Colony Commerce Center East Specific Plan

TRAFFIC IMPACT ANALYSIS

CITY OF ONTARIO

PREPARED BY:

Aric Evatt, PTP
aevatt@urbanxroads.com
(949) 660-1994 x204

Charlene So, PE
cso@urbanxroads.com
(949) 660-1994 x222

Brandon Alvarado
balvarado@urbanxroads.com
(949) 660-1994 x234

FEBRUARY 1, 2018

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CCI	Construction Cost Index
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
FHWA	Federal Highway Administration
HCM	Highway Capacity Manual
ITE	Institute of Transportation Engineers
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
PA	Planning Area
PeMS	Performance Measurement System
NP	No Project (or Without Project)
PCE	Passenger Car Equivalents
PHF	Peak Hour Factor
Project	Colony Commerce Center East Specific Plan
RivTAM	Riverside Transportation Analysis Model
RTA	Riverside Transport Authority
RTP	Regional Transportation Plan
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
sf	Square Feet
SHS	State Highway System
SR	State Route
TIA	Traffic Impact Analysis
WP	With Project

This Page Intentionally Left Blank

1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Colony Commerce Center East Specific Plan ("Project"), which is located on the southwest corner of Archibald Avenue and Merrill Avenue in the City of Ontario, as shown on Exhibit 1-1.

The purpose of this TIA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and to recommend improvements to achieve acceptable circulation system operational conditions. As directed by City of Ontario staff, this traffic study has been prepared in accordance with the San Bernardino County Transportation Authority (SBCTA) 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* (December 2002), and consultation with City staff during the scoping process. (1) (2) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

1.1 PROJECT OVERVIEW

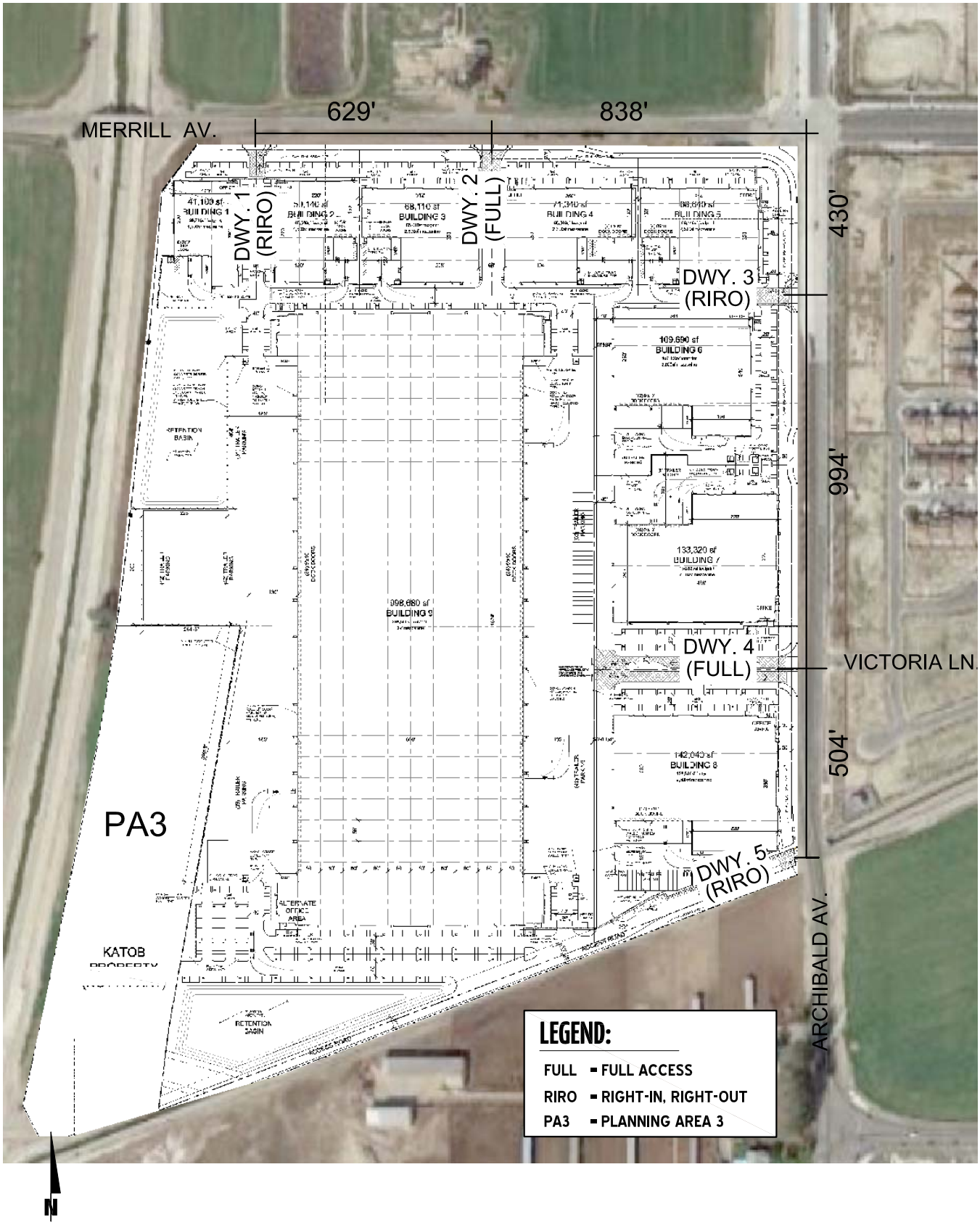
Exhibit 1-1 illustrates the preliminary Project site plan. The proposed Project would develop and operate the Colony Commerce East Specific Plan. The Specific Plan contains three Planning Areas. Planning Area (PA) 1 and PA2 of the Specific Plan is anticipated to be operational by 2019. The remaining PA3 is proposed to be developed with up to 231,195 square feet (sf) of industrial use; however, the timeline for development is unknown, and dependent upon economic conditions and full occupancy of PA1 and PA2. However, this analysis assumes that PA-3 would be developed and operational by 2040.

As indicated on Exhibit 1-1, the total development of PA1 and PA2 is proposed to consist of up to 175,330-sf of manufacturing use (25 percent of the square footage for Buildings 1 through 8), 525,991-sf of warehousing use (75 percent of the square footage for Buildings 1 through 8), and 998,680-sf high-cube warehouse/distribution center use (Building 9). Similarly, PA3 would develop consist of up to 57,799-sf of manufacturing use (25 percent of the square footage), 173,396-sf of warehousing use (75 percent of the square footage).

Regional access to the Project is provided by the State Route 71 (SR-71), State Route 60 (SR-60) and Interstate 15 (I-15) freeways. Vehicular and truck traffic access will be provided via the following driveways:

- Driveway 1 / Merrill Avenue – Right-in/right-out driveway providing access to both passenger cars and trucks for Buildings 1, 2, and 9
- Driveway 2 / Merrill Avenue – Full access driveway providing access to both passenger cars and trucks for Buildings 3, 4, 5, 6, and 9
- Archibald Avenue / Driveway 3 – Right-in/right-out driveway providing access to passenger cars and trucks for Buildings 5, 6, and 9

EXHIBIT 1-1: PRELIMINARY SITE PLAN



10522 - siteplan.dwg

- Archibald Avenue / Driveway 4 – Full access driveway providing access to both passenger cars and trucks for Buildings 6, 7, 8, and 9
- Archibald Avenue / Driveway 5 – Right-in/right-out driveway providing access to passenger cars and trucks for Buildings 8 and 9

Trips generated by the Project's proposed land uses have been estimated based on trip generation rates collected by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition, 2017. (3) The proposed Project is anticipated to generate a net total of 4,109 passenger car equivalent (PCE) trip-ends per day, 371 PCE AM peak hour trips and 424 PCE PM peak hour trips for Opening Year Cumulative traffic conditions. The proposed Project is anticipated to generate a net total of 4,782 PCE trip-ends per day, 454 PCE AM peak hour trips and 514 PCE PM peak hour trips with the addition of PA3 for Horizon Year (2040) traffic conditions. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.2 ANALYSIS SCENARIOS

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

- Existing (2017)
- Existing plus Project (E+P)
- Opening Year Cumulative (2019) Without Project
- Opening Year Cumulative (2019) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.2.1 EXISTING (2017) CONDITIONS

Information for Existing (2017) 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) analysis determines circulation system deficiencies that would occur on the existing roadway system in the scenario of the Project being placed upon Existing conditions. The E+P analysis is intended to identify the project-specific traffic impacts associated solely with the development of the proposed Project based on a comparison of the E+P traffic conditions to Existing (2017) conditions.

1.2.3 OPENING YEAR CUMULATIVE CONDITIONS

The Opening Year Cumulative traffic conditions analyses determine the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient

growth factor from Existing conditions of 2.0% (for 2019 conditions) are included for Opening Year Cumulative traffic conditions. This comprehensive list was compiled from information provided by the City of Ontario and other near-by agencies.

1.2.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) modified to represent buildout of the City of Ontario. Forecasts for the proposed Project include the development of PA1, PA2, and PA3 under Horizon Year (2040) With Project traffic conditions. 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 Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the City of Ontario (lead agency). It should be noted that the City of Ontario 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 Ontario's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The Agreement approved by the City is included in Appendix 1.1.

1.3.1 INTERSECTIONS

The following 37 study area intersections shown on Exhibit 1-2 and listed in Table 1-1 were selected for this TIA based on consultation with City of Ontario staff. The "50 peak hour trip" criterion utilized by the City of Ontario 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). The "50 peak hour trip" criterion is also utilized by the County of Riverside, including the City of Eastvale. Other analysis intersections, within the adjacent cities were not selected for evaluation as the Project is anticipated to contribute less than 50 peak hour trips.

The Project is anticipated to contribute less than 50 peak hour trips to several study area intersections, however, all study area intersections identified in the approved scoping agreement with City of Ontario staff has been evaluated for the purposes of this study.

EXHIBIT 1-2: LOCATION MAP

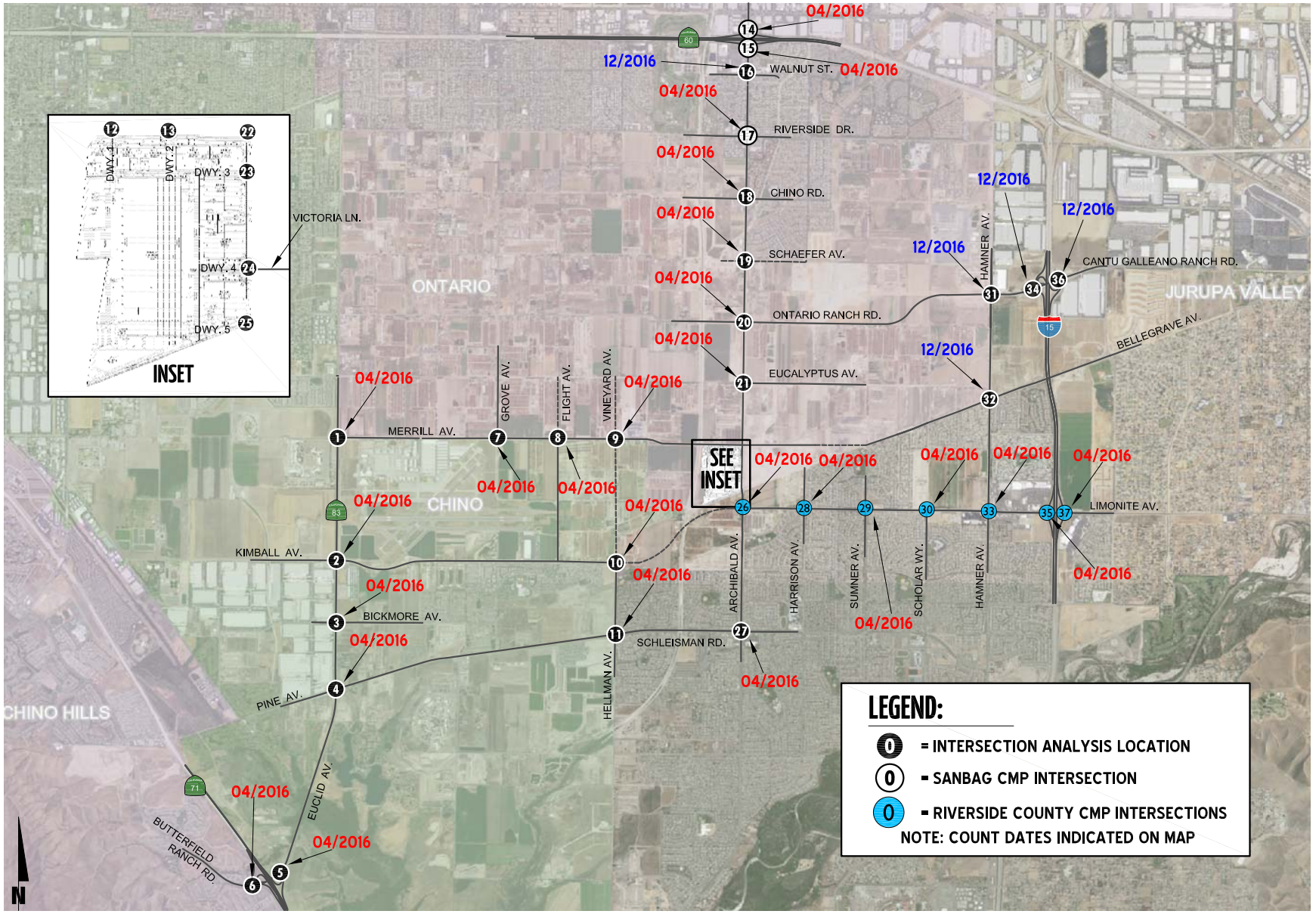


TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Euclid Av. (SR-83) / Merrill Av.	Caltrans/Chino/Ontario	No
2	Euclid Av. (SR-83) / Kimball Av.	Caltrans/Chino	No
3	Euclid Av. (SR-83) / Bickmore Av.	Caltrans/Chino	No
4	Euclid Av. (SR-83) / Pine Av.	Caltrans/Chino	No
5	SR-71 NB Ramps / Euclid Av. (SR-83)	Caltrans/Chino	No
6	SR-71 SB Ramps / Euclid Av. (SR-83)	Caltrans/Chino Hills	No
7	Grove Av. / Merrill Av.	Chino/Ontario	No
8	Flight Av. / Merrill Av.	Chino/Ontario	No
9	Hellman Av. / Merrill Av.	Chino/Ontario	No
10	Hellman Av. / Kimball Av.	Chino/Eastvale	No
11	Hellman Av. / Pine Av.	Chino/Eastvale	No
12	Driveway 1 / Merrill Av. – Future Intersection	Ontario	No
13	Driveway 2 / Merrill Av. – Future Intersection	Ontario	No
14	Archibald Av. / SR-60 WB Ramps	Caltrans/Ontario	Yes
15	Archibald Av. / SR-60 EB Ramps	Caltrans/Ontario	Yes
16	Archibald Av. / Walnut Av.	Ontario	No
17	Archibald Av. / Riverside Dr.	Ontario	Yes
18	Archibald Av. / Chino Av.	Ontario	No
19	Archibald Av. / Schaefer Av.	Ontario	No
20	Archibald Av. / Ontario Ranch Rd.	Ontario	No
21	Archibald Av. / Eucalyptus Av.	Ontario	No
22	Archibald Av. / Merrill Av.	Ontario	No
23	Archibald Av. / Driveway 3 – Future Intersection	Ontario	No
24	Archibald Av. / Driveway 4 – Future Intersection	Ontario	No
25	Archibald Av. / Driveway 5 – Future Intersection	Ontario	No
26	Archibald Av. / Limonite Av.	Eastvale	Yes
27	Archibald Av. / Schleisman Rd.	Eastvale	No
28	Harrison Av. / Limonite Av.	Eastvale	Yes
29	Sumner Av. / Limonite Av.	Eastvale	Yes
30	Scholar Way / Limonite Av.	Eastvale	Yes
31	Hamner Av. / Ontario Ranch Rd.	Ontario/Eastvale	No
32	Hamner Av. / Bellegrave Av.	Ontario/Eastvale	No
33	Hamner Av. / Limonite Av.	Eastvale	Yes
34	I-15 SB Ramps / Cantu Galleano Ranch Rd.	Caltrans/Eastvale	No
35	I-15 SB Ramps / Limonite Av.	Caltrans/Eastvale	Yes
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.	Caltrans/Jurupa Valley	No
37	I-15 NB Ramps / Limonite Av.	Caltrans/Jurupa Valley	Yes

1.3.2 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 25 or more one-way peak hour trips (see Table 1-2):

TABLE 1-2: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS

ID	Freeway Mainline Segments
1	SR-71 Freeway – Southbound, South of Euclid Av. (SR-83)
2	SR-71 Freeway – Northbound, South of Euclid Av. (SR-83)
3	SR-60 Freeway – Westbound, West of Archibald Av.
4	SR-60 Freeway – Westbound, East of Archibald Av.
5	SR-60 Freeway – Eastbound, West of Archibald Av.
6	SR-60 Freeway – Eastbound, East of Archibald Av.
7	I-15 Freeway – Southbound, North of Cantu Galleano Ranch Rd.
8	I-15 Freeway – Southbound, Cantu Galleano Ranch Rd. to Limonite Av.
9	I-15 Freeway – Southbound, South of Limonite Av.
10	I-15 Freeway – Northbound, North of Cantu Galleano Ranch Rd.
11	I-15 Freeway – Northbound, Cantu Galleano Ranch Rd. to Limonite Av.
12	I-15 Freeway – Northbound, South of Limonite Av.

1.3.3 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 1-3, where the Project is anticipated to contribute 25 or more one-way peak hour trips:

TABLE 1-3: FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS LOCATIONS

ID	Freeway Merge/Diverge Ramp Junctions
1	SR-71 Freeway – Southbound, Loop On-Ramp at Euclid Av. (SR-83) (Upstream) (Merge)
2	SR-71 Freeway – Southbound, Loop On-Ramp at Euclid Av. (SR-83) (Downstream) (Merge)
3	SR-71 Freeway – Northbound, Off-Ramp at Euclid Av. (SR-83) (Diverge)
4	SR-60 Freeway – Westbound, On-Ramp at Archibald Av. (Merge)
5	SR-60 Freeway – Westbound, Off-Ramp at Archibald Av. (Diverge)
6	SR-60 Freeway – Eastbound, Off-Ramp at Archibald Av. (Diverge)
7	SR-60 Freeway – Eastbound, On-Ramp at Archibald Av. (Merge)
8	I-15 Freeway – Southbound, Off-Ramp at Cantu Galleano Ranch Rd. (Diverge)
9	I-15 Freeway – Southbound, On-Ramp at Limonite Av. (Merge)
10	I-15 Freeway – Northbound, On-Ramp at Cantu Galleano Ranch Rd. (Merge)
11	I-15 Freeway – Northbound, Off-Ramp at Limonite Av. (Diverge)

1.4 PROJECT IMPACTS AND MITIGATION MEASURES

This section provides a summary of recommended mitigation measures necessary to address Project impacts for E+P traffic conditions. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *E+P Traffic Analysis* includes the detailed analysis. The recommended mitigation measures necessary to reduce Project impacts to less than significant are discussed in Section 1.4.2. The construction of facilities by the Project applicant would be eligible for DIF credit and reimbursement if the construction exceeds the Project's fair share. The City shall review the proposed mitigation measures to determine if the Project shall construct certain improvements, including traffic signals or contribute fair share.

1.4.1 PROJECT IMPACTS

Hellman Avenue / Kimball Avenue (#10) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. However, the Project is anticipated to contribute less than 50 peak hour trips (City of Chino's significance criteria) and the delay is anticipated to increase by less than 5.0 seconds (City of Eastvale's significance criteria). As such, the impact is considered less than significant.

Impact 1.1 – Archibald Avenue / Limonite Avenue (#26) – Although this intersection was found to operate at an unacceptable LOS (LOS E) during the PM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. As such, the impact is considered cumulatively significant (Cumulative Impact 1.1).

Impact 2.1 – Hamner Avenue / Ontario Ranch Road (#31) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the AM and PM peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during

both peak hours with the addition of Project traffic. As such, the impact is considered cumulatively significant (Cumulative Impact 2.1).

1.4.2 MITIGATION MEASURES

Mitigation Measure 1.1 – Archibald Avenue / Limonite Avenue (#26) – The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Construct a 2nd southbound left turn lane. The Project should contribute their fair share towards the implementation of this improvement to reduce the Project's cumulative impact to less than significant.

Mitigation Measure 2.1 – Hamner Avenue / Ontario Ranch Road (#31) – It should be noted that the intersection of Hamner Avenue and Ontario Ranch Road is currently under construction to widen Hamner Avenue between Ontario Ranch Road/Cantu Galleano Ranch Road and Bellegrave Avenue. It is anticipated that once these improvements are completed (mid to late 2017), the intersection would operate at acceptable LOS during the peak hours and the Project's cumulative impact at the intersection would be less than significant.

1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the City of Ontario are funded through a combination of direct project mitigation, development impact fee programs or fair share contributions, such as the City of Ontario Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

Table 1-4 lists the incremental intersection improvements that are required for each analysis scenario from Existing and Horizon Year (2040) traffic conditions to alleviate circulation system deficiencies. Similarly, Table 1-5 lists the incremental roadway segment improvements. The regional and local transportation impact fee programs have each been reviewed and compared to the recommended improvements for each impacted facility. Recommended improvements already identified and included in the City of Ontario DIF are clearly denoted. If an impacted facility was found to require improvements beyond those already identified within the fee program, the Project would be required to contribute the associated intersection or roadway fair-share percentage toward the costs of the recommended improvements. The fair-share calculations, presented on Table 1-4, indicate that the Project contributes 0.9% to 18.9% of new vehicle trips to these intersections. The construction of facilities by the Project Applicant would be eligible for DIF credit and reimbursement if the construction exceeds the Project's fair share, as identified in Table 1-4.

This Page Intentionally Left Blank

Table 1-4

Summary of Improvements and Rough Order of Magnitude Costs for Intersections

#	Intersection Location	Jurisdiction	Existing (2017)	E+P (Project Buildout)	2019 Without/With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Total Cost[2,3,4]	Fair Share %[1]	Fair Share Cost[5]	Significant Impact?[13]
1	Euclid Av. (SR-83) / Merrill Av.	Caltrans, Chino, Ontario	None	None	3rd NB through lane	Same	Yes	ST-30	$267,120	2.437%	$6,509	Yes
					2nd SB left turn lane	Same	No		$74,200		$1,808	
					3rd SB through lane	Same	No		$267,120		$6,509	
					2nd WB left turn lane	Same	Yes		$74,200		$1,808	
					WB right turn lane	Same	No		$267,120		$6,509	
					Modify traffic signal to implement overlap phasing on the WB right turn lane	Same	No		$111,300		$2,712	
								Total	**$1,061,060**		**$25,857**	
2	Euclid Av. (SR-83) / Kimball Av.	Caltrans, Chino	None	None	None	3rd NB through lane	Yes	ST-30	$267,120	2.747%	$7,337	Yes
						2nd SB left turn lane[7]	No		$74,200		$2,038	
						3rd SB through lane	Yes	ST-30	$267,120		$7,337	
						SB right turn lane[7]	No		$74,200		$2,038	
						2nd EB left turn lane[7]	No		$74,200		$2,038	
						WB right turn lane	No		$74,200		$2,038	
						Modify traffic signal to implement overlap phasing on the SB and WB right turn lanes[7]	No		$111,300		$3,057	
						2nd WB left turn lane	No		$74,200		$2,038	
								Total	**$1,016,540**		**$27,921**	
4	Euclid Av. (SR-83) / Pine Av.	Caltrans, Chino	None	None	None	3rd NB through lane	Yes	ST-30	$267,120	2.341%	$6,253	Yes
						3rd SB through lane	Yes	ST-30	$267,120		$6,253	
						NB free-right turn lane	No		$111,300		$2,605	
						2nd SB left turn lane	No		$74,200		$1,737	
						SB right turn lane	No		$74,200		$1,737	
						2nd EB through lane	No		$267,120		$6,253	
						2nd WB through lane	No		$267,120		$6,253	
						WB channelized right turn lane	No		$96,460		$2,258	
								Total	**$1,424,640**		**$33,348**	
7	Grove Av. / Merrill Av.	Chino, Ontario	None	None	EB left turn lane	Same	Yes		$74,200	6.346%	$4,709	Yes
					2nd EB through lane	Same	Yes		$267,120		$16,952	
					2nd WB through lane	Same	Yes		$267,120		$16,952	
						Install a traffic signal	Yes		$250,000		$15,865	
									$858,440		**$54,478**	

Table 1-4

Summary of Improvements and Rough Order of Magnitude Costs for Intersections

#	Intersection Location	Jurisdiction	Existing (2017)	E+P (Project Buildout)	2019 Without/With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Total Cost[2,3,4]	Fair Share %[1]	Fair Share Cost[5]	Significant Impact?[13]
8	Flight Av. / Merrill Av.	Chino, Ontario	None	None	Install a traffic signal	Same	Yes		$250,000	6.337%	$15,842	Yes
					Restripe to provide a NB left turn lane within the painted median	Same	No		$74,200		$4,702	
					2nd EB through lane	Same	No		$267,120		$16,927	
					2nd WB through lane	Same	Yes		$267,120		$16,927	
						SB left turn lane	Yes		$74,200		$4,702	
						SB shared through-right turn lane	Yes		$267,120		$16,927	
						EB left turn lane	Yes		$74,200		$4,702	
						Modify traffic signal to implement overlap phasing on the EB right turn lane	No		$111,300		$7,053	
									$1,385,260		**$87,781**	
9	Vineyard Av./Hellman Av. / Merrill Av.	Chino, Ontario	None	None	Install a traffic signal	Same	Yes		$250,000	6.003%	$15,007	Yes
					NB left turn lane	Same	No		$74,200		$4,454	
					NB right turn lane	Same	No		$267,120		$16,034	
					2nd EB through lane	Same	No		$267,120		$16,034	
					EB right turn lane	Same	No		$74,200		$4,454	
					WB left turn lane	Same	Yes		$74,200		$4,454	
					2nd WB through lane	Same	Yes		$267,120		$16,034	
						2nd NB left turn lane	No		$74,200		$4,454	
						NB through lane	No		$267,120		$16,034	
						SB left turn lane	Yes		$74,200		$4,454	
						SB shared through-right turn lane	Yes		$267,120		$16,034	
						EB left turn lane	No		$74,200		$4,454	
						WB right turn lane	No		$74,200		$4,454	
						Modify traffic signal to implement overlap phasing on the NB right turn lane	No		$111,300		$6,681	
								Total	**$2,216,300**		**$133,036**	
14	Archibald Av. / SR-60 WB Ramps	Caltrans, Ontario	None	None	2nd NB left turn lane	Same	Yes	ST-106	$74,200	4.462%	$3,311	No
					WB left turn lane	Same	Yes	ST-106	$519,400		$23,176	
								Total	**$593,600**		**$26,487**	
15	Archibald Av. / SR-60 EB Ramps	Caltrans, Ontario	None	None	None	Restripe to provide 3 NB through lanes and a NB right turn lane	Yes	ST-106	$37,100	8.286%	$3,074	No
						2nd SB left turn lane	Yes	ST-106	$74,200		$6,148	
								Total	**$111,300**		**$9,222**	
17	Archibald Av. / Riverside Dr.	Ontario	None	None	2nd NB left turn lane	Same	Yes		$74,200	8.430%	$6,255	Yes
					2nd SB left turn lane	Same	Yes		$74,200		$6,255	
					EB right turn lane	Same	No		$74,200		$6,255	
					Modify traffic signal to implement overlap phasing on the WB right turn lane	Same	No		$111,300		$9,383	
								Total	**$333,900**		**$28,148**	

Table 1-4

Summary of Improvements and Rough Order of Magnitude Costs for Intersections

#	Intersection Location	Jurisdiction	Existing (2017)	E+P (Project Buildout)	2019 Without/With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Total Cost[2,3,4]	Fair Share %[1]	Fair Share Cost[5]	Significant Impact?[13]
18	Archibald Av. / Chino Av.	Ontario	None	None	None	3rd SB through lane	Yes		$267,120	11.599%	$30,983	Yes
								Total	**$267,120**		**$30,983**	
19	Archibald Av. / Schaefer Av.	Ontario	None	None	Install a traffic signal	Same	Yes		$250,000	6.674%	$16,686	
					NB left turn lane	Same	Yes		$74,200		$4,952	
					Shared EB left-through-right turn lane	Same	Yes		$267,120		$17,829	Yes
					Shared WB left-through-right turn lane	Same	Yes		$267,120		$17,829	
								Total	**$858,440**		**$57,296**	
20	Archibald Av. / Ontario Ranch Rd.	Ontario	None	None	2nd NB left turn lane	Same	Yes		$74,200	8.479%	$6,291	
					Modify traffic signal to implement overlap phasing on the NB right turn lane	Same	No		$111,300		$9,437	
						3rd NB through lane	Yes		$267,120		$22,649	Yes
						3rd SB through lane	Yes		$267,120		$22,649	
						3rd EB through lane	Yes		$267,120		$22,649	
						2nd and 3rd WB through lane	Yes		$534,240		$45,298	
								Total	**$1,521,100**		**$128,973**	
21	Archibald Av. / Eucalyptus Av.	Ontario	None	None	None	NB left turn lane	Yes		$74,200	13.50%	$10,016	
						3rd NB through lane	Yes		$267,120		$36,059	
						3rd SB through lane	Yes		$267,120		$36,059	
						EB left turn lane	Yes		$74,200		$10,016	Yes
						EB shared through-right turn lane	Yes		$267,120		$36,059	
						WB left turn lane	Yes		$74,200		$10,016	
								Total	**$1,023,960**		**$138,226**	
22	Archibald Av. / Merrill Av.	Ontario	None	None	2nd EB left turn lane[14]	Same	Yes		--	11.859%	--	
					2nd EB through lane[14]	Same	Yes		--		--	
					EB free-right turn lane[14]	Same	No		--		--	
					2nd NB left turn lane	Same	Yes		$74,200		$8,799	
					3rd NB through lane	Same	Yes		$267,120		$31,678	
					3rd SB through lane	Same	Yes		$267,120		$31,678	
					SB right turn lane	Same	No		$74,200		$8,799	Yes
					2nd WB through lane	Same	Yes		$267,120		$31,678	
					Modify traffic signal to implement overlap phasing on the SB right turn lane	Same	No		$111,300		$13,199	
						2nd WB left turn lane	Yes		$74,200		$8,799	
								Total	**$1,135,260**		**$134,632**	

Table 1-4

Summary of Improvements and Rough Order of Magnitude Costs for Intersections

#	Intersection Location	Jurisdiction	Existing (2017)	E+P (Project Buildout)	2019 Without/With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Total Cost[2,3,4]	Fair Share %[1]	Fair Share Cost[5]	Significant Impact?[13]
26	Archibald Av. / Limonite Av.	Eastvale	2nd SB left turn lane	Same	Same	Same	No		$74,200	4.986%	$3,700	
					2nd NB through lane	Same	No		$267,120		$13,320	
					2nd SB through lane	Same	No		$267,120		$13,320	
					2nd WB left turn lane	Same	No		$74,200		$3,700	
					2nd WB right turn lane	Same	No		$74,200		$3,700	
						NB left turn lane	No		$74,200		$3,700	
						3rd NB through lane	No		$267,120		$13,320	Yes
						3rd SB through lane	No		$267,120		$13,320	
						SB right turn lane	No		$74,200		$3,700	
						2 EB left turn lanes	No		$148,400		$7,400	
						2 EB through lanes	No		$534,240		$26,639	
						2 WB through lanes	No		$534,240		$26,639	
								Total	**$2,656,360**		**$132,455**	
28	Harrison Av. / Limonite Av.	Eastvale	None	None	3rd WB through lane	Same	No		$267,120	5.527%	$14,764	Yes
								Total	**$267,120**		**$14,764**	
29	Sumner Av. / Limonite Av.	Eastvale	None	None	None	2nd NB left turn lane	No		$74,200	3.295%	$2,445	Yes
								Total	**$74,200**		**$2,445**	
35	I-15 SB Ramps / Limonite Av.	Caltrans, Eastvale	None	None	3rd EB and WB through lanes	Interchange Redesign[8]	No		$1,038,800	2.900%	$30,127	No
								Total	**$1,038,800**		**$30,127**	
36	I-15 NB Ramps / Cantu Galleano Rd.	Caltrans, Eastvale	None	None	None	Modify the traffic signal to implement a 120-second cycle length	No		$111,300	4.283%	$4,767	Yes
								Total	**$111,300**		**$4,767**	
Total Costs for Horizon Year (2040) Improvements									**$17,954,700**		**$1,100,946**	
Total Project Fair Share Contribution to the City of Ontario (non-DIF/other)[9]									**$60,749**			
Total Project Fair Share Contribution to the City of Chino[10]									**$193,408**			
Total Project Fair Share Contribution to the City of Eastvale[11]									**$164,728**			
Total Project Fair Share Contribution to Caltrans[12]									**$35,922**			

[1] Improvements included in City of Ontario DIF program for local, regional and specific plan components.

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

[3] Appendix "G" costs escalated by a factor of 1.484 except Traffic Signals to reflect current costs.

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

[5] Rough order of magnitude cost estimate.

[6] Improvements are to be constructed by other projects since these improvements are needed for site access.

[7] Improvements are currently under construction.

[8] Interchange redesign includes widening the bridge over the I-15 Freeway to three lanes in each direction with loop on-ramps, eliminating the left turns onto the on-ramps.

[9] The project fair share contribution for those improvements already included in a pre-existing fee program has been provided for comparison purposes. Project would not pay this fair share amount, but would instead contribute their fair share towards these improvements through their payment of fees.

[9] Total project fair share contribution consists of the improvements which are not already included in the City-wide DIF for those intersections wholly or partially within the City of Ontario.

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

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

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

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

[13] If improvements are not fully covered by an applicable pre-existing fee program, then the intersection has been identified to have a significant impact even after mitigation measures are implements. However, if the improvements in a pre-existing fee program are fully funded by the pre-existing fee program, then the intersection is found to have no significant impact after the implementation of the mitigation measures.

[14] Fair share not applicable as these improvements would be constructed by the Project as part of the site adjacent improvements.

Table 1-5

Summary of Improvements and Rough Order of Magnitude Costs for Roadway Segments

#	Roadway Segment	Jurisdiction	Existing (2017)	E+P (Project Buildout)	2019 Without/With Project	2040 Without/With Project	Improvements in City DIF?[1]	DIF Project #	Total Cost[2,3,4]	Fair Share %[1]	Fair Share Cost[5]	Significant Impact?[11]
1	Merrill Av., East of Euclid Av. (SR-83)	Ontario, Chino	None	None	Construct 2nd EB throguh lane	Same	Yes		$347,256	5.239%	$18,191	
					Construct 2nd WB through lane	Same	Yes		$347,256		$18,191	Yes
								Total	**$694,512**		**$36,382**	
2	Merrill Av., Grove Av. to Vineyard Av.	Ontario, Chino	None	None	Construct 2nd EB throguh lane	Same	Yes		$235,066	5.418%	$12,736	
					Construct 2nd WB through lane	Same	Yes		$235,066		$12,736	Yes
								Total	**$470,131**		**$25,473**	
3	Merrill Av., West of Driveway 2	Ontario, Chino	None	None	Construct 2nd EB throguh lane	Same	Yes		$267,120	5.888%	$15,729	
					Construct 2nd WB through lane	Same	Yes		$267,120		$15,729	Yes
								Total	**$534,240**		**$31,459**	
4	Archibald Av., North of Ontario Ranch Rd.	Ontario	None	None	Construct 3rd NB through lane	Same	Yes		$267,120	5.885%	$15,720	
					Construct 3rd SB through lane	Same	Yes		$267,120		$15,720	Yes
								Total	**$534,240**		**$31,440**	
5	Archibald Av., Eucalyptus Av. to Merrill Av.	Ontario	None	None	Construct 3rd NB through lane	Same	Yes		$133,560	7.683%	$10,261	
					Construct 3rd SB through lane	Same	Yes		$133,560		$10,261	Yes
									$267,120		**$20,522**	
6	Archibald Av., North of County Line	Ontario	None	Construct 2nd NB through lane	Construct 3rd NB through lane	Same	Yes		$66,600	6.997%	$4,660	
				Construct 2nd SB through lane	Construct 3rd SB through lane	Same	Yes		$98,834		$6,915	Yes
									$165,434		**$11,576**	
Total Costs for Horizon Year (2040) Improvements									**$2,665,678**		**$156,851**	
Total Project Fair Share Contribution to the City of Ontario (non-DIF/other)[9]									**$110,194**			
Total Project Fair Share Contribution to the City of Chino[10]									**$46,657**			

[1] Improvements included in City of Ontario DIF program for local, regional and specific plan components.

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

[3] Appendix "G" costs escalated by a factor of 1.484 except Traffic Signals to reflect current costs.

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

[5] Rough order of magnitude cost estimate.

[6] Improvements are to be constructed by other projects since these improvements are needed for site access.

[7] Improvements are currently under construction.

[8] Interchange redesign includes widening the bridge over the I-15 Freeway to three lanes in each direction with loop on-ramps, eliminating the left turns onto the on-ramps.

[9] The project fair share contribution for those improvements already included in a pre-existing fee program has been provided for comparison purposes. Project would not pay this fair share amount, but would instead contribute their fair share towards these improvements through their payment of fees.

[9] Total project fair share contribution consists of the improvements which are not already included in the City-wide DIF for those intersections wholly or partially within the City of Ontario.

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

[11] If improvements are not fully covered by an applicable pre-existing fee program, then the intersection has been identified to have a significant impact even after mitigation measures are implements. However, if the improvements in a pre-existing fee program are fully funded by the pre-existing fee program, then the intersection is found to have no significant impact after the implementation of the mitigation measures.

This Page Intentionally Left Blank

The improvements listed in Table 1-4 comprise lane additions/modifications, installation of signals and signal modifications. As noted, the identified improvements are covered either by the City of Ontario DIF Program or as a fair-share contribution, if not covered by a fee program. Depending on the width of the existing pavement and right-of-way, these improvements may involve only striping modifications or they may involve construction of additional pavement width. Additional discussion of the relevant pre-existing transportation impact fee programs is provided below.

1.5.1 CITY OF ONTARIO DEVELOPMENT IMPACT FEE PROGRAM

The City of Ontario 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 last updated in April 6, 2015 and is 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 at the rates then in effect, pursuant to the City DIF Program, would satisfy the Project's proportional mitigation requirements at potentially affected DIF-funded facilities.

1.5.2 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 SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in November 2011. Revenues collected through these programs are used in tandem

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

1.5.3 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, have been provided on Table 1-6 for the deficient intersections shown previously on Table 1-4 and on Table 1-7 for the deficient roadway segments previously 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. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the project's fair share of traffic as part of the project approval process. Table 1-4 and Table 1-5 also summarize the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.484 to reflect current (2017) costs. The total cost of needed study area intersection improvements is $17,954,700 and $2,665,678 for study area roadway segments. Based on the Project fair share percentages shown on Table 1-6 and Table 1-7, the Project's fair share cost is estimated at $1,100,946 for the study area intersections and $156,851 for the study area roadway segments. These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or mitigation.

Table 1-6

Project Fair Share Calculations for Intersections

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
1	Euclid Av. (SR-83) / Merrill Av.						
		AM:	2,684	56	4,982	2,298	**2.437%**
		PM:	2,542	64	5,690	3,148	2.033%
2	Euclid Av. (SR-83) / Kimball Av.						
		AM:	3,126	49	4,910	1,784	**2.747%**
		PM:	3,305	55	6,248	2,943	1.869%
4	Euclid Av. (SR-83) / Pine Av.						
		AM:	3,115	50	5,251	2,136	**2.341%**
		PM:	3,232	57	6,624	3,392	1.680%
7	Grove Av. / Merrill Av.						
		AM:	923	66	1,963	1,040	**6.346%**
		PM:	867	75	2,029	1,162	6.454%
8	Flight Av. / Merrill Av.						
		AM:	1,062	73	2,214	1,152	**6.337%**
		PM:	957	82	2,389	1,432	5.726%
9	Vineyard Av./Hellman Av. / Merrill Av.						
		AM:	855	91	2,371	1,516	**6.003%**
		PM:	833	103	3,227	2,394	4.302%
14	Archibald Av. / SR-60 WB Ramps						
		AM:	3,220	56	4,475	1,255	**4.462%**
		PM:	2,835	69	4,765	1,930	3.575%
15	Archibald Av. / SR-60 EB Ramps						
		AM:	3,283	102	4,514	1,231	**8.286%**
		PM:	3,135	116	4,738	1,603	7.236%
17	Archibald Av. / Riverside Dr.						
		AM:	3,297	109	4,590	1,293	**8.430%**
		PM:	3,714	122	5,169	1,455	8.385%
18	Archibald Av. / Chino Av.						
		AM:	2,042	111	2,999	957	**11.599%**
		PM:	2,042	125	4,240	2,198	5.687%
19	Archibald Av. / Schaefer Av.						
		AM:	1,548	114	3,256	1,708	**6.674%**
		PM:	1,677	129	4,676	2,999	4.301%
20	Archibald Av. / Ontario Ranch Rd.						
		AM:	2,589	199	4,936	2,347	**8.479%**
		PM:	2,439	225	6,778	4,339	5.186%
21	Archibald Av. / Eucalyptus Av.						
		AM:	2,077	202	3,928	1,851	10.913%
		PM:	2,062	228	3,751	1,689	**13.499%**
22	Archibald Av. / Merrill Av.						
		AM:	2,644	266	4,887	2,243	**11.859%**
		PM:	2,570	299	5,858	3,288	9.094%

Table 1-6

Project Fair Share Calculations for Intersections

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
26	Archibald Av. / Limonite Av.						
		AM:	2,686	146	5,614	2,928	**4.986%**
		PM:	2,851	166	6,638	3,787	4.383%
28	Harrison Av. / Limonite Av.						
		AM:	2,045	86	3,601	1,556	**5.527%**
		PM:	1,965	97	4,608	2,643	3.670%
29	Sumner Av. / Limonite Av.						
		AM:	2,263	84	4,812	2,549	**3.295%**
		PM:	2,293	94	5,904	3,611	2.603%
35	I-15 SB Ramps / Limonite Av.						
		AM:	3,380	67	6,005	2,625	2.552%
		PM:	3,873	77	6,528	2,655	**2.900%**
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.						
		AM:	1,918	26	2,886	968	2.686%
		PM:	1,769	72	3,450	1,681	**4.283%**

BOLD = Denotes highest fair share percentage.

Table 1-7

Project Fair Share Calculations for Roadway Segments

#	Intersection	Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
1	Merrill Av., East of Euclid Av. (SR-83) ADT:	8,407	610	20,051	11,644	5.239%
2	Merrill Av., Grove Av. to Vineyard Av. ADT:	7,466	770	21,677	14,211	5.418%
3	Merrill Av., West of Driveway 2 ADT:	10,754	1,060	28,755	18,001	5.888%
4	Archibald Av., North of Ontario Ranch Rd. ADT:	21,177	1,222	41,942	20,765	5.885%
5	Archibald Av., Eucalyptus Av. to Merrill Av. ADT:	20,073	2,152	48,084	28,011	7.683%
6	Archibald Av., North of County Line ADT:	27,064	1,515	48,716	21,652	6.997%

1.6 CUMULATIVE IMPACTS

A summary of the cumulatively impacted study area intersections and recommended mitigation measures to address cumulatively significant impacts are described in detail within Section 6 *Opening Year Cumulative (2019) Traffic Conditions* and Section 7 *Horizon Year (2040) Traffic Conditions*. Cumulative impacts are deficiencies that would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient facilities along with other cumulative development projects, resulting in a cumulatively considerable impact.

The following mitigation measures are based on the improvements needed under Horizon Year (2040) traffic conditions. The improvements needed to address Opening Year Cumulative deficiencies would be a sub-set of those improvements recommended under Horizon Year (2040) traffic conditions.

1.6.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

A summary of off-site improvements needed to address cumulative traffic impacts for Horizon Year (2040) traffic conditions was included in Table 1-4. Improvements found to be included in City of Ontario (lead agency) DIF program have been identified as such. For improvements that do not appear to be in the City's DIF program, a fair share financial contribution based on the Project's fair share impact shall be imposed (for City of Ontario facilities) and may be imposed by other jurisdictions in order to mitigate the Project's share of impacts in lieu of construction. These fees (both to the City of Ontario, and as determined, to surrounding agencies as fair-share contributions) are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected vehicle trip increases.

A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process. Based on the Project fair share percentages, the Project's fair share cost is estimated at $1,836,745. Table 1-4 shows the Project's fair share cost for Horizon Year (2040) traffic conditions. These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or mitigation.

1.6.2 CUMULATIVE MITIGATION MEASURES

Mitigation Measure 3.1 – Prior to the issuance of building permits, the Project applicant shall participate in the City's DIF program by paying the requisite DIF fee at the time of building permit; and in addition, shall pay the Project's fair share amount of $60,749 for the improvements identified in Table 1-4 that are consistent with the improvements shown on Table 7-6, or as agreed to by the City and Project Applicant.

Mitigation Measure 4.1 – Table 1-4 of the TIA includes intersections that either share a mutual border with the City of Chino or are wholly located within the City of Chino that have recommended improvements which are not covered by DIF. Because the City of Ontario does not have plenary control over intersections that share a border with the City of Chino, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Ontario shall participate in a multi-jurisdictional effort

with the City of Chino to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in Table 1-4 of the TIA, that are located in the City of Chino. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to City of Chino facilities that are not attributable to development located within the City of Ontario are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City of Ontario and the City of Chino are responsible to implement this mitigation measure, Developer shall have no compliance obligations with respect to this Mitigation Measure.

Mitigation Measure 4.2 – The Developer's fair-share amount for the intersections that either share a mutual border with the City of Chino or are wholly located within the City of Chino that have recommended improvements for Project Buildout which are not covered by DIF equals $193,408. Developer shall be required to pay this $193,408 amount to the City of Ontario prior to the issuance of the Project's final certificate of occupancy. The City of Ontario shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the City of Ontario and City of Chino as a result of implementation of Mitigation Measure 4.1. If, within five years of the date of collection of Developer's Fair Share Contribution, the City of Ontario and City of Chino do not comply with Mitigation Measure 4.1, then Developer's Fair Share Contribution shall be returned to the Developer.

Mitigation Measure 5.1 – Table 1-4 of the TIA includes intersections that either shares a mutual border with the City of Eastvale or are wholly located within the City of Eastvale that have a recommended improvement which is not covered by DIF. Because the City of Ontario does not have plenary control over intersections that share a border with the City of Eastvale, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Ontario shall participate in a multi-jurisdictional effort with the City of Eastvale to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in Table 1-4 of the TIA, that are located in the City of Eastvale. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to City of Eastvale facilities that are not attributable to development located within the City of Ontario are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the

recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City of Ontario and the City of Eastvale are responsible to implement this mitigation measure, Developer shall have no compliance obligations with respect to this Mitigation Measure.

Mitigation Measure 5.2 – The Developer's fair-share amount for the intersections that either shares a mutual border with the City of Eastvale or are wholly located within the City of Eastvale that have recommended improvements for Project Buildout which is not covered by DIF equals $164,728. Developer shall be required to pay this $164,728 amount to the City of Ontario prior to the issuance of the Project's final certificate of occupancy. The City of Ontario shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the City of Ontario and City of Eastvale as a result of implementation of Mitigation Measure 5.1. If, within five years of the date of collection of Developer's Fair Share Contribution, the City of Ontario and City of Eastvale do not comply with Mitigation Measure 5.1, then Developer's Fair Share Contribution shall be returned to the Developer.

Mitigation Measure 6.1 – Table 1-4 of the TIA includes intersections that either share a mutual border with Caltrans' jurisdiction or are wholly located within Caltrans' jurisdiction and have recommended improvements which are not covered by payment of fees. Because the City of Ontario does not have plenary control over the freeway on and off ramps that lie within Caltrans' jurisdiction, the City cannot guarantee that such improvements will be constructed. Thus, the following additional mitigation measure is required: The City of Ontario shall participate in a multi-jurisdictional effort with Caltrans to develop a study to identify fair share contribution funding sources attributable to and paid from private and public development to supplement other regional and State funding sources necessary to implement the improvements identified in Table 1-4 of the TIA, that are located in Caltrans' jurisdiction. The study shall include fair-share contributions related to private and or public development based on nexus requirements contained in the Mitigation Fee Act (Govt. Code § 66000 et seq.) and 14 Cal. Code of Regs. § 15126.4(a)(4) and, to this end, the study shall recognize that impacts attributable to Caltrans facilities that are not attributable to development located within the City of Ontario are not paying in excess of such developments' fair share obligations. The fee study shall also be compliant with Government Code § 66001(g) and any other applicable provisions of law. The study shall set forth a timeline and other agreed-upon relevant criteria for implementation of the recommendations contained within the study to the extent the other agencies agree to participate in the fee study program. Because the City of Ontario and Caltrans are responsible to implement this mitigation measure, Developer shall have no compliance obligations with respect to this Mitigation Measure.

Mitigation Measure 6.2 – The Developer's fair-share amount for the intersections that either share a mutual border with Caltrans or are wholly located within Caltrans' jurisdiction that have recommended improvements for Project Buildout which are not covered by payment of fees equals $35,922. Developer shall be required to pay this $35,922 amount to the City of Ontario prior to the issuance of the Project's final certificate of occupancy. The City of Ontario shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution

to any fee program adopted or agreed upon by the City of Ontario and Caltrans as a result of implementation of Mitigation Measure 6.1. If, within five years of the date of collection of Developer's Fair Share Contribution, the City of Ontario and Caltrans do not comply with Mitigation Measure 6.1, then Developer's Fair Share Contribution shall be returned to the Developer.

1.7 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. The Project is proposed to have access on Merrill Avenue and Archibald Avenue via the following driveways:

- Driveway 1 / Merrill Avenue – Right-in/right-out driveway providing access to both passenger cars and trucks.
- Driveway 2 / Merrill Avenue – Full access driveway providing access to both passenger cars and trucks. This driveway is proposed to be signalized and would provide access to the future development on the northwest corner of Archibald Avenue and Merrill Avenue.
- Archibald Avenue / Driveway 3 – Right-in/right-out driveway providing access to both passenger cars and trucks.
- Archibald Avenue / Driveway 4 – Full access driveway providing access to both passenger cars and trucks. This driveway is proposed to be signalized and would provide access to the existing residential development on the southeast corner of Archibald Avenue and Merrill Avenue.
- Archibald Avenue / Driveway 5 – Right-in/right-out driveway providing access to both passenger cars and trucks.

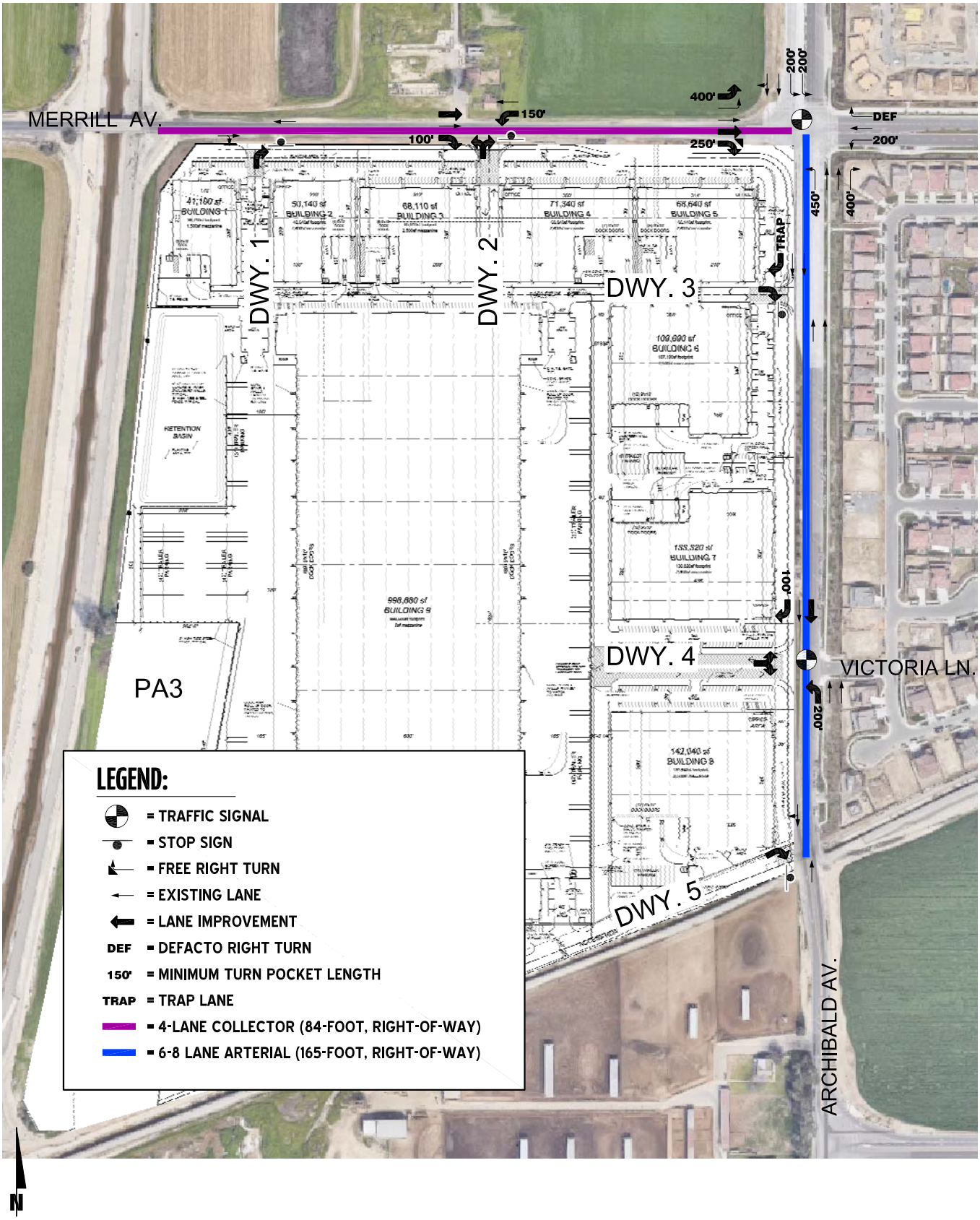
Regional access to the Project site is provided via the SR-60 Freeway at Archibald Avenue, the SR-71 Freeway at Euclid Avenue (SR-83), and the I-15 Freeway at Cantu Galleano Ranch Road and Limonite Avenue interchanges. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements are required to be in place prior to occupancy.

1.7.1 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

The recommended site-adjacent roadway improvements for 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.

Exhibit 1-3 also illustrates the on-site and site adjacent recommended roadway lane improvements for the Project under near term traffic conditions. 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. Ultimate improvements along Merrill Avenue and Archibald Avenue are consistent with the City of Ontario General Plan.

EXHIBIT 1-3: SITE ACCESS AND SITE ADJACENT ROADWAY IMPROVEMENT RECOMMENDATIONS



10522 - recs.dwg

Merrill Avenue – Merrill Avenue is an east-west oriented roadway located along the Project's northern boundary. Construct Merrill Avenue from the western Project boundary to Archibald Avenue at its ultimate half-section width as a 4-lane Collector (ultimate 84-foot right-of-way), consistent with the City of Ontario's General Plan. The roadway is proposed to have two travel lane in each direction, with an ultimate curb-to-curb width of 64 feet.

Archibald Avenue – Archibald Avenue is a north-south oriented roadway located along the eastern boundary of the Project. Construct Archibald Avenue from Merrill Avenue to the Project's southern boundary at its ultimate half-section width as a 6-lane Principal Arterial (ultimate 165-foot or more right-of-way) in compliance with the circulation recommendations found in the City of Ontario's General Plan. The cross-section includes an ultimate curb-to-curb width of 94-feet with three travel lanes in each direction.

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

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 Ontario sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

1.7.2 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted along the site adjacent roadways of Merrill Avenue and Archibald Avenue for Horizon Year (2040) traffic conditions to determine the turn pocket lengths necessary to accommodate near term 95th percentile queues. The analysis was conducted for both the weekday AM and weekday PM peak hours.

The traffic modeling and signal timing optimization software package Synchro (Version 9) has been utilized to assess queues at the Project access points. Synchro is a macroscopic traffic software program that is based on the signalized and unsignalized intersection capacity analyses as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length in Synchro. The LOS and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. The 95th percentile queue is not necessarily ever observed; it is simply based on statistical calculations (or Average Queue plus 1.65 standard deviations). However, the average queue is the average of all the two-minute maximum queues observed by SimTraffic. The maximum back of queue observed for every two-minute period is recorded by SimTraffic.

SimTraffic has been utilized to assess peak hour queuing at the site access driveways for Horizon Year (2040) With Project traffic conditions. The random simulations generated by SimTraffic have been utilized to determine the 50th and 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded five (5) times, during the weekday AM and weekday PM peak hours, and has been seeded for 60-minute periods with 60-minute recording intervals.

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 utilized for purposes of determining the necessary turn pocket storage lengths, the 50th percentile queues are also reported. The 50th percentile 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 storage length recommendations for the turning movements at the Project were shown previously on Exhibit 1-3. A summary of the queuing results are also shown on Table 1-8. The Horizon Year (2040) queuing results are provided in Appendix 1.2 of this report.

1.8 PEDESTRIAN AND BICYCLE ACCOMMODATIONS

1.8.1 PEDESTRIAN ACCOMMODATIONS

The Project will construct its ultimate half-section of Merrill Avenue and Archibald Avenue including curb and gutter and sidewalk improvements.

1.8.2 BICYCLE ACCOMMODATIONS

Consistent with the City of Ontario General Plan, Merrill Avenue is proposed to have a Class II bikeway and multipurpose trail in the vicinity of the Project. The Cucamonga Creek Multipurpose Trail runs along the Project's western boundary.

1.9 TRUCK ACCESS AND CIRCULATION

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at each applicable Project driveway and site adjacent intersection anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers (see Exhibit 1-4). As shown, the Project driveways and site adjacent intersections are anticipated to accommodate the wide turning radius of the heavy trucks, with the exception of Driveways 1, 3, and 5. As shown on Exhibit 1-4, Driveway 1 should be modified to provide a 70-foot radius on the southwest curb, Driveway 3 should be modified to provide a 35-foot radius on the northwest curb, and Driveway 5 should be modified to provide a 50-foot radius on the northwest curb and a 25-foot radius on the southwest curb in order to accommodate the wide turning radius of a heavy truck. A WB-67 truck (53-foot trailer) has been utilized for the purposes of this analysis.

Table 1-8

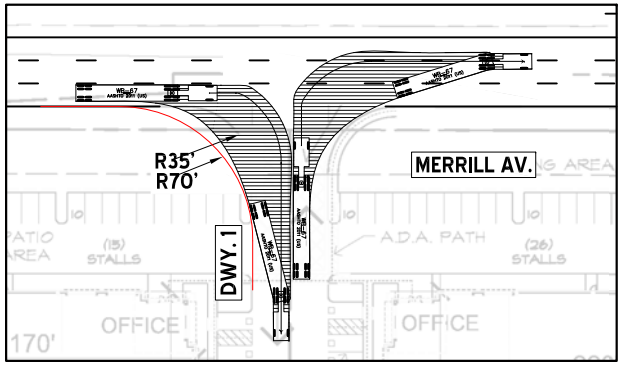
Peak Hour Queuing Summary for Site Adjacent Intersections - Horizon Year (2040) With Project Conditions

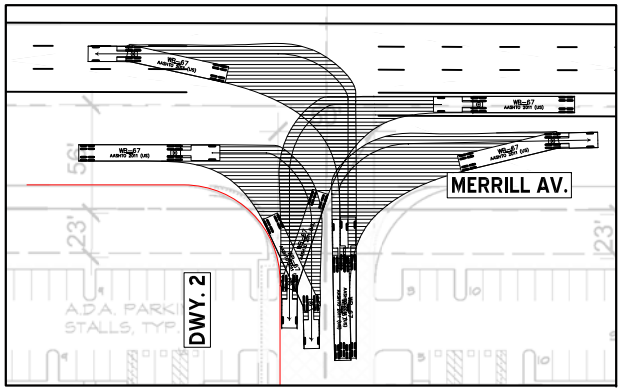
Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Driveway 1 / Merrill Avenue	NBR	380	36	56	Yes	Yes
	EBT	1,170	0	20	Yes	Yes
	EBT/R	1,170	0	0	Yes	Yes
	WBT	550	0	0	Yes	Yes
Driveway 2 / Merrill Avenue	NBL/T/R	340	48	101	Yes	Yes
	SBL/T/R	380	129	90	Yes	Yes
	EBL	300	52	157	Yes	Yes
	EBT	550	146	340	Yes	Yes
	EBR	100	23	14	Yes	Yes
	WBL	150	102	76	Yes	Yes
	WBT	790	170	158	Yes	Yes
	WBT/R	790	185	175	Yes	Yes
Archibald Avenue / Merrill Avenue	NBL	450	180	213	Yes	Yes
	NBT	1,250	224	327	Yes	Yes
	NBR	400	118	182	Yes	Yes
	SBL	450	71	443	Yes	Yes
	SBT	2,605	236	852	Yes	Yes
	SBR	500	208	487	Yes	Yes
	EBL	400	154	397	Yes	Yes
	EBT	790	45	752	Yes	Yes
	EBR	250	83	265	Yes	Yes
	WBL	200	140	118	Yes	Yes
	WBT	730	92	67	Yes	Yes
	WBR	300	51	34	Yes	Yes
Archibald Avenue / Driveway 3	NBT	900	0	6	Yes	Yes
	SBT	350	47	55	Yes	Yes
	SBR	350	54	53	Yes	Yes
	EBR	300	31	57	Yes	Yes
Archibald Avenue / Driveway 4	NBL	200	121	76	Yes	Yes
	NBT	400	254	241	Yes	Yes
	NBTR	400	243	193	Yes	Yes
	SBL	200	67	78	Yes	Yes
	SBT	900	291	341	Yes	Yes
	SBR	100	102	86	No	Yes
	EBL	300	66	143	Yes	Yes
	EBT/R	300	33	49	Yes	Yes
	WBL	175	74	80	Yes	Yes
	WBT/R	175	94	51	Yes	Yes
Arcbhiald Avenue / Driveway 5	NBT	900	0	0	Yes	Yes
	SBT	400	0	0	Yes	Yes
	EBR	300	39	72	Yes	Yes

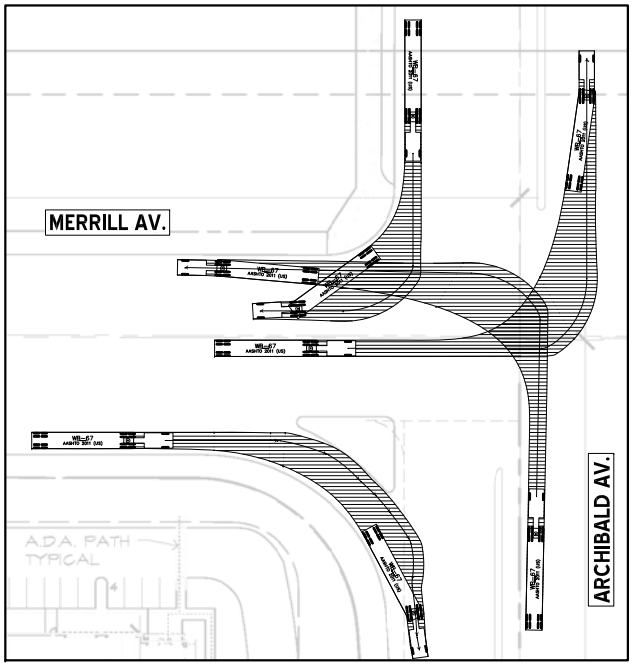
[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

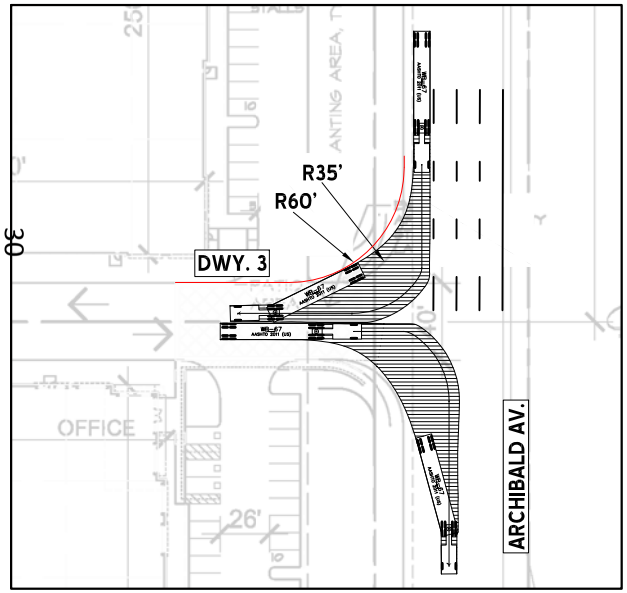
[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

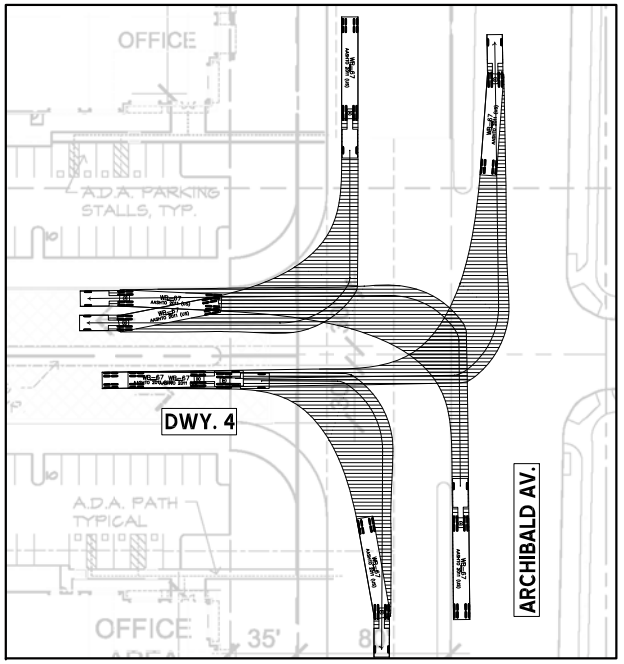
EXHIBIT 1-4: TRUCK ACCESS

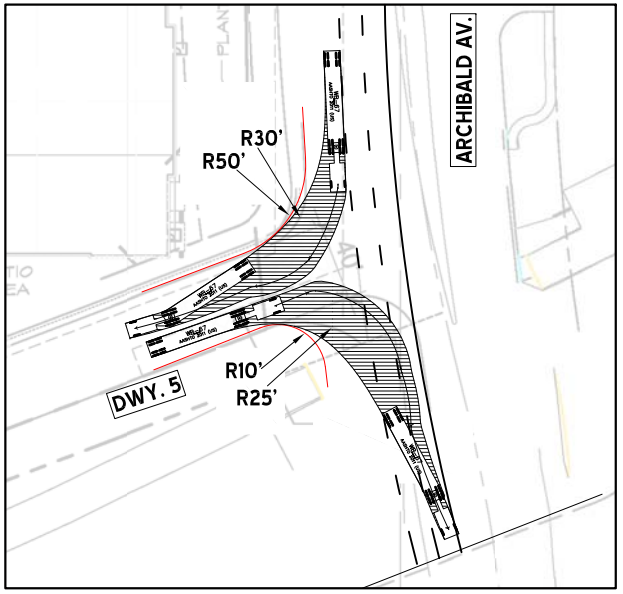






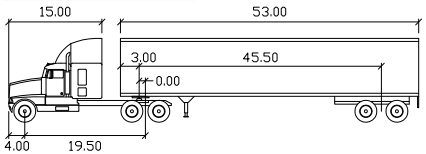






30

LEGEND:



WB-67 feet

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

NOT TO SCALE

GRAPHIC SCALE
0 50 100
1"=100'

N

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 Ontario traffic study guidelines.

2.1 LEVEL OF SERVICE

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

2.2 INTERSECTION CAPACITY ANALYSIS

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

2.2.1 SIGNALIZED INTERSECTIONS

City of Ontario, City of Chino, City of Eastvale, City of Jurupa Valley

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

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM 2010

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

Existing and Opening Year Cumulative Traffic Conditions:

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

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

The traffic modeling and signal timing optimization software package Synchro (Version 9) has been utilized to analyze signalized intersections within the City of Ontario, City of Chino, City of Eastvale, and City of Jurupa Valley. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15 minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

California Department of Transportation (Caltrans)

Per the Caltrans *Guide for the Preparation of Traffic Impact Studies*, the traffic modeling and signal timing optimization software package Synchro (Version 9) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. SR-71 Freeway ramp at Euclid Avenue (SR-83), SR-60 Freeway ramps at Archibald Avenue, and I-15 Freeway ramps at Cantu Galleano Ranch Road and Limonite Avenue). (2) 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 Ontario, City of Chino, City of Eastvale, and City of Jurupa Valley require the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM 2010

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

2.3 ROADWAY SEGMENT CAPACITY ANALYSIS

Roadway segment operations have been evaluated using the City of Ontario Roadway Capacity Values provided in the *City of Ontario General Plan (1992) Infrastructure Element, Figure INF-2 and Table INF-1.* (5) Per the City of Ontario's TIA guidelines, roadway segments within the study area should maintain LOS D capacities on City roadways. The daily roadway segment capacities for each type of roadway are summarized in Table 2-3. As noted in the City of Ontario's General Plan, these 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. In other words, while using average daily traffic (ADT) for planning purposes is suitable with regards to evaluating potential volume to capacity with future forecasts, it is not suitable for operational analysis because it does not account for the factors listed previously. 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.

TABLE 2-3: ROADWAY SEGMENT CAPACITY LOS THRESHOLDS[1]

Street Classification	Lanes	Right of Way Width[2]	Curb-to-Curb Width[2]	Median[3]	LOS E Capacity
Divided Arterial	8	146	120	Yes	65,000
Divided Arterial	6	120 or more	94	Yes	49,000
Standard Arterial	4	100	76	TWLTL[4]	33,000
Collector Street	4	88	64	No	22,000
Local Street	2	66 / 60	40	No	12,500
Local Industrial Street	2	66	48	No	12,500

[1] Source: Derived from the City of Ontario General Plan (1992), Infrastructure Element, Figure INF-2 and Table INF-1.
[2] Some arterial streets may be narrower than the right-of-way or curb-to-curb standard indicated above.
[3] Median not necessarily raised and/or landscaped.
[4] Two-way left-turn lane.

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. (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. 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. (6) Specifically, this TIA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. 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, that currently do not exist, have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets. As shown on Table 2-4, traffic signal warrant analyses were performed for the following unsignalized study area intersections during the peak weekday conditions wherein the Project is anticipated to contribute the highest trips:

TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction
7	Grove Av. / Merrill Av.	Ontario/Chino
8	Flight Av. / Merrill Av.	Ontario/Chino
9	Hellman Av. / Merrill Av.	Ontario/Chino
10	Hellman Av. / Kimball Av.	Chino/Eastvale
13	Driveway 2 / Merrill Av.	Ontario
19	Archibald Av. / Schaefer Av.	Ontario
24	Archibald Av. / Driveway 4	Ontario

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Analysis,* Section 6 *Opening Year Cumulative (2019) Traffic Analysis,* and Section 7 *Horizon Year (2040) Traffic Analysis* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.5 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TIA includes the freeway-to-arterial interchanges of the SR-71 Freeway at Euclid Avenue (SR-83) off-ramps, SR-60 Freeway at Archibald Avenue off-ramps, I-15 Freeway at Cantu Galleano Ranch Road off-ramps, and I-15 Freeway at Limonite Avenue 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 Euclid Avenue (SR-83), Archibald Avenue, Cantu Galleano Ranch Road, and Limonite Avenue. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the SR-71 Freeway, SR-60 Freeway, and I-15 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, 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 Synchro progression analysis. There are two footnotes which appear on the Synchro outputs. One footnote indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The other footnote indicates whether or not the volume for the 95th percentile queue is metered by an upstream signal. In many cases, the 95th percentile queue will not be experienced and may potentially be less than the 50th percentile

queue due to upstream metering. If the upstream intersection is at or near capacity, the 50th percentile queue represents the maximum queue experienced.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. 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 queue length reported is for the lane with the highest queue in the lane group. 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 METHODOLOGY

Consistent with recent Caltrans guidance and because impacts to freeway segments dissipate with distance from the point of SHS entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry is not required. As such, the traffic study has evaluated the freeway segments along the SR-71 Freeway, SR-60 Freeway, and I-15 Freeway where the Project is anticipated to contribute 25 or more one-way peak hour trips. Because impacts to freeway segments dissipate with distance from the point of SHS entry, quantitative evaluation of freeway segments with less than 25 peak hour trips is not necessary.

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 TIA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using HCS2010 software. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-5 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis. The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in April and December of 2016. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative (2019) Without and With Project, and Horizon Year (2040) Without and With Project conditions.

The SR-71 Freeway, SR-60 Freeway, and I-15 Freeway mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the SR-71 Freeway north of Euclid Avenue (SR-83), SR-60 Freeway west of Archibald Avenue, I-15 Freeway north of Cantu Galleano Ranch Road, and I-15 Freeway north of Limonite Avenue. The data was obtained from May 2016. In an effort to conduct a conservative analysis, the maximum value observed within the three-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. As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the basic freeway segment analysis. (7)

TABLE 2-5: DESCRIPTION OF FREEWAY MAINLINE LOS

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

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

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 HCS2010 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 2-6 presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

TABLE 2-6: 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 SR-71, SR-60, and I-15 Freeway mainline volume data were obtained from the Caltrans PeMS website for the segments of the SR-71 Freeway north of Euclid Avenue (SR-83), SR-60 Freeway west of Archibald Avenue, I-15 Freeway north of Cantu Galleano Ranch Road, and I-15 Freeway north of Limonite Avenue. The ramp data (per the count data presented in Appendix 3.1, and if applicable, were increased to reflect 2017 conditions) were then utilized to flow conserve the mainline volumes to determine the remaining SR-71, SR-60, and I-15 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from east to west and north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from May 2016. In an effort to conduct a conservative analysis, the maximum value observed within the three-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. (7) 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 ACCEPTABLE LEVELS OF SERVICE (LOS) AND INTERSECTION DEFICIENCY CRITERIA

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

2.8.1 CITY OF ONTARIO

According to the City of Ontario's General Plan, LOS E is the minimum acceptable condition that should be maintained during the peak commute hours, where feasible. Therefore, any intersection operating at LOS F is considered deficient. LOS will also be reported by movement for the City's review. A higher LOS standard of LOS D has been applied to the Project driveways. LOS D has been utilized as the minimum LOS for all roadway segments.

2.8.2 CITY OF CHINO HILLS

The City of Chino Hills utilizes a minimum acceptable LOS of LOS D, where feasible.

2.8.3 CITY OF CHINO

The City of Chino utilizes a minimum acceptable LOS of LOS D, where feasible.

2.8.4 CITY OF EASTVALE

The City of Eastvale General Plan Policy C-10 sets a standard of LOS C with LOS D as acceptable in commercial and employment areas and at intersections of any combination of major highways, urban arterials, secondary highways, or freeway ramps. Based on this criterion, where feasible, LOS D is the minimum acceptable LOS at each of the study intersections within the City of Eastvale.

2.8.5 CITY OF JURUPA VALLEY

The City of Jurupa Valley utilizes a minimum acceptable LOS of LOS D, where feasible.

2.8.6 CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, in an effort to overstate as opposed to understate potential impacts, LOS D has been utilized for the CMP intersections for the purposes of this analysis.

2.8.7 CALTRANS

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

2.9 THRESHOLDS OF SIGNIFICANCE

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

2.9.1 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 (or LOS E for CMP intersections and intersections located in the City of Ontario) (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

However, when the pre-Project condition is already below LOS D/LOS E (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/LOS E 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.

For the study area intersections that lie within the City of Eastvale, project-related significant impacts will be identified by comparing the "Without Project" condition to the "With Project" condition based on the following criteria:

- If the LOS deteriorates from acceptable LOS (LOS D or better) to unacceptable LOS (LOS E or F); or
- If the intersection is already operating at an unacceptable LOS (LOS E or F) in "Without Project" conditions and the addition of Project traffic increases the delay by more than 5.0 seconds.

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring additional improvements to maintain acceptable level of service operations with or without the Project. A Project's contribution to a significant cumulative impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact. Cumulatively considerable is defined as the addition of 50 or more peak hour trips.

In the event that an intersection is operating at or is forecast to operate at a deficient LOS, the CMP guidelines have defined a series of steps to be completed to determine the Project's contribution to the deficiency of intersections, which has been applied to both CMP and non-CMP study area intersections. The steps are as follows:

- Determine the mitigation measures necessary to achieve an acceptable service level,
- Calculate the Project's share in the future traffic volume projections for the peak hours,
- Estimate the cost to implement recommended mitigation measures, and
- Calculate the Project's fair-share contribution to mitigate the Project's traffic impacts

2.9.2 ROADWAY SEGMENTS

To determine whether the addition of project traffic on study area roadway segments would result in a significant traffic impact, the following will be utilized:

- When the pre-Project condition is at or better than LOS D (or LOS E for CMP roadways located in the City of Ontario) (i.e., acceptable LOS), and project-generated traffic, as measured by 50 or more peak hour trips, causes deterioration below LOS D/LOS E (i.e., unacceptable LOS), a deficiency is deemed to occur.

However, when the pre-Project condition is already below LOS D/LOS E (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 roadway segments 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/LOS E or better would in effect force the Project to mitigate beyond its Project impacts, which is prohibited under California law.

Cumulative traffic impacts are created as a result of a combination of the proposed Project together with other future developments contributing to the overall traffic impacts requiring additional improvements to maintain acceptable level of service operations with or without the Project. A Project's contribution to a significant cumulative impact can be reduced to less than significant if the Project is required to implement or fund its fair share of improvements designed to alleviate its cumulatively considerable contribution to the impact. Cumulatively considerable impacts are defined as the addition of 50 or more peak hour trips.

2.9.3 CALTRANS FACILITIES

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

- The traffic study finds that the LOS of a segment 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 25 or more one-way peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.10 PROJECT FAIR SHARE CALCULATION METHODOLOGY

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

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

The Project fair share contribution calculations are presented in Section 1.5 *Local and Regional Funding Mechanisms* of this TIA. The cost of implementing the improvements shown on Table 1-4 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a total cost escalation factor of 1.484 to more closely approximate current (2017) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended cumulative improvements (see Table 1-5). These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or mitigation.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the City of Ontario General Plan Circulation Network, and a review of existing peak hour intersection operations, freeway mainline operations, and traffic signal warrant analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Ontario staff (Appendix 1.1), the study area includes a total of 37 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF ONTARIO GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Ontario. The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Ontario General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Ontario General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Ontario General Plan roadway cross-sections.

The study area roadways that are classified as 8-lane Principal Arterials are identified as having four lanes of travel in each direction. The following study area roadways within the City of Ontario are classified as 8-lane Principal Arterials:

- Euclid Avenue (SR-83) north of Merrill Avenue
- Edison Avenue/Ontario Ranch Road from Euclid Avenue (SR-83) to Hamner Avenue
- Hamner Avenue between the SR-60 Freeway and Bellegrave Avenue

The study area roadway that is classified as a 6-lane Principal Arterial is identified as having three lanes of travel in each direction and a 14-foot curbed or painted median. The following study area roadways within the City of Ontario are classified as a 6-lane Principal Arterial:

- Hellman Avenue (Vineyard Avenue) north of Merrill Avenue
- Archibald Avenue north of Bellegrave Avenue

The study area roadway that is classified as a 4-lane Principal Arterial is identified as having two lanes of travel in each direction. The following study area roadway within the City of Ontario is classified as a 4-lane Principal Arterial:

- Grove Avenue north of Merrill Avenue

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

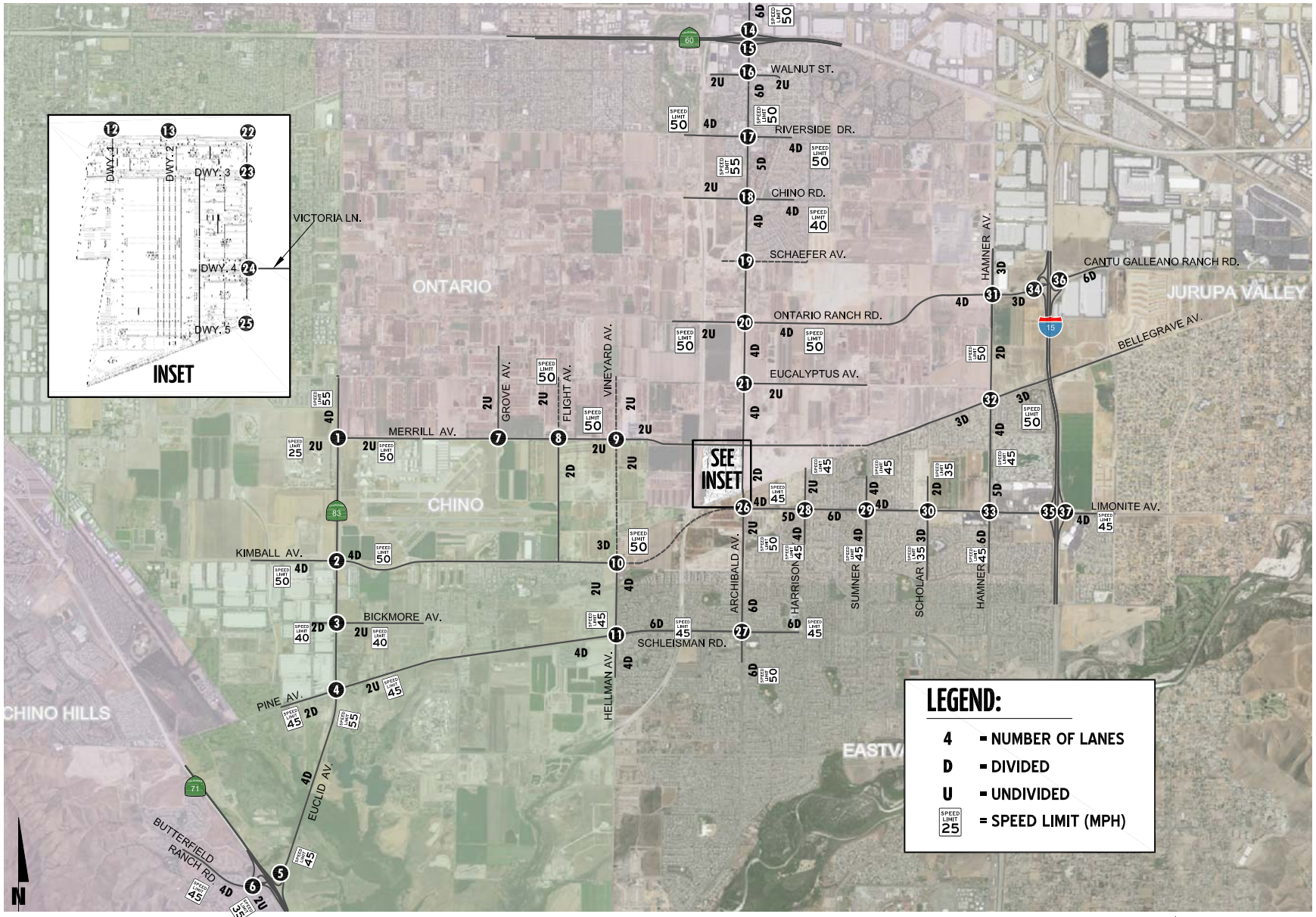


EXHIBIT 3-1 (2OF2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

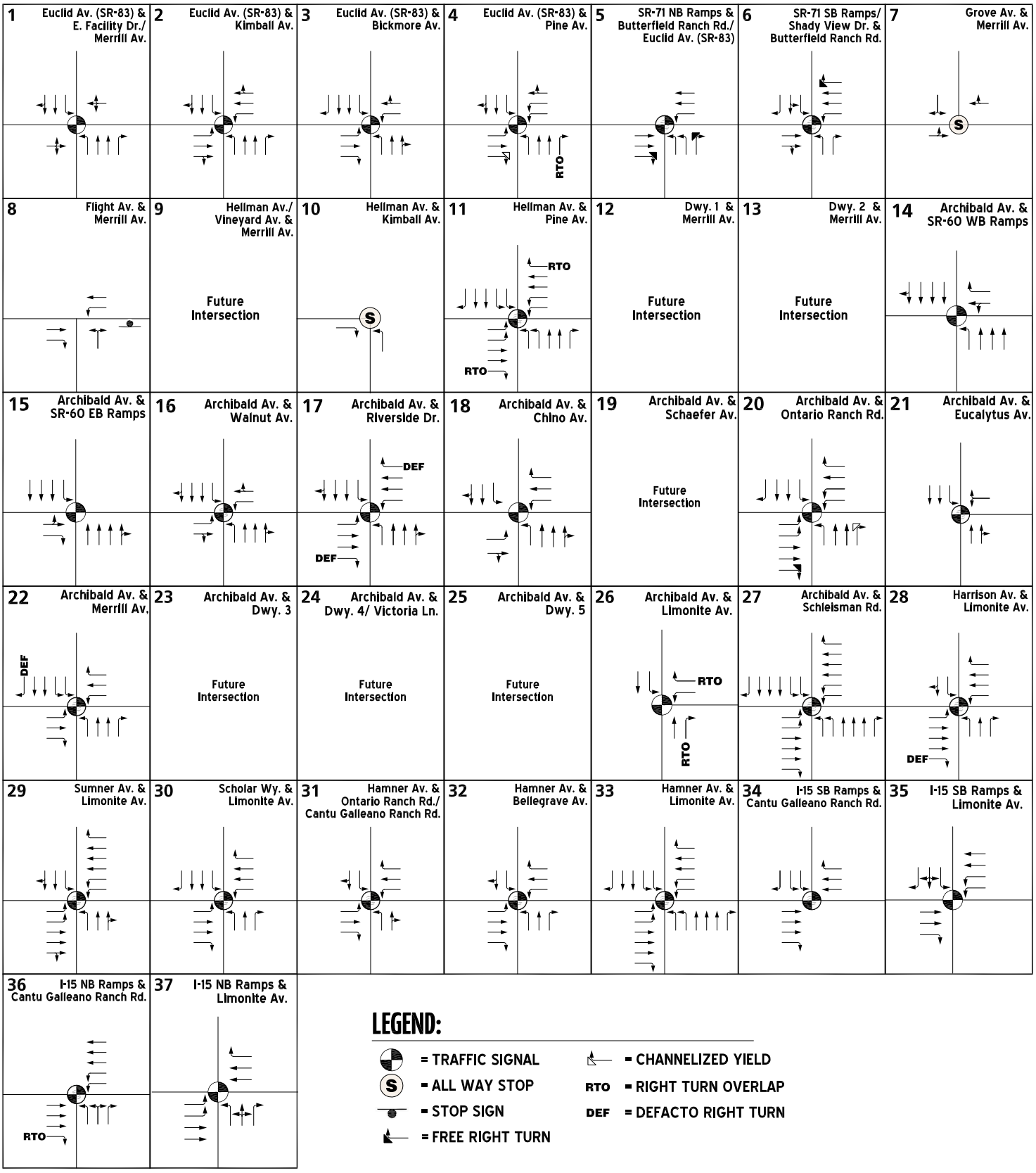


EXHIBIT 3-2: CITY OF ONTARIO GENERAL PLAN CIRCULATION ELEMENT

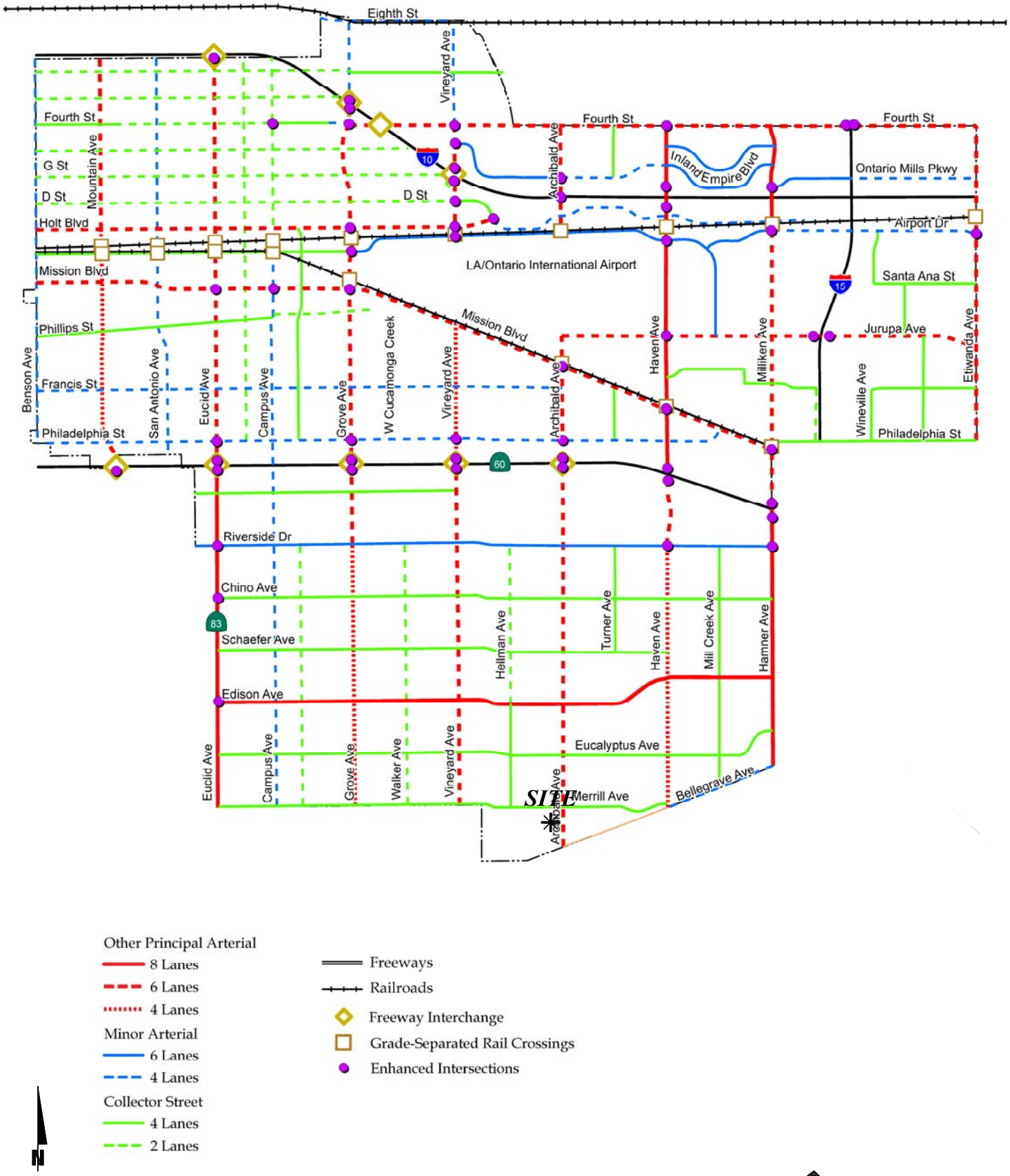
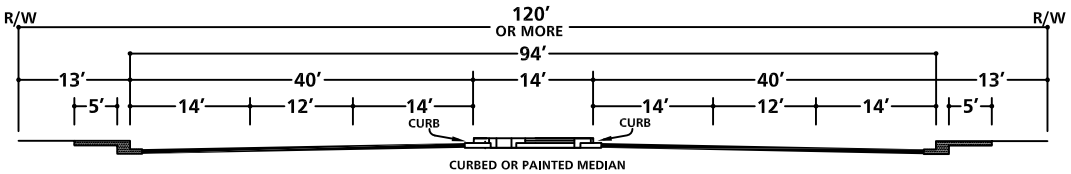
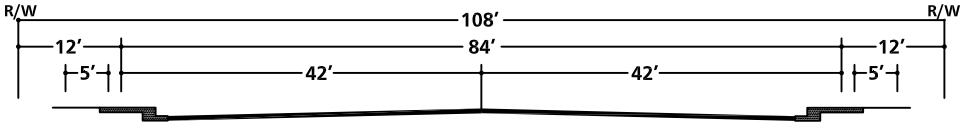


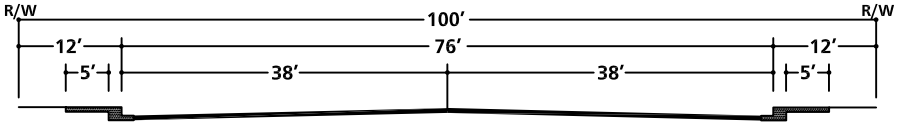
EXHIBIT 3-3: CITY OF ONTARIO GENERAL PLAN ROADWAY CROSS-SECTIONS



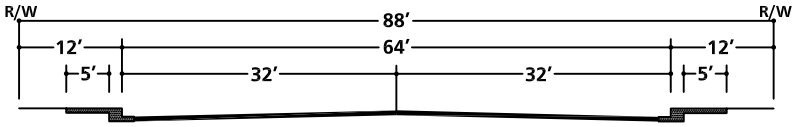
PRINCIPAL ARTERIAL



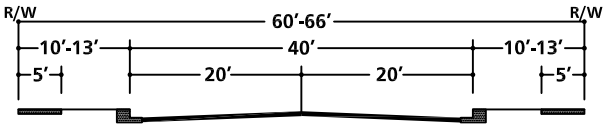
MINOR ARTERIAL



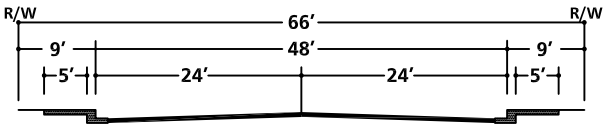
OTHER PRINCIPAL ARTERIAL



COLLECTOR STREET



LOCAL STREET



LOCAL INDUSTRIAL STREET

SOURCE: CITY OF ONTARIO

The study area roadway that is classified as a 6-lane Minor Arterial is identified as having three lanes of travel in each direction. The following study area roadway within the City of Ontario is classified as a 6-lane Minor Arterial:

- Riverside Drive

The study area roadway that is classified as a 4-lane Minor Arterial is identified as having two lanes of travel in each direction and a 14-foot median. The following study area roadway within the City of Ontario is classified as a 4-lane Minor Arterial:

- Bellegrave Avenue from Haven Avenue to Hamner Avenue

The study area roadways that are classified as Collector Streets are identified as having two to four lanes of travel in each direction. The following study area roadways within the City of Ontario are classified as Collector Streets:

- Chino Avenue
- Schaefer Avenue from Euclid Avenue (SR-83) to Haven Avenue
- Eucalyptus Avenue
- Merrill Avenue
- Bon View Avenue
- Flight Avenue (Walker Avenue)

3.3 CITY OF CHINO, CITY OF CHINO HILLS, AND CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT

Exhibits 3-4 and 3-5 show the City of Chino General Plan Circulation Element and roadway cross-sections, respectively. Exhibits 3-6 and 3-7 show the City of Chino Hills General Plan Circulation Element and roadway cross-sections, respectively. Exhibits 3-8 and 3-9 show the City of Eastvale General Plan Circulation Element and roadway cross-sections, respectively.

3.4 TRUCK ROUTES

The City of Ontario designated truck route map is shown on Exhibit 3-10. Euclid Avenue (SR-83), Edison Avenue/Ontario Ranch Road, Merrill Avenue, Archibald Avenue, and Hamner Avenue/Milliken Avenue are designated as a Truck Route in the City of Ontario. The designated truck route map has been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

The City of Chino designated truck route map is shown on Exhibit 3-11. Merrill Avenue, Kimball Avenue, Pine Avenue, Flight Avenue, and Hellman Avenue are some of the designated City of Chino truck routes near the Project while Euclid Avenue (SR-83) is designated as a State Truck Route. Other truck routes in the study area include, Riverside Drive and Edison Drive. The designated truck route map has been utilized to route truck traffic from both the proposed Project and future cumulative development projects throughout the study area.

EXHIBIT 3-4: CITY OF CHINO GENERAL PLAN CIRCULATION ELEMENT

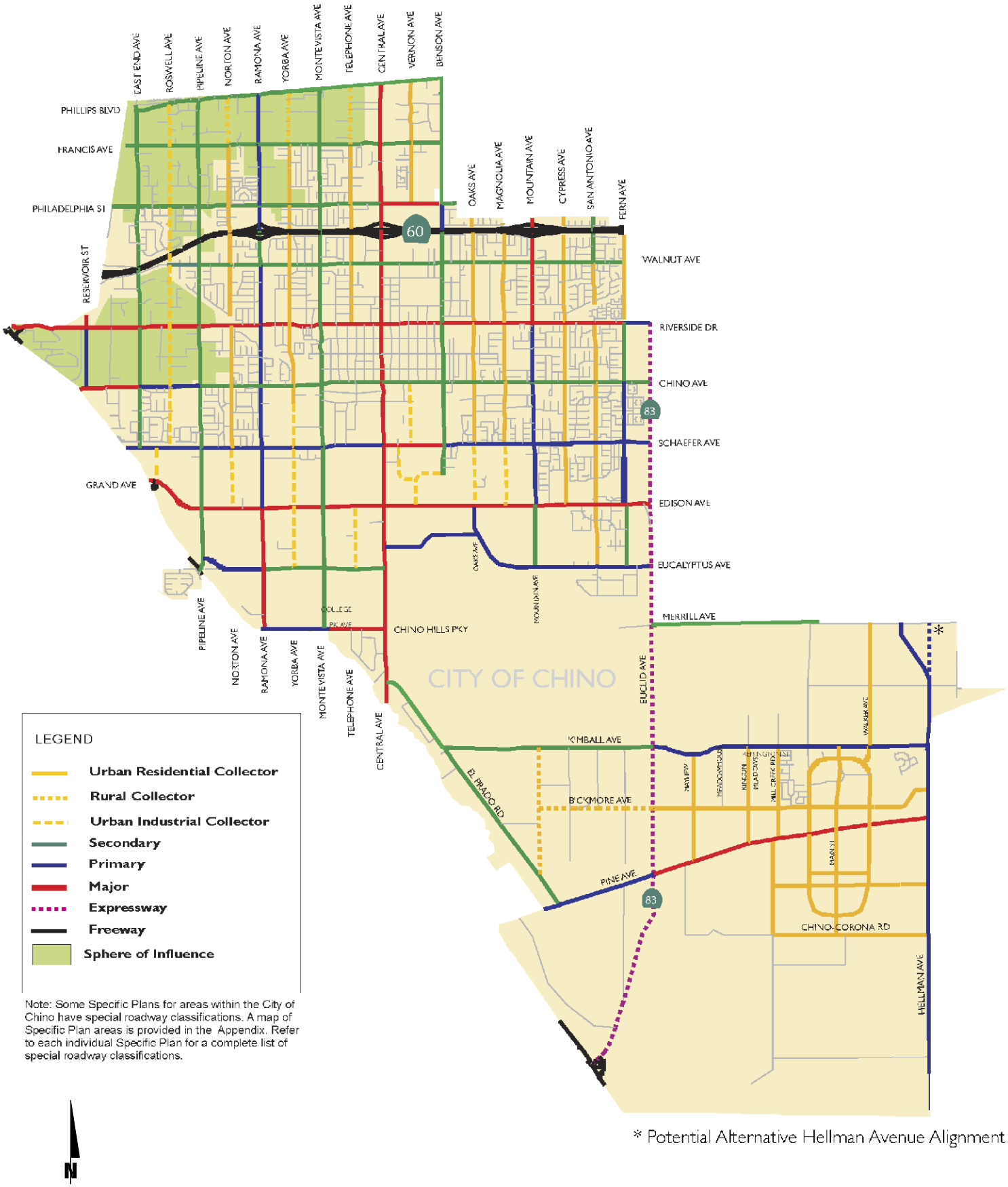
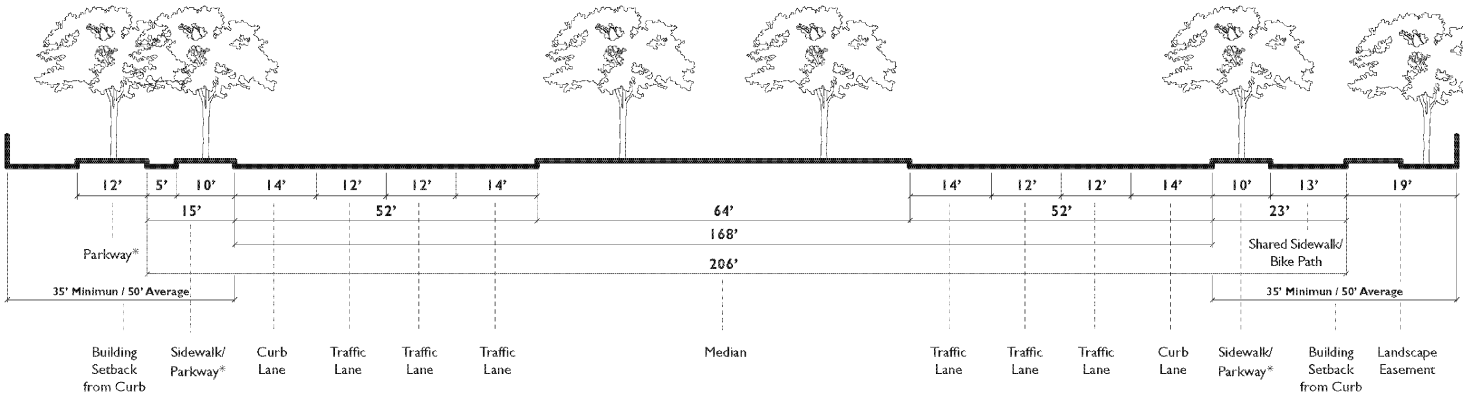
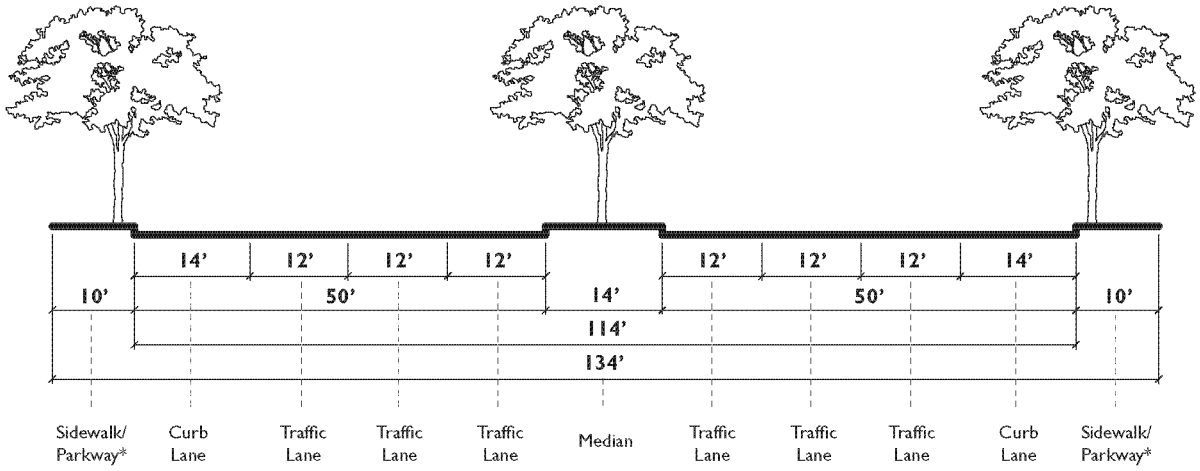


EXHIBIT 3-5 (1 of 2): CITY OF CHINO GENERAL PLAN ROADWAY CROSS-SECTIONS

Major Arterial (Expressway): Typical 8 Lane
Provides 8 traffic lanes and a wide median without parking



Major Arterial: Minimum 8 Lane
Provides 8 traffic lanes and 2 bicycle lanes separated by a median without parking



Major Arterial: Minimum 6 Lane
Provides 6 traffic lanes and 2 bicycle lanes separated by a median without parking

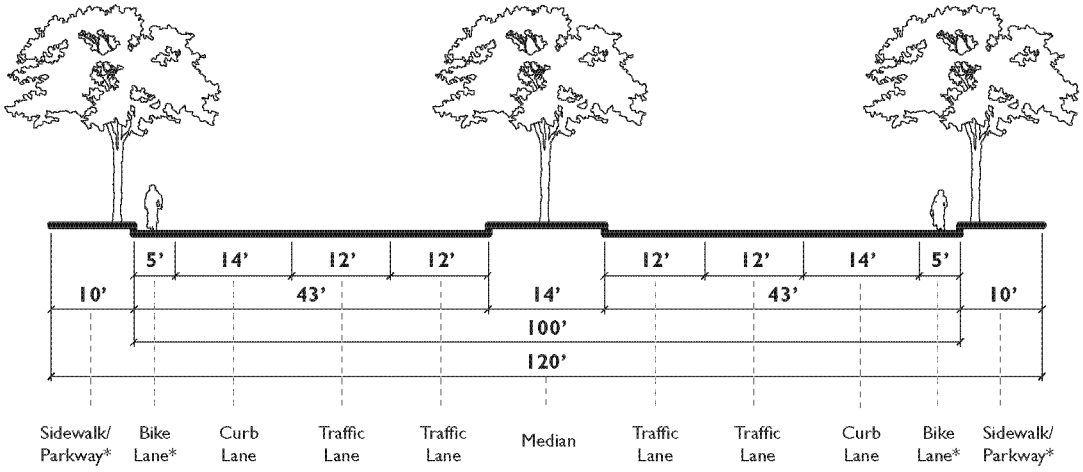
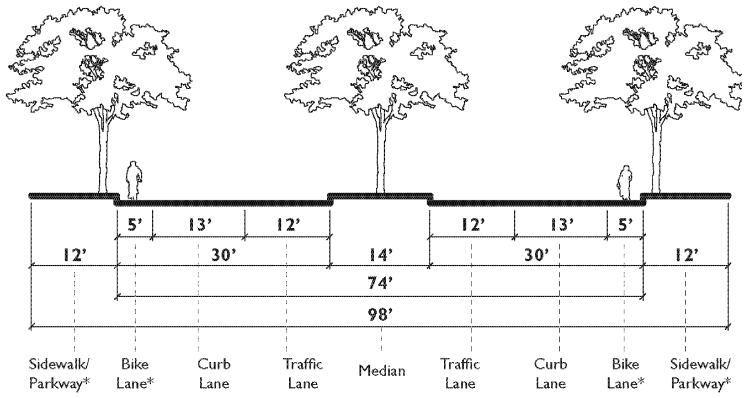
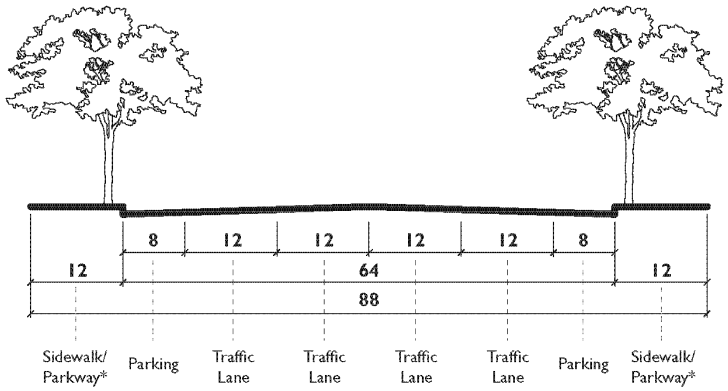


EXHIBIT 3-5 (2 of 2): CITY OF CHINO GENERAL PLAN ROADWAY CROSS-SECTIONS

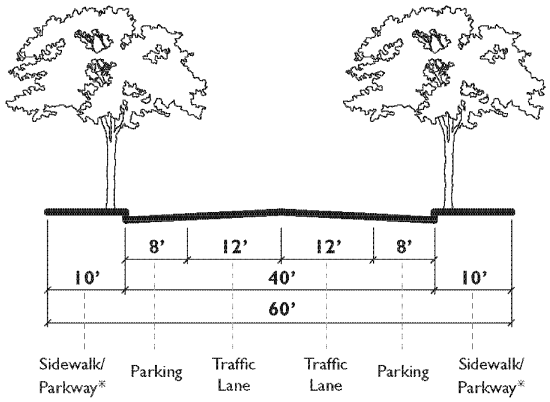
Primary Arterial: Typical 4 Lane
Provides 4 traffic lanes and 2 bicycle lanes separated by a median without parking



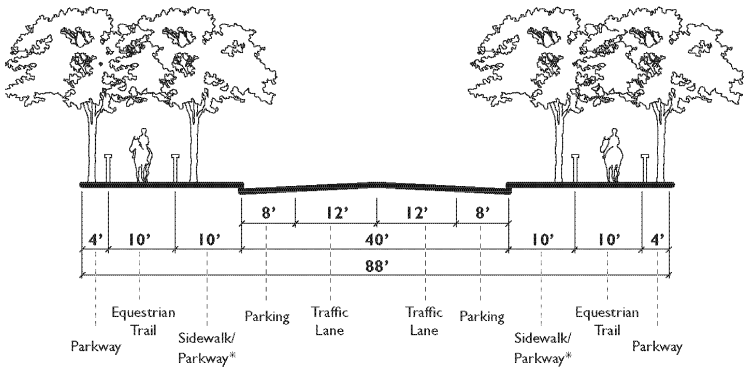
Secondary Arterial
Provides 4 traffic lanes with parking



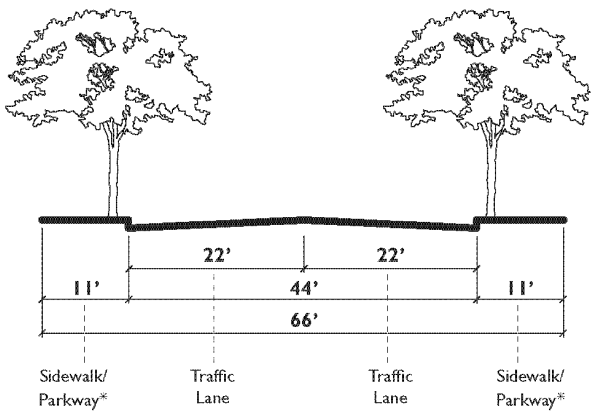
Urban Residential/Rural Collector
Provides 2 traffic lanes with parking and shared bicycle access



Urban Residential/Rural Collector with Equestrian Trails
Provides 2 traffic lanes and 2 equestrian trails with parking and shared bicycle access



Urban Industrial Collector
Provides 2 traffic lanes



Local Street
Provides 2 traffic lanes

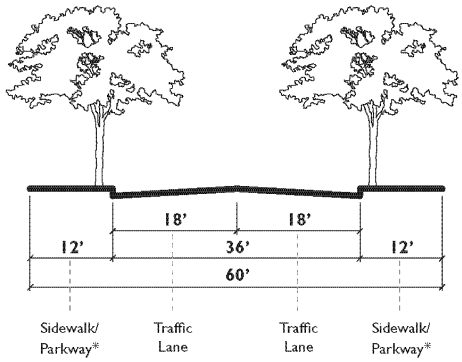


EXHIBIT 3-6: CITY OF CHINO HILLS GENERAL PLAN ROADWAY SEGMENTS

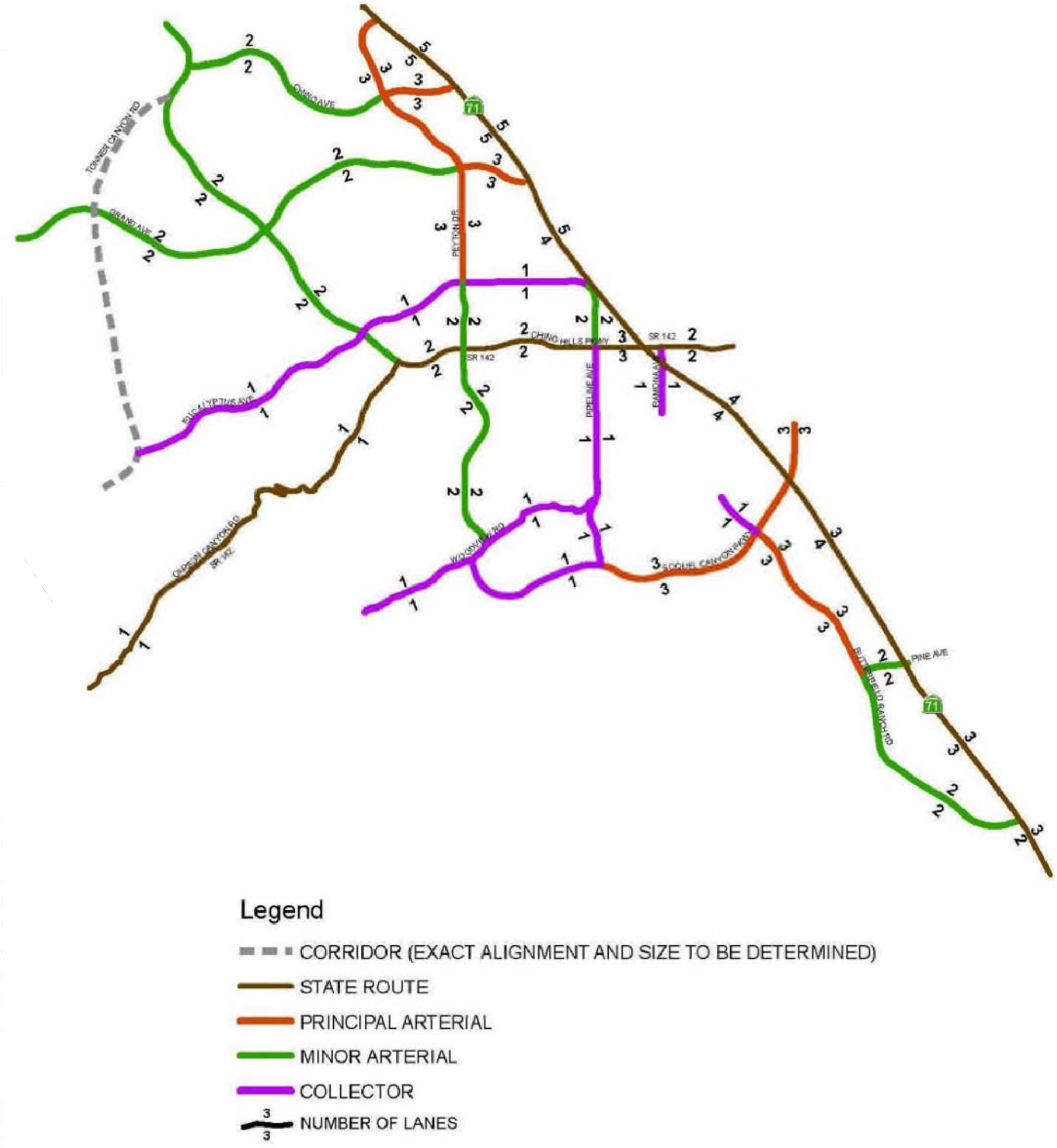
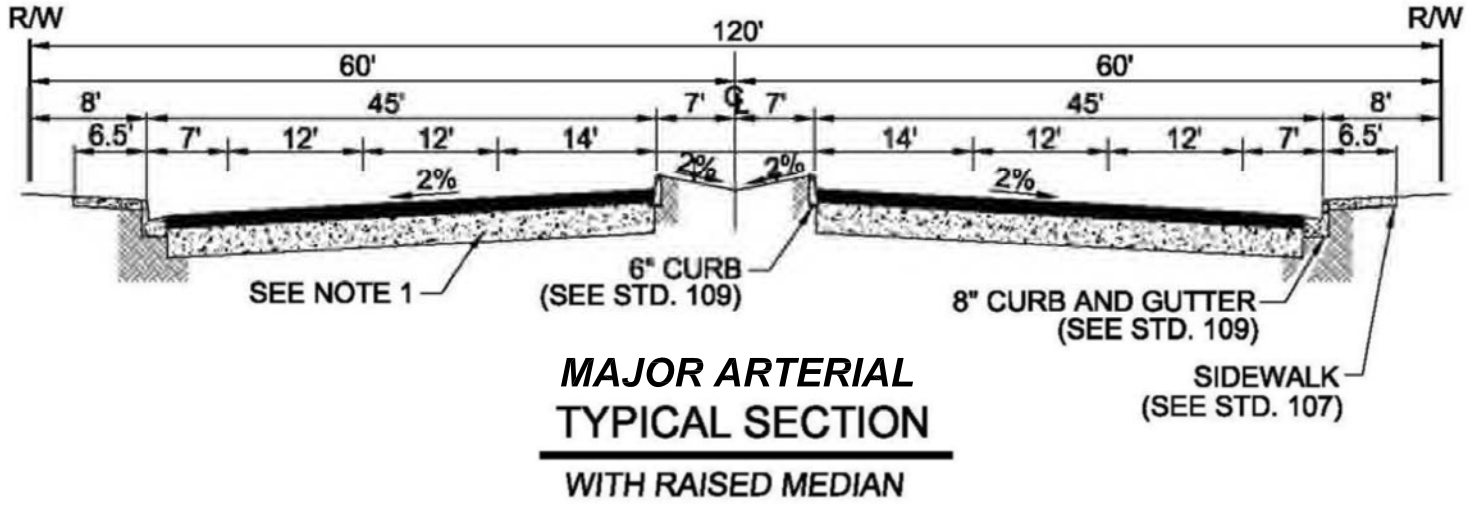
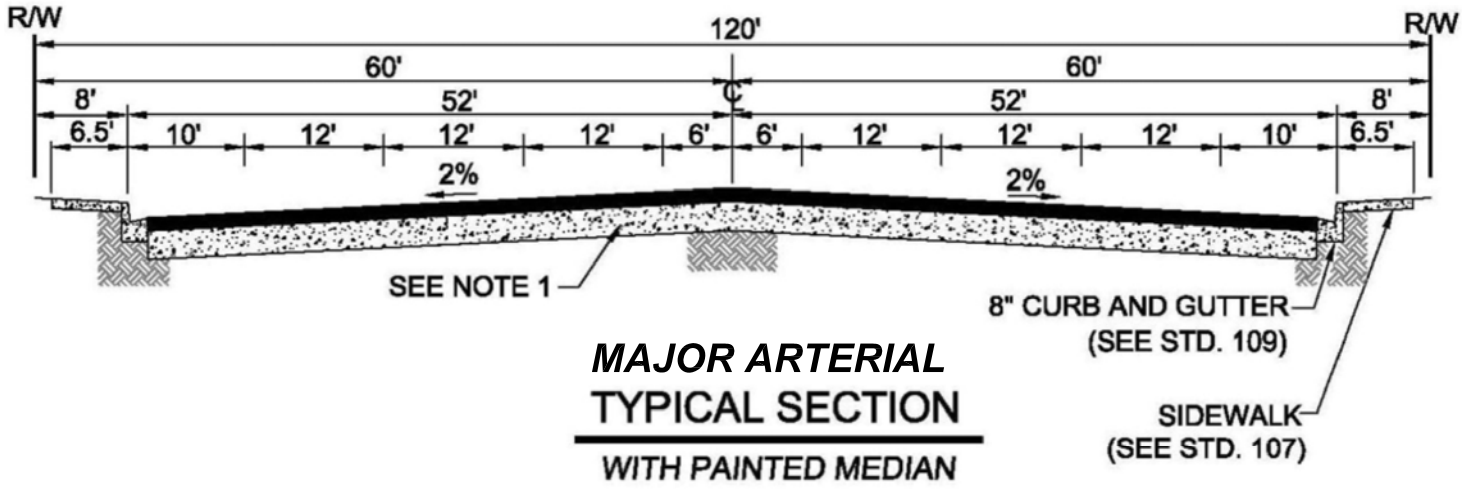


EXHIBIT 3-7 (1 of 2): CITY OF CHINO HILLS GENERAL PLAN ROADWAY CROSS-SECTIONS





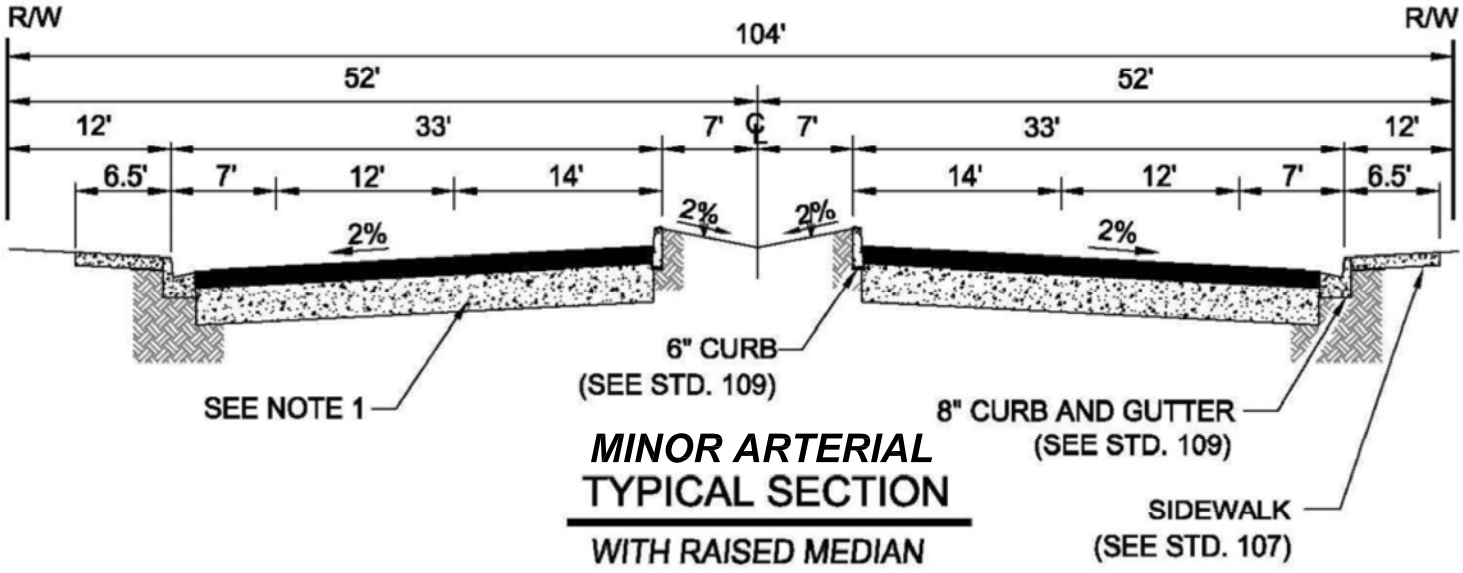
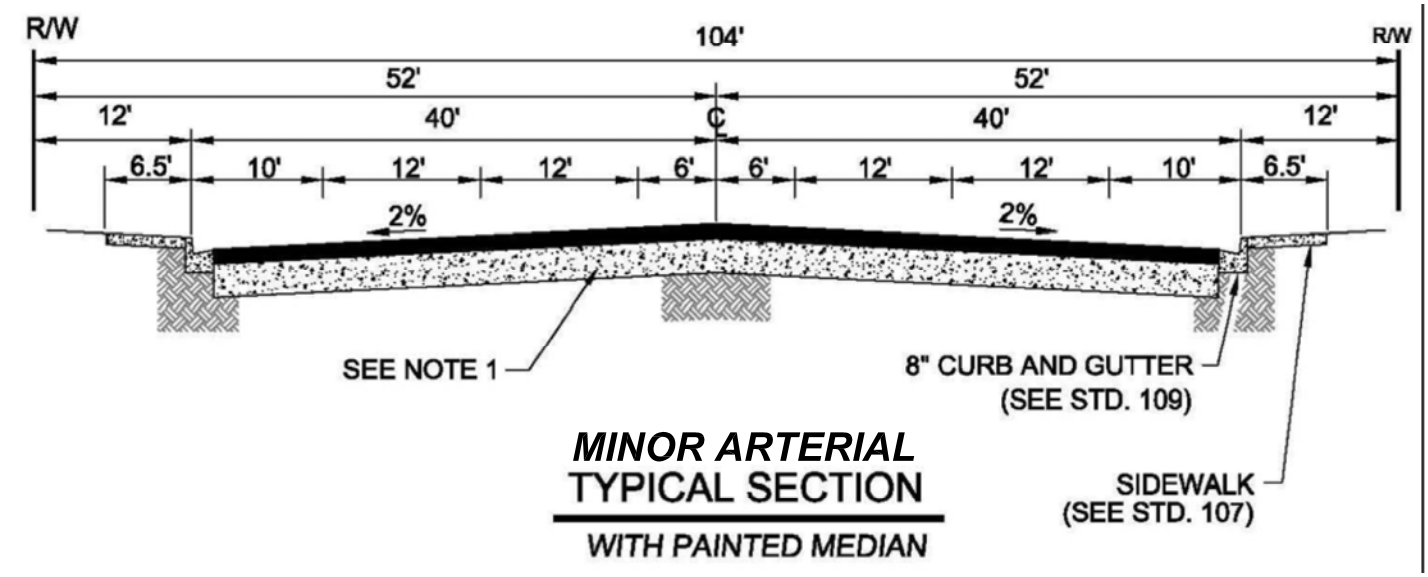
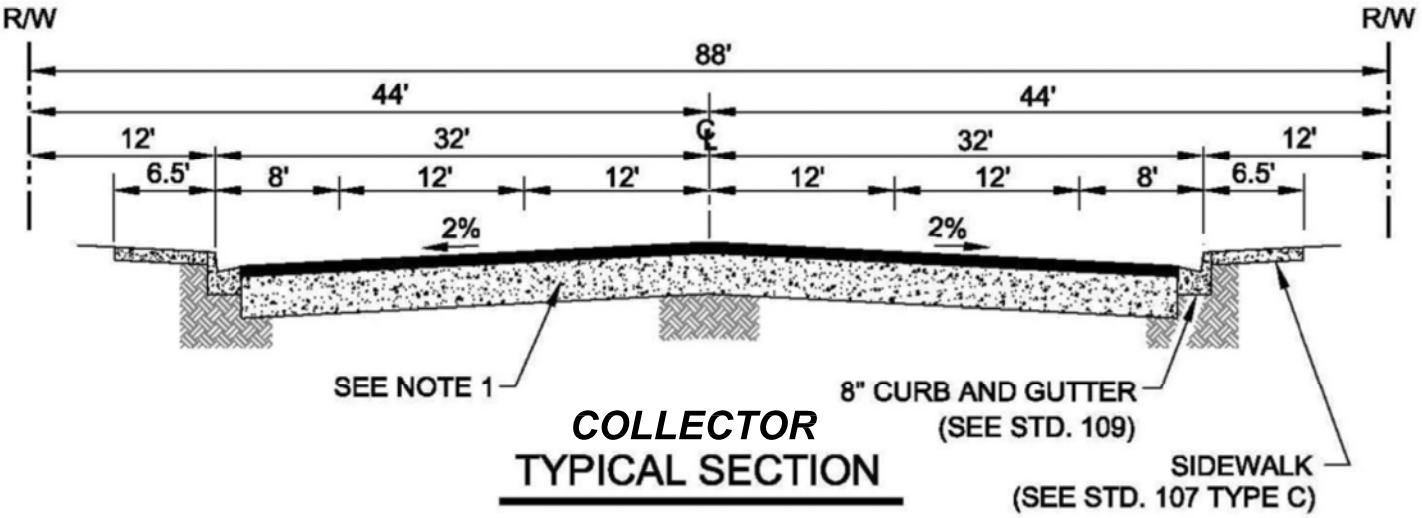


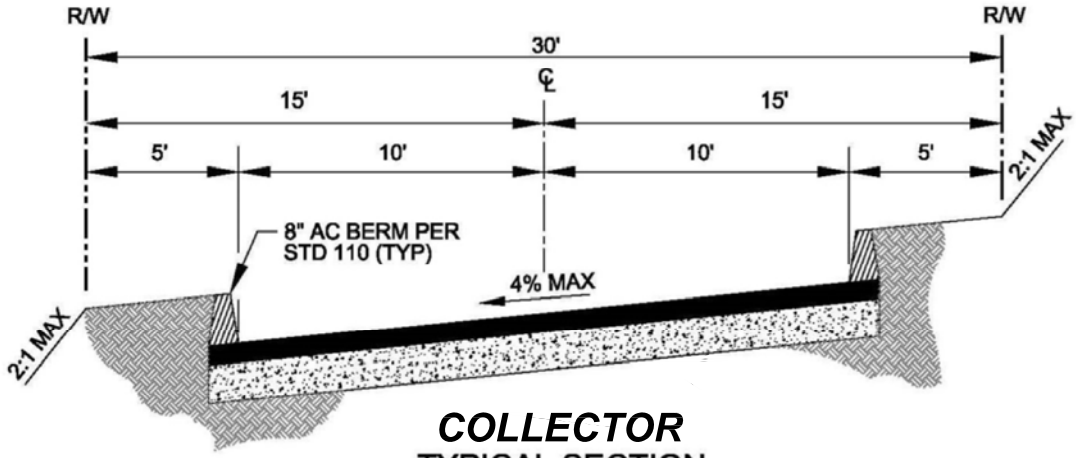
EXHIBIT 3-7 (2 of 2): CITY OF CHINO HILLS GENERAL PLAN ROADWAY CROSS-SECTIONS



MINOR ARTERIAL
TYPICAL SECTION
WITH PAINTED MEDIAN

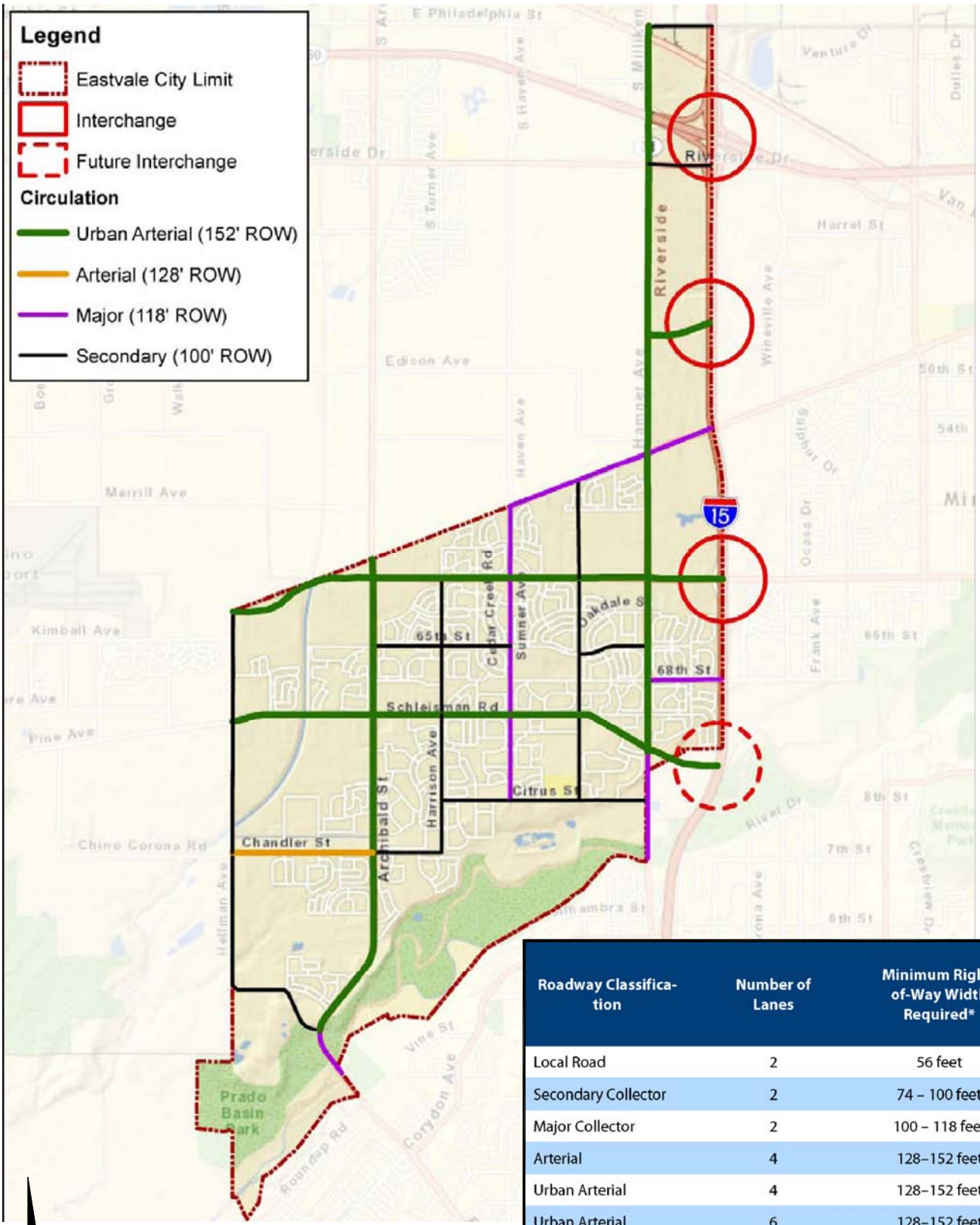


COLLECTOR
TYPICAL SECTION



COLLECTOR
TYPICAL SECTION
(RURAL)

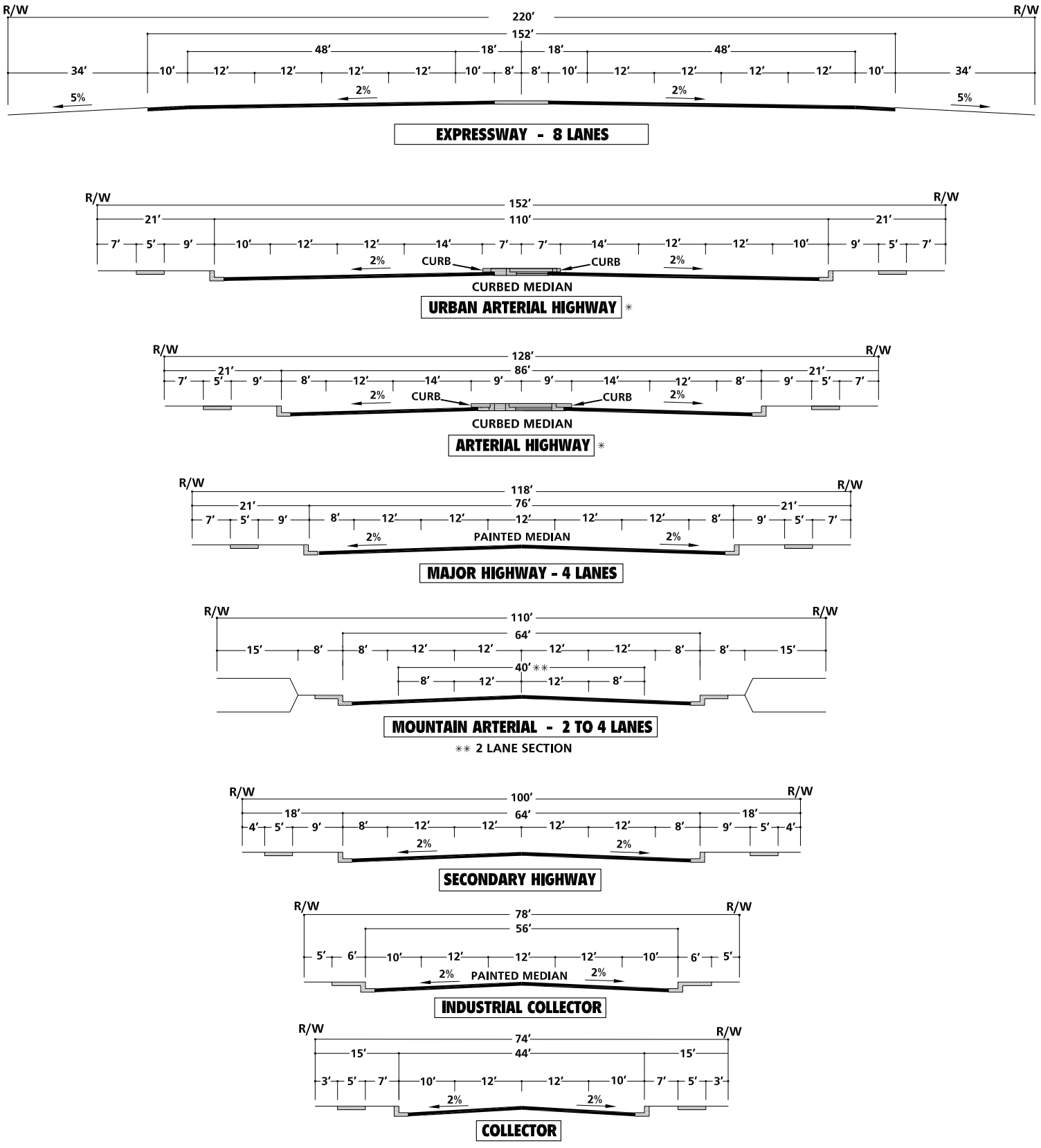
EXHIBIT 3-8: CITY OF EASTVALE GENERAL PLAN CIRCULATION ELEMENT



Roadway Classification	Number of Lanes	Minimum Right-of-Way Width Required*
Local Road	2	56 feet
Secondary Collector	2	74 – 100 feet
Major Collector	2	100 – 118 feet
Arterial	4	128–152 feet
Urban Arterial	4	128–152 feet
Urban Arterial	6	128–152 feet

SOURCE: CITY OF EASTVALE GENERAL PLAN
ADOPTED: JUNE 13, 2012

EXHIBIT 3-9: CITY OF EASTVALE GENERAL PLAN ROADWAY CROSS-SECTIONS

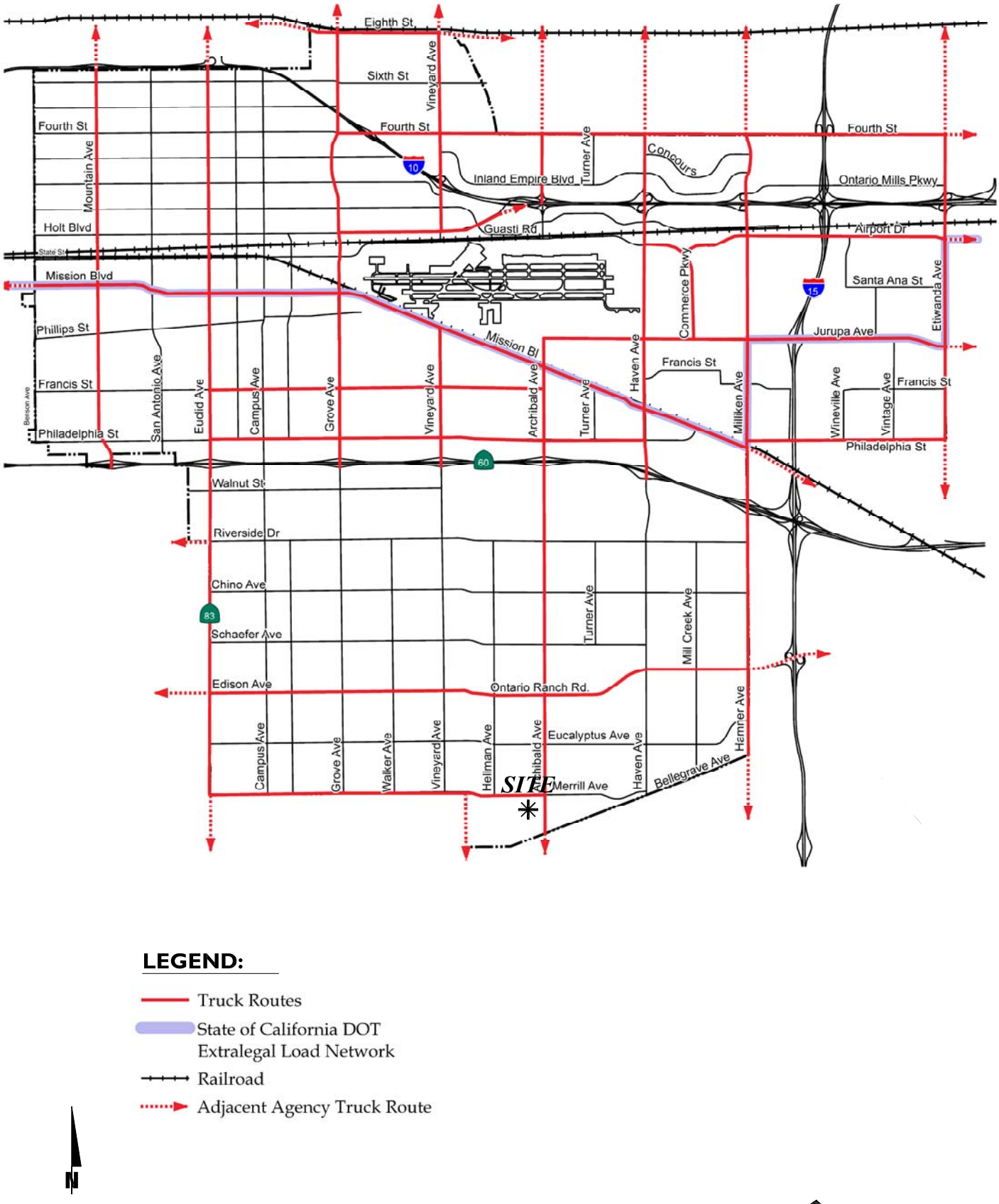


* *IMPROVEMENTS MAY BE RECONFIGURED TO ACCOMMODATE EXCLUSIVE TRANSIT LANES OR ALTERNATIVE LANE ARRANGEMENTS ADDITIONAL RIGHT OF WAY MAY BE REQUIRED AT INTERSECTIONS TO ACCOMMODATE ULTIMATE IMPROVEMENTS FOR STATE HIGHWAYS SHALL CONFORM TO CALTRANS DESIGN STANDARDS.*

NOT TO SCALE

10522 - gprcs.dwg

EXHIBIT 3-10: CITY OF ONTARIO TRUCK ROUTES



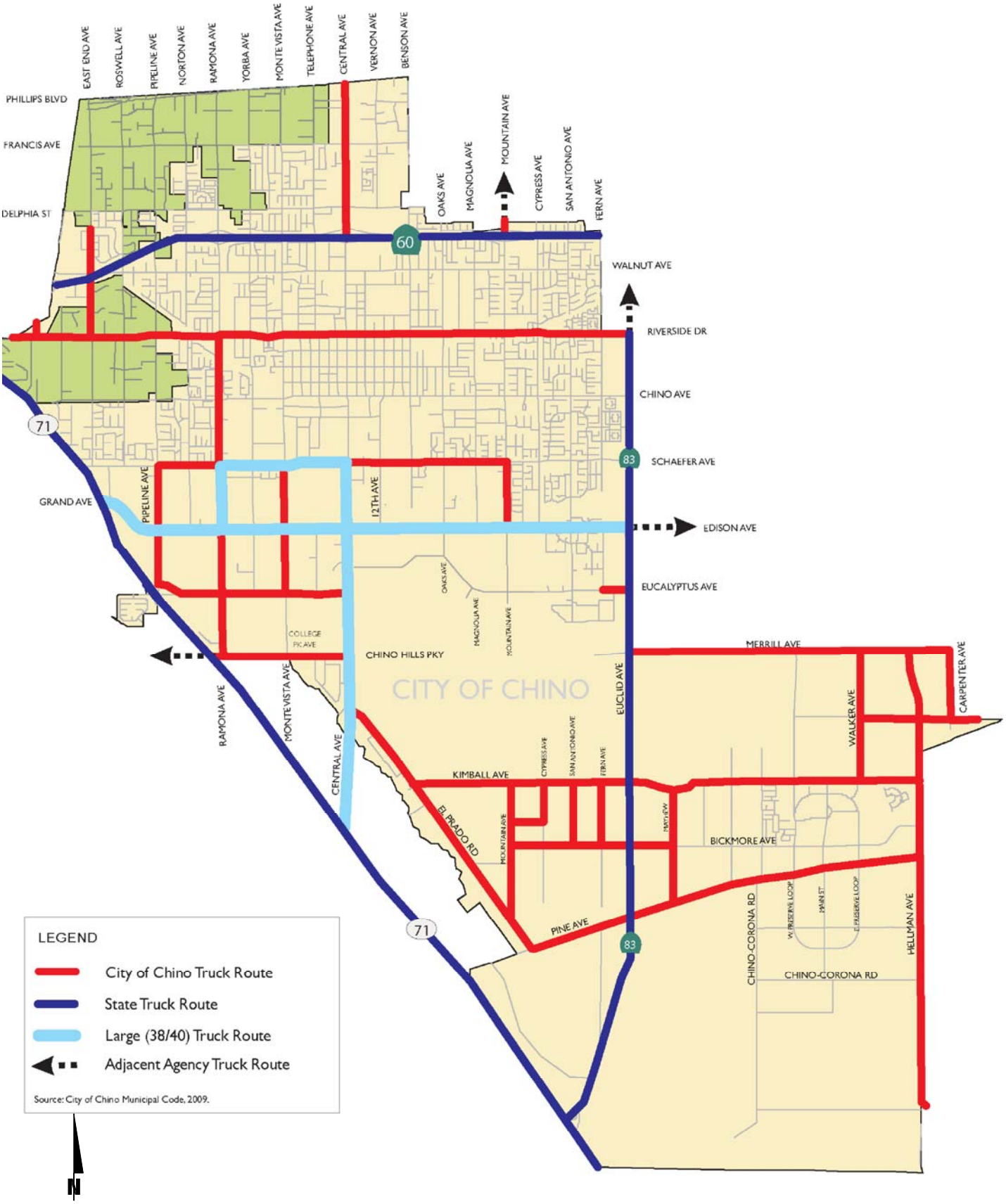
LEGEND:

- Truck Routes
- State of California DOT Extralegal Load Network
- Railroad
- Adjacent Agency Truck Route

N

10522 - ontario truck routes.dwg

EXHIBIT 3-11: CITY OF CHINO TRUCK ROUTES



10522 - chino-trucks.dwg

3.5 BICYCLE, EQUESTRIAN, & PEDESTRIAN FACILITIES

Field observations conducted in April and December of 2016 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-12 illustrates the City of Ontario future planned bicycle facilities, which proposes Class II and Multipurpose Trails along Merrill Avenue adjacent to the Project and the Cucamonga Creek Multipurpose Trail located immediately to the west of the Project. Exhibit 3-13 illustrates City of Chino future bicycle facilities, which proposes Class I bicycle facilities along Pine Avenue, Hellman Avenue, and Kimball Avenue near the vicinity of the site. Exhibit 3-14 illustrates the City of Eastvale trails and bikeway systems. Existing pedestrian facilities within the study area are shown on Exhibit 3-15.

3.6 TRANSIT SERVICE

The study area within the City of Chino is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County. Based on a review of the existing transit routes within the vicinity of the proposed Project, Omnitrans Route 81 operates on Riverside Drive north of the site. However, there are no existing bus routes near the vicinity of the Project. The Riverside Transit Authority (RTA) serves the City of Eastvale. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the applicant work in conjunction with Omnitrans and RTA to potentially provide additional bus service to the site. Existing transit routes in the vicinity of the study area are illustrated on Exhibit 3-16.

3.7 EXISTING (2017) TRAFFIC COUNTS

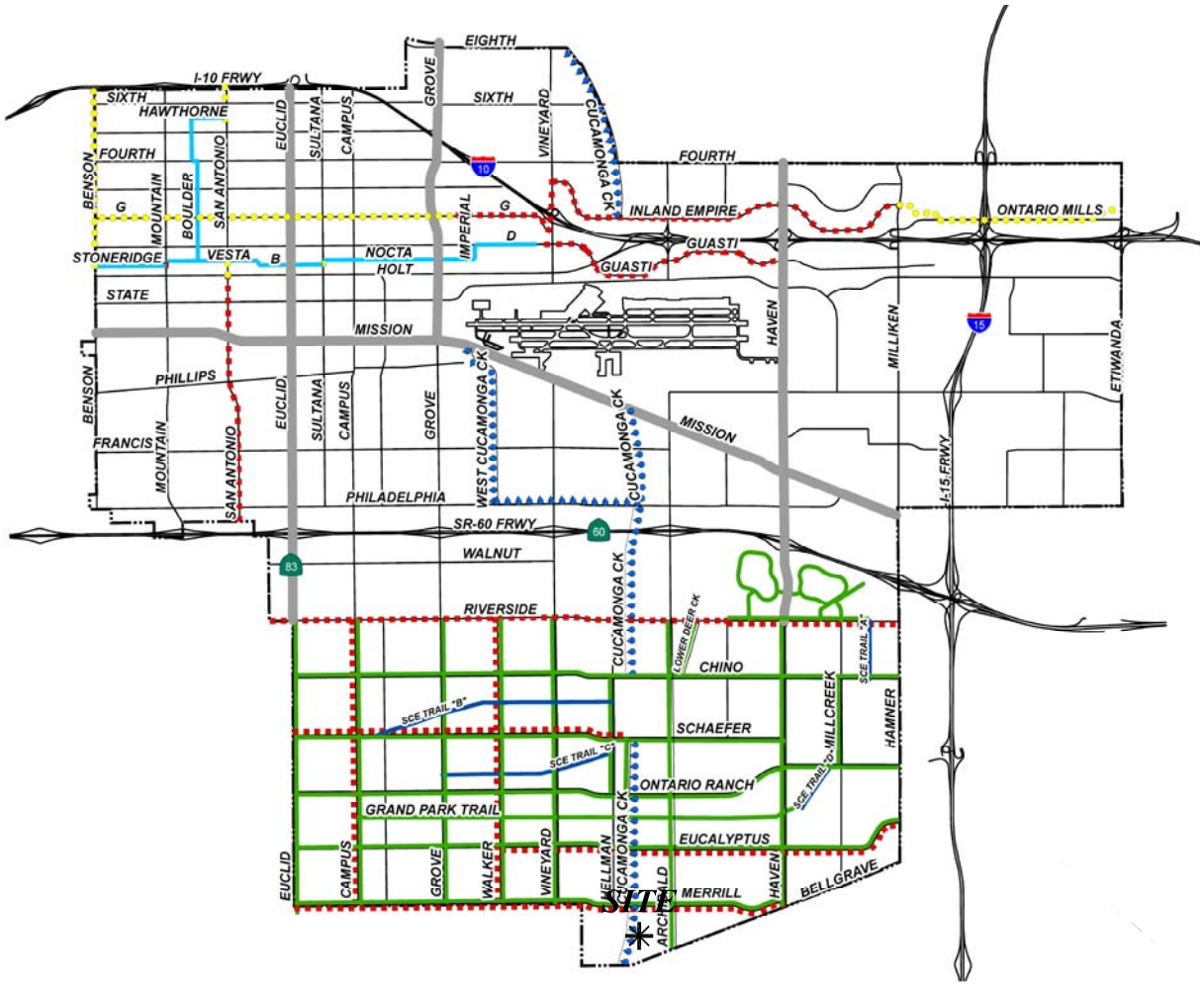
The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in April and December of 2016. The following peak hours were selected for analysis:

- 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 weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The traffic counts collected in April and December of 2016 include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 2-Axle Trucks, and 4 or More Axle Trucks.

EXHIBIT 3-12: CITY OF ONTARIO GENERAL PLAN TRAILS AND BIKEWAY SYSTEMS

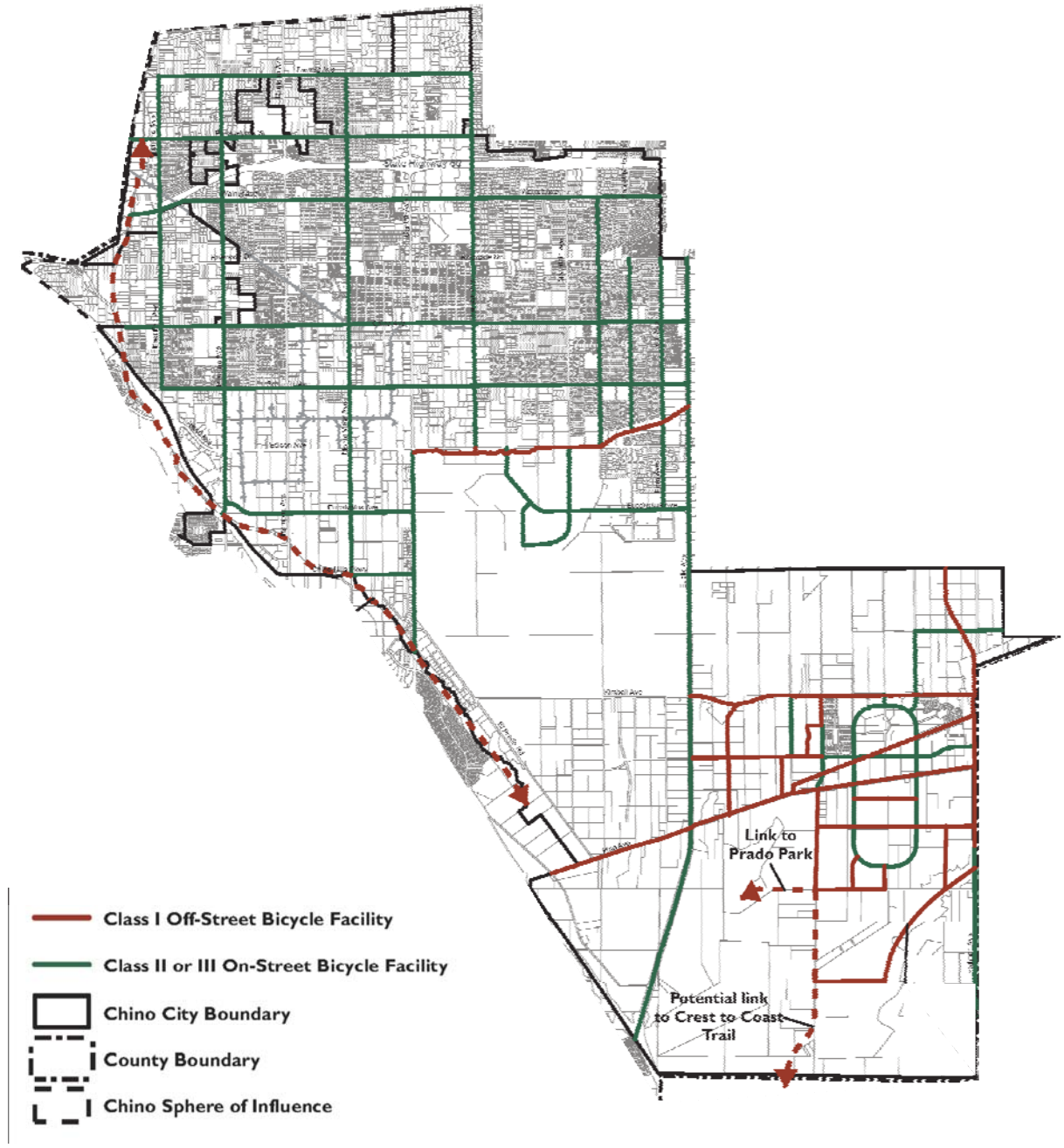


LEGEND:

- Freeway
- Streets
- Multipurpose Trail
- Class I
- Class II
- Class III
- Sharrow/Bike Boulevard
- SCE Trail
- Bicycle Corridor

N

EXHIBIT 3-13: CITY OF CHINO FUTURE BICYCLE FACILITIES



10522 - chino-future-bike.dwg

EXHIBIT 3-14: EASTVALE AREA TRAILS AND BIKEWAYS SYSTEM

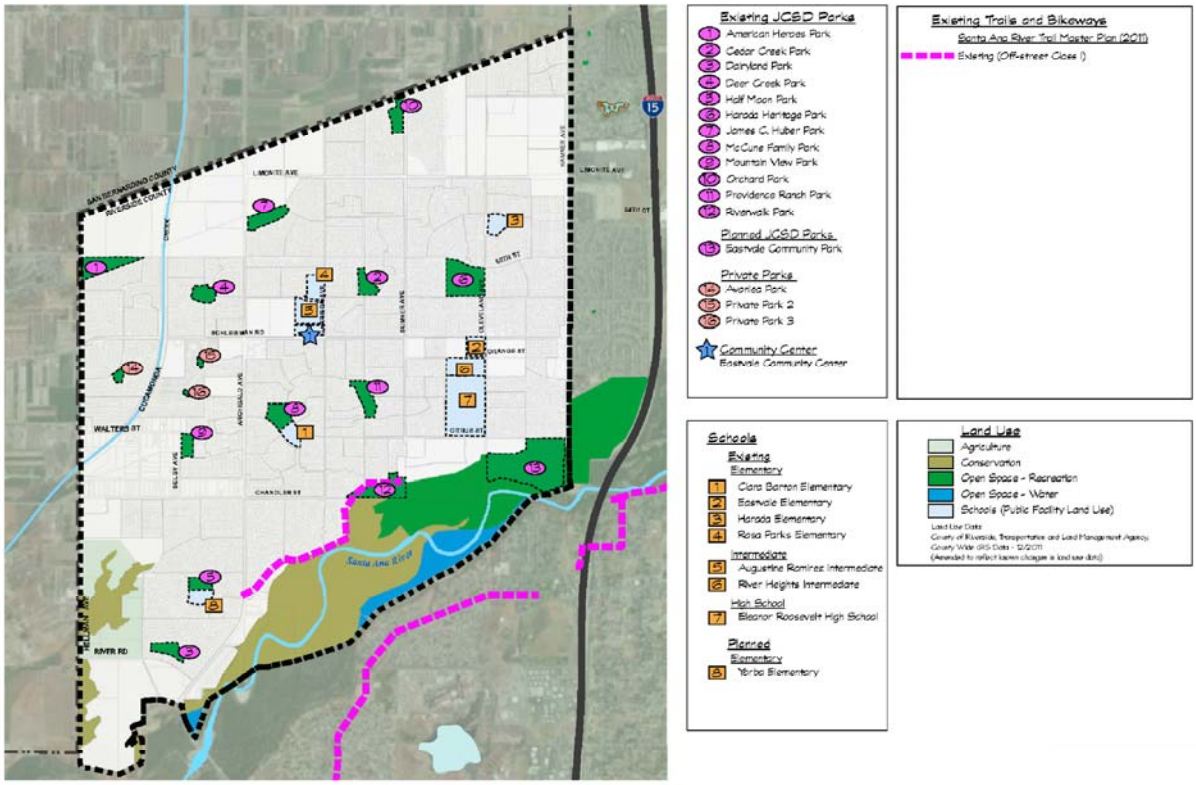


Exhibit 2.8-1 Existing Trails

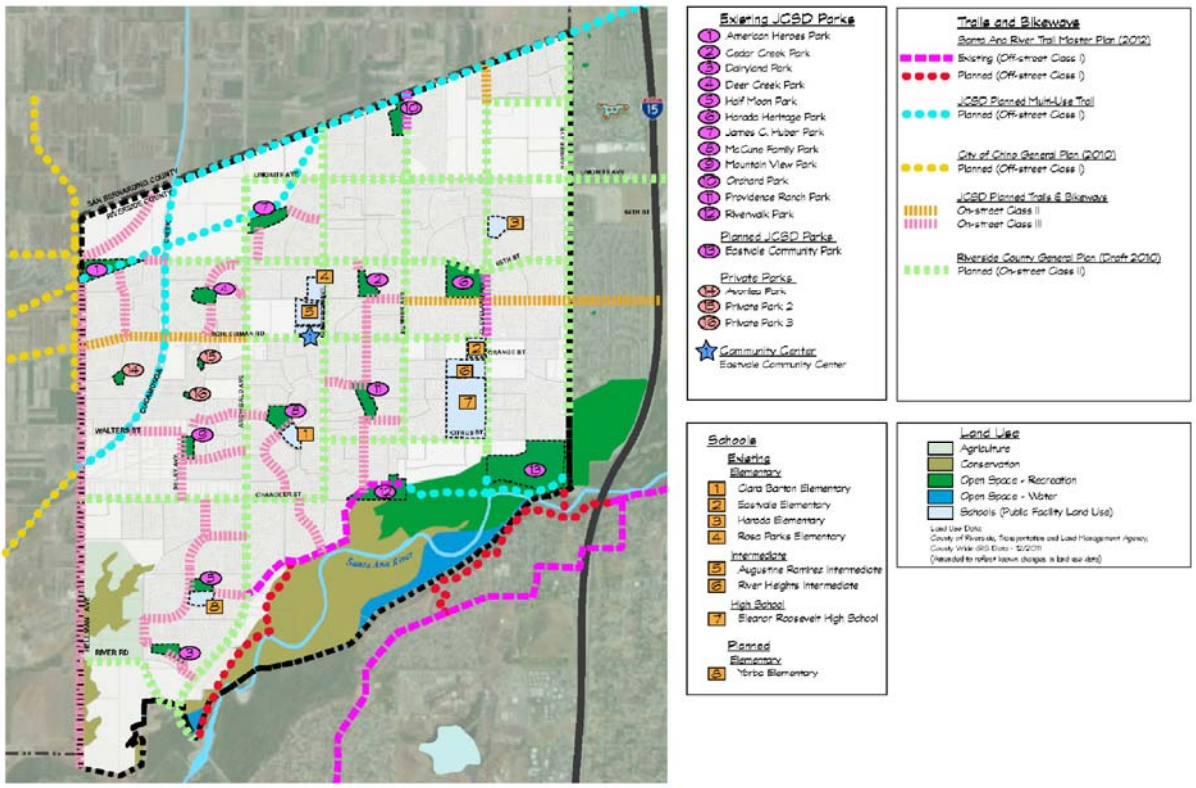
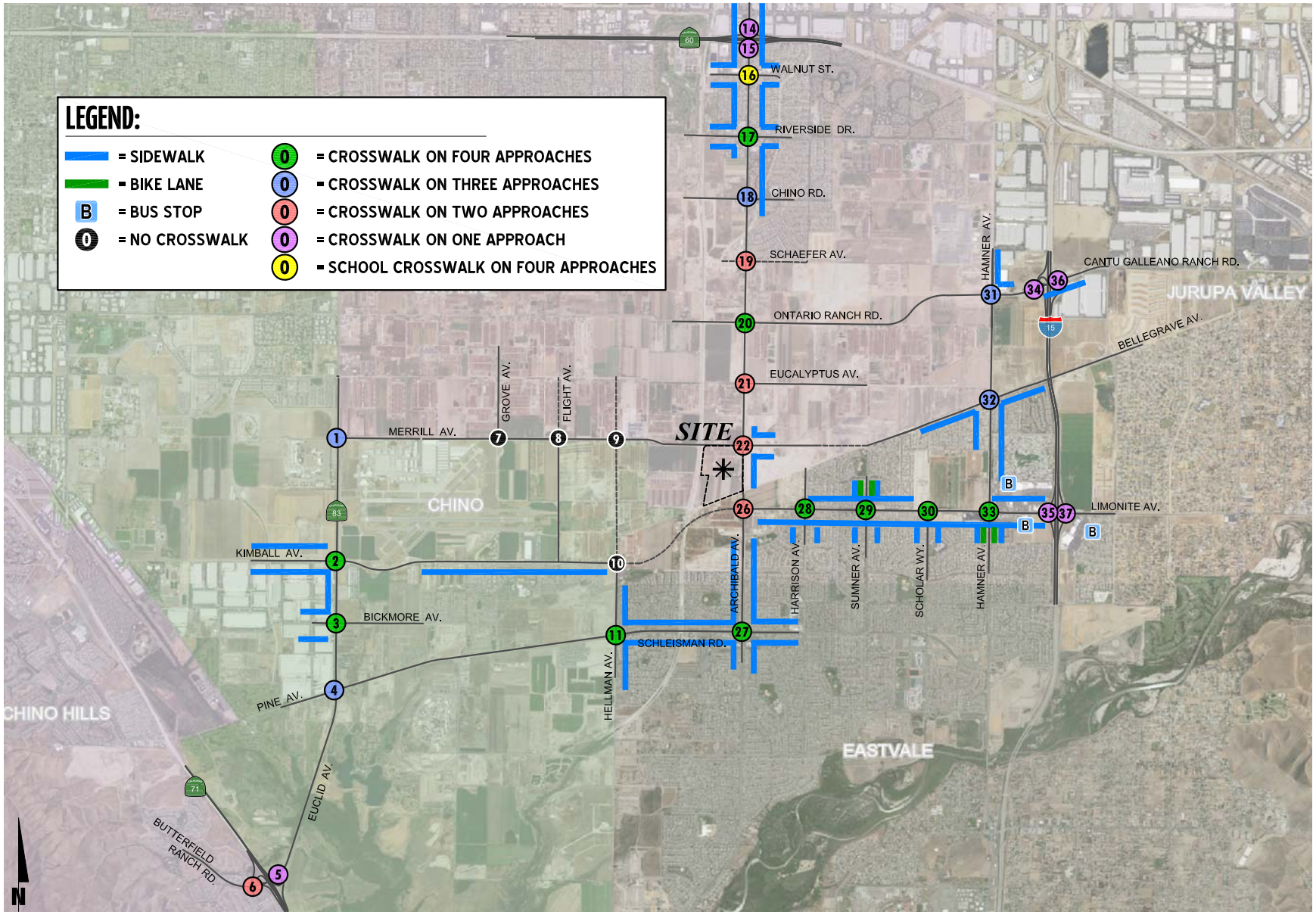


Exhibit 2.8-2 Planned Trails

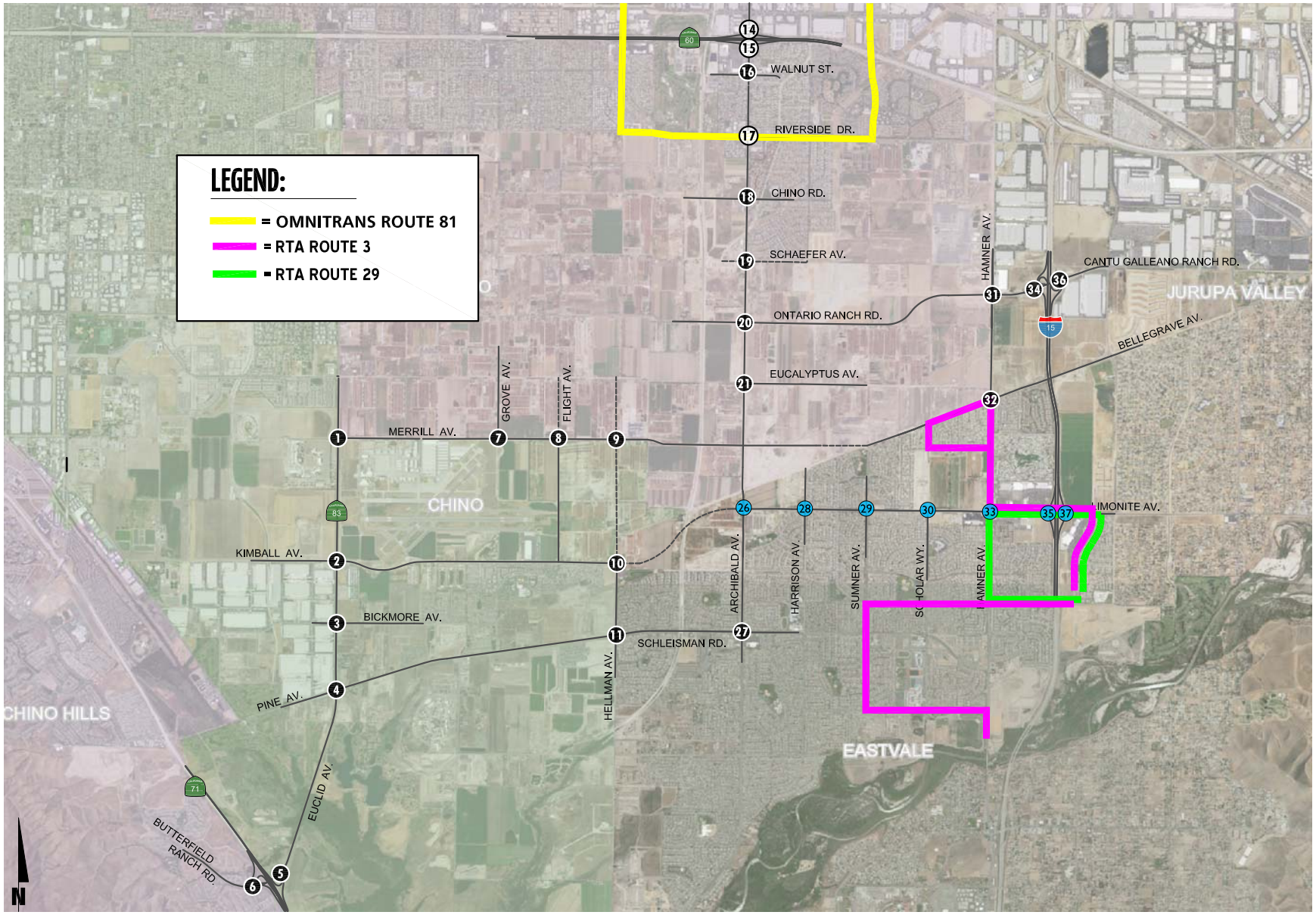
N

EXHIBIT 3-15: EXISTING PEDESTRIAN FACILITIES



URBAN CROSSROADS

EXHIBIT 3-16: EXISTING TRANSIT ROUTES



URBAN CROSSROADS

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

Existing weekday ADT volumes are shown on Exhibit 3-17. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 12.7572 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.84 percent. As such, the above equation utilizing a factor of 12.7572 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.84 percent (i.e., 1/0.0784 = 12.7572) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are shown on Exhibit 3-18.

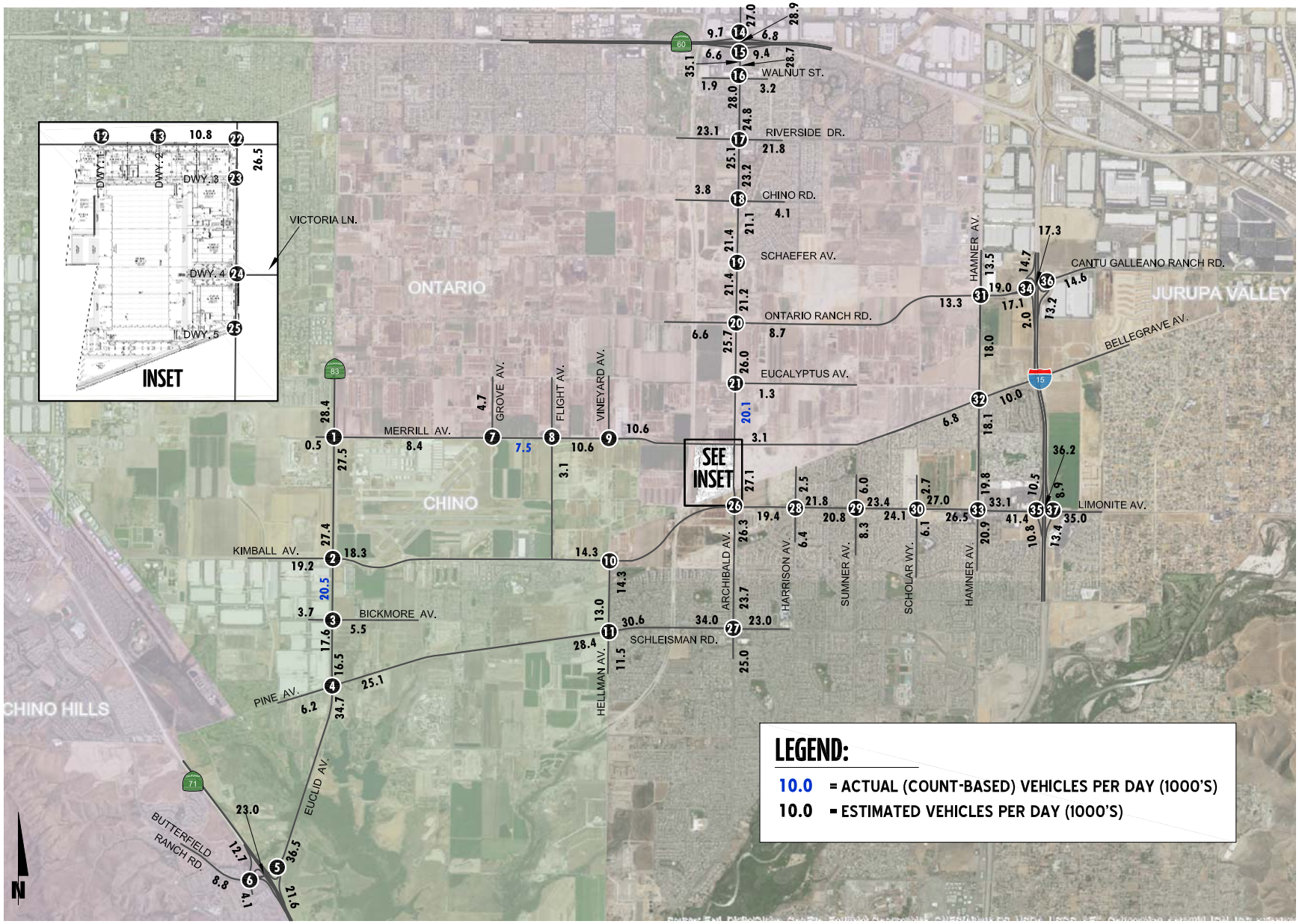
3.8 INTERSECTION OPERATIONS ANALYSIS

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

- Hellman Av. / Kimball Av. (#10) – LOS F AM and PM peak hours
- Archibald Av. / Limonite Av. (#26) – LOS E PM peak hour only
- Hamner Av. / Ontario Ranch Rd. (#31) – LOS E AM and PM peak hours

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-19. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

EXHIBIT 3-17: EXISTING (2017) AVERAGE DAILY TRAFFIC (ADT)



URBAN CROSSROADS

EXHIBIT 3-18: EXISTING (2017) TRAFFIC VOLUMES (IN PCE)

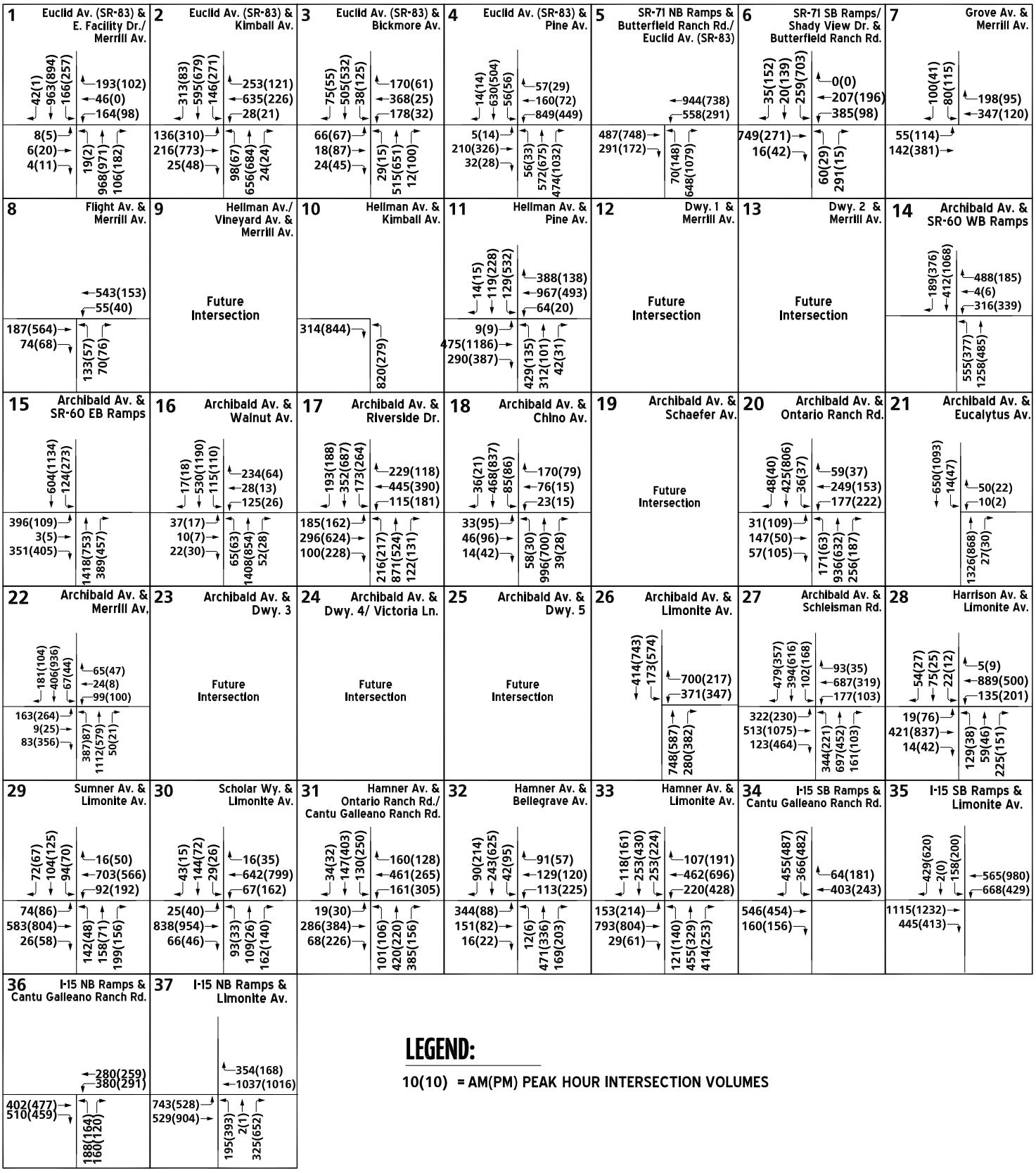
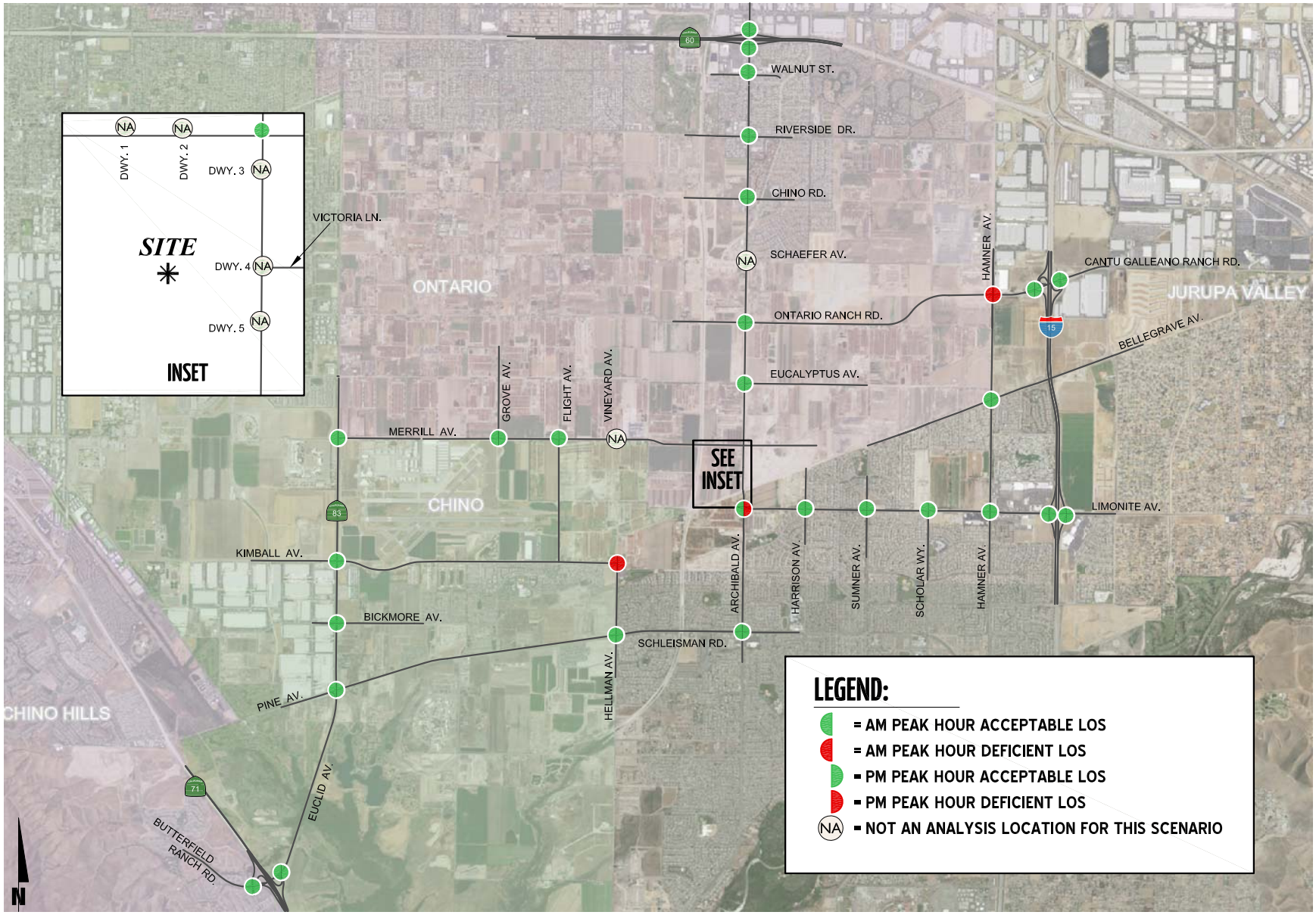


EXHIBIT 3-19: SUMMARY OF LOS FOR EXISTING (2017) CONDITIONS



URBAN CROSSROADS

Table 3-1

Intersection Analysis for Existing (2017) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service		Acceptable LOS
			Northbound			Southbound			Eastbound			Westbound							
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	
1	Euclid Av. (SR-83) / Merrill Av.	TS	1	2	1	1	2	d	0	1	d	0	1	0	26.4	40.5	C	C	D
2	Euclid Av. (SR-83) / Kimball Av.	TS	1	2	1	1	2	0	1	2	0	1	2	0	50.0	45.7	D	D	D
3	Euclid Av. (SR-83) / Bickmore Av.	TS	1	2	d	1	2	1	1	1	1	1	1	0	46.1	25.8	D	C	D
4	Euclid Av. (SR-83) / Pine Av.	TS	1	2	1>	1	2	0	1	1	1>>	2	1	0	40.1	34.2	D	C	D
5	SR-71 NB Ramps / Euclid Av. (SR-83)	TS	2	0	1>>	0	0	0	0	2	1>>	1	2	0	15.4	32.4	B	C	D
6	SR-71 SB Ramps / Euclid Av. (SR-83)	TS	1	0	1	1	1	1	0	2	d	1	2	1>>	53.5	34.2	D	C	D
7	Grove Av. / Merrill Av.	AWS	0	0	0	0	1	0	0	1	0	0	1	0	19.5	14.7	C	B	D
8	Flight Av. / Merrill Av.	CSS	0	1	0	0	0	0	0	1	1	1	1	0	27.9	19.0	D	C	D
9	Vineyard Av./Hellman Av. / Merrill Av.		Intersection Does Not Exist																D
10	Hellman Av. / Kimball Av.	AWS	1	0	0	0	0	0	0	0	1	0	0	0	**98.6**	**56.2**	**F**	**F**	D
11	Hellman Av. / Pine Av.	TS	2	2	1	2	2	1	2	2	1>	2	2	1>	23.3	31.9	C	C	D
12	Driveway 1 / Merrill Av.		Intersection Does Not Exist																D
13	Driveway 2 / Merrill Av.		Intersection Does Not Exist																D
14	Archibald Av. / SR-60 WB Ramps	TS	1	3	0	0	4	0	0	0	0	0	1	1	24.3	32.6	C	C	D
15	Archibald Av. / SR-60 EB Ramps	TS	0	4	0	1	3	0	0	1	1	0	0	0	25.0	28.5	C	C	D
16	Archibald Av. / Walnut Av.	TS	1	3	0	1	3	0	1	1	0	1	1	0	17.4	11.4	B	B	E
17	Archibald Av. / Riverside Dr.	TS	1	3	0	1	3	0	1	2	d	1	2	d	40.5	44.9	D	D	E
18	Archibald Av. / Chino Av.	TS	1	3	0	1	2	0	1	1	0	1	1	1	14.4	15.4	B	B	E
19	Archibald Av. / Schaefer Av.		Future Intersection																E
20	Archibald Av. / Ontario Ranch Rd.	TS	1	2	0	1	1	1	1	1	d	1	1	d	23.3	21.1	C	C	E
21	Archibald Av. / Eucalyptus Av.	TS	0	2	0	1	2	0	0	0	0	0	1	0	7.1	5.9	A	A	E
22	Archibald Av. / Merrill Av.	TS	1	2	1	2	2	d	1	1	1	1	1	d	32.9	38.6	C	D	E
23	Archibald Av. / Driveway 3		Future Intersection																D
24	Archibald Av. / Driveway 4/Victoria Ln.		Future Intersection																D
25	Archibald Av. / Driveway 5		Future Intersection																D
26	Archibald Av. / Limonite Av.	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	40.1	**65.5**	D	**E**	D
27	Archibald Av. / Schleisman Rd.	TS	2	3	1	2	3	1	2	3	1	2	3	1	38.1	29.8	D	C	D
28	Harrison Av. / Limonite Av.	TS	1	1	1	1	1	0	1	3	d	1	2	1	20.3	18.7	C	B	D
29	Sumner Av. / Limonite Av.	TS	1	2	d	1	2	d	2	3	d	2	3	1	17.5	16.3	B	B	D
30	Scholar Way / Limonite Av.	TS	1	1	1	1	2	1	1	2	1	1	2	1	16.6	15.3	B	B	D
31	Hamner Av. / Ontario Ranch Rd.	TS	1	1	0	1	1	0	1	1	1	1	1	1	**76.4**	**59.4**	**E**	**E**	D
32	Hamner Av. / Bellegrave Av.	TS	1	1	1	1	1	0	1	2	1	1	1	1	29.5	44.5	C	D	D
33	Hamner Av. / Limonite Av.	TS	2	3	1	2	2	1	2	3	1	2	2	1	32.9	33.8	C	C	D
34	I-15 SB Ramps / Cantu Galleano Ranch Rd.	TS	0	0	0	2	0	1	0	3	1	0	2	1	12.9	8.6	B	A	D
35	I-15 SB Ramps / Limonite Av.	TS	0	0	0	1	1	1	0	2	1	2	2	0	29.3	30.0	C	C	D
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.	TS	1	1	1	0	0	0	0	3	1>	2	3	0	15.4	15.2	B	B	D
37	I-15 NB Ramps / Limonite Av.	TS	1	1	1	0	0	0	2	2	0	0	2	1	24.8	25.1	C	C	D

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

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

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

3.9 EXISTING CONDITIONS ROADWAY SEGMENT CAPACITY ANALYSIS

The City of Ontario General Plan provides roadway volume capacity values presented previously on Table 2-3. The roadway segment capacities 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 (2017) conditions roadway segment capacity analysis based on the City of Ontario General Plan Roadway Segment Capacity Thresholds identified previously on Table 2-3. As shown on Table 3-2, all but 1 of the study area roadway segments currently operate at an acceptable LOS based on the City's planning level daily roadway capacity thresholds (Archibald Avenue north of the County Line is the only deficient roadway segment).

3.10 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. The following study area intersections currently warrant a traffic signal for Existing traffic conditions: Grove Avenue / Merrill Avenue, Flight Avenue / Merrill Avenue, and Hellman Avenue / Kimball Avenue. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

3.11 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the SR-71 Freeway and Euclid Avenue (SR-83), SR-60 Freeway and Archibald Avenue, I-15 Freeway and Cantu Galleano Ranch Road, and I-15 Freeway and Limonite 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 SR-71, SR-60, and I-15 Freeway mainlines. 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.

3.12 BASIC FREEWAY SEGMENT ANALYSIS

Existing (2017) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 3-20. As shown on Table 3-4, the SR-71, SR-60, and I-15 Freeway segments analyzed for this study were found to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing (2017) traffic conditions, with exception of the following:

- SR-71 Freeway Southbound, South of Euclid Av. (SR-83) (#1) – LOS E AM peak hour only
- I-15 Freeway Southbound, South of Limonite Av. (#9) – LOS E AM peak hour only

Existing (2017) basic freeway segment analysis worksheets are provided in Appendix 3.5.

Table 3-2

Roadway Segment Capacity Analysis for Existing (2017) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2017	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	2U	14,000	8,407	0.60	B	D
2		Between Grove Av. and Vineyard Av.	2U	14,000	7,466	0.53	A	D
3		West of Driveway 2	2U	14,000	10,754	0.77	C	D
4	Archibald Avenue	North of Ontario Ranch Rd.	4D	35,900	21,177	0.59	A	D
5		Between Eucalyptus Av. and Merrill Av.	4D	35,900	20,073	0.56	A	D
6		North of the County Line	2D	17,950	**27,064**	**1.51**	**F**	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

Table 3-3

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2017) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM
SR-71 NB Ramps / Euclid Avenue (SR-83)	NBL	1,745	38	48	Yes	Yes
	NBR	420	150 [2]	992 [2]	Yes	Yes[3]
SR-71 SB Ramps / Euclid Avenue (SR-83)	SBL	1,100	129	468 [2]	Yes	Yes
	SBL/T	1,560	128	458 [2]	Yes	Yes
	SBR	255	0	43	Yes	Yes
Archibald Avenue/ SR-60 WB Ramps	WBL/T	1,389	331 [2]	357 [2]	Yes	Yes
	WBR	250	522 [2]	52	Yes[3]	Yes
Archibald Avenue/ SR-60 EB Ramps	EBL/T	1,268	322	89	Yes	Yes
	EBR	350	157	298 [2]	Yes	Yes
I-15 SB Ramps / Cantu Galleano Ranch Rd.	SBL	1,440	61	62	Yes	Yes
	SBR	460	154	109	Yes	Yes
I-15 NB Ramps / Cantu Galleano Ranch Rd.	NBL	1,680	80 [2]	59	Yes	Yes
	NBL/R	580	0	0	Yes	Yes
	NBR	440	45	39	Yes	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	182	191	Yes	Yes
	SBL/T/R	400	95	256	Yes	Yes
	SBR	1,200	74	232	Yes	Yes
I-15 NB Ramps / Limonite Avenue	NBL	450	225 [2]	350	Yes	Yes
	NBL/T/R	1,235	90	252	Yes	Yes
	NBR	400	65	237	Yes	Yes

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

Table 3-4

Basic Freeway Segment Analysis for Existing (2017) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	Volume		Truck %	Truck %	Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
SR-71	SB	South of Euclid Av. (SR-83)	2	4,082	3,279	3%	2%	**39.4**	27.3	**E**	D
	NB	South of Euclid Av. (SR-83)	3	4,219	4,362	15%	12%	24.3	24.9	C	C
SR-60	WB	West of Archibald Av.	4	5,550	5,422	4%	3%	22.4	21.7	C	C
		East of Archibald Av.	5	5,672	5,174	4%	3%	18.0	16.3	B	B
	EB	West of Archibald Av.	4	6,732	6,281	7%	5%	29.4	26.3	D	D
		East of Archibald Av.	4	6,498	6,498	8%	5%	28.1	27.6	D	D
I-15	SB	North of Cantu Galleano Ranch Rd.	4	5,896	5,938	7%	6%	24.5	24.6	C	C
		Cantu Galleano Ranch Rd. to Limonite Av.	3	5,349	5,339	7%	7%	32.1	32.0	D	D
		South of Limonite Av.	3	5,872	5,354	6%	7%	**37.4**	32.2	**E**	D
	NB	North of Cantu Galleano Ranch Rd.	5	6,069	5,311	2%	2%	19.1	16.7	C	B
		Cantu Galleano Ranch Rd. to Limonite Av.	3	5,573	4,866	1%	2%	32.7	27.0	D	D
		South of Limonite Av.	3	5,006	5,206	1%	2%	27.8	29.7	D	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

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

[4] LOS = Level of Service

EXHIBIT 3-20: EXISTING (2017) FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)

3.13 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing (2017) conditions and the results of this analysis are presented in Table 3-5. As shown in Table 3-5, the following merge and diverge areas currently do not operate at LOS D or better during the peak hours under Existing (2017) traffic conditions:

- SR-60 Freeway, Eastbound Off-Ramp at Archibald Av. (#6) – LOS E AM peak hour only
- I-15 Freeway, Southbound On-Ramp at Limonite Av. (#9) – LOS E AM peak hour only
- I-15 Freeway, Northbound On-Ramp at Cantu Galleano Ranch Rd. (#10) – LOS E AM peak hour only

Existing (2017) freeway ramp junction operations analysis worksheets are provided in Appendix 3.6.

3.14 RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at intersections, roadway segments, and freeway segments that have been identified as impacted under Existing (2017) traffic conditions in an effort to achieve an acceptable LOS (i.e., LOS D or better).

3.13.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Table 3-6 indicates the physical improvements needed to address LOS deficiencies at each of the study area intersections under Existing (2017) traffic conditions. The following improvements are recommended to improve Existing (2017) deficiencies.

Recommended Improvement – Hellman Av. / Kimball Av. (#10) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Install a traffic signal.

Recommended Improvement – Archibald Av. / Limonite Av. (#26) – The following improvement is necessary to improve the existing deficiency to acceptable levels:

- Construct a 2nd southbound left turn lane.

Recommended Improvement – Hamner Av. / Ontario Ranch Rd. (#31) – The intersection of Hamner Avenue and Ontario Ranch Road is currently under construction to widen Hamner Avenue between Ontario Ranch Road/Cantu Galleano Ranch Road and Bellegrave Avenue. It is anticipated that once these improvements are completed (mid to late 2017), the intersection would operate at acceptable LOS during the peak hours and the Project's cumulative impact at the intersection would be less than significant.

The intersection operations analysis worksheets, with improvements, are included in Appendix 3.7 of this TIA.

Table 3-5

Freeway Ramp Junction Merge/Diverge Analysis for Existing (2017) Conditions

Freeway	Direction[1]	Ramp or Segment	Lanes on Freeway[2]	AM Peak Hour		PM Peak Hour	
				Density[3]	LOS[4]	Density[2]	LOS[4]
SR-71	SB	Loop On-Ramp at Euclid Av. (SR-83) (Upstream)	2	33.0	D	29.7	D
		Loop On-Ramp at Euclid Av. (SR-83) (Downstream)	2	33.0	D	29.7	D
	NB	Off-Ramp at Euclid Av. (SR-83)	3	32.3	D	33.9	D
SR-60	WB	On-Ramp at Archibald Av.	4	23.2	C	22.7	C
		Off-Ramp at Archibald Av.	5	28.7	D	25.0	C
	EB	Off-Ramp at Archibald Av.	4	**35.1**	**E**	31.3	D
		On-Ramp at Archibald Av.	4	25.8	C	26.2	C
I-15	SB	Off-Ramp at Cantu Galleano Ranch Rd.	4	31.8	D	32.8	D
		On-Ramp at Limonite Av.	3	**35.1**	**E**	31.7	D
	NB	On-Ramp at Cantu Galleano Ranch Rd.	3	**37.8**	**E**	33.7	D
		Off-Ramp at Limonite Av.	3	32.5	D	34.5	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

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

[4] LOS = Level of Service

Table 3-6

Intersection Analysis for Existing (2017) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
10	Hellman Av. / Kimball Av.																	
	- Without Improvements	AWS	1	0	0	0	0	0	0	0	1	0	0	0	**98.6**	**56.2**	**F**	**F**
	- With Improvements	**TS**	1	0	0	0	0	0	0	0	1	0	0	0	3.4	1.9	A	A
26	Archibald Av. / Limonite Av.																	
	- Without Improvements	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	40.1	**65.5**	D	**E**
	- With Improvements	TS	0	1	1>	**2**	1	0	0	0	0	1	0	1>	41.7	30.1	D	C
31	Hamner Av. / Ontario Ranch Rd.																	
	- Without Improvements	TS	1	1	0	1	1	0	1	1	1	1	1	1	**76.4**	**59.4**	**E**	**E**
	- With Improvements[4]	TS	**2**	**3**	**1**	**2**	**2**	**1**	**2**	**3**	1	**2**	**2**	1	21.2	19.7	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] AWS = All-Way Stop; TS = Traffic Signal; **TS** = Improvement

[4] Improvements shown are currently under construction and are anticipated to be completed by mid to late 2017.

3.13.2 Recommended Improvements To Address Deficiencies On Roadway Segments

As shown on Table 3-7, the segment of Archibald Avenue north of the County Line would accommodate the anticipated daily traffic flows once the section is widened to a four-lane section. This segment would be widened as part of the frontage improvements in conjunction with the development of the proposed Project.

3.13.3 Recommended Improvements To Address Deficiencies On Off-Ramp Queues

As shown previously on Table 3-3, there are no peak hour queuing issues at the SR-71 Freeway and Euclid Avenue (SR-83), SR-60 Freeway at Archibald Avenue, I-15 Freeway and Cantu Galleano Ranch Road, or I-15 Freeway and Limonite Avenue interchanges. As such, no improvements have been recommended.

3.13.4 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 Ontario (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the Existing (2017) deficiencies on the SHS, because there is no feasible mitigation available.

Table 3-7

Roadway Segment Capacity Analysis for Existing (2017) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2017	V/C[2]	LOS[3]	Acceptable LOS
6	Archibald Avenue	North of the County Line	**4D**	35,900	27,064	0.75	C	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

This Page Intentionally Left Blank

4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by operation of PA1 and PA2, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 175,330-sf of manufacturing use (25 percent of Buildings 1 through 8), 525,991-sf of warehousing use (75 percent of Buildings 1 through 8), and 998,680-sf high-cube warehouse/distribution center use (Building 9). Similarly, PA3 would develop consist of up to 57,799-sf of manufacturing use (25 percent of the square footage), 173,396-sf of warehousing use (75 percent of the square footage). Regional access to the project site is provided via the SR-60 Freeway, the SR-71 Freeway, and the I-15 Freeway.

The Project is located on the southwest corner of Archibald Avenue and Merrill Avenue in the City of Ontario. Vehicular and truck traffic access will be provided via the following driveways:

- Driveway 1 / Merrill Avenue – Right-in/right-out driveway providing access to both passenger cars and trucks for Buildings 1, 2, and 9
- Driveway 2 / Merrill Avenue – Full access driveway providing access to both passenger cars and trucks for Buildings 3, 4, 5, 6, and 9
- Archibald Avenue / Driveway 3 – Right-in/right-out driveway providing access to passenger cars and trucks for Buildings 5, 6, and 9
- Archibald Avenue / Driveway 4 – Full access driveway providing access to both passenger cars and trucks for Buildings 6, 7, 8, and 9
- Archibald Avenue / Driveway 5 – Right-in/right-out driveway providing access to passenger cars and trucks for Buildings 8 and 9

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. A summary of the Project's trip generation based on PCE is shown in Table 4-2 while the trip generation based on actual vehicles is shown on Table 4-3 for informational purposes. The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual, 10th Edition, 2017. (3)

Table 4-1

Project Trip Generation Rates

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Project Trip Generation Rates (PCE)									
Manufacturing[3]	TSF	140	0.477	0.143	0.620	0.208	0.462	0.670	3.930
Passenger Cars			0.375	0.112	0.487	0.163	0.363	0.527	3.089
2-Axle Trucks (PCE = 1.5)			0.057	0.017	0.074	0.025	0.055	0.080	0.472
3-Axle Trucks (PCE = 2.0)			0.037	0.011	0.048	0.016	0.036	0.052	0.307
4-Axle+ Trucks (PCE = 3.0)			0.136	0.041	0.177	0.059	0.132	0.191	1.120
Warehouse[4]	TSF	150	0.131	0.039	0.170	0.051	0.139	0.190	1.740
Passenger Cars			0.105	0.031	0.137	0.041	0.111	0.153	1.397
2-Axle Trucks (PCE = 1.5)			0.010	0.003	0.013	0.004	0.011	0.015	0.136
3-Axle Trucks (PCE = 2.0)			0.012	0.004	0.015	0.005	0.012	0.017	0.157
4-Axle+ Trucks (PCE = 3.0)			0.039	0.012	0.051	0.015	0.042	0.057	0.522
High-Cube Transload and Short-term Storage Warehouse[5]	TSF	154	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars			0.042	0.013	0.055	0.019	0.050	0.069	0.963
2-Axle Trucks (PCE = 1.5)			0.005	0.001	0.006	0.002	0.006	0.008	0.109
3-Axle Trucks (PCE = 2.0)			0.008	0.002	0.010	0.004	0.009	0.013	0.181
4-Axle+ Trucks (PCE = 3.0)			0.036	0.011	0.047	0.016	0.042	0.059	0.820

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Project Trip Generation Rates (Actual Vehicles)									
Manufacturing[3]	TSF	140	0.477	0.143	0.620	0.208	0.462	0.670	3.930
Passenger Cars			0.375	0.112	0.487	0.163	0.363	0.527	3.089
2-Axle Trucks			0.038	0.011	0.050	0.017	0.037	0.054	0.314
3-Axle Trucks			0.019	0.006	0.024	0.008	0.018	0.026	0.153
4-Axle+ Trucks			0.045	0.014	0.059	0.020	0.044	0.064	0.373
Warehouse[4]	TSF	150	0.131	0.039	0.170	0.051	0.139	0.190	1.740
Passenger Cars			0.105	0.031	0.137	0.041	0.111	0.153	1.397
2-Axle Trucks			0.007	0.002	0.009	0.003	0.007	0.010	0.090
3-Axle Trucks			0.006	0.002	0.008	0.002	0.006	0.009	0.078
4-Axle+ Trucks			0.013	0.004	0.017	0.005	0.014	0.019	0.174
High-Cube Transload and Short-term Storage Warehouse[5]	TSF	154	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars			0.042	0.013	0.055	0.019	0.050	0.069	0.963
2-Axle Trucks			0.003	0.001	0.004	0.001	0.004	0.005	0.073
3-Axle Trucks			0.004	0.001	0.005	0.002	0.005	0.006	0.090
4-Axle+ Trucks			0.012	0.004	0.016	0.005	0.014	0.020	0.273

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

[2] TSF = thousand square feet

[3] Manufacturing Vehicle Mix Source: City of Fontana Truck Trip Generation Study for Land Use 110 (Light Industrial), August 2003. PCE rates per SBCTA.

[4] Warehouse Vehicle Mix Source: City of Fontana Truck Trip Generation Study for LU 150, August 2003. PCE rates are per SBCTA.

[5] Vehicle Mix Source: High Cube Warehouse Vehicle Trip Generation Analysis, October 2016, ITE.
Truck mix (by axle type) source from SCAQMD. PCE rates are per SBCTA.

Table 4-2

Project Trip Generation Summary (in PCE)

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Manufacturing (25% of Buildings 1-8)	175.330	TSF							
Passenger Cars:			66	20	86	29	64	93	542
Truck Trips:									
2-axle:			*10*	*3*	*13*	*4*	*10*	*14*	*83*
3-axle:			*7*	*2*	*9*	*3*	*6*	*9*	*54*
4+-axle:			*24*	*7*	*31*	*10*	*23*	*33*	*196*
- Net Truck Trips (PCE)			*41*	*12*	*53*	*17*	*39*	*56*	*333*
TOTAL NET TRIPS (PCE) [2]			***107***	***32***	***139***	***46***	***103***	***149***	***875***
Warehousing (75% of Buildings 1-8)	525.991	TSF							
Passenger Cars:			55	17	72	22	59	81	735
Truck Trips:									
2-axle:			*5*	*2*	*7*	*2*	*6*	*8*	*71*
3-axle:			*6*	*2*	*8*	*2*	*7*	*9*	*82*
4+-axle:			*21*	*6*	*27*	*8*	*22*	*30*	*275*
- Net Truck Trips (PCE)			*32*	*10*	*42*	*12*	*35*	*47*	*428*
TOTAL NET TRIPS (PCE) [2]			***87***	***27***	***114***	***34***	***94***	***128***	***1,163***
High-Cube Warehouse (Building 9)	998.680	TSF							
Passenger Cars:			42	13	55	19	49	68	962
Truck Trips:									
2-axle:			*5*	*1*	*6*	*2*	*6*	*8*	*109*
3-axle:			*8*	*2*	*10*	*4*	*9*	*13*	*181*
4+-axle:			*36*	*11*	*47*	*16*	*42*	*58*	*819*
- Net Truck Trips (PCE)			*49*	*14*	*63*	*22*	*57*	*79*	*1,109*
TOTAL NET TRIPS (PCE) [2]			***91***	***27***	***118***	***41***	***106***	***147***	***2,071***
Total (PCE) for Opening Year Cumulative (2019)			***285***	***86***	***371***	***121***	***303***	***424***	***4,109***
Horizon Year (2040) Only									
Manufacturing (25% of PA3)	57.799	TSF							
Passenger Cars:			22	6	28	9	21	30	179
Truck Trips:									
2-axle:			*3*	*1*	*4*	*1*	*3*	*4*	*27*
3-axle:			*2*	*1*	*3*	*1*	*2*	*3*	*18*
4+-axle:			*8*	*2*	*10*	*3*	*8*	*11*	*65*
- Net Truck Trips (PCE)			*13*	*4*	*17*	*5*	*13*	*18*	*110*
TOTAL NET TRIPS (PCE) [2]			***35***	***10***	***45***	***14***	***34***	***48***	***289***
Warehousing (75% of PA3)	173.396	TSF							
Passenger Cars:			18	5	23	7	19	26	242
Truck Trips:									
2-axle:			*2*	*1*	*3*	*1*	*2*	*3*	*24*
3-axle:			*2*	*1*	*3*	*1*	*2*	*3*	*27*
4+-axle:			*7*	*2*	*9*	*3*	*7*	*10*	*91*
- Net Truck Trips (PCE)			*11*	*4*	*15*	*5*	*11*	*16*	*142*
TOTAL NET TRIPS (PCE) [2]			***29***	***9***	***38***	***12***	***30***	***42***	***384***
Total (PCE) for Horizon Year (2040)			***349***	***105***	***454***	***147***	***367***	***514***	***4,782***

[1] TSF = thousand square feet

[2] TOTAL NET TRIPS (PCE) = Passenger Cars + Net Truck Trips (PCE).

Table 4-3

Project Trip Generation Summary (in Actual Vehicles)

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Manufacturing (25% of Buildings 1-8)	175.330	TSF							
Passenger Cars:			66	20	86	29	64	93	542
Truck Trips:									
2-axle:			*7*	*2*	9	*3*	*6*	9	*55*
3-axle:			*3*	*1*	4	*1*	*3*	4	*27*
4+-axle:			*8*	*2*	10	*3*	*8*	11	*65*
- Net Truck Trips			*18*	*5*	*23*	*7*	*17*	*24*	*147*
TOTAL NET TRIPS [2]			***84***	***25***	***109***	***36***	***81***	***117***	***689***
Warehousing (75% of Buildings 1-8)	525.991	TSF							
Passenger Cars:			55	17	72	22	59	81	735
Truck Trips:									
2-axle:			*4*	*1*	5	*1*	*4*	5	*48*
3-axle:			*3*	*1*	4	*1*	*3*	4	*41*
4+-axle:			*7*	*2*	9	*3*	*7*	10	*92*
- Net Truck Trips			*14*	*4*	*18*	*5*	*14*	*19*	*181*
TOTAL NET TRIPS [2]			***69***	***21***	***90***	***27***	***73***	***100***	***916***
High-Cube Warehouse	998.680	TSF							
Passenger Cars:			42	13	55	19	49	68	962
Truck Trips:									
2-axle:			*3*	*1*	4	*1*	*4*	5	*73*
3-axle:			*4*	*1*	5	*2*	*5*	7	*90*
4+-axle:			*12*	*4*	16	*5*	*14*	19	*273*
- Net Truck Trips			*19*	*6*	*25*	*8*	*23*	*31*	*436*
TOTAL NET TRIPS [2]			***61***	***19***	***80***	***27***	***72***	***99***	***1,398***
Total for Opening Year Cumulative (2019)			***214***	***65***	***279***	***90***	***226***	***316***	***3,003***
Horizon Year (2040) Only									
Manufacturing (25% of PA3)	57.799	TSF							
Passenger Cars:			22	6	28	9	21	30	179
Truck Trips:									
2-axle:			*2*	*1*	3	*1*	*2*	3	*18*
3-axle:			*1*	*0*	1	*0*	*1*	1	*9*
4+-axle:			*3*	*1*	4	*1*	*3*	4	*22*
- Net Truck Trips			*6*	*2*	*8*	*2*	*6*	*8*	*49*
TOTAL NET TRIPS [2]			***28***	***8***	***36***	***11***	***27***	***38***	***228***
Warehousing (75% of PA3)	173.396	TSF							
Passenger Cars:			18	5	23	7	19	26	242
Truck Trips:									
2-axle:			*1*	*0*	1	*0*	*1*	1	*16*
3-axle:			*1*	*0*	1	*0*	*1*	1	*14*
4+-axle:			*2*	*1*	3	*1*	*2*	3	*30*
- Net Truck Trips			*4*	*1*	*5*	*1*	*4*	*5*	*60*
TOTAL NET TRIPS [2]			***22***	***6***	***28***	***8***	***23***	***31***	***302***
Total for Horizon Year (2040)			***264***	***79***	***343***	***109***	***276***	***385***	***3,533***

[1] TSF = thousand square feet

[2] TOTAL NET TRIPS = Passenger Cars + Net Truck Trips.

For purposes of this analysis, the following ITE land use codes and vehicle mixes have been utilized:

- ITE land use code 140 (Manufacturing) has been used to derive site specific trip generation estimates for up to 25 percent of the total square footage for Buildings 1 through 8. The ITE Trip Generation Manual includes very limited data regarding the types of vehicles that are generated for manufacturing uses (passenger cars and various sizes of trucks). As such, data regarding the vehicle mix has been obtained from a separate report; the City of Fontana Truck Trip Generation Study (August 2003) for the manufacturing uses proposed as part of the Project. Buildings 1 through 8 have been identified as a mix of manufacturing and warehousing uses. The "Light Industrial" vehicle mix data has been utilized as a vehicle mix for manufacturing is not readily available.
- ITE land use code 150 (Warehousing) has been used to derive site specific trip generation estimates for up to 75 percent of the total square footage for Buildings 1 through 8. The ITE Trip Generation Manual includes very limited data regarding the types of vehicles that are generated for warehousing uses (passenger cars and various sizes of trucks). Data regarding the vehicle mix has therefore been obtained from a separate report; the City of Fontana Truck Trip Generation Study (August 2003) for the warehousing use proposed as part of the Project. Buildings 1 through 8 have been identified as a mix of manufacturing and warehousing uses. The "Heavy Warehouse" vehicle mix data has been utilized for the warehouse use.
- ITE land use code 154 (High-Cube Transload and Short-Term Storage Warehouse) has been used to derive site specific trip generation estimates for Building 9. Total vehicle mix percentages were also obtained from the ITE High Cube Warehouse Vehicle Trip Generation Analysis in conjunction with the South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type. (8) The SCAQMD is currently recommending their truck mix by axle-type to better quantify trip rates associated with local warehouse and distribution projects, as truck emission represent more than 90 percent of air quality impacts from these projects. This recommended procedure has been utilized for the purposes of this analysis in effort to be consistent with other technical studies being prepared for the Project. The ITE High Cube Warehouse Vehicle Trip Generation Analysis shows that the total trucks for high-cube transload warehouses if 31.2%. Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the SCAQMD interim recommended truck mix. The SCAQMD has recently performed surveys of existing facilities and compiled the data to provide interim guidance on the mix of heavy trucks for these types of high-cube warehousing/distribution facilities. Based on this interim guidance from the SCAQMD, the following truck fleet mix was utilized for the purposes of estimating the truck trip generation for the site (for without cold storage): 16.7% of the total trucks as 2-axle trucks, 20.7% of the total trucks as 3-axle trucks, and 62.6% of the total trucks as 4+-axle trucks.

Trip generation for heavy trucks was further broken down by truck type (or axle type). The total truck percentage is comprised of 3 different truck types: 2-axle, 3-axle, and 4+-axle trucks. For the purposes of this analysis, the percentage of trucks, by axle type, were obtained from the ITE High Cube Warehouse Vehicle Trip Generation Analysis or the City of Fontana's Truck Trip Generation Study. (8) (9) Lastly, PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCEs allow the typical "real-world" mix of vehicle types

to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County CMP 2016 Update. Trip generation rates for actual vehicles and with PCE factors are shown on Table 4-1.

As shown on Table 4-2, the proposed Project (Project buildout) is anticipated to generate a net total of 4,109 PCE trip-ends per day, 371PCE AM peak hour trips and 424 PCE PM peak hour trips for Opening Year Cumulative traffic conditions. The proposed Project is anticipated to generate a net total of 4,782 PCE trip-ends per day, 454 PCE AM peak hour trips and 514 PCE PM peak hour trips with the addition of PA3 for Horizon Year (2040) traffic conditions. In comparison, the proposed Project is anticipated to generate a net total of 3,003 actual vehicle trip-ends per day with 279 AM peak hour trips and 316 PM peak hour trips for Opening Year Cumulative traffic conditions and 3,533 trip-ends per day with 343 AM peak hour trips and 385 PM peak hour trips with the addition of PA3 under Horizon Year (2040) traffic conditions (see Table 4-3).

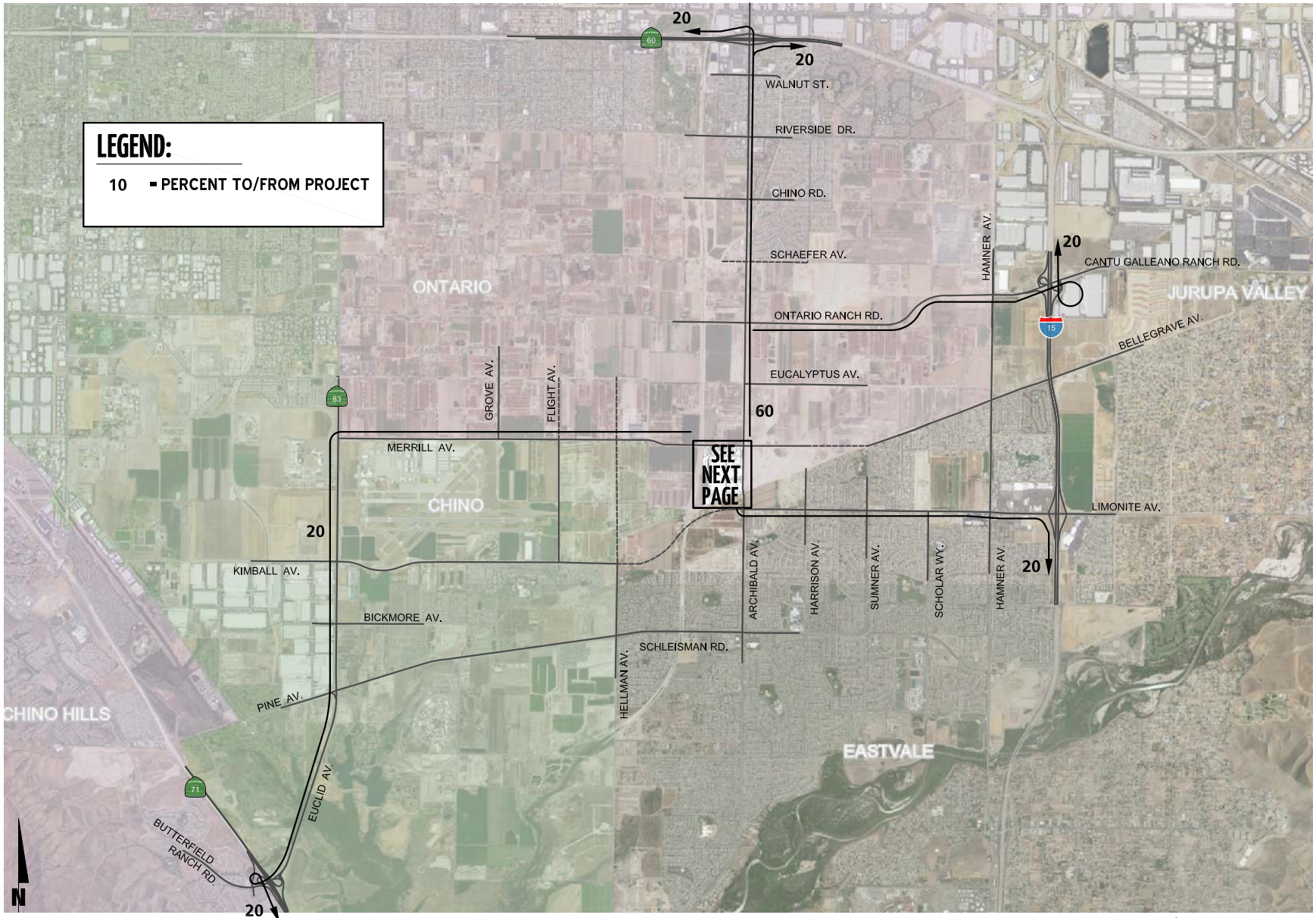
4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution and assignment process represents the directional orientation of traffic to and from the Project site. The trip distribution pattern of passenger cars is heavily influenced by the geographical location of the site, the location of surrounding uses, and the proximity to the regional freeway system. The trip distribution pattern for truck traffic is also influenced by the local truck routes approved by the City of Ontario, City of Chino, City of Chino Hills, City of Eastvale, and the California Department of Transportation (Caltrans). Given these differences, separate trip distributions were generated for both passenger cars and truck trips.

The Opening Year Cumulative distribution patterns utilize the existing roadway system in relation to the Horizon Year trip distribution patterns, which assumes future roadway connections. The Project trip distribution patterns are also affected by near-term development patterns in the vicinity of the Project site. The extension of Flight Avenue north of Merrill Avenue, Hellman Avenue north of Merrill Avenue, Carpenter Avenue north of Merrill Avenue, Schaefer Avenue at Archibald Avenue, Limonite Avenue/Kimball Avenue extension between Hellman Avenue and Archibald Avenue, and the Merrill Avenue extension to Bellegrave Avenue will also be assumed for Horizon Year conditions only.

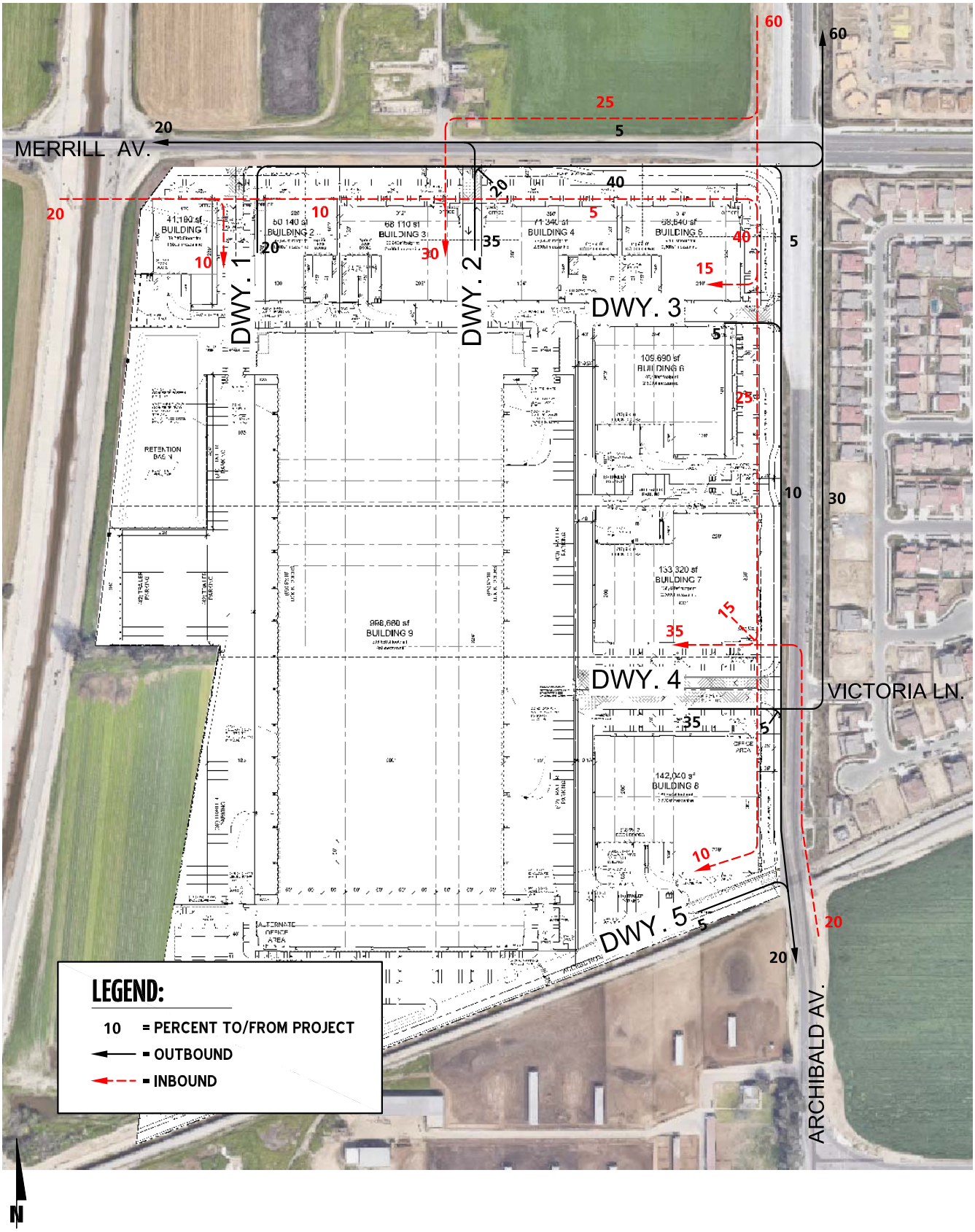
Exhibit 4-1 illustrates the truck trip distribution patterns for Opening Year Cumulative and Horizon Year conditions. As shown on Exhibit 4-1, trucks are anticipated to utilize designated truck routes such as Merrill Avenue, Euclid Avenue (SR-83), Archibald Avenue, Edison Avenue/Ontario Ranch Road, and Limonite Avenue to reach regional freeways such as the SR-71, SR-60, and I-15 Freeways. These travel patterns are not anticipated to change with the addition of new future facilities for Horizon Year traffic conditions.

EXHIBIT 4-1 (1OF2): PROJECT (OPENING YEAR CUMULATIVE AND HORIZON YEAR TRUCK) TRIP DISTRIBUTION



URBAN CROSSROADS

EXHIBIT 4-1 (2OF2): PROJECT (OPENING YEAR CUMULATIVE AND HORIZON YEAR TRUCK) TRIP DISTRIBUTION



10522 - trip2.dwg

Exhibit 4-2 illustrates the Opening Year Cumulative passenger car trip distribution patterns. The Opening Year Cumulative passenger car trip distribution patterns are based on a SBTAM select zone run for the zone containing the Project, with modifications to utilize the existing roadway system. Exhibit 4-3 illustrates the passenger car trip distribution patterns for Horizon Year traffic conditions. The passenger car trip distribution patterns are based on a SBTAM select zone run for the zone containing the Project.

4.3 MODAL SPLIT

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

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-4 and 4-5 for near-term traffic conditions, and Project ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-6 and 4-7 for Horizon Year (2040) traffic conditions.

4.5 BACKGROUND TRAFFIC

4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2019 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. The total ambient growth is 2.0% for 2019 traffic conditions (growth of 2.0 percent per year over 1 year). This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

Opening Year Cumulative (2019) traffic volumes are provided in Section 6 *Opening Year Cumulative (2019)* of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative "With Project" forecasts for 2019.

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

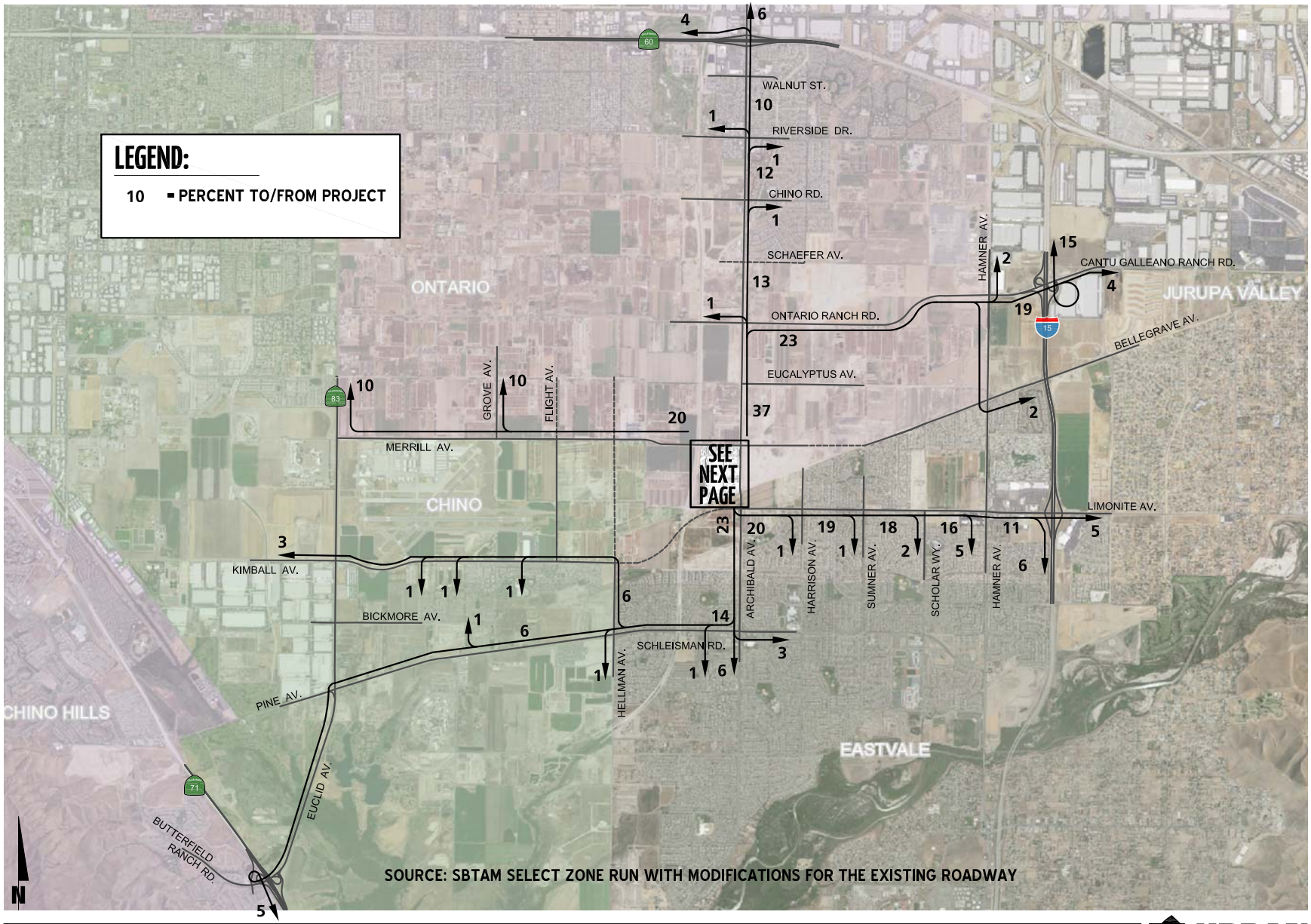
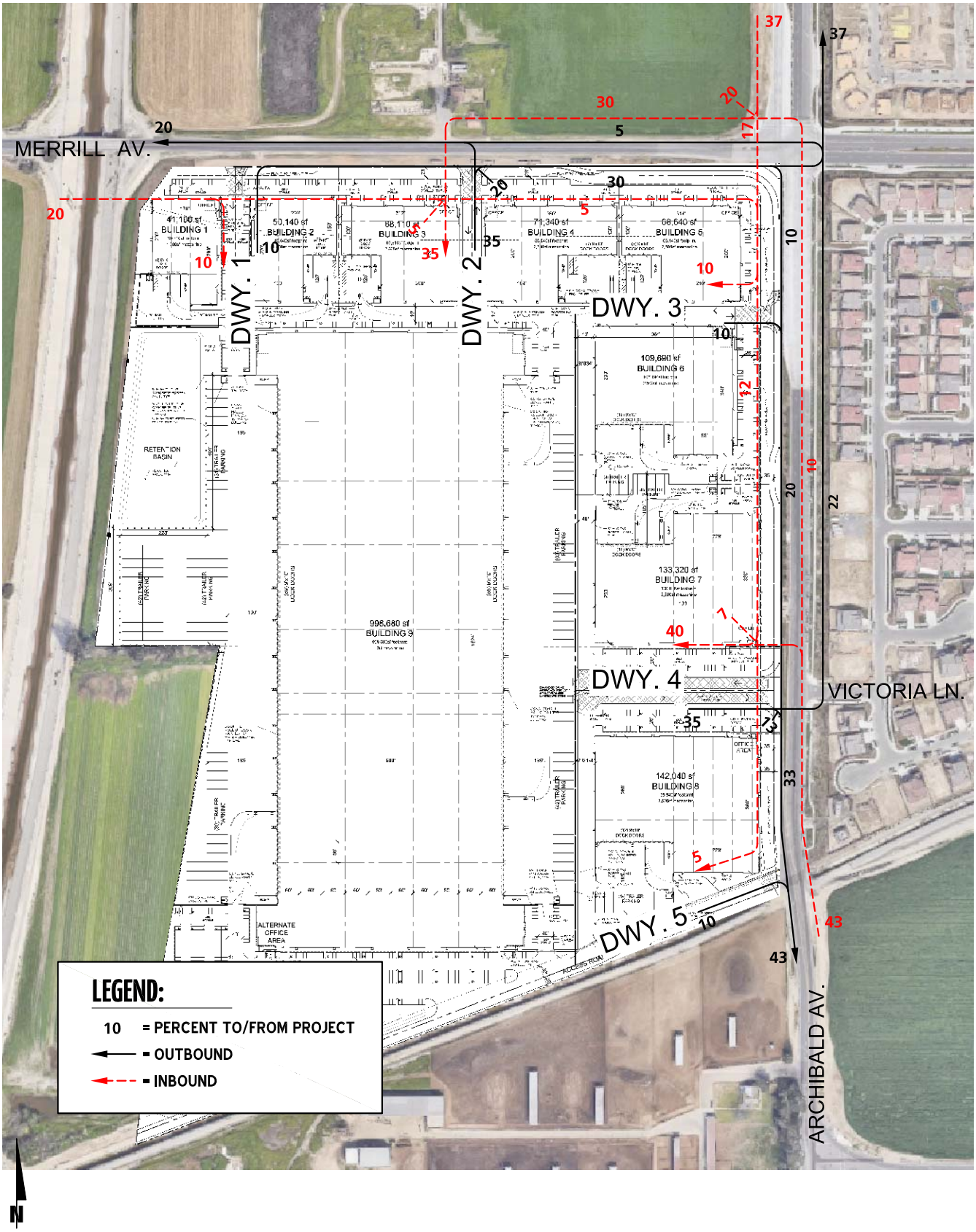
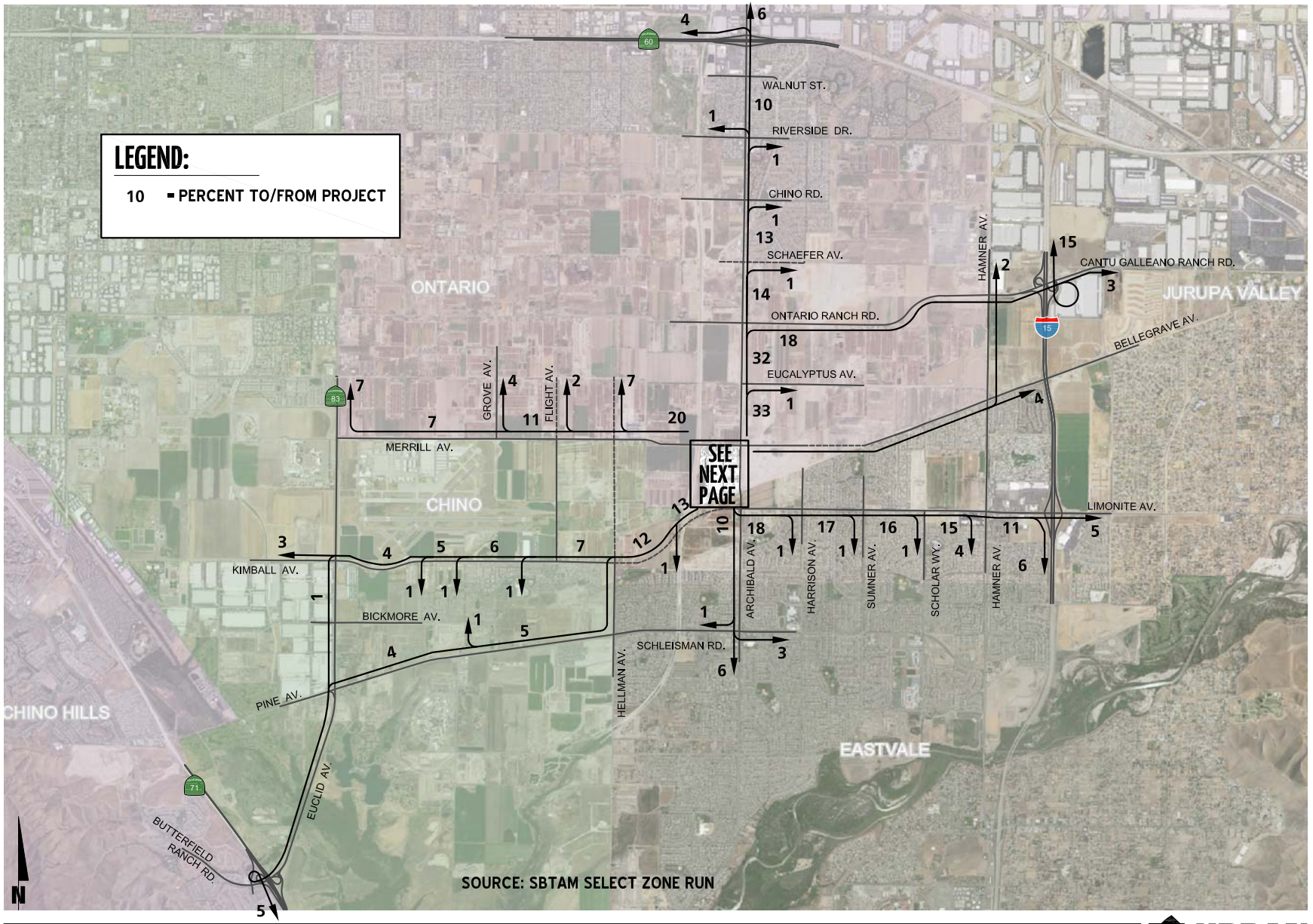


EXHIBIT 4-2 (2OF2): PROJECT (OPENING YEAR CUMULATIVE PASSENGER CAR) TRIP DISTRIBUTION



10522 - trip2.dwg

EXHIBIT 4-3 (1OF2): PROJECT (HORIZON YEAR PASSENGER CAR) TRIP DISTRIBUTION



URBAN CROSSROADS

EXHIBIT 4-3 (2OF2): PROJECT (HORIZON YEAR PASSENGER CAR) TRIP DISTRIBUTION

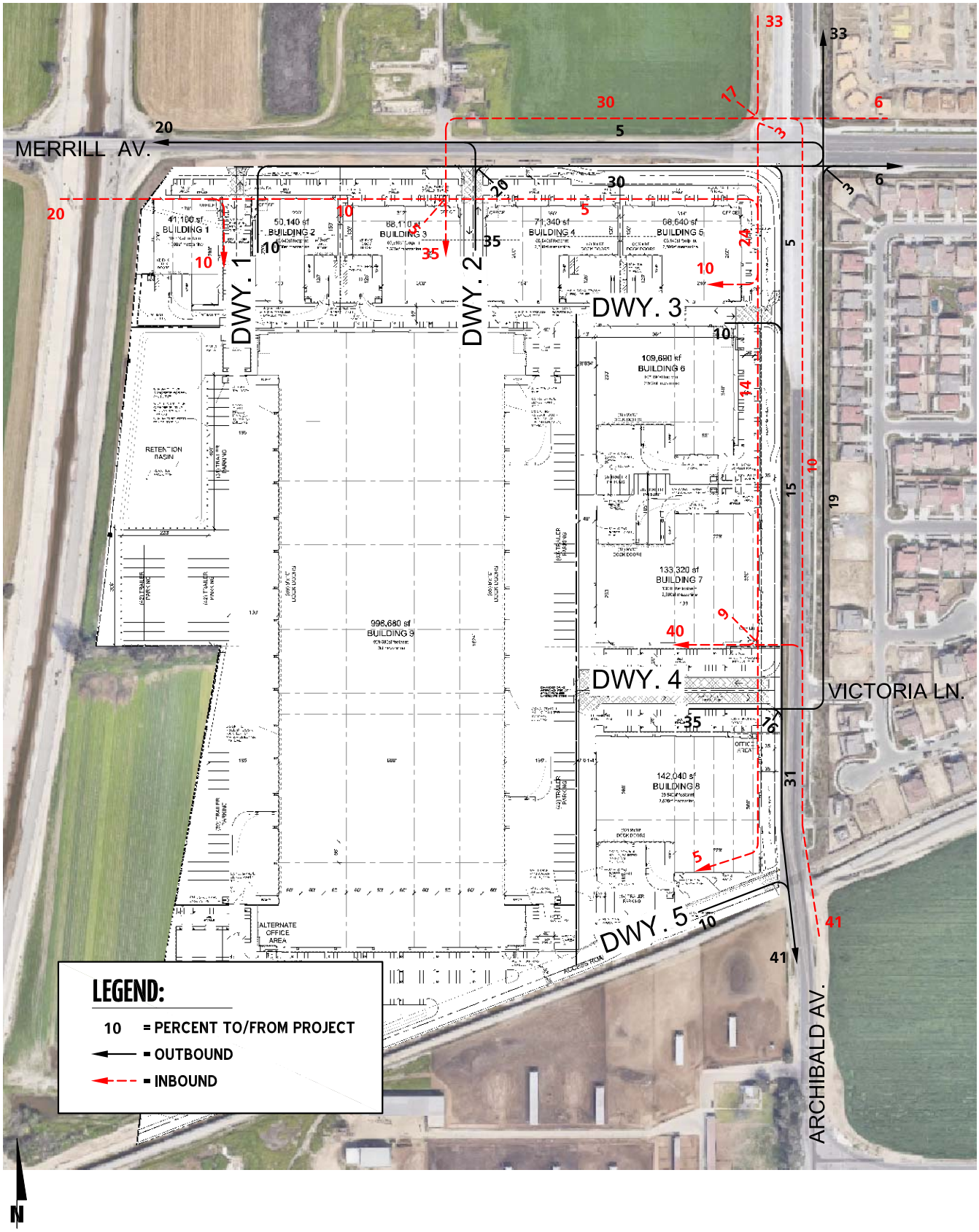
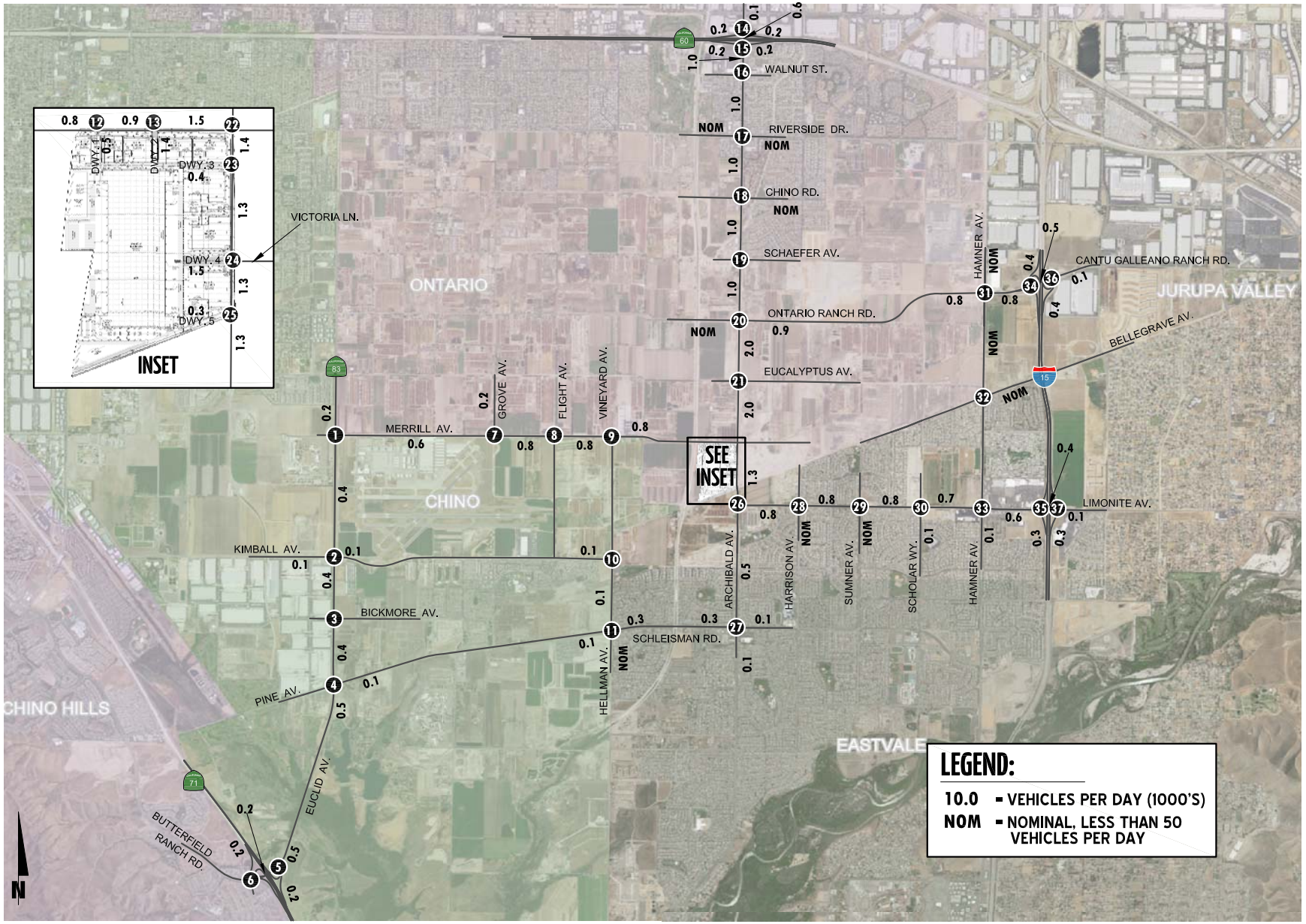


EXHIBIT 4-4: PROJECT ONLY (PROJECT BUILDOUT) AVERAGE DAILY TRAFFIC (ADT)



URBAN CROSSROADS

EXHIBIT 4-5: PROJECT ONLY (PROJECT BUILDOUT) TRAFFIC VOLUMES (IN PCE)

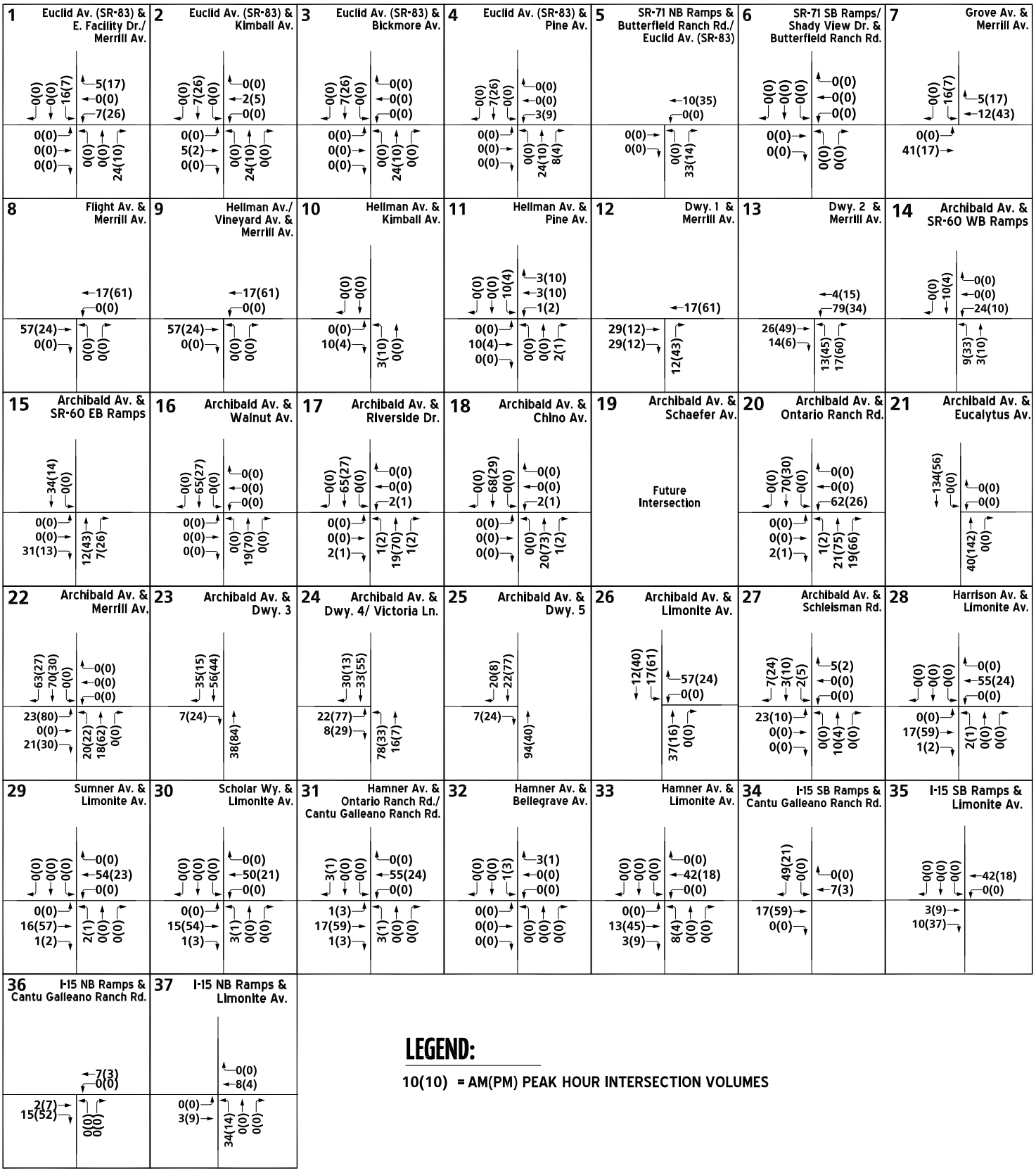


EXHIBIT 4-6: PROJECT ONLY (2040) AVERAGE DAILY TRAFFIC (ADT)

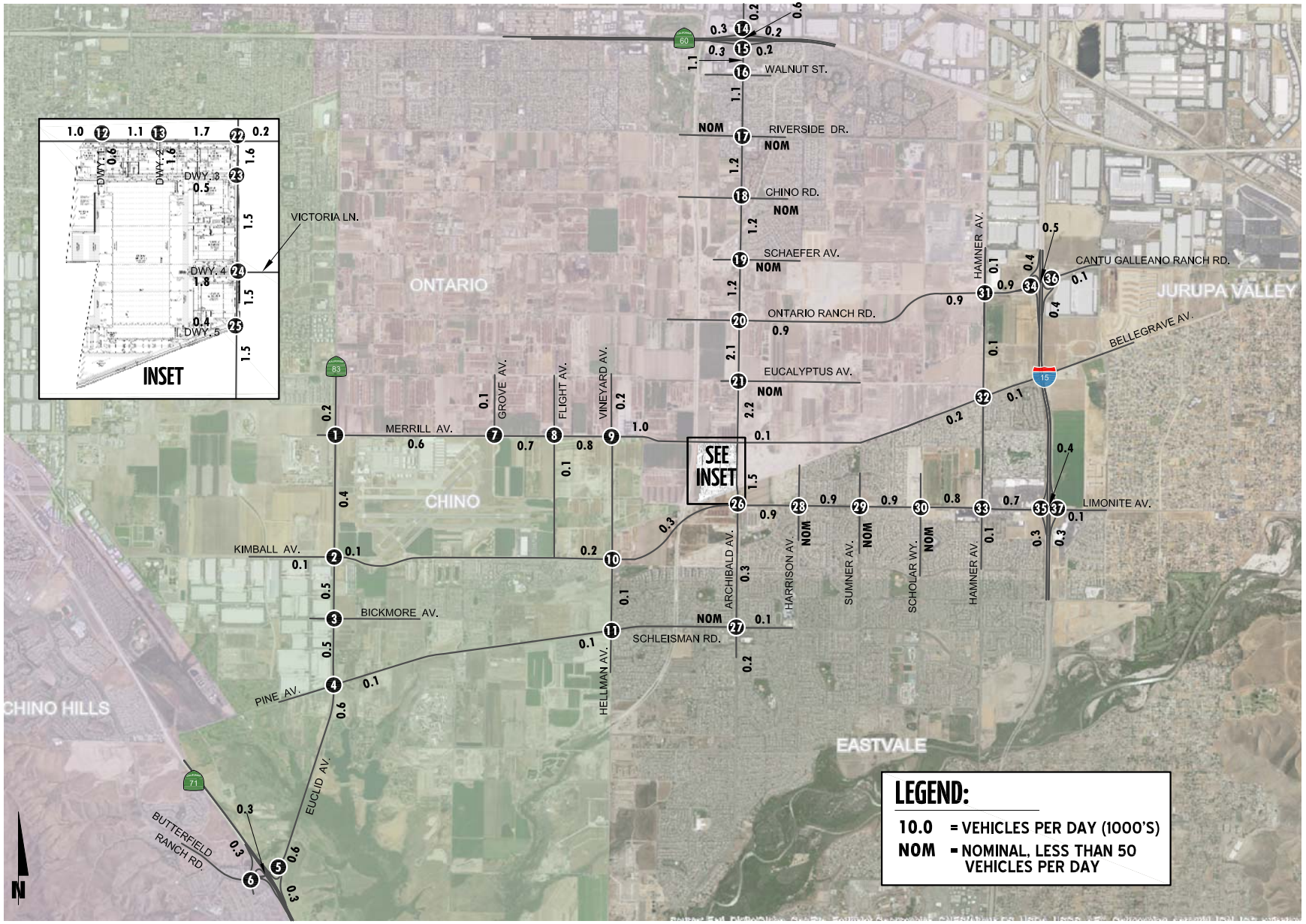
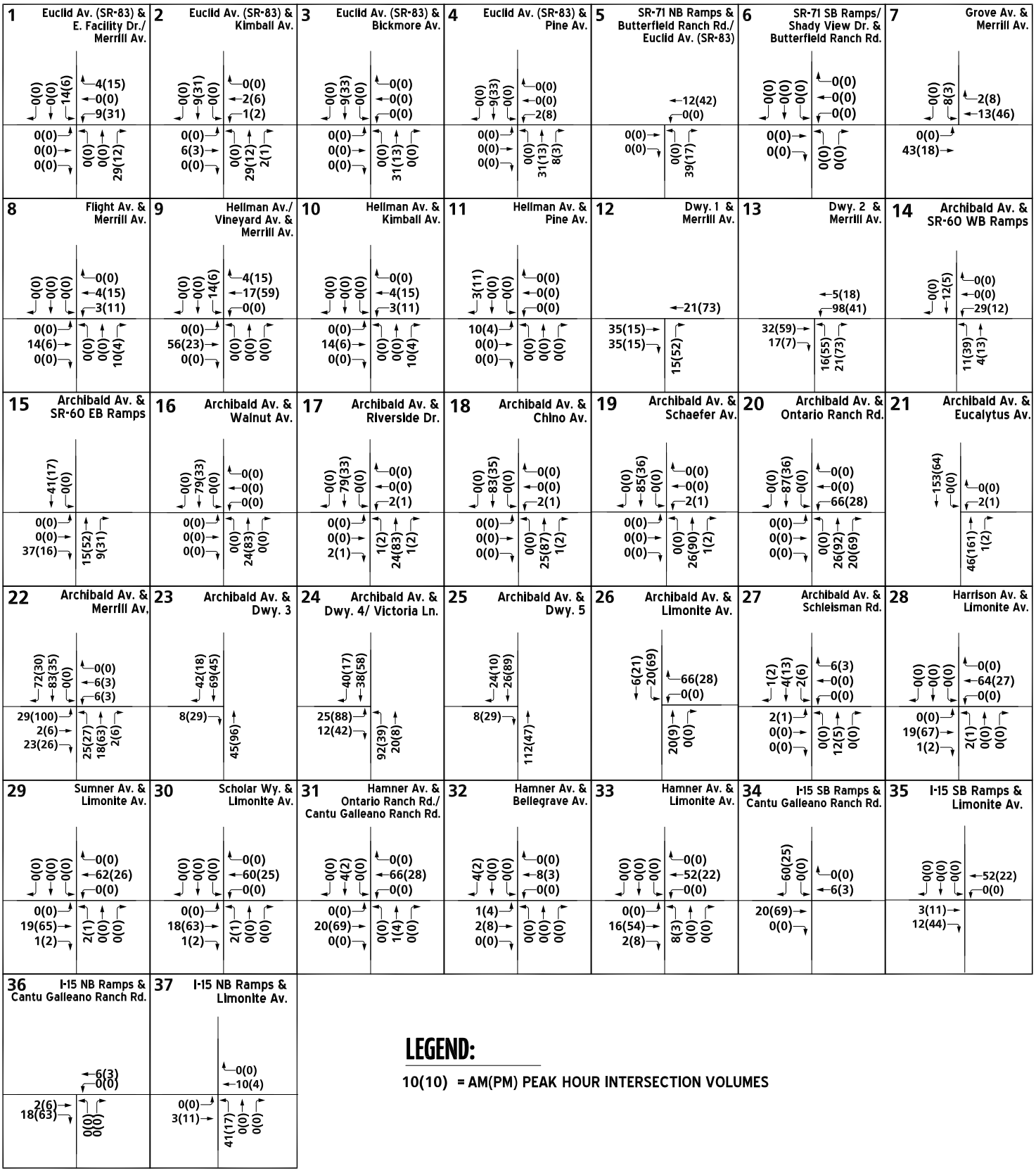


EXHIBIT 4-7: PROJECT ONLY (2040) TRAFFIC VOLUMES (IN PCE)



4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted *Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)* (April 2016) growth forecasts for the City of Ontario identifies projected growth in population of 166,300 in 2012 to 258,600 in 2040, or a 55.50% increase over the 28-year period. (10) The change in population equates to roughly a 1.59% growth rate, compounded annually. Similarly, growth over the same 28-year period in households is projected to increase by 66.96%, or a 1.85% annual growth rate. Finally, growth in employment over the same 28-year period is projected to increase by 69.80%, or a 1.91% annual growth rate.

Based on a comparison of Existing (2017) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is estimated at approximately 2.75%, compounded annually between Existing (2017) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 0.60% compounded annually to as high as 5.89% 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 Ontario for Opening Year Cumulative and Horizon Year (2040) 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. Horizon Year (2040) With Project traffic forecasts reflects buildout of the Project (i.e., traffic associated with PA1, PA2, and PA3).

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 Ontario. The neighboring jurisdictions of Chino, Eastvale, and Jurupa Valley have also been contacted to include key projects in their respective cities.

Exhibit 4-8 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-4. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects in Table 4-4 are reflected as part of the background traffic. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibits 4-9 and 4-10 for near-term traffic conditions.

EXHIBIT 4-8: CUMULATIVE DEVELOPMENT LOCATION MAP

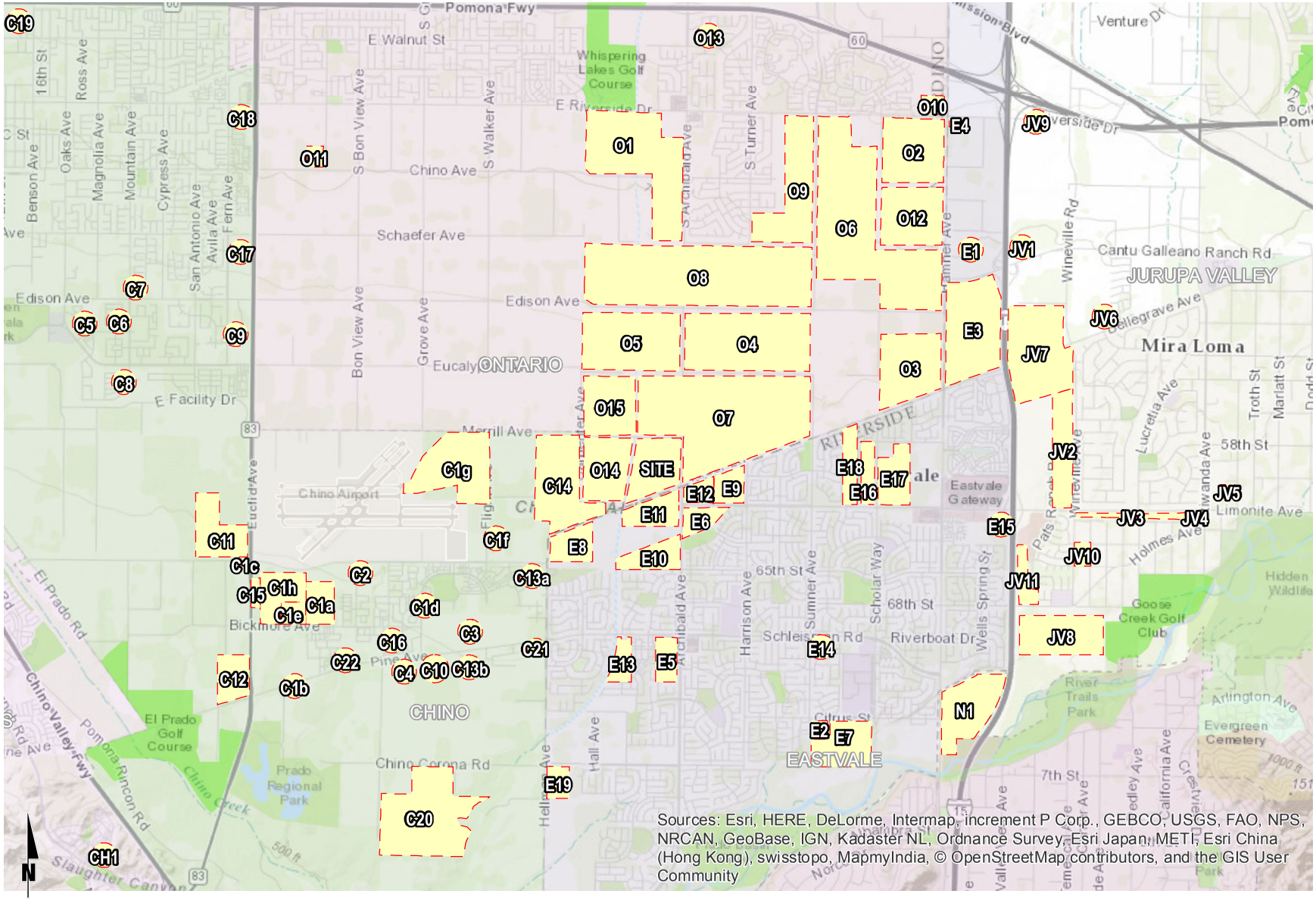
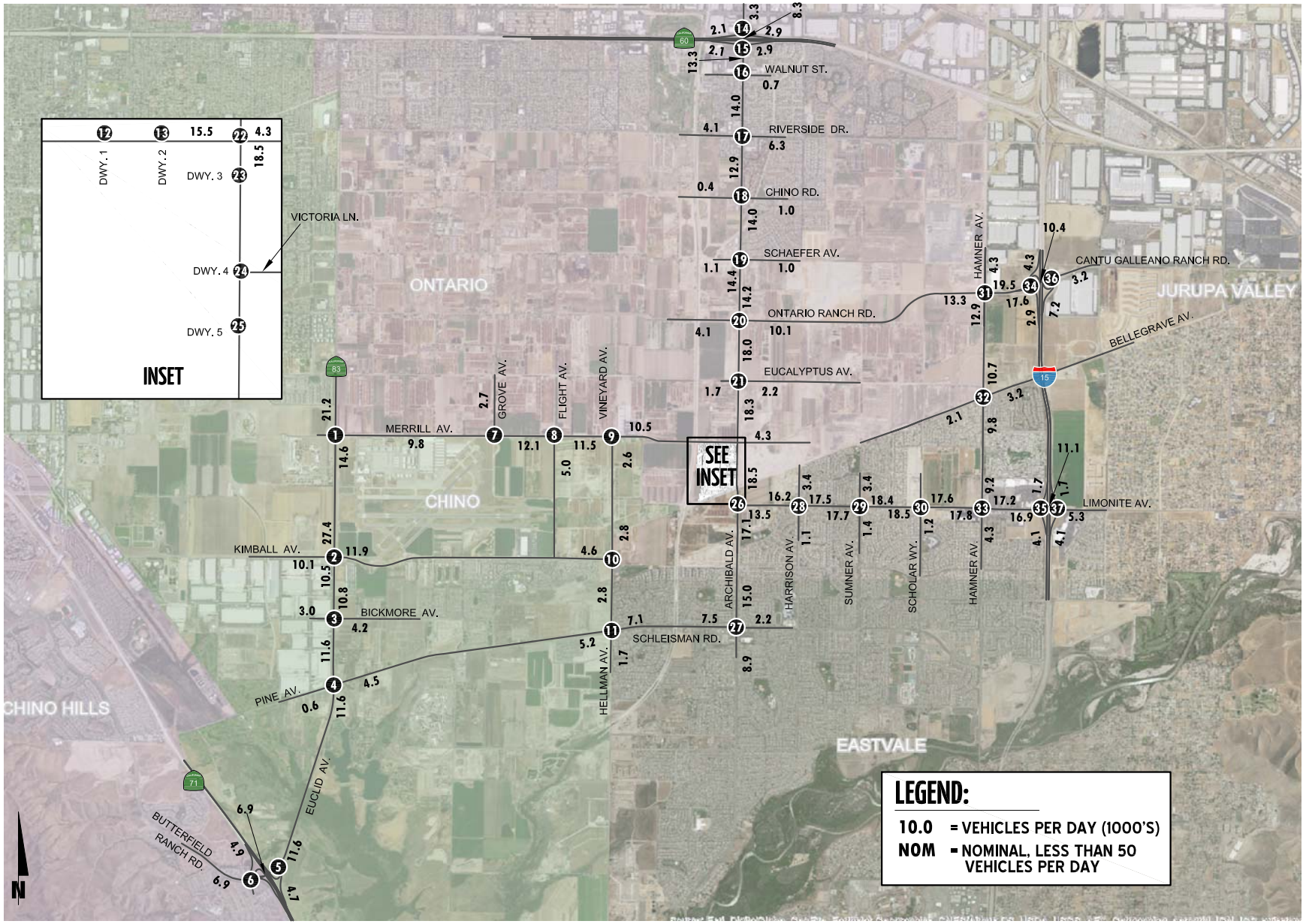


EXHIBIT 4-9: CUMULATIVE DEVELOPMENT PROJECT AVERAGE DAILY TRAFFIC (ADT)



URBAN CROSSROADS

EXHIBIT 4-10: CUMULATIVE DEVELOPMENT PROJECTS TRAFFIC VOLUMES (IN PCE)

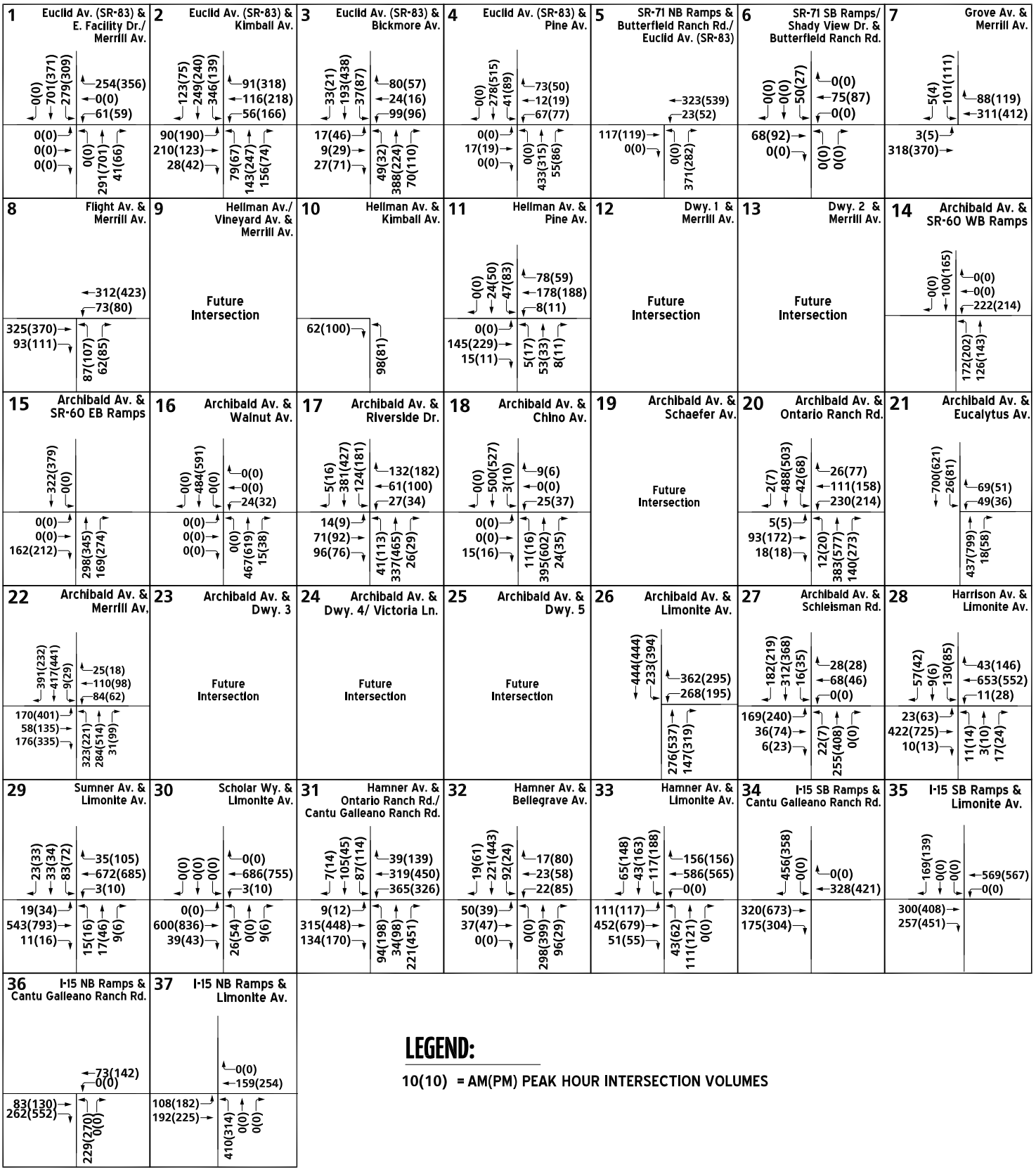


Table 4-4
Page 1 of 4

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
City of Ontario				
O1	Countryside	SFDR	819	DU
	Armstrong Ranch	SFDR	994	DU
O2	Edenglen	SFDR	310	DU
		Multi-Family Attached (Condo)	274	DU
		Shopping Center	217.520	TSF
		Business Park	550.000	TSF
O3	Esperanza	SFDR	914	DU
		Multi-Family Attached (Apartments)	496	DU
O4	Grand Park	SFDR	484	DU
		Multi-Family Attached (Apartments)	843	DU
O5	Parkside	SFDR	437	DU
		Multi-Family Attached (Apartments)	1,510	DU
		Shopping Center	115.000	TSF
O6	Rich Haven	SFDR	2,732	DU
		Multi-Family Attached (Condo)	1,524	DU
		Shopping Center	317.400	TSF
O7	Subarea 29 & Amendment	SFDR	2,149	DU
		Shopping Center	87.000	TSF
O8	The Avenue	SFDR	2,020	DU
		Multi-Family Attached (Apartments)	586	DU
		Shopping Center	250.000	TSF
O9	West Haven	SFDR	753	DU
		Shopping Center	87.000	TSF
O10	Tuscana Village	SFDR	176	DU
		Shopping Center	26.000	TSF
O11	PDEV10-011	SFDR	11	DU
O12	PDEV10-008 - Dry Food Storage	Mini-Warehouse	17.000	TSF
O13	PDEV08-008	Shopping Center	3.920	TSF
O14	Colony Commerce West	High-Cube Warehouse	2213.360	TSF
		Manufacturing	737.786	TSF
O15	West Ontario Commerce Center SP	High-Cube Warehouse	1976.535	TSF
		Manufacturing	658.845	TSF
		Business Park	548.856	TSF
City of Chino				
C1a	Bickmore Street Residential (TM 18858)	SFDR	185	DU
C1b	Barthelemy	SFDR	193	DU
		Condo/Townhouse	198	DU
		Apartments	288	DU
C1c	Farmer Boys	Fast-food w/ Drive-Thru	3.218	TSF
		Shopping Center	2.300	TSF
C1d	TM17635	SFDR	67	DU
C1e	Bouma Residential	SFDR	106	DU
		Condo/Townhouse	94	DU

Table 4-4
Page 2 of 4

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
C1f	Kimball Business Park	Light Industrial	140.500	TSF
		Warehousing	564.000	TSF
		High-Cube Warehouse	352.000	TSF
		Business Park	146.550	TSF
C1g	Chino Parcel Delivery	Parcel Delivery Facility	765.274	TSF
C1h	Kimball Business Center	Warehousing	715.000	TSF
		Light Industrial	255.000	TSF
		Business Park	233.000	TSF
		Self-Storage	110.000	TSF
C2	TM17574	Condo/Townhouse	108	DU
C3	Falloncrest at the Preserve	SFDR	204	DU
		Condo/Townhouse	786	DU
		Apartments	412	DU
		Shopping Center	77.597	TSF
		General Office	77.597	TSF
C4	TM18778	SFDR	65	DU
C5	PL11-0047	Apartments	135	DU
	TM 18873	Condo/Townhouse	149	DU
	TM 16838-2 PA 7B	SFDR	67	DU
C6	TM17898	SFDR	77	DU
	TM 17899	SFDR	66	DU
	PL 13-0435	SFDR	41	DU
C7	SA 07-07 RV Storage	RV Storage	313	SPC
C8	Chaffey College Expansion	Junior/Community College	93.50	AC
	College Park Commercial	Commercial	7.50	AC
	TM 18891	SFDR	118	DU
	TM 17893	SFDR	34	DU
	TM 17894	SFDR	39	DU
	TM 17897	SFDR	93	DU
C9	PL13-0601	SFDR	209	DU
C10	South of Pine	SFDR	1,351	DU
		Condo/Townhouse	732	DU
		Apartments	670	DU
C11	Majestic Gateway	High-Cube Warehouse	1,490.400	TSF
		Warehousing	180.000	TSF
		Specialty Retail	25.000	TSF
		Pharmacy/Drugstore with Drive-Thru	13.000	TSF
		Fast-Food with Drive-Thru	8.600	TSF
C12	PM18635	General Light Industrial	99.164	TSF
		High-Cube Warehouse	2,077.594	TSF
C13a	TM 18890	Condo/Townhouse	94	DU
C13b	TM 19980 Homecoming Phase 4 Apartments	Apartments	454	DU
C14	Watson Industrial Park	High-Cube Warehouse	3,889.900	TSF
C15	Chino Business Park	General Light Industrial	165.500	TSF
		Business Park	21.500	TSF

Table 4-4
Page 3 of 4

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
C16	Flores Site	Shopping Center	4.000	TSF
		Gas Station w/ convenience store	16	VFP
		Express Car Wash	5.000	TSF
C17	Brewart Residential (TM 18923)	SFDR	127	DU
C18	Fern and Riverside Residential (TM 18901)	SFDR	94	DU
C19a	Borba Chino Residential (TM 18957)	SFDR	84	DU
C20	Edgewater Communities	SFDR	415	DU
		Condo/Townhouse	659	DU
		Museum/Retail	6.500	TSF
		Church	15.200	TSF
		Park	15.0	AC
C21	TM 18480 Harvest	SFDR	600	DU
C22	Church	Church	47.979	TSF
		Daycare	190	STU
City of Chino Hills				
CH1	Vila Borba Specific Plan	SFDR	176	DU
City of Eastvale				
E1	14-1077 - Grainger Site (APN:156-050-025, 156-050-026, 156-020-027)	Industrial	546.000	TSF
E2	10-0117 (TM36373)	SFDR	51	DU
E3	10-0271 - Eastvale Commerce Center (Phase 1 and 2)	Shopping Center	249.000	TSF
		Hotel	130	RM
		Business Park	610.000	TSF
E4	11-0354 - Arco Gas Station	Gas Station w/ convenience store and car wash	18.000	VFP
		Fast-Food w/o Drive-Thru	2.800	TSF
		Fast-Food with Drive-Thru	2.100	TSF
E5	The Marketplace at Enclave	Shopping Center	42.000	TSF
E6	Eastvale Shopping Center	Free-Standing Discount Superstore	192.000	TSF
		Specialty Retail	9.200	TSF
		Fast-Food Without Drive-Thru	7.200	TSF
		Coffee/Donut Shop w/ Drive Thru	2.000	TSF
		Fast-Food with Drive-Thru	3.500	TSF
		Gas Station w/ convenience store and car wash	16	VFP
E7	11-0363 TTM 36382 (Altfillisch Residential Project[5])	SFDR	146	DU
E8	SP00358 - The Ranch at Eastvale	Shopping Center	267.200	TSF
		General Light Industrial	801.500	TSF
		Business Park	1,121.100	TSF
E9	SC Limonite, LLC	SFDR	330	TSF
E10	13-0395 - 65th Street Residential (Copper Sky)	SFDR	250	DU
E11	PP23219 (PM35865)	General Light Industrial	738.430	TSF
E12	Dairy Property	SFDR	119	DU
E13	TR35751	Condo/Townhouse	243	DU
E14	13-0632 - Sumner Residential (Stratham Homes)	SFDR	129	DU
E15	14-0046 - Kasbergen/William Lyons Homes	Condo/Townhouse	220	DU
E16	TR32821	Condo/Townhouse	350	DU
E17	TR32909	SFDR	140	DU
E18	10-0124 - TR31252 (The Lodge)	SFDR	205	DU

Table 4-4
Page 4 of 4

Cumulative Development Land Use Summary

#	Project/Location	Land Use[1]	Quantity	Units[2]
E19	TR29997	SFDR	122	DU
City of Norco				
N1	Silverlakes Equestrian[6]	Soccer Field	14	Fields
		Soccer Field	10	Fields
		Equestrian Facility	400	Stalls
City of Jurupa Valley				
JV1	PP24596	Warehousing	122.59	TSF
JV2	TR33428	SFDR	338	DU
JV3	TR33258	SFDR	45	DU
JV4	CUP03555	Mini-Warehouse	141.460	TSF
JV5	CUP03488 (Self Storage)	Mini-Warehouse	89.642	TSF
JV6	TR36692	SFDR	176	DU
	TR31768	SFDR	189	DU
	TR31778-1	SFDR	128	DU
	TR33461	SFDR	203	DU
	TR31644	SFDR	425	DU
JV7	TR31644	SFDR	213	DU
	TR31768	SFDR	95	DU
	TR31778	SFDR	64	DU
	TR33461	SFDR	102	DU
	Thorobred Farms	High-Cube Warehouse	1,176.120	TSF
JV8	Ter Maaten (TTM No. 36391)	SFDR	468	DU
		Park	8.4	AC
JV9	Riverside Drive Development	General Light Industrial	167.020	TSF
JV10	6316 Wineville Av. (Daycare)	Daycare	40	STU
JV11	Vernola Marketplace Apartments	Apartments	597	DU

[1] SFDR = Single Family Detached Residential

[2] TSF = Ten Thousand Square Feet; DU = Dwelling Unit; VFP = Vehicle Fueling Position ; AC = Acres

[3] Source: Eastvale South Trip Generation Analysis, Albert A. Webb Associates, May 27, 2011

[4] Source: Trip Generation Comparison for Cloverdale Marketplace, Phase II, Eastvale CA, Albert A. Webb Associates, August 15, 2011.

[5] Source: Altfillisch Residential Project TIA Memorandum, LSA Associates, Inc., July 25, 2011.

[6] Source: From Silverlakes TIA (Revised), Kunzman Associates, September 25, 2008.

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The current version of the SBTAM reflects the local input in the adopted 2016 SCAG RTP within the County of San Bernardino.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2017) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in April and December of 2016. The SBTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period. The Riverside Transportation Analysis Model (RivTAM) has a base (validation) year of 2008 and a horizon (future forecast) year of 2035. The RivTAM 2035 model utilized for the purposes of this analysis assumes buildout of the City of Eastvale. A compounded growth rate consistent with the SCAG RTP/SCS has been applied to the Eastvale locations to determine 2040 forecasts.

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

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.28. These factors represent the relationship of the highest single AM peak hour to the modeled 3 hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4 hour PM peak period (an even distribution would result in a factor of 0.25). The model data from RivTAM represents peak hour data and therefore did not require adjustments.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to Opening Year Cumulative (2019) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening

Year Cumulative (2019) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2017) and Opening Year Cumulative (2019) conditions. Adjustments have not been made to study area intersections that may be affected by new future roadway connections (such as the extension of Limonite Avenue), where travel patterns would likely get affected and forecasts may potentially decrease from the Opening Year cumulative conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified 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.

The SBTAM and RivTAM do not include a truck component or have data that is unusually low. As such, in an effort to conduct a conservative analysis, the presence of trucks has been accounted for based on the manual volume adjustments made to demonstrate growth above Opening Year Cumulative (2019) traffic forecasts, which are presented and evaluated in PCE (see Section 3.6 *Existing Traffic Counts* for discussion on PCE). As such, the Horizon Year (2040) forecasts are also assumed to be in PCE for the purposes of this analysis. Horizon Year (2040) With Project traffic forecasts reflects buildout of the Project (i.e., traffic associated with PA1, PA2, and PA3). Post-processing worksheets for Horizon Year (2040) without Project traffic conditions are provided in Appendix 4.1.

This Page Intentionally Left Blank

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, 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 following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. The ADT volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1. E+P weekday AM and PM peak hour intersection turning movement volumes 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 there are no additional study area intersections anticipated to operate at unacceptable LOS with the addition of Project traffic, in addition to those identified previously for Existing traffic conditions.

Consistent with Table 5-1, a summary of the peak hour intersection LOS for E+P conditions is 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 CAPACITY ANALYSIS

As noted previously, the City of Ontario stated roadway segment capacities 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 future traffic demand. Table 5-2 provides a summary of the E+P conditions roadway segment capacity analysis based on the City of Ontario General Plan Roadway Segment Capacity Thresholds identified previously on Table 2-3. As shown on Table 5-2, there are no additional roadway segments anticipated to operate at an unacceptable LOS under E+P traffic conditions, in addition to those previously identified under Existing (2017) traffic conditions.

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

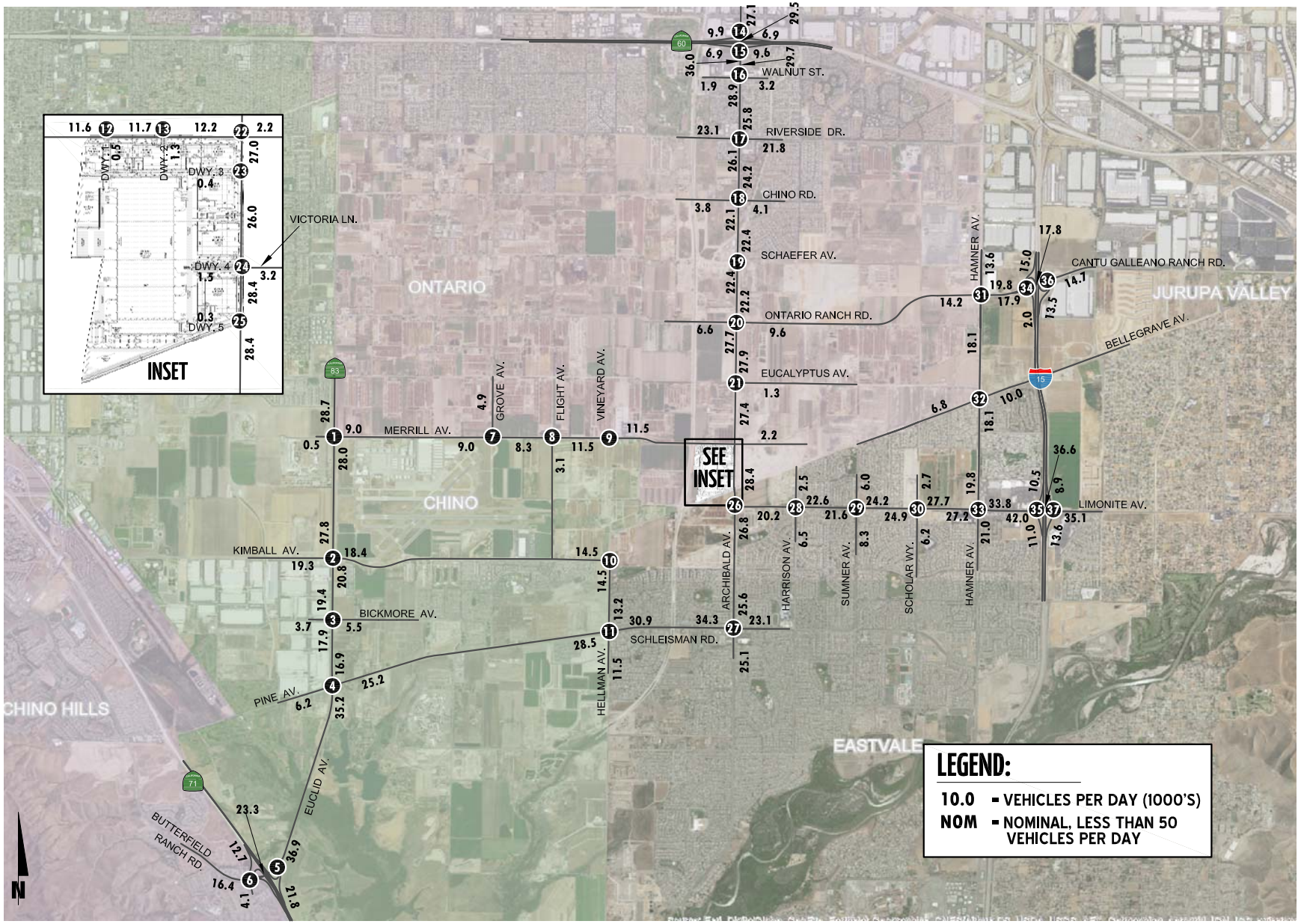
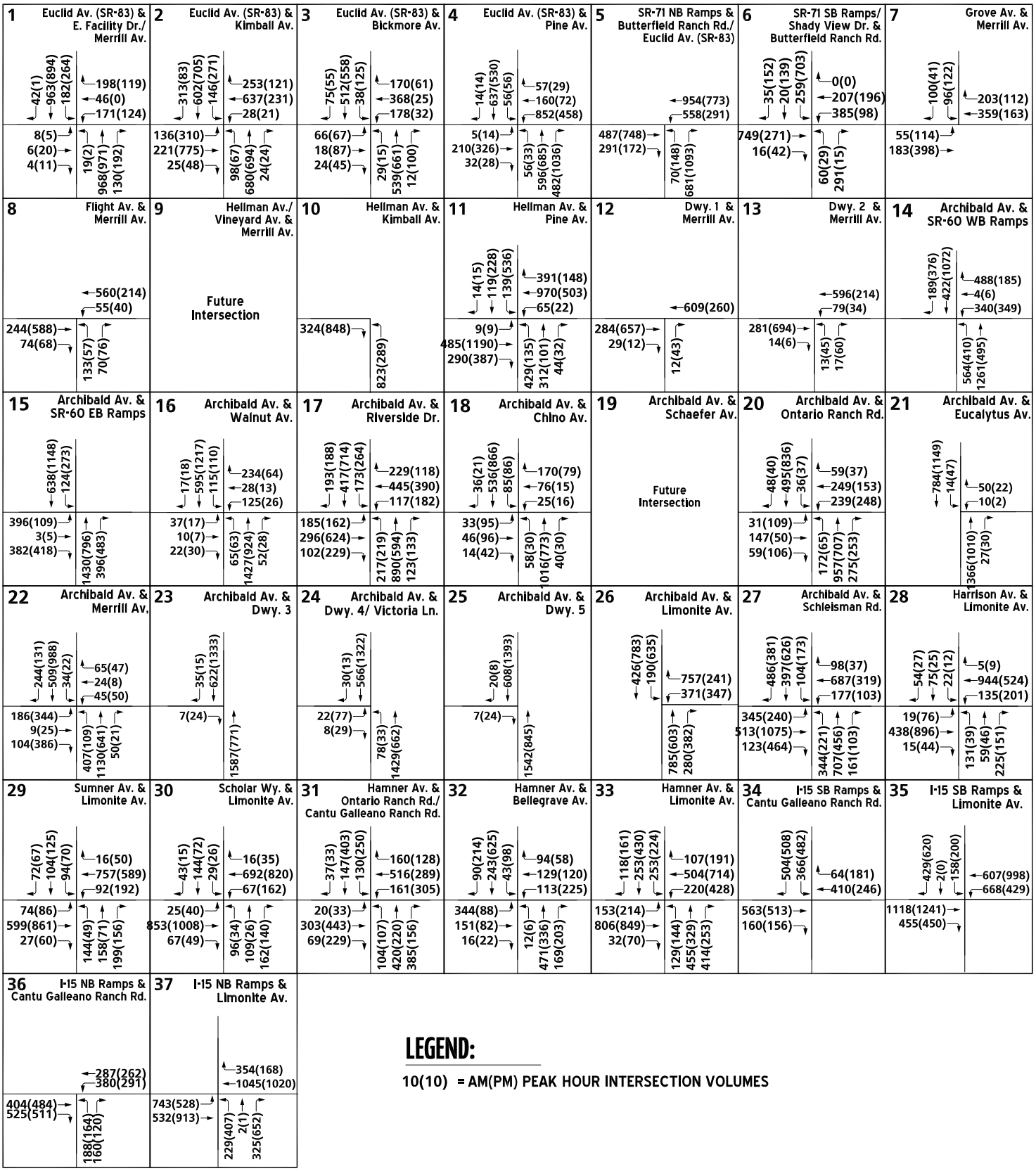


EXHIBIT 5-2: E+P TRAFFIC VOLUMES (IN PCE)



LEGEND:

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

EXHIBIT 5-3: SUMMARY OF LOS FOR E+P CONDITIONS

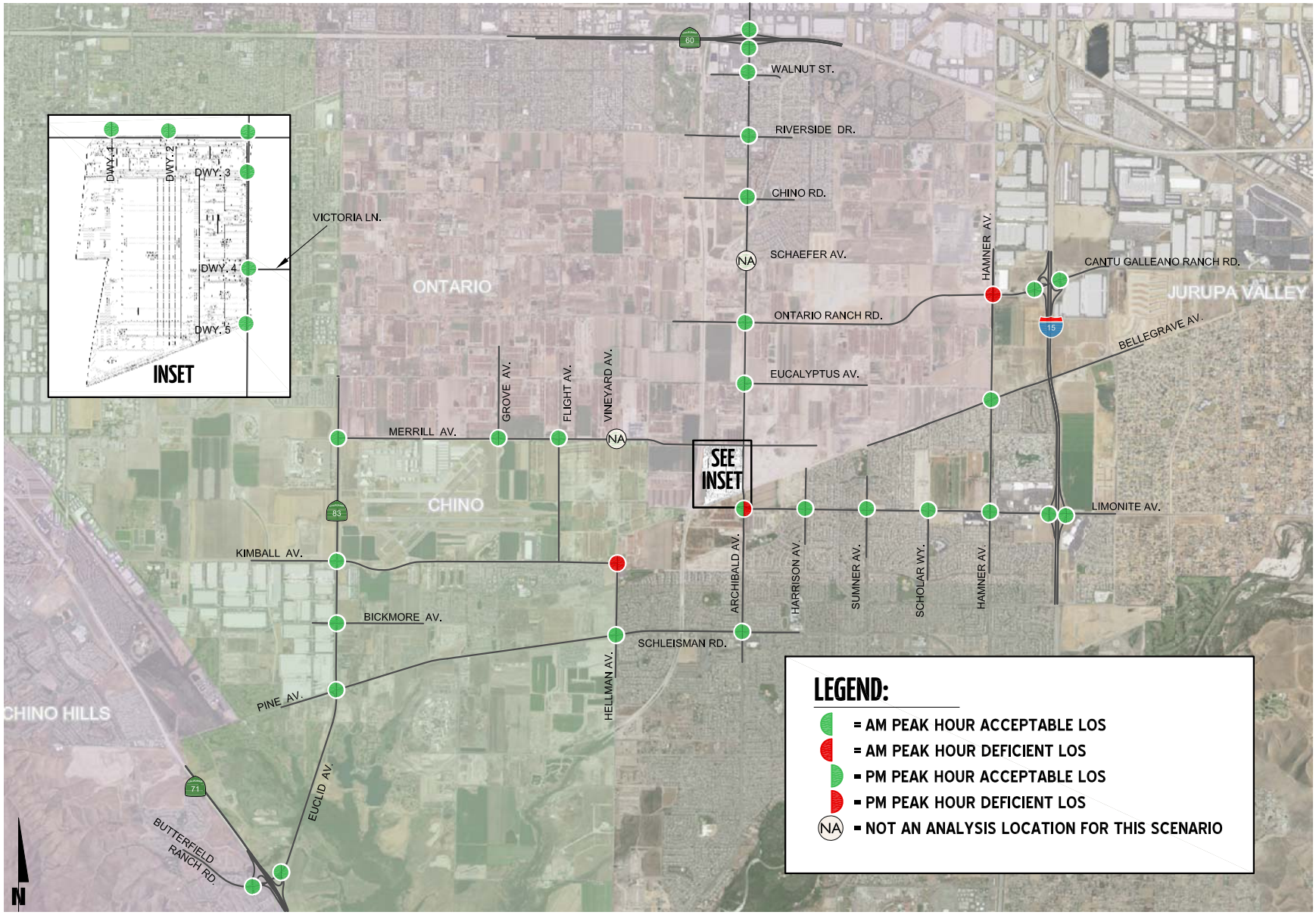


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2017)				E+P				Acceptable LOS	Significant Impact?[3]
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service			
			AM	PM	AM	PM	AM	PM	AM	PM		
1	Euclid Av. (SR-83) / Merrill Av.	TS	26.4	40.5	C	C	29.2	43.7	C	D	D	No
2	Euclid Av. (SR-83) / Kimball Av.	TS	50.0	45.7	D	D	51.6	46.0	D	D	D	No
3	Euclid Av. (SR-83) / Bickmore Av.	TS	46.1	25.8	D	C	46.1	26.9	D	C	D	No
4	Euclid Av. (SR-83) / Pine Av.	TS	40.1	34.2	D	C	40.3	34.5	D	C	D	No
5	SR-71 NB Ramps / Euclid Av. (SR-83)	TS	15.4	32.4	B	C	21.5	38.8	C	D	D	No
6	SR-71 SB Ramps / Euclid Av. (SR-83)	TS	53.5	34.2	D	C	53.5	36.2	D	D	D	No
7	Grove Av. / Merrill Av.	AWS	19.5	14.7	C	B	23.1	16.4	C	C	D	No
8	Flight Av. / Merrill Av.	CSS	27.9	19.0	D	C	31.3	21.0	D	C	D	No
9	Vineyard Av./Hellman Av. / Merrill Av.		Future Intersection				Future Intersection				D	No
10	Hellman Av. / Kimball Av.	AWS	**98.6**	**56.2**	**F**	**F**	**>100.0**	**59.6**	**F**	**F**	D	No
11	Hellman Av. / Pine Av.	TS	23.3	31.9	C	C	23.4	32.6	C	C	D	No
12	Driveway 1 / Merrill Av.	**CSS**	Future Intersection				10.1	14.4	B	B	D	No
13	Driveway 2 / Merrill Av.	**TS**	Future Intersection				11.4	11.5	B	B	D	No
14	Archibald Av. / SR-60 WB Ramps	TS	24.3	32.6	C	C	26.0	35.7	C	D	D	No
15	Archibald Av. / SR-60 EB Ramps	TS	25.0	28.5	C	C	25.1	28.6	C	C	D	No
16	Archibald Av. / Walnut Av.	TS	17.4	11.4	B	B	17.4	11.6	B	B	E	No
17	Archibald Av. / Riverside Dr.	TS	40.5	44.9	D	D	40.9	46.2	D	D	E	No
18	Archibald Av. / Chino Av.	TS	14.4	15.4	B	B	14.5	15.6	B	B	E	No
19	Archibald Av. / Schaefer Av.		Future Intersection				Future Intersection				E	No
20	Archibald Av. / Ontario Ranch Rd.	TS	23.3	21.1	C	C	25.1	22.0	C	C	E	No
21	Archibald Av. / Eucalyptus Av.	TS	7.1	5.9	A	A	7.2	6.5	A	A	E	No
22	Archibald Av. / Merrill Av.	TS	32.9	38.6	C	D	36.4	62.8	D	E	E	No
23	Archibald Av. / Driveway 3	**CSS**	Future Intersection				10.6	15.5	B	C	D	No
24	Archibald Av. / Driveway 4/Victoria Ln.	**TS**	Future Intersection				20.3	16.8	C	B	D	No
25	Archibald Av. / Driveway 5	**CSS**	Future Intersection				10.4	15.9	B	C	D	No
26	Archibald Av. / Limonite Av.	TS	40.1	**65.5**	D	**E**	51.1	**80.1**	D	**F**	D	Yes
27	Archibald Av. / Schleisman Rd.	TS	38.1	29.8	D	C	40.2	30.6	D	C	D	No
28	Harrison Av. / Limonite Av.	TS	20.3	18.7	C	B	20.6	18.8	C	B	D	No
29	Sumner Av. / Limonite Av.	TS	17.5	16.3	B	B	17.6	16.4	B	B	D	No
30	Scholar Way / Limonite Av.	TS	16.6	15.3	B	B	16.7	15.4	B	B	D	No
31	Hamner Av. / Ontario Ranch Rd.	TS	**76.4**	**59.4**	**E**	**E**	**85.9**	**67.0**	**F**	**E**	D	Yes
32	Hamner Av. / Bellegrave Av.	TS	29.5	44.5	C	D	29.6	44.6	C	D	D	No
33	Hamner Av. / Limonite Av.	TS	32.9	33.8	C	C	33.1	34.1	C	C	D	No
34	I-15 SB Ramps / Cantu Galleano Ranch Rd.	TS	12.9	8.6	B	A	13.2	8.9	B	A	D	No
35	I-15 SB Ramps / Limonite Av.	TS	29.3	30.0	C	C	29.4	30.0	C	C	D	No
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.	TS	15.4	15.2	B	B	16.0	15.4	B	B	D	No
37	I-15 NB Ramps / Limonite Av.	TS	24.8	25.1	C	C	25.5	25.2	C	C	D	No

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

[1] 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.

[2] CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Impact is significant if the pre-project condition is at or better than LOS D (or acceptable LOS) and the project-generated traffic causes deterioration below acceptable levels, a deficiency is deemed to occur. However, if the pre-project condition is already below LOS D (or acceptable LOS), the Project will be responsible for mitigating its impact to a LOS equal to or better than it was without the Project.

Table 5-2

Roadway Segment Capacity Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2017	V/C[2]	LOS[3]	E+P	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	2U	14,000	8,407	0.60	B	9,005	0.64	B	D
2		Between Grove Av. and Vineyard Av.	2U	14,000	7,466	0.53	A	8,288	0.59	A	D
3		West of Driveway 2	2U	14,000	10,754	0.77	C	11,668	0.83	D	D
4	Archibald Avenue	North of Ontario Ranch Rd.	4D	35,900	21,177	0.59	A	22,216	0.62	B	D
5		Between Eucalyptus Av. and Merrill Av.	4D	35,900	20,073	0.56	A	22,023	0.61	B	D
6		North of the County Line	2D	17,950	**27,064**	**1.51**	**F**	**28,401**	**1.58**	**F**	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The intersection of Archibald Avenue at Driveway 4 is anticipated to warrant a traffic signal under E+P traffic conditions in addition to those previously warranted under Existing (2017) traffic conditions (see Appendix 5.2).

5.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for E+P are presented in Table 5-3. As shown on Table 5-3, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with the addition of Project traffic. Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.3.

5.7 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the AM and PM peak hours are provided on Exhibit 5-4. As shown on Table 5-4, no additional freeway segments analyzed for this TIA are were found to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for E+P traffic conditions, in addition to those previously identified under 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 conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5, there are no additional merge and diverge areas that currently operate at LOS E or LOS F for E+P in addition to those previously listed under Existing traffic conditions. E+P freeway ramp junction operations analysis worksheets are provided in Appendices 5.5.

Table 5-3

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

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2017)				E+P			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
SR-71 NB Ramps / Euclid Avenue (SR-83)	NBL	1,745	38	48	Yes	Yes	38	49	Yes	Yes
	NBR	420	150 [2]	992 [2]	Yes	Yes[3]	249 [2]	1,054 [2]	Yes	Yes[3]
SR-71 SB Ramps / Euclid Avenue (SR-83)	SBL	1,100	129	468 [2]	Yes	Yes	129	468 [2]	Yes	Yes
	SBL/T	1,560	128	458 [2]	Yes	Yes	128	458 [2]	Yes	Yes
	SBR	255	0	43	Yes	Yes	0	43	Yes	Yes
Archibald Avenue/ SR-60 WB Ramps	WBL/T	1,389	331 [2]	357 [2]	Yes	Yes	368 [2]	373 [2]	Yes	Yes
	WBR	250	522 [2]	52	Yes[3]	Yes	522 [2]	52	Yes[3]	Yes
Archibald Avenue/ SR-60 EB Ramps	EBL/T	1,268	322	89	Yes	Yes	322	89	Yes	Yes
	EBR	350	157	298 [2]	Yes	Yes	199	338 [2]	Yes	Yes
I-15 SB Ramps / Cantu Galleano Ranch Rd.	SBL	1,440	61	62	Yes	Yes	56	67	Yes	Yes
	SBR	460	154	109	Yes	Yes	171	129	Yes	Yes
I-15 NB Ramps / Cantu Galleano Ranch Rd.	NBL	1,680	80 [2]	59	Yes	Yes	80 [2]	59	Yes	Yes
	NBL/R	580	0	0	Yes	Yes	0	0	Yes	Yes
	NBR	440	45	39	Yes	Yes	45	39	Yes	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	182	191	Yes	Yes	182	191	Yes	Yes
	SBL/T/R	400	95	256	Yes	Yes	95	260	Yes	Yes
	SBR	1,200	74	232	Yes	Yes	74	236	Yes	Yes
I-15 NB Ramps / Limonite Avenue	NBL	450	225 [2]	350	Yes	Yes	270 [2]	365	Yes	Yes
	NBL/T/R	1,235	90	252	Yes	Yes	107	257	Yes	Yes
	NBR	400	65	237	Yes	Yes	67	240	Yes	Yes

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

Table 5-4

Basic Freeway Segment Analysis for E+P Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	Existing (2017)				E+P			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
SR-71	SB	South of Euclid Av. (SR-83)	2	**39.4**	27.3	**E**	D	**39.5**	27.6	**E**	D
	NB	South of Euclid Av. (SR-83)	3	24.3	24.9	C	C	24.5	24.9	C	C
SR-60	WB	West of Archibald Av.	4	22.4	21.7	C	C	22.4	21.8	C	C
		East of Archibald Av.	5	18.0	16.3	B	B	18.0	16.4	B	B
	EB	West of Archibald Av.	4	29.4	26.3	D	D	29.8	26.4	D	D
		East of Archibald Av.	4	28.1	27.6	D	D	28.2	27.7	D	D
I-15	SB	North of Cantu Galleano Ranch Rd.	4	24.5	24.6	C	C	24.7	24.7	C	C
		Cantu Galleano Ranch Rd. to Limonite Av.	3	32.1	32.0	D	D	32.1	32.0	D	D
		South of Limonite Av.	3	**37.4**	32.2	**E**	D	**37.8**	32.4	**E**	D
	NB	North of Cantu Galleano Ranch Rd.	5	19.1	16.7	C	B	19.1	16.8	C	B
		Cantu Galleano Ranch Rd. to Limonite Av.	3	32.7	27.0	D	D	32.7	27.0	D	D
		South of Limonite Av.	3	27.8	29.7	D	D	28.0	29.7	D	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

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

[4] LOS = Level of Service

Table 5-5

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

Freeway	Direction[1]	Ramp or Segment	Lanes on Freeway[2]	Existing (2017)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]
SR-71	SB	Loop On-Ramp at Euclid Av. (SR-83) (Upstream)	2	33.0	D	29.7	D	33.0	D	29.9	D
		Loop On-Ramp at Euclid Av. (SR-83) (Downstream)	2	33.0	D	29.7	D	33.0	D	29.9	D
	NB	Off-Ramp at Euclid Av. (SR-83)	3	32.3	D	33.9	D	32.6	D	33.9	D
SR-60	WB	On-Ramp at Archibald Av.	4	23.2	C	22.7	C	23.2	C	23.1	C
		Off-Ramp at Archibald Av.	5	28.7	D	25.0	C	28.8	D	25.2	C
	EB	Off-Ramp at Archibald Av.	4	**35.1**	**E**	31.3	D	**35.4**	**E**	31.4	D
		On-Ramp at Archibald Av.	4	25.8	C	26.2	C	25.9	C	26.4	C
I-15	SB	Off-Ramp at Cantu Galleano Ranch Rd.	4	31.8	D	32.8	D	32.1	D	32.9	D
		On-Ramp at Limonite Av.	3	**35.1**	**E**	31.7	D	**35.2**	**E**	31.9	D
	NB	On-Ramp at Cantu Galleano Ranch Rd.	3	**37.8**	**E**	33.7	D	**37.9**	**E**	34.0	D
		Off-Ramp at Limonite Av.	3	32.5	D	34.5	D	32.6	D	34.5	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbounc

[2] Number of lanes are in the specified direction and is based on existing conditions

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

[4] LOS = Level of Service

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

LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

5.9 PROJECT IMPACTS AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project impacts and recommended improvements. Based on the City of Ontario significance criteria discussed in Section 2.9 *Thresholds of Significance*, the following intersections were found to be impacted by Project. Improvements necessary to reduce project-related traffic impacts to less than significant are also discussed below.

5.9.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the proposed recommended mitigation measures is presented in Table 5-6 for E+P traffic conditions. With the implementation of the intersection mitigation measures discussed below, there are no project-related impacts anticipated to the study area intersections. The intersection operations analysis worksheets for E+P traffic conditions, with improvements, are included in Appendix 5.6 of this TIA.

Hellman Avenue / Kimball Avenue (#10) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. However, the Project is anticipated to contribute less than 50 peak hour trips (City of Chino's significance criteria) and the delay is anticipated to increase by less than 5.0 seconds (City of Eastvale's significance criteria). As such, the impact is considered less than significant.

Impact 1.1 – Archibald Avenue / Limonite Avenue (#26) – Although this intersection was found to operate at an unacceptable LOS (LOS E) during the PM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during the peak hours with the addition of Project traffic. As such, the impact is considered cumulatively significant (Cumulative Impact 1.1).

Mitigation Measure 1.1 – Archibald Avenue / Limonite Avenue (#26) – The following improvement is necessary to reduce the Project's proportionate increase in delay to pre-project levels or better, thus reducing the Project's cumulative impact to less than significant:

- Construct a 2nd southbound left turn lane. The Project should contribute their fair share towards the implementation of this improvement to reduce the Project's cumulative impact to less than significant.

Impact 2.1 – Hamner Avenue / Ontario Ranch Road (#31) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the AM and PM peak hours under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during both peak hours with the addition of Project traffic. As such, the impact is considered cumulatively significant (Cumulative Impact 2.1).

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						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
26	Archibald Av. / Limonite Av.																	
	- Existing Conditions	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	40.1	**65.5**	D	**E**
	- With Improvements	TS	0	1	1>	**2**	1	0	0	0	0	1	0	1>	41.7	30.1	D	C
	- E+P	TS	0	1	1>	1	1	0	0	0	0	1	0	1>	51.1	**80.1**	D	**F**
	- With Improvements[4]	TS	0	1	1>	**2**	1	0	0	0	0	1	0	1>	44.9	32.5	D	C
31	Hamner Av. / Ontario Ranch Rd.																	
	- Existing Conditions	TS	1	1	0	1	1	0	1	1	1	1	1	1	**76.4**	**59.4**	**E**	**E**
	- With Improvements	TS	**2**	**3**	**1**	**2**	**2**	**1**	**2**	**3**	1	**2**	**2**	1	21.2	19.7	C	B
	- E+P	TS	1	1	0	1	1	0	1	1	1	1	1	1	**85.9**	**67.0**	**F**	**E**
	- With Improvements[4,5]	TS	**2**	**3**	**1**	**2**	**2**	**1**	**2**	**3**	1	**2**	**2**	1	21.8	19.8	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 (o movements sharing a single lane) are shown.

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

[4] Mitigation measure consists of fair share contribution towards the improvements (as the same improvements are required for existing conditions).

[5] Improvements shown are currently under construction and are anticipated to be completed by mid to late 2017.

Mitigation Measure 2.1 – Hamner Avenue / Ontario Ranch Road (#31) – It should be noted that the intersection of Hamner Avenue and Ontario Ranch Road is currently under construction to widen Hamner Avenue between Ontario Ranch Road/Cantu Galleano Ranch Road and Bellegrave Avenue. It is anticipated that once these improvements are completed (mid to late 2017), the intersection would operate at acceptable LOS during the peak hours and the Project's cumulative impact at the intersection would be less than significant.

5.9.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

As shown on Table 5-7, the segment of Archibald Avenue north of the County Line would accommodate the anticipated daily traffic flows once the section is widened to a four-lane section. This segment would be widened as part of frontage improvements in conjunction with the development of the proposed Project.

5.9.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 5-3, there are no peak hour queuing issues at SR-71 Freeway and Euclid Avenue (SR-83), SR-60 Freeway and Archibald Avenue, I-15 Freeway and Cantu Galleano Ranch Road, and I-15 Freeway and Limonite Avenue interchanges. As such, no improvements have been recommended.

5.9.4 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 Ontario (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the E+P deficiencies on the SHS, because there is no feasible mitigation available.

Table 5-7

Roadway Segment Capacity Analysis for E+P Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2017	V/C[2]	LOS[3]	E+P	V/C[2]	LOS[3]	Acceptable LOS
6	Archibald Avenue	North of the County Line	**4D**	35,900	27,064	0.75	C	28,401	0.79	C	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

This Page Intentionally Left Blank

6 OPENING YEAR CUMULATIVE (2019) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2019) Without and With Project traffic forecasts, and the resulting intersection operations, 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 (2019) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways such as the northern extension of Meadow Valley Avenue on Kimball Avenue and the northern extension of Hellman Avenue north of Kimball Avenue).

6.2 OPENING YEAR CUMULATIVE (2019) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 1.02% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2019) Without Project traffic conditions are shown on Exhibits 6-1 and 6-2, respectively.

6.3 OPENING YEAR CUMULATIVE (2019) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2019) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2019) With Project traffic conditions are shown on Exhibits 6-3 and 6-4, respectively.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2019) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)

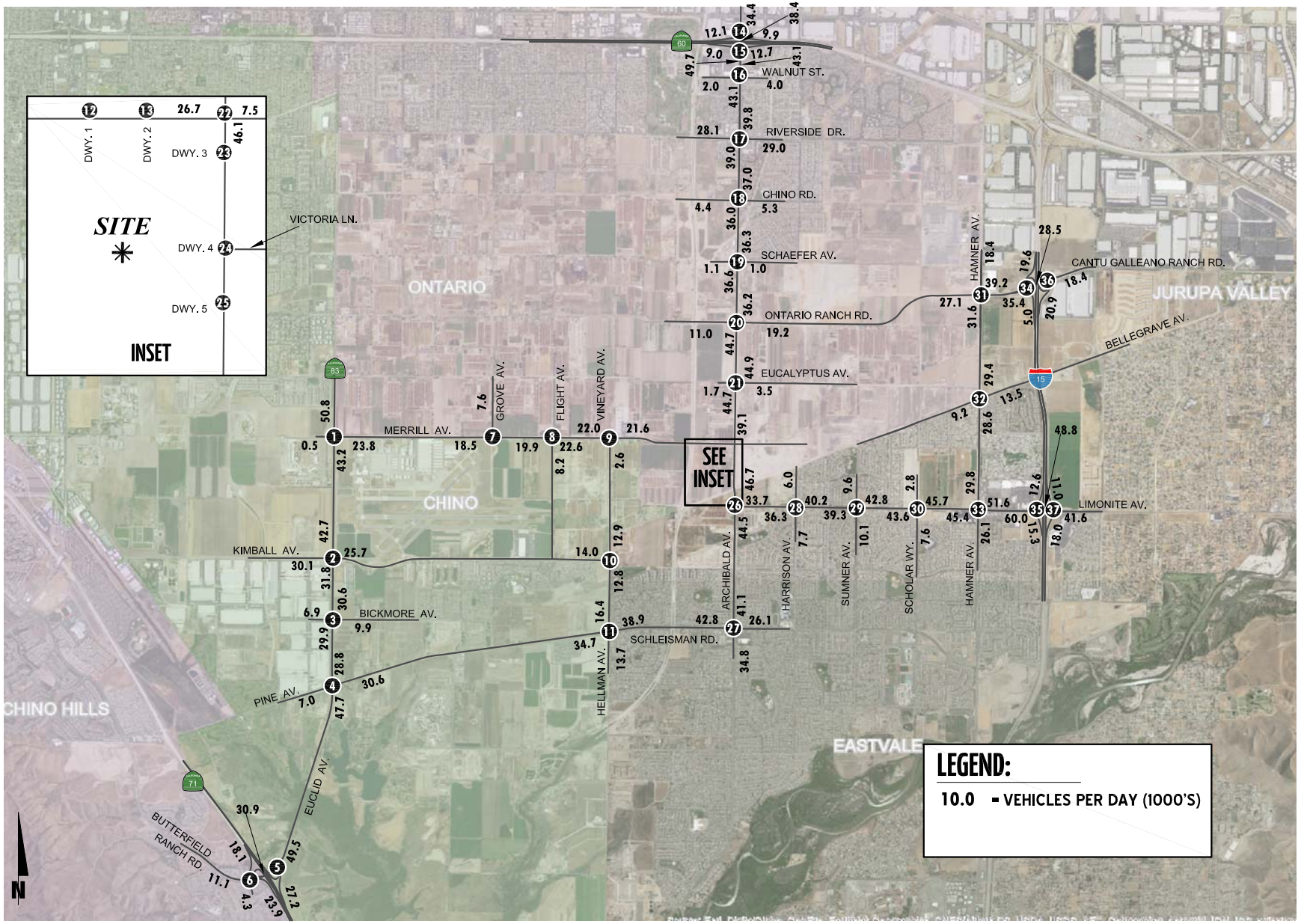


EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2018) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

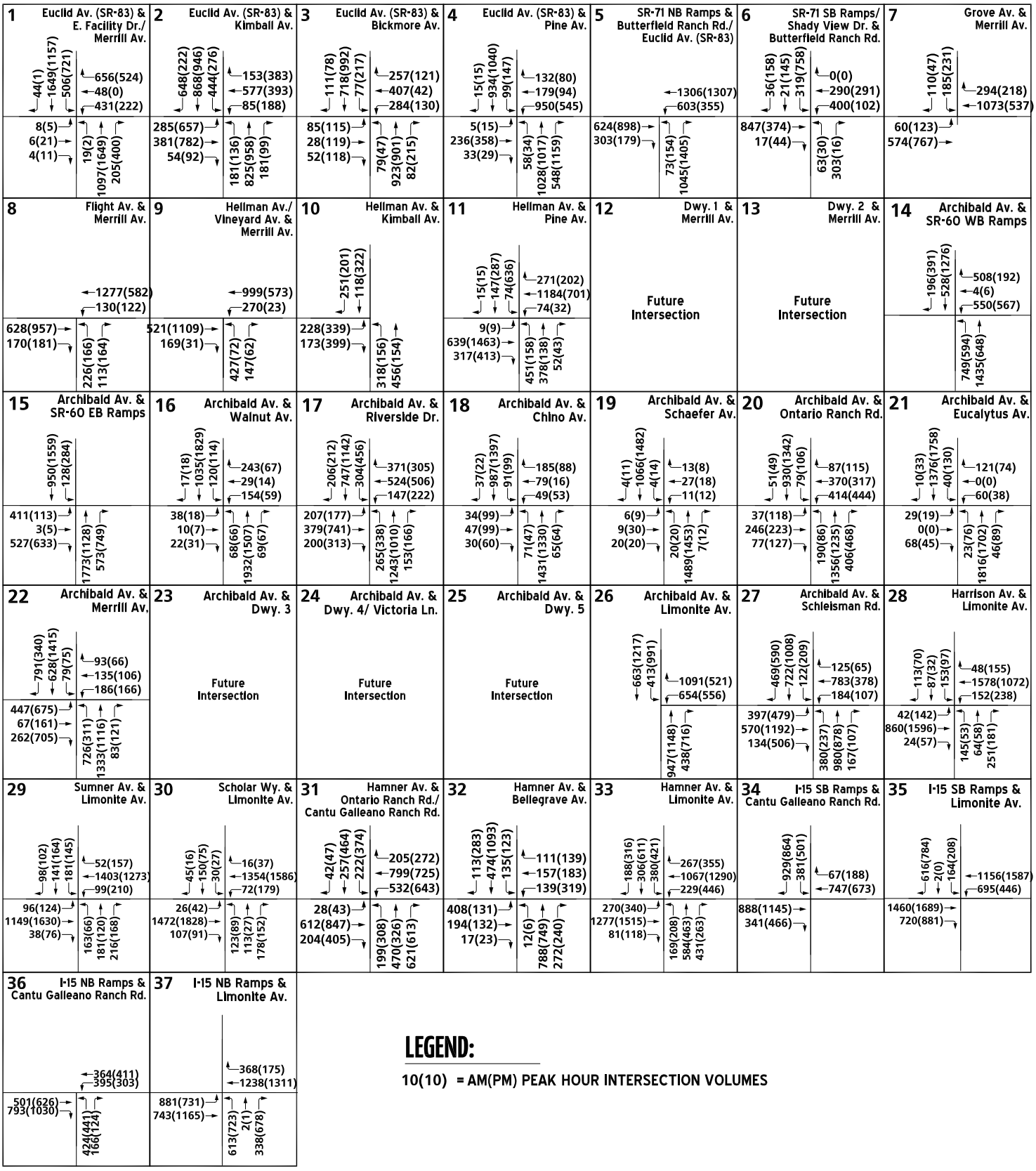


EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2019) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)

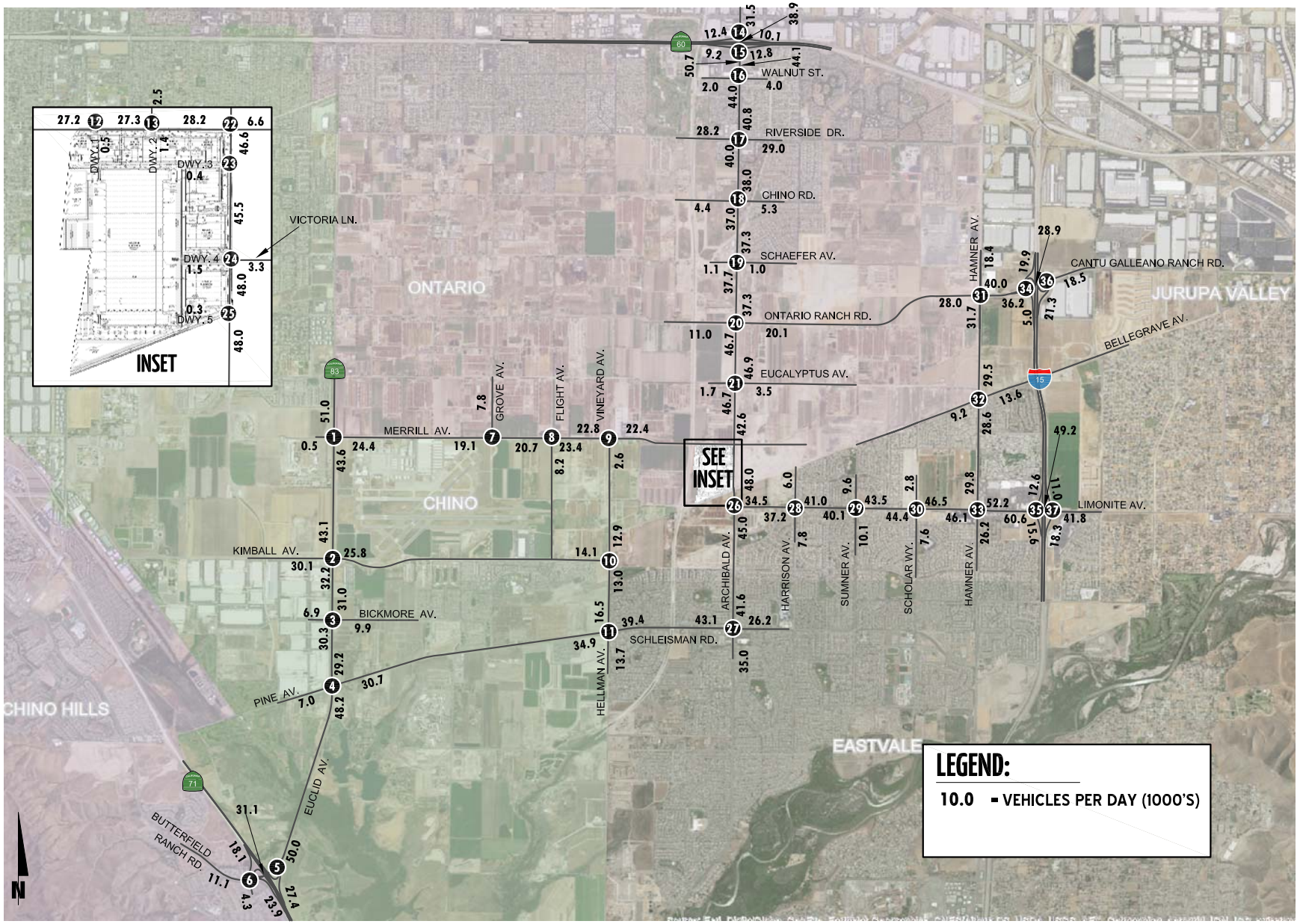
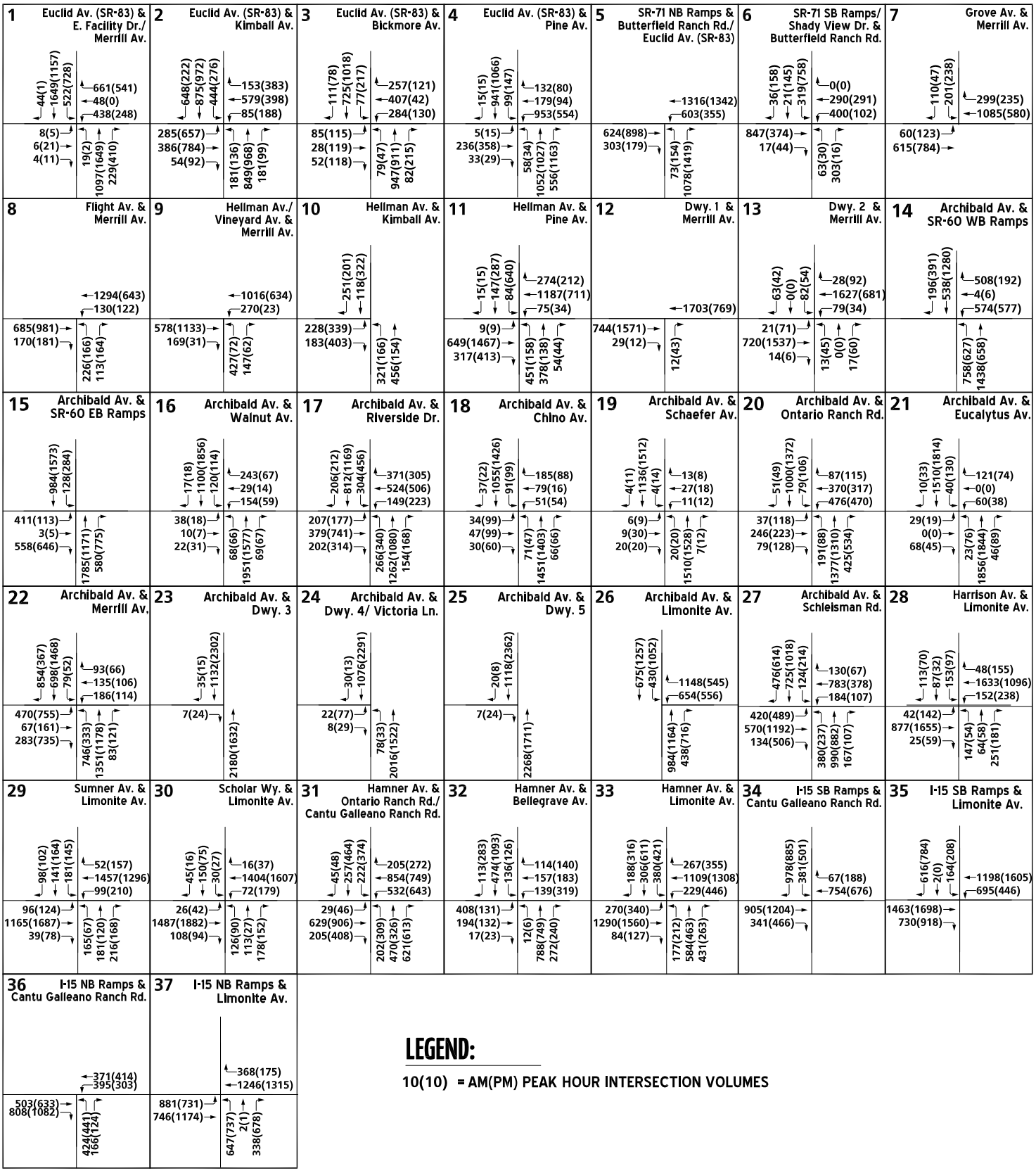


EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2018) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

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

6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2019) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2019) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown in Table 6-1, the following additional study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2019) Without Project traffic conditions, in addition to the locations previously identified under Existing traffic conditions:

- Euclid Av. (SR-83) / Merrill Av. (#1) – LOS F AM and PM peak hours
- Euclid Av. (SR-83) / Kimball Av. (#2) – LOS F AM and PM peak hours
- Euclid Av. (SR-83) / Bickmore Av. (#3) – LOS E AM and PM peak hours
- Euclid Av. (SR-83) / Pine Av. (#4) – LOS E AM and PM peak hours
- SR-71 Southbound Ramps / Euclid Av. (SR-83) (#6) – LOS E AM peak hour only
- Grove Av. / Merrill Av. (#7) – LOS F AM and PM peak hours
- Flight Av. / Merrill Av. (#8) – LOS F AM and PM peak hours
- Hellman Av. / Merrill Av. (#9) – LOS F AM peak hour; LOS E PM peak hour
- Hallman Av. / Pine Av. (#11) – LOS E PM peak hour only
- Archibald Av. / SR-60 WB Ramps (#14) – LOS F AM peak hour; LOS E PM peak hour
- Archibald Av. / Riverside Dr. (#17) – LOS F AM and PM peak hours
- Archibald Av. / Schaefer Av. (#19) – LOS F AM and PM peak hours
- Archibald Av. / Ontario Ranch Rd. (#20) – LOS F AM peak hour only
- Archibald Av. / Merrill Av. (#22) – LOS F AM and PM peak hours
- Archibald Av. / Limonite Av. (#26) – LOS F AM and PM peak hours
- Archibald Av. / Schleisman Rd. (#27) – LOS E PM peak hour only
- Harrison Av. / Limonite Av. (#28) – LOS E AM peak hour only
- Hamner Av. / Ontario Ranch Rd. (#31) – LOS E AM peak hour only
- Hamner Av. / Limonite Av. (#33) – LOS E PM peak hour only
- I-15 Southbound Ramps / Limonite Av. (#35) – LOS E AM peak hour only

A summary of the peak hour intersection LOS for Opening Year Cumulative (2019) Without Project conditions is shown on Exhibit 6-5. The intersection operations analysis worksheets for Opening Year Cumulative (2019) Without Project traffic conditions are included in Appendix 6.1 of this TIA.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2019) Conditions

#	Intersection	Traffic Control[2]	2019 Without Project				2019 With Project				Acceptable LOS	Significant Impact?[3]
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service			
			AM	PM	AM	PM	AM	PM	AM	PM		
1	Euclid Av. (SR-83) / Merrill Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D	**Yes**
2	Euclid Av. (SR-83) / Kimball Av.	TS	**156.2**	**>200.0**	**F**	**F**	**162.3**	**>200.0**	**F**	**F**	D	No
3	Euclid Av. (SR-83) / Bickmore Av.	TS	**74.5**	**71.1**	**E**	**E**	**84.5**	**74.0**	**F**	**E**	D	No
4	Euclid Av. (SR-83) / Pine Av.	TS	**57.2**	**62.3**	**E**	**E**	**59.6**	**65.6**	**E**	**E**	D	No
5	SR-71 NB Ramps / Euclid Av. (SR-83)	TS	11.6	39.8	B	D	12.9	48.2	B	D	D	No
6	SR-71 SB Ramps / Euclid Av. (SR-83)	TS	**74.0**	33.9	**E**	C	**74.9**	34.9	**E**	C	D	No
7	Grove Av. / Merrill Av.	AWS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	**Yes**
8	Flight Av. / Merrill Av.	CSS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	**Yes**
9	Vineyard Av./Hellman Av. / Merrill Av.	**CSS**	**>100.0**	**39.9**	**F**	**E**	**>100.0**	**64.1**	**F**	**F**	D	**Yes**
10	Hellman Av. / Kimball Av.	AWS	25.9	23.9	D	C	27.0	24.4	D	C	D	No
11	Hellman Av. / Pine Av.	TS	26.6	**55.2**	C	**E**	26.7	**56.1**	C	**E**	D	No
12	Driveway 1 / Merrill Av.	**CSS**	Future Intersection				11.3	19.0	B	C	D	No
13	Driveway 2 / Merrill Av.	**TS**	Future Intersection				14.9	14.6	B	B	D	No
14	Archibald Av. / SR-60 WB Ramps	TS	**84.9**	**60.2**	**F**	**E**	**92.1**	**62.1**	**F**	**E**	D	**Yes**
15	Archibald Av. / SR-60 EB Ramps	TS	27.9	51.7	C	D	28.8	52.6	C	D	D	No
16	Archibald Av. / Walnut Av.	TS	37.8	21.8	D	C	39.1	23.6	D	C	E	No
17	Archibald Av. / Riverside Dr.	TS	**91.1**	**118.3**	**F**	**F**	**94.0**	**126.9**	**F**	**F**	E	**Yes**
18	Archibald Av. / Chino Av.	TS	22.2	43.9	C	D	24.5	47.5	C	D	E	No
19	Archibald Av. / Schaefer Av.	**CSS**	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	E	**Yes**
20	Archibald Av. / Ontario Ranch Rd.	TS	**85.7**	68.8	**F**	E	**97.7**	77.6	**F**	E	E	**Yes**
21	Archibald Av. / Eucalyptus Av.	TS	16.2	24.8	B	C	17.0	30.2	B	C	E	No
22	Archibald Av. / Merrill Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	E	**Yes**
23	Archibald Av. / Driveway 3	**CSS**	Future Intersection				15.1	26.5	C	D	D	No
24	Archibald Av. / Driveway 4/Victoria Ln.	**TS**	Future Intersection				14.1	10.7	B	B	D	No
25	Archibald Av. / Driveway 5	**CSS**	Future Intersection				14.7	27.3	C	D	D	No
26	Archibald Av. / Limonite Av.	TS	**162.6**	**>200.0**	**F**	**F**	**180.0**	**>200.0**	**F**	**F**	D	**Yes**
27	Archibald Av. / Schleisman Rd.	TS	50.5	**55.5**	D	**E**	52.6	**60.1**	D	**E**	D	No
28	Harrison Av. / Limonite Av.	TS	**59.7**	33.0	**E**	C	**65.9**	34.1	**E**	C	D	**Yes**
29	Sumner Av. / Limonite Av.	TS	23.9	22.8	C	C	24.1	23.2	C	C	D	No
30	Scholar Way / Limonite Av.	TS	22.6	30.0	C	C	23.2	34.0	C	C	D	No
31	Hamner Av. / Ontario Ranch Rd.[3]	TS	47.1	**73.7**	D	**E**	47.4	**74.5**	D	**E**	D	**Yes**
32	Hamner Av. / Bellegrave Av.[3]	TS	26.6	23.6	C	C	26.7	23.7	C	C	D	No
33	Hamner Av. / Limonite Av.	TS	48.6	**61.7**	D	**E**	50.3	**64.4**	D	**E**	D	No
34	I-15 SB Ramps / Cantu Galleano Ranch Rd.	TS	25.0	24.6	C	C	30.2	31.2	C	C	D	No
35	I-15 SB Ramps / Limonite Av.	TS	**58.7**	53.3	**E**	D	**60.9**	**57.5**	**E**	**E**	D	**Yes**
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.	TS	42.2	50.3	D	D	42.5	54.4	D	D	D	No
37	I-15 NB Ramps / Limonite Av.	TS	49.9	39.1	D	D	50.5	39.6	D	D	D	No

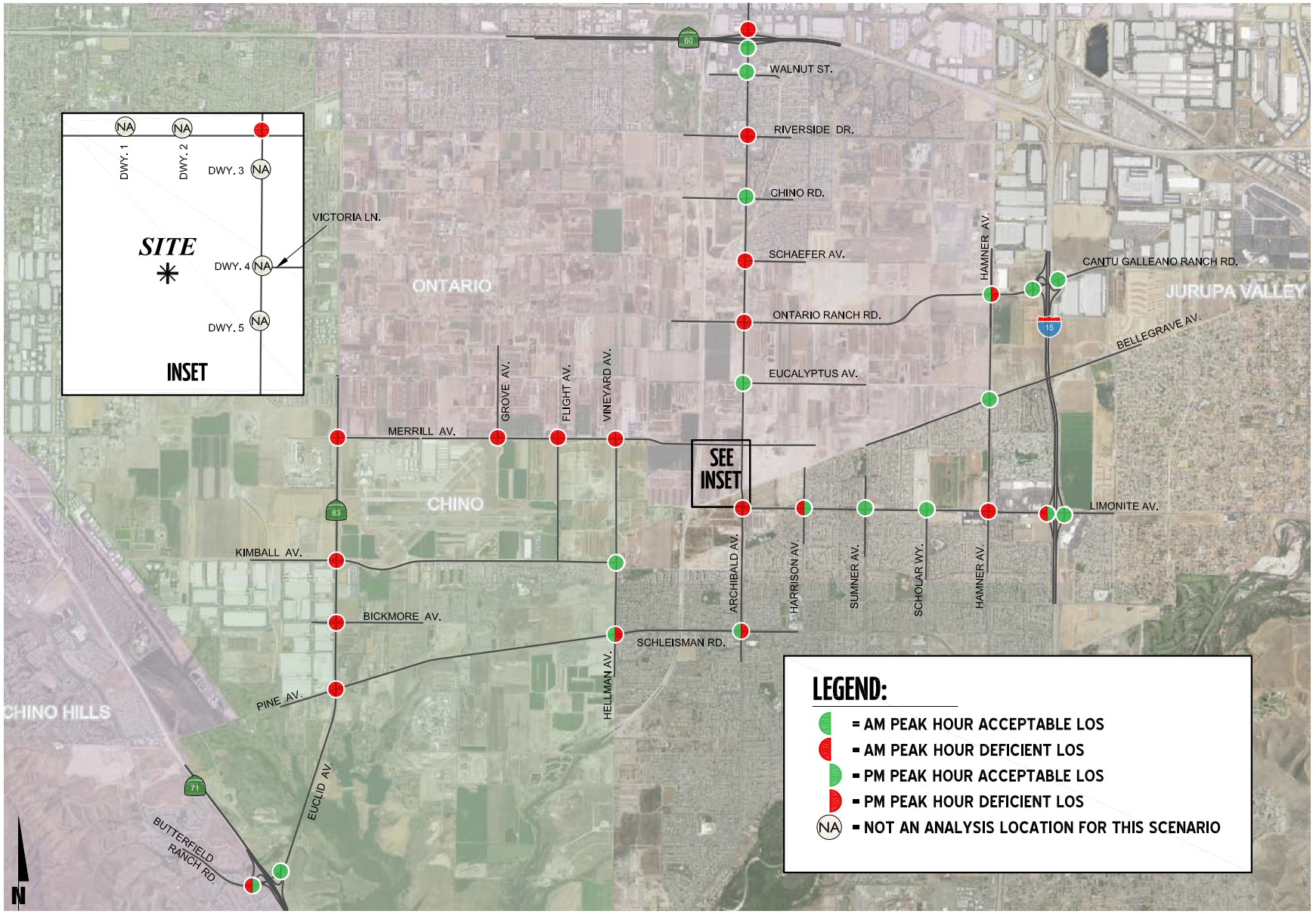
* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

[1] 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.

[2] CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Improvements currently under construction and anticipated to be completed by mid to late 2017 have been assumed to be in place.

EXHIBIT 6-5: SUMMARY OF LOS FOR OPENING YEAR CUMULATIVE (2019) WITHOUT PROJECT CONDITIONS



6.4.2 OPENING YEAR CUMULATIVE (2019) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-1 and illustrated on Exhibit 6-6, there are no additional study area intersections anticipated to experience unacceptable LOS with the addition of Project traffic during the peak hours. The intersection operations analysis worksheets for Opening Year Cumulative (2019) With Project traffic conditions are included in Appendix 6.2 of this TIA.

6.5 ROADWAY SEGMENT CAPACITY ANALYSIS

As noted previously, the roadway segment capacities are approximate figures only, and are typically used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet future forecasted traffic demand.

Table 6-2 provides a summary of the Opening Year Cumulative (2019) conditions roadway segment capacity analysis based on the City of Ontario General Plan Roadway Segment Capacity Thresholds identified previously on Table 2-3. As shown on Table 6-2, all of the study area roadway segments are anticipated to operate at unacceptable LOS (based on daily roadway segment capacities) under Opening Year Cumulative (2019) Without and With Project traffic conditions.

A peak hour assessment of intersections located on either side of a deficient roadway segment has been conducted to determine if peak hour traffic flows can be accommodated by the potentially deficient roadway segment. If it is determined that peak traffic flows can be accommodated at the City's stated LOS thresholds, then roadway segment widening is typically not recommended.

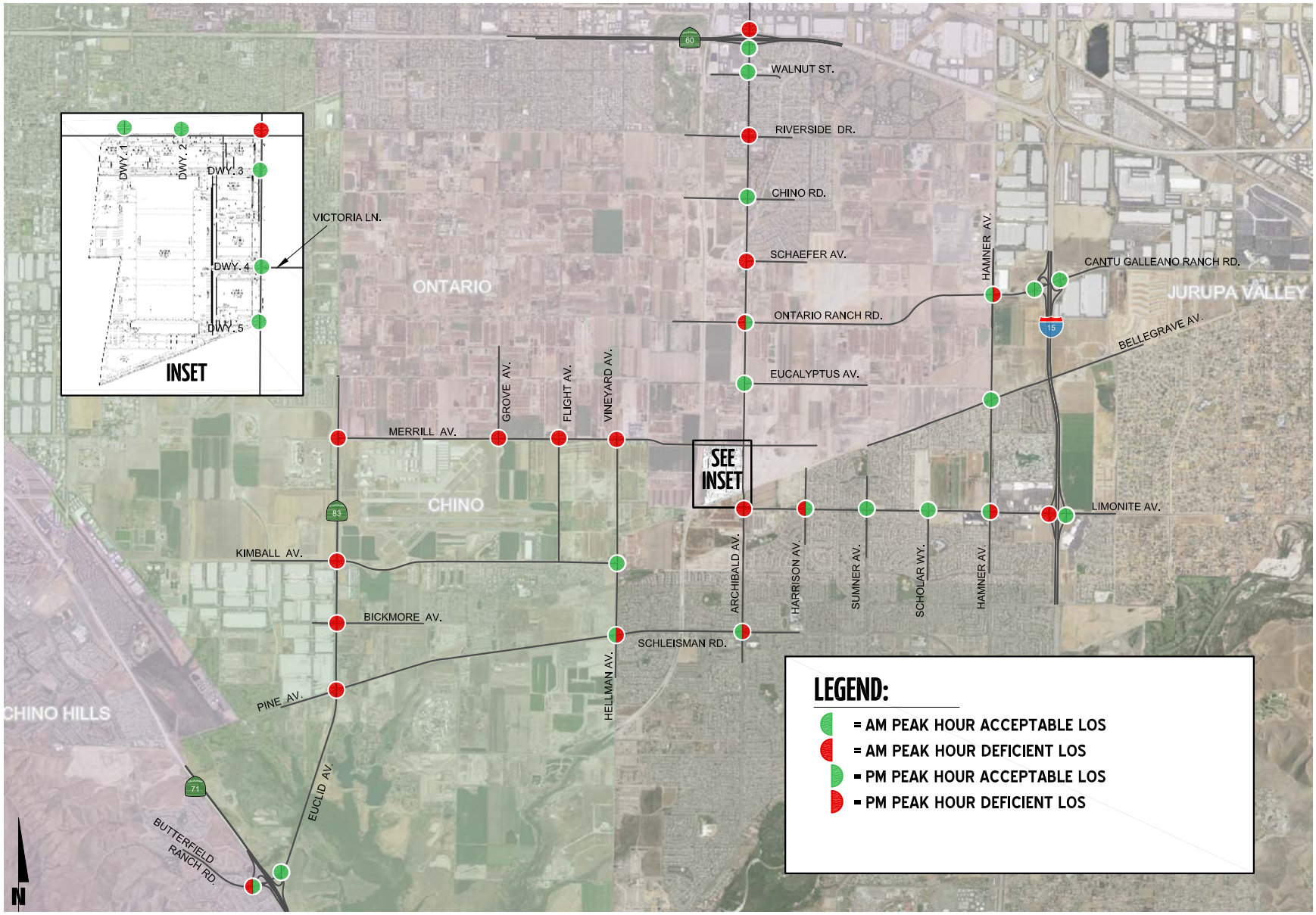
6.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

Hellman Avenue and Merrill Avenue is anticipated to warrant a traffic signal under Opening Year Cumulative (2019) Without Project traffic conditions in addition to those previously warranted under Existing and E+P traffic conditions. The intersection of Driveway 2 and Merrill Avenue is anticipated to meet planning level (ADT) volume based traffic signal warrants for Opening Year Cumulative (2019) With Project traffic conditions in addition to those previously warranted under Opening Year Cumulative (2019) Without traffic conditions (see Appendices 6.3 and 6.4).

6.7 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2019) Without and With Project traffic conditions are shown in Table 6-3. 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 with the addition of Project traffic. Worksheets for Opening Year Cumulative (2019) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 6.5 and 6.6, respectively.

EXHIBIT 6-6: SUMMARY OF LOS FOR OPENING YEAR CUMULATIVE (2019) WITH PROJECT CONDITIONS



URBAN CROSSROADS

Table 6-2

Roadway Segment Capacity Analysis for Opening Year Cumulative (2019) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2019 Without Project	V/C[2]	LOS[3]	2019 With Project	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	2U	14,000	**18,516**	**1.32**	**F**	**19,114**	**1.37**	**F**	D
2		Between Grove Av. and Vineyard Av.	2U	14,000	**19,912**	**1.42**	**F**	**20,734**	**1.48**	**F**	D
3		West of Driveway 2	2U	14,000	**26,376**	**1.88**	**F**	**27,290**	**1.95**	**F**	D
4	Archibald Avenue	North of Ontario Ranch Rd.	4D	35,900	**36,227**	**1.01**	**F**	**37,266**	**1.04**	**F**	D
5		Between Eucalyptus Av. and Merrill Av.	4D	35,900	**39,133**	**1.09**	**F**	**41,083**	**1.14**	**F**	D
6		North of the County Line	2D	17,950	**46,665**	**2.60**	**F**	**48,002**	**2.67**	**F**	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

Table 6-3

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2019) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2019 Without Project				2019 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
SR-71 NB Ramps / Euclid Avenue (SR-83)	NBL	1,745	40	50	Yes	Yes	40	51	Yes	Yes
	NBR	420	821 [2]	1,470 [2]	Yes[3]	Yes[3]	890 [2]	1,536 [2]	Yes[3]	Yes[3]
SR-71 SB Ramps / Euclid Avenue (SR-83)	SBL	1,100	155	523 [2]	Yes	Yes	155	523 [2]	Yes	Yes
	SBL/T	1,560	154	507 [2]	Yes	Yes	154	507 [2]	Yes	Yes
	SBR	255	0	44	Yes	Yes	0	44	Yes	Yes
Archibald Avenue/ SR-60 WB Ramps	WBL/T	1,389	678 [2]	688 [2]	Yes	Yes	712 [2]	701 [2]	Yes	Yes
	WBR	250	551 [2]	58	Yes[3]	Yes	551 [2]	59	Yes[3]	Yes
Archibald Avenue/ SR-60 EB Ramps	EBL/T	1,268	340 [2]	93	Yes	Yes	340 [2]	93	Yes	Yes
	EBR	350	504 [2]	649 [2]	Yes[3]	Yes[3]	547 [2]	650 [2]	Yes[3]	Yes[3]
I-15 SB Ramps / Cantu Galleano Ranch Rd.	SBL	1,440	57	68	Yes	Yes	57	68	Yes	Yes
	SBR	460	627 [2]	563 [2]	Yes[3]	Yes[3]	673 [2]	583 [2]	Yes[3]	Yes[3]
I-15 NB Ramps / Cantu Galleano Ranch Rd.	NBL	1,680	203 [2]	203 [2]	Yes	Yes	203 [2]	190 [2]	Yes	Yes
	NBL/R	580	0	0	Yes	Yes	0	0	Yes	Yes
	NBR	440	51	43	Yes	Yes	51	43	Yes	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	187	200	Yes	Yes	186	200	Yes	Yes
	SBL/T/R	400	426 [2]	516 [2]	Yes	Yes[3]	436 [2]	516 [2]	Yes[3]	Yes[3]
	SBR	1,200	389 [2]	475 [2]	Yes	Yes	397 [2]	475 [2]	Yes	Yes
I-15 NB Ramps / Limonite Avenue	NBL	450	542 [2]	578 [2]	Yes[3]	Yes[3]	541 [2]	594 [2]	Yes[3]	Yes[3]
	NBL/T/R	1,235	570 [2]	571 [2]	Yes	Yes	572 [2]	580 [2]	Yes	Yes
	NBR	400	157	475 [2]	Yes	Yes[3]	176	477 [2]	Yes	Yes[3]

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

6.8 BASIC FREEWAY SEGMENT ANALYSIS

Opening Year Cumulative (2019) Without and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 6-7 and 6-8, respectively. As shown on Table 6-4, the following additional freeway segments are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for both Opening Year cumulative (2019) Without and With Project conditions, in addition to those previously identified under Existing and E+P traffic conditions:

- I-15 Freeway Southbound, Cantu Galleano Ranch Rd. to Limonite Av. (#8) – LOS E AM and PM peak hours
- I-15 Freeway Northbound, Cantu Galleano Ranch Rd. to Limonite Av. (#11) – LOS E AM peak hour only
- I-15 Freeway Northbound, South of Limonite Av. (#12) – LOS E AM and PM peak hours

Opening Year Cumulative (2019) Without and With Project basic freeway segment analysis worksheets are provided in Appendix 6.7 and 6.8, respectively.

6.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative (2019) conditions and the results of this analysis are presented in Table 6-5. As shown in Table 6-5, the following additional merge and diverge areas are anticipated operate at LOS E or LOS F for Opening Year Cumulative (2019) Without and With Project, in addition to those previously identified under Existing and E+P traffic conditions:

- SR-71 Freeway, Southbound Loop On-Ramp at Euclid Av. (SR-83) (Upstream) (#1) – LOS E AM peak hour only
- SR-71 Freeway, Southbound Loop On-Ramp at Euclid Av. (SR-83) (Downstream) (#2) – LOS E AM peak hour only
- SR-71 Freeway, Northbound Off-Ramp at Euclid Av. (SR-83) (#3) – LOS E AM and PM peak hours
- I-15 Freeway, Southbound Off-Ramp at Cantu Galleano Ranch Rd. (#8) – LOS E AM and PM peak hours
- I-15 Freeway, Northbound Off-Ramp at Limonite Av. (#11) – LOS E AM and PM peak hours

Opening Year Cumulative (2019) Without and With Project freeway ramp junction operations analysis worksheets are provided in Appendices 6.9 and 6.10, respectively.

EXHIBIT 6-7: OPENING YEAR CUMULATIVE (2019) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)

EXHIBIT 6-8: OPENING YEAR CUMULATIVE (2019) WITH PROJECT FREEWAY MAINLINE VOLUMES (ACTUAL VEHICLES)

Table 6-4

Basic Freeway Segment Analysis for Opening Year Cumulative (2019) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2019 Without Project				2019 With Project			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
SR-71	SB	South of Euclid Av. (SR-83)	2	**48.1**	34.1	**F**	D	**48.3**	34.3	**F**	D
	NB	South of Euclid Av. (SR-83)	3	28.0	28.3	D	D	28.1	28.4	D	D
SR-60	WB	West of Archibald Av.	4	26.0	25.0	C	C	26.0	25.1	C	C
		East of Archibald Av.	5	20.5	18.6	C	C	20.5	18.6	C	C
	EB	West of Archibald Av.	4	34.1	31.4	D	D	34.4	31.5	D	D
		East of Archibald Av.	4	32.4	33.4	D	D	32.5	33.5	D	D
I-15	SB	North of Cantu Galleano Ranch Rd.	4	29.4	28.8	D	D	29.7	28.9	D	D
		Cantu Galleano Ranch Rd. to Limonite Av.	3	**38.0**	**38.9**	**E**	**E**	**38.0**	**38.9**	**E**	**E**
		South of Limonite Av.	3	**46.7**	**43.1**	**F**	**E**	**46.8**	**43.4**	**F**	**E**
	NB	North of Cantu Galleano Ranch Rd.	5	21.1	19.6	C	C	21.1	19.7	C	C
		Cantu Galleano Ranch Rd. to Limonite Av.	3	**39.1**	32.3	**E**	D	**39.1**	32.3	**E**	D
		South of Limonite Av.	3	**35.3**	**37.5**	**E**	**E**	**35.5**	**37.6**	**E**	**E**

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

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

[4] LOS = Level of Service

Table 6-5

Freeway Ramp Junction Merge/Diverge Analysis for Opening Year Cumulative (2019) Conditions

Freeway	Direction[1]	Ramp or Segment	Lanes on Freeway[2]	2019 Without Project				2019 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]
SR-71	SB	Loop On-Ramp at Euclid Av. (SR-83) (Upstream)	2	**36.1**	**E**	33.8	D	**36.2**	**E**	34.0	D
		Loop On-Ramp at Euclid Av. (SR-83) (Downstream)	2	**36.1**	**E**	33.8	D	**36.2**	**E**	34.0	D
	NB	Off-Ramp at Euclid Av. (SR-83)	3	**35.3**	**E**	**36.7**	**E**	**35.5**	**E**	**36.8**	**E**
SR-60	WB	On-Ramp at Archibald Av.	4	26.6	C	26.2	C	26.6	C	26.4	C
		Off-Ramp at Archibald Av.	5	31.2	D	28.8	D	31.4	D	28.9	D
	EB	Off-Ramp at Archibald Av.	4	**38.8**	**E**	**35.9**	**E**	**39.0**	**E**	**36.0**	**E**
		On-Ramp at Archibald Av.	4	28.9	D	30.5	D	29.1	D	30.6	D
I-15	SB	Off-Ramp at Cantu Galleano Ranch Rd.	4	**37.9**	**E**	**37.9**	**E**	**38.2**	**E**	**38.1**	**E**
		On-Ramp at Limonite Av.	3	**39.5**	**F**	**37.8**	**E**	**39.5**	**F**	**38.0**	**E**
	NB	On-Ramp at Cantu Galleano Ranch Rd.	3	**41.5**	**F**	**39.8**	**E**	**41.6**	**F**	**40.1**	**E**
		Off-Ramp at Limonite Av.	3	**36.7**	**E**	**38.4**	**E**	**36.8**	**E**	**38.5**	**E**

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbounc

[2] Number of lanes are in the specified direction and is based on existing conditions

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

[4] LOS = Level of Service

6.10 RECOMMENDED IMPROVEMENTS

6.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as significantly impacted by the Project, in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). Significant impacts have been identified at deficient intersections if the Project contributes 50 or more peak hours or if the addition of Project traffic increases the delay by 5.0 seconds or more (for the intersections in Eastvale only).

The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative (2019) traffic deficiencies is presented in Table 6-6. Worksheets for Opening Year Cumulative (2019) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.11 and Appendix 6.12.

6.10.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

As shown on Table 6-6, the Opening Year Cumulative peak hour analysis indicates that the adjacent study area intersections on either side of the deficient roadway segments are anticipated to operate at acceptable LOS with the recommended intersection improvements shown. These intersection improvements consist of installation of traffic signals, additional turn lanes, additional through lanes, and traffic signal modifications to accommodate right turn overlap phasing. Table 6-7 shows the LOS for each of the applicable roadway segments with improvements consistent with those shown on Table 6-6 for the adjacent study area intersections, where roadway widening through additional through lanes has been recommended. In other words, only the roadway segments adjacent to study area intersections where additional through lanes have been recommended on Table 6-6 are shown on Table 6-7. As shown on Table 6-7, all roadway segments shown are anticipated to improve in LOS to acceptable levels.

6.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 6-3, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with addition of Project traffic. However, Table 6-8 shows the queuing results with the proposed intersection improvements shown previously on Table 6-6. Worksheets for Opening Year Cumulative (2019) Without and With Project traffic conditions, with improvements, off-ramp queuing analysis are provided in Appendices 6.13 and 6.14, respectively.

Table 6-6

Intersection Analysis for Opening Year Cumulative (2019) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Euclid Av. (SR-83) / Merrill Av.																	
	- Without Project[4]	TS	1	**3**	1	**2**	**3**	0	0	1	0	**1**	1	**1>**	36.7	45.9	D	D
	- With Project[4]	TS	1	**3**	1	**2**	**3**	0	0	1	0	**1**	1	**1>**	37.9	48.5	D	D
7	Grove Av. / Merrill Av.																	
	- Without Project	**TS**	0	0	0	0	1	0	**1**	**2**	0	0	**2**	0	32.0	16.5	C	B
	- With Project	**TS**	0	0	0	0	1	0	**1**	**2**	0	0	**2**	0	35.4	17.8	D	B
8	Flight Av. / Merrill Av.																	
	- Without Project	**TS**	**1**	**0**	**1**	0	0	0	0	**2**	1	1	**2**	0	13.2	16.3	B	B
	- With Project	**TS**	**1**	**0**	**1**	0	0	0	0	**2**	1	1	**2**	0	13.5	16.3	B	B
9	Vineyard Av./Hellman Av. / Merrill Av.																	
	- Without Project	**TS**	**1**	0	**1**	0	0	0	0	**2**	**1**	**1**	**2**	0	26.7	12.2	C	B
	- With Project	**TS**	**1**	0	**1**	0	0	0	0	**2**	**1**	**1**	**2**	0	27.4	12.5	C	B
14	Archibald Av. / SR-60 WB Ramps																	
	- Without Project[4]	TS	**2**	3	0	0	4	0	0	0	0	**1**	1	1	32.4	33.4	C	C
	- With Project[4]	TS	**2**	3	0	0	4	0	0	0	0	**1**	1	1	33.1	34.3	C	C
17	Archibald Av. / Riverside Dr.																	
	- Without Project	TS	**2**	3	0	**2**	3	0	1	2	d	1	2	**1>**	53.2	66.8	D	E
	- With Project	TS	**2**	3	0	**2**	3	0	1	2	d	1	2	**1>**	54.1	70.5	E	E
19	Archibald Av. / Schaefer Av.																	
	- Without Project	**TS**	**1**	2	0	1	2	0	0	**1**	0	0	**1**	0	14.3	17.0	B	B
	- With Project	**TS**	**1**	2	0	1	2	0	0	**1**	0	0	**1**	0	14.6	18.0	B	B
20	Archibald Av. / Ontario Ranch Rd.																	
	- Without Project	TS	**2**	2	**1>**	1	2	1	2	2	1>>	2	1	1	42.2	41.4	D	D
	- With Project	TS	**2**	2	**1>**	1	2	1	2	2	1>>	2	1	1	46.7	45.9	D	D
22	Archibald Av. / Merrill Av.																	
	- Without Project	TS	**2**	**3**	1	2	**3**	**1>**	**2**	**2**	**1>>**	1	**2**	1	46.8	36.8	D	D
	- With Project	TS	**2**	**3**	1	2	**3**	**1>**	**2**	**2**	**1>>**	1	**2**	1	49.7	42.7	E	D
26	Archibald Av. / Limonite Av.																	
	- Without Project	TS	0	**2**	1>	**2**	**2**	0	0	0	0	**2**	0	**2>**	24.3	41.0	C	D
	- With Project	TS	0	**2**	1>	**2**	**2**	0	0	0	0	**2**	0	**2>**	25.7	46.8	C	D
28	Harrison Av. / Limonite Av.																	
	- Without Project	TS	1	1	1	1	1	0	1	3	d	1	**3**	1	30.2	31.9	C	C
	- With Project	TS	1	1	1	1	1	0	1	3	d	1	**3**	1	30.6	33.1	C	C
31	Hamner Av. / Ontario Ranch Rd.																	
	- Without Project	TS	2	3	**1>**	2	2	1	2	3	1	2	2	1	24.0	36.7	C	D
	- With Project	TS	2	3	**1>**	2	2	1	2	3	1	2	2	1	24.0	37.7	C	D
35	I-15 SB Ramps / Limonite Av.																	
	- Without Project	TS	0	0	0	1	1	1	0	**3**	1	2	**3**	0	45.4	46.6	D	D
	- With Project	TS	0	0	0	1	1	1	0	**3**	1	2	**3**	0	46.3	50.8	D	D

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

L = Left; T = Through; R = Right; > = 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; **TS** = Improvement

[4] Includes modifying the coordinated cycle length from 90 seconds to 120 seconds.

[5] Includes new lanes on the westbound approach, implementing split phase for the eastbound and westbound approaches, and removing the eastbound (south leg) crosswalk.

Table 6-7

Roadway Segment Capacity Analysis for Opening Year Cumulative (2019) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2019 Without Project	V/C[2]	LOS[3]	2019 With Project	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	**4D**	28,000	18,516	0.66	B	19,114	0.68	B	D
2		Between Grove Av. and Vineyard Av.	**4D**	28,000	19,912	0.71	C	20,734	0.74	C	D
3		West of Driveway 2[4]	**4D**	35,000	26,376	0.75	C	27,290	0.78	C	D
4	Archibald Avenue	North of Ontario Ranch Rd.	**6D**	53,900	36,227	0.67	B	37,266	0.69	B	D
5		Between Eucalyptus Av. and Merrill Av.	**6D**	53,900	39,133	0.73	C	41,083	0.76	C	D
6		North of the County Line	**6D**	53,900	46,665	0.87	D	48,002	0.89	D	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

[4] Additional capacity provided along the Project's frontage via turn lanes.

Table 6-8

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2019) Conditions With Improvements

Intersection	Movement	Available Stacking Distance (Feet)	2019 Without Project				2019 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Archibald Avenue/ SR-60 WB Ramps	WBL	1,389	294	377 [2]	Yes	Yes	310	387 [2]	Yes	Yes
	WBL/T	1,312	293	338	Yes	Yes	308	347	Yes	Yes
	WBR	250	619 [2]	58	Yes[3]	Yes	621 [2]	58	Yes[3]	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	173	200	Yes	Yes	173	200	Yes	Yes
	SBL/T/R	400	390 [2]	503 [2]	Yes	Yes[3]	401 [2]	503 [2]	Yes	Yes[3]
	SBR	1,200	351 [2]	464 [2]	Yes	Yes	362 [2]	464 [2]	Yes	Yes

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

6.10.4 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 Ontario (or other neighboring jurisdictions) on SHS roadway segments. As such, no improvements have been recommended to address the Opening Year Cumulative (2019) deficiencies on the SHS, because there is no feasible mitigation available.

7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, 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) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways such as the northern extension of Meadow Valley Avenue on Kimball Avenue and the northern extension of Hellman Avenue north of Kimball Avenue).
- The Pine Avenue extension between its El Prado Road and the SR-71 Freeway.
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area (e.g., new future roadways within the New Model Colony area such as Schaefer Avenue east of Archibald Avenue, Eucalyptus Avenue east of Archibald Avenue, Merrill Avenue east of Archibald Avenue, The Preserve Specific Plan roadway network within the City of Chino, etc.).

7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

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

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project (see Section 4.7 *Horizon Year (2040) Volume Development* of this TIA for a detailed discussion on the post-processing methodology). Horizon Year (2040) With Project traffic forecasts reflects buildout of the Project (i.e., traffic associated with PA1, PA2, and PA3). The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibits 7-3 and 7-4, respectively.

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

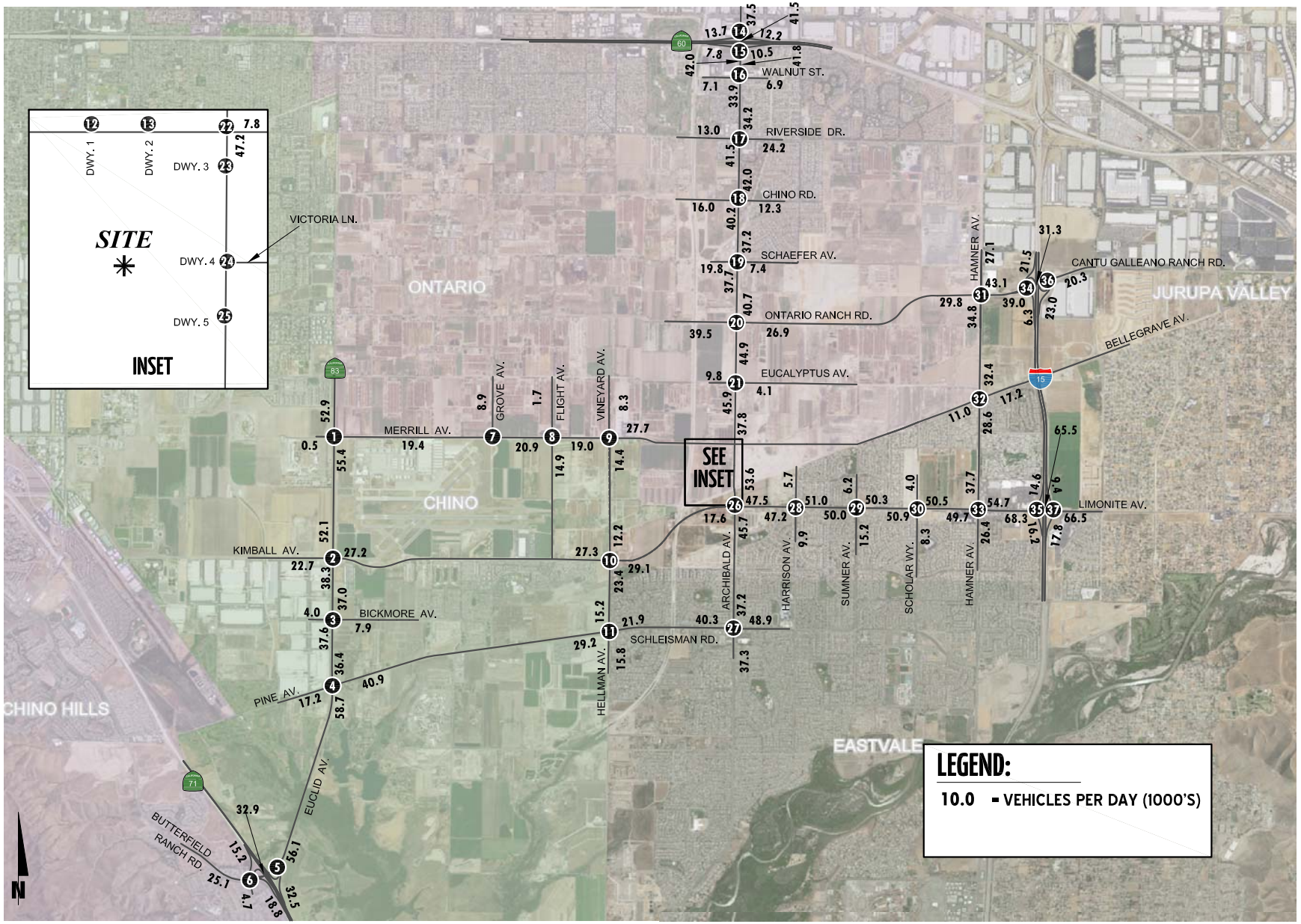


EXHIBIT 7-2: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

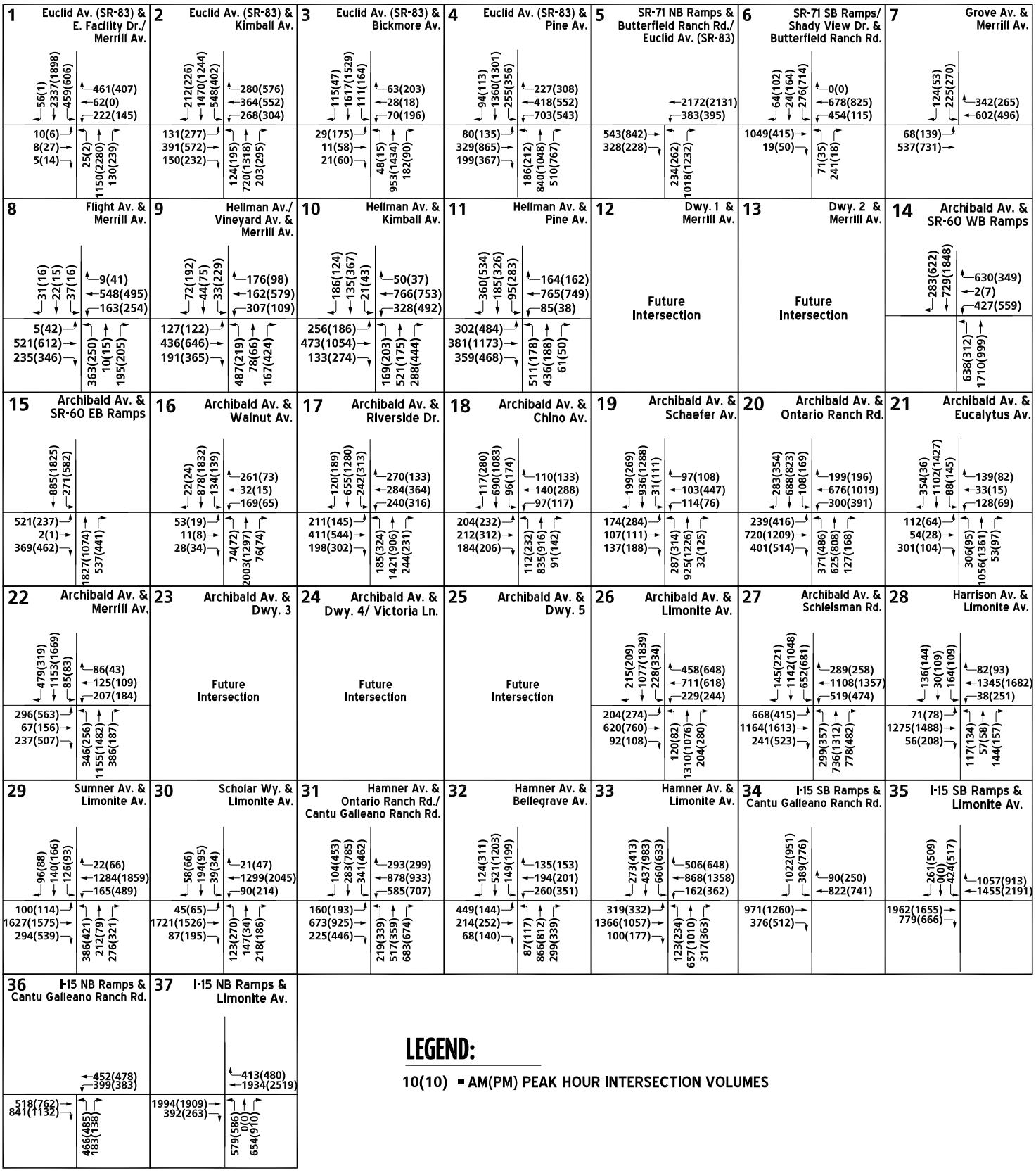
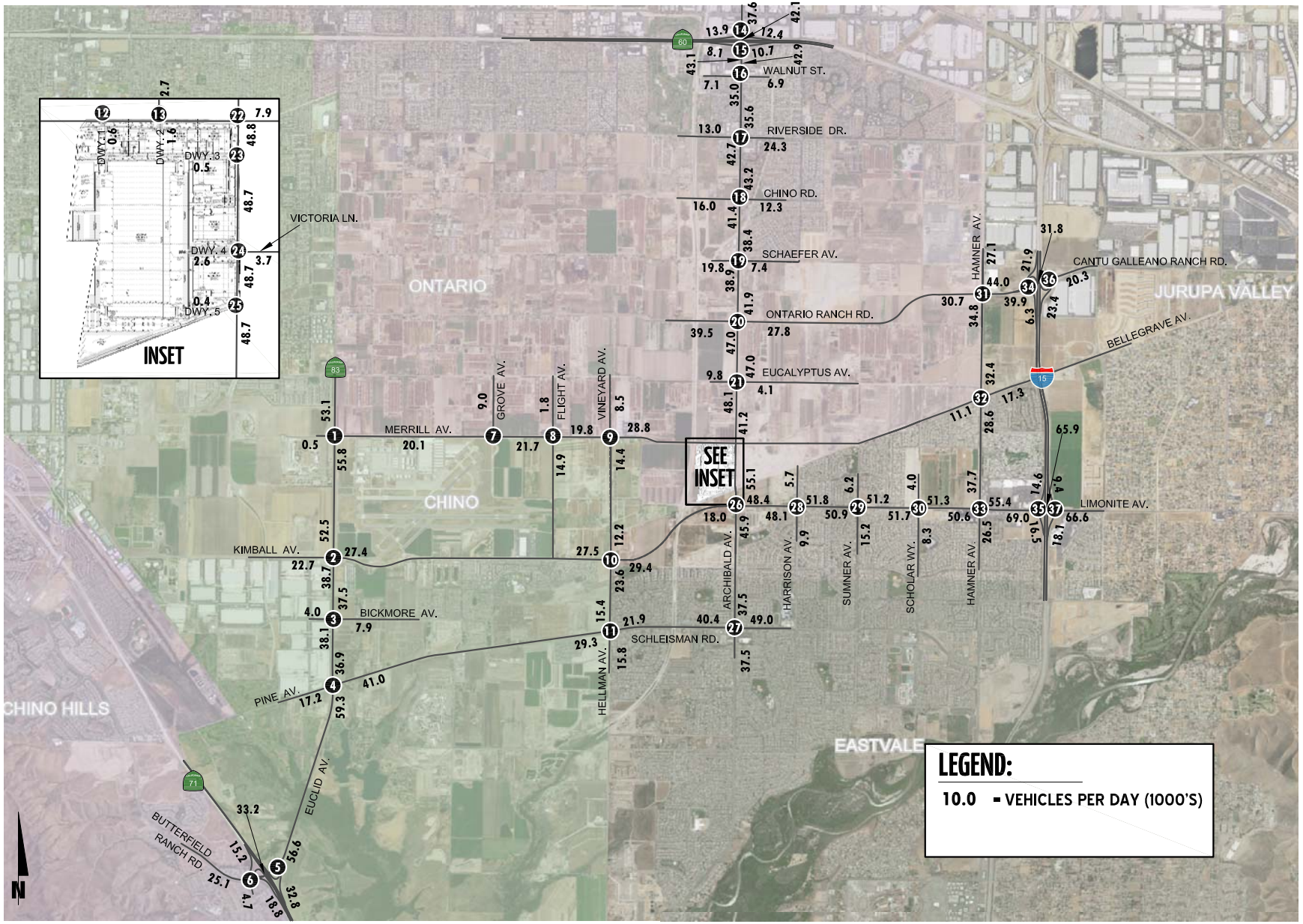
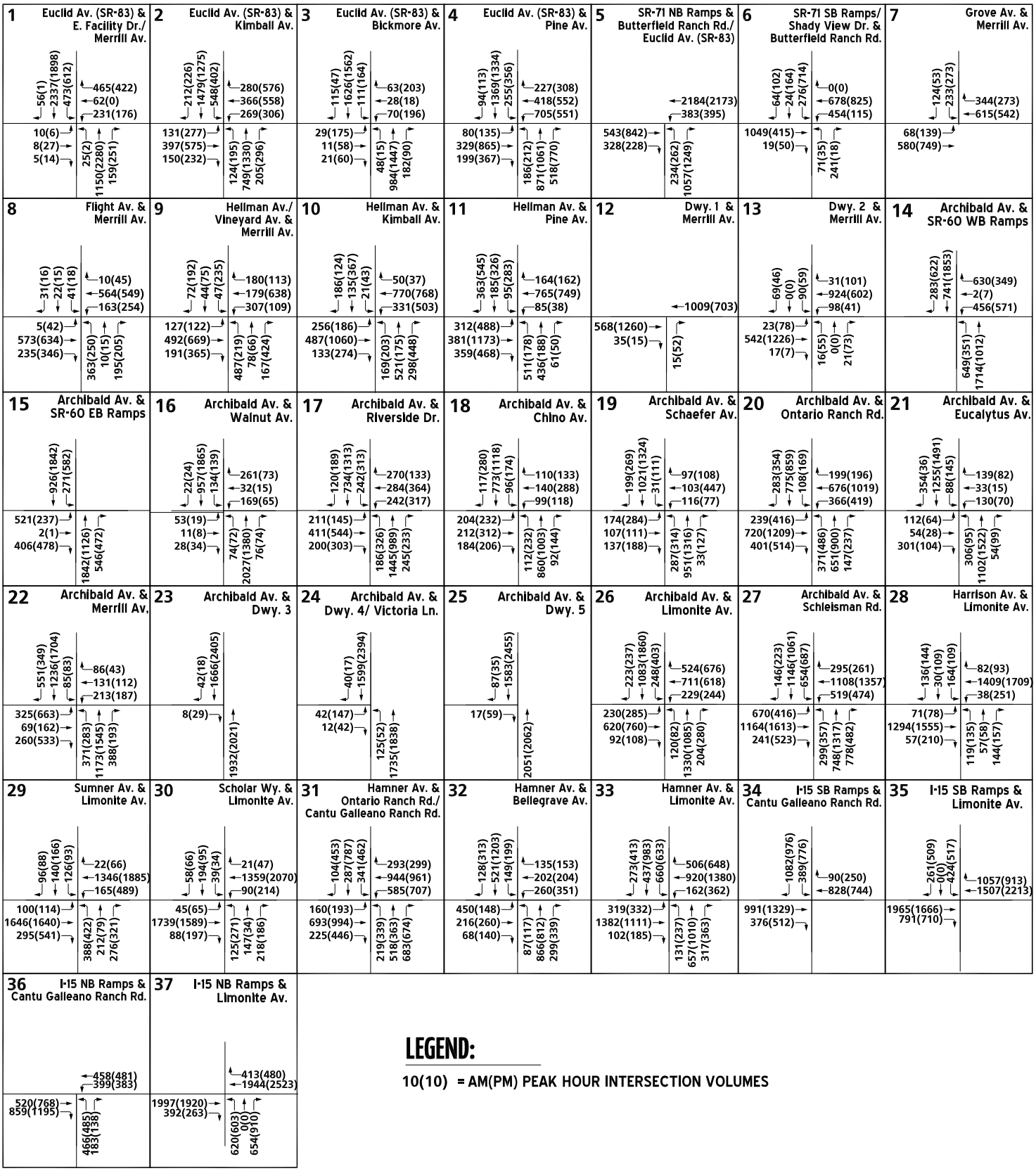


EXHIBIT 7-3: HORIZON YEAR (2040) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



URBAN CROSSROADS

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



LEGEND:

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

7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown in Table 7-1, the following additional study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions, in addition to the intersections previously identified under Existing, E+P, and Opening Year Cumulative (2019) traffic conditions:

- Archibald Av. / SR-60 Eastbound Ramps (#15) – LOS E AM peak hour; LOS F PM peak hour
- Archibald Av. / Chino Av. (#18) – LOS F PM peak hour only
- Archibald Av. / Eucalyptus Av. (#21) – LOS F AM peak hour only
- Sumner Av. / Limonite Av. (#29) – LOS E AM peak hour; LOS F PM peak hour
- Scholar Wy. / Limonite Av. (#30) – LOS E AM peak hour only
- I-15 Northbound Ramps / Cantu Galleano Ranch Rd. (#36) – LOS E AM peak hour; LOS F PM peak hour
- I-15 Northbound Ramps / Limonite Av. (#37) – LOS E AM and PM peak hours

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

7.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-6, there are no additional study area intersections anticipated to experience unacceptable LOS with the addition of Project traffic during one or more peak hours. The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TIA.

7.5 ROADWAY SEGMENT CAPACITY ANALYSIS

As noted previously, the roadway segment capacities are approximate figures only, and are typically used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet future forecasted traffic demand.

Table 7-2 provides a summary of the Horizon Year (2040) conditions roadway segment capacity analysis based on the City of Ontario General Plan Roadway Segment Capacity Thresholds identified previously on Table 2-3. As shown on Table 7-2, all of the study area roadway segments are anticipated to operate at unacceptable LOS (based on daily roadway segment capacities) under Horizon Year (2040) Without and With Project traffic conditions.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project				2040 With Project				Acceptable LOS	Significant Impact?[3]
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service			
			AM	PM	AM	PM	AM	PM	AM	PM		
1	Euclid Av. (SR-83) / Merrill Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D	**Yes**
2	Euclid Av. (SR-83) / Kimball Av.	TS	**168.7**	**>200.0**	**F**	**F**	**177.1**	**>200.0**	**F**	**F**	D	**Yes**
3	Euclid Av. (SR-83) / Bickmore Av.	TS	**>200.0**	**76.3**	**F**	**E**	**>200.0**	**77.0**	**F**	**E**	D	No
4	Euclid Av. (SR-83) / Pine Av.	TS	**141.5**	**>200.0**	**F**	**F**	**145.9**	**>200.0**	**F**	**F**	D	**Yes**
5	SR-71 NB Ramps / Euclid Av. (SR-83)	TS	12.9	42.6	B	D	14.8	51.4	B	D	D	No
6	SR-71 SB Ramps / Euclid Av. (SR-83)	TS	**100.3**	33.9	**F**	C	**101.4**	38.7	**F**	D	D	No
7	Grove Av. / Merrill Av.	AWS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	**Yes**
8	Flight Av. / Merrill Av.	CSS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	**Yes**
9	Vineyard Av./Hellman Av. / Merrill Av.	**CSS**	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	**Yes**
10	Hellman Av. / Kimball Av.	AWS	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	D	No
11	Hellman Av. / Pine Av.	TS	**89.0**	**166.9**	**F**	**F**	**93.6**	**170.9**	**F**	**F**	D	No
12	Driveway 1 / Merrill Av.	**CSS**	Future Intersection				10.5	15.8	B	C	D	No
13	Driveway 2 / Merrill Av.	**TS**	Future Intersection				12.4	12.9	B	B	D	No
14	Archibald Av. / SR-60 WB Ramps	TS	**89.0**	**116.2**	**F**	**F**	**93.5**	**117.5**	**F**	**F**	D	**Yes**
15	Archibald Av. / SR-60 EB Ramps	TS	**60.9**	**92.5**	**E**	**F**	**69.3**	**94.5**	**E**	**F**	D	**Yes**
16	Archibald Av. / Walnut Av.	TS	42.7	21.1	D	C	44.5	22.9	D	C	E	No
17	Archibald Av. / Riverside Dr.	TS	**90.1**	**93.3**	**F**	**F**	**92.5**	**128.2**	**F**	**F**	E	**Yes**
18	Archibald Av. / Chino Av.	TS	58.1	**145.6**	E	**F**	61.6	**149.2**	E	**F**	E	**Yes**
19	Archibald Av. / Schaefer Av.	**CSS**	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**	E	**Yes**
20	Archibald Av. / Ontario Ranch Rd.	TS	**125.1**	**>200.0**	**F**	**F**	**139.9**	**>200.0**	**F**	**F**	E	**Yes**
21	Archibald Av. / Eucalyptus Av.	TS	**173.8**	28.3	**F**	C	**194.1**	39.4	**F**	D	E	**Yes**
22	Archibald Av. / Merrill Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	E	**Yes**
23	Archibald Av. / Driveway 3	**CSS**	Future Intersection				20.9	22.3	C	C	D	No
24	Archibald Av. / Driveway 4/Victoria Ln.	**TS**	Future Intersection				15.5	15.5	B	B	D	No
25	Archibald Av. / Driveway 5	**CSS**	Future Intersection				19.9	22.7	C	C	D	No
26	Archibald Av. / Limonite Av.	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**	D	**Yes**
27	Archibald Av. / Schleisman Rd.	TS	**>200.0**	**145.8**	**F**	**F**	**>200.0**	**147.2**	**F**	**F**	D	No
28	Harrison Av. / Limonite Av.	TS	**60.7**	**73.7**	**E**	**E**	**67.6**	**79.1**	**E**	**E**	D	**Yes**
29	Sumner Av. / Limonite Av.	TS	**57.9**	**100.0**	**E**	**F**	**59.6**	**105.3**	**E**	**F**	D	**Yes**
30	Scholar Way / Limonite Av.	TS	39.8	**62.7**	D	**E**	41.7	**64.5**	D	**E**	D	No
31	Hamner Av. / Ontario Ranch Rd.[3]	TS	**69.3**	**96.7**	**E**	**F**	**70.5**	**99.0**	**E**	**F**	D	No
32	Hamner Av. / Bellegrave Av.[3]	TS	32.0	44.9	C	D	32.1	48.8	C	D	D	No
33	Hamner Av. / Limonite Av.	TS	**76.6**	**95.5**	**E**	**F**	**76.6**	**96.6**	**E**	**F**	D	No
34	I-15 SB Ramps / Cantu Galleano Ranch Rd.	TS	35.7	46.9	D	D	45.2	47.6	D	D	D	No
35	I-15 SB Ramps / Limonite Av.	TS	**58.5**	**84.5**	**E**	**F**	**59.0**	**86.0**	**E**	**F**	D	**Yes**
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.	TS	**67.0**	**91.8**	**E**	**F**	**67.9**	**103.3**	**E**	**F**	D	**Yes**
37	I-15 NB Ramps / Limonite Av.	TS	**57.1**	**62.9**	**E**	**E**	**57.6**	**64.1**	**E**	**E**	D	No

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

[1] 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.

[2] CSS = Cross-street Stop; AWS = All-Way Stop; TS = Traffic Signal; **CSS** = Improvement

[3] Improvements currently under construction and anticipated to be completed by mid to late 2017 have been assumed to be in place.

Table 7-2

Roadway Segment Capacity Analysis for Horizon Year (2040) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2040 Without Project	V/C[2]	LOS[3]	2040 With Project	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	2U	14,000	**19,441**	**1.39**	**F**	**20,051**	**1.43**	**F**	D
2		Between Grove Av. and Vineyard Av.	2U	14,000	**20,907**	**1.49**	**F**	**21,677**	**1.55**	**F**	D
3		West of Driveway 2	2U	14,000	**27,695**	**1.98**	**F**	**28,755**	**2.05**	**F**	D
4	Archibald Avenue	North of Ontario Ranch Rd.	4D	35,900	**40,720**	**1.13**	**F**	**41,942**	**1.17**	**F**	D
5		Between Eucalyptus Av. and Merrill Av.	4D	35,900	**45,932**	**1.28**	**F**	**48,084**	**1.34**	**F**	D
6		North of the County Line	2D	17,950	**47,201**	**2.63**	**F**	**48,716**	**2.71**	**F**	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

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

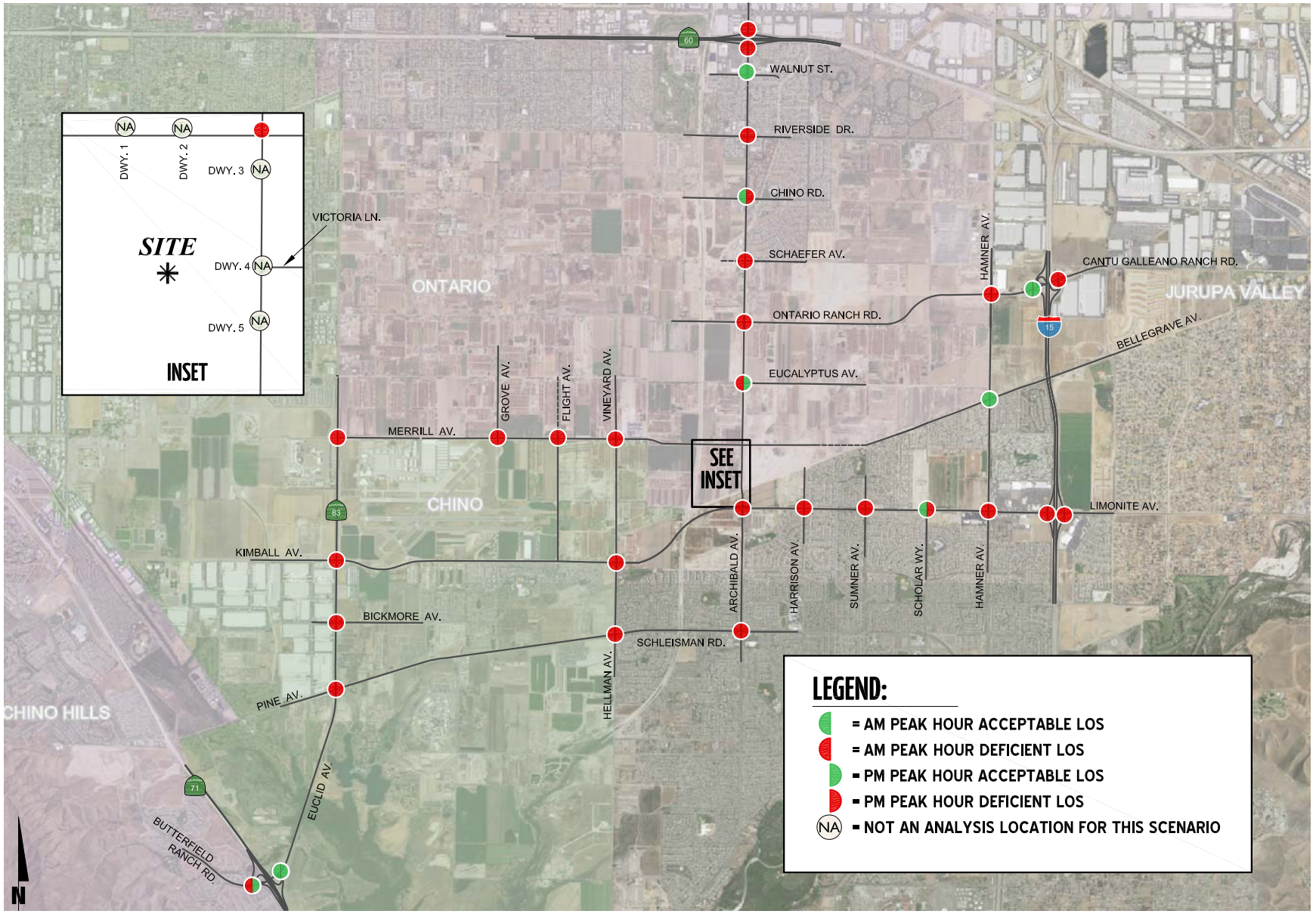
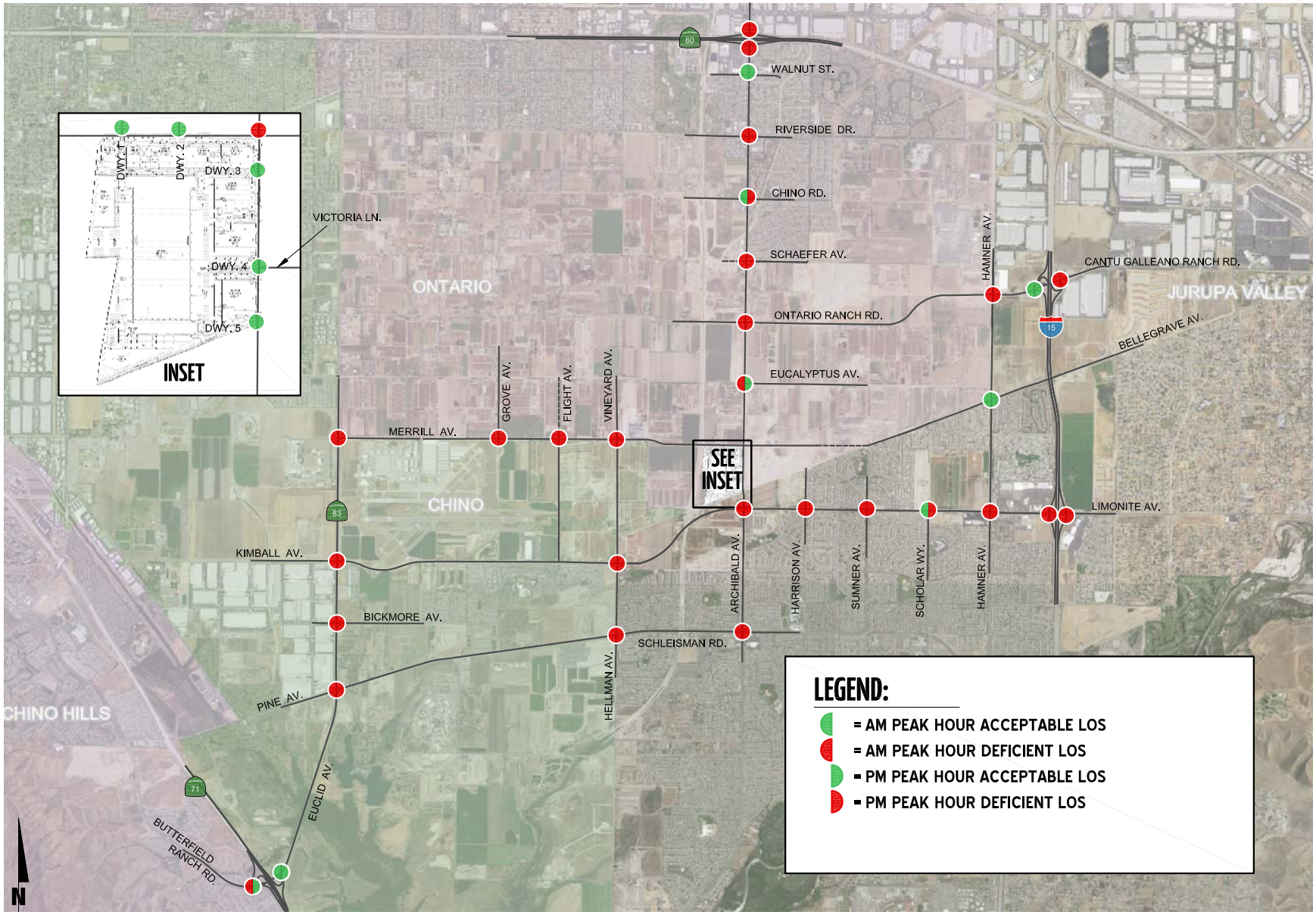


EXHIBIT 7-6: SUMMARY OF LOS FOR HORIZON YEAR (2040) WITH PROJECT CONDITIONS



URBAN CROSSROADS

A peak hour assessment of intersections located on either side of a deficient roadway segment has been conducted to determine if peak hour traffic flows can be accommodated by the potentially deficient roadway segment. If it is determined that peak traffic flows can be accommodated at the City's stated LOS thresholds, then roadway segment widening is typically not recommended.

7.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

The intersection of Archibald Avenue and Schaefer Avenue intersections are anticipated to meet ADT based traffic signal warrants for Horizon Year (2040) Without Project traffic conditions in addition to those previously warranted under Existing, E+P, and Opening Year Cumulative (2019) traffic conditions (see Appendix 7.3). No traffic signal warrant analysis was performed for Horizon Year (2040) With Project traffic conditions as all unsignalized study area intersections are warranted in a previous scenario.

7.7 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2040) traffic conditions are presented in Table 7-3. 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 with the addition of Project traffic. Worksheets for Horizon Year (2040) traffic conditions off-ramp queuing analysis are provided in Appendices 7.4 and 7.5.

7.8 BASIC FREEWAY SEGMENT ANALYSIS

Horizon Year (2040) mainline directional volumes for the AM and PM peak hours are provided on Exhibits 7-7 and 7-8. As shown on Table 7-4, the following freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours, in addition to those previously identified in Opening Year Cumulative (2019) traffic conditions:

- SR-71 Freeway Northbound, South of Euclid Av. (SR-83) (#2) – LOS F AM and PM peak hours
- SR-60 Freeway Eastbound, West of Archibald Av. (#5) – LOS E AM and PM peak hours
- SR-60 Freeway Eastbound, East of Archibald Av. (#6) – LOS E AM and PM peak hours

There are no additional freeway segments that are anticipated to operate at an unacceptable LOS during the peak hours with the addition of Project traffic conditions. Horizon Year (2040) Without and With Project basic freeway segment analysis worksheets are provided in Appendix 7.6 and 7.7, respectively.

Table 7-3

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

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
SR-71 NB Ramps / Euclid Avenue (SR-83)	NBL	1,745	106	80	Yes	Yes	106	81	Yes	Yes
	NBR	420	739 [2]	1,195 [2]	Yes[3]	Yes[3]	810 [2]	1,263 [2]	Yes[3]	Yes[3]
SR-71 SB Ramps / Euclid Avenue (SR-83)	SBL	1,100	136	544 [2]	Yes	Yes	136	481 [2]	Yes	Yes
	SBL/T	1,560	135	528 [2]	Yes	Yes	135	461 [2]	Yes	Yes
	SBR	255	0	15	Yes	Yes	0	7	Yes	Yes
Archibald Avenue/ SR-60 WB Ramps	WBL/T	1,389	480 [2]	664 [2]	Yes	Yes	524 [2]	681 [2]	Yes	Yes
	WBR	250	739 [2]	286 [2]	Yes[3]	Yes[3]	739 [2]	286 [2]	Yes[3]	Yes[3]
Archibald Avenue/ SR-60 EB Ramps	EBL/T	1,268	495 [2]	176	Yes	Yes	495 [2]	176	Yes	Yes
	EBR	350	242	385 [2]	Yes	Yes[3]	286	408 [2]	Yes	Yes[3]
I-15 SB Ramps / Cantu Galleano Ranch Rd.	SBL	1,440	59	118	Yes	Yes	164	123	Yes	Yes
	SBR	460	714 [2]	647 [2]	Yes[3]	Yes[3]	0 [2]	679 [2]	Yes[3]	Yes[3]
I-15 NB Ramps / Cantu Galleano Ranch Rd.	NBL	1,680	234 [2]	233 [2]	Yes	Yes	234 [2]	233 [2]	Yes	Yes
	NBL/R	580	0	0	Yes	Yes	0	0	Yes	Yes
	NBR	440	57 [2]	47	Yes	Yes	57 [2]	47	Yes	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	329 [2]	445 [2]	Yes	Yes[3]	358 [2]	445 [2]	Yes	Yes[3]
	SBL/T/R	400	235 [2]	385 [2]	Yes	Yes	272 [2]	385 [2]	Yes	Yes
	SBR	1,200	201	342 [2]	Yes	Yes	230 [2]	342 [2]	Yes	Yes
I-15 NB Ramps / Limonite Avenue	NBL	450	690 [2]	644 [2]	Yes[3]	Yes[3]	748 [2]	649 [2]	Yes[3]	Yes[3]
	NBL/T/R	1,235	631 [2]	600 [2]	Yes	Yes	696 [2]	608 [2]	Yes	Yes
	NBR	400	569 [2]	550 [2]	Yes[3]	Yes[3]	625 [2]	565 [2]	Yes[3]	Yes[3]

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

Table 7-4

Basic Freeway Segment Analysis for Horizon Year (2040) Conditions

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2040 Without Project				2040 With Project			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
SR-71	SB	South of Euclid Av. (SR-83)	2	**989.9**	**448.7**	**F**	**F**	**1,055.6**	**490.8**	**F**	**F**
	NB	South of Euclid Av. (SR-83)	3	**91.4**	**107.4**	**F**	**F**	**92.5**	**108.0**	**F**	**F**
SR-60	WB	West of Archibald Av.	4	19.8	28.1	C	D	20.0	28.6	C	D
		East of Archibald Av.	5	16.2	21.1	B	C	16.3	21.2	B	C
	EB	West of Archibald Av.	4	**44.8**	**35.2**	**E**	**E**	**45.4**	**35.3**	**F**	**E**
		East of Archibald Av.	4	**43.5**	**37.9**	**E**	**E**	**43.8**	**38.1**	**E**	**E**
I-15	SB	North of Cantu Galleano Ranch Rd.	4	29.2	15.5	D	B	29.5	15.5	D	B
		Cantu Galleano Ranch Rd. to Limonite Av.	3	**36.4**	24.5	**E**	C	**36.4**	24.7	**E**	C
		South of Limonite Av.	3	**54.2**	29.3	**F**	D	**54.3**	29.5	**F**	D
	NB	North of Cantu Galleano Ranch Rd.	5	18.0	16.3	B	B	18.0	16.5	C	B
		Cantu Galleano Ranch Rd. to Limonite Av.	3	28.7	23.0	D	C	28.7	23.2	D	C
		South of Limonite Av.	3	33.1	28.8	D	D	33.3	29.1	D	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on existing conditions.

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

[4] LOS = Level of Service

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

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

7.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Horizon Year Cumulative (2040) conditions and the results of this analysis are presented in Table 7-5. As shown in Table 7-5, there are no merge and diverge areas anticipated to operate at LOS E or LOS F for Horizon Year (2040) Without Project, in addition to those previously identified under Existing, E+P, and Opening Year Cumulative (2019) traffic conditions.

There are no additional merge and diverge areas that are anticipated to operate at an unacceptable LOS during the peak hours with the addition of Project traffic. Horizon Year Cumulative (2040) Without and With Project freeway ramp junction operations analysis worksheets are provided in Appendices 7.8 and 7.9, respectively.

7.10 HORIZON YEAR (2040) 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 significantly impacted by the Project, in an effort to reduce each location's peak hour delay and improve the associated LOS grade to an acceptable LOS (LOS D or better). Significant impacts have been identified at deficient intersections if the Project contributes 50 or more peak hours or if the addition of Project traffic increases the delay by 5.0 seconds or more (for the intersections in Eastvale only).

The effectiveness of the recommended improvement strategies discussed below to address Horizon Year (2040) traffic deficiencies is presented in Table 7-6 for both the Without and With Limonite Avenue Extension alternatives.

The Project Applicant shall participate in the funding of off-site improvements, including traffic signals that are needed to serve cumulative traffic conditions through the payment of City of Ontario DIF (if the improvements are included in the DIF program) or on a fair share basis (if the improvements are not included in the DIF program. These fees shall be collected by the City of Ontario, with the proceeds solely used as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. Each of the improvements shown on Table 7-5 have been identified as being included as part of City DIF fee program or fair share contribution in Section 1.5 *Local and Regional Funding Mechanisms* of this TIA.

Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.10 and Appendix 7.11, respectively.

Table 7-5

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

Freeway	Direction[1]	Ramp or Segment	Lanes on Freeway[2]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]
SR-71	SB	Loop On-Ramp at Euclid Av. (SR-83) (Upstream)	2	**52.1**	**F**	**55.7**	**F**	**52.2**	**F**	**56.0**	**F**
		Loop On-Ramp at Euclid Av. (SR-83) (Downstream)	2	**52.1**	**F**	**55.7**	**F**	**52.2**	**F**	**56.0**	**F**
	NB	Off-Ramp at Euclid Av. (SR-83)	3	**58.2**	**F**	**60.7**	**F**	**58.4**	**F**	**60.7**	**F**
SR-60	WB	On-Ramp at Archibald Av.	4	22.5	C	28.3	D	22.6	C	28.6	D
		Off-Ramp at Archibald Av.	5	28.2	D	31.2	D	28.4	D	31.3	D
	EB	Off-Ramp at Archibald Av.	4	**43.4**	**E**	**38.1**	**E**	**43.7**	**F**	**38.3**	**E**
		On-Ramp at Archibald Av.	4	33.8	D	32.8	D	33.9	D	33.0	D
I-15	SB	Off-Ramp at Cantu Galleano Ranch Rd.	4	**38.9**	**E**	24.6	C	**39.4**	**E**	24.8	C
		On-Ramp at Limonite Av.	3	**43.0**	**F**	32.4	D	**43.1**	**F**	32.7	D
	NB	On-Ramp at Cantu Galleano Ranch Rd.	3	**37.5**	**E**	**35.9**	**E**	**37.6**	**E**	**36.3**	**E**
		Off-Ramp at Limonite Av.	3	**36.7**	**E**	**35.2**	**E**	**36.8**	**E**	**35.4**	**E**

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbounc

[2] Number of lanes are in the specified direction and is based on existing conditions

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

[4] 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						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Euclid Av. (SR-83) / Merrill Av.																	
	- Without Project[4]	TS	1	**3**	1	**2**	**3**	0	0	1	0	**1**	1	**1>**	28.8	29.8	C	C
	- With Project[4]	TS	1	**3**	1	**2**	**3**	0	0	1	0	**1**	1	**1>**	29.0	30.0	C	C
2	Euclid Av. (SR-83) / Kimball Av.																	
	- Without Project[4]	TS	1	**3**	1	**2**	**3**	**1>**	**2**	2	0	**2**	2	**1>**	47.3	52.4	D	D
	- With Project[4]	TS	1	**3**	1	**2**	**3**	**1>**	**2**	2	0	**2**	2	**1>**	47.8	53.3	D	D
4	Euclid Av. (SR-83) / Pine Av.																	
	- Without Project[4]	TS	1	**3**	**1>>**	**2**	**3**	**1**	1	**2**	1	2	**2**	**1**	50.7	49.1	D	D
	- With Project[4]	TS	1	**3**	**1>>**	**2**	**3**	**1**	1	**2**	1	2	**2**	**1**	51.0	49.6	D	D
7	Grove Av. / Merrill Av.																	
	- Without Project	**TS**	0	0	0	0	1	0	**1**	**2**	0	0	**2**	0	19.9	17.2	B	B
	- With Project	**TS**	0	0	0	0	1	0	**1**	**2**	0	0	**2**	0	20.5	17.8	C	B
8	Flight Av. / Merrill Av.																	
	- Without Project	**TS**	**1**	1	0	**1**	**1**	0	**1**	**2**	**1>**	1	**2**	0	26.8	27.0	C	C
	- With Project	**TS**	**1**	1	0	**1**	**1**	0	**1**	**2**	**1>**	1	**2**	0	27.7	27.3	C	C
9	Vineyard Av./Hellman Av. / Merrill Av.																	
	- Without Project	**TS**	**2**	**1**	**1>**	**1**	**1**	0	**1**	**2**	**1**	**1**	**2**	**1**	29.3	37.9	C	D
	- With Project	**TS**	**2**	**1**	**1>**	**1**	**1**	0	**1**	**2**	**1**	**1**	**2**	**1**	30.3	38.5	C	D
14	Archibald Av. / SR-60 WB Ramps																	
	- Without Project[4]	TS	**2**	3	0	0	4	0	0	0	0	**1**	1	1	23.7	26.5	C	C
	- With Project[4]	TS	**2**	3	0	0	4	0	0	0	0	**1**	1	1	24.1	27.8	C	C
15	Archibald Av. / SR-60 EB Ramps																	
	- Without Project[4]	TS	0	**3**	**1**	**2**	3	0	0	1	1	0	0	0	39.0	38.2	D	D
	- With Project[4]	TS	0	**3**	**1**	**2**	3	0	0	1	1	0	0	0	39.9	39.2	D	D
17	Archibald Av. / Riverside Dr.																	
	- Without Project[4,5]	TS	**2**	3	0	**2**	3	0	1	2	d	1	2	**1>**	53.3	59.1	D	E
	- With Project[4,5]	TS	**2**	3	0	**2**	3	0	1	2	d	1	2	**1>**	54.1	61.2	D	E
18	Archibald Av. / Chino Av.																	
	- Without Project	TS	1	3	0	1	**3**	0	1	1	0	1	1	1	28.2	53.6	C	D
	- With Project	TS	1	3	0	1	**3**	0	1	1	0	1	1	1	28.7	54.6	C	D
19	Archibald Av. / Schaefer Av.																	
	- Without Project	**TS**	**2**	**3**	0	1	**3**	**1>**	**1**	**2**	0	**1**	**2**	0	23.4	48.9	C	D
	- With Project	**TS**	**2**	**3**	0	1	**3**	**1>**	**1**	**2**	0	**1**	**2**	0	23.6	51.9	C	D
20	Archibald Av. / Ontario Ranch Rd.																	
	- Without Project	TS	**2**	**3**	**1>**	1	**3**	1	2	**3**	1>>	2	**3**	1	46.8	78.6	D	E
	- With Project	TS	**2**	**3**	**1>**	1	**3**	1	2	**3**	1>>	2	**3**	1	51.8	79.7	D	E
21	Archibald Av. / Eucalyptus Av.																	
	- Without Project	TS	**1**	**3**	0	1	**3**	0	**1**	**1**	0	**1**	1	0	54.6	21.6	D	C
	- With Project	TS	**1**	**3**	0	1	**3**	0	**1**	**1**	0	**1**	1	0	65.3	22.5	E	C
22	Archibald Av. / Merrill Av.																	
	- Without Project	TS	**2**	**3**	1	2	**3**	**1>**	**2**	**2**	**1>>**	**2**	**2**	1	24.6	38.8	C	D
	- With Project	TS	**2**	**3**	1	2	**3**	**1>**	**2**	**2**	**1>>**	**2**	**2**	1	25.9	51.9	C	D

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						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
26	Archibald Av. / Limonite Av.																	
	- Without Project	TS	**1**	**3**	1>	**2**	**3**	**1**	**2**	**2**	0	**2**	**2**	**2>**	35.4	44.9	D	D
	- With Project	TS	**1**	**3**	1>	**2**	**3**	**1**	**2**	**2**	0	**2**	**2**	**2>**	36.6	45.8	D	D
28	Harrison Av. / Limonite Av.																	
	- Without Project	TS	1	1	1	1	1	0	1	3	d	1	**3**	1	38.1	44.6	D	D
	- With Project	TS	1	1	1	1	1	0	1	3	d	1	**3**	1	40.9	47.8	D	D
29	Sumner Av. / Limonite Av.																	
	- Without Project	TS	**2**	2	0	1	2	0	2	3	0	2	3	1	32.2	50.6	C	D
	- With Project	TS	**2**	2	0	1	2	0	2	3	0	2	3	1	32.5	53.8	C	D
35	I-15 SB Ramps / Limonite Av.																	
	- Without Project[6]	TS	0	0	0	1	1	**2**	0	**3**	**1>>**	0	**3**	**1>>**	9.9	11.1	A	B
	- With Project[6]	TS	0	0	0	1	1	**2**	0	**3**	**1>>**	0	**3**	**1>>**	9.9	11.2	A	B
36	I-15 NB Ramps / Cantu Galleano Ranch Rd.																	
	- Without Project[7]	TS	1	1	1	0	0	0	0	3	1	2	3	0	26.9	34.2	C	C
	- With Project[7]	TS	1	1	1	0	0	0	0	3	1	2	3	0	26.9	36.0	C	D

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

L = Left; T = Through; R = Right; > = 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; **TS** = Improvement

[4] Includes modifying the coordinated cycle length from 90 seconds to 120 seconds.

[5] Recommended improvement consists of restriping the EB shared left-through lane as a shared left-through-right turn lane.

[6] Improvements are consistent with planned partial cloverleaf interchange.

[7] No physical improvement required. Recommendation is to increase the cycle length during the peak hours to 120 seconds.

7.10.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

As shown on Table 7-6, the Horizon Year peak hour analysis indicates that the adjacent study area intersections on either side of the deficient roadway segments are anticipated to operate at acceptable LOS with the recommended intersection improvements shown. These intersection improvements consist of installation of traffic signals, additional turn lanes, additional through lanes, and traffic signal modifications to accommodate right turn overlap phasing. Table 7-7 shows the LOS for each of the applicable roadway segments with improvements consistent with those shown on Table 7-6 for the adjacent study area intersections, where roadway widening through additional through lanes has been recommended. In other words, only the roadway segments adjacent to study area intersections where additional through lanes have been recommended on Table 7-6 are shown on Table 7-7. As shown on Table 7-7, although most roadway segments shown are anticipated to improve in LOS to acceptable levels, there is 1 deficient roadway segment (Archibald Avenue north of the County Line) with the recommended roadway segment improvements, however, roadway segment widening does not appear necessary to address the deficiencies at the identified roadway segments based on the peak hour intersection operations analysis shown on Table 7-6.

7.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

Table 7-8 shows the queuing results with the proposed intersection improvements shown previously on Table 7-6. As shown, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with the addition of Project traffic. Worksheets for Horizon Year (2040) Without and With Project traffic conditions, with improvements, off-ramp queuing analysis are provided in Appendices 7.12 and 7.13, respectively.

7.10.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

The Final Transportation Report for the California State Route 60 Freeway (prepared by Caltrans in July 2005), includes the construction of an additional high-occupancy vehicle (HOV) lane in each direction of the SR-60 Freeway and the construction of two truck by-pass lanes within the vicinity of the Archibald Avenue interchange. (11) Improvements along the I-15 Freeway near the vicinity of Cantu Galleano Ranch Road and Limonite Avenue include the addition of one to two tolled express lanes in each direction between the SR-60 Freeway and Cajalco Road. At the time of study preparation, an analysis of the future planned improvements along the SR-71 Freeway was not readily available (i.e., no study has been conducted to date). As such, no additional analysis has been performed for these freeway mainline segments and ramp merge/diverge junctions and no improvements are assumed within this analysis.

Table 7-7

Roadway Segment Capacity Analysis for Horizon Year (2040) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2040 Without Project	V/C[2]	LOS[3]	2040 With Project	V/C[2]	LOS[3]	Acceptable LOS
1	Merrill Avenue	East of Euclid Av. (SR-83)	**4D**	28,000	19,441	0.69	B	20,051	0.72	C	D
2		Between Grove Av. and Vineyard Av.	**4D**	28,000	20,907	0.75	C	21,677	0.77	C	D
3		West of Driveway 2[4]	**4D**	35,000	27,695	0.79	C	28,755	0.82	D	D
4	Archibald Avenue	North of Ontario Ranch Rd.	**6D**	53,900	40,720	0.76	C	41,942	0.78	C	D
5		Between Eucalyptus Av. and Merrill Av.	**6D**	53,900	45,932	0.85	D	48,084	0.89	D	D
6		North of the County Line	**6D**	53,900	47,201	0.88	D	**48,716**	**0.90**	**E**	D

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

[1] These maximum roadway capacities have been obtained from the City of Ontario's General Plan.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

[4] Additional capacity provided along the Project's frontage via turn lanes.

Table 7-8

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

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)[3]		Acceptable?[1]		95th Percentile Queue (Feet)[3]		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Archibald Avenue/ SR-60 WB Ramps	WBL	1,389	209	412 [2]	Yes	Yes	224	424 [2]	Yes	Yes
	WBL/T	1,312	204	368 [2]	Yes	Yes	220	378 [2]	Yes	Yes
	WBR	250	783 [2]	340 [2]	Yes[3]	Yes[3]	783 [2]	346 [2]	Yes[3]	Yes[3]
Archibald Avenue/ SR-60 EB Ramps	EBL/T	1,268	636 [2]	221	Yes	Yes	636	221	Yes	Yes
	EBR	350	297	437	Yes	Yes[3]	355 [2]	491 [2]	Yes[3]	Yes[3]
I-15 NB Ramps / Cantu Galleano Ranch Rd.	NBL	1,680	176	155	Yes	Yes	176	155	Yes	Yes
	NBL/R	580	0	0	Yes	Yes	0	0	Yes	Yes
	NBR	440	43	34	Yes	Yes	43	34	Yes	Yes
I-15 SB Ramps / Limonite Avenue	SBL	400	234	255	Yes	Yes	242	263	Yes	Yes
	SBL/T/R	400	234	257	Yes	Yes	242	265	Yes	Yes
	SBR	1,200	117	239	Yes	Yes	118	246	Yes	Yes

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

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

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the SR-60, SR-71, or I-15 Freeway mainline.

Caltrans typically assumes a reduction of fourteen percent to the freeway mainline through volumes in this region to account for vehicles utilizing the carpool (high-occupancy vehicle) lanes. The reduction to the SR-60 and I-15 Freeway mainline volumes has been applied to account for the proposed HOV/Express Toll lanes and truck bypass lanes. The analysis has been performed assuming the same number of mixed-flow lanes and on and off-ramp configurations as existing baseline conditions at the SR-60 Freeway at Euclid Avenue (SR-83) and I-15 Freeway at Limonite Avenue interchanges. Reductions to mainline volumes have been taken into account for the HOV/Express Toll lanes and truck bypass lanes, but HCM analyses for the freeway facility only considers the mixed-flow lanes.

As shown on Table 7-9, the SR-60 and I-15 Freeway mainline segments are anticipated to operate at an acceptable LOS with the improvements discussed above. Table 7-10 shows that the following SR-60 and I-15 Freeway ramp junctions are anticipated to continue to operate at an unacceptable LOS with the improvements discussed above (i.e., LOS E or worse), although they are anticipated to operate at an improved density as compared to the "without improvement" condition:

- SR-60 Freeway, Eastbound, Off-Ramp at Archibald Avenue (#6) – LOS E AM peak hour only
- I-15 Freeway, Southbound Off-Ramp at Limonite Av. (#8) – LOS E AM peak hour only
- I-15 Freeway, Southbound On-Ramp at Limonite Av. (#9) – LOE AM peak hour only

Worksheets for Horizon Year (2040) Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.14 and Appendix 7.15. Horizon Year (2040) Without and With Project freeway ramp junction level of service analysis worksheets, with improvements, are provided in Appendix 7.16 and Appendix 7.17.

Table 7-9

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

Freeway	Direction[1]	Mainline Segment	Lanes[2]	2040 Without Project				2040 With Project			
				Density[3]		LOS[4]		Density[3]		LOS[4]	
				AM	PM	AM	PM	AM	PM	AM	PM
SR-60	WB	West of Archibald Av.	4	16.7	22.9	B	C	16.9	23.3	B	C
		East of Archibald Av.	5	13.8	17.9	B	B	13.9	18.0	B	B
	EB	West of Archibald Av.	4	31.7	27.1	D	D	32.3	27.2	D	D
		East of Archibald Av.	4	31.2	28.9	D	D	31.4	29.0	D	D
I-15	SB	North of Cantu Galleano Ranch Rd.	4	24.8	13.1	C	B	25.1	13.2	C	B
		Cantu Galleano Ranch Rd. to Limonite Av.	4	20.1	12.6	C	B	20.1	12.7	C	B
		South of Limonite Av.	4	25.8	24.8	C	C	25.8	24.9	C	C
	NB	North of Cantu Galleano Ranch Rd.	5	15.7	14.6	B	B	15.8	14.7	B	B
		Cantu Galleano Ranch Rd. to Limonite Av.	4	17.2	12.1	B	B	17.2	12.1	B	B
		South of Limonite Av.	4	19.1	17.7	C	B	19.2	17.8	C	B

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbound

[2] Number of lanes are in the specified direction and is based on an additional HOV and truck bypass lane on the SR-60 Freeway and an additional mainline and HOV lane on the I-15 Freeway.

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

[4] LOS = Level of Service

Table 7-10

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

Freeway	Direction[1]	Ramp or Segment	Lanes on Freeway[2]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]	Density[3]	LOS[4]
SR-60	WB	On-Ramp at Archibald Av.	4	19.9	B	25.0	C	20.0	C	25.3	C
		Off-Ramp at Archibald Av.	5	26.5	C	29.1	D	26.6	C	29.3	D
	EB	Off-Ramp at Archibald Av.	4	**37.4**	**E**	33.2	D	**37.8**	**E**	33.3	D
		On-Ramp at Archibald Av.	4	28.8	D	28.6	D	29.0	D	28.8	D
I-15	SB	Off-Ramp at Cantu Galleano Ranch Rd.	4	**35.8**	**E**	22.2	C	**36.3**	**E**	22.3	C
		On-Ramp at Limonite Av.	4	**39.0**	**E**	29.5	D	**39.0**	**E**	29.7	D
	NB	On-Ramp at Cantu Galleano Ranch Rd.	4	34.1	D	33.3	D	34.2	D	33.4	D
		Off-Ramp at Limonite Av.	4	33.6	D	32.5	D	33.8	D	32.7	D

* **BOLD** = Unacceptable Level of Service

[1] NB = Northbound; SB = Southbound, EB = Eastbound; WB = Westbounc

[2] Number of lanes are in the specified direction and is based on an additional HOV and truck bypass lane on the SR-60 Freeway and an additional mainline and HOV lane on the I-15 Freeway.

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

[4] LOS = Level of Service

This Page Intentionally Left Blank

8 REFERENCES

1. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
2. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.
3. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* s.l. : National Academy of Sciences, 2010.
5. **City of Ontario.** *City of Ontario General Plan, Infrastructure Element.* Ontario : s.n., 1992.
6. **Federal Highway Administration.** Manual on Uniform Traffic Control Devices (MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CAMUTCD).* 2014.
7. **California Department of Transportation.** *Freeway Performance Measurement (PeMS).* [Online] [Cited: January 6, 2017.] http://pems.dot.ca.gov/.
8. **Institute of Transportation Engineers.** *High Cube Warehouse Vehicle Trip Generation Analysis.* October 2016.
9. **City of Fontana.** *Truck Trip Generation Study.* Fontana : s.n., August 2003.
10. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.
11. **California Department of Transportation (Caltrans).** *Final Transportation Report for the California State Route 60 Freeway.* July 2005.

This Page Intentionally Left Blank