%	2%	32.6	30.6	D	D

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 3-5

Freeway Ramp Junction Merge/Diverge Analysis for Existing (2016) 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	SB	Off-Ramp at Barton Road	3	33.3	D	32.7	D
		Off-Ramp at S. Iowa Avenue	3	33.8	D	32.0	D
		On-Ramp at S. La Cadena Drive	3	31.5	D	28.7	D
	NB	On-Ramp at Barton Road	3	35.9	E	33.3	D
		On-Ramp at S. Iowa Avenue	3	34.4	D	33.5	D
		Off-Ramp at S. Iowa Avenue	3	35.0	E	34.3	D

* **BOLD** = Unacceptable Level of Service

¹ Number of 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

EXHIBIT 3-21: EXISTING (2016) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



3.12 RECOMMENDED IMPROVEMENTS

3.12.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient to reduce each location’s peak hour delay and improve the associated LOS grade to acceptable levels. The effectiveness of these recommended improvements to address Existing LOS deficiencies are presented in Table 3-6 and are described below. The intersection operations analysis worksheets for Existing traffic conditions, with improvements, are provided in Appendix 3.7.

Recommended Improvement – Main St. / Strong St. (#3)

- Restripe the eastbound approach with a left turn lane and shared through-right turn lane.

Recommended Improvement – La Cadena Dr. W. / Stephens Av./I-215 Southbound Ramps (#23)

- Add a traffic signal.

Recommended Improvement – S. Iowa Av. / S. La Cadena Dr. / I-215 Southbound Off-Ramp (#27)

- Add a traffic signal.

Recommended Improvement – S. Iowa Av. / I-215 Northbound Ramps (#29)

- Add a southbound right turn lane.

Recommended Improvement – Michigan Av. / W. Main St. (#36)

- Add a southbound right turn lane.

3.12.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes. As the intersections along S. Iowa Avenue between the I-215 Southbound Ramps and Main Street are anticipated to operate at acceptable LOS with the improvements shown in Table 3-6, widening along S. Iowa Avenue does not appear to be necessary.

3.12.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Colton (or other neighboring jurisdictions) on the SHS segments. As such, no improvements have been recommended to address the Existing (2016) deficiencies on the SHS.

Table 3-6

Intersection Analysis for Existing (2016) Conditions With Improvements

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
3	Main St. / Strong St.																	
	- Without Improvements	TS	1	2	d	1	2	0	0	1	1	0	1	1	43.3	78.7	D	E
	- With Improvements	TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	11.9	13.3	B	B
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps																	
	- Without Improvements	AWS	0	1	1	0	1	0	0	1	0	0	1	1	21.3	38.6	C	E
	- With Improvements	<u>TS</u>	0	1	1	0	1	0	0	1	0	0	1	1	17.3	15.6	B	B
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp																	
	- Without Improvements	CSS	0	1	0	0	1	0	1	0	1	0	0	0	35.2	28.8	E	D
	- With Improvements	<u>TS</u>	0	1	0	0	1	0	1	0	1	0	1	0	22.7	28.0	C	C
29	S. Iowa Av. / I-215 NB Ramps																	
	- Without Improvements	TS	0	0	0	0	1	0	1	1	0	0	1	0	69.0	54.4	E	D
	- With Improvements	TS	0	0	0	1	0	<u>1</u>	1	1	0	0	0	0	27.8	25.4	C	C
36	Michigan Av. / W. Main St.																	
	- Without Improvements	TS	1	1	0	1	1	0	1	1	1	1	1	0	64.0	25.0	E	C
	- With Improvements	TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	49.6	24.6	D	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; 1 = Improvement

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal; RA = Roundabout

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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 754 single-family residential units, 244 condo/townhomes, 52 active adult attached units, 6,500 square feet of commercial retail use, a 1,500 square foot coffee shop with drive-through window, a 4,000 square foot fast-food restaurant with drive-through window, an 11.1 acre community park, and 8.4 acres of passive parks. Planning Area 12 and Planning Area 13 both include Public/Institution uses, however, it has been determined that the residential dwelling unit overlay would generate more off-site trips. As such, the dwelling unit overlay has been evaluated for both Planning Areas 12 and 13 for the purposes of this traffic study. The Project is anticipated to have an Opening Year of 2020.

Main access to the Project site will be provided via the future Pellissier Road, which will align with the existing W. Maryknoll Drive at La Cadena Drive and secondary access via an extension of Orange Street, north of West Center Street. All proposed access points are assumed to allow for full access.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development. Determining traffic generation for a specific project is therefore based upon forecasting the amount of traffic that is expected to be both attracted to and produced by the specific land uses being proposed for a given development. Trip generation rates used to estimate Project traffic are shown in Table 4-1. The trip generation rates are based upon data collected by the ITE *Trip Generation Manual*, 9th Edition, 2012. (6)

Pass-by trips are defined as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. These types of trips are many times associated with retail uses such as fast-food restaurants and coffee/donut shops with drive-through windows. As the Project is proposed to include these types of land uses, pass-by percentages have been obtained from Table F.9, F.31, and F.32 from the ITE Trip Generation Handbook, 3rd Edition, August 2014. (10)

Table 4-1

Project Trip Generation Rates

Land Use ¹	Units ³	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Single Family Detached Residential	DU	210	0.19	0.56	0.75	0.63	0.37	1.00	9.52
Condo/Townhomes	DU	230	0.07	0.37	0.44	0.35	0.17	0.52	5.81
Active Adult - Attached	DU	252	0.07	0.13	0.20	0.14	0.11	0.25	3.44
Shopping Center	TSF	820	2.42	1.48	3.90	6.25	6.77	13.02	154.79
Coffee Shop with Drive Thru	TSF	937	51.30	49.28	100.58	21.40	21.40	42.80	818.58
Fast Food with Drive Thru	TSF	934	23.16	22.26	45.42	16.98	15.67	32.65	496.12
Active Park ^{2, 4}	AC	--	1.00	1.00	2.00	2.00	2.00	4.00	50.00
Passive Park ⁴	AC	--	0.10	0.11	0.21	0.07	0.07	0.14	1.59

¹ Trip Generation Source: Institute of Transportation Engineers (ITE), [Trip Generation Manual](#), Ninth Edition (2012).

² Trip Generation Source: (Not So) Brief Guide of Vehicular Traffic Generation Rates, April 2002.

³ TSF = thousand square feet; DU = Dwelling Units, STU = Students, AC = Acres

⁴ Active and passive park trip generation rates are not available in the 9th Edition [Trip Generation](#) manual.

Source for AM and PM peak hour percentages of daily and AM/PM in and out splits: [\(Not So\) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region](#), April 2002. Daily trip rate for passive park is per the ITE [Trip Generation](#) manual.

Internal capture is a percentage reduction that can be applied to the trip generation estimates for individual land uses to account for trips internal to the site. In other words, trips may be made between individual retail uses on-site and can be made either by walking or using internal roadways without using external streets. An internal capture reduction was applied to recognize the interactions that would occur between the various complimentary land uses. For example, residents may visit the commercial site without leaving the site and are therefore considered as vehicle trips that are internal to the site. The National Cooperative Highway Research Program (NCHRP) 684 Internal Trip Capture Estimation Tool was used to compute internal capture reduction for residential-to-retail.

A summary of the Project's trip generation is shown subsequently on Table 4-2. As shown on Table 4-2, the Project is estimated to generate a net total of 10,021 trip-ends per day on a typical weekday with 819 AM peak hour trips and 991 PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

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. The Project residential trip distribution patterns are graphically depicted on Exhibit 4-1. Exhibit 4-2 shows trip distribution for commercial retail uses that will be utilized. Each of the distributions shown are for external trips only.

The project trip distributions have been based on the PM peak period trip distribution from the current SBTAM. The PM peak period trip distribution is a reasonable representation of traffic patterns to and from the Project site during primary entry/exit times. The afternoon is typically selected because the majority of land use types are active (for example, the morning peak may not have much commercial activity). The proposed Project's trip distribution patterns were also reviewed and approved by the City of Colton as part of the traffic study scoping process (see Appendix 1.1).

4.3 MODAL SPLIT

The traffic reducing potential of public transit, walking or bicycling have not been considered in this TIA. Essentially, the traffic projections are "conservative" in that these alternative travel modes might be able to reduce the forecasted traffic volumes.

Table 4-2

Project Trip Generation Summary

Planning Area	Land Use	Quantity	Units ¹	AM Peak Hour			PM Peak Hour			Daily
				In	Out	Total	In	Out	Total	
1	Single Family Residential	65	DU	12	36	49	41	24	65	619
2	Single Family Residential	121	DU	23	68	91	76	45	121	1,152
3	Single Family Residential	169	DU	32	95	127	106	63	169	1,609
4	Single Family Residential	78	DU	15	44	59	49	29	78	743
5	Single Family Residential	75	DU	14	42	56	47	28	75	714
6	Single Family Residential	78	DU	15	44	59	49	29	78	743
7	Single Family Residential	20	DU	4	11	15	13	7	20	190
8	Condo/Townhomes	79	DU	6	29	35	28	13	41	459
9	Single Family Residential	137	DU	26	77	103	86	51	137	1,304
10	Active Adult - Attached	52	DU	4	7	10	7	6	13	179
12	Condo/Townhomes	165	DU	12	61	73	58	28	86	959
13	Single Family Residential	11	DU	2	6	8	7	4	11	105
Residential Net Trips				164	519	683	568	326	894	8,775
<i>Internal Capture (Residential to Retail)</i> ²				-8	-37	-45	-28	-18	-46	-452
Residential Subtotal				156	482	638	540	308	848	8,323
11	Shopping Center	6,500	TSF	16	10	25	41	44	85	1,006
	<i>Internal Capture</i> ²			-4	-2	-6	-25	-24	-49	-583
	<i>Pass-By Reduction</i> ³		34%	--	--	--	-5	-5	-11	-342
	Coffee Shop with Drive Thru	1,500	TSF	77	74	151	32	32	64	1,228
	<i>Internal Capture</i> ²			-18	-4	-22	-14	-19	-33	-622
	<i>Pass-By Reduction</i> ³		49/50%	-34	-34	-69	-7	-7	-13	-303
	Fast Food with Drive Thru	4,000	TSF	93	89	182	68	63	131	1,984
	<i>Internal Capture</i> ²			-18	-4	-22	-14	-19	-33	-494
	<i>Pass-By Reduction</i> ³		49/50%	-42	-42	-83	-22	-22	-44	-745
	Planning Area 11 Net Trips				185	173	358	141	139	279
<i>Total Internal Capture</i>				-39	-10	-49	-52	-62	-114	-1,698
<i>Total Pass-by Reduction</i>				-76	-76	-152	-34	-34	-67	-1,391
Planning Area 11 Subtotal				70	87	157	55	43	98	1,130
13B	Community Park ⁵	11.1	AC	11	11	22	22	22	44	555
15, 16, 17, 18, 19	Passive Parks	8.4	AC	1	1	2	1	1	1	13
Total				238	581	819	617	374	991	10,021

¹ TSF = thousand square feet; DU = Dwelling Units; STU = Students; AC = Acres

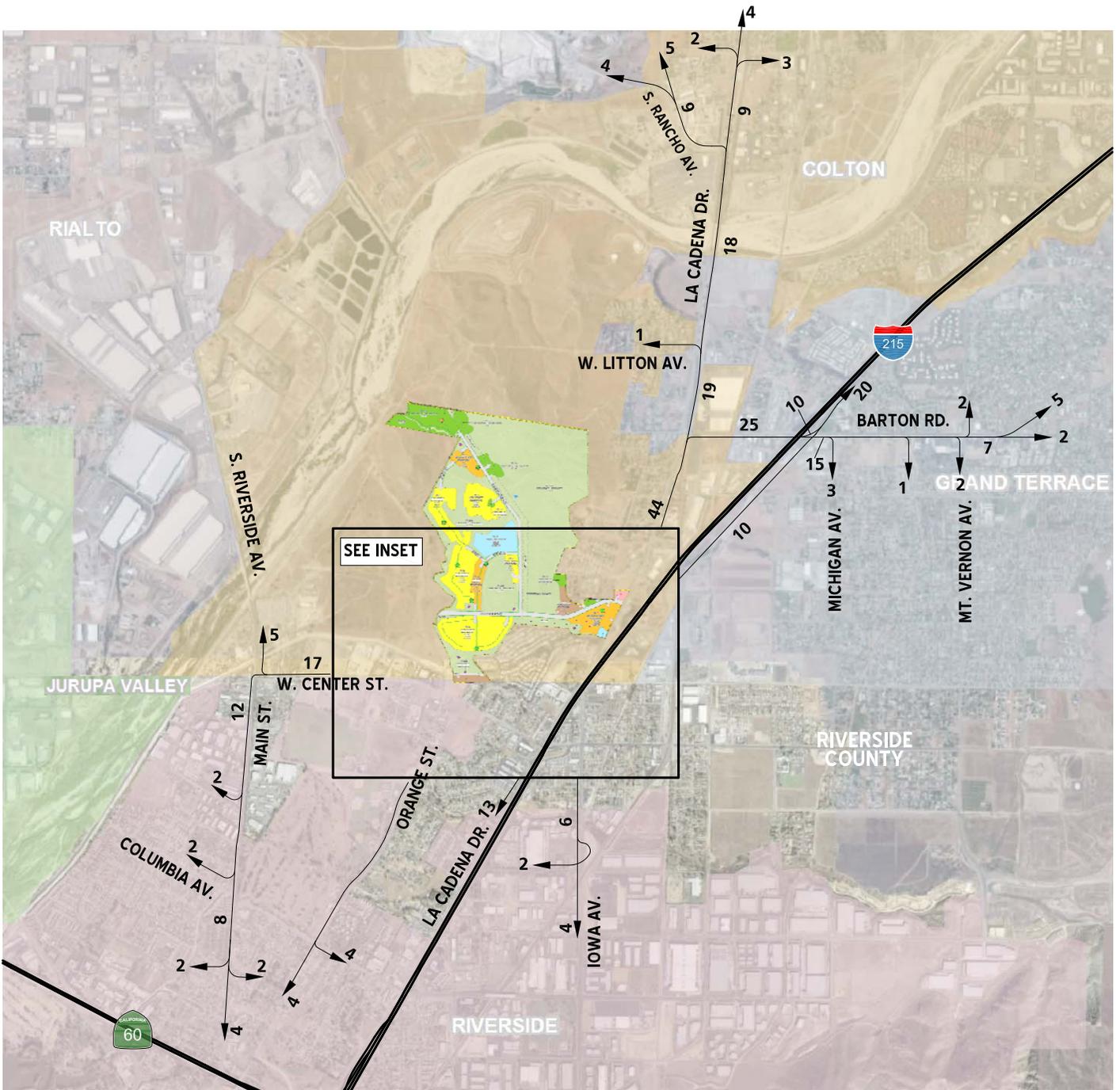
² Internal capture calculated from NCHRP 684 Internal Trip Capture Estimation Tool.

³ Pass-by reduction percentages based on Tables F.9, F.31, F.32 from ITE Trip Generation Handbook, 3rd Edition, August 2014.

⁴ Planning Area 12 has an alternative overlay for a 10-acre school. For the purpose of this study, the more conservative trip generation has been evaluated (i.e. 165 condo/townhomes).

⁵ Community Park totals 13.9 acres, however 2.8 acres are intended for residential amenities, such as clubhouse and pool, and have not been included as it will only generate internal trips.

EXHIBIT 4-1 (1 OF 2): PROJECT (RESIDENTIAL) TRIP DISTRIBUTION



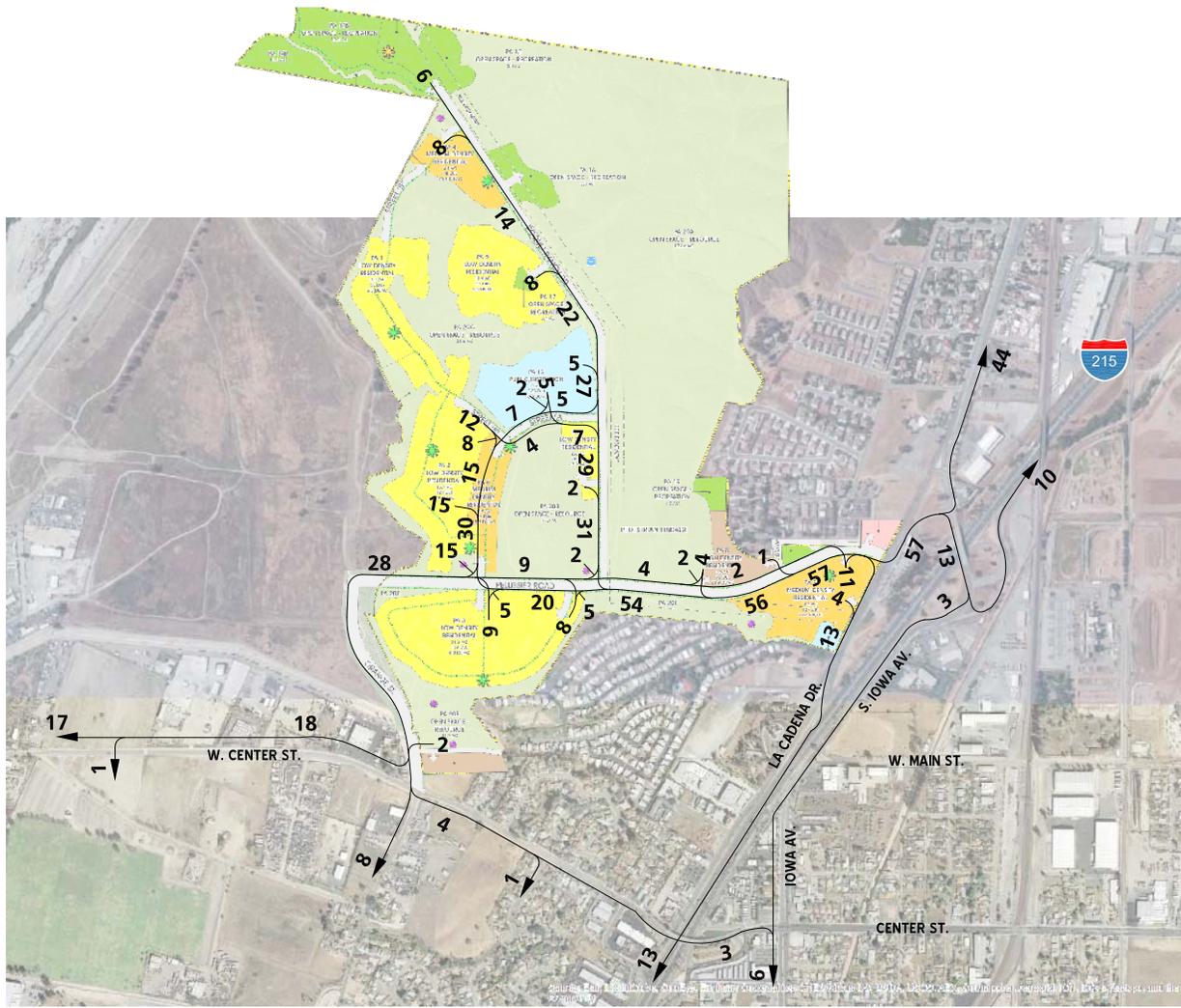
NOTE: ALSO UTILIZED FOR PARK USES

LEGEND:

10 = PERCENT TO/FROM PROJECT



EXHIBIT 4-1 (2 OF 2): PROJECT (RESIDENTIAL) TRIP DISTRIBUTION

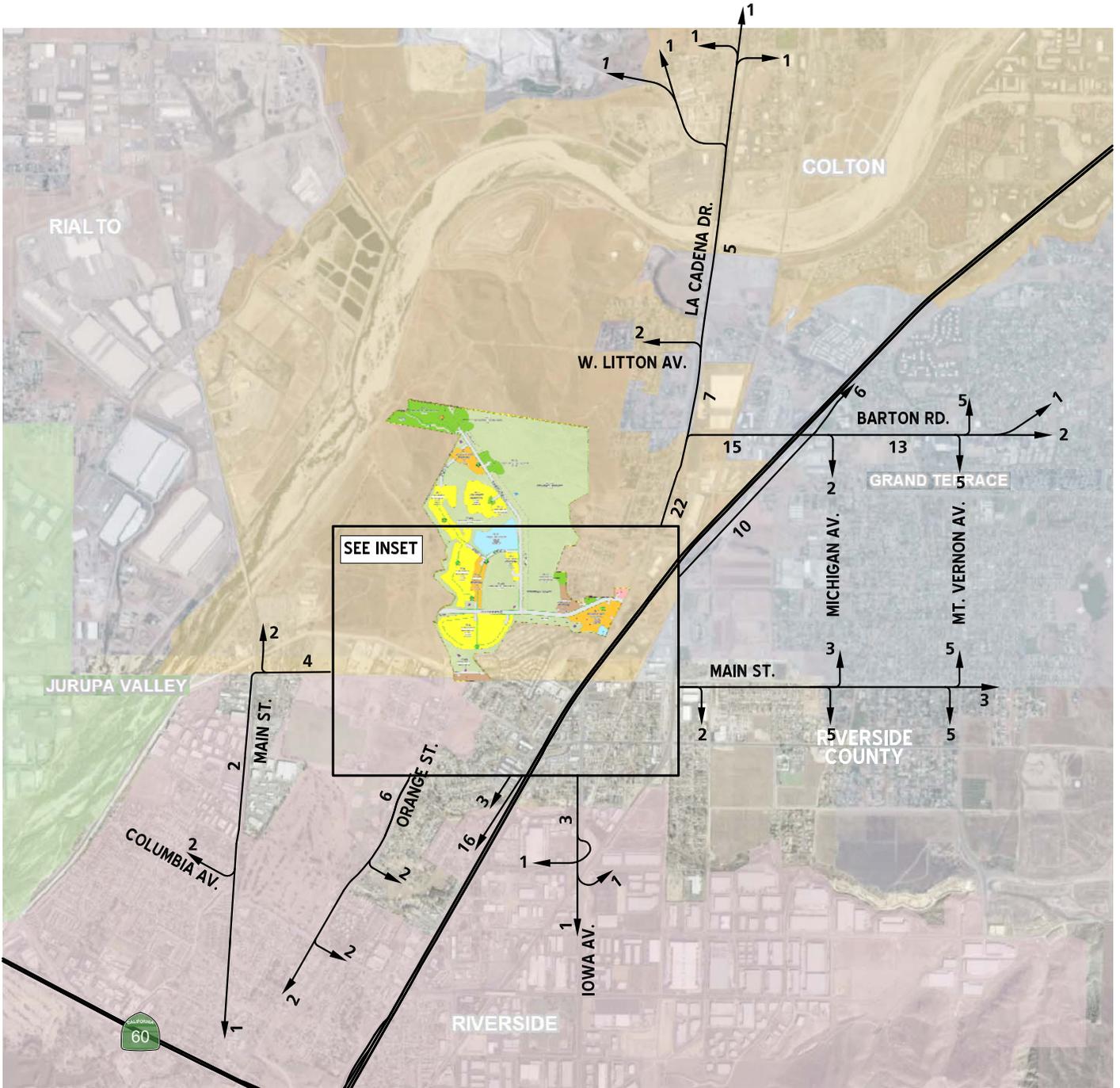


LEGEND:

10 = PERCENT TO/FROM PROJECT



EXHIBIT 4-2 (1 OF 2): PROJECT (COMMERCIAL RETAIL) TRIP DISTRIBUTION

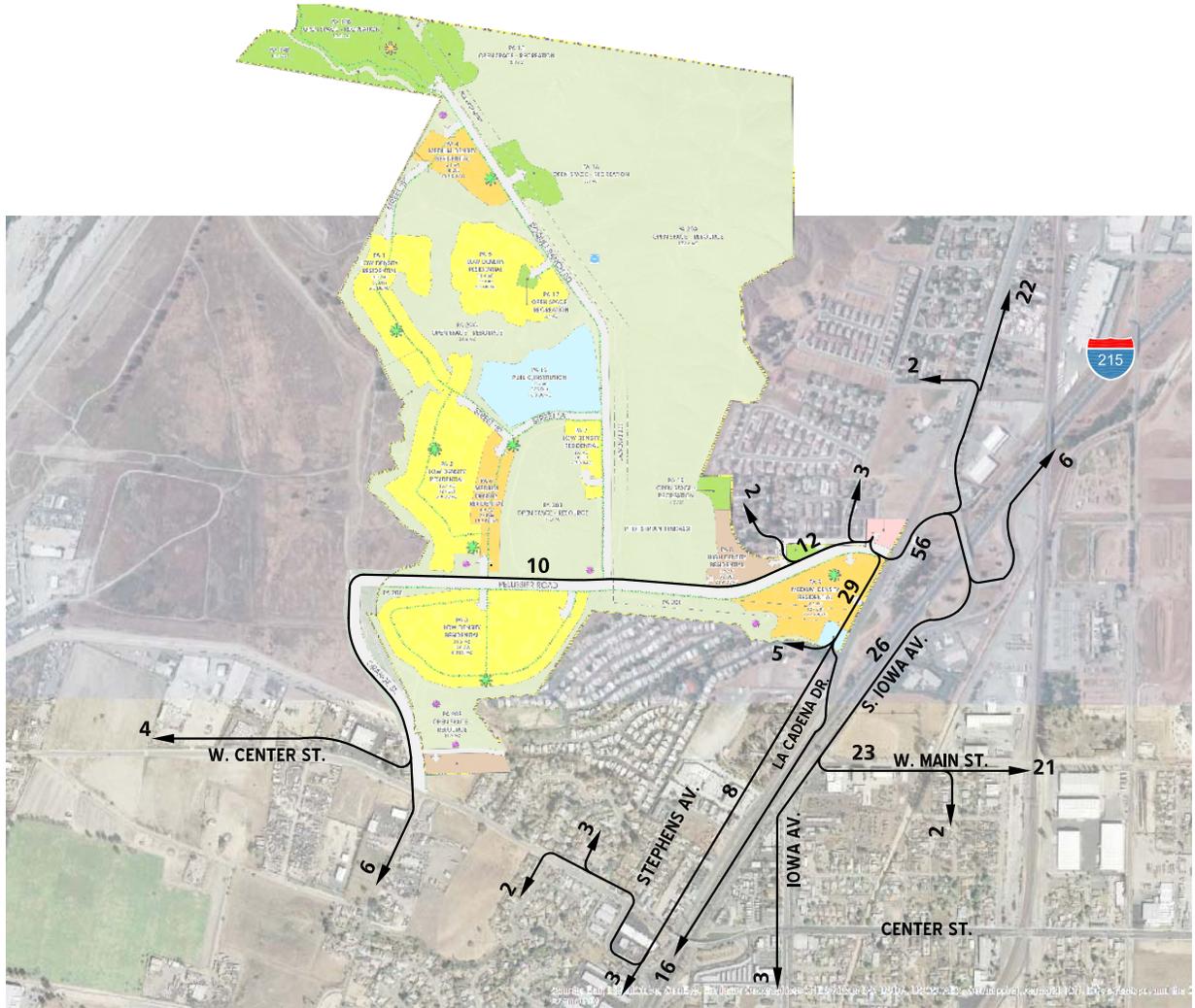


LEGEND:

10 = PERCENT TO/FROM PROJECT



EXHIBIT 4-2 (2 OF 2): PROJECT (COMMERCIAL RETAIL) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT



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 are currently in place or 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 weekday average daily traffic (ADT) and peak hour volumes are shown on Exhibits 4-3 and 4-4, respectively.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon two and four years of background (ambient) growth at 1% per year for 2020 traffic conditions. The Opening Year Cumulative traffic forecasts were developed by applying an ambient growth factor to Existing conditions of 4.06 (e.g., 1 percent per year over 4 years, compounded annually). 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.

The adopted *Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan (RTP)* (April 2012) growth forecasts for the City of Colton identifies projected growth in population of 52,100 in 2008 to 71,700 in 2035, or a 37.6% increase over the 27-year period. (11) The change in population equates to roughly a 1.19% growth rate, compounded annually. Similarly, growth over the same 27-year period in households is projected to increase by 40.7%, or 1.27% annual growth rate. Finally, growth in employment over the same 27-year period is projected to increase by 23.3%, or a 0.78% annual growth rate.

On March 9, 2015, SCAG, as Lead Agency, published a Notice of Preparation (NOP) of a Program Environmental Impact Report (PEIR) for the 2016–2040 RTP/Sustainable Communities Strategy (2016 RTP/SCS), which was adopted April 7, 2016. The 2016 RTP/SCS forecasts reflect reduced growth rates and total growth when compared to the 2012 – 2035 RTP/SCS forecasts (used in this TIA to calculate expected ambient growth), with the exception of employment. The 2016-2040 RTP/SCS growth rate for employment is approximately 1.2% greater than the 2012 - 2035 RTP/SCS however, this slight increase in projected regional employment would have a de minimus effect on the impact conclusions drawn by this TIA and would not result in any additional traffic impacts when considered in conjunction with the reduced growth rates for both population and households, and the addition of cumulative developments utilized for the purposes of this analysis. The annual average growth based on the 2016 RTP/SCS is 1.38 percent per year for the City of Colton. Therefore, the annual growth rate of 2% in conjunction with cumulative project traffic would appear to be conservative and tend to overstate as opposed to understate future traffic growth.

Based on a comparison of Existing traffic volumes to the Horizon Year forecasts, the average growth rate is estimated at approximately 2.4% compounded annually between Existing and

Horizon Year traffic conditions. The annual growth rate at each individual intersection is not lower than 1.6% compounded annually to as high as 5.2% 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 traffic conditions, especially when considered along with the addition of project-related traffic. As such, the growth in traffic volumes assumed in this traffic impact analysis would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

California Environmental Quality Act (CEQA) guidelines require that other reasonably foreseeable development projects which are either approved or being processed concurrently in the study area also be included as part of a cumulative analysis scenario. A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the City of Colton, City of Grand Terrace, City of Rialto, City of Riverside, and County of Riverside. Appendix 4.1 contains the correspondence and materials provided by each of the aforementioned jurisdictions.

Exhibit 4-5 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-3. If applicable, the traffic generated by individual cumulative projects was manually added to both the Opening Year Cumulative (2020) and Horizon Year forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-3 are reflected as part of the background traffic.

4.7 TRAFFIC FORECASTS

To provide a comprehensive assessment of the potential project-related and cumulative traffic deficiencies, two types of analyses, “buildup” and “buildout”, were performed in support of this work effort. The “buildup” method was used to approximate traffic forecasts for E+P and Opening Year Cumulative (2020) traffic conditions. The E+P traffic conditions include existing traffic in addition to the traffic generated by the proposed Project. The Opening Year Cumulative (2020) traffic conditions include existing traffic, background traffic growth, traffic generated by other cumulative development projects within the study area and the traffic generated by the proposed Project. The “buildout” approach is used to forecast the Horizon Year Without and With Project traffic conditions of the study area.

4.8 OPENING YEAR CUMULATIVE CONDITIONS

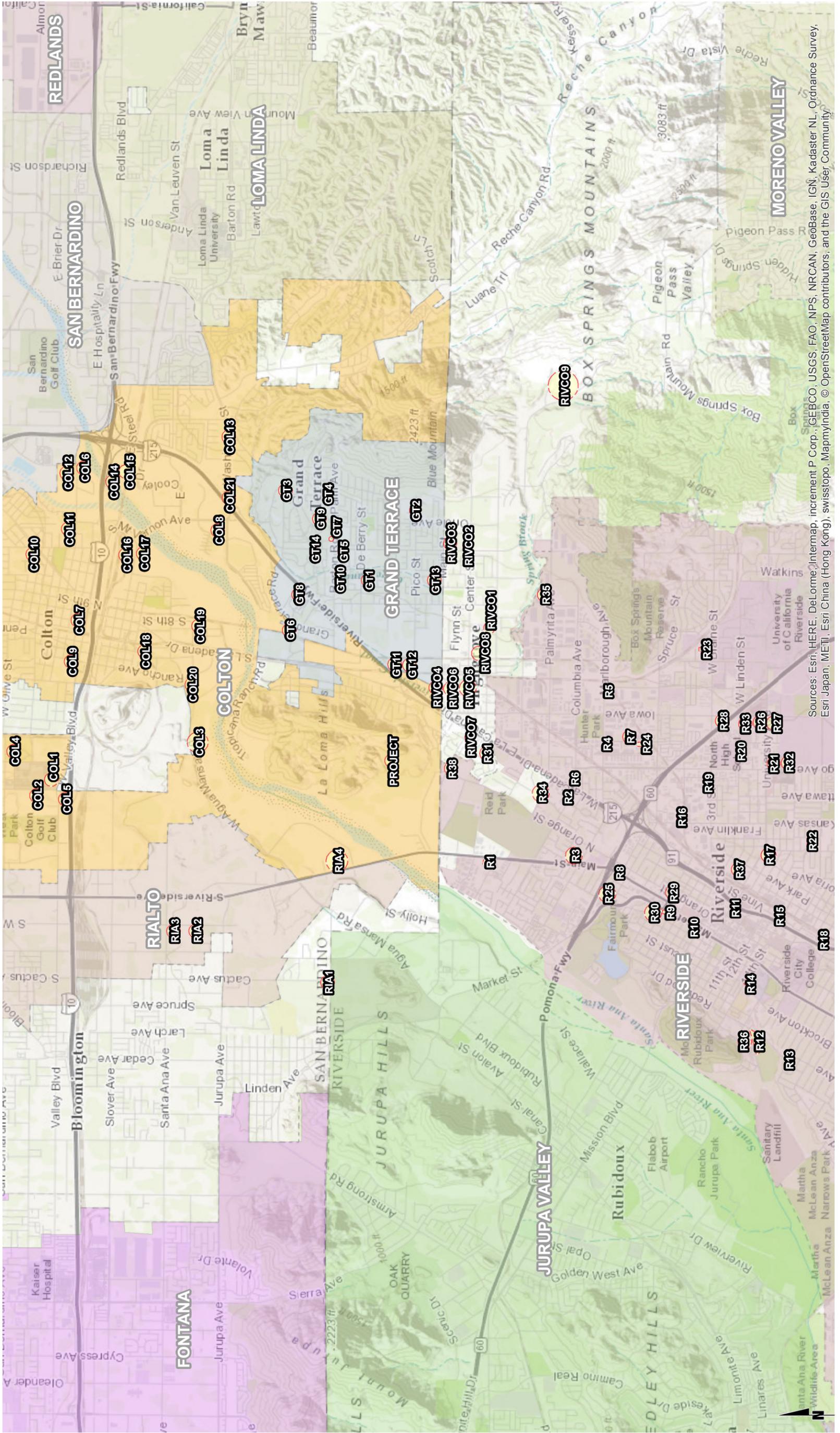
The “buildup” approach combines existing traffic counts with a background ambient growth factor to forecast Opening Year Cumulative traffic conditions. An ambient growth factor to account for background (area-wide) traffic increases that occur over time up to the year 2020 from the year 2016 (compounded annually). Traffic volumes generated by the Project and other cumulative development projects are then added to assess the Opening Year Cumulative traffic conditions. The 2020 roadway networks are similar to the existing conditions roadway network with the exception of future driveways proposed to be developed by the Project.

EXHIBIT 4-4: PROJECT TRAFFIC VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p> <p>←0(0) ↓0(0) ↓10(29) ←25(17) ↓0(0) ↓57(41)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓22(69)</p>	<p>2 Main St. & Columbia Av.</p> <p>←10(7) ↓38(27) ↓0(0) ←0(0) ↓0(0) ↓0(0)</p> <p>4(12) ↓0(0) ↓0(0) 0(0) ↓14(46) ↓0(0)</p>	<p>3 Main St. & Strong St.</p> <p>←9(7) ↓19(14) ↓9(7) ←3(11) ↓0(0) ↓0(0)</p> <p>3(11) ↓0(0) ↓0(0) 0(0) ↓7(23) ↓0(0)</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>←140(98)</p> <p>55(164) ↓</p>	<p>5 Orange St. & W. Center St.</p> <p>←87(61) ↓42(29) ↓19(13) ←7(22) ↓0(0) ↓0(0)</p> <p>33(103) ↓0(0) ↓0(0) 0(0) ↓18(48) ↓0(0)</p>	<p>6 Orange St. & Columbia Av.</p> <p>←0(0) ↓20(14) ↓20(14) ←8(24) ↓0(0) ↓0(0)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓8(24) ↓0(0)</p>	<p>7 Street "C" & Street "A"</p> <p>←4(29) ↓0(0)</p> <p>14(48) ↓0(0)</p> <p>0(0) ↓0(0)</p>	
<p>8 Street "A" & Pellissier Rd.</p> <p>←70(50) ↓0(0) ↓80(55) ←27(91) ↓51(35) ↓9(30)</p> <p>25(84) ↓23(57) ↓7(22) 19(13) ↓0(0) ↓26(16)</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>←23(17) ↓108(76)</p> <p>8(28) ↓36(25) 13(42) ↓38(129)</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>←9(7) ↓146(102) ←51(172) ↓74(172)</p> <p>3(11) ↓148(120)</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p> <p>←0(0) ↓0(0)</p> <p>0(0) ↓1(1) 2(1) ↓0(0)</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>←0(0) ↓0(0) ↓6(4) ←3(6) ↓119(350) ↓0(0)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓0(0) ↓0(0)</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p> <p>←0(0) ↓2(2) ←3(1) ↓113(350)</p> <p>0(0) ↓304(211)</p>	<p>14 Stephens Av. & W. Center St.</p> <p>←0(0) ↓0(0) ↓0(0) ←0(0) ↓9(19) ↓0(0)</p> <p>0(0) ↓17(13) ↓0(0) 0(0) ↓0(0) ↓0(0)</p>	
<p>15 S. Rancho Av. & Agua Mansa Rd.</p> <p>←0(0) ↓9(29) ↓0(0) ←0(0) ↓0(0) ↓0(0)</p> <p>0(0) ↓0(0) ↓7(23) 19(14) ↓24(17) ↓0(0)</p>	<p>16 La Cadena Dr. & W. N St.</p> <p>←0(0) ↓7(23) ↓0(0) ←0(0) ↓0(0) ↓6(17)</p> <p>0(0) ↓0(0) ↓4(12) 10(7) ↓19(14) ↓15(10)</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p> <p>←0(0) ↓17(52)</p> <p>0(0) ↓17(52) 43(31) ↓44(31)</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p> <p>←0(0) ↓34(104)</p> <p>0(0) ↓3(7) 6(4) ↓88(62)</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p> <p>←37(111) ↓0(0) ←0(0) ↓53(149)</p> <p>94(66) ↓129(89) 77(173) ↓0(0)</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p> <p>←91(260) ↓0(0)</p> <p>225(156) ↓88(57) 77(173) ↓0(0)</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p> <p>←199(427) ↓0(6) ↓0(0) ←0(0) ↓0(0) ↓0(0)</p> <p>351(230) ↓0(0) ↓105(59) 47(24) ↓0(0) ↓0(0)</p>	
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p> <p>←4(2) ↓7(3) ↓74(50) ←0(0) ↓0(0) ↓0(0)</p> <p>4(3) ↓0(0) ↓0(0) 0(0) ↓6(4) ↓0(0)</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p> <p>←0(0) ↓3(1) ↓0(0) ←0(0) ↓0(0) ↓0(0)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓2(2) ↓0(0)</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p>←17(56)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓0(0)</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p>←0(0) ↓0(0) ←53(149) ↓0(0)</p> <p>129(89) ↓0(0) 0(0) ↓0(0)</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p> <p>←0(0) ↓0(0) ←0(0) ↓36(93) ↓0(0)</p> <p>0(0) ↓129(89) ↓0(0) 0(0) ↓0(0)</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p> <p>←88(57)</p> <p>21(60) ↓0(0) 56(113) ↓</p>	<p>28 I-215 NB Ramps & Barton Rd.</p> <p>←0(0) ↓36(93)</p> <p>46(33) ↓83(56) 0(0) ↓0(0)</p>	
<p>29 S. Iowa Av. & I-215 NB Ramps</p> <p>←37(21) ↓52(36) ←33(82) ↓0(0)</p> <p>23(31) ↓0(0)</p>	<p>30 Iowa Av. & W. Main St.</p> <p>←17(11) ↓20(10) ←16(13) ↓0(0)</p> <p>7(19) ↓0(0) 0(0) ↓0(0)</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p> <p>←0(0) ↓17(11)</p> <p>0(0) ↓0(0) 0(0) ↓7(19)</p>	<p>32 Iowa Av. & Center St.</p> <p>←0(0) ↓17(11) ↓0(0) ←0(0) ↓0(0) ↓0(0)</p> <p>0(0) ↓0(0) ↓14(10) 5(17) ↓7(19) ↓0(0)</p>	<p>33 Iowa Av. & W. Citrus St.</p> <p>←0(0) ↓20(14) ↓10(7) ←4(12) ↓0(0) ↓0(0)</p> <p>0(0) ↓0(0) ↓0(0) 0(0) ↓8(24) ↓0(0)</p>	<p>34 Iowa Av. & E. Citrus St.</p> <p>←19(14) ↓1(0) ←1(1) ↓0(0)</p> <p>7(23) ↓0(0) 56(113) ↓</p>	<p>35 Michigan Av. & Barton Rd.</p> <p>←29(75) ↓0(0)</p> <p>67(45) ↓16(11) 6(18) ↓0(0)</p>	
<p>36 Michigan Av. & W. Main St.</p> <p>←2(2) ↓0(0) ↓0(0) ←0(0) ↓9(7) ↓0(0)</p> <p>3(1) ↓11(6) ↓4(2) 4(3) ↓0(0) ↓0(0)</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p> <p>←7(14) ↓0(0) ↓0(0) ←0(0) ↓14(41) ↓0(0)</p> <p>14(9) ↓35(24) ↓14(9) 7(14) ↓0(0) ↓0(0)</p>	<p>38 Mt. Vernon Av. & Main St.</p> <p>←4(3) ↓0(0) ↓0(0) ←0(0) ↓2(2) ↓0(0)</p> <p>4(2) ↓3(1) ↓4(2) 4(3) ↓0(0) ↓0(0)</p>	<p>39 Palm Av. & Barton Rd.</p> <p>←9(29) ↓0(0)</p> <p>24(17) ↓11(7) 5(12) ↓0(0)</p>	<p>LEGEND:</p> <p>10(10) = AM(PM) PEAK HOUR VOLUMES</p>			



EXHIBIT 4-5: CUMULATIVE DEVELOPMENT PROJECTS LOCATION MAP



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, Geobase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Table 4-3

Cumulative Development Land Use Summary

#	Project/Location	Land Use	Quantity	Units ¹
CITY OF COLTON				
COL1	CUSM (300 N. Pepper Av.)	Medical College	150	STU
COL2	1601 W. Valley Blvd.	Hotel	NA	RM
		Gas Station	NA	VFP
COL3	1600 Agua Mansa Road	Warehouse	805.500	TSF
COL4	Cal-Med Surgery Center (1281 W. C St.)	Medical Office	NA	TSF
COL5	Valley Orange Ent. (1600 W. Valley Blvd.)	Service Station	8	VFP
COL6	Diesel Injection (1610 Fairway Dr.)	Auto Shop	1.350	TSF
COL7	New Juan Colorado Family Restaurant (195 W. Valley Bl.)	Restaurant	NA	TSF
COL8	1175 S. Mt. Vernon Av.	Commercial	104.000	TSF
COL9	495 W. Valley Bl.	Church	NA	Seats
COL10	Smart & Final Extra (1023 N. Mt. Vernon)	Discount Super Store	27.870	TSF
		Fast Food w/ Drive-Thru	4.400	TSF
COL11	839 Fairway Dr.	Assisted Living and Memory Care Facility	103	Beds
COL12	1601 Fairway Dr.	Industrial	178.980	TSF
COL13	1550 E. Washington St.	Church	120	Seats
COL14	1559 Steel Rd.	Industrial	60.000	TSF
COL15	1603 Steel Rd.	Industrial	159.271	TSF
COL16	785 E. M Street	Metal Building	20.600	TSF
COL17	Colton Iron Metal (790 E. M St.)	Recycling Center	3.630	AC
COL18	644-660 Laurel Lane	SFDR	7	DU
COL19	1200 Jefferson Ln.	Office	NA	TSF
COL20	602 Agua Mansa Rd.	Trucking Facility	19.919	TSF
COL21	1395 Washington St.	Tire Store	NA	TSF
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
CITY OF GRAND TERRACE				
GT1	SA-14-03	Single-Family Residential	1	DU
GT2	TT18071 (Karger Pico Tract)	Single-Family Residential	18	DU
GT3	SA 13-05	SFDR	1	DU
GT4	Site and Architectural Review 12-04	Townhomes	12	DU
GT5	Grand Terrace Town Square Master Plan SA-07-07	Commercial Retail	209.611	TSF
		Retail	65.730	TSF
GT6	SA 14-05; SA 14-07 SA 14-06	SFDR	1	DU
		SFDR	1	DU
GT7	Barton Plaza Commercial Center (Phase 2)	Commercial Center	16.251	TSF
GT8	SA 15-01	Commercial	1.800	TSF
GT9	SA 15-06 ACUP15-07 E15-08	Medical Office	2.870	TSF
GT10	SA 15-07 E15-09	Commercial Hair Salon	1.800	TSF
GT11	SA 15-04 E15-07	Office/Shop	8.800	TSF
GT12	SA 15-05; ACUP15-06; V15-02	Office	1.400	TSF
GT13	TTM 15-01; SA 15-03; E15-05	SFDR	12	DU
GT14	SA05-19-A1; E15-06	Condo/Townhomes	35	DU

Table 4-3

Cumulative Development Land Use Summary

#	Project/Location	Land Use	Quantity	Units ¹
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
CITY OF RIVERSIDE				
R1	P09-0749	Industrial	54.22	AC
R2	TR34908 (P06-0782)	Single-Family Residential	15	DU
R3	TR33550 (P05-0269; P08-0416)	Single-Family Residential	9	DU
R4	P09-0612	Adult Day Care	39	STU
R5	P11-0329; P11-0330; P11-0332	Metrolink train station and parking lot	600.00	Spaces
R6	P10-0685; P10-0794	Gas Station & Car Wash	16	VFP
R7	P10-0733	Church	598	Seats
R8	P09-0419; P10-0476	Gas Station & Car Wash	16	VFP
R9	P14-0183	Apartments	146	DU
R10	P06-0028; P06-0029; P06-0031	Condos	205	DU
		Hotel	125	DU
		Commercial	31.600	TSF
R11	P09-0835; P10-0002	Office with Parking Structure	132.136	TSF
R12	P10-0454	Public Park	43.64	AC
R13	TR36516 (P12-0799; P12-0800)	Single-Family Residential	7	DU
R14	Jacobs Medical Office (P06-1237)	Medical Office	65.281	TSF
R15	P14-0315; P14-0437	Security Operations Building	3.150	TSF
R16	P10-0212; P10-0213	School Bus Storage Yard	4.38	AC
R17	P13-0650; P13-0651	Bed and Breakfast	3.650	TSF
R18	P14-0132	Metal Processing Facility	30.324	TSF
R19	P09-0530; P09-0531	RTA Bus Storage	2.60	AC
R20	P11-0545	Church	80	Seats
R21	P12-0336	Mixed Use Urban	17.80	AC
R22	P09-0808; P08-0809	Senior Housing	134	Beds
R23	P09-0717; P09-0718	Apartments	55	DU
R24	P07-1161	Health/Fitness Club	5.580	TSF
R25	P13-0087; P13-0262	Senior Adult Housing - Attached	67	DU
R26	P08-0980; P09-0095	Apartments	57	DU
R27	P08-0960; P09-0025	Apartments	53.5	DU
R28	P09-0125	Apartments	11.5	DU
R29	P15-0535	Hotel	239	RM
R30	P15-0653	Townhomes	NA	DU
R31	P15-0812	Residential Condo/Townhouse	61	DU
R32	P16-0011	Health/Fitness Club	18.000	TSF
R33	P15-0877; P16-0067	Hotel	144	RM
R34	P16-0016	Single Family Detached	5	DU
R35	P13-0956; P13-0959; P13-0960; P13-0963; P13-0964 P13-0965; P13-0966	Industrial Park	1,461.449	TSF
R36	P12-0334	Single Family Detached	2.8	AC
R37	P14-0045; P14-0046; P14-0047; P14-0048; P14-0049	Apartments	208	DU
R38	P14-1033; P14-1034	Warehousing	308.000	TSF

¹ DU = Dwelling Units; TSF = Thousand Square Feet; STU = Students; AC = Acres; TPD = Tons Per Day

The Opening Year Cumulative traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2020) Conditions
 - Existing counts
 - Ambient growth traffic (4.06%)
 - Cumulative Development traffic
 - Project traffic

4.9 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) Without Project conditions were derived from the SBTAM, the sub-regional model for San Bernardino County, using accepted procedures for model forecast refinement and smoothing.

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 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 initial estimate of the future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads 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 freeway ramp 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. Post-processing worksheets for Horizon Year (2040) Without and With Project traffic conditions are provided in Appendix 4.2. Project traffic was then added to determine Horizon Year (2040) With Project traffic forecasts.

In some instances, the SBTAM model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Horizon Year Without Project turning volumes were compared to Opening Year Cumulative (2020) Without Project traffic turning volumes in order to ensure a minimum growth of approximately 22 percent (1 percent compounded per year over 20 years) as a part of the refinement process, where applicable. The minimum growth includes any additional growth between Opening Year Cumulative (2020) traffic conditions and Horizon Year Without Project traffic conditions that is not accounted for by the traffic generated by cumulative development projects and the ambient growth between Existing and Opening Year Cumulative (2020) traffic conditions.

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5 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions, and the resulting peak hour intersection operations, roadway segment capacities, freeway mainline operations, and traffic signal warrant 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 Project driveways and those facilities assumed to be in place prior to or constructed by the Project to provide site access are also assumed to be in place for E+P conditions.

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. Exhibit 5-1 shows the weekday ADT which can be expected for E+P traffic conditions. Peak hour intersection volumes for E+P traffic conditions are shown on Exhibit 5-2.

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 TIA. The intersection analysis results are summarized in Table 5-1, which indicates that the addition of Project traffic is anticipated to result in the following additional LOS deficiency, in addition to those previously identified for Existing traffic conditions:

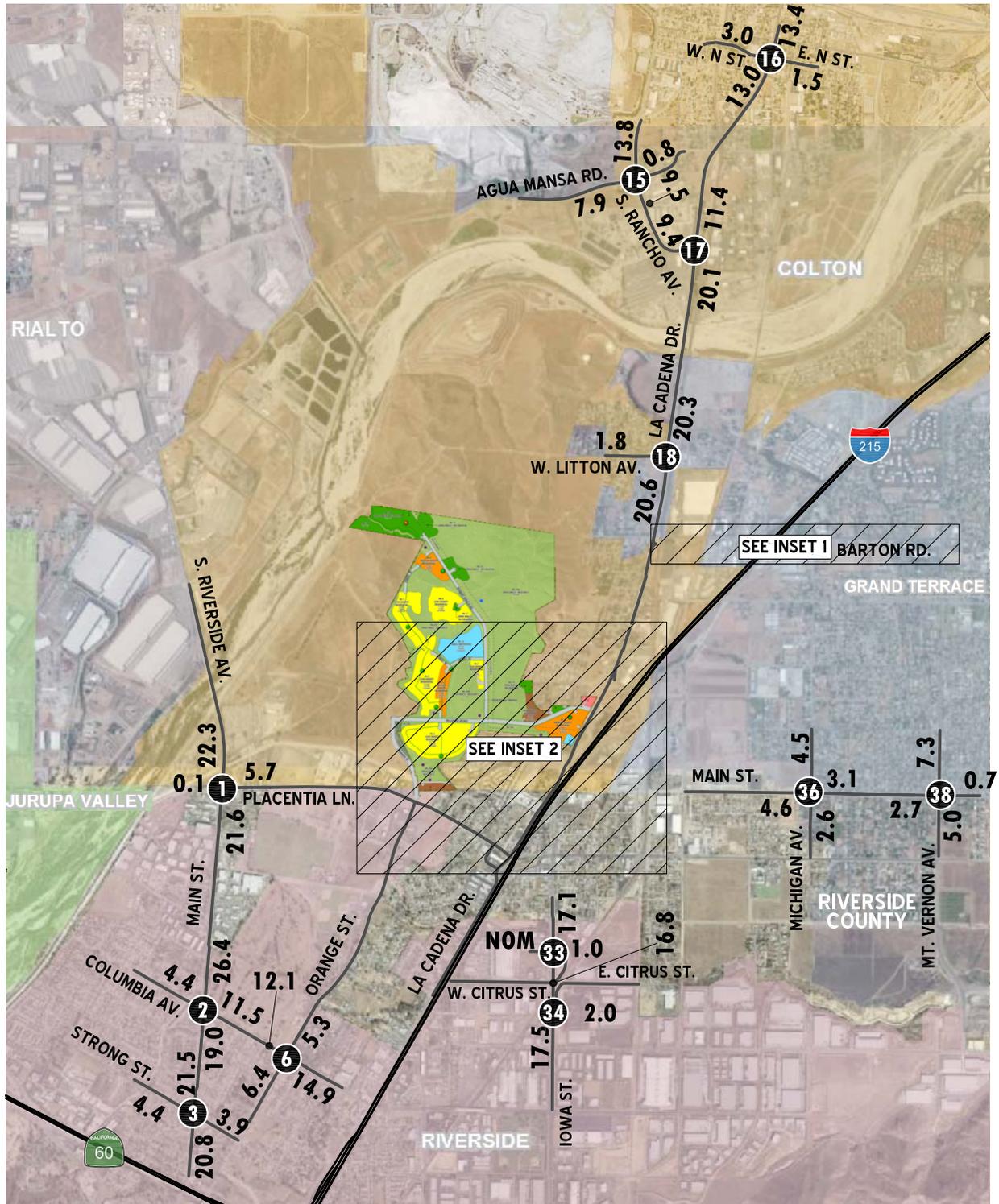
ID	Intersection Location
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F AM and PM peak hours

Consistent with Table 5-1, a summary of the peak hour intersection LOS for E+P conditions are shown on Exhibit 5-3. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TIA.

5.4 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 5-2 provides a summary of the E+P conditions roadway segment capacity analysis based on the applicable roadway segment capacities, by jurisdiction.

EXHIBIT 5-1 (1 OF 2): E+P AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

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



EXHIBIT 5-2: E+P TRAFFIC VOLUMES

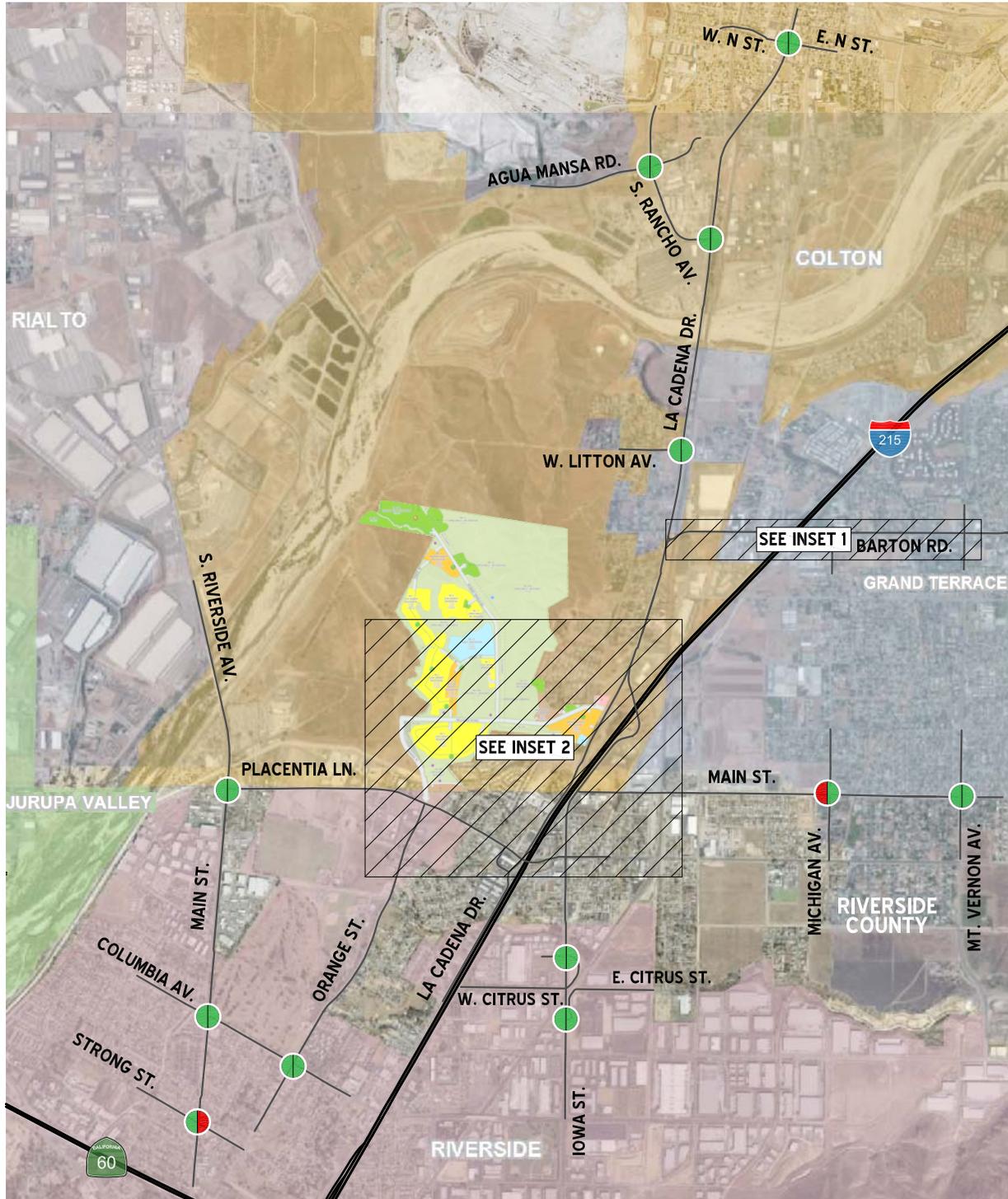
<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p> <p>←1(1) ←685(992) ←90(174) ←132(114) ←1(0) ←94(66)</p> <p>0(0) 0(0) 0(2)</p> <p>3(1) 713(717) 61(169)</p>	<p>2 Main St. & Columbia Av.</p> <p>←21(41) ←589(691) ←233(345) ←209(184) ←56(119) ←83(141)</p> <p>23(38) 111(112) 60(38)</p> <p>18(44) 615(669) 148(130)</p>	<p>3 Main St. & Strong St.</p> <p>←82(62) ←748(903) ←39(47) ←23(47) ←37(50) ←22(38)</p> <p>67(91) 51(109) 74(49)</p> <p>38(33) 713(785) 82(64)</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>←140(98)</p> <p>55(164)</p>	<p>5 Orange St. & W. Center St.</p> <p>←89(63) ←42(36) ←22(31) ←12(29) ←98(96) ←40(72)</p> <p>38(106) 74(236) 0(8)</p> <p>5(11) 19(49) 39(137)</p>	<p>6 Orange St. & Columbia Av.</p> <p>←22(32) ←109(95) ←58(48) ←36(78) ←297(408) ←52(117)</p> <p>36(45) 453(554) 21(17)</p> <p>30(27) 77(184) 98(138)</p>	<p>7 Street "C" & Street "A"</p> <p>←41(29) ←19(13) ←7(22) ←32(23)</p> <p>14(48) 12(39)</p>
<p>8 Street "A" & Pellissier Rd.</p> <p>←70(50) ←0(0) ←80(55) ←27(91) ←51(35) ←9(30)</p> <p>25(84) 23(57) 7(22)</p> <p>19(13) 0(0) 26(16)</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>←23(17) ←108(76)</p> <p>8(28) 36(25)</p> <p>13(42) 38(129)</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>←9(7) ←146(102) ←51(172) ←74(172)</p> <p>3(11) 148(120)</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p> <p>←0(0) ←0(0) ←14(0)</p> <p>0(0) 6(1) 5(1) 7(0)</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>←0(0) ←0(0) ←25(20) ←13(20) ←119(350) ←0(0)</p> <p>0(0) 0(0) 0(0)</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p> <p>←1(1) ←0(0) ←28(21) ←7(35) ←122(363) ←16(54)</p> <p>1(2) 322(225) 3(11)</p> <p>9(7) 0(0) 47(32)</p>	<p>14 Stephens Av. & W. Center St.</p> <p>←1(2) ←10(3) ←9(3) ←7(9) ←164(138) ←333(195)</p> <p>0(6) 139(256) 73(140)</p> <p>58(80) 2(5) 102(61)</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p> <p>←198(131) ←386(428) ←7(4) ←3(4) ←23(14) ←1(0)</p> <p>102(377) 13(47) 38(103)</p> <p>53(37) 225(294) 0(0)</p>	<p>16 La Cadena Dr. & W. N St.</p> <p>←29(53) ←428(521) ←7(19) ←15(12) ←14(25) ←22(35)</p> <p>49(83) 13(24) 59(51)</p> <p>28(30) 480(517) 21(18)</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p> <p>←2(8) ←451(550)</p> <p>13(23) 409(504)</p> <p>277(318) 408(444)</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p> <p>←8(39) ←966(993)</p> <p>44(31) 37(36)</p> <p>32(59) 712(775)</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p> <p>←860(760) ←179(256) ←184(159) ←237(353)</p> <p>551(680) 236(204)</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p> <p>←732(848) ←409(310)</p> <p>314(360) 171(182)</p> <p>149(253) 466(585)</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p> <p>←205(453) ←664(645) ←12(3) ←2(2) ←0(1) ←7(2)</p> <p>375(253) 1(0) 123(74)</p> <p>49(47) 108(287) 0(4)</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p> <p>←53(76) ←331(321) ←420(309) ←13(47) ←13(13)</p> <p>76(54) 9(12) 13(13)</p> <p>4(22) 62(227) 1(0)</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p> <p>←31(55) ←186(371) ←59(66) ←3(12) ←87(62) ←90(88)</p> <p>53(58) 310(180) 49(67)</p> <p>41(29) 75(153) 15(11)</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p>←33(70) ←3(7) ←290(394)</p> <p>3(3)</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p>←104(148) ←18(2) ←359(446) ←17(6)</p> <p>425(491) 5(1)</p> <p>0(2) 7(51)</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p> <p>←518(291) ←5(7) ←359(396) ←384(257)</p> <p>399(534) 30(28)</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p> <p>←580(492)</p> <p>37(104) 414(399)</p> <p>578(734)</p>	<p>28 I-215 NB Ramps & Barton Rd.</p> <p>←487(276) ←722(633)</p> <p>105(123) 512(678)</p> <p>26(27) 303(400)</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p> <p>←848(751) ←147(140) ←268(397) ←13(13)</p> <p>310(337) 427(511)</p>	<p>30 Iowa Av. & W. Main St.</p> <p>←633(671) ←237(109) ←285(189) ←103(105)</p> <p>471(724) 84(113)</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p> <p>←570(571) ←420(321)</p> <p>89(204) 83(125)</p> <p>64(80) 473(604)</p>	<p>32 Iowa Av. & Center St.</p> <p>←75(61) ←537(576) ←31(40) ←58(26) ←252(131) ←98(100)</p> <p>78(177) 187(221) 92(87)</p> <p>94(110) 327(558) 68(79)</p>	<p>33 Iowa Av. & W. Citrus St.</p> <p>←0(0) ←841(650) ←18(22) ←28(40) ←0(0) ←9(20)</p> <p>0(0) 0(0) 0(0)</p> <p>5(3) 431(828) 24(6)</p>	<p>34 Iowa Av. & E. Citrus St.</p> <p>←798(659) ←52(11) ←25(41) ←48(75)</p> <p>435(796) 60(45)</p>	<p>35 Michigan Av. & Barton Rd.</p> <p>←688(593) ←131(74)</p> <p>533(732) 274(271)</p> <p>471(297) 173(100)</p>
<p>36 Michigan Av. & W. Main St.</p> <p>←328(73) ←43(94) ←1(20) ←20(23) ←277(77) ←12(7)</p> <p>119(100) 203(142) 28(16)</p> <p>60(5) 83(97) 51(11)</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p> <p>←127(123) ←325(277) ←38(75) ←48(31) ←274(409) ←302(253)</p> <p>111(165) 293(409) 133(157)</p> <p>170(118) 386(257) 281(259)</p>	<p>38 Mt. Vernon Av. & Main St.</p> <p>←247(80) ←243(186) ←11(16) ←23(11) ←22(11) ←13(5)</p> <p>236(124) 12(15) 12(6)</p> <p>9(9) 132(237) 1(5) 1(5)</p>	<p>39 Palm Av. & Barton Rd.</p> <p>←483(603) ←1(1)</p> <p>504(583) 65(126)</p> <p>112(65) 1(3)</p>			

LEGEND:

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



EXHIBIT 5-3 (1 OF 2): E+P SUMMARY OF LOS

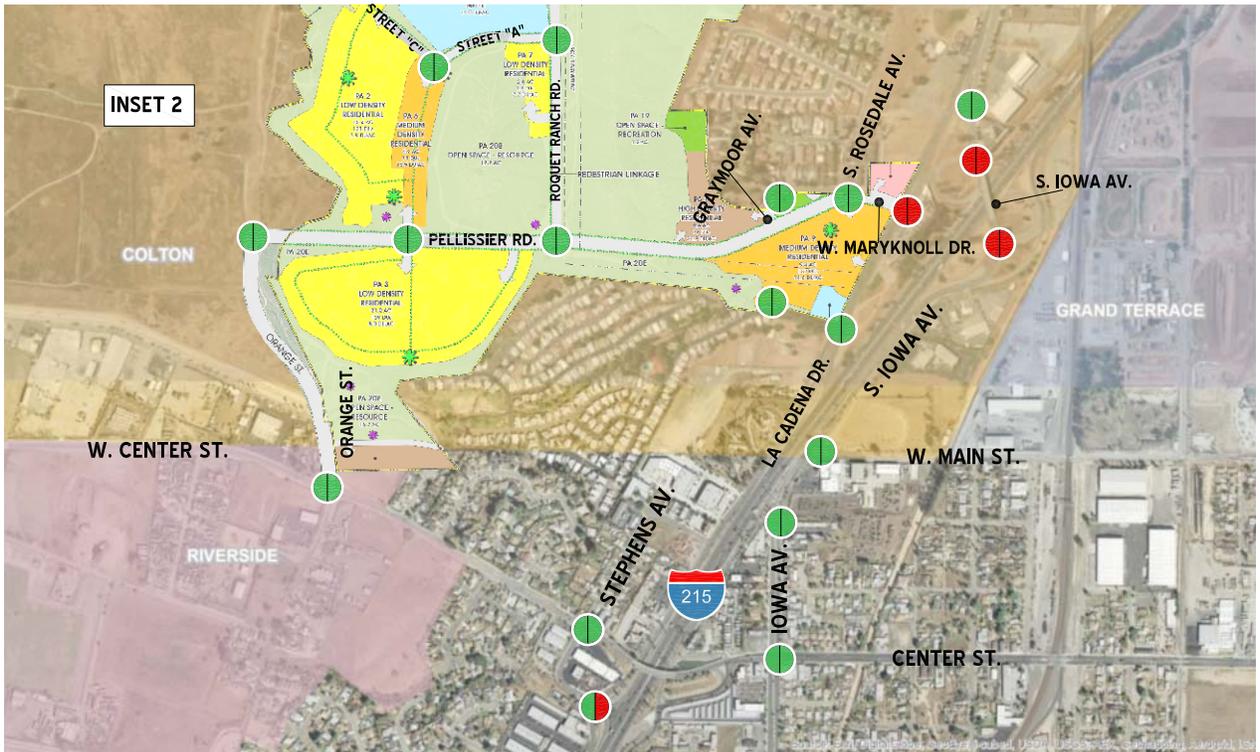
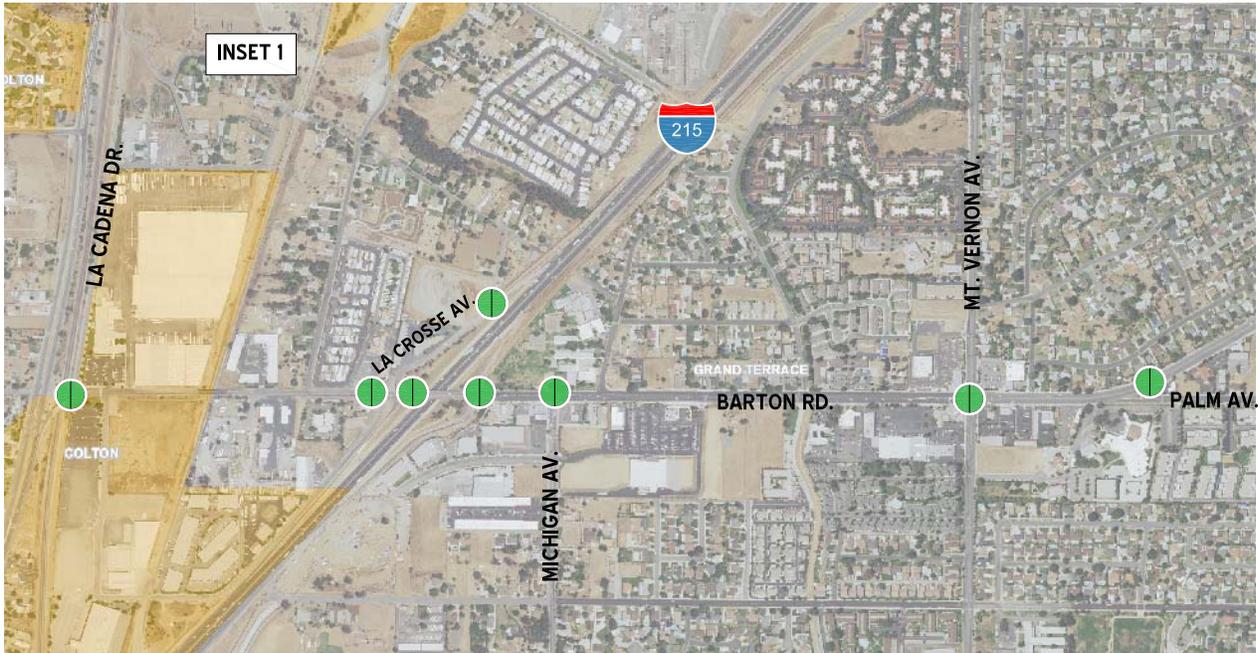


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS



EXHIBIT 5-3 (2 OF 2): E+P SUMMARY OF LOS



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS



Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control ³	Existing (2016)				E+P			
			Delay ² (secs.)		Level of Service		Delay ² (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	S. Riverside Av. / Main St. / Placentia Ln.	CSS	17.3	21.2	C	C	25.1	28.7	D	D
2	Main St. / Columbia Av.	TS	22.3	29.4	C	C	22.0	29.1	C	C
3	Main St. / Strong St.	TS	43.3	78.7	D	E	45.9	91.6	D	F
4	Orange St. / Pellissier Rd.	<u>CSS</u>	Future Intersection				0.0	0.0	A	A
5	Orange St. / W. Center St.	AWS	8.2	9.9	A	A	9.6	14.3	A	B
6	Orange St. / Columbia Av.	TS	20.2	18.9	C	B	20.2	19.1	C	B
7	Street "C" / Street "A"	<u>CSS</u>	Future Intersection				8.9	9.0	A	A
8	Street "A" / Pellissier Rd.	<u>CSS</u>	Future Intersection				10.3	11.8	B	B
9	Roquet Ranch Rd. / Street "A"	<u>CSS</u>	Future Intersection				9.3	10.1	A	B
10	Roquet Ranch Rd. / Pellissier Rd.	<u>CSS</u>	Future Intersection				11.5	12.8	B	B
11	S. Graymoor Av. / W. Maryknoll Dr.	CSS	8.4	8.4	A	A	7.3	8.5	A	A
12	S. Graymoor Av. / Pellissier Rd.	<u>CSS</u>	Future Intersection				11.8	13.5	B	B
13	S. Rosedale Av. / W. Maryknoll Dr.	CSS	8.9	8.9	A	A	17.3	20.3	C	C
14	Stephens Av. / W. Center St.	TS	40.5	36.8	D	D	41.6	38.2	D	D
15	S. Rancho Av. / Agua Mansa Rd.	TS	11.9	20.4	B	C	12.5	21.7	B	C
16	La Cadena Dr. / W. N. St.	TS	6.1	6.9	A	A	6.3	7.2	A	A
17	S. La Cadena Dr. / S. Rancho Av.	CSS	18.6	23.7	C	C	21.2	27.4	C	D
18	S. La Cadena Dr. / W. Litton Av.	CSS	21.7	20.3	C	C	23.3	22.7	C	C
19	S. La Cadena Dr. / Barton Rd.	TS	12.7	18.5	B	B	15.2	36.0	B	D
20	S. La Cadena Dr. / S. Iowa Av.	CSS	11.6	14.1	B	B	19.7	33.1	C	B
21	S. La Cadena Dr. / W. Maryknoll Dr.	CSS	24.3	23.5	C	C	>100.0	>100.0	F	F
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	AWS	17.7	13.0	C	B	23.8	13.9	C	B
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	AWS	21.3	38.6	C	E	21.5	39.2	C	E
24	La Crosse Av. / I-215 SB Off-Ramp	CSS	0.0	0.0	A	A	0.0	0.0	A	A
25	La Crosse Av. / Barton Rd.	CSS	10.4	10.5	B	B	11.1	11.1	B	B
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd.	TS	36.2	32.5	D	C	39.8	33.4	D	C
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	CSS	35.2	28.8	E	D	54.3	36.9	F	E
28	I-215 NB Ramps / Barton Rd.	TS	10.0	11.8	A	B	16.3	20.9	B	C
29	S. Iowa Av. / I-215 NB Ramps	TS	69.0	54.4	E	D	100.9	87.3	F	F
30	Iowa Av. / W. Main St.	TS	35.0	20.8	D	C	39.3	23.4	D	C
31	Iowa Av. / E. La Cadena Dr.	CSS	13.8	20.0	B	C	14.0	20.7	B	C
32	Iowa Av. / Center St.	TS	38.9	35.0	D	D	40.1	38.1	D	D
33	Iowa Av. / W. Citrus St.	TS	5.1	6.0	A	A	5.6	6.8	A	A
34	Iowa Av. / E. Citrus St.	TS	6.7	6.6	A	A	6.8	6.7	A	A
35	Michigan Av. / Barton Rd.	TS	28.5	16.0	C	B	30.5	16.6	C	B
36	Michigan Av. / W. Main St.	TS	64.0	25.0	E	C	66.5	25.2	E	C
37	Mt. Vernon Av. / Barton Rd.	TS	39.7	32.1	D	C	40.6	32.9	D	C
38	Mt. Vernon Av. / Main St.	AWS	24.9	10.9	C	B	26.7	11.1	D	B
39	Palm Av. / Barton Rd.	CSS	12.3	12.7	B	B	12.7	13.3	B	B

* **BOLD** = 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.

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal; CSS = Improvement

Table 5-2

Roadway Volume/Capacity Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	Existing (2016)	V/C ²	LOS ³	E+P	V/C ²	LOS ³	Acceptable LOS ³
1	S. Rancho Avenue	Agua Mansa Rd. to La Cadena Dr.	4D	33,000	8,692	0.26	A	9,514	0.29	A	D
2		N St. to S. Rancho Av.	4D	33,000	12,152	0.37	A	12,986	0.39	A	D
3		South of S. Rancho Av.	4D	33,000	18,411	0.56	A	20,068	0.61	B	D
4		North of W. Litton Av.	4D	33,000	18,657	0.57	A	20,314	0.62	B	D
5	La Cadena Drive	Between W. Litton Av. and Barton Rd.	4D	33,000	18,813	0.57	A	20,582	0.62	B	D
6		South of Barton Rd.	5D	41,250	17,653	0.43	A	21,813	0.53	A	D
7		North of S. Iowa Av.	4D	33,000	16,169	0.49	A	20,352	0.62	B	D
8		Between S. Iowa Av. and W. Maryknoll Dr.	4D	33,000	11,125	0.34	A	17,494	0.53	A	D
9		Between W. Maryknoll Dr. and Pellissier Rd.	4D	33,000	10,322	0.31	A	11,138	0.34	A	D
10		East of La Cadena Dr.	2U	18,000	8,190	0.46	A	10,582	0.59	A	D
11		West of La Crosse Av.	2U	18,000	8,860	0.49	A	11,252	0.63	B	D
12		Between La Crosse Av. and I-215 SB Ramps	2D	18,000	8,436	0.47	A	10,383	0.58	A	D
13	Barton Road	Between I-215 SB Ramps and I-215 NB Ramps	2D	18,000	14,272	0.79	C	16,220	0.90	E	D
14		Between I-215 NB Ramps and Michigan Av.	4D	33,000	20,509	0.62	B	22,012	0.67	B	D
15		East of Michigan Av.	4D	33,000	15,387	0.47	A	16,601	0.50	A	D
16		West of Mt. Vernon Av.	4D	33,000	14,171	0.43	A	15,295	0.46	A	D
17		Mt. Vernon Av. to Palm Av.	4D	33,000	15,298	0.46	A	15,954	0.48	A	D
18	Placentia Lane / West Center Street	East of S. Riverside Av. / Main St.	2U	18,000	4,095	0.23	A	5,653	0.31	A	D
19		West of Orange St.	2U	18,000	3,972	0.22	A	5,618	0.31	A	D
20		South of Placentia Ln.	4D	33,000	20,498	0.62	B	21,588	0.65	B	D
21	Main Street	North of Columbia Av.	4D	33,000	25,490	0.77	C	26,402	0.80	C	D
22		Columbia Av. to Strong St.	4D	33,000	20,777	0.63	B	21,499	0.65	B	D
23		South of Pellissier Rd.	2U	12,500	0	0.00	--	2,612	0.21	A	D
24	Orange Street	North of W. Center St.	2U	12,500	424	0.03	A	3,206	0.26	A	D
25		South of W. Center St.	2U	12,500	2,633	0.21	A	3,413	0.27	A	D
26		North of Columbia Av.	2U	12,500	4,530	0.36	A	5,286	0.42	A	D
27		Between Orange St. and Street "A"	4D	33,000	0	0.00	--	2,612	0.08	A	D
28		Between Street "A" and Roquet Ranch Rd.	4D	33,000	0	0.00	--	2,862	0.09	A	D
29	Pellissier Road / Maryknoll Dr.	East of Roquet Ranch Rd.	4D	33,000	0	0.00	--	5,630	0.17	A	D
30		West of Graymoor Av.	4D	33,000	0	0.00	--	5,652	0.17	A	D
31		Between Graymoor Av. and Rosedale Av.	2U	12,500	335	0.03	A	6,099	0.49	A	D
32		Between Rosedale Av. and La Cadena Dr.	2U	12,500	982	0.08	A	10,590	0.85	D	D
33		Between La Cadena Dr. and I-215 SB Off-Ramp	2U	18,000	12,274	0.68	B	14,460	0.80	D	D
34	South Iowa Avenue	Between I-215 SB Off-Ramp and I-215 NB Ramps	2U	18,000	16,236	0.90	E	17,944	1.00	E	D
35		South of I-215 NB Ramps	2D	18,000	17,407	0.97	E	17,967	1.00	E	D
36		North of W. Main St.	2U	18,000	18,300	1.02	F	18,860	1.05	F	D
37	West Main Street	East of S. Iowa Av.	2U	18,000	5,501	0.31	A	5,761	0.32	A	D
38		West of Michigan Av.	2D	18,000	4,374	0.24	A	4,610	0.26	A	D

¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "e" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

² V/C= Volume-to-capacity ratio

³ LOS= Level of Service



As shown on Table 5-2, the addition of Project traffic is anticipated to result in the following additional roadway segment capacity deficiency, in addition to those previously identified for Existing traffic conditions:

ID	Roadway Segment Location
13	Barton Rd., Between I-215 SB Ramps and I-215 NB Ramps

As noted in Section 2.3 *Roadway Segment Capacity Analysis Methodology*, daily roadway capacities are “rule of thumb” estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

For E+P conditions, the following unsignalized study area intersection is anticipated to meet peak hour volume based traffic signal warrants, in addition to the intersection previously warranted under Existing traffic conditions (see Appendix 5.2):

ID	Intersection Location	Jurisdiction
21	S. La Cadena Dr. / W. Maryknoll Dr.	City of Colton

5.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Barton Road, Iowa Avenue, and Stephens Avenue interchanges 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-215 Freeway mainline. Queuing Analysis findings are presented in Table 5-3. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 5-3, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under E+P traffic conditions. Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.3.

Table 5-3

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

Intersection	Movemen	Available Stacking Distance (Feet)	95th Percentile Queue (Feet) ²		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
La Crosse Av. / I-215 SB Off-Ramp	SBT	570	0	0	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	34	32	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	45	40	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	270	210	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	93	117	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 Maximum queue length for the approach reported.

5.7 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the AM and PM peak hours are shown on Exhibit 5-4. The I-215 Freeway segments analyzed for E+P traffic conditions are shown in Table 5-4, which indicates that the addition of Project traffic is not anticipated to result in any additional freeway segment LOS deficiencies, in addition to those previously identified for Existing traffic conditions. E+P basic freeway segment analysis worksheets are provided in Appendix 5.4.

5.8 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for E+P traffic conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5, the addition of Project traffic is not anticipated to result in any additional freeway ramp merge and diverge junction LOS deficiencies in addition to those previously identified for Existing traffic conditions. E+P freeway ramp junction operations analysis worksheets are provided in Appendix 5.5.

5.9 RECOMMENDED IMPROVEMENTS

5.9.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient to reduce each location's peak hour delay and improve the associated LOS grade to acceptable levels. The effectiveness of these recommended improvements to address E+P LOS deficiencies are presented in Table 5-6. The intersection operations analysis worksheets for E+P traffic conditions, with improvements, are provided in Appendix 5.6. The improvements required for each intersection are consistent with those previously identified for Existing traffic conditions, with the exception of the following intersection:

Recommended Improvement – S. La Cadena Dr. / W. Maryknoll Dr. (#21)

- Add a traffic signal.
- One northbound left turn lane.
- One eastbound left turn lane.

EXHIBIT 5-4: E+P FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



Table 5-4

Basic Freeway Segment Analysis for E+P Conditions

Freeway	Direction	Mainline Segment	Lanes ¹	Existing (2016)				E+P			
				Density ²		LOS ³		Density ²		LOS ³	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Barton Road	3	29.4	28.0	D	D	29.7	29.0	D	D
		Barton Road to La Cadena Drive	3	30.5	27.2	D	D	30.7	27.7	D	D
		South of La Cadena Drive	3	29.8	25.9	D	C	30.5	26.3	D	D
	NB	North of Barton Road	3	38.2	33.0	E	D	39.4	33.7	E	D
		Barton Road to La Cadena Drive	3	35.7	33.6	E	D	36.2	34.0	E	D
		South of La Cadena Drive	3	32.6	30.6	D	D	32.9	31.4	D	D

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 5-5

Freeway Ramp Junction Merge/Diverge Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway ¹	Existing (2016)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density ²	LOS ³						
I-215 Freeway	SB	Off-Ramp at Barton Road	3	33.3	D	32.7	D	33.5	D	33.3	D
		Off-Ramp at S. Iowa Avenue	3	33.8	D	32.0	D	33.9	D	32.4	D
		On-Ramp at S. La Cadena Drive	3	31.5	D	28.7	D	32.1	D	29.1	D
	NB	On-Ramp at Barton Road	3	35.9	E	33.3	D	36.5	E	33.7	D
		On-Ramp at S. Iowa Avenue	3	34.4	D	33.5	D	34.9	D	33.8	D
		Off-Ramp at S. Iowa Avenue	3	35.0	E	34.3	D	35.2	E	34.7	D

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 5-6

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			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
3	Main St. / Strong St.																	
	- Without Project	TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	11.9	13.3	B	B
	- With Project	TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	12.3	13.9	B	B
21	S. La Cadena Dr. / W. Maryknoll Dr.		No Improvements Necessary															
	- With Project	<u>TS</u>	<u>1</u>	1	0	0	2	1	<u>1</u>	1	0	0	1	0	14.4	11.0	B	B
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps																	
	- Without Project	<u>TS</u>	0	1	1	0	1	0	0	1	0	0	1	1	17.3	15.6	B	B
	- With Project	<u>TS</u>	0	1	1	0	1	0	0	1	0	0	1	1	17.3	15.6	B	B
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp																	
	- Without Project	<u>TS</u>	0	1	0	0	1	0	1	0	1	0	1	0	22.7	28.0	C	C
	- With Project	<u>TS</u>	0	1	0	0	1	0	1	0	1	0	1	0	23.7	28.4	C	C
29	S. Iowa Av. / I-215 NB Ramps																	
	- Without Project	TS	0	0	0	1	0	<u>1</u>	1	1	0	0	0	0	27.8	25.4	C	C
	- With Project	TS	0	0	0	1	0	<u>1</u>	1	1	0	0	0	0	31.9	35.7	C	D
36	Michigan Av. / W. Main St.																	
	- Without Project	TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	49.6	24.6	D	C
	- With Project	TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	52.2	24.7	D	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; 1 = Improvement

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal

5.9.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes. The following 5 study area intersections are located adjacent to the deficient roadway segments shown previously in Table 5-2:

- La Crosse Avenue / I-215 Southbound On-Ramp/Barton Road (#26)
- S. Iowa Avenue/S. La Cadena Drive / I-215 Southbound Off-Ramp (#27)
- I-215 Northbound Ramps / Barton Road (#28)
- S. Iowa Avenue / I-215 Northbound Ramps (#29)
- Iowa Avenue / W. Main Street (#30)

These intersections are anticipated to operate at acceptable LOS with either existing lanes and intersection controls or with the implementation of the recommended improvements shown previously on Table 5-6. As such, additional roadway widening has not been recommended as the more detailed peak hour intersection operations analysis demonstrates that the adjacent study area intersections are anticipated to adequately process the peak hour traffic flows and demonstrates that roadway widening is not necessary. The roadway segment deficiencies would be less than significant with the implementation of the recommended intersection improvements shown previously on Table 5-6.

Roadway segments anticipated to operate at a deficient LOS using the ADT method have been further evaluated using the Florida Department of Transportation's Quality/Level of Service Handbook to demonstrate roadway widening is not necessary. (12) This method is based on the peak hour segment volume comparison with the threshold capacities. As the worst case condition occurs during the AM and PM peak hours, this method is used as a reasonable way to evaluate the LOS of the segment and to determine if any roadway segment widening is necessary.

As shown on Table 5-7, a review of the deficient roadway segments using the Florida Method (peak hour volume based) indicates acceptable peak hour operations with the addition of Project traffic, without additional widening. As such, no roadway segment widening improvements have been recommended.

5.9.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Colton (or other neighboring jurisdictions) on the SHS segments. As such, no improvements have been recommended to address the E+P deficiencies on the SHS.

Table 5-7

Roadway Volume/Capacity Analysis (Florida Method) for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ^{1,2}	Existing (2016)		E+P		Significant Impact? ³	Acceptable LOS
					Peak Hour Vol	V/C	Peak Hour Vol	V/C		
AM Peak Hour										
13	Barton Road	Between I-215 SB Ramps and I-215 NB Ramps	FL 2D	2,090	1,200	0.57	1,365	0.65	No	D
33	South Iowa Avenue	Between I-215 SB Off-Ramp and I-215 NB Ramps	FL 2U	1,986	1,428	0.72	1,573	0.79	No	D
34		South of I-215 NB Ramps	FL 2D	2,090	1,538	0.74	1,598	0.76	No	D
35		North of W. Main St.	FL 2U	1,986	1,566	0.79	1,626	0.82	No	D
PM Peak Hour										
13	Barton Road	Between I-215 SB Ramps and I-215 NB Ramps	FL 2D	2,090	1,279	0.61	1,461	0.70	No	D
33	South Iowa Avenue	South of Palm Av.	FL 2U	1,986	1,455	0.73	1,625	0.82	No	D
34		North of Elm Av.	FL 2D	2,090	1,560	0.75	1,612	0.77	No	D
35		Between Ebony Av. and Imperial Beach Bl.	FL 2U	1,986	1,640	0.83	1,693	0.85	No	D

¹ These maximum roadway capacities have been extracted from the following source: 2013 Quality/Level of Service Handbook from the State of Florida Department of Transportation for two lanes. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. By using the LOS "E" capacity for each roadway facility type, peak hour volumes of 2,090 will represent LOS "E", and peak hour volumes greater than 2,090 will represent LOS "F" operations. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

² For two-lane undivided roadways, an adjustment factor of .5% must be applied to the LOS capacity. Source: Table 7 of the 2013 Quality/Level of Service Handbook from the State of Florida Department of Transportation.

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6 OPENING YEAR CUMULATIVE (2020) TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Opening Year Cumulative (2020) conditions, and the resulting peak hour intersection operations, roadway segment capacities, freeway mainline operations, and traffic signal warrant analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2020) traffic 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 Buildout of 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 (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).
- The Orange Street extension between its existing terminus north of Center Street and the future Pellissier Road is anticipated to be in place by the Project's Opening Year to provide secondary access to the site.
- I-215 Freeway and Barton Road Interchange Project improvements assumed to be in place per Modified Alternative 7 (locally preferred alternative). The interchange improvements include widening the existing bridge on Barton Road to four lanes and implementing a roundabout at the I-215 Freeway Southbound Ramps in order to preserve local access to La Crosse Avenue. The interchange project improvements are anticipated to be completed by the end of 2018, and as such, have been assumed to be in place by Opening Year Cumulative (2020) traffic conditions.

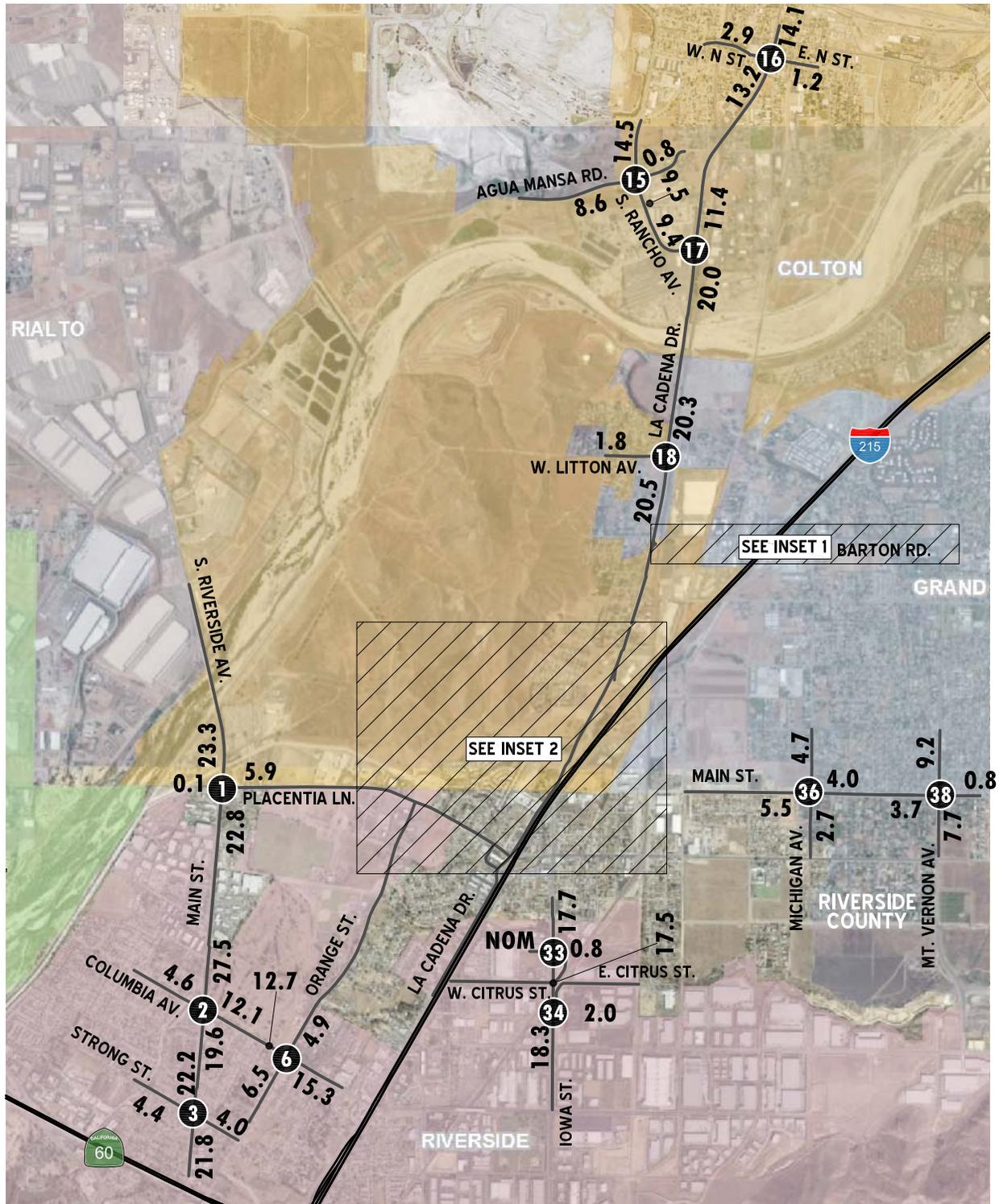
6.2 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 4.06% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT volumes for Opening Year Cumulative (2020) Without Project traffic conditions are shown on Exhibit 6-1. Weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2020) Without Project traffic conditions are shown on Exhibit 6-2.

6.3 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes, an ambient growth factor of 4.06%, traffic from pending and approved but not yet constructed known development projects in the area and the addition of Project traffic. The weekday ADT volumes for Opening Year Cumulative (2020) With Project traffic conditions are shown on Exhibit 6-3. Weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2020) With Project traffic conditions are shown on Exhibit 6-4.

EXHIBIT 6-1 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)

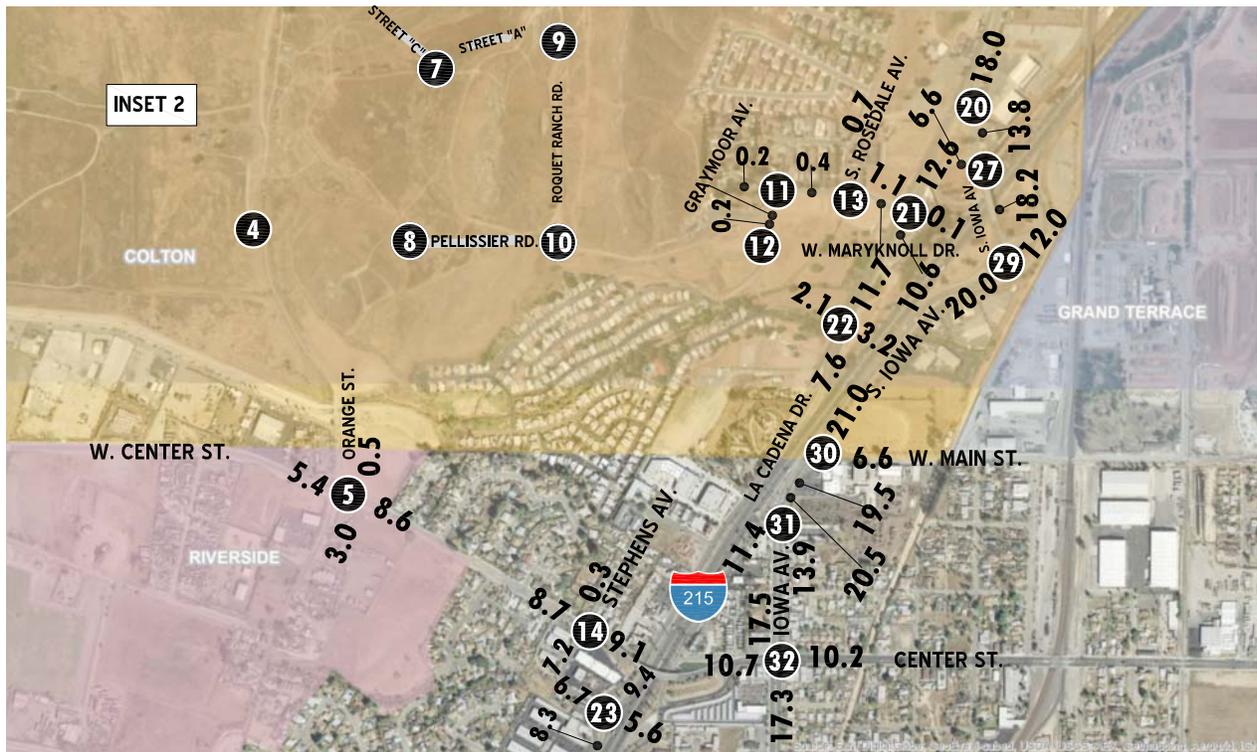
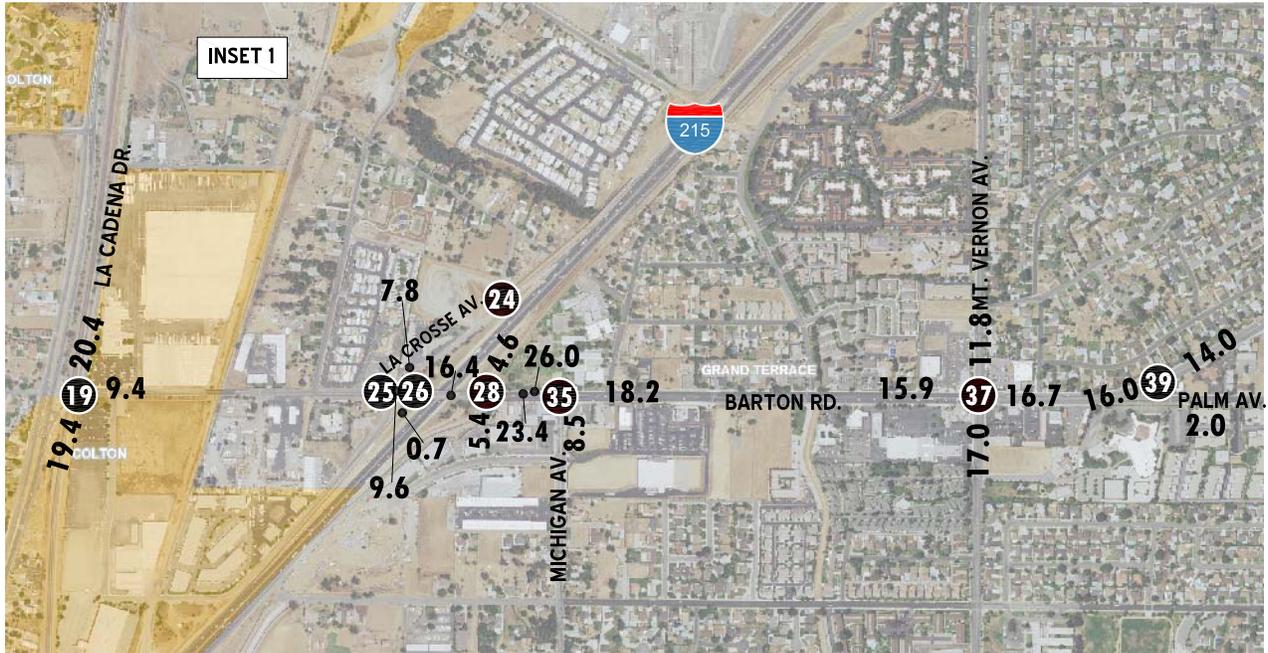


LEGEND:

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



EXHIBIT 6-1 (2 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)



EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p>	<p>2 Main St. & Columbia Av.</p>	<p>3 Main St. & Strong St.</p>	<p>4 Orange St. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>5 Orange St. & W. Center St.</p>	<p>6 Orange St. & Columbia Av.</p>	<p>7 Street "C" & Street "A"</p> <p style="text-align: center;">Future Intersection</p>
<p>8 Street "A" & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p style="text-align: center;">Future Intersection</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p style="text-align: center;">Future Intersection</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p>	<p>14 Stephens Av. & W. Center St.</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p>	<p>16 La Cadena Dr. & W. N St.</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p style="text-align: center;">Intersection Does Not Exist</p> <p style="text-align: center;">SEE NOTE</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p style="text-align: center;">Intersection Does Not Exist</p> <p style="text-align: center;">SEE NOTE</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p>	<p>28 I-215 NB Ramps & Barton Rd.</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p>	<p>30 Iowa Av. & W. Main St.</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p>	<p>32 Iowa Av. & Center St.</p>	<p>33 Iowa Av. & W. Citrus St.</p>	<p>34 Iowa Av. & E. Citrus St.</p>	<p>35 Michigan Av. & Barton Rd.</p>
<p>36 Michigan Av. & W. Main St.</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p>	<p>38 Mt. Vernon Av. & Main St.</p>	<p>39 Palm Av. & Barton Rd.</p>	<p>LEGEND:</p> <p>10(10) = AM(PM) PEAK HOUR VOLUMES</p> <p>NOTE: THE PROPOSED I-215 FREEWAY AND BARTON ROAD INTERCHANGE IMPROVEMENT PROJECT (MODIFIED ALTERNATIVE 7) IS ASSUMED TO BE COMPLETED AND IN USE BY YEAR 2020. THE MODIFIED ALTERNATIVE 7 INCLUDES A ROUNDABOUT AT THE SOUTHBOUND RAMP TO PRESERVE LOCAL ACCESS AT LA CROSSE AVENUE AND DIRECT ACCESS BETWEEN BARTON ROAD AND THE I-215 FREEWAY. THE CONSTRUCTION OF THIS DESIGN ALTERNATIVE WILL ELIMINATE ANALYSIS LOCATION #24 AND #25. AS SUCH, THESE LOCATIONS HAVE NOT BEEN EVALUATED FOR THIS ANALYSIS SCENARIO.</p>		

EXHIBIT 6-3 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

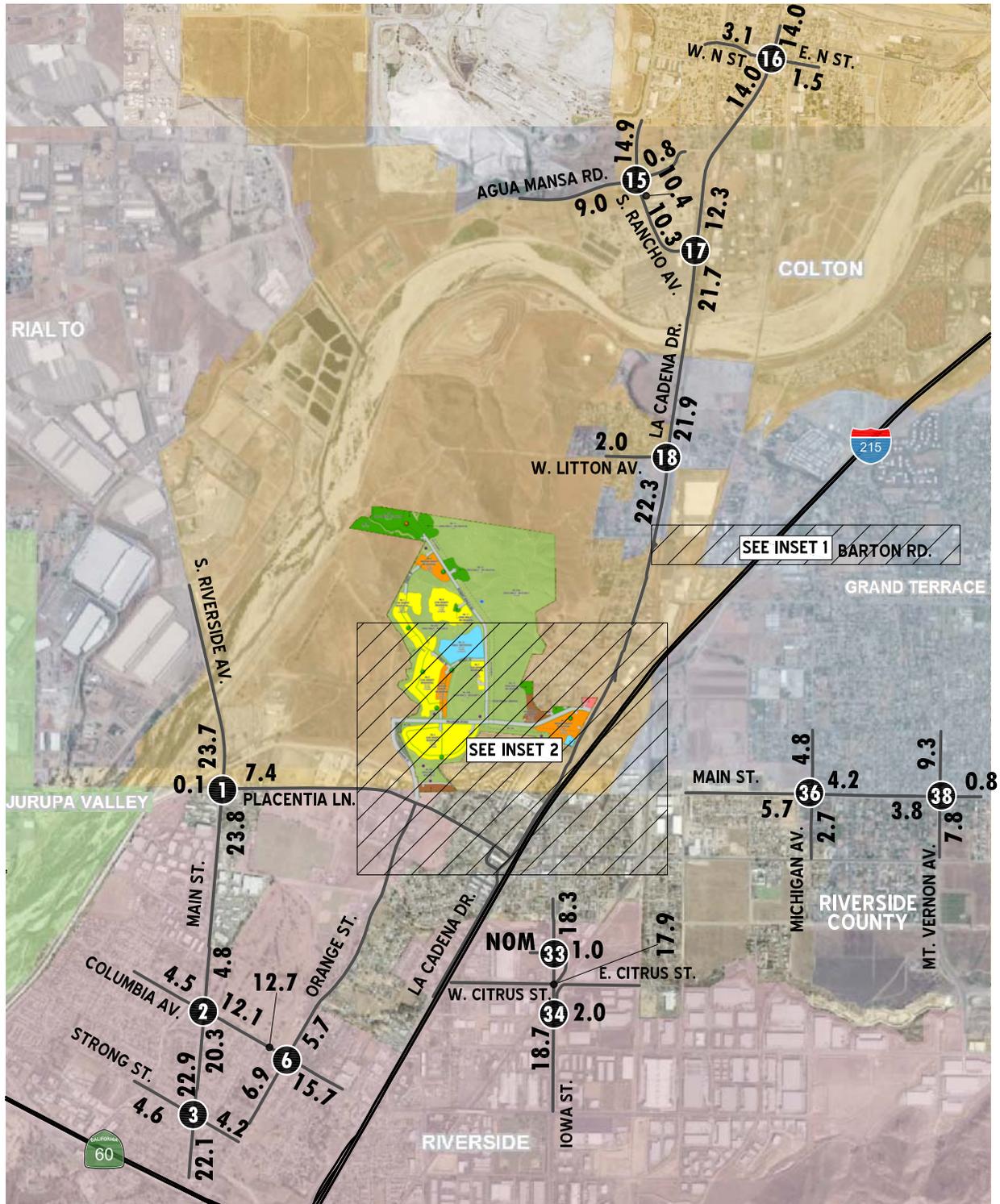


EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p> <p>↑1(1) ↓734(1039) ↑106(203) ↓155(133) ↑1(0) ↓210(109) ↑3(1) ↓748(766) ↑96(283) ↓96(283)</p>	<p>2 Main St. & Columbia Av.</p> <p>↑30(60) ↓632(756) ↑247(373) ↓232(191) ↑59(127) ↓59(127) ↑87(157) ↓87(157)</p>	<p>3 Main St. & Strong St.</p> <p>↑87(70) ↓795(982) ↑42(54) ↓28(51) ↑39(52) ↓39(52) ↑23(40) ↓23(40)</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>↑140(98) ↑55(164)</p>	<p>5 Orange St. & W. Center St.</p> <p>↑89(63) ↓45(38) ↑22(32) ↓12(29) ↑235(157) ↓235(157) ↑47(86) ↓47(86)</p>	<p>6 Orange St. & Columbia Av.</p> <p>↑23(33) ↓118(105) ↑66(54) ↓38(84) ↑319(433) ↓319(433) ↑54(124) ↓54(124)</p>	<p>7 Street "C" & Street "A"</p> <p>↑41(29) ↓19(13) ↑7(22) ↓7(22) ↑32(23) ↓32(23)</p>
<p>8 Street "A" & Pellissier Rd.</p> <p>↑70(50) ↓80(55) ↑27(91) ↓27(91) ↑51(35) ↓51(35) ↑9(30) ↓9(30)</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>↑23(17) ↓108(76) ↑8(28) ↓8(28) ↑36(25) ↓36(25)</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>↑9(7) ↓146(102) ↑51(172) ↓51(172) ↑74(172) ↓74(172)</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p> <p>↑0(0) ↓0(0) ↑15(10) ↓15(10)</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>↑0(0) ↓27(24) ↑14(24) ↓14(24) ↑119(350) ↓119(350) ↑0(0) ↓0(0)</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p> <p>↑1(1) ↓31(23) ↑7(37) ↓7(37) ↑122(365) ↓122(365) ↑16(54) ↓16(54)</p>	<p>14 Stephens Av. & W. Center St.</p> <p>↑1(2) ↓10(3) ↑9(3) ↓9(3) ↑7(9) ↓7(9) ↑260(189) ↓260(189) ↑400(248) ↓400(248)</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p> <p>↑228(148) ↓405(453) ↑7(4) ↓3(4) ↑24(15) ↓24(15) ↑1(0) ↓1(0)</p>	<p>16 La Cadena Dr. & W. N St.</p> <p>↑30(55) ↓460(568) ↑7(20) ↓16(12) ↑15(26) ↓15(26) ↑23(36) ↓23(36)</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p> <p>↑5(10) ↓482(594) ↑15(27) ↓15(27) ↑436(545) ↓436(545)</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p> <p>↑8(41) ↓1028(1076) ↑46(32) ↓46(32) ↑39(38) ↓39(38)</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p> <p>↑909(817) ↓195(283) ↑202(177) ↓202(177) ↑252(384) ↓252(384)</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p> <p>↑769(898) ↓439(351) ↑346(438) ↓174(187) ↑199(271) ↓527(655)</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p> <p>↑205(456) ↓750(710) ↑12(3) ↓12(3) ↑2(2) ↓2(2) ↑0(1) ↓0(1) ↑7(2) ↓7(2)</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p> <p>↑56(82) ↓401(370) ↑434(320) ↓434(320)</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p> <p>↑84(88) ↓194(387) ↑64(73) ↓9(33) ↑91(65) ↓91(65) ↑94(92) ↓94(92)</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p>Intersection Does Not Exist SEE NOTE</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p>Intersection Does Not Exist SEE NOTE</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p> <p>↑112(154) ↓5(6) ↑241(329) ↓415(307) ↑387(441) ↓387(441) ↑18(6) ↓18(6)</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p> <p>↑613(538) ↑101(147) ↓485(541) ↑625(779)</p>	<p>28 I-215 NB Ramps & Barton Rd.</p> <p>↑517(316) ↓517(316) ↑775(725) ↓775(725)</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p> <p>↑936(891) ↓163(188) ↑278(410) ↓278(410) ↑14(14) ↓14(14)</p>	<p>30 Iowa Av. & W. Main St.</p> <p>↑688(755) ↓271(166) ↑347(232) ↓347(232) ↑108(110) ↓108(110)</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p> <p>↑593(694) ↓467(392) ↑93(212) ↓93(212) ↑86(130) ↓86(130)</p>	<p>32 Iowa Av. & Center St.</p> <p>↑80(68) ↓561(603) ↑61(101) ↓135(77) ↑357(204) ↓357(204) ↑127(122) ↓127(122)</p>	<p>33 Iowa Av. & W. Citrus St.</p> <p>↑0(0) ↓905(700) ↑18(23) ↓29(41) ↑0(0) ↓0(0) ↑9(21) ↓9(21)</p>	<p>34 Iowa Av. & E. Citrus St.</p> <p>↑861(709) ↓54(11) ↑26(43) ↓26(43) ↑50(78) ↓50(78)</p>	<p>35 Michigan Av. & Barton Rd.</p> <p>↑748(708) ↓748(708) ↑138(84) ↓138(84)</p>
<p>36 Michigan Av. & W. Main St.</p> <p>↑342(76) ↓48(100) ↑12(22) ↓21(25) ↑340(117) ↓340(117) ↑23(15) ↓23(15)</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p> <p>↑138(139) ↓363(347) ↑41(81) ↓51(35) ↑293(436) ↓293(436) ↑326(289) ↓326(289)</p>	<p>38 Mt. Vernon Av. & Main St.</p> <p>↑260(85) ↓302(304) ↑11(17) ↓24(11) ↑29(16) ↓29(16) ↑14(5) ↓14(5)</p>	<p>39 Palm Av. & Barton Rd.</p> <p>↑523(667) ↓523(667) ↑1(1) ↓1(1)</p>			

LEGEND:

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

NOTE: THE PROPOSED I-215 FREEWAY AND BARTON ROAD INTERCHANGE IMPROVEMENT PROJECT (MODIFIED ALTERNATIVE 7) IS ASSUMED TO BE COMPLETED AND IN USE BY YEAR 2020. THE MODIFIED ALTERNATIVE 7 INCLUDES A ROUNDABOUT AT THE SOUTHBOUND RAMP TO PRESERVE LOCAL ACCESS AT LA CROSSE AVENUE AND DIRECT ACCESS BETWEEN BARTON ROAD AND THE I-215 FREEWAY. THE CONSTRUCTION OF THIS DESIGN ALTERNATIVE WILL ELIMINATE ANALYSIS LOCATION #24 AND #25. AS SUCH, THESE LOCATIONS HAVE NOT BEEN EVALUATED FOR THIS ANALYSIS SCENARIO.



6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC CONDITIONS

Level of service calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2020) conditions with existing roadway and intersection geometrics consistent with those described under Section 6.1 *Roadway Improvements*. The intersection analysis results are summarized in Table 6-1, which indicates that the addition of 4.06% ambient growth along with cumulative development traffic is anticipated to result in the following additional LOS deficiencies, in addition to those previously identified for Existing traffic conditions:

ID	Intersection Location
1	S. Riverside Av. / Main St. / Placentia Ln. – LOS E AM peak hour; LOS F PM peak hour
14	Stephens Av. / W. Center St. – LOS F AM peak hour only
38	Mt. Vernon Av. / Main St. – LOS E AM peak hour only

Consistent with Table 6-1, a summary of the peak hour intersection LOS for Opening Year Cumulative (2020) Without Project conditions are shown on Exhibit 6-5. The intersection operations analysis worksheets for Opening Year Cumulative (2020) Without Project traffic conditions are included in Appendix 6.1 of this TIA.

6.4.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-1 and illustrated on Exhibit 6-6, the following additional study area intersections are anticipated to experience unacceptable LOS (i.e., LOS E or worse) with the addition of Project traffic during one or more peak hours, in addition to those previously identified under Opening Year Cumulative (2020) Without Project conditions:

ID	Intersection Location
5	Orange St. / W. Center St. – LOS E PM peak hour only
20	S. La Cadena Dr. / S. Iowa Av. – LOS F PM peak hour only
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F AM and PM peak hours

The intersection operations analysis worksheets for Opening Year Cumulative (2020) With Project traffic conditions are included in Appendix 6.2 of this TIA. Measures to address near-term deficiencies for Opening Year Cumulative traffic conditions are discussed in Section 6.10 *Near-Term Deficiencies and Recommended Improvements*.

6.5 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 6-2 provides a summary of the Opening Year Cumulative (2020) traffic conditions roadway segment capacity analysis based on the applicable roadway segment capacities, by jurisdiction.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2020) Conditions

#	Intersection	Traffic Control ³	2020 Without Project				2020 With Project			
			Delay ² (secs.)		Level of Service		Delay ² (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	S. Riverside Av. / Main St. / Placentia Ln.	CSS	49.3	62.0	E	F	>100.0	86.3	F	F
2	Main St. / Columbia Av.	TS	22.8	30.6	C	C	22.9	30.8	C	C
3	Main St. / Strong St.	TS	49.1	83.9	D	F	51.6	96.7	D	F
4	Orange St. / Pellissier Rd.	CSS	Future Intersection				0.0	0.0	A	A
5	Orange St. / W. Center St.	AWS	10.5	13.8	B	B	13.7	36.9	B	E
6	Orange St. / Columbia Av.	TS	20.5	21.3	C	C	20.7	21.9	C	C
7	Street "C" / Street "A"	CSS	Future Intersection				8.9	9.0	A	A
8	Street "A" / Pellissier Rd.	CSS	Future Intersection				10.3	11.8	B	B
9	Roquet Ranch Rd. / Street "A"	CSS	Future Intersection				9.3	10.1	A	B
10	Roquet Ranch Rd. / Pellissier Rd.	CSS	Future Intersection				11.5	12.8	B	B
11	S. Graymoor Av. / W. Maryknoll Dr.	CSS	8.4	8.4	A	A	8.8	8.7	A	A
12	S. Graymoor Av. / Pellissier Rd.	CSS	Future Intersection				11.8	13.6	B	B
13	S. Rosedale Av. / W. Maryknoll Dr.	CSS	8.9	8.9	A	A	17.5	20.7	C	C
14	Stephens Av. / W. Center St.	TS	91.8	54.8	F	D	>100.0	64.3	F	E
15	S. Rancho Av. / Agua Mansa Rd.	TS	13.0	22.8	B	C	13.9	25.6	B	C
16	La Cadena Dr. / W. N. St.	TS	6.2	6.9	A	A	6.4	7.3	A	A
17	S. La Cadena Dr. / S. Rancho Av.	CSS	20.5	27.0	C	D	24.1	32.6	C	D
18	S. La Cadena Dr. / W. Litton Av.	CSS	23.7	22.3	C	C	25.9	25.7	D	D
19	S. La Cadena Dr. / Barton Rd.	TS	13.4	25.4	B	C	15.8	39.6	B	D
20	S. La Cadena Dr. / S. Iowa Av.	CSS	24.7	18.0	C	C	28.9	>100.0	D	F
21	S. La Cadena Dr. / W. Maryknoll Dr.	CSS	29.8	28.5	D	D	>100.0	>100.0	F	F
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	AWS	22.6	15.5	C	C	32.1	16.7	D	C
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	AWS	40.9	55.5	E	F	41.1	55.5	E	F
24	La Crosse Av. / I-215 SB Off-Ramp	CSS	Intersection Does Not Exist ⁴							
25	La Crosse Av. / Barton Rd.	CSS	Intersection Does Not Exist ⁴							
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd.	RA	8.2	9.8	A	A	9.5	12.0	A	B
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	CSS	68.5	96.2	F	F	>100.0	>100.0	F	F
28	I-215 NB Ramps / Barton Rd.	TS	11.1	10.0	B	B	21.7	12.2	C	B
29	S. Iowa Av. / I-215 NB Ramps	TS	108.0	89.5	F	F	145.0	129.1	F	F
30	Iowa Av. / W. Main St.	TS	45.2	37.2	D	D	47.4	43.2	D	D
31	Iowa Av. / E. La Cadena Dr.	CSS	14.7	24.8	B	C	15.0	26.0	C	D
32	Iowa Av. / Center St.	TS	46.7	50.0	D	D	47.9	53.6	D	D
33	Iowa Av. / W. Citrus St.	TS	5.1	6.2	A	A	5.8	7.0	A	A
34	Iowa Av. / E. Citrus St.	TS	6.7	6.7	A	A	6.9	6.8	A	A
35	Michigan Av. / Barton Rd.	TS	22.7	16.9	C	B	23.3	28.9	C	C
36	Michigan Av. / W. Main St.	TS	78.7	25.8	E	C	88.2	26.4	F	C
37	Mt. Vernon Av. / Barton Rd.	TS	34.8	35.1	C	D	34.9	36.0	C	D
38	Mt. Vernon Av. / Main St.	AWS	45.5	14.8	E	B	47.9	15.2	E	C
39	Palm Av. / Barton Rd.	CSS	12.4	12.8	B	B	12.7	13.3	B	B

* BOLD = 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.

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal; CSS = Improvement; RA = Roundabout

⁴ The proposed I-215 Freeway and Barton Road Interchange Improvement Project (Modified Alternative 7) is assumed to be completed and in use by year 2020. The Modified Alternative 7 includes a roundabout at the southbound ramp to preserve local access at La Crosse Avenue and direct access between Barton Road and the I-215 Freeway. The construction of this design alternative will eliminate analysis locations #24 and #25. As such, these locations have not been evaluated for this analysis scenario.

Table 6-2

Roadway Volume/Capacity Analysis for Opening Year Cumulative (2020) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	2020 NP	V/C ²	LOS ³	2020 WP	V/C ²	LOS ³	Acceptable LOS ³
1	S. Rancho Avenue	Agua Mansa Rd. to La Cadena Dr.	4D	33,000	9,526	0.29	A	10,348	0.31	A	D
2		N St. to S. Rancho Av.	4D	33,000	13,152	0.40	A	13,986	0.42	A	D
3		South of S. Rancho Av.	4D	33,000	20,020	0.61	B	21,677	0.66	B	D
4		North of W. Litton Av.	4D	33,000	20,276	0.61	B	21,933	0.66	B	D
5	La Cadena Drive	Between W. Litton Av. and Barton Rd.	4D	33,000	20,479	0.62	B	22,248	0.67	B	D
6		South of Barton Rd.	5D	41,250	19,426	0.47	A	23,586	0.57	A	D
7		North of S. Iowa Av.	4D	33,000	18,014	0.55	A	22,197	0.67	B	D
8		Between S. Iowa Av. and W. Maryknoll Dr.	4D	33,000	11,937	0.36	A	18,306	0.55	A	D
9		Between W. Maryknoll Dr. and Pellissier Rd.	4D	33,000	11,735	0.36	A	12,551	0.38	A	D
10		East of La Cadena Dr.	2U	18,000	9,421	0.52	A	11,813	0.66	B	D
11		West of La Crosse Av.	2U	18,000	10,082	0.56	A	12,474	0.69	B	D
12		Between La Crosse Av. and I-215 SB Ramps	2D	18,000	10,277	0.57	A	12,224	0.68	B	D
13	Barton Road	Between I-215 SB Ramps and I-215 NB Ramps	2D	18,000	16,350	0.91	E	18,298	1.02	F	D
14		Between I-215 NB Ramps and Michigan Av.	4D	33,000	23,437	0.71	C	24,940	0.76	C	D
15		East of Michigan Av.	4D	33,000	18,147	0.55	A	19,361	0.59	A	D
16		West of Mt. Vernon Av.	4D	33,000	15,926	0.48	A	17,050	0.52	A	D
17		Mt. Vernon Av. to Palm Av.	4D	33,000	16,647	0.50	A	17,303	0.52	A	D
18	Placencia Lane / West Center Street	East of S. Riverside Av. / Main St.	2U	18,000	5,850	0.33	A	7,408	0.41	A	D
19		West of Orange St.	2U	18,000	5,422	0.30	A	7,068	0.39	A	D
20		South of Placencia Ln.	4D	33,000	22,749	0.69	B	23,839	0.72	C	D
21	Main Street	North of Columbia Av.	4D	33,000	27,460	0.83	D	28,372	0.86	D	D
22		Columbia Av. to Strong St.	4D	33,000	22,198	0.67	B	22,920	0.69	B	D
23		South of Pellissier Rd.	2U	12,500	0	0.00	--	2,612	0.21	A	D
24	Orange Street	North of W. Center St.	2U	12,500	457	0.04	A	3,239	0.26	A	D
25		South of W. Center St.	2U	12,500	2,970	0.24	A	3,750	0.30	A	D
26		North of Columbia Av.	2U	12,500	4,914	0.39	A	5,670	0.45	A	D
27		Between Orange St. and Street "A"	4D	33,000	0	0.00	--	2,612	0.08	A	D
28		Between Street "A" and Roquet Ranch Rd.	4D	33,000	0	0.00	--	2,862	0.09	A	D
29	Pellissier Road / Maryknoll Dr.	East of Roquet Ranch Rd.	4D	33,000	0	0.00	--	5,630	0.17	A	D
30		West of Graymoor Av.	4D	33,000	0	0.00	--	5,652	0.17	A	D
31		Between Graymoor Av. and Rosedale Av.	2U	12,500	379	0.03	A	6,143	0.49	A	D
32		Between Rosedale Av. and La Cadena Dr.	2D	12,500	1,082	0.09	A	10,690	0.86	D	D
33		Between La Cadena Dr. and I-215 SB Off-Ramp	2U	18,000	13,759	0.76	C	15,945	0.89	D	D
34	South Iowa Avenue	Between I-215 SB Off-Ramp and I-215 NB Ramps	2U	18,000	18,244	1.01	F	19,952	1.11	F	D
35		South of I-215 NB Ramps	2D	18,000	20,037	1.11	F	20,597	1.14	F	D
36		North of W. Main St.	2U	18,000	20,966	1.16	F	21,526	1.20	F	D
37	West Main Street	East of S. Iowa Av.	2U	18,000	6,618	0.37	A	6,878	0.38	A	D
38		West of Michigan Av.	2D	18,000	5,446	0.30	A	5,682	0.32	A	D

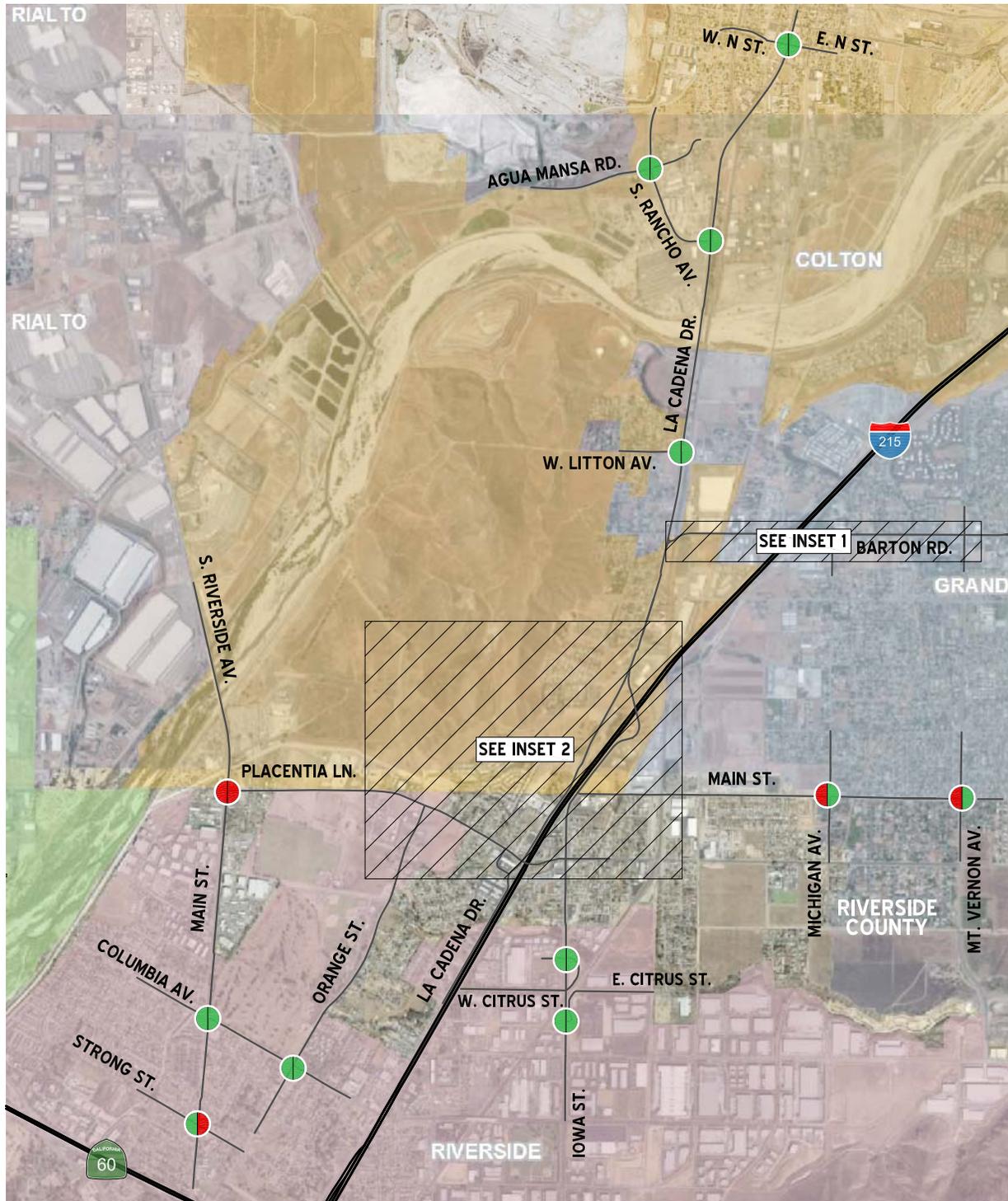
¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

² V/C = Volume-to-capacity ratio

³ LOS = Level of Service



**EXHIBIT 6-5 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS
SUMMARY OF LOS**

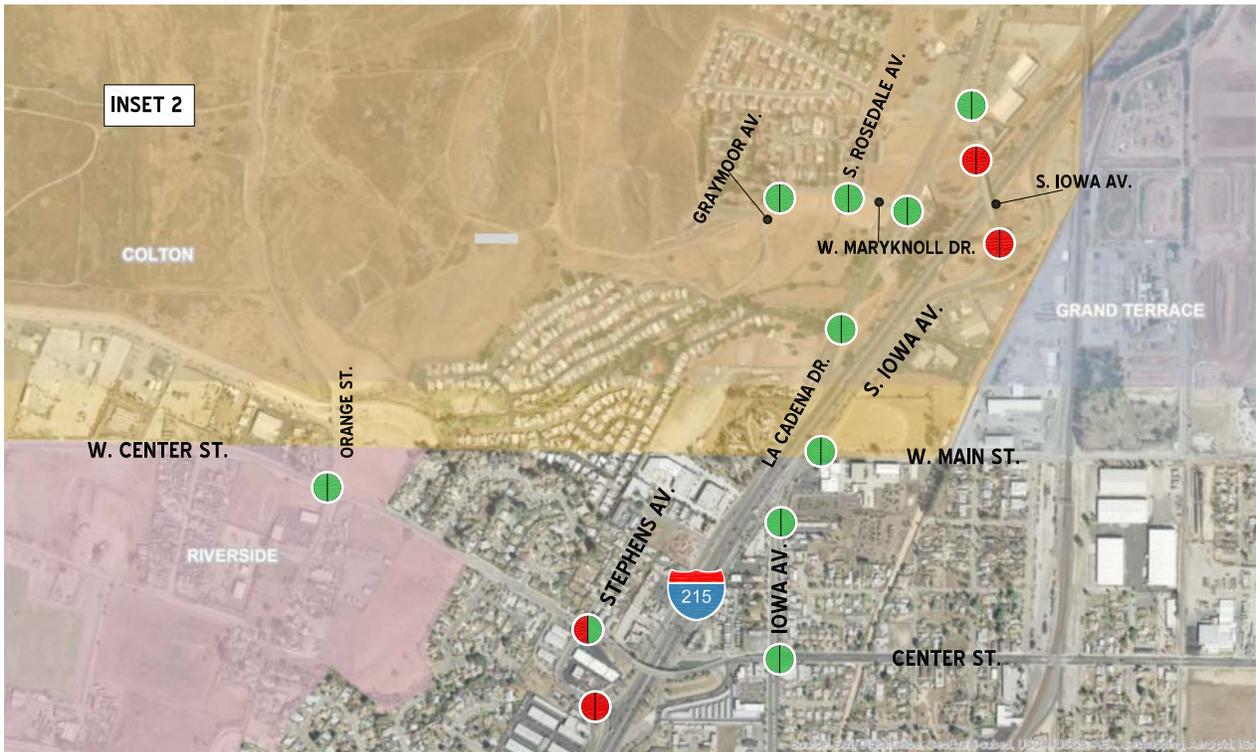


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS



**EXHIBIT 6-5 (2 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS
SUMMARY OF LOS**

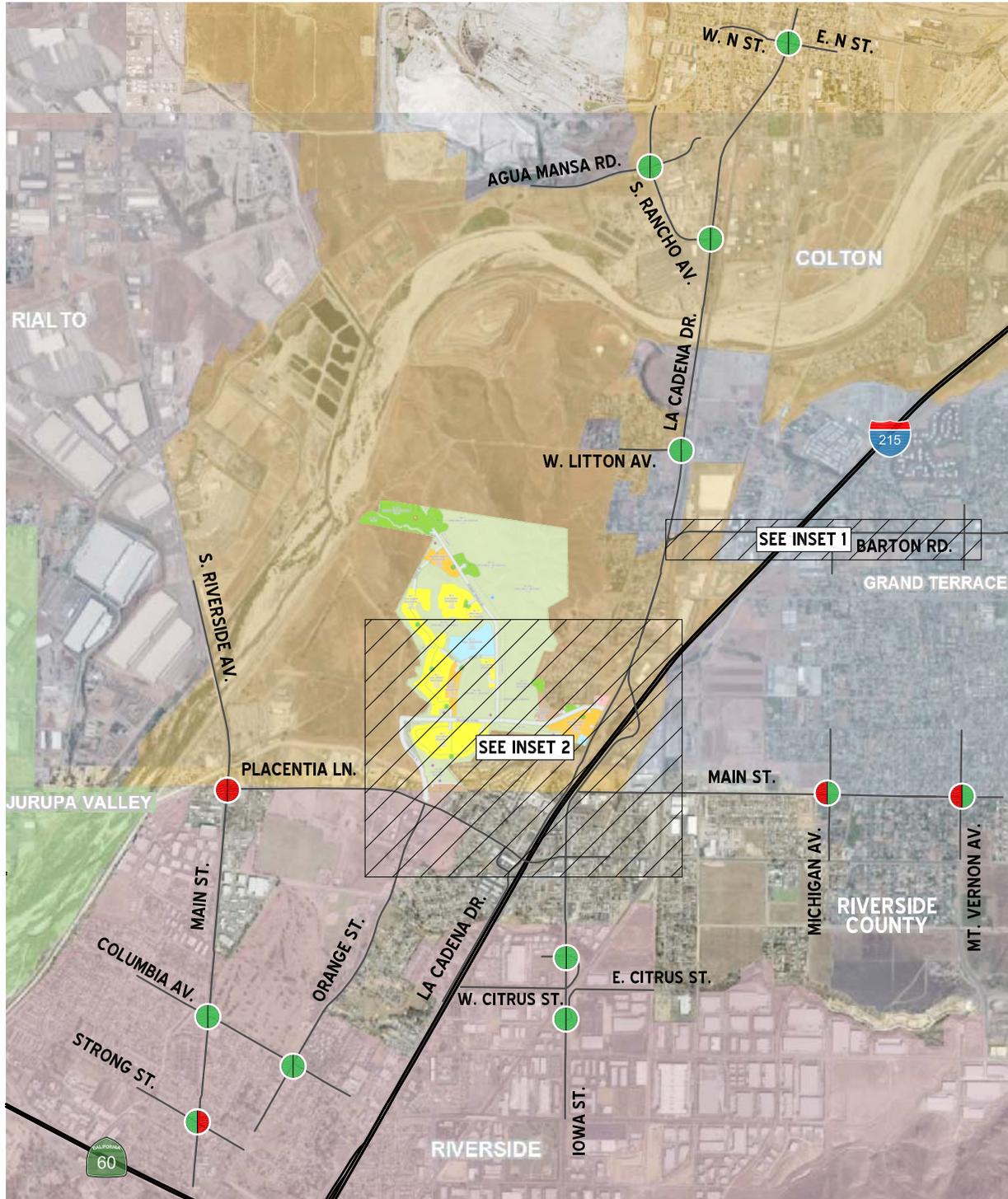


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS
-  = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO



**EXHIBIT 6-6 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS
SUMMARY OF LOS**

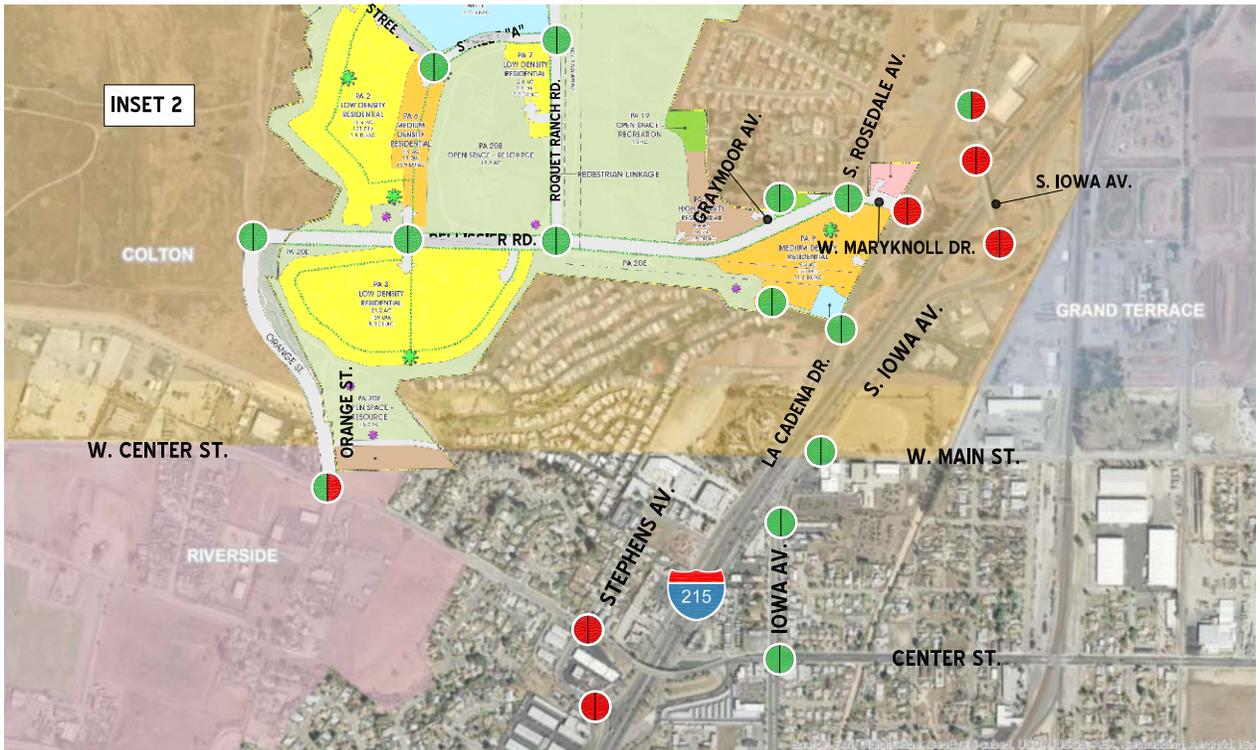


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS



**EXHIBIT 6-6 (2 OF 2): OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS
SUMMARY OF LOS**



LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS
-  = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO



6.5.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC CONDITIONS

As shown on Table 6-2, the addition of 4.06% ambient growth along with cumulative development traffic is anticipated to result in the following additional roadway segment capacity deficiency, in addition to those previously identified for Existing traffic conditions:

ID	Roadway Segment Location
13	Barton Road, Between I-215 SB Ramps and I-215 NB Ramps – LOS E

6.5.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-2, the addition of Project traffic is not anticipated to result in any additional roadway segment capacity deficiencies, in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions.

As noted in Section 2.3 *Roadway Segment Capacity Analysis Methodology*, daily roadway capacities are “rule of thumb” estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

6.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

For Opening Year Cumulative (2020) Without and With Project traffic conditions, there are no additional unsignalized study area intersections that are anticipated to meet peak hour volume based traffic signal warrants, in addition to the intersection previously warranted under Existing and E+P traffic conditions (see Appendix 6.3 and Appendix 6.4).

6.7 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Barton Road, Iowa Avenue, and Stephens Avenue interchanges 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-215 Freeway mainline. Queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative (2020) traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline.

Table 6-3

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2020) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet) ³		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
Opening Year Cumulative (2020) Without Project Conditions						
La Crosse Av. / I-215 SB Off-Ramp / Barton Road	SBL/T/R	1,550	25	50	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	38	41	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	53	48	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	350	468	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	1,084	1,279 ²	Yes	No
Opening Year Cumulative (2020) With Project Conditions						
La Crosse Av. / I-215 SB Off-Ramp / Barton Road	SBL/T/R	1,550	50	50	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	38	41	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	53	48	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	455	553	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	1,381 ²	1,442 ²	No	No

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.

³ Maximum queue length for the approach reported.

6.7.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC CONDITIONS

As shown on Table 6-3, 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 (2020) Without Project traffic conditions. Worksheets for Opening Year Cumulative (2020) Without Project traffic conditions off-ramp queuing analysis are provided in Appendix 6.5.

6.7.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-3, 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 (2020) traffic conditions with the addition of Project traffic. Worksheets for Opening Year Cumulative (2020) With Project traffic conditions off-ramp queuing analysis are provided in Appendix 6.6.

6.8 BASIC FREEWAY SEGMENT ANALYSIS

6.8.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC CONDITIONS

Opening Year Cumulative (2020) Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-7. As shown on Table 6-4, I-215 Freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS D or better) during the peak hours, consistent with Existing traffic conditions, with the exception of the following additional deficiency:

ID	Freeway Mainline Segments
6	I-215 Freeway Northbound, South of La Cadena Dr. – LOS E AM peak hour only

Opening Year Cumulative (2020) Without Project basic freeway segment analysis worksheets are provided in Appendix 6.7.

6.8.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC CONDITIONS

Opening Year Cumulative (2020) With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-8. As shown on Table 6-4, there are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Opening Year Cumulative (2020) Without Project conditions. Worksheets for Opening Year Cumulative (2020) With Project conditions basic freeway segment analysis worksheets are provided in Appendix 6.8.

**EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES
(ACTUAL VEHICLES)**



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



**EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2020) WITH PROJECT FREEWAY MAINLINE VOLUMES
(ACTUAL VEHICLES)**



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



Table 6-4

Basic Freeway Segment Analysis for Opening Year Cumulative (2020) Conditions

Freeway	Direction	Mainline Segment	Lanes ¹	2020 Without Project				2020 With Project			
				Density ²		LOS ³		Density ²		LOS ³	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Barton Road	3	32.5	31.7	D	D	32.8	32.8	D	D
		Barton Road to La Cadena Drive	3	33.8	30.9	D	D	34.0	31.4	D	D
		South of La Cadena Drive	3	31.9	28.0	D	D	32.6	28.4	D	D
	NB	North of Barton Road	3	44.9	37.9	E	E	46.4	38.8	F	E
		Barton Road to La Cadena Drive	3	41.8	38.7	E	E	42.5	39.2	E	E
		South of La Cadena Drive	3	36.4	33.8	E	D	36.8	34.7	E	D

* **BOLD** = Unacceptable Level of Service

¹ Number of 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

6.9 FREEWAY MERGE/DIVERGE ANALYSIS

6.9.1 OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC CONDITIONS

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative (2020) Without Project conditions and the results of this analysis are presented in Table 6-5. As shown in Table 6-5, the following freeway ramp merge and diverge areas are anticipated to operate at unacceptable LOS under Opening Year Cumulative (2020) Without Project conditions, in addition to those previously identified for Existing traffic conditions:

ID	Freeway Merge/Diverge Ramp Junctions
2	I-215 Freeway – Southbound, Off-Ramp at S. Iowa Av. – LOS E AM peak hour only
5	I-215 Freeway – Northbound, On-Ramp at S. Iowa Av. – LOS E AM and PM peak hours

Opening Year Cumulative (2020) Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 6.9.

6.9.2 OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-5, the addition of Project traffic is anticipated to result in the following additional freeway ramp merge and diverge junction LOS deficiency, in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off-Ramp at Barton Rd. – LOS E AM and PM peak hours

Worksheets for Opening Year Cumulative (2020) With Project conditions freeway ramp junction operations analysis worksheets are provided in Appendix 6.10.

6.10 NEAR-TERM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

6.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient to reduce each location’s peak hour delay and improve the associated LOS grade to acceptable levels. The effectiveness of these recommended improvements to address Opening Year Cumulative (2020) LOS deficiencies are presented in Table 6-6. The intersection operations analysis worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions, with improvements, are provided in Appendix 6.11 and Appendix 6.12.

Table 6-5

Freeway Ramp Junction Merge/Diverge Analysis for Opening Year Cumulative (2020) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway ¹	2020 Without Project				2020 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density ²	LOS ³						
I-215 Freeway	SB	Off-Ramp at Barton Road	3	34.8	D	34.7	D	35.0	E	35.3	E
		Off-Ramp at S. Iowa Avenue	3	35.5	E	34.3	D	35.6	E	34.7	D
		On-Ramp at S. La Cadena Drive	3	32.6	D	30.1	D	33.2	D	30.4	D
	NB	On-Ramp at Barton Road	3	39.2	E	35.4	E	40.0	F	35.8	E
		On-Ramp at S. Iowa Avenue	3	37.3	E	36.3	E	37.7	E	36.6	E
		Off-Ramp at S. Iowa Avenue	3	36.6	E	35.8	E	36.8	E	36.1	E

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 6-6

Intersection Analysis for Opening Year Cumulative (2020) Conditions With Improvements

#	Intersection	Traffic Control ³	Intersection Approach Lanes ¹												Delay ² (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	S. Riverside Av. / Main St. / Placentia Ln.																	
	- Without Project	TS	1	2	d	1	2	d	0	1	0	0	1	0	10.8	5.7	B	A
	- With Project	TS	1	2	d	1	2	d	0	1	0	0	1	0	13.3	11.2	B	B
3	Main St. / Strong St.																	
	- Without Project	TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	12.3	13.6	B	B
	- With Project	TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	12.7	14.2	B	B
5	Orange St. / W. Center St.		No Improvements Necessary															
	- Without Project		No Improvements Necessary															
	- With Project	TS	0	1	0	0	1	0	0	1	0	0	1	0	15.7	18.1	B	B
14	Stephens Av. / W. Center St.																	
	- Without Project	TS	0	1	0	0	1	0	0	1	1	<u>1</u>	1	d	33.1	33.9	C	C
	- With Project	TS	0	1	0	0	1	0	0	1	1	<u>1</u>	1	d	33.1	34.0	C	C
20	S. La Cadena Dr. / S. Iowa Av.		No Improvements Necessary															
	- Without Project	CSS	No Improvements Necessary															
	- With Project	CSS	1	<u>2</u>	0	0	<u>2</u>	2>>	1	0	1	0	0	0	12.1	15.3	B	C
21	S. La Cadena Dr. / W. Maryknoll Dr.		No Improvements Necessary															
	- Without Project		No Improvements Necessary															
	- With Project	TS	<u>1</u>	1	0	0	2	1	<u>1</u>	1	0	0	1	0	16.7	12.4	B	B
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps																	
	- Without Project	TS	0	1	1	0	1	0	0	1	0	0	1	1	21.7	25.5	C	C
	- With Project	TS	0	1	1	0	1	0	0	1	0	0	1	1	36.8	43.4	D	D
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp																	
	- Without Project	TS	0	1	0	0	1	0	1	0	1	0	0	0	36.3	54.6	D	D
	- With Project	TS	0	1	0	0	1	0	1	0	1	0	0	0	37.0	54.6	D	D
29	S. Iowa Av. / I-215 NB Ramps																	
	- Without Project	TS	0	0	0	1	0	<u>1</u>	<u>2</u>	1	0	0	1	0	43.8	38.5	D	D
	- With Project	TS	0	0	0	1	0	<u>1</u>	<u>2</u>	1	0	0	1	0	44.3	45.2	D	D
36	Michigan Av. / W. Main St.																	
	- Without Project	TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	50.6	25.8	D	C
	- With Project	TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	53.8	25.9	D	C
38	Mt. Vernon Av. / Main St.																	
	- Without Project	TS	0	1	1	0	2	0	0	1	d	0	1	0	36.2	9.4	D	A
	- With Project	TS	0	1	1	0	2	0	0	1	d	0	1	0	39.7	9.5	D	A

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 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal

6.10.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes. Based on the peak hour intersection operations analysis presented on Tables 6-1 and 6-6, roadway widening has been recommended along S. Iowa Avenue between La Cadena Drive and the I-215 Southbound Ramps from the existing 2-lane roadway to a 4-lane roadway (see Table 6-7). Other adjacent intersections are anticipated to operate at acceptable LOS without the need for additional roadway widening, as such, no other roadway widening has been recommended.

6.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Colton (or other neighboring jurisdictions) on the SHS segments. As such, no improvements have been recommended to address the Opening Year Cumulative (2020) deficiencies on the SHS.

Table 6-7

Roadway Volume/Capacity Analysis Opening Year Cumulative (2020) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	2020 NP	V/C	LOS	2020 WP	V/C	LOS	Acceptable LOS
33	South Iowa Avenue	Between La Cadena Dr. and I-215 SB Off-Ramp	<u>4U</u>	36,000	13,759	0.38	A	15,945	0.44	A	D

2U = Improvement

¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

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7 HORIZON YEAR (2040) TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Horizon Year (2040) conditions, and the resulting peak hour intersection operations, roadway segment capacities, freeway mainline operations, and traffic signal warrant analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) traffic 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 Buildout of 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).
- The Orange Street extension between its existing terminus north of Center Street and the future Pellissier Road is anticipated to be in place by the Project's Opening Year to provide secondary access to the site.
- I-215 Freeway and Barton Road Interchange Project improvements assumed to be in place per Modified Alternative 7 (locally preferred alternative). The interchange improvements include widening the existing bridge on Barton Road to four lanes and implementing a roundabout at the I-215 Freeway Southbound Ramps in order to preserve local access to La Crosse Avenue. The interchange project improvements are anticipated to be completed by the end of 2018, and as such, have been assumed to be in place by Horizon Year traffic conditions.

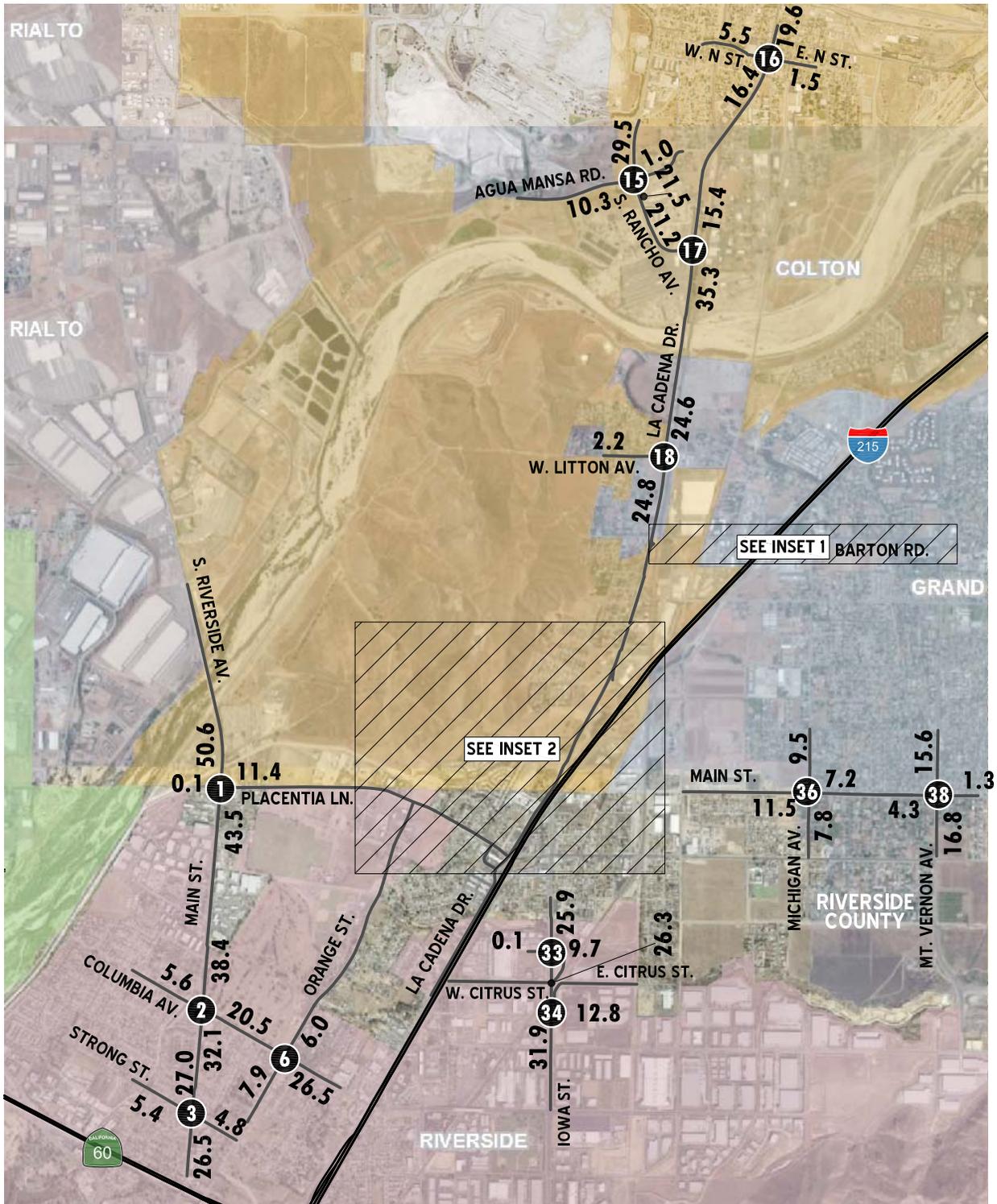
7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the recently updated 2040 SBTAM. The weekday ADT volumes for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-1. Weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-2.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the SBTAM, plus proposed Project volumes. The weekday ADT volumes for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-3. Weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-4.

EXHIBIT 7-1 (1 OF 2): HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)

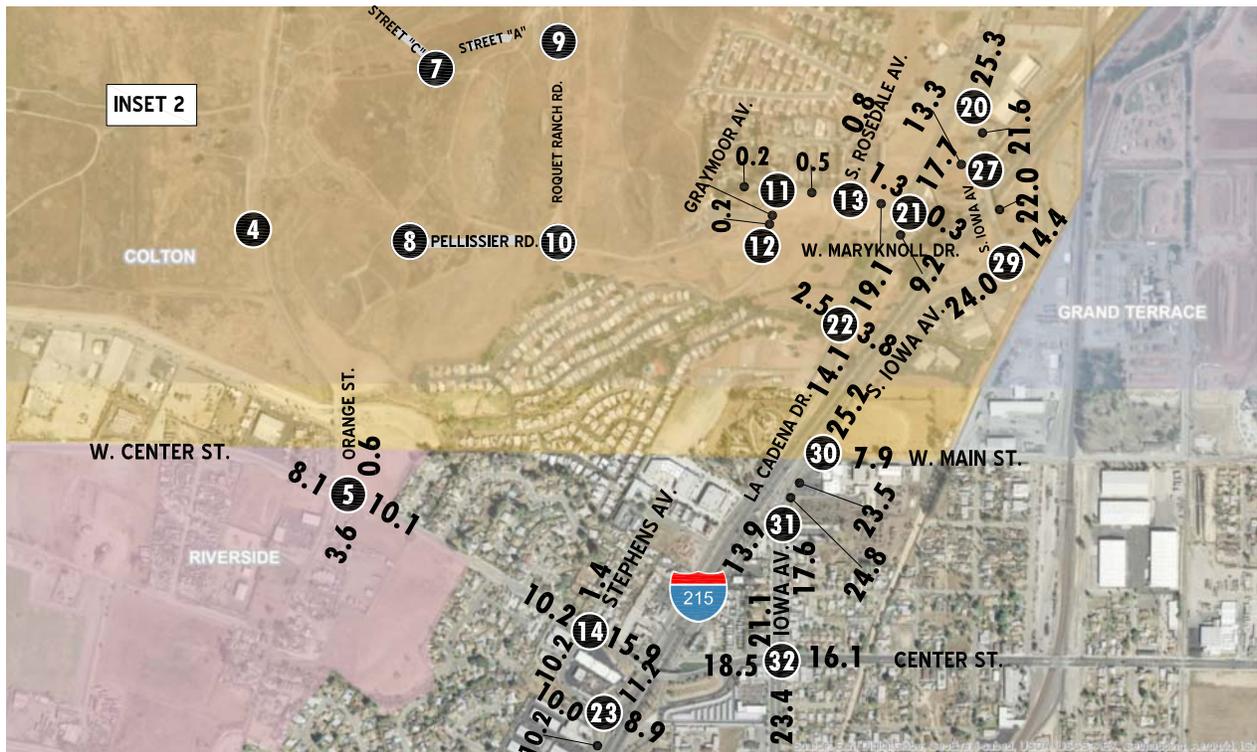
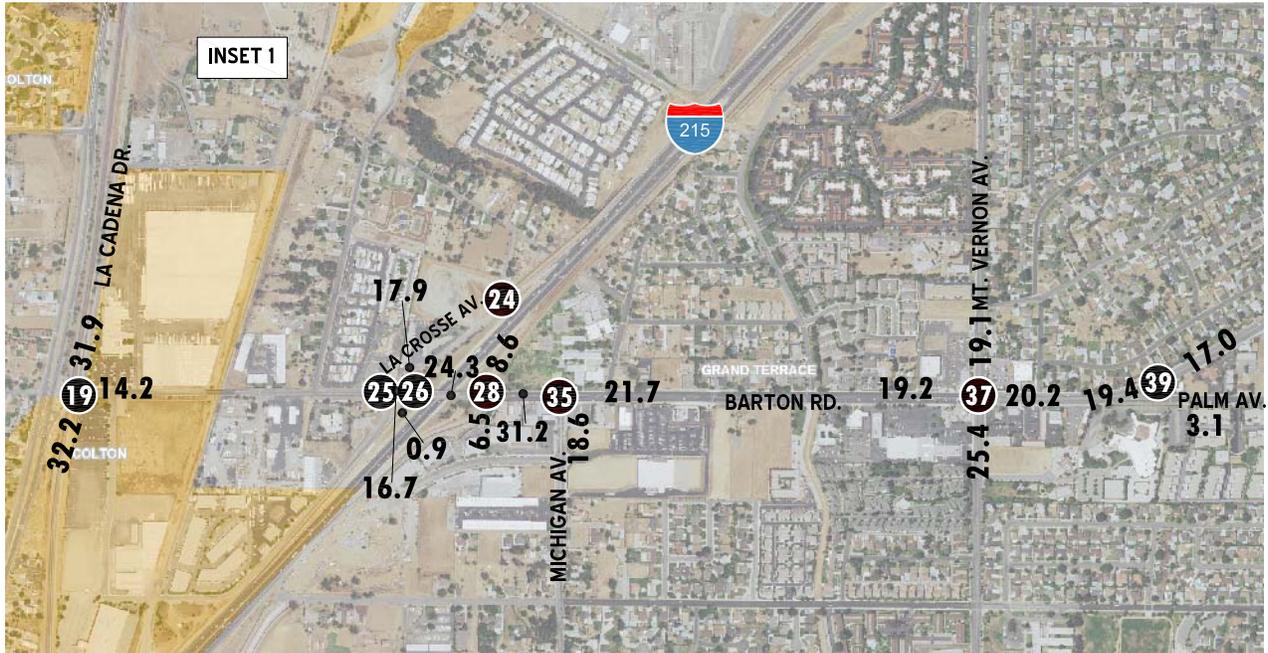


LEGEND:

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)



EXHIBIT 7-1 (2 OF 2): HORIZON YEAR (2040) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

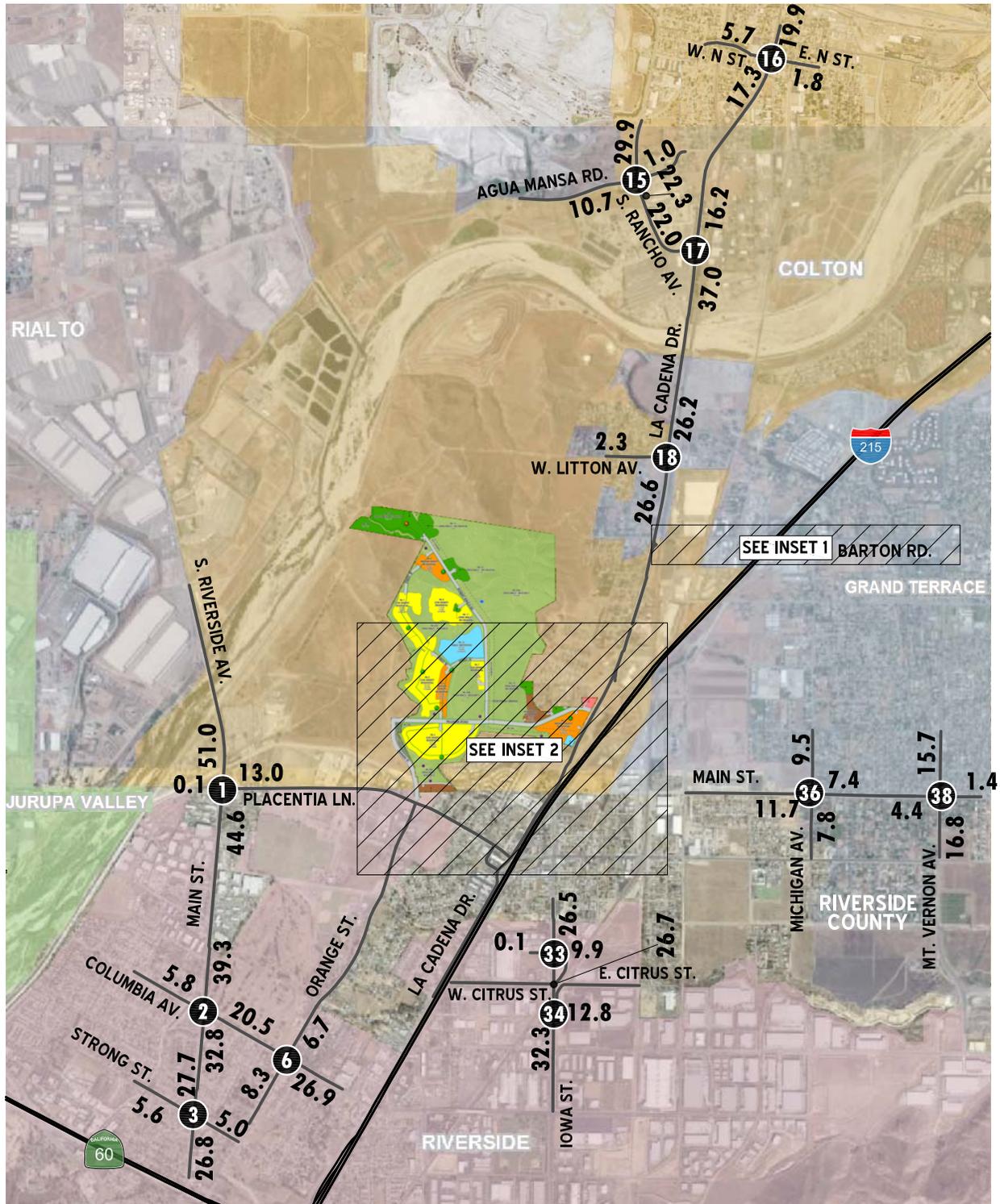
10.0 = ESTIMATED VEHICLES PER DAY (1000'S)



EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT PEAK HOUR INTERSECTION VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p>	<p>2 Main St. & Columbia Av.</p>	<p>3 Main St. & Strong St.</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>5 Orange St. & W. Center St.</p>	<p>6 Orange St. & Columbia Av.</p>	<p>7 Street "C" & Street "A"</p> <p>Future Intersection</p>
<p>8 Street "A" & Pellissier Rd.</p> <p>Future Intersection</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>Future Intersection</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>Future Intersection</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p>	<p>14 Stephens Av. & W. Center St.</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p>	<p>16 La Cadena Dr. & W. N St.</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p>Intersection Does Not Exist</p> <p>SEE NOTE</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p>Intersection Does Not Exist</p> <p>SEE NOTE</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p>	<p>28 I-215 NB Ramps & Barton Rd.</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p>	<p>30 Iowa Av. & W. Main St.</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p>	<p>32 Iowa Av. & Center St.</p>	<p>33 Iowa Av. & W. Citrus St.</p>	<p>34 Iowa Av. & E. Citrus St.</p>	<p>35 Michigan Av. & Barton Rd.</p>
<p>36 Michigan Av. & W. Main St.</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p>	<p>38 Mt. Vernon Av. & Main St.</p>	<p>39 Palm Av. & Barton Rd.</p>	<p>LEGEND:</p> <p>10(10) = AM(PM) PEAK HOUR VOLUMES</p> <p>NOTE: THE PROPOSED I-215 FREEWAY AND BARTON ROAD INTERCHANGE IMPROVEMENT PROJECT (MODIFIED ALTERNATIVE 7) IS ASSUMED TO BE COMPLETED AND IN USE BY YEAR 2020. THE MODIFIED ALTERNATIVE 7 INCLUDES A ROUNDABOUT AT THE SOUTHBOUND RAMP TO PRESERVE LOCAL ACCESS AT LA CROSSE AVENUE AND DIRECT ACCESS BETWEEN BARTON ROAD AND THE I-215 FREEWAY. THE CONSTRUCTION OF THIS DESIGN ALTERNATIVE WILL ELIMINATE ANALYSIS LOCATION #24 AND #25. AS SUCH, THESE LOCATIONS HAVE NOT BEEN EVALUATED FOR THIS ANALYSIS SCENARIO.</p>		

EXHIBIT 7-3 (1 OF 2): HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = ESTIMATED VEHICLES PER DAY (1000'S)



EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT PEAK HOUR INTERSECTION VOLUMES

<p>1 S. Riverside Av. / Main St. & Placentia Ln.</p> <p>↓ 2(1) ↓ 1012(1427) ↓ 225(236) ↓ 239(240) ↓ 2(0) ↓ 218(115)</p> <p>↑ 5(1) ↑ 156(1377) ↑ 105(306)</p> <p>0(0) 0(0) 0(3)</p>	<p>2 Main St. & Columbia Av.</p> <p>↓ 33(88) ↓ 817(908) ↓ 301(452) ↓ 280(268) ↓ 72(154) ↓ 375(470)</p> <p>↑ 46(47) ↑ 144(144) ↑ 106(55)</p> <p>23(56) 815(862) 245(253)</p>	<p>3 Main St. & Strong St.</p> <p>↓ 104(82) ↓ 962(1186) ↓ 49(63) ↓ 32(60) ↓ 47(63) ↓ 28(48)</p> <p>↑ 88(115) ↑ 65(138) ↑ 94(62)</p> <p>48(42) 938(1013) 104(81)</p>	<p>4 Orange St. & Pellissier Rd.</p> <p>↑ 140(98)</p> <p>55(164)</p>	<p>5 Orange St. & W. Center St.</p> <p>↓ 90(64) ↓ 45(40) ↓ 26(36) ↓ 13(31) ↓ 257(256) ↓ 130(111)</p> <p>↑ 39(107) ↑ 185(433) ↑ 50(10)</p> <p>6(26) 20(51) 56(202)</p>	<p>6 Orange St. & Columbia Av.</p> <p>↓ 46(80) ↓ 138(129) ↓ 81(80) ↓ 66(132) ↓ 560(846) ↓ 66(151)</p> <p>↑ 50(57) ↑ 585(717) ↑ 30(28)</p> <p>46(40) 124(254) 127(177)</p>	<p>7 Street "C" & Street "A"</p> <p>↓ 41(29) ↓ 19(13) ↓ 7(22) ↓ 32(23)</p> <p>↑ 14(48) ↑ 12(39)</p>
<p>8 Street "A" & Pellissier Rd.</p> <p>↓ 70(50) ↓ 0(0) ↓ 80(55) ↓ 27(91) ↓ 51(35) ↓ 9(30)</p> <p>↑ 25(84) ↑ 23(57) ↑ 7(22)</p> <p>19(13) 0(0) 26(16)</p>	<p>9 Roquet Ranch Rd. & Street "A"</p> <p>↓ 23(17) ↓ 108(76)</p> <p>↑ 8(28) ↑ 36(25)</p> <p>13(42) 38(129)</p>	<p>10 Roquet Ranch Rd. & Pellissier Rd.</p> <p>↓ 9(7) ↓ 146(102) ↓ 51(172) ↓ 74(172)</p> <p>↑ 3(11) ↑ 148(120)</p>	<p>11 S. Graymoor Av. & W. Maryknoll Dr.</p> <p>↓ 0(0) ↓ 0(0) ↓ 17(14)</p> <p>↑ 0(0) ↑ 8(10)</p> <p>6(12) 8(9)</p>	<p>12 S. Graymoor Av. & Pellissier Rd.</p> <p>↓ 0(0) ↓ 0(0) ↓ 31(27) ↓ 17(27) ↓ 119(350) ↓ 0(0)</p> <p>↑ 0(0) ↑ 0(0) ↑ 0(0)</p>	<p>13 S. Rosedale Av. & W. Maryknoll Dr.</p> <p>↓ 1(1) ↓ 0(0) ↓ 37(27) ↓ 8(45) ↓ 124(368) ↓ 16(54)</p> <p>↑ 1(3) ↑ 328(230) ↑ 3(11)</p> <p>9(7) 0(0) 47(32)</p>	<p>14 Stephens Av. & W. Center St.</p> <p>↓ 1(3) ↓ 13(4) ↓ 17(8) ↓ 9(120) ↓ 312(386) ↓ 523(333)</p> <p>↑ 0(8) ↑ 275(404) ↑ 118(268)</p> <p>123(126) 3(20) 195(295)</p>
<p>15 S. Rancho Av. & Agua Mansa Rd.</p> <p>↓ 293(178) ↓ 547(544) ↓ 9(5) ↓ 4(5) ↓ 29(18) ↓ 1(0)</p> <p>↑ 142(587) ↑ 17(60) ↑ 98(249)</p> <p>138(104) 307(538) 0(0)</p>	<p>16 La Cadena Dr. & W. N St.</p> <p>↓ 78(67) ↓ 766(682) ↓ 13(24) ↓ 19(17) ↓ 18(32) ↓ 26(40)</p> <p>↑ 66(140) ↑ 17(30) ↑ 74(62)</p> <p>34(36) 627(887) 23(20)</p>	<p>17 S. La Cadena Dr. & S. Rancho Av.</p> <p>↓ 6(12) ↓ 860(721)</p> <p>↑ 18(32) ↑ 654(726)</p> <p>450(639) 560(880)</p>	<p>18 S. La Cadena Dr. & W. Litton Av.</p> <p>↓ 10(50) ↓ 1241(1280)</p> <p>↑ 56(39) ↑ 47(45)</p> <p>39(76) 920(1000)</p>	<p>19 S. La Cadena Dr. & Barton Rd.</p> <p>↓ 1381(966) ↓ 253(374) ↓ 296(235) ↓ 419(514)</p> <p>↑ 708(1386) ↑ 286(508)</p>	<p>20 S. La Cadena Dr. & S. Iowa Av.</p> <p>↓ 916(1033) ↓ 598(422)</p> <p>↑ 366(485) ↑ 193(369)</p> <p>215(649) 797(1304)</p>	<p>21 S. La Cadena Dr. & W. Maryknoll Dr.</p> <p>↓ 207(462) ↓ 909(1215) ↓ 15(4) ↓ 3(3) ↓ 0(1) ↓ 9(3)</p> <p>↑ 383(261) ↑ 110 ↑ 128(78)</p> <p>50(53) 173(590) 0(5)</p>
<p>22 La Cadena Dr. S. & Pellissier Rd. / I-215 SB On-Ramp</p> <p>↓ 67(99) ↓ 476(802) ↓ 513(385) ↓ 10(40) ↓ 229(225) ↓ 136(142)</p> <p>↑ 96(71) ↑ 11(15) ↑ 17(17)</p> <p>5(28) 127(577) 1(0)</p>	<p>23 La Cadena Dr. W. & Stephens Av. / I-215 SB Ramps</p> <p>↓ 91(118) ↓ 236(472) ↓ 78(88) ↓ 10(40) ↓ 229(225) ↓ 136(142)</p> <p>↑ 95(137) ↑ 461(301) ↑ 64(85)</p> <p>52(37) 96(195) 19(14)</p>	<p>24 La Crosse Av. & I-215 SB Off-Ramp</p> <p>Intersection Does Not Exist</p> <p>SEE NOTE</p>	<p>25 La Crosse Av. & Barton Rd.</p> <p>Intersection Does Not Exist</p> <p>SEE NOTE</p>	<p>26 La Crosse Av. / I-215 SB On-Ramp & Barton Rd.</p> <p>↓ 114(119) ↓ 0(0) ↓ 509(583) ↓ 503(366) ↓ 610(637) ↓ 22(8)</p> <p>↑ 513(530) ↑ 491(658) ↑ 6(1)</p> <p>0(3) 0(0) 9(65)</p>	<p>27 S. Iowa Av. & S. La Cadena Dr. / I-215 SB Off-Ramp</p> <p>↓ 791(791)</p> <p>↑ 104(696) ↑ 597(633)</p> <p>908(1257)</p>	<p>28 I-215 NB Ramps & Barton Rd.</p> <p>↑ 628(435) ↑ 932(849)</p> <p>181(155) 402(541)</p>
<p>29 S. Iowa Av. & I-215 NB Ramps</p> <p>↓ 1204(1058) ↓ 185(366) ↓ 306(550) ↓ 17(17)</p> <p>↑ 602(707) ↑ 641(738)</p>	<p>30 Iowa Av. & W. Main St.</p> <p>↓ 950(906) ↓ 321(189) ↓ 409(272) ↓ 157(162)</p> <p>↑ 670(1039) ↑ 108(373)</p>	<p>31 Iowa Av. & E. La Cadena Dr.</p> <p>↓ 724(725) ↓ 755(463)</p> <p>↑ 121(331) ↑ 105(159)</p> <p>81(102) 673(1069)</p>	<p>32 Iowa Av. & Center St.</p> <p>↓ 98(84) ↓ 868(732) ↓ 68(110) ↓ 149(83) ↓ 497(319) ↓ 242(207)</p> <p>↑ 104(230) ↑ 320(518) ↑ 200(221)</p> <p>200(421) 458(962) 134(249)</p>	<p>33 Iowa Av. & W. Citrus St.</p> <p>↓ 0(0) ↓ 1295(1084) ↓ 68(63) ↓ 93(189) ↓ 0(0) ↓ 11(134)</p> <p>↑ 0(0) ↑ 0(0) ↑ 0(0)</p> <p>11(4) 735(1567) 51(24)</p>	<p>34 Iowa Av. & E. Citrus St.</p> <p>↓ 1194(1193) ↓ 113(25) ↓ 37(77) ↓ 231(139)</p> <p>↑ 760(1518) ↑ 197(178)</p>	<p>35 Michigan Av. & Barton Rd.</p> <p>↓ 912(827) ↓ 168(101)</p> <p>↑ 705(1001) ↑ 522(496)</p> <p>773(699) 223(134)</p>
<p>36 Michigan Av. & W. Main St.</p> <p>↓ 417(186) ↓ 117(172) ↓ 16(41) ↓ 38(42) ↓ 401(133) ↓ 26(17)</p> <p>↑ 169(275) ↑ 280(233) ↑ 42(20)</p> <p>75(6) 216(194) 77(21)</p>	<p>37 Mt. Vernon Av. & Barton Rd.</p> <p>↓ 165(164) ↓ 496(411) ↓ 68(133) ↓ 90(71) ↓ 352(520) ↓ 395(347)</p> <p>↑ 184(353) ↑ 369(634) ↑ 181(233)</p> <p>245(171) 1019(740) 394(535)</p>	<p>38 Mt. Vernon Av. & Main St.</p> <p>↓ 316(103) ↓ 490(347) ↓ 24(27) ↓ 63(19) ↓ 33(18) ↓ 17(6)</p> <p>↑ 300(163) ↑ 15(23) ↑ 41(63)</p> <p>64(60) 273(680) 1(10)</p>	<p>39 Palm Av. & Barton Rd.</p> <p>↓ 746(799) ↓ 3(1)</p> <p>↑ 666(974) ↑ 109(158)</p> <p>154(79) 1(4)</p>			

LEGEND:

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

NOTE: THE PROPOSED I-215 FREEWAY AND BARTON ROAD INTERCHANGE IMPROVEMENT PROJECT (MODIFIED ALTERNATIVE 7) IS ASSUMED TO BE COMPLETED AND IN USE BY YEAR 2020. THE MODIFIED ALTERNATIVE 7 INCLUDES A ROUNDABOUT AT THE SOUTHBOUND RAMP TO PRESERVE LOCAL ACCESS AT LA CROSSE AVENUE AND DIRECT ACCESS BETWEEN BARTON ROAD AND THE I-215 FREEWAY. THE CONSTRUCTION OF THIS DESIGN ALTERNATIVE WILL ELIMINATE ANALYSIS LOCATION #24 AND #25. AS SUCH, THESE LOCATIONS HAVE NOT BEEN EVALUATED FOR THIS ANALYSIS SCENARIO.



7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

Level of service calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) conditions with existing roadway and intersection geometrics consistent with those described under Section 7.1 *Roadway Improvements*. The intersection analysis results are summarized in Table 7-1, which indicates that the following additional LOS deficiency is anticipated during the AM and PM peak hours for Horizon Year (2040) Without Project traffic conditions, in addition to those previously identified for Opening Year Cumulative (2020) traffic conditions:

ID	Intersection Location
2	Main St. / Columbia Av. – LOS F AM and PM peak hours
17	S. La Cadena Dr. / S. Rancho Av. – LOS F AM and PM peak hours
18	S. La Cadena Dr. / W. Litton Av. – LOS E AM peak hour only
20	S. La Cadena Dr. / S. Iowa Av. – LOS F PM peak hour only
21	S. La Cadena Dr. / W. Maryknoll Dr. – LOS F PM peak hour only
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp – LOS E PM peak hour only
28	I-215 NB Ramps / Barton Rd. – LOS F PM peak hour only
31	Iowa Av. / E. La Cadena Dr. – LOS F PM peak hour only
32	Iowa Av. / Center St – LOS F AM and PM peak hours

Consistent with Table 7-1, a summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions are 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 TIA.

7.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-6, the following additional study area intersection is anticipated to experience unacceptable LOS (i.e., LOS E or worse) with the addition of Project traffic during one or more peak hours, in addition to those previously identified under Horizon Year (2040) Without Project conditions:

ID	Intersection Location
5	Orange St. / W. Center St. – LOS F PM peak hour only

The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TIA. Measures to address long-term deficiencies for Horizon Year traffic conditions are discussed in Section 7.10 *Long-Term Deficiencies and Recommended Improvements*.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control ³	2040 Without Project				2040 With Project			
			Delay ² (secs.)		Level of Service		Delay ² (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	S. Riverside Av. / Main St. / Placentia Ln.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
2	Main St. / Columbia Av.	TS	92.4	107.0	F	F	93.8	108.8	F	F
3	Main St. / Strong St.	TS	61.6	120.0	E	F	64.1	149.7	E	F
4	Orange St. / Pellissier Rd.	CSS	Future Intersection				0.0	0.0	A	A
5	Orange St. / W. Center St.	AWS	15.9	24.7	C	C	34.2	51.0	D	F
6	Orange St. / Columbia Av.	TS	23.2	31.7	C	C	23.8	34.6	C	C
7	Street "C" / Street "A"	CSS	Future Intersection				8.9	9.0	A	A
8	Street "A" / Pellissier Rd.	CSS	Future Intersection				10.3	11.8	B	B
9	Roquet Ranch Rd. / Street "A"	CSS	Future Intersection				9.3	10.1	A	B
10	Roquet Ranch Rd. / Pellissier Rd.	CSS	Future Intersection				11.5	12.8	B	B
11	S. Graymoor Av. / W. Maryknoll Dr.	CSS	8.4	8.4	A	A	8.6	8.6	A	A
12	S. Graymoor Av. / Pellissier Rd.	CSS	Future Intersection				11.9	13.7	B	B
13	S. Rosedale Av. / W. Maryknoll Dr.	CSS	8.9	9.0	A	A	18.1	21.5	C	C
14	Stephens Av. / W. Center St.	TS	165.8	173.2	F	F	177.4	191.8	F	F
15	S. Rancho Av. / Agua Mansa Rd.	TS	19.2	511.0	B	D	22.1	53.2	C	D
16	La Cadena Dr. / W. N. St.	TS	6.6	8.0	A	A	6.8	8.4	A	A
17	S. La Cadena Dr. / S. Rancho Av.	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
18	S. La Cadena Dr. / W. Litton Av.	CSS	35.6	31.3	E	D	40.5	38.1	E	E
19	S. La Cadena Dr. / Barton Rd.	TS	25.5	45.5	C	D	36.1	54.1	D	D
20	S. La Cadena Dr. / S. Iowa Av.	CSS	16.2	>100.0	C	F	64.5	>100.0	F	F
21	S. La Cadena Dr. / W. Maryknoll Dr.	CSS	29.8	>100.0	D	F	>100.0	>100.0	F	F
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp	AWS	22.6	37.7	C	E	51.5	39.4	F	E
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	AWS	63.8	66.9	F	F	64.7	67.8	F	F
24	La Crosse Av. / I-215 SB Off-Ramp	CSS	Intersection Does Not Exist ⁴							
25	La Crosse Av. / Barton Rd.	CSS	Intersection Does Not Exist ⁴							
26	La Crosse Av. / I-215 SB On-Ramp / Barton Rd.	RA	28.0	27.6	D	D	30.6	32.8	D	D
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp	CSS	>100.0	>100.0	F	F	>100.0	>100.0	F	F
28	I-215 NB Ramps / Barton Rd.	TS	40.7	31.5	D	C	37.4	33.5	D	C
29	S. Iowa Av. / I-215 NB Ramps	TS	>200.0	>200.0	F	F	>200.0	>200.0	F	F
30	Iowa Av. / W. Main St.	TS	53.1	47.3	D	D	54.4	50.8	D	D
31	Iowa Av. / E. La Cadena Dr.	CSS	24.8	149.5	C	F	26.0	160.7	D	F
32	Iowa Av. / Center St.	TS	98.3	192.5	F	F	102.9	>200.0	F	F
33	Iowa Av. / W. Citrus St.	TS	10.4	14.5	B	B	11.1	15.8	B	B
34	Iowa Av. / E. Citrus St.	TS	16.4	9.5	B	A	17.0	9.8	B	A
35	Michigan Av. / Barton Rd.	TS	52.0	47.9	D	D	53.8	49.5	D	D
36	Michigan Av. / W. Main St.	TS	177.7	145.6	F	F	190.5	149.4	F	F
37	Mt. Vernon Av. / Barton Rd.	TS	49.7	45.4	D	D	50.4	54.6	D	D
38	Mt. Vernon Av. / Main St.	AWS	63.6	38.8	F	E	63.9	39.0	F	F
39	Palm Av. / Barton Rd.	CSS	15.7	15.3	C	C	16.5	16.2	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.

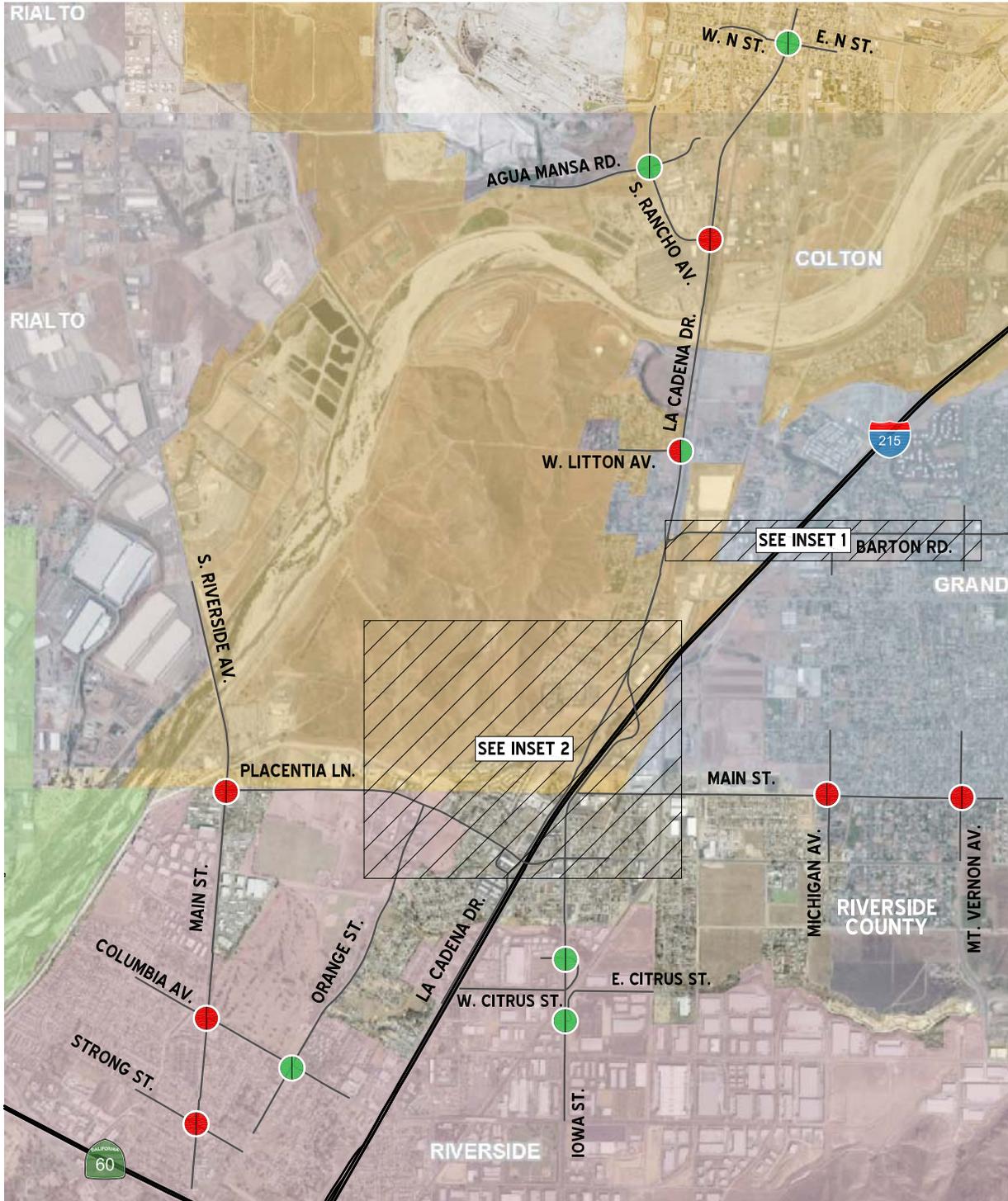
² Per the 2010 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

³ CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; CSS = Improvement; RA = Roundabout

⁴ The proposed I-215 Freeway and Barton Road Interchange Improvement Project (Modified Alternative 7) is assumed to be completed and in use by year 2020. The Modified Alternative 7 includes a roundabout at the southbound ramp to preserve local access at La Crosse Avenue and direct access between Barton Road and the I-215 Freeway. The construction of this design alternative will eliminate analysis locations #24 and #25. As such, these locations have not been evaluated for this analysis scenario.

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

**EXHIBIT 7-5 (1 OF 2): HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS
SUMMARY OF LOS**

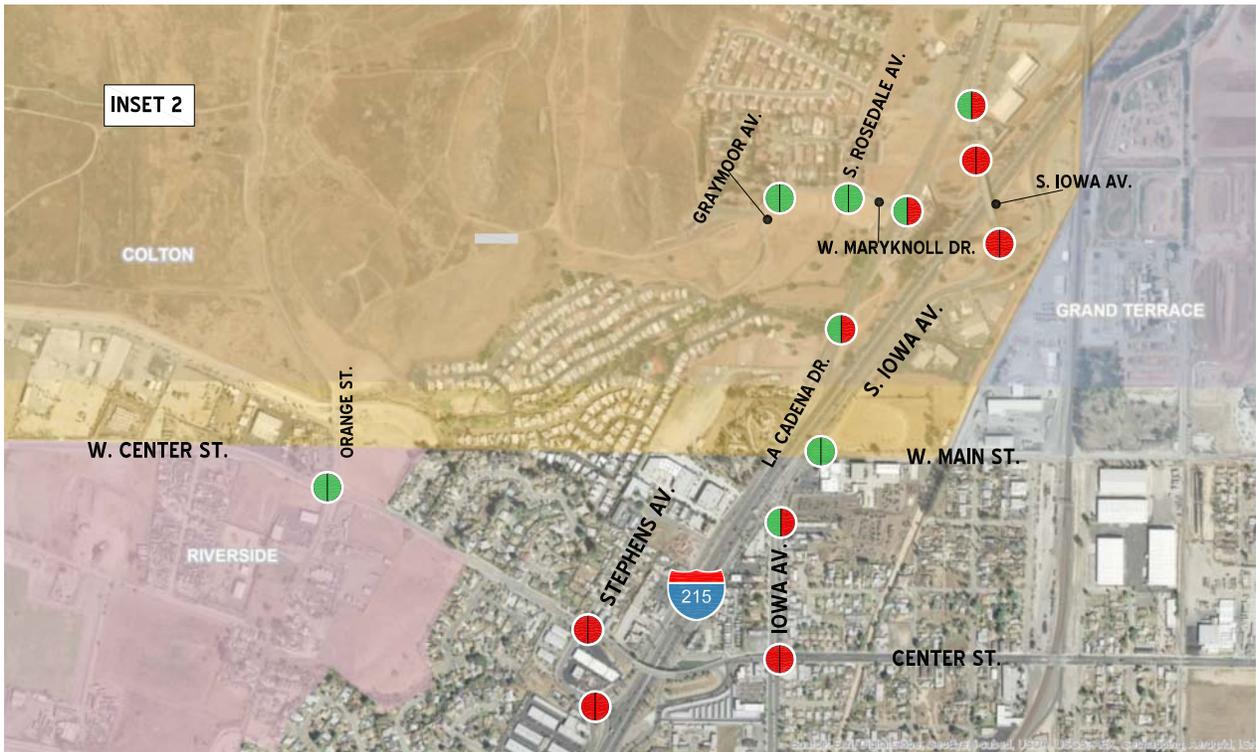


LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS



**EXHIBIT 7-5 (2 OF 2): HORIZON YEAR (2040) WITHOUT PROJECT CONDITIONS
SUMMARY OF LOS**

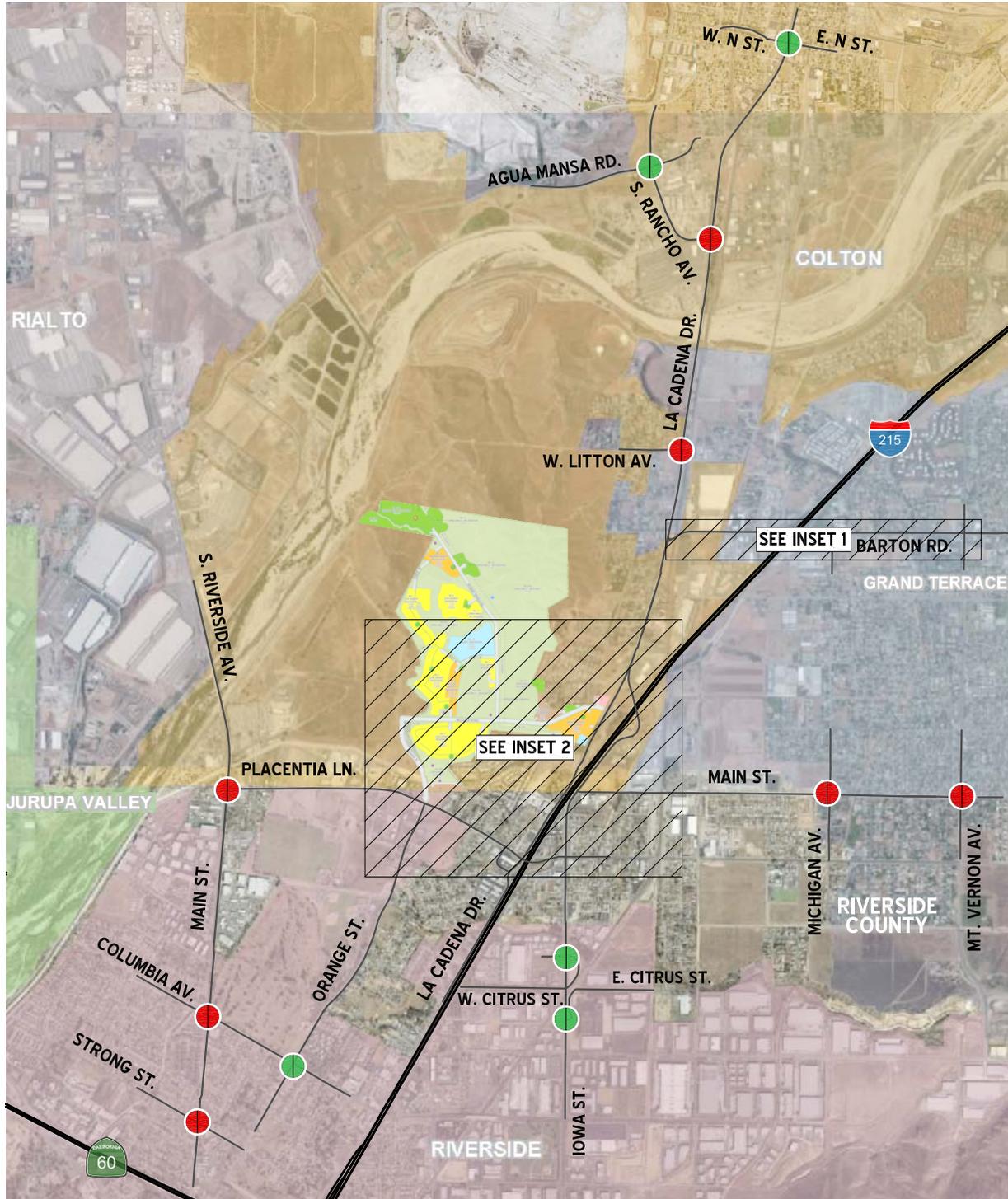


LEGEND:

-  = AM PEAK HOUR ACCEPTABLE LOS
-  = AM PEAK HOUR DEFICIENT LOS
-  = PM PEAK HOUR ACCEPTABLE LOS
-  = PM PEAK HOUR DEFICIENT LOS
-  = NOT AN ANALYSIS LOCATION FOR THIS SCENARIO



**EXHIBIT 7-6 (1 OF 2): HORIZON YEAR (2040) WITH PROJECT CONDITIONS
SUMMARY OF LOS**



LEGEND:

- = AM PEAK HOUR ACCEPTABLE LOS
- = AM PEAK HOUR DEFICIENT LOS
- = PM PEAK HOUR ACCEPTABLE LOS
- = PM PEAK HOUR DEFICIENT LOS



7.5 ROADWAY SEGMENT ANALYSIS

The roadway segment capacities utilized for the purposes of this analysis are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 7-2 provides a summary of the Horizon Year (2040) traffic conditions roadway segment capacity analysis based on the applicable roadway segment capacities, by jurisdiction.

7.5.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

As shown on Table 7-2, the following additional roadway segment capacity deficiencies are anticipated under Horizon Year (2040) Without Project traffic conditions, in addition to those previously identified for Opening Year Cumulative (2020) Without Project traffic conditions:

ID	Roadway Segment Location
3	La Cadena Dr., South of S. Rancho Av. – LOS F
5	La Cadena Dr., between W. Litton Av. and Barton Rd. – LOS E
11	Barton Road, West of La Crosse Av. – LOS E
12	Barton Rd., between La Crosse Av. and I-215 SB Ramps – LOS E
14	Barton Rd., between I-215 NB Ramps and Michigan Av. – LOS E
20	Main St., South of Placentia Ln. – LOS F
21	Main St., North of Columbia Av. – LOS F
22	Main St., Columbia Av. to Strong St. – LOS E
33	S. Iowa Av., between La Cadena Dr. and I-215 SB Off-Ramp – LOS F

7.5.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-2, the addition of Project traffic is anticipated to result in the following additional roadway segment capacity deficiency, in addition to those previously identified for Horizon Year (2040) Without Project traffic conditions:

ID	Roadway Segment Location
10	Barton Road, East of La Cadena Dr. – LOS E

As noted in Section 2.3 *Roadway Segment Capacity Analysis Methodology*, daily roadway capacities are “rule of thumb” estimates for planning purposes and are affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian bicycle traffic. Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes.

Table 7-2

Roadway Volume/Capacity Analysis for Horizon Year (2040) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	2040 NP	V/C ²	LOS ³	2040 WP	V/C ²	LOS ³	Acceptable LOS ³
1	S. Rancho Avenue	Agua Mansa Rd. to La Cadena Dr.	4D	33,000	21,447	0.65	B	21,928	0.66	B	D
2		N St. to S. Rancho Av.	4D	33,000	16,436	0.50	A	17,270	0.52	A	D
3		South of S. Rancho Av.	4D	33,000	35,338	1.07	F	36,995	1.12	F	D
4		North of W. Litton Av.	4D	33,000	24,549	0.74	C	26,206	0.79	C	D
5	La Cadena Drive	Between W. Litton Av. and Barton Rd.	4D	33,000	31,930	0.97	E	33,699	1.02	F	D
6		South of Barton Rd.	5D	41,250	32,203	0.78	C	36,363	0.88	D	D
7		North of S. Iowa Av.	4D	33,000	25,286	0.77	C	29,469	0.89	D	D
8		Between S. Iowa Av. and W. Maryknoll Dr.	4D	33,000	17,680	0.54	A	24,049	0.73	C	D
9		Between W. Maryknoll Dr. and Pellissier Rd.	4D	33,000	19,100	0.58	A	19,916	0.60	B	D
10		East of La Cadena Dr.	2U	18,000	14,157	0.79	C	16,549	0.92	E	D
11		West of La Crosse Av.	2U	18,000	16,668	0.93	E	19,060	1.06	F	D
12		Between La Crosse Av. and I-215 SB Ramps	2D	18,000	16,668	0.93	E	18,615	1.03	F	D
13	Barton Road	Between I-215 SB Ramps and I-215 NB Ramps	2D	18,000	24,241	1.35	F	26,189	1.45	F	D
14		Between I-215 NB Ramps and Michigan Av.	4D	33,000	31,178	0.94	E	32,681	0.99	E	D
15		East of Michigan Av.	4D	33,000	21,673	0.66	B	22,887	0.69	B	D
16		West of Mt. Vernon Av.	4D	33,000	19,174	0.58	A	20,298	0.62	B	D
17		Mt. Vernon Av. to Palm Av.	4D	33,000	20,153	0.61	B	20,809	0.63	B	D
18	Placentia Lane / West Center Street	East of S. Riverside Av. / Main St.	2U	18,000	11,390	0.63	B	12,948	0.72	C	D
19		West of Orange St.	2U	18,000	8,095	0.45	A	9,741	0.54	A	D
20		South of Placentia Ln.	4D	33,000	43,511	1.32	F	44,601	1.35	F	D
21	Main Street	North of Columbia Av.	4D	33,000	38,357	1.16	F	39,269	1.19	F	D
22		Columbia Av. to Strong St.	4D	33,000	32,116	0.97	E	32,838	1.00	E	D
23		South of Pellissier Rd.	2U	12,500	0	0.00	--	2,612	0.21	A	D
24	Orange Street	North of W. Center St.	2U	12,500	554	0.04	A	3,336	0.27	A	D
25		South of W. Center St.	2U	12,500	3,574	0.29	A	4,354	0.35	A	D
26		North of Columbia Av.	2U	12,500	5,952	0.48	A	6,708	0.54	A	D
27		Between Orange St. and Street "A"	4D	33,000	0	0.00	--	2,612	0.08	A	D
28		Between Street "A" and Roquet Ranch Rd.	4D	33,000	0	0.00	--	2,862	0.09	A	D
29	Pellissier Road / Maryknoll Dr.	East of Roquet Ranch Rd.	4D	33,000	0	0.00	--	5,630	0.17	A	D
30		West of Graymoor Av.	4D	33,000	0	0.00	--	5,652	0.17	A	D
31		Between Graymoor Av. and Rosedale Av.	2U	12,500	455	0.04	A	6,219	0.50	A	D
32		Between Rosedale Av. and La Cadena Dr.	2U	12,500	1,307	0.10	A	10,915	0.87	D	D
33		Between La Cadena Dr. and I-215 SB Off-Ramp	2D	18,000	21,572	1.20	F	23,758	1.32	F	D
34	South Iowa Avenue	Between I-215 SB Off-Ramp and I-215 NB Ramps	2U	18,000	21,964	1.22	F	23,672	1.32	F	D
35		South of I-215 NB Ramps	2D	18,000	24,025	1.33	F	24,585	1.37	F	D
36		North of W. Main St.	2U	18,000	25,159	1.40	F	25,719	1.43	F	D
37	West Main Street	East of S. Iowa Av.	2U	18,000	7,879	0.44	A	8,139	0.45	A	D
38		West of Michigan Av.	2D	18,000	11,448	0.64	B	11,684	0.65	B	D

¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

² V/C = Volume-to-capacity ratio

³ LOS = Level of Service



7.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

For Horizon Year (2040) Without Project traffic conditions, the following additional unsignalized study area intersection is anticipated to meet a peak hour volume based traffic signal warrant, in addition to the intersection previously warranted under Existing and E+P traffic conditions (see Appendix 7.3):

ID	Intersection Location
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp

For Horizon Year (2040) With Project traffic conditions, the following unsignalized study area intersection is anticipated to meet a peak hour volume based traffic signal warrant, in addition to the intersection previously warranted under Horizon Year (2040) Without Project traffic conditions (see Appendix 7.4):

ID	Intersection Location
5	Orange St. / W. Center St.

7.7 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Barton Road, Iowa Avenue, and Stephens Avenue interchanges 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-215 Freeway mainline. Queuing analysis findings are presented in Table 7-3 for Horizon Year (2040) traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline.

7.7.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

As shown on Table 7-3, 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 traffic conditions. Worksheets for Horizon Year (2040) Without Project traffic conditions off-ramp queuing analysis are provided in Appendix 7.5.

7.7.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-3, 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 with the addition of Project traffic. Worksheets for Horizon Year (2040) With Project traffic conditions off-ramp queuing analysis are provided in Appendix 7.6.

Table 7-3

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

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet) ³		Acceptable? ¹	
			AM Peak Hour	PM Peak Hour	AM	PM
Horizon Year (2040) Without Project Conditions						
La Crosse Av. / I-215 SB Off-Ramp / Barton Road	SBL/T/R	1,550	116	57	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	223	148	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	101	89	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	242	232	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	128	184	Yes	Yes
Horizon Year (2040) With Project Conditions						
La Crosse Av. / I-215 SB Off-Ramp / Barton Road	SBL/T/R	1,550	122	94	Yes	Yes
I-215 NB Ramps / Barton Road	NBL/R	1,320	188	143	Yes	Yes
La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps	WBL/T/R	545	102	87	Yes	Yes
S. Iowa Av. / S. La Cadena Drive / I-215 SB Off-Ramp	EBL/R	1,000	240	232	Yes	Yes
S. Iowa Av. / I-215 NB Ramps	WBT/R	1,175	142	218	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.

³ Maximum queue length for the approach reported.

7.8 BASIC FREEWAY SEGMENT ANALYSIS

7.8.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

Horizon Year (2040) Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-7. As shown on Table 7-4, all of the I-215 Freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse). Horizon Year (2040) Without Project basic freeway segment analysis worksheets are provided in Appendix 7.7.

7.8.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

Horizon Year (2040) With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-8. As shown on Table 7-4, there are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year (2040) Without Project conditions. Worksheets for Horizon Year (2040) With Project conditions basic freeway segment analysis worksheets are provided in Appendix 7.8.

7.9 FREEWAY MERGE/DIVERGE ANALYSIS

7.9.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

Ramp merge and diverge operations were also evaluated for Horizon Year (2040) Without Project conditions and the results of this analysis are presented in Table 7-5. As shown in Table 7-5, all of the I-215 Freeway ramp merge and diverge areas are anticipated to operate at unacceptable LOS (i.e., LOS E or worse). Horizon Year (2040) Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 7.9.

7.9.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

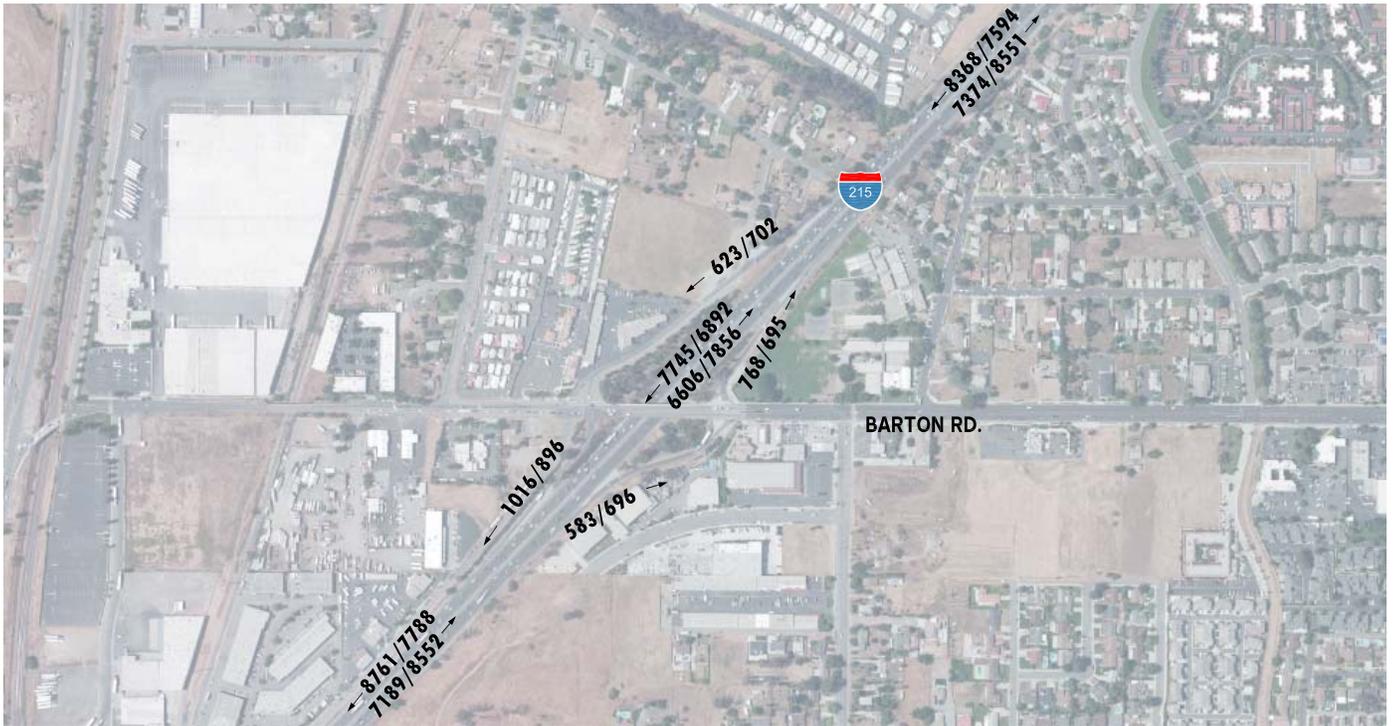
As shown on Table 7-5, there are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under Horizon Year (2040) Without Project conditions. Worksheets for Horizon Year (2040) With Project conditions freeway ramp junction operations analysis worksheets are provided in Appendix 7.10.

7.10 LONG-TERM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

7.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient to reduce each location's peak hour delay and improve the associated LOS grade to acceptable levels. The effectiveness of these recommended improvements to address Horizon Year (2040) LOS deficiencies are presented in Table 7-6. The intersection operations analysis worksheets for Horizon Year (2040) Without and With Project traffic conditions, with improvements, are provided in Appendix 7.11 and Appendix 7.12.

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



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



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



LEGEND:

100/100 = AM/PM PEAK HOUR VOLUMES



Table 7-4

Basic Freeway Segment Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Mainline Segment	Lanes ¹	2040 Without Project				2040 With Project			
				Density ²		LOS ³		Density ²		LOS ³	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Barton Road	3	105.6	67.7	F	F	108.4	71.4	F	F
		Barton Road to La Cadena Drive	3	148.4	74.2	F	F	145.5	76.4	F	F
		South of La Cadena Drive	3	118.7	50.3	F	F	125.5	51.2	F	F
	NB	North of Barton Road	3	62.4	120.4	F	F	65.1	126.9	F	F
		Barton Road to La Cadena Drive	3	57.7	116.8	F	F	59.0	119.9	F	F
		South of La Cadena Drive	3	47.4	81.4	F	F	48.0	85.1	F	F

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 7-5

Freeway Ramp Junction Merge/Diverge 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						
I-215 Freeway	SB	Off-Ramp at Barton Road	3	58.9	F	51.2	F	59.3	F	52.3	F
		Off-Ramp at S. Iowa Avenue	3	62.4	F	52.8	F	62.6	F	53.3	F
		On-Ramp at S. La Cadena Drive	3	56.2	F	41.6	F	56.8	F	42.1	F
	NB	On-Ramp at Barton Road	3	46.5	F	56.3	F	47.3	F	56.9	F
		On-Ramp at S. Iowa Avenue	3	44.5	F	55.8	F	45.0	F	56.1	F
		Off-Ramp at S. Iowa Avenue	3	43.0	E	55.0	F	43.3	F	55.7	F

* **BOLD** = Unacceptable Level of Service

¹ Number of 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 7-6

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			AM	PM	AM	PM
			L	T	R	L	T	R	L	T	R	L	T	R				
1	S. Riverside Av. / Main St. / Placentia Ln. - Without Project - With Project	TS TS	1	2	d	1	2	d	0	1	0	0	1	0	30.5	29.5	C	C
2	Main St. / Columbia Av. - Without Project - With Project	TS TS	1	2	1>	2	2	d	1	1	0	<u>2</u>	1	1	36.9	46.7	D	D
3	Main St. / Strong St. - Without Project - With Project	TS TS	1	2	d	1	2	0	<u>1</u>	<u>1</u>	0	0	1	1	13.7	15.2	B	B
5	Orange St. / W. Center St. - Without Project - With Project	TS	No Improvements Necessary															
14	Stephens Av. / W. Center St. - Without Project - With Project	TS TS	<u>1</u>	1	0	0	1	0	0	1	1	<u>1</u>	<u>2</u>	d	38.6	49.4	D	D
17	S. La Cadena Dr. / S. Rancho Av. - Without Project - With Project	TS TS	1	2	0	0	2	0	1	0	1>	0	0	0	25.4	22.0	C	C
18	S. La Cadena Dr. / W. Litton Av. - Without Project - With Project	TS TS	1	2	0	0	2	0	0	1	0	0	0	0	6.3	5.3	A	A
20	S. La Cadena Dr. / S. Iowa Av. - Without Project - With Project	TS TS	1	<u>2</u>	0	0	<u>2</u>	2>>	1	0	1	0	0	0	9.2	27.7	A	C
21	S. La Cadena Dr. / W. Maryknoll Dr. - Without Project - With Project	TS TS	<u>1</u>	1	0	0	2	1	<u>1</u>	1	0	0	1	0	6.0	4.7	A	A
22	La Cadena Dr. S. / Pellissier Rd. / I-215 SB On-Ramp - Without Project - With Project	TS TS	1	2	0	1	1	0	0	1	0	0	0	0	27.5	32.3	C	C
23	La Cadena Dr. W. / Stephens Av. / I-215 SB Ramps - Without Project - With Project	TS TS	0	1	1	0	1	0	<u>1</u>	1	0	<u>1</u>	1	0	36.8	43.4	D	D
27	S. Iowa Av. / S. La Cadena Dr. / I-215 SB Off-Ramp - Without Project - With Project	TS TS	0	<u>2</u>	0	0	<u>2</u>	0	<u>2</u>	0	1	0	0	0	43.2	47.0	D	D
29	S. Iowa Av. / I-215 NB Ramps - Without Project - With Project	TS TS	0	0	0	1	0	<u>1</u>	<u>2</u>	1	0	0	1	0	41.6	40.0	D	D
31	Iowa Av. / E. La Cadena Dr. - Without Project - With Project	TS TS	1	2	0	0	2	1>>	0	1	0	0	0	0	12.1	20.4	B	C
32	Iowa Av. / Center St. - Without Project ⁴ - With Project ⁴	TS TS	1	2	d	1	2	0	1	2	0	1	1	1	51.3	53.7	D	D
36	Michigan Av. / W. Main St. - Without Project - With Project	TS TS	1	1	0	1	1	<u>1</u>	1	1	1	1	1	0	50.0	35.6	D	D
38	Mt. Vernon Av. / Main St. - Without Project - With Project	TS TS	0	1	1	0	2	0	<u>1</u>	1	0	0	1	0	24.3	12.0	C	B

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 Right Turn Lane; 1 = Improvement

² Per the 2010 Highway Capacity Manual, 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; AWS = All-Way Stop; TS = Traffic Signal

7.10.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT ROADWAY SEGMENTS

Where the ADT-based roadway segment analysis indicates a deficiency (unacceptable LOS), a review of the more detailed peak hour intersection analysis has been undertaken. The more detailed peak hour intersection analysis explicitly accounts for factors that affect roadway capacity. Therefore, roadway segment widening is typically only recommended if the peak hour intersection analysis indicates the need for additional through lanes. Based on the peak hour intersection operations analysis presented on Tables 7-1 and 7-6, roadway widening has been recommended along S. Iowa Avenue between La Cadena Drive and the I-215 Northbound Ramps from the existing 2-lane roadway to a 4-lane roadway (see Table 7-7). Other adjacent intersections are anticipated to operate at acceptable LOS without the need for additional roadway widening, as such, no other roadway widening has been recommended.

7.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

Long-range improvement plans for the I-215 Freeway within the study area includes an additional mixed-flow lane in each direction of travel, for a total of 4 mixed-flow lanes in each direction plus an HOV lane.

As shown on Table 7-8, although there are peak hour operational improvements to the I-215 freeway mainline segments, all of the segments are anticipated to continue to operate at an unacceptable LOS with the improvements discussed above (i.e., LOS E or worse) under Horizon Year (2040) traffic conditions during one or more peak hours. Worksheets for Horizon Year (2040) Without and With Project traffic conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.13 and Appendix 7.14.

As shown on Table 7-9, although there are peak hour operational improvements to the I-215 freeway ramp junctions, all of the ramp junctions are anticipated to continue to operate at an unacceptable LOS with the improvements discussed above (i.e., LOS E or worse) under Horizon Year (2040) traffic conditions during one or more peak hours. Horizon Year (2040) Without and With Project traffic conditions freeway ramp junction level of service analysis worksheets, with improvements, are provided in Appendix 7.15 and 7.16.

At this time, Caltrans has no fee programs or other improvement programs in place to address the deficiencies caused by development projects in the City of Colton (or other neighboring jurisdictions) on SHS roadway segments. As such, no additional improvements have been recommended to address the Horizon Year (2040) ramp junction deficiency on the SHS, because there is no feasible mitigation available.

Table 7-7

Roadway Volume/Capacity Analysis Horizon Year (2040) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity ¹	2035 NP	V/C	LOS	2035 WP	V/C	LOS	Acceptable LOS
33	South Iowa Avenue	Between La Cadena Dr. and I-215 SB Off-Ramp	<u>4U</u>	36,000	21,572	0.60	A	23,758	0.66	B	D
34		Between I-215 SB Off-Ramp and I-215 NB Ramps	<u>4U</u>	36,000	21,000	0.58	A	23,028	0.64	B	D

2U = Improvement

¹ These maximum roadway capacities have been extracted from the City of Colton General Plan Circulation Element, City of Grand Terrace General Plan Circulation Element, City of Riverside General Plan Circulation Element, County of Riverside General Plan Circulation Element, and County of San Bernardino Article III Designation of Streets. These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

Table 7-8

Basic Freeway Segment Analysis for Horizon Year (2040) Conditions With Improvements

Freeway	Direction	Mainline Segment	Lanes ¹	2040 Without Project				2040 With Project			
				Density ²		LOS ³		Density ²		LOS ³	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215	SB	North of Barton Road	<u>4</u>	41.4	34.2	E	D	41.8	35.1	E	E
		Barton Road to La Cadena Drive	<u>4</u>	46.2	35.7	F	E	46.0	36.2	F	E
		South of La Cadena Drive	<u>4</u>	43.1	29.2	E	D	44.0	29.5	E	D
	NB	North of Barton Road	<u>4</u>	32.8	43.3	D	E	33.6	44.1	D	E
		Barton Road to La Cadena Drive	<u>4</u>	31.5	42.9	D	E	31.9	43.3	D	E
		South of La Cadena Drive	<u>4</u>	28.2	37.3	D	E	28.4	38.0	D	E

¹ = Improvement

¹ Number of lanes are in the specified direction and assumes the addition of a mixed flow lane for a total of 4 mixed flow lanes in each direction.

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

³ LOS = Level of Service

Table 7-9

Freeway Ramp Junction Merge/Diverge Analysis for Horizon Year (2040) Conditions With Improvements

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						
I-215 Freeway	SB	Off-Ramp at Barton Road	<u>4</u>	40.8	E	37.7	E	41.0	E	38.5	E
		Off-Ramp at S. Iowa Avenue	<u>4</u>	42.4	F	41.3	E	42.6	F	41.9	E
		On-Ramp at S. La Cadena Drive	<u>4</u>	35.8	E	29.4	D	36.4	E	29.8	D
	NB	On-Ramp at Barton Road	<u>4</u>	33.4	D	37.0	E	34.0	D	37.4	E
		On-Ramp at S. Iowa Avenue	<u>4</u>	32.6	D	38.4	E	33.1	D	38.7	E
		Off-Ramp at S. Iowa Avenue	<u>4</u>	32.1	D	38.4	E	32.4	D	39.1	E

1 = Improvement

¹ Number of lanes are in the specified direction and assumes the addition of a mixed flow lane for a total of 4 mixed flow lanes in each direction.

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

³ LOS = Level of Service

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