Moreno Valley Logistics Center

TRAFFIC IMPACT ANALYSIS

CITY OF MORENO VALLEY

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
FHWA	Federal Highway Administration
FTIP	Federal Transportation Improvement Program
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
JPA	Joint Powers Authority
LOS	Level of Service
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Program
NP	No Project (or Without Project)
PCE	Passenger Car Equivalents
PeMS	Caltrans Performance Measurement System
PHF	Peak Hour Factor
Project	Moreno Valley Logistics Center
RCTC	Riverside County Transportation Commission
RivTAM	Riverside County Transportation Analysis Model
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SHS	State Highway System
sf	Square Feet
TIA	Traffic Impact Analysis
TOD	Transit Oriented Development
TUMF	Transportation Uniform Mitigation Fee
WP	With Project
WRCOG	Western Riverside Council of Governments

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1 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed Moreno Valley Logistics Center ("Project") located south of Krameria Avenue between Heacock Street and Indian Street in the City of Moreno Valley as shown on Exhibit 1-1.

The purpose of this traffic impact analysis 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. This traffic study has been prepared in accordance with the City of Moreno Valley Transportation Engineering Division's *Traffic Impact Analysis Preparation Guide* (August 2007), the California Department of Transportation (Caltrans) *Guide for the Preparation of Traffic Impact Studies* (December 2002), and consultation with City of Moreno Valley staff during the scoping process. (1) (2) The approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TIA.

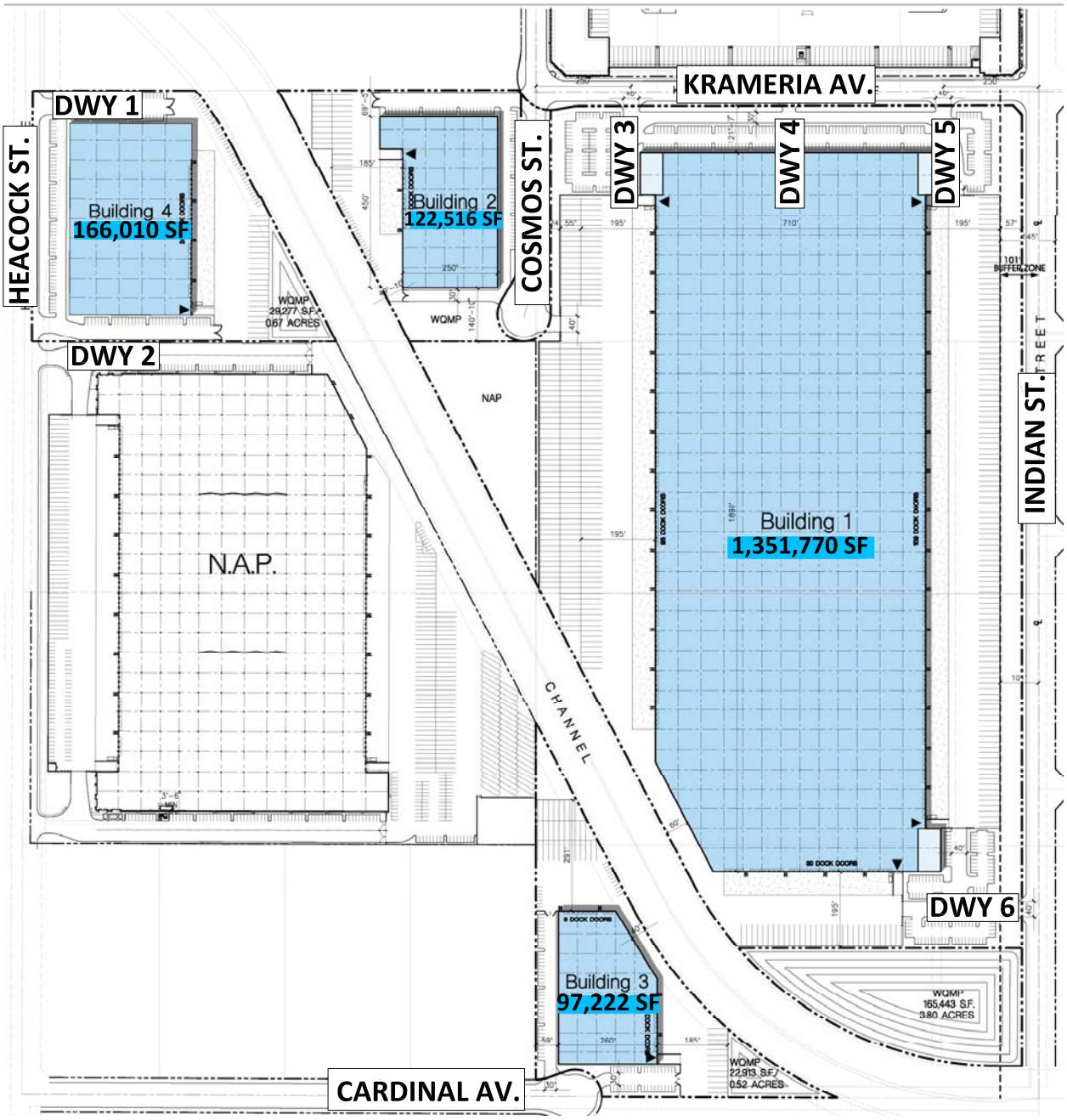
1.1 PROJECT OVERVIEW

The Project is proposed to consist of 1,351,770 square feet (sf) of high-cube warehouse use/distribution center within a single building (Building 1) and 385,748 square feet of general light industrial use. Building 2 located on the southwest corner of Cosmos Street and Krameria Avenue is proposed to consist of 122,516 sf of general light industrial use, Building 3 located at the eastern terminus of Cardinal Avenue is proposed to consist of 97,222 sf of general light industrial use, and Building 4 located on the east of Heacock Street and south of Krameria Avenue (North) is proposed to consist of 166,010 sf of general light industrial use. Per the City's traffic study guidelines, the Opening Year will have a 5 year minimum horizon from baseline conditions. As such, the Opening Year analysis will assess 2020 traffic conditions.

Vehicular and truck traffic access will be provided via the following driveways (see Exhibit 1-1):

- Heacock Street / Driveway 1 – Full access driveway providing access to passenger cars and heavy trucks for Building 4.
- Heacock Street / Driveway 2 – Full access driveway providing access to both passenger cars and heavy trucks for Building 4.
- Heacock Street / Cardinal Avenue – Full access intersection providing access to both passenger cars and heavy trucks for Building 3.
- Cosmos Street / Krameria Avenue – Full access intersection providing access to both passenger cars and heavy trucks for Buildings 1 and 2. Although the intersection would allow for full access, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and additional design features (e.g., reductions to the curb radius on the southeast corner).
- Driveway 3 / Krameria Avenue – Full access driveway providing access to both passenger cars and heavy trucks for Building 1. Although the driveway would allow for full access, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and additional design features (e.g., reductions to the curb radius on the southeast corner).

EXHIBIT 1-1: PRELIMINARY SITE PLAN



- Driveway 4 / Krameria Avenue – Full access driveway providing access to passenger cars only for Building 1.
- Driveway 5 / Krameria Avenue – Full access driveway providing access to both passenger cars and heavy trucks for Building 1. Although the driveway would allow for full access for passenger cars, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and design features for the intersection. The northbound right turn lane from Driveway 5 would include a small turning radius on the southeast corner and signage to prohibit use by heavy trucks.
- Indian Street / Driveway 6 – Full access driveway providing access to passenger cars only to Building 1. The layout of and geometry of the parking prohibits heavy trucks from entering or existing the driveway. However, if in the future Indian Street is extended over the Perris Valley Storm Drain Channel and the City's truck route is modified to the north to Driveway 6 from its current terminus, then heavy truck access could be accommodated to and from the south on Indian Street via Driveway 6 with modifications to the parking layout.

Regional access to the project site is provided via the I-215 Freeway at Cactus Avenue and Harley Knox Boulevard interchanges.

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*, 9th Edition, 2012. (3) The Project is estimated to generate a net total of 6,975 passenger-car-equivalent (PCE) trip-ends per day on a typical weekday with approximately 660 net AM PCE peak hour trips and 718 net PM PCE peak hour trips. 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 (2015) (1 scenario)
- Existing plus Project (E+P), Without and With Indian Street Bridge (2 scenarios)
- Opening Year Cumulative (2020), Without and With Project (2 scenarios)
- General Plan Buildout (Post 2035), Without and With Project (2 scenarios)

1.2.1 EXISTING (2015) CONDITIONS

Information for Existing (2015) 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. Pursuant to the request of City staff, the E+P analysis has been prepared for both Without and With the future Indian Street bridge over the Perris Valley Storm Drain Channel.

1.2.3 OPENING YEAR CUMULATIVE (2020) CONDITIONS

To account for background traffic, other known cumulative development projects in the study area were included in addition to 10.41% of ambient growth for Opening Year Cumulative traffic conditions in conjunction with traffic associated with the proposed Project. Although it is unlikely that these cumulative projects would be fully built and occupied by Year 2020, they have been included in an effort to conduct a conservative analysis and overstate and opposed to understate potential cumulative traffic impacts.

The currently adopted Southern California Association of Governments (SCAG) 2012 Regional Transportation Plan (RTP) (April 2012) growth forecasts for the unincorporated areas of the City of Moreno Valley identifies projected growth in population of 187,400 in 2008 to 255,200 in 2035, or a 36.2 percent increase over the 27 year period. (5) The change in population equates to roughly a 1.15 percent growth rate compounded annually. Similarly, growth over the same 27 year period in households is projected to increase by 42.5 percent, or 1.32 percent annual growth rate. Finally, growth in employment over the same 27 year period is projected to increase by 99.4 percent, or a 2.59 percent annual growth rate.

Based on a comparison of Existing traffic volumes to the General Plan Buildout (Post 2035) forecasts, the average growth rate is estimated at approximately 5.68 percent per year, compounded annually between Existing and General Plan Buildout (Post 2035) traffic conditions. The annual growth rate at each individual intersection is not lower than 2.49 percent per year, compounded annually to as high as 10.64 percent per year, compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis (2.0 percent per year) would appear to conservatively approximate the anticipated regional growth in traffic volumes in the City of Moreno Valley for both Opening Year Cumulative and General Plan Buildout (Post 2035) 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.

1.2.4 GENERAL PLAN BUILDOUT (POST 2035) CONDITIONS

The General Plan Buildout (Post 2035) Without Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) modified to represent General Plan Buildout conditions for the City of Moreno Valley using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and General Plan Buildout conditions. The General Plan Buildout With Project traffic forecasts were determined by adding the Project traffic to the General Plan Buildout Without Project traffic forecasts from the RivTAM model. The General Plan Buildout traffic forecasts used in the traffic analysis were refined with existing peak hour traffic count data collected at intersection analysis locations. The initial estimate of the future peak hour turning movements has, therefore, been reviewed for reasonableness. The reasonableness checks performed include a review of traffic flow conservation in addition to a comparison with the Existing and Opening Year Cumulative traffic volumes. As such, the General Plan Buildout Without and With Project traffic forecasts also include the traffic generated by the cumulative

development projects considered for the Opening Year Cumulative analysis. Where necessary, the General Plan Buildout volumes have been adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes.

The General Plan Buildout Without and With Project traffic conditions analyses will be utilized to determine if improvements funded through regional transportation mitigation fee programs, such as the TUMF and DIF programs, or other approved funding mechanism can accommodate the long-range cumulative traffic at the target LOS identified in the City of Moreno Valley General Plan. (4) If the "funded" improvements can provide the target LOS, then the Project's payment into TUMF and/or DIF will be considered as long-range cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF facilities) are identified as such.

1.3 STUDY AREA

To ensure that this TIA satisfies the City of Moreno Valley's traffic study requirements, Urban Crossroads, Inc. prepared a project traffic study scoping package for review by City of Moreno Valley staff prior to the preparation of this report. The scoping agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology and is included in Appendix 1.1.

1.3.1 INTERSECTIONS

The following 32 study area intersections listed in Table 1-1 and shown on Exhibit 1-2 were selected for this TIA based on the City of Moreno Valley's traffic study guidelines and consultation with City of Moreno Valley staff. The study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the City of Moreno Valley's traffic study guidelines. (1)

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

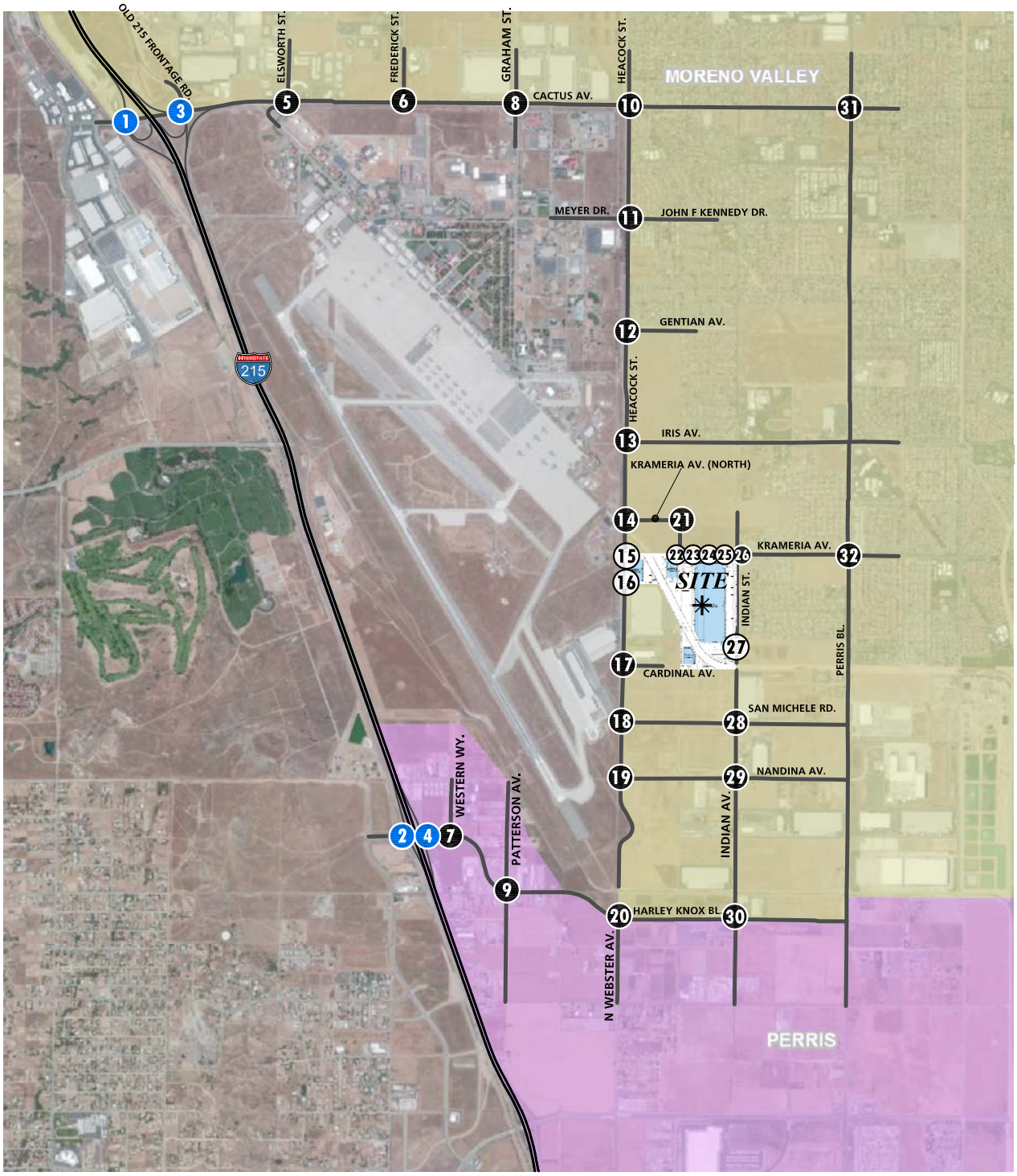
ID	Intersection Location	Jurisdiction	CMP?
1	I-215 Southbound Ramps / Cactus Avenue	Caltrans, March JPA	Yes
2	I-215 Southbound Ramps / Harley Knox Boulevard	Caltrans, Riverside Co.	Yes
3	I-215 Northbound Ramps / Cactus Avenue	Caltrans, March JPA, Moreno Valley	Yes
4	I-215 Northbound Ramps / Harley Knox Boulevard	Caltrans, Perris	Yes
5	Elsworth Street / Cactus Avenue	Moreno Valley, March JPA	No
6	Frederick Street / Cactus Avenue	Moreno Valley, March JPA	No
7	Western Way / Harley Knox Boulevard	Perris	No
8	Graham Street / Cactus Avenue	Moreno Valley, March JPA	No
9	Patterson Avenue / Harley Knox Boulevard	Perris	No
10	Heacock Street / Cactus Avenue	Moreno Valley, March JPA	No
11	Heacock Street / Meyer Drive/John F. Kennedy Drive	Moreno Valley, March JPA	No
12	Heacock Street / Gentian Avenue	Moreno Valley, March JPA	No

ID	Intersection Location	Jurisdiction	CMP?
13	Heacock Street / Iris Avenue	Moreno Valley, March JPA	No
14	Heacock Street / Krameria Avenue (North)	Moreno Valley, March JPA	No
15	Heacock Street / Driveway 1 – Future Intersection	Moreno Valley, March JPA	No
16	Heacock Street / Driveway 2 – Future Intersection	Moreno Valley, March JPA	No
17	Heacock Street / Cardinal Avenue	Moreno Valley, March JPA	No
18	Heacock Street / San Michele Road	Moreno Valley, March JPA	No
19	Heacock Street / Nandina Avenue	Moreno Valley, March JPA	No
20	Heacock Street/Webster Avenue / Harley Knox Boulevard	Perris	No
21	Cosmos Street / Krameria Avenue (North)	Moreno Valley	No
22	Cosmos Street / Krameria Avenue	Moreno Valley	No
23	Driveway 3 / Krameria Avenue – Future Intersection	Moreno Valley	No
24	Driveway 4 / Krameria Avenue – Future Intersection	Moreno Valley	No
25	Driveway 5 / Krameria Avenue – Future Intersection	Moreno Valley	No
26	Indian Street / Krameria Avenue	Moreno Valley	No
27	Indian Street / Driveway 6 – Future Intersection	Moreno Valley	No
28	Indian Street / San Michele Road	Moreno Valley	No
29	Indian Street / Nandina Avenue	Moreno Valley	No
30	Indian Street / Harley Knox Boulevard	Perris	No
31	Perris Boulevard / Cactus Avenue	Moreno Valley	No
32	Perris Boulevard / Krameria Avenue	Moreno Valley	No

It should also be noted that the 50 peak hour trip threshold is used by numerous other agencies throughout Southern California including Caltrans, County of Riverside, County of San Bernardino, and the County of Orange. The 50 peak hour trip threshold represents approximately 3 percent of the theoretical capacity of an intersection, estimated based on the Highway Capacity Manual (HCM) at approximately 1700 vehicles per hour. In effect, acting as the lead agency, these jurisdictions have established 50 project trips as the threshold for when to analyze signalized intersections. Therefore, a project trip contribution of less than 50 peak hour trips is generally considered less than significant and is typically not evaluated.

The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related impacts, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. The County of Riverside CMP became effective with the passage of Proposition 111 in 1990 and updated most recently updated in 2011. The Riverside County Transportation Commission (RCTC) adopted the 2011 CMP for the County of Riverside in December 2011. (6) There are 4 study area intersections that are ramp-to-arterial intersections with the I-215 Freeway, which are identified as CMP facilities.

EXHIBIT 1-2: LOCATION MAP



LEGEND:

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

N

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URBAN CROSSROADS

1.3.2 ROADWAY SEGMENTS

The roadway segment study area utilized for this analysis is based on a review of the key roadway segments in which the Project is anticipated to contribute 50 or more peak hour trips. The study area identifies a total of 48 existing/future roadway segments. The roadway segments include the segments on either side of the study area intersections and are listed in Table 1-2.

TABLE 1-2: ROADWAY SEGMENT ANALYSIS LOCATIONS

ID	Street	Segment	Jurisdiction
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	Moreno Valley
2		East of I-215 NB Ramps	Moreno Valley
3		West of Elsworth Street	Moreno Valley
4		East of Elsworth Street	Moreno Valley
5		West of Frederick Street	Moreno Valley
6		East of Frederick Street	Moreno Valley
7		West of Graham Street	Moreno Valley
8		East of Graham Street	Moreno Valley
9		West of Heacock Street	Moreno Valley
10		East of Heacock Street	Moreno Valley
11		West of Perris Boulevard	Moreno Valley
12	Krameria Avenue	Heacock Street to Cosmos Street	Moreno Valley
13		Cosmos Street to Driveway 3	Moreno Valley
14		Driveway 3 to Driveway 4	Moreno Valley
15		Driveway 4 to Driveway 5	Moreno Valley
16		Driveway 5 to Indian Street	Moreno Valley
17		East of Indian Street	Moreno Valley
18		West of Perris Boulevard	Moreno Valley
19	Cardinal Avenue	East of Heacock Street	Moreno Valley
20	San Michele Road	East of Heacock Street	Moreno Valley
21		West of Indian Street	Moreno Valley
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	Perris
23		I-215 NB Ramps to Western Way	Perris
24		East of Western Way	Perris
25		West of Patterson Avenue	Perris
26		East of Patterson Avenue	Perris
27		West of Webster Avenue	Perris
28		East of Webster Avenue	Perris
29		West of Indian Street	Perris

ID	Street	Segment	Jurisdiction
30	Heacock Street	South of Cactus Avenue	Moreno Valley
31		North of John F. Kennedy Drive	Moreno Valley
32		South of John F. Kennedy Drive	Moreno Valley
33		North of Gentian Avenue	Moreno Valley
34		South of Gentian Avenue	Moreno Valley
35		North of Iris Avenue	Moreno Valley
36		Iris Avenue to Krameria Avenue (N)	Moreno Valley
37		Krameria Avenue (N) to Driveway 1	Moreno Valley
38		Driveway 1 to Driveway 2	Moreno Valley
39		Driveway 2 to Cardinal Avenue	Moreno Valley
40		Cardinal Avenue to San Michele Road	Moreno Valley
41		San Michele Road to Nandina Avenue	Moreno Valley
42		South of Nandina Avenue	Moreno Valley
43		North of Harley Knox Boulevard	Perris
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	Moreno Valley
45	Indian Street	Driveway 6 to San Michele Road	Moreno Valley
46		San Michele Road to Nandina Avenue	Moreno Valley
47		South of Nandina Avenue	Moreno Valley
48		North of Harley Knox Boulevard	Perris

1.3.3 FREEWAY MAINLINE SEGMENTS

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

TABLE 1-3: FREEWAY MAINLINE SEGMENT ANALYSIS LOCATIONS

ID	Freeway Mainline Segments
1	I-215 Freeway – Southbound, North of Cactus Avenue
2	I-215 Freeway – Southbound, South of Cactus Avenue
3	I-215 Freeway – Southbound, North of Harley Knox Boulevard
4	I-215 Freeway – Southbound, South of Harley Knox Boulevard
5	I-215 Freeway – Northbound, North of Cactus Avenue
6	I-215 Freeway – Northbound, South of Cactus Avenue
7	I-215 Freeway – Northbound, North of Harley Knox Boulevard
8	I-215 Freeway – Northbound, South of Harley Knox Boulevard

1.3.4 FREEWAY MERGE/DIVERGE RAMP JUNCTIONS

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

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

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue(Diverge) – Upstream
2	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue(Diverge) – Downstream
3	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard (Diverge)
4	I-215 Freeway – Southbound, On-Ramp at Harley Knox Boulevard (Merge)
5	I-215 Freeway – Northbound, On-Ramp at Cactus Avenue (Merge)
6	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard (Merge)
7	I-215 Freeway – Northbound, Off-Ramp at Harley Knox Boulevard (Diverge)

1.4 SUMMARY OF INTERSECTION ANALYSIS

A summary of the peak hour intersection LOS are provided on Table 1-5 for each of the analysis scenarios and on Table 1-6 for the study area roadway segments. The I-215 Freeway mainline segments are anticipated to operate at acceptable LOS for each of the analysis scenarios until General Plan Buildout (Post 2035) traffic conditions (see Table 1-7). Similarly, the -215 Freeway merge/diverge ramp junctions are also anticipated to operate at acceptable LOS for each of the analysis scenarios until Opening Year Cumulative (2020) traffic conditions (see Table 1-8).

1.5 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements throughout the City of Moreno Valley are funded through a combination of project mitigation, fair share contributions or development impact fee programs, such as Transportation Uniform Mitigation Fee (TUMF) program or the County's Development Impact Fee (DIF) program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

1.5.1 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The Western Riverside Council of Governments (WRCOG) is responsible for establishing and updating TUMF rates. The County may grant to developers a credit against the specific components of fees for the dedication of land or the construction of facilities identified in the list of improvements funded by each of these fee programs. Fees are based upon projected land uses and a related transportation needs to address growth based upon a 2009 Nexus study.

Table 1-5

Summary of Intersection Level of Service

#	Intersection	Traffic Control [1]	Existing (2015) LOS		E+P w/o Indian LOS		E+P w/ Indian LOS		2020 w/o Project LOS		2020 w/ Project LOS		P2035 w/o Project LOS		P2035 w/ Project LOS	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av	TS	B	D	B	D	B	D	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
2	I-215 SB Ramps / Harley Knox Bl	TS	C	C	C	D	D	D	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
3	I-215 NB Ramps / Cactus Av	TS	B	B	B	B	B	B	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
4	I-215 NB Ramps / Harley Knox Bl	TS	B	B	B	B	B	B	B	**F**	C	**F**	**E**	**F**	**F**	**F**
5	Elsworth St / Cactus Av	TS	D	C	D	C	D	C	**F**	D	**F**	D	**F**	**E**	**F**	**F**
6	Frederick St / Cactus Av	TS	C	C	C	C	C	C	C	D	C	D	C	D	C	D
7	Western Wy / Harley Knox Bl	CSS	B	B	B	B	B	B	C	**F**	C	**F**	**E**	**F**	**F**	**F**
8	Graham St / Cactus Av	TS	C	C	C	C	C	C	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
9	Patterson Av / Harley Knox Bl	TS	C	C	C	D	C	C	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
10	Heacock St / Cactus Av	TS	C	B	D	D	D	C	**E**	D	**E**	**F**	**F**	**F**	**F**	**F**
11	Heacock St / John F. Kennedy Dr	TS	C	C	C	C	C	C	C	C	C	D	D	D	D	D
12	Heacock St / Gentian Av	CSS	C	**F**	**E**	**F**	D	**F**	D	**F**	**F**	**F**	**F**	**F**	**F**	**F**
13	Heacock St / Iris Av	AWS	C	**E**	**E**	**F**	D	**F**	**E**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
14	Heacock St / Krameria Av (North)	TS	B	A	B	C	B	C	B	D	C	D	C	D	C	D
15	Heacock St / Driveway 1	**CSS**	--	--	B	B	B	B	--	--	B	C	--	--	C	C
16	Heacock St / Driveway 2	**CSS**	--	--	B	B	B	B	--	--	C	C	--	--	C	C
17	Heacock St / Cardinal Av	CSS	A	B	B	C	B	C	B	D	C	D	B	C	C	D
18	Heacock St / San Michele Rd	TS	C	D	D	**E**	D	**E**	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
19	Heacock St / Nandina Av	CSS	A	A	A	A	A	A	A	A	A	A	B	C	B	C
20	Webster Av / Harley Knox Bl	CSS	B	B	B	B	B	B	A	C	A	C	C	**F**	C	**F**
21	Cosmos St / Krameria Av (North)	CSS	A	A	B	B	A	B	B	C	C	D	B	C	C	C
22	Cosmos St / Krameria Av	**AWS**	--	--	A	A	A	A	--	--	B	B	--	--	A	A
23	Driveway 3 / Krameria Av	**CSS**	--	--	A	A	A	A	--	--	B	B	--	--	A	B
24	Driveway 4 / Krameria Av	**CSS**	--	--	A	A	A	A	--	--	A	A	--	--	A	A
25	Driveway 5 / Krameria Av	**CSS**	--	--	A	A	A	A	--	--	A	B	--	--	A	B
26	Indian St / Krameria Av	AWS	B	A	B	A	B	A	B	B	B	B	**F**	**F**	**F**	**F**
27	Indian St / Driveway 6	**CSS**	--	--	A	A	A	A	--	--	A	A	--	--	B	C
28	Indian St / San Michele Rd	TS	C	D	C	D	C	D	**F**	**F**	**F**	**F**	**E**	**F**	**F**	**F**
29	Indian St / Nandina Av	TS	B	B	B	C	C	C	**F**	**F**	**F**	**F**	**F**	**F**	**F**	**F**
30	Indian St / Harley Knox Bl	TS	B	C	B	D	C	**E**	B	**F**	B	**F**	**F**	**F**	**F**	**F**
31	Perris Bl / Cactus Av	TS	C	C	C	C	C	C	**E**	**F**	**E**	**F**	**F**	**F**	**F**	**F**
32	Perris Bl / Krameria Av	TS	C	C	C	C	C	C	D	**E**	D	**E**	**F**	**F**	**F**	**F**

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS). -- = Not Applicable/Future Intersection

[1] CSS = Cross-street Stop; TS = Traffic Signal: AWS= All-way stop; **CSS** = Improvement

Table 1-6

Summary of Roadway Segment Level of Service

#	Roadway	Segment Limits	Roadway Section	Existing LOS	E+P w/o Indian LOS	E+P w/ Indian LOS	2020 w/o Project LOS	2020 w/ Project LOS	P2035 w/o Project LOS	P2035 w/ Project LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	4D	B	C	B	**F**	**F**	**F**	**F**
2		East of I-215 NB Ramps	4D	D	D	D	**F**	**F**	**F**	**F**
3		West of Elsworth Street	6D	B	B	B	**F**	**F**	**F**	**F**
4		East of Elsworth Street	6D	A	A	A	**E**	**F**	**F**	**F**
5		West of Frederick Street	5D	B	C	C	**F**	**F**	**F**	**F**
6		East of Frederick Street	5D	C	D	D	**F**	**F**	**F**	**F**
7		West of Graham Street	5D	C	D	D	**F**	**F**	**F**	**F**
8		East of Graham Street	5D	B	C	B	**F**	**F**	**F**	**F**
9		West of Heacock Street	5D	C	D	C	**F**	**F**	**F**	**F**
10		East of Heacock Street	4D	A	A	A	D	D	**F**	**F**
11		West of Perris Boulevard	4D	A	A	A	B	B	**E**	**E**
12	Krameria Avenue	Heacock Street to Cosmos Street	2U	A	A	A	A	D	D	**F**
13		Cosmos Street to Driveway 3	2U	A	A	A	A	A	C	D
14		Driveway 3 to Driveway 4	2U	A	A	A	A	A	C	D
15		Driveway 4 to Driveway 5	2U	A	A	A	A	A	C	D
16		Driveway 5 to Indian Street	2D	A	A	A	A	A	A	A
17		East of Indian Street	2D	A	A	A	A	A	A	A
18		West of Perris Boulevard	2U	A	A	A	A	A	**F**	**F**
19	Cardinal Avenue	East of Heacock Street	2U	A	A	A	A	A	A	A
20	San Michele Road	East of Heacock Street	2D	A	A	A	**E**	**F**	**F**	**F**
21		West of Indian Street	2D	A	B	B	**F**	**F**	**F**	**F**
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	4D	A	A	A	A	B	D	D
23		I-215 NB Ramps to Western Way	4D	A	A	A	**E**	**E**	**F**	**F**
24		East of Western Way	4U	A	B	B	**F**	**F**	**F**	**F**
25		West of Patterson Avenue	4U	A	A	A	**E**	**F**	**F**	**F**
26		East of Patterson Avenue	2D	A	B	C	**F**	**F**	**F**	**F**
27		West of Webster Avenue	2D	A	B	B	**F**	**F**	**F**	**F**
28		East of Webster Avenue	2D	A	B	B	**F**	**F**	**F**	**F**
29		West of Indian Street	3D	A	A	A	**E**	**F**	**F**	**F**

Table 1-6

Summary of Roadway Segment Level of Service

#	Roadway	Segment Limits	Roadway Section	Existing LOS	E+P w/o Indian LOS	E+P w/ Indian LOS	2020 w/o Project LOS	2020 w/ Project LOS	P2035 w/o Project LOS	P2035 w/ Project LOS
30	Heacock Street	South of Cactus Avenue	4D	B	C	C	C	D	C	D
31		North of John F. Kennedy Drive	4D	B	C	B	C	D	C	C
32		South of John F. Kennedy Drive	4D	A	B	B	B	C	C	C
33		North of Gentian Avenue	3D	B	D	C	D	**E**	D	**E**
34		South of Gentian Avenue	2U	**F**	**F**	**F**	**F**	**F**	**F**	**F**
35		North of Iris Avenue	2D	D	**F**	**F**	**F**	**F**	**F**	**F**
36		Iris Avenue to Krameria Avenue (N)	2U	C	**F**	**E**	**F**	**F**	**F**	**F**
37		Krameria Avenue (N) to Driveway 1	3D	B	A	A	C	C	D	D
38		Driveway 1 to Driveway 2	3D	B	A	A	C	C	D	D
39		Driveway 2 to Cardinal Avenue	4D	A	A	A	A	A	B	B
40		Cardinal Avenue to San Michele Road	3D	A	A	A	B	C	D	**E**
41		San Michele Road to Nandina Avenue	2D	A	A	A	A	A	B	C
42		South of Nandina Avenue	2U	A	A	A	A	A	B	C
43		North of Harley Knox Boulevard	2U	A	A	A	A	A	A	A
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	2U	A	A	A	A	A	C	D
45	Indian Street	Driveway 6 to San Michele Road	4D	A	A	A	A	A	B	B
46		San Michele Road to Nandina Avenue	4D	A	A	A	C	D	**E**	**F**
47		South of Nandina Avenue	2D	B	C	D	**F**	**F**	**F**	**F**
48		North of Harley Knox Boulevard	4D	A	A	A	B	B	**F**	**F**

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 Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

Table 1-7

Summary of Basic Freeway Segment Level of Service

Freeway	Direction	Mainline Segment	Lanes[1]	Existing LOS		E+P w/o Indian LOS		E+P w/ Indian LOS		2020 w/o Project LOS		2020 w/ Project LOS		P2035 w/o Project LOS		P2035 w/ Project LOS	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	C	C	C	C	C	C	D	D	D	D	**E**	**E**	**E**	**E**
		South of Cactus Avenue	4	C	C	C	C	C	C	D	D	D	D	D	**E**	D	**E**
		North of Harley Knox Boulevard	3	B	C	B	C	B	C	C	D	C	D	**F**	**F**	**F**	**F**
		South of Harley Knox Boulevard	3	B	C	B	C	B	C	B	D	B	D	D	**E**	D	**E**
	NB	North of Cactus Avenue	4	A	A	B	A	B	A	B	B	B	C	D	D	D	D
		South of Cactus Avenue	4	B	A	B	A	B	A	C	B	C	B	D	C	D	C
		North of Harley Knox Boulevard	3	C	B	C	B	C	B	D	D	D	D	**F**	**F**	**F**	**F**
		South of Harley Knox Boulevard	3	C	B	C	B	C	B	D	C	D	C	**E**	D	**E**	D

* **BOLD** = Unacceptable Level of Service

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

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

Table 1-8

Summary of Freeway Ramp Junction Merge/Diverge Level of Service

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing		E+P w/o Indian		E+P w/ Indian		2020 w/o Project		2020 w/ Project		P2035 w/o Project		P2035 w/ Project	
				LOS		LOS		LOS		LOS		LOS		LOS		LOS	
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	C	D	D	D	D	D	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**
		Loop Off-Ramp at Cactus Avenue - Downstream	4	C	D	D	D	D	D	**E**	**E**	**E**	**E**	**E**	**E**	**E**	**E**
		Off-Ramp at Harley Knox Boulevard	3	C	C	C	C	C	C	D	**E**	D	**E**	**F**	**F**	**F**	**F**
		On-Ramp at Harley Knox Boulevard	3	B	C	B	C	B	C	B	D	B	D	D	**E**	D	**E**
	NB	On-Ramp at Cactus Avenue	3	C	B	C	C	C	C	C	D	C	D	**E**	**E**	**E**	**F**
		On-Ramp at Harley Knox Boulevard	3	C	C	C	C	C	C	D	D	D	D	D	**F**	**F**	**F**
		Off-Ramp at Harley Knox Boulevard	3	C	B	C	C	C	C	D	C	D	C	**E**	D	**E**	D

* **BOLD** = Unacceptable Level of Service

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

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

TUMF is an ambitious regional program created to address cumulative impacts of growth throughout western Riverside County. Program guidelines are being handled on an iterative basis. Exemptions, credits, reimbursements and local administration are being deferred to primary agencies. The County of Riverside serves this function for the proposed Project. Fees submitted to the County are passed on to the WRCOG as the ultimate program administrator.

TUMF guidelines empower a local zone committee to prioritize and arbitrate certain projects. The Project is located in the Central Zone. The zone has developed a 5-year capital improvement program to prioritize public construction of certain roads. TUMF is focused on improvements necessitated by regional growth. The I-215/Cactus Avenue interchange, I-215/Harley Knox Boulevard interchange, Cactus Avenue, Harley Knox Boulevard, Heacock Street, Indian Street, and Perris Boulevard are designated TUMF roadways/facilities within the Project's traffic study area.

1.5.2 CITY OF MORENO VALLEY DEVELOPMENT IMPACT FEE (DIF) PROGRAM

The City of Moreno Valley has created its own local Development Impact Fee (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 program includes facilities that are not part of, or which may exceed improvements identified and covered by the TUMF program. As a result, the pairing of the regional and local fee programs provides a more comprehensive funding and implementation plan to ensure an adequate and interconnected transportation system. 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.

As shown in Table 1-9, a few of the facilities forecasted to be impacted by the Project are planned for improvements through the City's DIF Program. The Project applicant will be subject to the City's DIF fee program, and will pay the requisite City DIF fees at the rates then in effect pursuant to the City's ordinance. The project applicant's payment of the requisite DIF fees at the rates then in effect pursuant to the DIF Program will mitigate its impacts to DIF-funded facilities.

Table 1-9

Summary of Recommended Improvements and Rough Order of Magnitude Costs

#	Intersection Location	Existing	E+P (w/o Indian)	E+P (w/ Indian)	2020 Without Project	2020 With Project	Post 2035 Without Project	Post 2035 With Project	Improvements in DIF, TUMF, etc.[1]	Total Cost[2]	Fair Share[3]	Fair Share Cost[3]	Significant Imapct?[10]
1	I-215 SB Ramps / Cactus Av	None	None	None	2nd SB right turn lane	Same	Same	Same	Yes (TUMF)[4]		NA[5]		Yes
					2nd WB left turn lane	Same	Same	Same	Yes (TUMF)[4]				
									TOTAL	**$0**		**$0**	
2	I-215 SB Ramps / Harley Knox Bl	None	None	None	Restripe SB approach w/ 2 left turn lanes and shared through-right turn lane	Same	Same	Same	Yes (TUMF)[4]		NA[5]		Yes
					2nd WB left turn lane	Same	Same	Same	Yes (TUMF)[4]				
									TOTAL	**$0**		**$0**	
3	I-215 NB Ramps / Cactus Av	None	None	None	Protected NB/SB left turn phasing	Same	Same	Same	Yes (TUMF)[4]		NA[5]		Yes
					2nd NB left turn lane	Same	Same	Same	Yes (TUMF)[4]				
					3rd EB through lane	Same	Same	Same	Yes (TUMF)[4]				
					3rd WB through lane	Same	Same	Same	Yes (TUMF)[4]				
							Protected EB left turn phasing	Same	Yes (TUMF)[4]				
							2nd NB through lane	Same	Yes (TUMF)[4]				
							2nd SB left turn lane	Same	Yes (TUMF)[4]				
							2 SB right turn lanes w/ overlap phasing	Same	Yes (TUMF)[4]				
							2nd EB left turn lane	Same	Yes (TUMF)[4]				
							EB free-right turn lane	Same	Yes (TUMF)[4]				
							4th WB through lane	Same	Yes (TUMF)[4]				
							WB right turn lane	Same	Yes (TUMF)[4]				
									TOTAL	**$0**		**$0**	
4	I-215 NB Ramps / Harley Knox Bl	None	None	None	2nd EB left turn lane	Same	Same	Same	Yes (TUMF)[4]		NA[5]		Yes
					WB free-right turn lane	Same	Same	Same	Yes (TUMF)[4]				
									TOTAL	**$0**		**$0**	
5	Elsworth St / Cactus Av	None	None	None	Protected NB/SB left turn phasing (Restripe NB approach)	Same	Same	Same	No	$131,198	6.2%	$8,100	Yes
							2nd NB left turn lane	Same	No	$87,465		$5,400	
							4th EB through lane	Same	No	$314,874		$19,440	
							4th WB through lane	Same	No	$314,874		$19,440	
									TOTAL	**$848,411**		**$52,379**	
7	Western Wy / Harley Knox Bl	None	None	None	Traffic signal	Same	Same	Same	No	$250,000	10.7%	$26,846	Yes
					EB left turn lane	Same	Same	Same	No	$87,465		$9,392	
							3rd EB through lane	Same	Yes (TUMF)[4]				
							3rd WB through lane	Same	Yes (TUMF)[4]				
									TOTAL	**$337,465**		**$36,239**	

Table 1-9

Summary of Recommended Improvements and Rough Order of Magnitude Costs

#	Intersection Location	Existing	E+P (w/o Indian)	E+P (w/ Indian)	2020 Without Project	2020 With Project	Post 2035 Without Project	Post 2035 With Project	Improvements in DIF, TUMF, etc.[1]	Total Cost[2]	Fair Share[3]	Fair Share Cost[3]	Significant Imapct?[10]
8	Graham St / Cactus Av	None	None	None	3rd EB through lane	Same	Same	Same	Yes (DIF)		5.7%		Yes
							2nd EB left turn lane	Same	No	$87,465		$5,004	
									TOTAL	**$87,465**		**$5,004**	
9	Patterson Av / Harley Knox Bl	None	None	None	2nd EB through lane[6]	Same	Same	Same	--[6]		11.5%		Yes
					2nd WB through lane[6]	Same	Same	Same	--[6]				
					WB right turn lane[6]	Same	Same	Same	No	$87,465		$10,059	
							3rd EB through lane	Same	Yes (TUMF)[4]				
							3rd WB through lane	Same	Yes (TUMF)[4]				
									TOTAL	**$87,465**		**$10,059**	
10	Heacock St / Cactus Av	None	Extend NB left turn lane storage to 315-feet	Same	Same	Same	Same	Same	No[11]	$0	10.0%	$0	Yes
					Modify the traffic signal to remove the SB crosswalk	Same	Same	Same	No	$43,733		$4,390	
							3rd EB through lane	Same	No	$314,874		$31,609	
							3rd WB through lane	Same	No	$314,874		$31,609	
									TOTAL	**$673,481**		**$67,607**	
12	Heacock St / Gentian Av	Traffic signal	Same	Same	Same	Same	Same	Same	Yes (DIF)		NA[5]		No
							2nd NB through lane	Same	Yes (DIF)				
							2nd SB through lane	Same	Yes (DIF)				
									TOTAL	**$0**		**$0**	
13	Heacock St / Iris Av	Traffic signal	Same	Same	Same	Same	Same	Same	Yes (DIF)		9.8%		Yes
			WB right turn lane w/ overlap phasing	Same	Same	Same	Same	Same	No	$131,198		$12,859	
					2nd NB through lane	Same	Same	Same	Yes (DIF)				
					2nd SB left turn lane	Same	Same	Same	No	$87,465		$8,573	
					2nd SB through lane	Same	Same	Same	Yes (DIF)				
									TOTAL	**$218,663**		**$21,431**	
18	Heacock St / San Michele Rd	None	Implement overlap phasing on WB right turn lane	Same	Same	Same	Same	Same	No	$131,198	8.8%	$11,514	Yes
					2nd SB left turn lane	Same	Same	Same	No	$87,465		$7,676	
							2nd NB through lane	Same	Yes (DIF)				
							2nd SB through lane	Same	Yes (DIF)				
									TOTAL	**$218,663**		**$19,190**	
20	Webster Av / Harley Knox Bl	None	None	None	None	None	Traffic signal	Same	No	$250,000	13.4%	$33,448	Yes
							SB shared left-through-right turn lane	Same	No	$314,874		$42,128	
							EB left turn lane	Same	No	$87,465		$11,702	
							3rd EB through lane	Same	Yes (TUMF)[6]				
							WB left turn lane	Same	No	$87,465		$11,702	
							3rd WB through lane	Same	Yes (TUMF)[6]				
									TOTAL	**$739,804**		**$98,980**	

Table 1-9

Summary of Recommended Improvements and Rough Order of Magnitude Costs

#	Intersection Location	Existing	E+P (w/o Indian)	E+P (w/ Indian)	2020 Without Project	2020 With Project	Post 2035 Without Project	Post 2035 With Project	Improvements in DIF, TUMF, etc.[1]	Total Cost[2]	Fair Share[3]	Fair Share Cost[3]	Significant Imapct?[10]
26	Indian St / Krameria Av	None	None	None	None	None	Traffic signal	Same	Yes (DIF)		6.2%		Yes
							2nd NB through lane	Same	Yes (DIF)				
							2nd SB through lane	Same	Yes (DIF)				
							EB right turn lane w/ overlap phasing	Same	No	$218,663		$13,557	
									TOTAL	**$218,663**		**$13,557**	
28	Indian St / San Michele Rd	None	None	None	2nd EB through lane	Same	Same	Same	Yes (DIF, TUMF)		2.9%		Yes
							2nd NB through lane	Same	Yes (DIF)				
							2nd EB right turn lane w/ overlap phasing	Same	No	$87,465		$2,516	
							2nd WB left turn lane	Same	No	$87,465		$2,516	
							NB right turn overlap phasing	Same	No	$131,198		$3,774	
							2nd SB left turn lane	Same	No	$87,465		$2,516	
							WB right turn lane w/ overlap phasing	Same	No	$87,465		$2,516	
									TOTAL	**$481,058**		**$13,838**	
29	Indian St / Nandina Av	None	None	None	Implement overlap phasing on the EB right turn lane	Same	Same	Same	No	$131,198	3.1%	$4,110	Yes
							2nd NB left turn lane	Same	No	$87,465		$2,740	
							NB right turn lane w/ overlap phasing	Same	No	$87,465		$2,740	
							3rd SB through lane	Same	No	$314,874		$9,864	
							2nd EB right turn lane w/ overlap phasing	Same	No	$87,465		$2,740	
							2nd WB left turn lane	Same	No	$87,465		$2,740	
									TOTAL	**$795,932**		**$24,934**	
30	Indian St / Harley Knox Bl	None	SB right turn lane w/ overlap phasing	Same	Same	Same	Same	Same	No	$218,663	2.2%	$4,913	Yes
			2 EB through lanes[6]	Same	Same	Same	Same	Same	--[6]				
			2 WB through lanes[6]	Same	Same	Same	Same	Same	--[6]				
					Restripe EB right turn lane as 3rd through lane[6]	Same	Same	Same	--[6]				
					3rd WB through lane[6]	Same	Same	Same	--[6]				
							2nd SB left turn lane	Same	No	$87,465		$1,965	
							2nd EB left turn lane	Same	No	$87,465		$1,965	
							EB right turn lane w/ overlap phasing	Same	No	$87,465		$1,965	
							2nd WB left turn lane	Same	No	$87,465		$1,965	
							WB right turn lane w/ overlap phasing	Same	No	$87,465		$1,965	
									TOTAL	**$655,988**		**$14,740**	

Table 1-9

Summary of Recommended Improvements and Rough Order of Magnitude Costs

#	Intersection Location	Existing	E+P (w/o Indian)	E+P (w/ Indian)	2020 Without Project	2020 With Project	Post 2035 Without Project	Post 2035 With Project	Improvements in DIF, TUMF, etc.[1]	Total Cost[2]	Fair Share[3]	Fair Share Cost[3]	Significant Imapct?[10]
31	Perris Bl / Cactus Av	None	None	None	EB right turn lane w/ overlap	Same	Same	Same	No	$218,663	1.4%	$3,109	Yes
							2nd EB left turn lane	Same	No	$87,465		$1,243	
							2nd NB left turn lane	Same	No	$87,465		$1,243	
							NB right turn lane	Same	No	$87,465		$1,243	
							3rd SB through lane	Same	Yes (DIF)	$314,874		$4,476	
							3rd EB through lane	Same	No	$314,874		$4,476	
									TOTAL	**$1,110,806**		**$15,792**	
32	Perris Bl / Krameria Av	None	None	None	Protected EB/WB left turn phasing	Same	Same	Same	No	$131,198	2.1%	$2,727	Yes
					Restripe EB approach w/ 1 left turn lane and shared through-right turn lane	Same	Same	Same	No	$43,733		$909	
					WB left turn lane	Same	Same	Same	No	$87,465		$1,818	
							2nd NB left turn lane	Same	No	$87,465		$1,818	
							NB right turn lane	Same	No	$87,465		$1,818	
							2nd SB left turn lane	Same	No	$87,465		$1,818	
							2nd EB through lane	Same	Yes (DIF)				
							2nd WB through lane	Same	Yes (DIF)				
									TOTAL	**$524,790**		**$10,910**	
Total Project Fair Share Contribution to the City of Moreno Valley (non-DIF/TUMF)[7]										**$4,513,194**		**$198,550**	
Total Project Fair Share Contribution to the City of Perris[8]										**$1,820,722**		**$160,018**	
Total Project Fair Share Contribution to the March Joint Powers Authority[9]										**$664,734**		**$46,092**	

[1] Improvements included in TUMF Nexus or City of Moreno Valley DIF programs.

[2] Costs have been estimated using the data provided in Appendix G of the San Bernardino County CMP (2003 Update) for preliminary construction costs. Appendix G costs escalated by a factor of 1.7493 to reflect 2020 conditions, except for Traffic Signals.

[3] Program improvements constructed by project may be eligible for fee credit. In lieu fee payment is at discretion of City. Represents the fair share percentage for the Project during the most impacted peak hour.

[4] Although the interchange is identified as a TUMF interchange, the interchange is not currently identified on the Central Zone 5-Year Transportation Improvement Program Amendment (adopted January 6, 2014).

[5] Fair share percentage is not shown as the recommended improvements at this location are included in a pre-existing fee program.

[6] The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussions with City staff, the improvements are anticipated to be completed by Fall 2015.

[7] Total project fair share contribution consists of the improvements which are not already included in the City-wide DIF/County TUMF for those intersections wholly or partially within the City of Moreno Valley.

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

[9] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the March Joint Powers Authority (JPA).

[10] 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.

[11] Project to implement improvement due to additional storage needed to accommodate 95th percentile queues.

1.5.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs (e.g., TUMF and/or DIF), 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 of Moreno Valley's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, has been provided on Table 1-10 for the applicable deficient intersections shown previously on Table 1-9. Improvements included in a defined program and constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate.

1.6 PROJECT IMPACTS AND MITIGATION MEASURES

This section provides a summary of recommended mitigation measures necessary to address Project impacts for E+P traffic conditions, by development phase. Section 2.0 *Methodologies* provides information on the methodologies used in the analysis and Section 5.0 *E+P Traffic Conditions* includes the detailed analysis. The recommended mitigation measures necessary to reduce Project impacts to less-than-significant are discussed in Section 1.6.2. 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, as identified in Table 1-9. The City shall review the proposed mitigation measures to determine if the Project shall construct certain improvements, including traffic signals or contribute fair share.

1.6.1 PROJECT IMPACTS

Potential Impact 1.1 – Heacock Street / Cactus Avenue (#10) – Although this intersection was found to operate at an acceptable LOS for the overall intersection (LOS D or better) during the peak hours under E+P traffic conditions, the addition of Project traffic is anticipated to worsen the northbound left turn lane's individual LOS from acceptable to unacceptable LOS, for both without and with the Indian Street extension. The addition of Project traffic is anticipated to also worsen the northbound left turn 95th percentile queue, which would likely exceed the existing available storage. As such, the impact is considered significant (Impact 1.1).

Potential Impact 2.1 – Heacock Street / Gentian Avenue (#12) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the PM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during one or more of the peak hours with the addition of Project traffic, for both without and with the Indian Street extension. As such, the impact is considered cumulatively significant (Impact 2.1).

Table 1-10

Project Fair Share Calculations

#	Intersection		Existing	Project	Post 2035 WP	Total New Traffic	Project Fair Share[1]
5	Elsworth St / Cactus Av						
		AM:	3,909	167	6,614	2,705	**6.2%**
		PM:	3,495	186	6,767	3,272	5.7%
7	Western Wy / Harley Knox Bl						
		AM:	1,339	253	3,695	2,356	**10.7%**
		PM:	1,312	279	4,358	3,046	9.2%
8	Graham St / Cactus Av						
		AM:	3,249	167	6,168	2,919	**5.7%**
		PM:	3,535	186	7,437	3,902	4.8%
9	Patterson Av / Harley Knox Bl						
		AM:	1,264	272	3,629	2,365	**11.5%**
		PM:	1,035	300	4,281	3,246	9.2%
10	Heacock St / Cactus Av						
		AM:	3,509	261	6,109	2,600	**10.0%**
		PM:	3,974	285	7,021	3,047	9.4%
13	Heacock St / Iris Av						
		AM:	1,076	271	2,765	1,689	**9.8%**
		PM:	1,506	297	3,580	2,074	8.3%
18	Heacock St / San Michele Rd						
		AM:	373	178	2,495	2,122	8.4%
		PM:	675	195	2,897	2,222	**8.8%**
20	Webster Av / Harley Knox Bl						
		AM:	747	272	2,780	2,033	**13.4%**
		PM:	808	299	3,285	2,477	12.1%
26	Indian St / Krameria Av						
		AM:	630	116	2,501	1,871	**6.2%**
		PM:	416	122	3,144	2,728	4.5%
28	Indian St / San Michele Rd						
		AM:	714	114	4,677	3,963	**2.9%**
		PM:	1,508	124	6,370	4,862	2.6%
29	Indian St / Nandina Av						
		AM:	740	114	4,379	3,639	**3.1%**
		PM:	1,273	124	5,600	4,327	2.9%
30	Indian St / Harley Knox Bl						
		AM:	1,378	113	6,407	5,029	**2.2%**
		PM:	1,666	125	8,124	6,458	1.9%
31	Perris Bl / Cactus Av						
		AM:	3,182	50	6,699	3,517	**1.4%**
		PM:	3,379	54	7,570	4,191	1.3%
32	Perris Bl / Krameria Av						
		AM:	2,553	58	5,343	2,790	**2.1%**
		PM:	2,430	61	5,794	3,364	1.8%

BOLD = Fair share percentage for the Project based on the highest peak hour.

[1] For intersections that are currently operating at acceptable LOS under Existing traffic conditions, Project fair share percentage based on net new traffic between Existing (2015) and General Plan Buildout (Post 2035) traffic conditions.

For intersections that are currently operating at an unacceptable LOS under Existing traffic conditions, Project fair share percentage based on total traffic for General Plan Buildout (Post 2035) traffic conditions.

Potential Impact 3.1 – Heacock Street / Iris Avenue (#13) – 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 one or more of the peak hours with the addition of Project traffic, for both without and with the Indian Street extension. As such, the impact is considered cumulatively significant (Impact 3.1).

Potential Impact 4.1 – Heacock Street / San Michele Road (#18) – This intersection was found to operate at acceptable LOS (LOS D or better) during the peak hours under Existing traffic conditions, however, the addition of Project traffic is anticipated to result in deficient peak hour operations during the PM peak hour only, for both without and with the Indian Street extension. As such, the impact is considered significant (Impact 4.1).

Potential Impact 5.1 – Indian Street / Harley Knox Boulevard (#30) – This intersection was found to operate at acceptable LOS (LOS C or better) during the peak hours under Existing traffic conditions, however, the addition of Project traffic (with Indian Street extension alternative only) is anticipated to result in deficient peak hour operations during the PM peak hour only. The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussions with City staff, the improvements are anticipated to be completed by Fall 2015. With the implementation of the planned improvements, there are no LOS deficiencies anticipated with the addition of Project traffic. As such, the impact is considered less-than-significant.

1.6.2 MITIGATION MEASURES

Mitigation Measure 1.1 – Heacock Street / Cactus Avenue (#10) – The following improvement is necessary to reduce the Project's proportionate increase in queues, thus reducing the Project's impact to less-than-significant:

- Restripe the northbound left turn lane to provide 315-feet of storage from the existing 215-feet in order to accommodate the anticipated 95th percentile queues.

Mitigation Measure 2.1 – Heacock Street / Gentian Avenue (#12) – 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:

- Payment of the Project's DIF fees to be applied towards the installation of a traffic signal to improve the existing deficiency.

Mitigation Measure 3.1 – Heacock Street / Iris Avenue (#13) – The following improvements are 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:

- Payment of the Project's DIF fees to be applied towards the installation of a traffic signal to improve the existing deficiency.
- Mitigation measure also consists of a westbound right turn lane with overlap phasing. The Project would pay its fair share to the City of Moreno Valley towards the addition of a westbound right turn lane with overlap phasing.

Mitigation Measure 4.1 – Heacock Street / San Michele Road (#18) – 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 impact to less-than-significant:

- Modify the existing traffic signal to implement overlap phasing on the westbound right turn lane.

The potential off-site impacts to the study area intersections are anticipated to be relatively the same for the proposed Project, without or with the bridge. As such, the development of the proposed Project is not anticipated to drive the need for the Indian Street bridge over the Perris Valley Storm Drain Channel.

1.7 CUMULATIVE IMPACTS AND RECOMMENDED IMPROVEMENTS

1.7.1 INTERSECTIONS AND ROADWAY SEGMENTS

This section provides a summary of recommended mitigation measures necessary to address the cumulative traffic impacts. A summary of the operationally deficient study area intersections and recommended improvements required to achieve acceptable circulation system operational conditions are described in detail within Section 6.0 *Opening Year Cumulative (2020) Traffic Conditions,* and Section 7.0 *General Plan Buildout (Post 2035) Traffic Conditions* of this report. 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 recommended mitigation measures necessary to reduce Project impacts to less-than-significant are discussed below. The construction of facilities by the Project applicant would be eligible for fee credit and reimbursement if the construction exceeds the Project's fair share, as identified in Table 1-10. The City shall review the proposed mitigation measures to determine if the Project shall construct certain improvements, including traffic signals, or contribute fair share.

Table 1-9 lists the recommended improvements necessary to reduce the identified intersection LOS deficiencies, by analysis scenario. Street and intersection improvements that may be funded though the TUMF and/or DIF programs are noted. If a particular facility tentatively listed in Table 1-9 is ultimately excluded from the TUMF and/or DIF programs, the Project would be responsible for, and would be required to pay, fair share fees for improvement of affected facilities. These fees 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. Alternatively, minor fair share responsibilities may be waived when collection is infeasible or where other mitigation assignments substantially exceed the Project's demonstrated impacts.

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 1-9 also

summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix "G" of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.749 to reflect 2020 costs. 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.

Mitigation Measure 5.1 – Prior to the issuance of building permits, the Project applicant shall participate in the City's DIF and County TUMF fee programs by paying the requisite fees at the time of building permit, and in addition pay the Project's fair share amount of $198,550 for the improvements identified in Table 1-9 that are consistent with the improvements shown on Table 5-6, Table 6-6, and Table 7-6, or as agreed to by the City and applicant. This fair share payment should only be collected if the City creates a fee program that includes the improvements in which this fair share contribution is intended to construct. The City shall ensure that the improvements will be constructed pursuant to the fee program at that point in time necessary to avoid identified significant impacts.

Mitigation Measure 6.1 – Table 1-9 includes 4 intersections that either shares a mutual border with the City of Perris or are wholly located within the City of Perris' jurisdiction and have recommended improvements which are not covered by payment of fees. The City of Moreno Valley shall participate in a multi-jurisdictional effort with the City of Perris 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 1-9, that are located in the City of Perris' jurisdiction. The Developer's fair-share amount for the 4 intersections that either shares a mutual border with the City of Perris or are wholly located within the City of Perris' jurisdiction that have recommended improvements which are not covered by payment of fees equals $160,018. Developer shall be required to pay this $160,018 amount to the City of Moreno Valley prior to the issuance of the Project's final certificate of occupancy.

Mitigation Measure 7.1 – Table 1-9 includes 5 intersections that either shares a mutual border with the March Joint Powers Authority (March JPA) or are wholly located within the March JPA's jurisdiction and have recommended improvements which are not covered by payment of fees. The City of Moreno Valley shall participate in a multi-jurisdictional effort with the March JPA 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 1-9, that are located in the March JPA's jurisdiction. The Developer's fair-share amount for the 5 intersections that either shares a mutual border with the March JPA or are wholly located within the March JPA's jurisdiction that have recommended improvements which are not covered by payment of fees equals $46,092. Developer shall be required to pay this $46,092 amount to the City of Moreno Valley prior to the issuance of the Project's final certificate of occupancy.

1.7.2 MITIGATION MEASURES TO ADDRESS CUMULATIVE DEFICIENCIES ON FREEWAY FACILITIES

The SCAG RTP includes a list of projects in the Federal Transportation Improvement Program (FTIP). The following is an applicable FTIP project within the study area: interchange improvements at I-215/Cactus Avenue, which includes the extension of the northbound auxiliary lane between Cactus Avenue and Alessandro Boulevard to the north (to be completed by 2018). In addition, the I-215 North Project, includes the construction of a high-occupancy vehicle lane in each direction of the I-215 Freeway between Nuevo Road and Box Springs Road within the existing median. Based on information provided on the Project website, these improvements are longer range as priority has been given to the I-215 South and I-215 Central projects.

The planned SCAG RTP and I-215 North projects will provide capacity enhancements to the cumulatively impacted freeway segments and ramp junctions, however, peak hour LOS is still anticipated to LOS E or F for certain freeway facilities under both Opening Year Cumulative (2020) and General Plan Buildout (Post 2035) traffic conditions.

Neither Caltrans or the State have adopted a fee program that can ensure that locally-contributed impact fees will be tied to improvements to freeway mainlines, and only Caltrans has the jurisdiction over mainline improvements. Because Caltrans has exclusive control over state highway improvements, ensuring that fair share contributions to mainline improvements are actually part of a program tied to implementation is within the jurisdiction of Caltrans. As such, the City of Moreno Valley may decide whether specific overriding economic, legal, social, technological, or other benefits of the Project outweigh the unavoidable adverse cumulative traffic impacts associated with the Project.

1.8 SITE ADJACENT ROADWAY AND SITE ACCESS IMPROVEMENTS

This section summarizes Project site access and on-site circulation recommendations. Vehicular and truck traffic access will be provided via the following driveways (see Exhibit 1-1):

- Heacock Street / Driveway 1 – Full access driveway providing access to passenger cars and heavy trucks for Building 4.
- Heacock Street / Driveway 2 – Full access driveway providing access to both passenger cars and heavy trucks for Building 4.
- Heacock Street / Cardinal Avenue – Full access intersection providing access to both passenger cars and heavy trucks for Building 3.
- Cosmos Street / Krameria Avenue – Full access intersection providing access to both passenger cars and heavy trucks for Buildings 1 and 2. Although the intersection would allow for full access, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and additional design features (e.g., reductions to the curb radius on the southeast corner).
- Driveway 3 / Krameria Avenue – Full access driveway providing access to both passenger cars and heavy trucks for Building 1. Although the driveway would allow for full access, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and additional design features (e.g., reductions to the curb radius on the southeast corner).

- Driveway 4 / Krameria Avenue – Full access driveway providing access to passenger cars only for Building 1.
- Driveway 5 / Krameria Avenue – Full access driveway providing access to both passenger cars and heavy trucks for Building 1. Although the driveway would allow for full access for passenger cars, heavy trucks will be prohibited from utilizing Krameria Avenue to the east through signage and design features for the intersection. The northbound right turn lane from Driveway 5 would include a small turning radius on the southeast corner and signage to prohibit use by heavy trucks.
- Indian Street / Driveway 6 – Full access driveway providing access to passenger cars only to Building 1. The layout of and geometry of the parking prohibits heavy trucks from entering or existing the driveway. However, if in the future Indian Street is extended over the Perris Valley Storm Drain Channel and the City's truck route is modified to the north to Driveway 6 from its current terminus, then heavy truck access could be accommodated to and from the south on Indian Street via Driveway 6 with modifications to the parking layout.

Regional access to the project site is provided via the I-215 Freeway at Cactus Avenue and Harley Knox Boulevard 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. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations and site access improvements. Construction of on-site and site adjacent improvements are recommended to occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

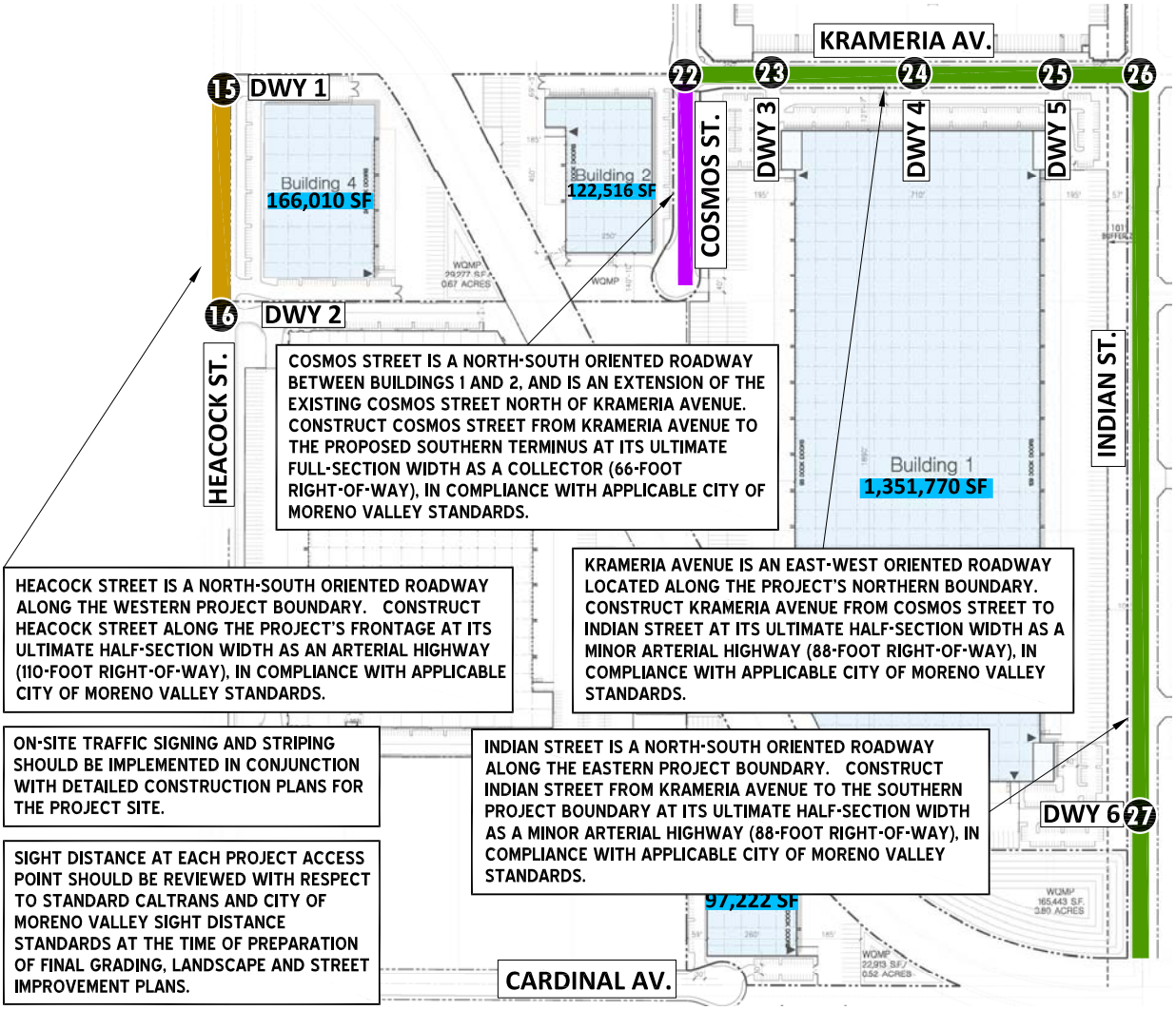
Heacock Street – Heacock Street is a north-south oriented roadway along the western Project boundary. Construct Heacock Street along the Project's frontage at its ultimate half-section width as an Arterial Highway (110-foot right-of-way), in compliance with applicable City of Moreno Valley standards.

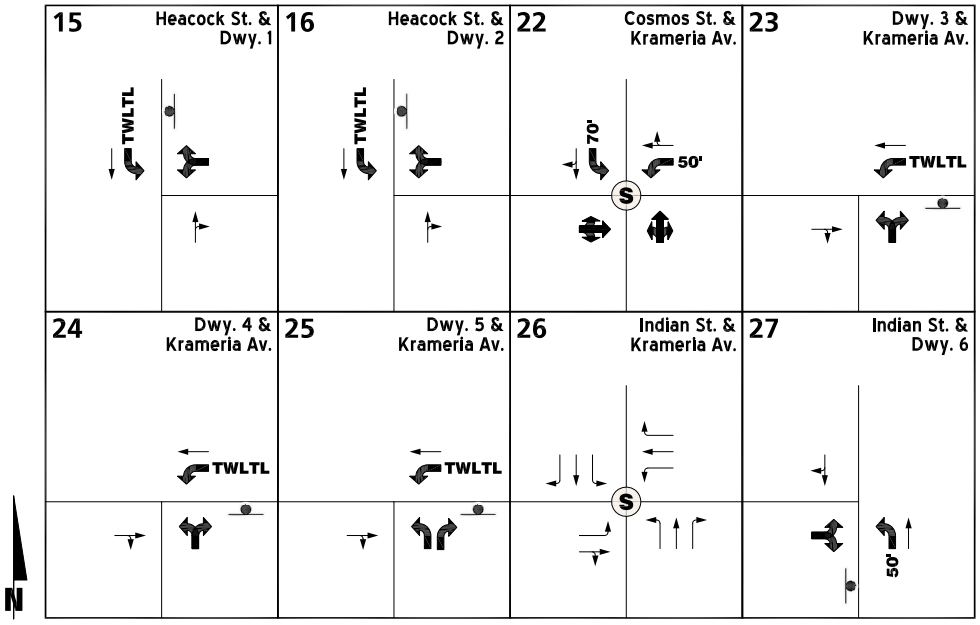
Krameria Avenue – Krameria Avenue is an east-west oriented roadway located along the Project's northern boundary. Construct Krameria Avenue from Cosmos Street to Indian Street at its ultimate half-section width as a Minor Arterial Highway (88-foot right-of-way), in compliance with applicable City of Moreno Valley standards.

Cosmos Street – Cosmos Street is a north-south oriented roadway between Buildings 1 and 2, and is an extension of the existing Cosmos Street north of Krameria Avenue. Construct Cosmos Street from Krameria Avenue to the proposed southern terminus at its ultimate full-section width as a Collector (66-foot right-of-way), in compliance with applicable City of Moreno Valley standards.

Indian Street – Indian Street is a north-south oriented roadway along the eastern Project boundary. Construct Indian Street from Krameria Avenue to the southern Project boundary at its ultimate half-section width as a Minor Arterial Highway (88-foot right-of-way), in compliance with applicable City of Moreno Valley standards.

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





LEGEND:

- S = ALL WAY STOP
- = STOP SIGN
- = EXISTING LANE
- = LANE IMPROVEMENT
- 50' = MINIMUM TURN POCKET LENGTH
- TWLTL = TWO-WAY-LEFT-TURN LANE
- = ARTERIAL HIGHWAY (110' R.O.W.)
- = MINOR ARTERIAL HIGHWAY (88' R.O.W.)
- = COLLECTOR (66' R.O.W.)

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URBAN CROSSROADS

Wherever necessary, roadways adjacent to the Project, site access points and site-adjacent intersections will be constructed to be consistent with or within the recommended roadway classifications and respective cross-sections in the City of Moreno Valley 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 Moreno Valley sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

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 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. For the purposes of this evaluation, the WB-67 class truck template has been utilized. WB-67 class trucks are approximately 73.5 feet in length.

Exhibit 1-4 illustrates the proposed truck access for the site and circulation for each of the applicable Project driveways. As shown on Exhibit 1-4, the Project driveways will need to provide a minimum 50-foot curb radius on the southeast corner of each Project driveway in order to accommodate the ingress and egress of WB-67 trucks (or smaller). A truck turning template has not been overlaid on Driveways 4 and 6 as they are anticipated to be utilized by heavy trucks.

1.10 QUEUING ANALYSIS AT THE PROJECT DRIVEWAYS

A queuing analysis was conducted along the site adjacent roadways of Heacock Street, Krameria Avenue and Indian Street for Horizon Year (2035) traffic conditions to determine the turn pocket lengths necessary to accommodate near term 95th percentile queues. The analysis was conducted for the weekday AM and weekday PM peak hours.

The traffic modeling and signal timing optimization software package Synchro (Version 8 Build 801) 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. 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.

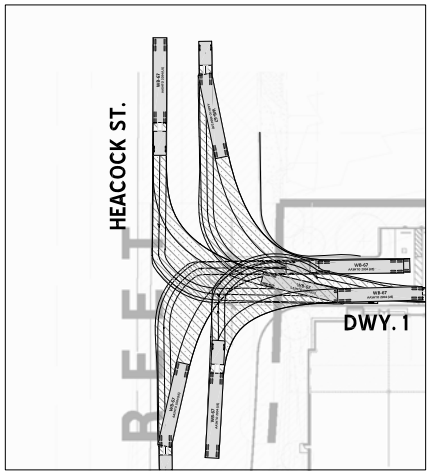
SimTraffic has been utilized to assess peak hour queuing at the site access driveways for Horizon Year With Project traffic conditions. The random simulations generated by SimTraffic

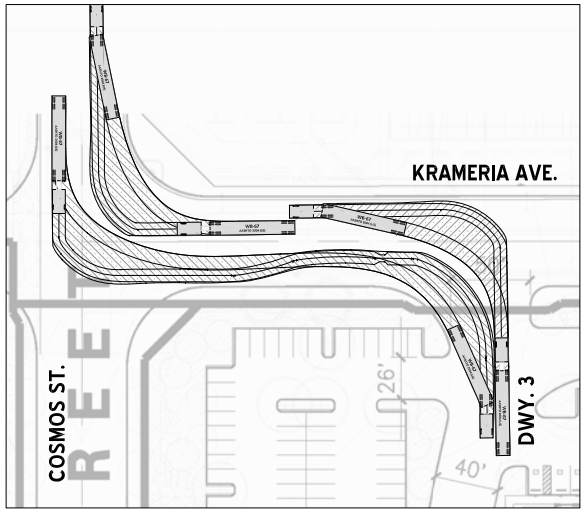
have been utilized to determine the 95th percentile queue lengths observed for each turn lane. A SimTraffic simulation has been recorded 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals.

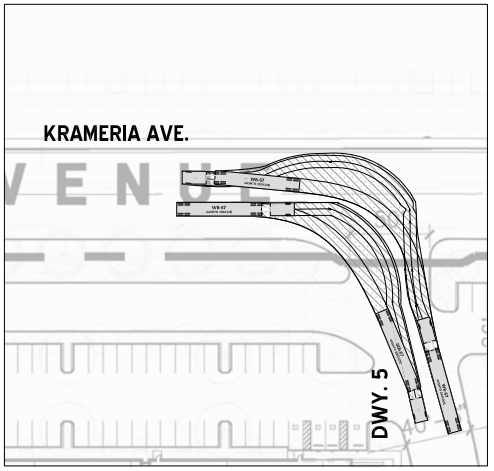
A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. Although only the 95th percentile queue has been utilized for purposes of determining the necessary turn pocket storage 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 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. However, many jurisdictions utilize the 95th percentile queues for design purposes.

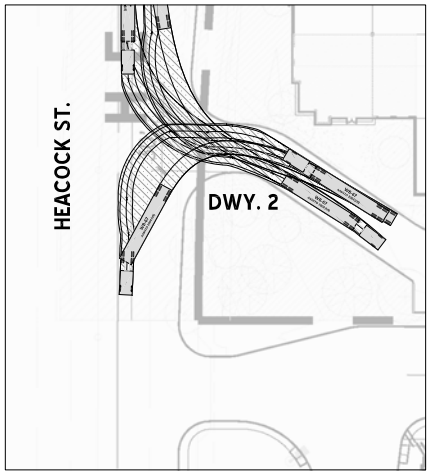
The storage length recommendations for the turning movements at the Project were shown previously on Exhibit 1-3 for Horizon Year traffic conditions. Although not indicated, it should be noted that the two-way-left-turn lanes shown on Exhibit 1-3 all require less than 50 feet of storage. Queuing results are provided in Appendix 1.2.

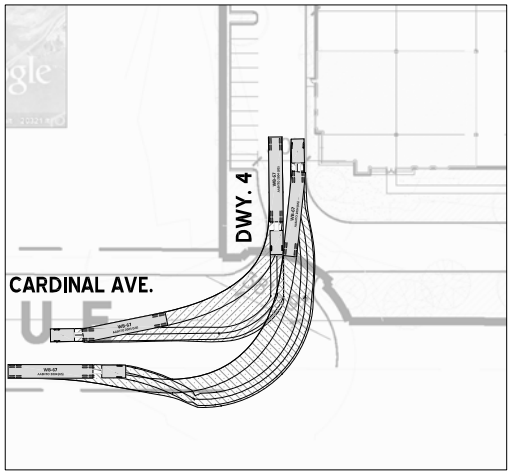
EXHIBIT 1-4: TRUCK ACCESS



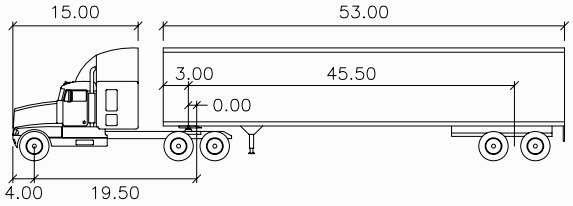








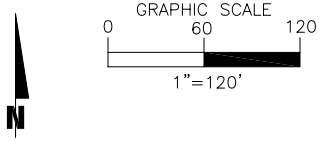
TRUCK TEMPLATE:



WB−67 feet

Tractor Width	: 8.00	Lock to Lock Time	: 6.00
Trailer Width	: 8.50	Steering Angle	: 28.40
Tractor Track	: 8.00	Articulating Angle	: 75.00
Trailer Track	: 8.50		

***NOT TO SCALE**



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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 Moreno Valley and Caltrans traffic study guidelines. (1) (2)

2.1 LEVEL OF SERVICE

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

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The *Highway Capacity Manual* (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (7) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

City of Moreno Valley, City of Perris, County of Riverside, March Joint Powers Authority

The City of Moreno Valley, City of Perris, County of Riverside, and March Joint Powers Authority (JPA) require signalized intersection operations analysis based on the methodology described in the HCM. (7) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1. Study area intersections have been evaluated using the Synchro (Version 8 Build 806) analysis software package.

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.

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

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. (7)

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 8 Build 806) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e. I-215 Freeway ramps at Harley Knox Boulevard). (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 Moreno Valley, City of Perris, County of Riverside, and March JPA requires the operations of unsignalized intersections be evaluated using the methodology described the HCM. (7) 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

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 Moreno Valley Daily Roadway Capacity Values provided in the *City of Moreno Valley Transportation Engineering Division Traffic Impact Analysis (TIA) Preparation Guide* and the City of Perris Daily Roadway Capacity Values provided in the City of Perris General Plan Circulation Element. (1) (8) Per the City of Moreno Valley TIA guidelines, roadway segments within the study area should maintain the LOS capacities illustrated on Exhibit 2-1. The City of Perris requires LOS D capacities to be maintained on City roadways. The daily roadway segment capacities for each type of roadway are summarized in Table 2-3. As noted in both the City of Moreno Valley's traffic study guidelines and City of Perris' General Plan Circulation Element, 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]

City of Moreno Valley:

Facility Type	Level of Service Capacity[1]				
	A	B	C	D	E
Six Lane Divided Arterial	33,900	39,400	45,000	50,600	56,300
Four Lane Divided Arterial	22,500	26,300	30,000	33,800	37,500
Four Lane Undivided Arterial	15,000	17,500	20,000	22,500	25,000
Two Lane Industrial Collector	7,500	8,800	10,000	11,300	12,500
Two Lane Undivided Residential	N/A	N/A	N/A	N/A	2,000

[1] These maximum roadway capacities have been extracted from the City of Moreno Valley's Transportation Division's TIA Preparation Guidelines (August 2007). These roadway capacities are "rule of thumb" estimates for planning purposes. The LOS "E" service volumes are estimated maximum daily capacity for respective roadway classifications. Capacity is affected by such factors as intersections (spacing, configuration and control features), degree of access control, roadway grades, design geometrics (horizontal and vertical alignment standards), sight distance, vehicle mix (truck and bus traffic) and pedestrian and bicycle traffic.

City of Perris:

Facility Type	Level of Service Capacity[1]				
	A	B	C	D	E
Six Lane Urban Arterial	32,340	37,730	43,100	48,500	53,900
Four Lane Urban Arterial	21,540	25,130	28,700	32,300	35,900
Two Lane Arterial	10,800	12,600	14,400	16,200	18,000
Four Lane Secondary Arterial	15,540	18,130	20,700	23,300	25,900
Two Lane Collector	7,800	9,100	10,400	11,700	13,000

[1] Source: Table CE-9 of the City of Perris General Plan Circulation Element and Figure C-2 of the County of Riverside General Plan Circulation Element.

All capacity exhibits are based on optimum conditions and are intended as guidelines for planning purposes only.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TIA includes the freeway-to-arterial interchange of the I-215 Freeway at Cactus Avenue and Harley Knox Boulevard 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 both Cactus Avenue and Harley Knox Boulevard. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-215 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential 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. The queue length reported is for the lane with the highest queue in the lane group.

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 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.

2.5 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. (9)

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. (9) 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	Western Way / Harley Knox Boulevard	Perris
12	Heacock Street / Gentian Avenue	Moreno Valley, March JPA
13	Heacock Street / Iris Avenue	Moreno Valley, March JPA
15	Heacock Street / Driveway 1 – Future Intersection	Moreno Valley, March JPA
16	Heacock Street / Driveway 2 – Future Intersection	Moreno Valley, March JPA
17	Heacock Street / Cardinal Avenue	Moreno Valley, March JPA
19	Heacock Street / Nandina Avenue	Moreno Valley, March JPA
20	Heacock Street/Webster Avenue / Harley Knox Boulevard	Perris
21	Cosmos Street / Krameria Avenue (North)	Moreno Valley
22	Cosmos Street / Krameria Avenue	Moreno Valley
23	Driveway 3 / Krameria Avenue – Future Intersection	Moreno Valley
24	Driveway 4 / Krameria Avenue – Future Intersection	Moreno Valley
25	Driveway 5 / Krameria Avenue – Future Intersection	Moreno Valley
26	Indian Street / Krameria Avenue	Moreno Valley
27	Indian Street / Driveway 6	Moreno Valley

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 (2020) Traffic Analysis,* and Section 7 *General Plan Buildout (Post 2035) 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.

2.6 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent Caltrans guidance and because impacts to freeway segments 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 is not required. As such, the traffic study has evaluated the freeway segments along the I-215 Freeway where the Project is anticipated to contribute 50 or more 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 50 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.

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

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in April 2015. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative, and General Plan Buildout Without and With Project conditions.

The I-215 Freeway mainline volume data were obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-215 Freeway interchange,

south of Cactus Avenue and north of Harley Knox Boulevard. The data was obtained from April 2015. 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 PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. (10)

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 6 existing on and off ramp locations where the Project is anticipated to contribute 50 or more peak hour trips. 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

Similar to the basic freeway segment analysis, the I-215 Freeway mainline volume data were obtained from the Caltrans maintained PeMS website for the segments of the I-215 Freeway interchange, south of Cactus Avenue and north of Harley Knox Boulevard. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining I-215 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from April 2015. 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. (10) As such, actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis.

2.8 THRESHOLDS OF SIGNIFICANCE

The definition of an intersection/roadway segment deficiency has been obtained from each of the applicable surrounding jurisdictions. The following thresholds of significance will be utilized to determine if the addition of project-related traffic will result in significant impacts, and whether the implementation of the recommended feasible improvements would result in exceeding the LOS thresholds for each applicable jurisdiction.

2.8.1 CITY OF MORENO VALLEY

The definition of an intersection deficiency in the City of Moreno Valley is based on the City of Moreno Valley General Plan Circulation Element. The City of Moreno Valley General Plan states that target LOS C or LOS D be maintained along City roads (including intersections) wherever possible. An exhibit depicting the level of service standards within the City is provided on Exhibit 2-1.

2.8.2 CITY OF PERRIS

LOS D is considered to be the limit of acceptable traffic operations during the peak hour in the City of Perris for both intersections and roadway segments.

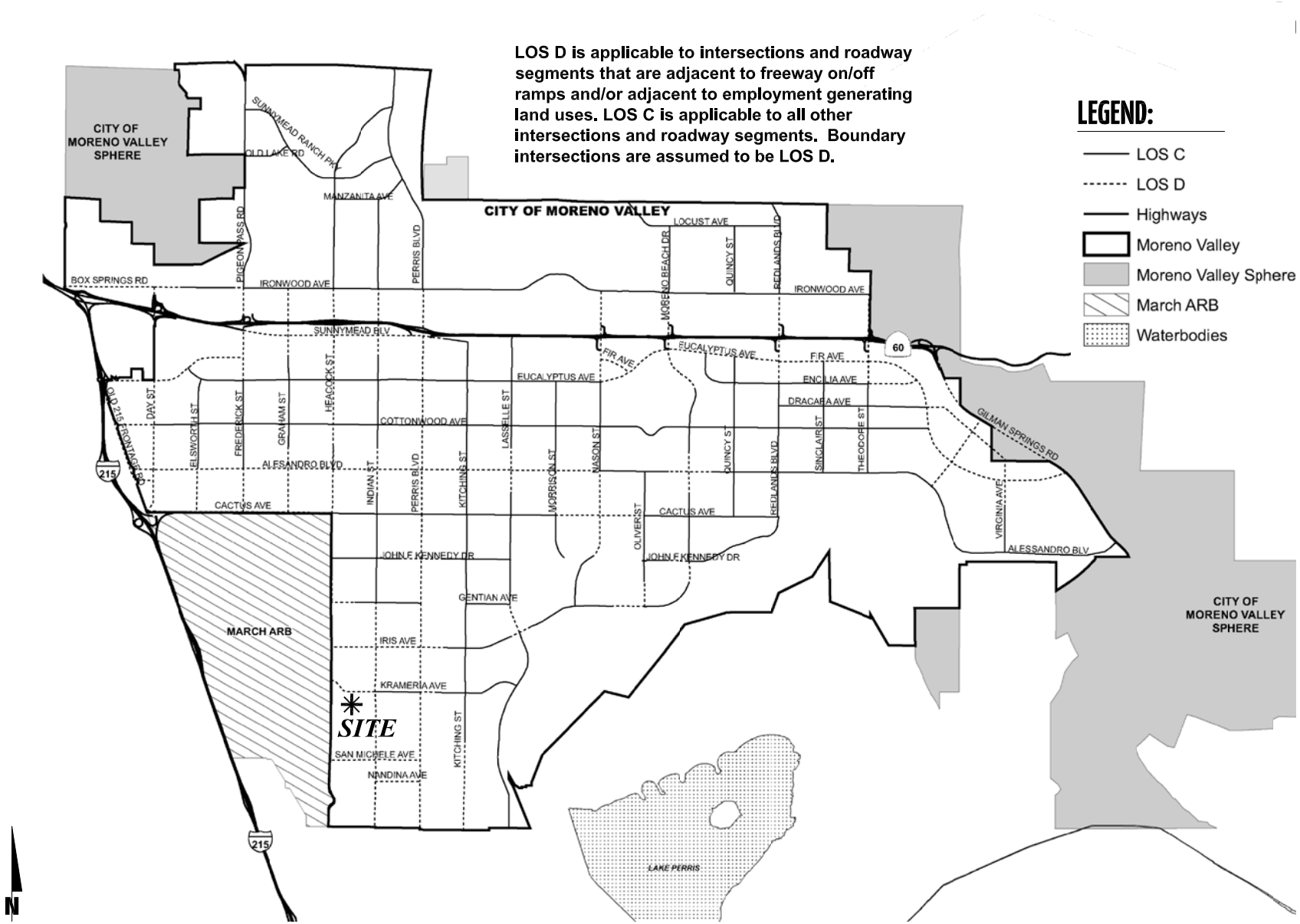
2.8.3 COUNTY OF RIVERSIDE

The County of Riverside General Plan Policy C 2.1 states that the County will maintain the following County-wide target level of service (LOS): LOS C on all County-maintained roads and conventional State Highways (including intersections). As an exception, LOS D may be allowed in Community Development areas at intersections of any combination of Secondary Highways, Major Highways, Arterial Highways, Urban Arterial Highways, Expressways or conventional State Highways. LOS E may be allowed in designated Community Centers to the extent that it would support transit-oriented development and pedestrian communities. As the Project is located within a Community Development area, LOS D has been considered acceptable at any intersection or study area roadway segment within the County of Riverside because all of the study area intersections are classified as Secondary Highways or a higher classification.

2.8.4 MARCH JOINT POWERS AUTHORITY

Based on the March JPA Traffic Impact Study Preparation Guide (August 3, 2011), all intersections and roadway segments within the March JPA Planning Area shall operate at LOS D or better with limiting circumstances of LOS E to occur. LOS E may also be allowed to the

EXHIBIT 2-1: CITY OF MORENO VALLEY LEVEL OF SERVICE (LOS) STANDARDS



URBAN CROSSROADS

extent that would support transit-oriented development (TOD) and walkable communities. LOS E is also acceptable during peak hours at interchange ramp intersections where ramp metering occurs. The Project is not proposed to be a TOD and the Cactus Avenue on-ramps are currently metered, as such, the minimum LOS utilized for the purposes of this analysis is LOS D for both intersections and roadway segments.

2.8.5 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. Caltrans acknowledges that the region-wide goal for an acceptable LOS on all freeways, roadway segments, and intersections is LOS D. Consistent with the City of Moreno Valley LOS threshold of LOS D and in excess of the CMP stated LOS threshold of LOS E, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

2.8.7 CMP

In an effort to more directly link land use, transportation and air quality and promote reasonable growth, the County of Riverside adopted a Congestion Management Plan (CMP) (December 2011). The Riverside County Transportation Commission (RCTC) monitors the CMP roadway network system to minimize LOS deficiencies. Within the project study area, the I-215 Freeway is recognized as a key transportation facility within the CMP system. Although Caltrans utilizes LOS D as their stated threshold, RCTC has adopted LOS E as the minimum standard for intersections and segments along the CMP System of Highways and Roadways. However, for the purposes of this traffic impact analysis, LOS D has been considered to be the limit of acceptable traffic operations for the I-215 Freeway mainline segments and ramp junctions in an effort to be conservative.

2.9 CEQA COMPLIANCE AND DOCUMENTATION

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

2.9.1 INTERSECTIONS/ROADWAY SEGMENTS

The following types of traffic deficiencies are considered to be significant under the California Environmental Quality Act (CEQA):

- When project traffic, added to existing traffic, will deteriorate the LOS to below the target LOS.
- When cumulative traffic exceeds the target LOS.

2.9.2 CALTRANS FACILITIES

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

- The 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 50 or more peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.10 PROJECT FAIR SHARE CALCULATION METHODOLOGY

Improvements found to be included in the City of Moreno Valley's DIF program and WRCOG TUMF, will be identified as such. For improvements that do not appear to be in either of the pre-existing fee programs, a fair share financial contribution based on the Project's fair share impact may be imposed in order to mitigate the Project's share of impacts in lieu of construction.

If the intersection is currently operating at deficient LOS under Existing traffic conditions, the Project's fair share cost of improvements would be determined based on the following equation, which is the ratio of Project traffic to total traffic:

Project Fair Share % = Project Traffic / General Plan Buildout Total Traffic

If the intersection is currently operating at acceptable LOS under Existing traffic conditions, the Project's fair share cost of improvements would be determined based on the following equation, which is the ratio of Project traffic to new traffic, where new traffic is total future traffic less existing baseline traffic:

Project Fair Share % = Project Traffic / (General Plan Buildout Total Traffic – Existing Traffic)

3 AREA CONDITIONS

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

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with City of Moreno Valley staff (Appendix 1.1), the study area includes a total of 32 existing and future intersections as shown previously on Exhibit 1-2 where the Project is anticipated to contribute 50 or more peak hour trips. 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 MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

As noted previously, the Project site is located within the City of Moreno Valley. However, the study area includes intersections within the neighboring jurisdiction of Perris and March Joint Powers Authority (JPA) (e.g., study area intersections along Harley Knox Boulevard, etc.).

3.2.1 CITY OF MORENO VALLEY

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the City of Moreno Valley General Plan Circulation Element, are described subsequently. Exhibit 3-2 shows the City of Moreno Valley General Plan Circulation Element, and Exhibit 3-3 illustrates the City of Moreno Valley General Plan roadway cross-sections.

3.2.2 CITY OF PERRIS

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the City of Perris as identified in the City of Perris General Plan Circulation Element are described subsequently. The circulation plan and proposed roadway cross-sections defined within the City of Perris are shown on Exhibits 3-4 and 3-5.

3.2.3 COUNTY OF RIVERSIDE / MARCH JOINT POWERS AUTHORITY

The roadway classifications and planned (ultimate) roadway cross-sections of the major roadways within the study area, as identified on the Riverside County General Plan Circulation Element, are described subsequently. Exhibit 3-6 shows the Riverside County General Plan Circulation Element, and Exhibit 3-7 illustrates the Riverside County General Plan roadway cross-sections.

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

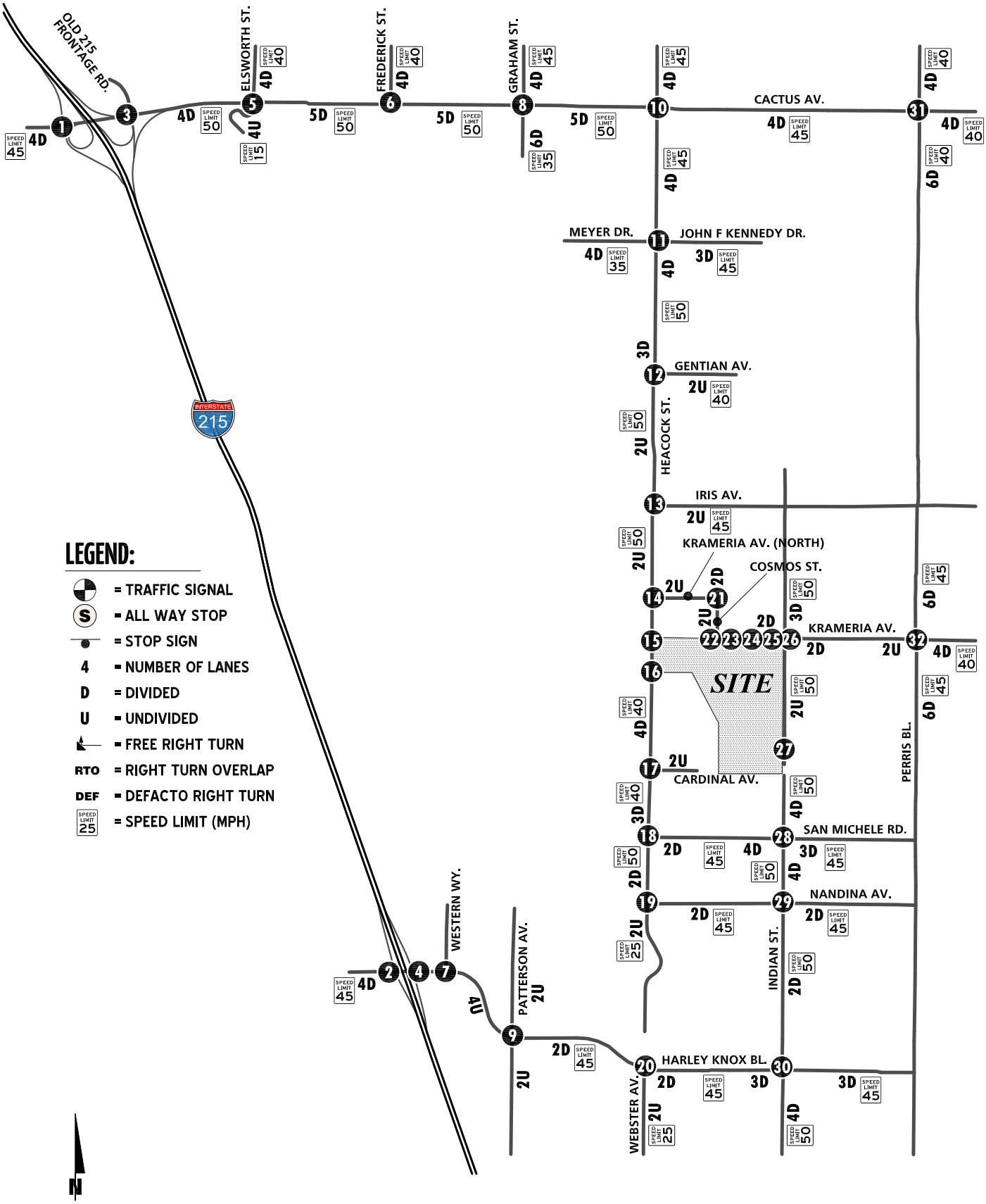
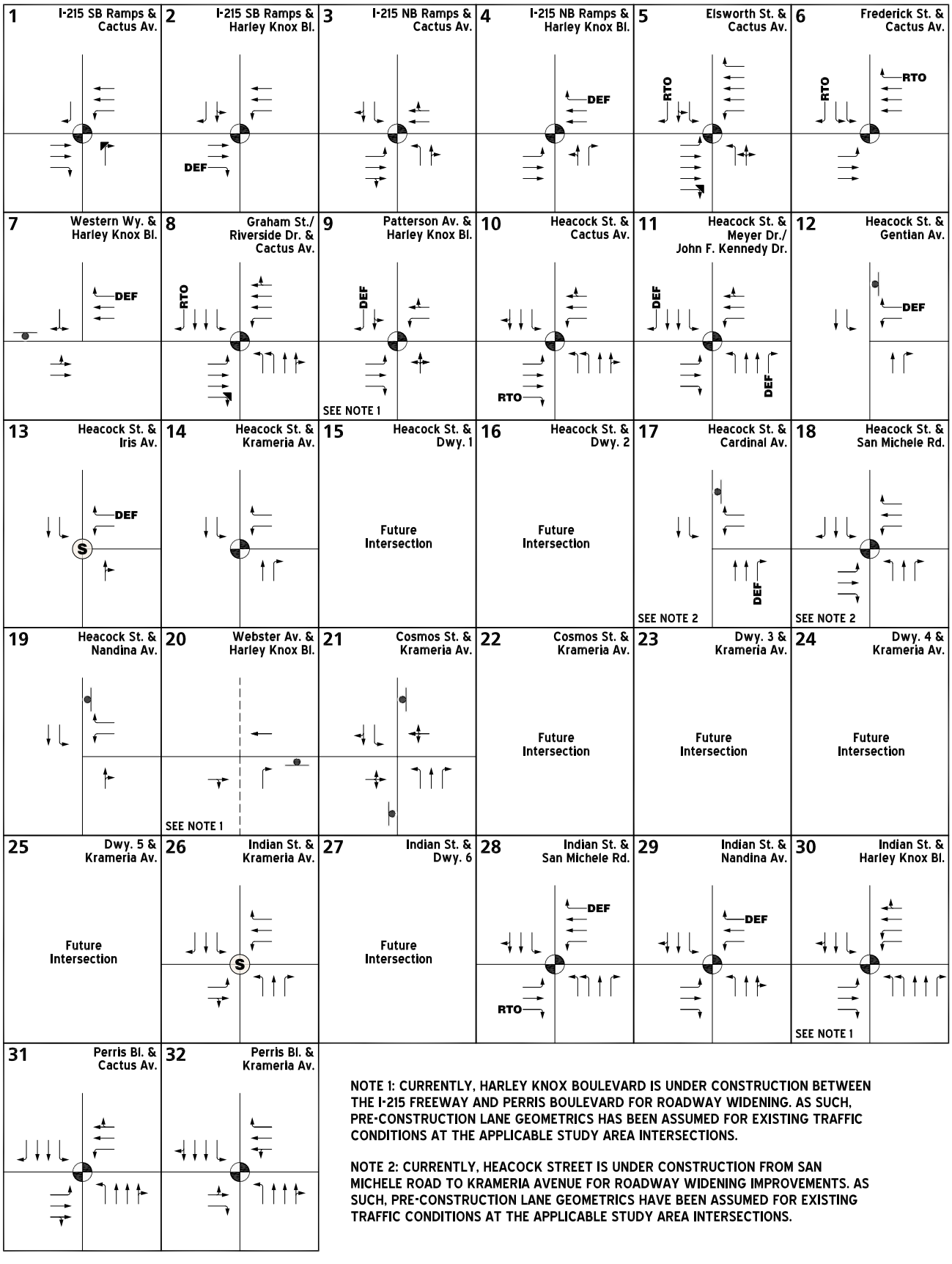


EXHIBIT 3-1 (2 OF 2): EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



NOTE 1: CURRENTLY, HARLEY KNOX BOULEVARD IS UNDER CONSTRUCTION BETWEEN THE I-215 FREEWAY AND PERRIS BOULEVARD FOR ROADWAY WIDENING. AS SUCH, PRE-CONSTRUCTION LANE GEOMETRICS HAS BEEN ASSUMED FOR EXISTING TRAFFIC CONDITIONS AT THE APPLICABLE STUDY AREA INTERSECTIONS.

NOTE 2: CURRENTLY, HEACOCK STREET IS UNDER CONSTRUCTION FROM SAN MICHELE ROAD TO KRAMERIA AVENUE FOR ROADWAY WIDENING IMPROVEMENTS. AS SUCH, PRE-CONSTRUCTION LANE GEOMETRICS HAVE BEEN ASSUMED FOR EXISTING TRAFFIC CONDITIONS AT THE APPLICABLE STUDY AREA INTERSECTIONS.

EXHIBIT 3-2: CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

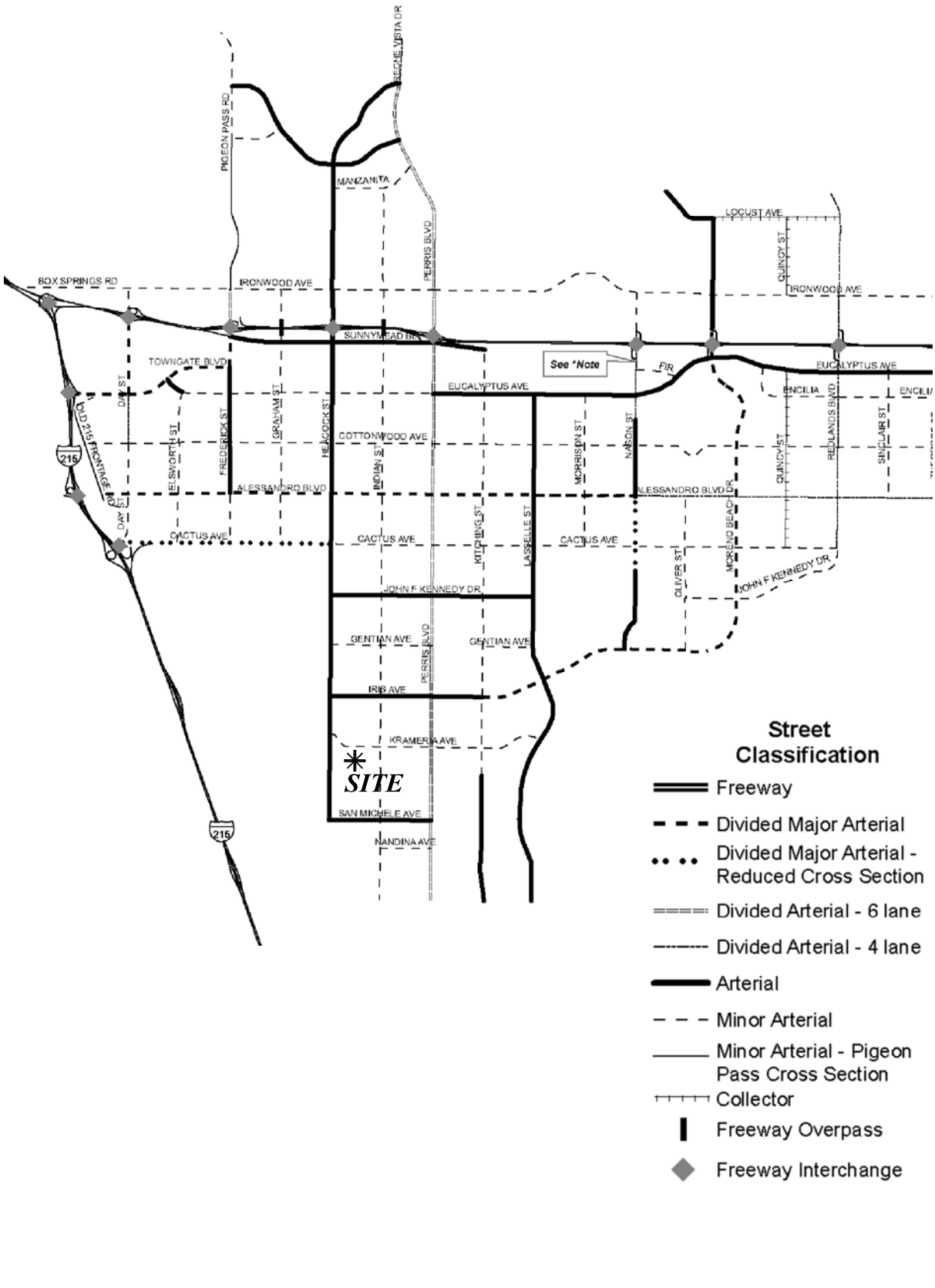


EXHIBIT 3-3: CITY OF MORENO VALLEY GENERAL PLAN ROADWAY CROSS-SECTIONS

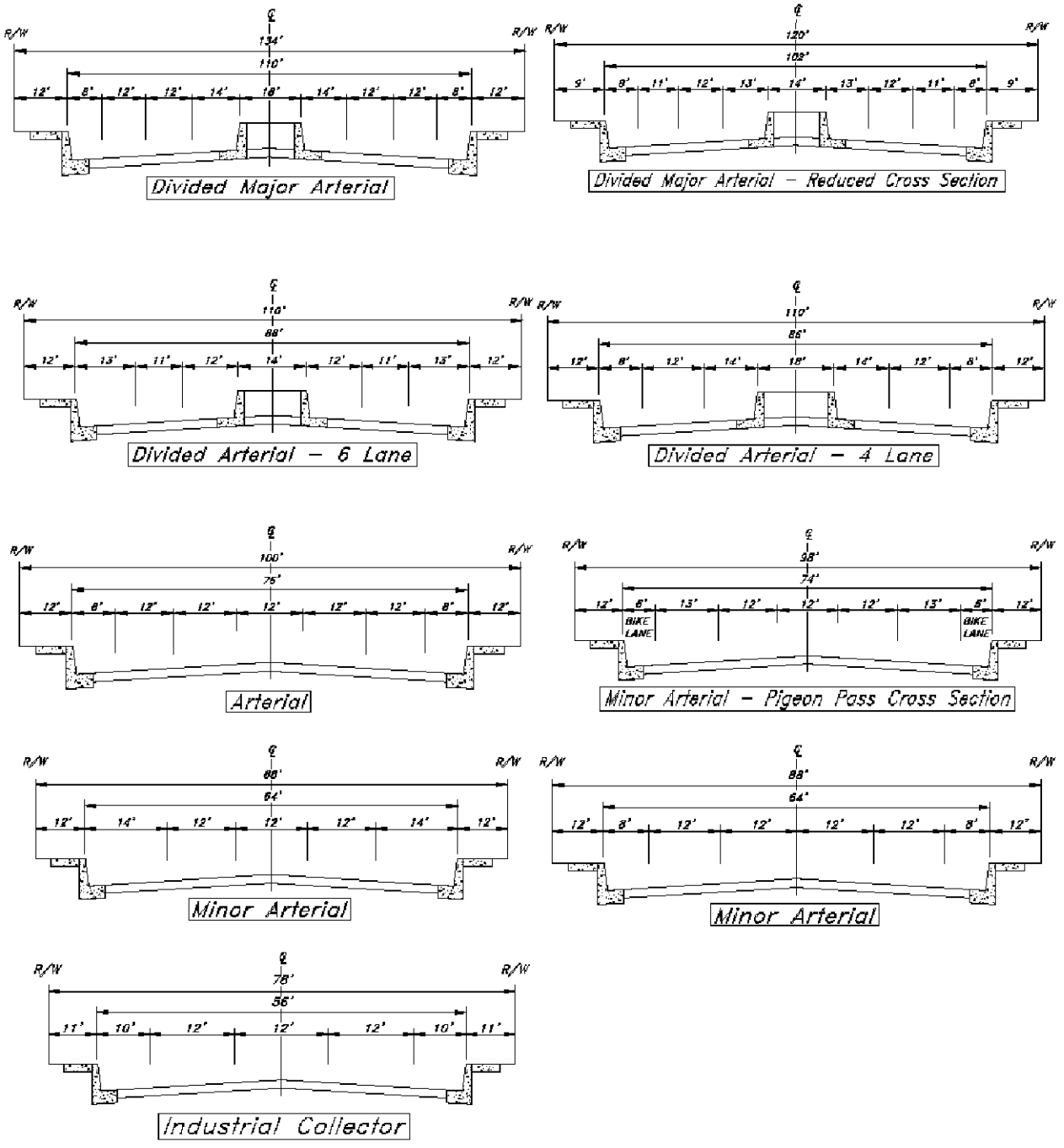
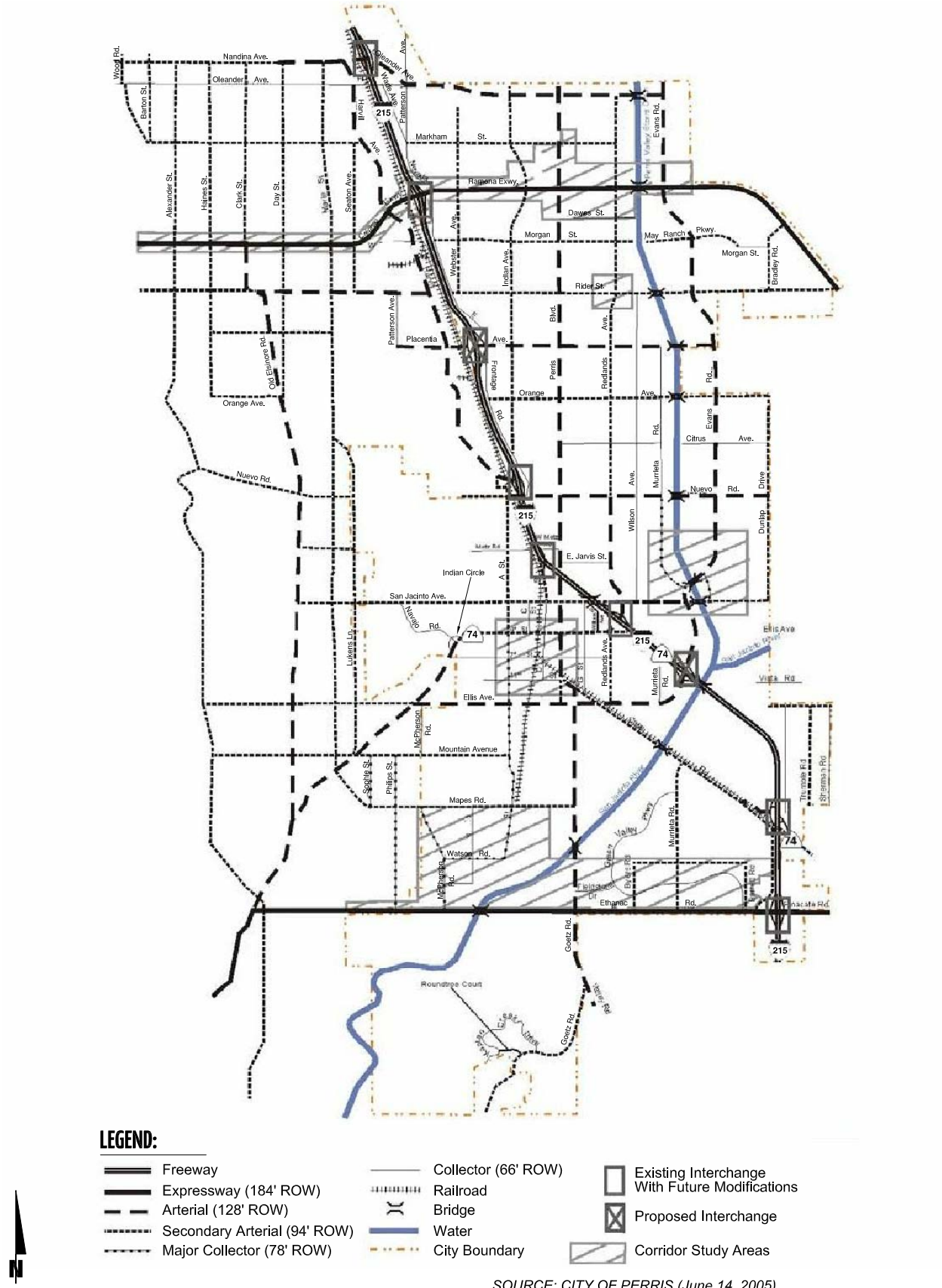


EXHIBIT 3-4: CITY OF PERRIS GENERAL PLAN CIRCULATION ELEMENT



SOURCE: CITY OF PERRIS (June 14, 2005)

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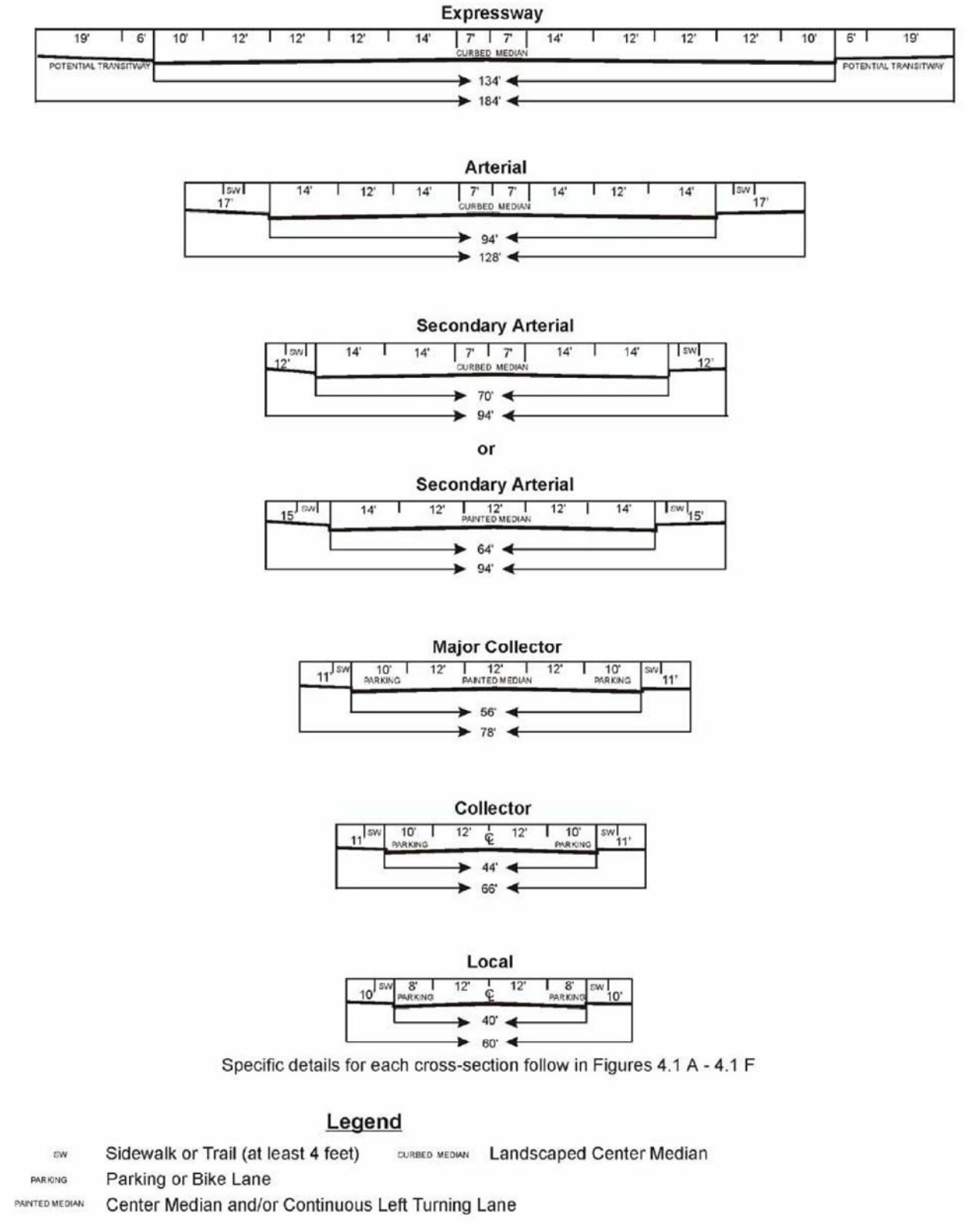
EXHIBIT 3-5: CITY OF PERRIS GENERAL PLAN ROADWAY CROSS-SECTIONS

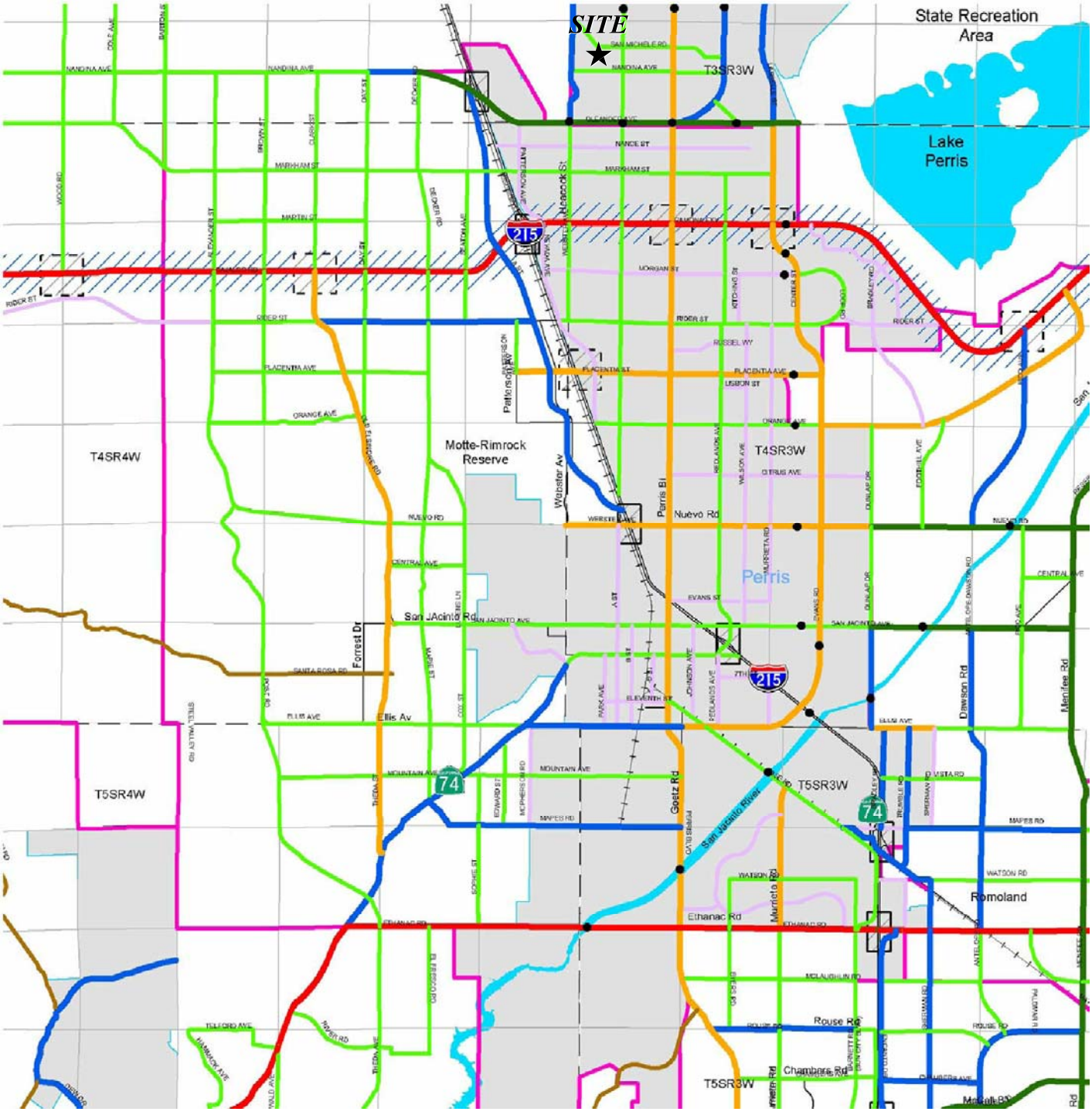


Specific details for each cross-section follow in Figures 4.1 A - 4.1 F

Legend

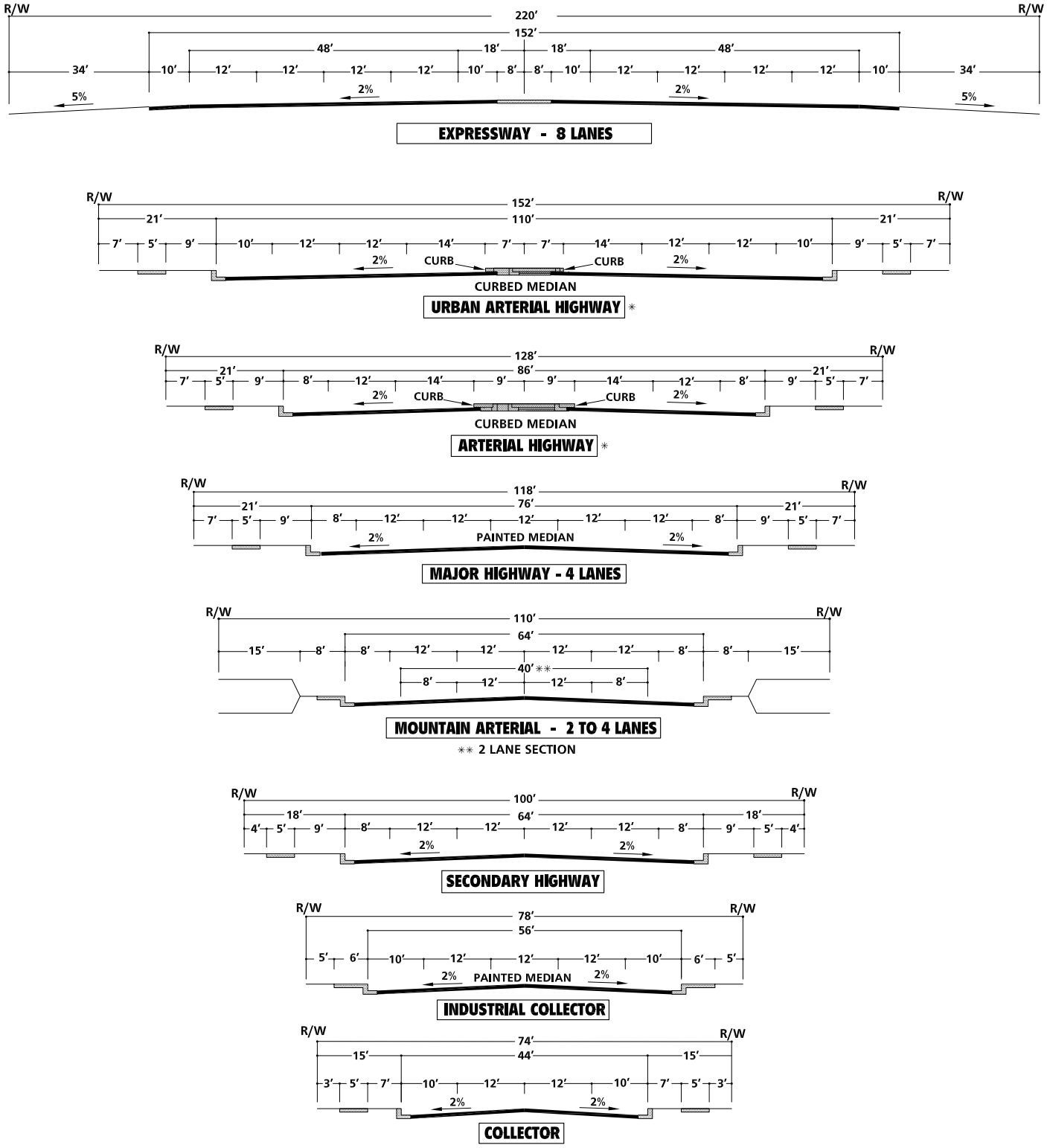
SW	Sidewalk or Trail (at least 4 feet)
PARKING	Parking or Bike Lane
PAINTED MEDIAN	Center Median and/or Continuous Left Turning Lane
CURBED MEDIAN	Landscaped Center Median

EXHIBIT 3-6: RIVERSIDE COUNTY GENERAL PLAN CIRCULATION ELEMENT



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

EXHIBIT 3-7: RIVERSIDE COUNTY GENERAL PLAN ROADWAY CROSS-SECTIONS



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

NOT TO SCALE

SOURCE: COUNTY OF RIVERSIDE

3.3 TRUCK ROUTES

While the City of Moreno Valley's General Plan recognizes the trucking industry and the importance of the region's role in the movement of goods, there are no truck routes defined within the County. Exhibit 3-8 shows the existing truck routes throughout the City of Moreno Valley. Based on the exhibit, the following roadways within the study area are identified as truck routes: Cactus Avenue, Elsworth Street, Frederick Street, Graham Street, Heacock Street, Perris Boulevard, Indian Street, San Michele Road, and Nandina Avenue. The City of Perris also has a designated truck route map in their General Plan, which is shown on Exhibit 3-9. As shown, Harley Knox Boulevard, east of the I-215 Freeway, Perris Boulevard, and Indian Street, are identified as designated City of Perris truck routes within the study area.

The development of the proposed Project would require a modification to the Existing Truck Routes, as shown on Exhibit 3-8 to extend the existing truck route along Indian Street from San Michele to Driveway 6 to the north. The proposed modification is only necessary if and when the Indian Street bridge is constructed over the Perris Valley Storm Drain Channel to provide access to trucks serving Building 1.

3.4 TRANSIT SERVICE

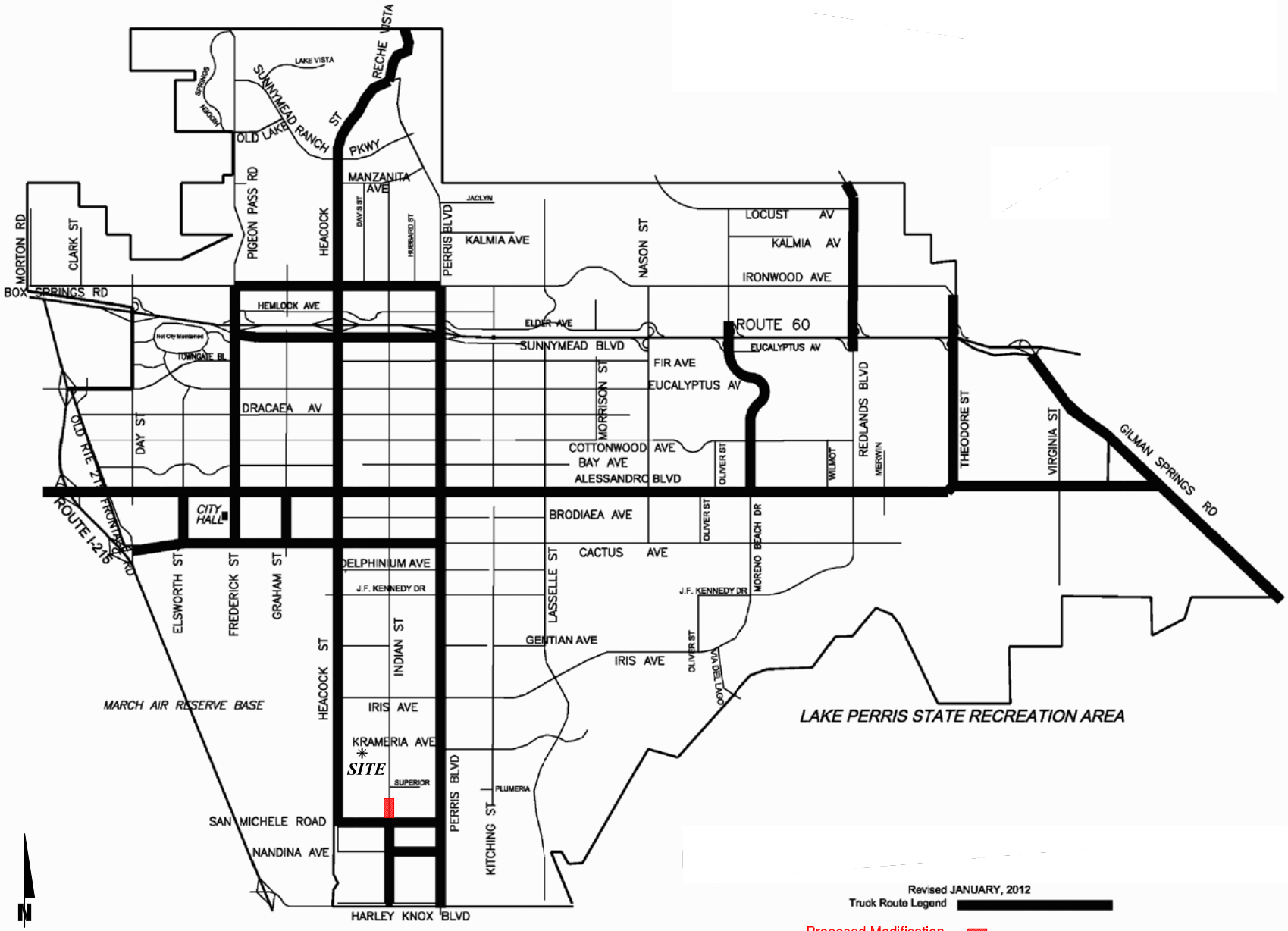
The study area is currently served by the Riverside Transit Authority (RTA), a public transit agency serving the unincorporated Riverside County region. As shown on Exhibit 3-10, there are currently 2 existing bus routes that serve the roadways within the study area in close proximity to the proposed Project. RTA Route 19 serves Perris Boulevard north of Iris Avenue, Iris Avenue east of Perris Boulevard, Perris Boulevard south of Krameria Avenue, and Krameria Avenue east of Perris Boulevard. RTA Route 20 runs along Indian Street between Iris Avenue and Krameria Avenue and along both Krameria Avenue and Iris Avenue east of Indian Street. However, RTA Route 20 only runs along this route when schools are in session.

Transit service is reviewed and updated by RTA periodically to address ridership, budget and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate. As such, it is recommended that the applicant work in conjunction with RTA to potentially provide bus service to the site.

3.5 BICYCLE & PEDESTRIAN FACILITIES

In an effort to promote alternative modes of transportation, the City of Moreno Valley also includes a trails and bikeway system. The City of Moreno Valley trails and bikeway system are shown on Exhibit 3-11 and Exhibit 3-12. There is a Class I bike path/multi-purpose trail planned near the vicinity of the proposed Project along the Perris Valley Storm Drain Channel. Class I bikeways are separated from the road. There are Class II bike lanes proposed along Heacock Street, Iris Street, Indian Street, and Krameria Avenue near the vicinity of the Project. Class II bike lanes are striped on the road. Indian Street is proposed to have Class III bike lanes south of the Perris Valley Storm Drain Channel. Class III bike lanes are bike lanes to be shared with vehicles, but are typically signed although not striped.

EXHIBIT 3-8: EXISTING TRUCK ROUTES



URBAN CROSSROADS

EXHIBIT 3-9: CITY OF PERRIS TRUCK ROUTES

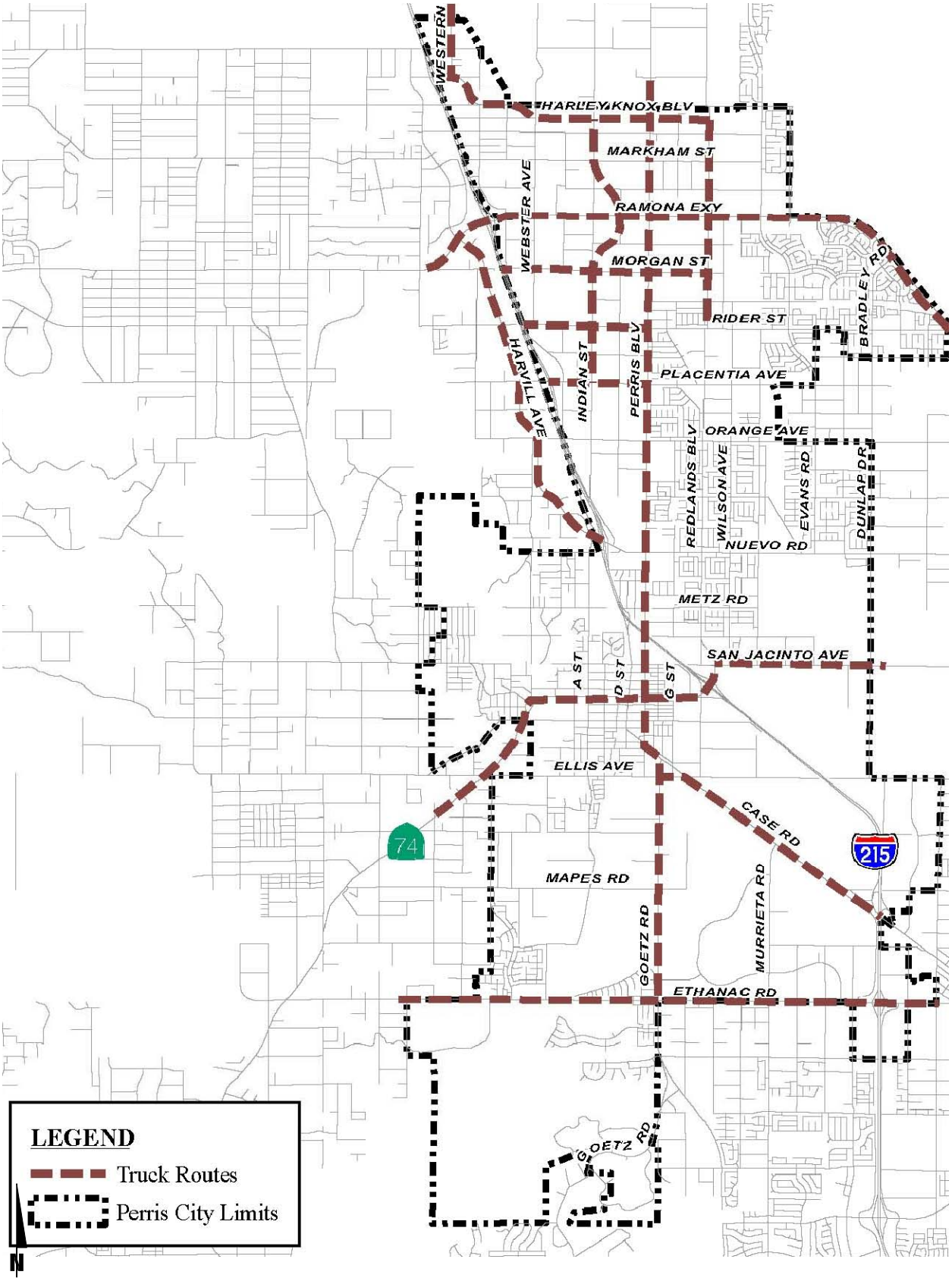


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EXHIBIT 3-10: EXISTING TRANSIT

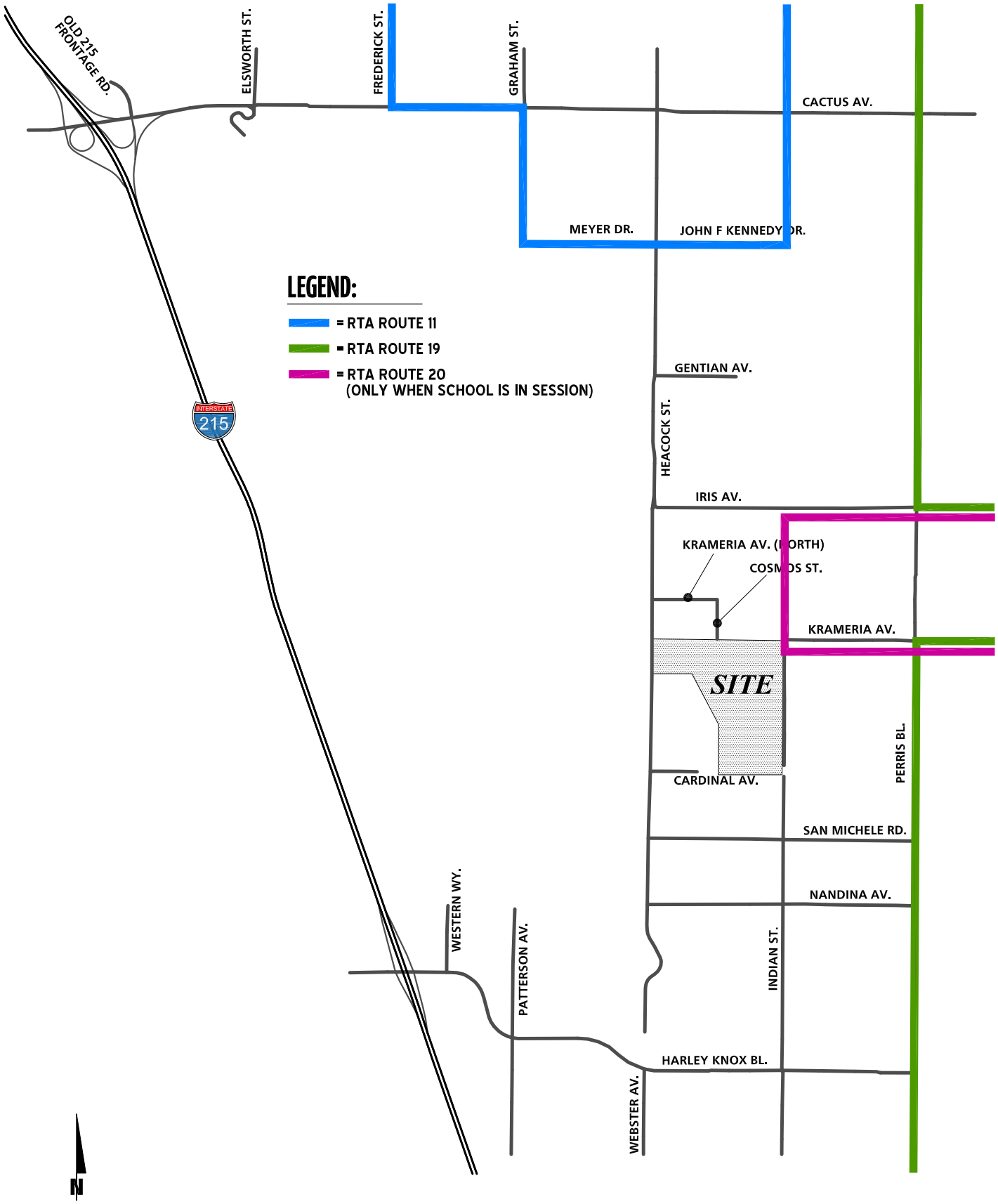


EXHIBIT 3-11: CITY OF MORENO VALLEY MASTER PLAN OF TRAILS

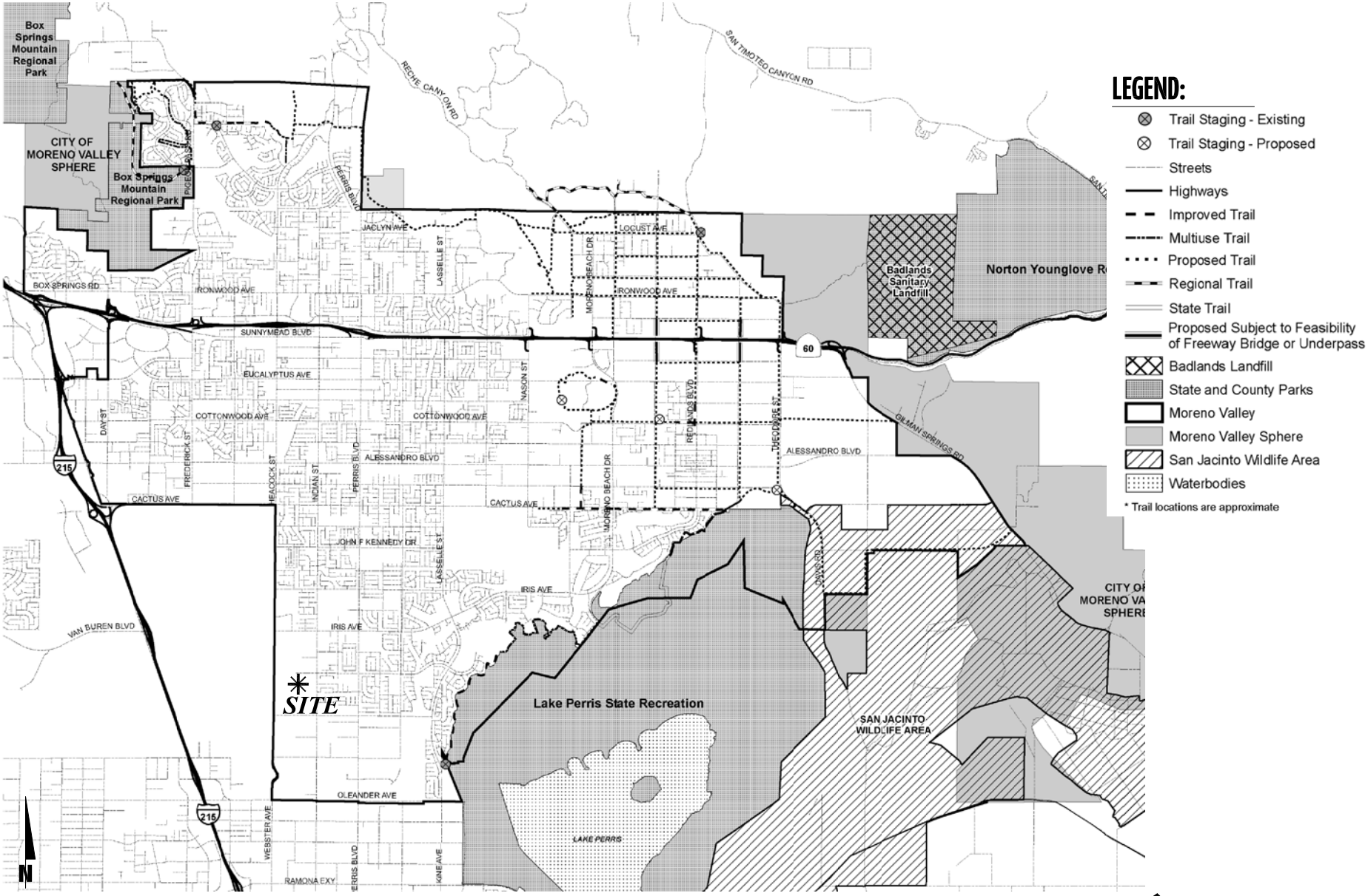
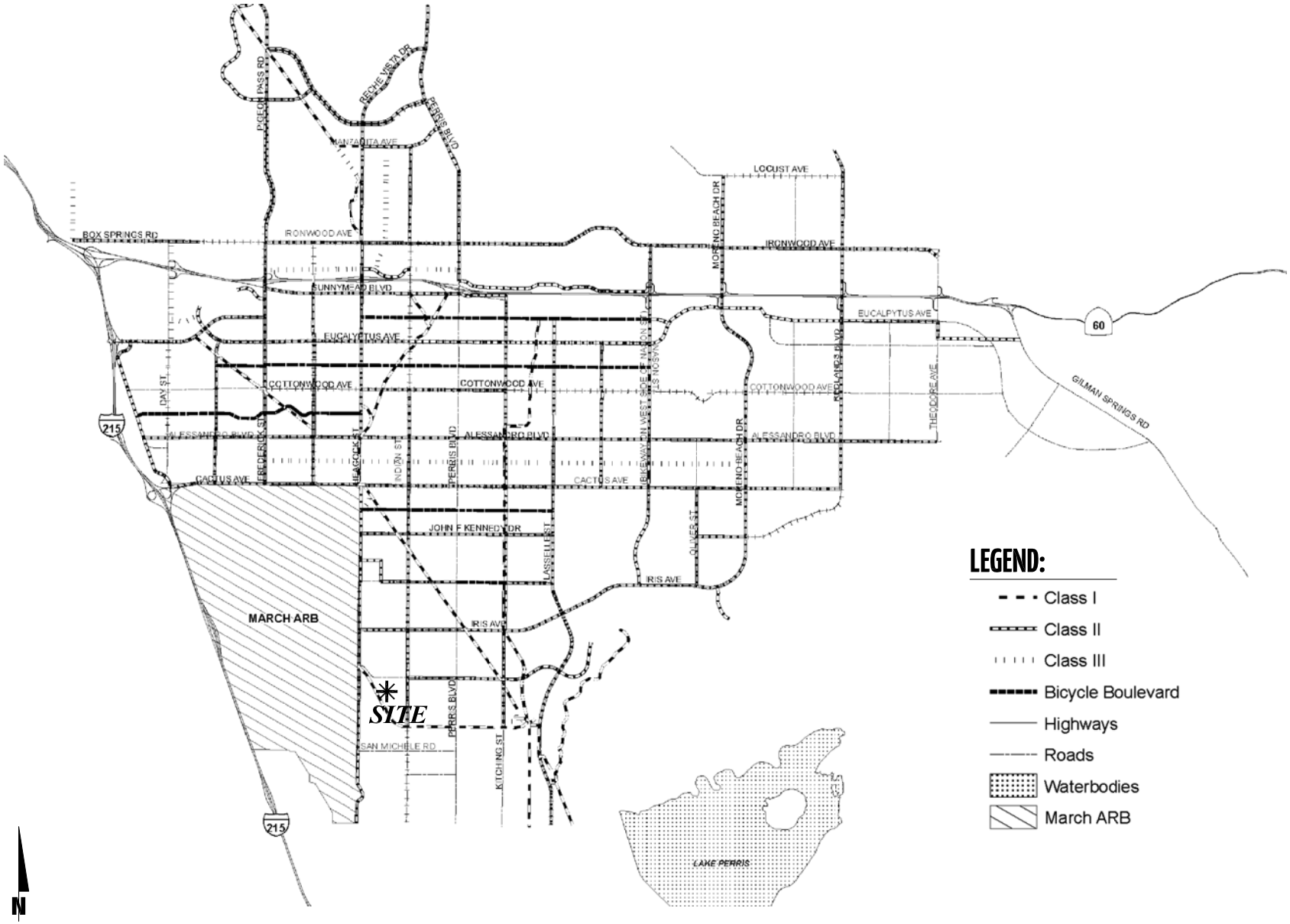


EXHIBIT 3-12: CITY OF MORENO VALLEY BIKE PLAN



Field observations conducted in April 2015 indicate nominal pedestrian and bicycle activity within the study area. Exhibit 3-13 illustrates the existing pedestrian facilities, including sidewalks and crosswalk locations.

3.6 EXISTING (2015) 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 2015. 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)

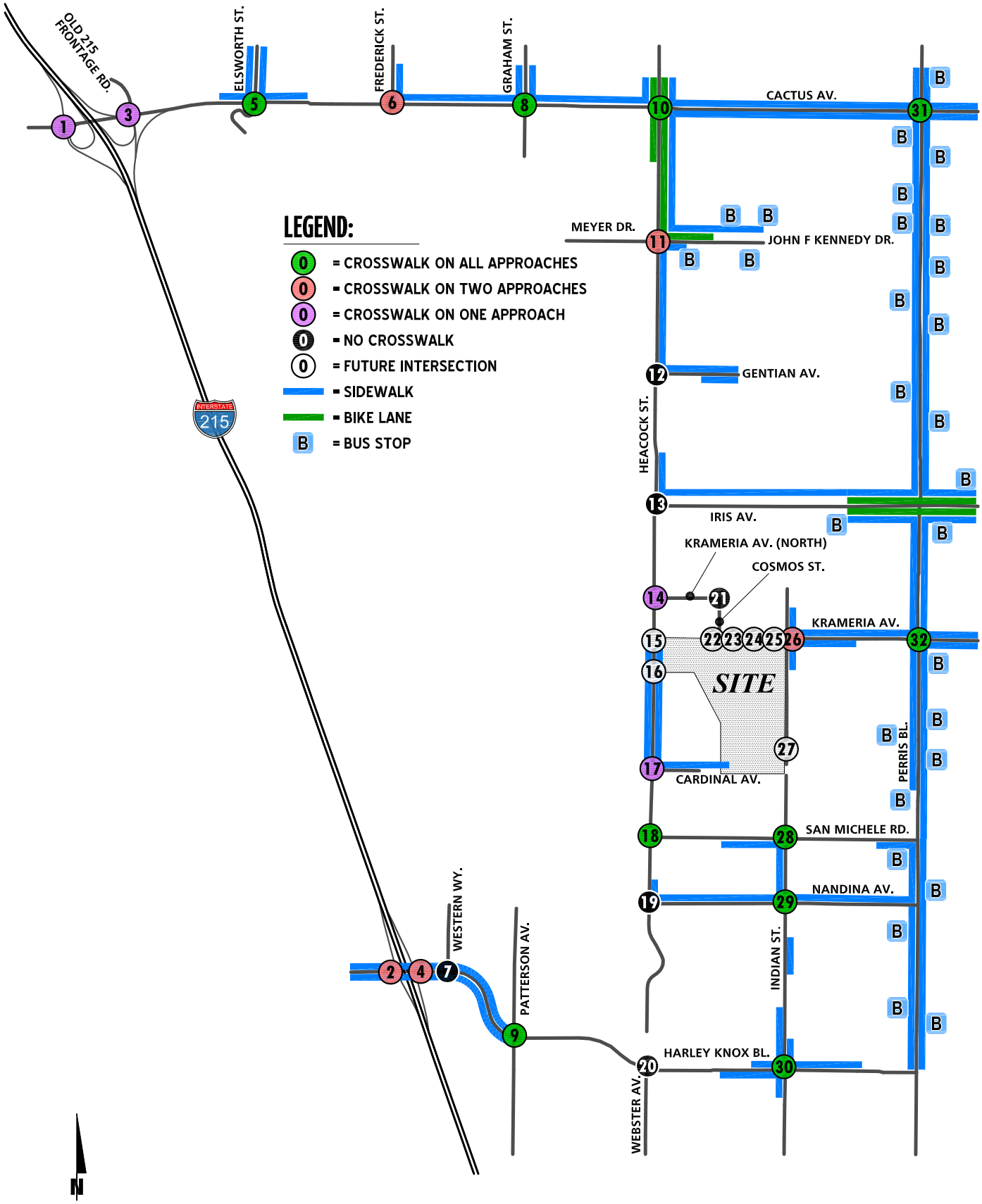
The weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The City of Perris is currently widening Harley Knox Boulevard from east of Western Way to Perris Boulevard. As such, older historical counts have been utilized for any intersections that were closed or operating under unusual circumstances. A growth factor of 2 percent per year has been applied to these intersections to represent 2015 traffic conditions. This methodology was reviewed and approved by City staff.

The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1. These raw turning volumes have been flow conserved between intersections with limited access, no access and where there are currently no uses generating traffic (e.g., between ramp-to-arterial intersections, etc.). The traffic counts collected in April 2015 include the vehicle classifications as shown below:

- Passenger Cars
- 2-Axle Trucks
- 3-Axle Trucks
- 4 or More Axle Trucks

To represent the impact large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCEs. 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 also 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 San Bernardino County CMP and are in excess of the factor recommended for use in the County of Riverside traffic study guidelines. (11) Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis.

EXHIBIT 3-13: EXISTING PEDESTRIAN FACILITIES



Existing weekday average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-14. Where actual 24-hour tube count data was not available, Existing ADT volumeswere based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 11.3847 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.78 percent. As such, the above equation utilizing a factor of 11.3847 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.78 percent (i.e., 1/0.0878 = 11.3847) 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 also shown on Exhibit 3-14.

3.7 INTERSECTION OPERATIONS ANALYSIS

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

ID	Intersection Location
12	Heacock Street / Gentian Avenue – LOS F PM peak hour only
13	Heacock Street / Iris Avenue – LOS E PM peak hour only

Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-15. The intersection operations analysis worksheets are included in Appendix 3.2 of this TIA.

3.8 EXISTING CONDITIONS ROADWAY SEGMENT CAPACITY ANALYSIS

The City of Moreno Valley General Plan Circulation Element 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 (2015) conditions roadway segment capacity analysis based on the City of Moreno Valley and City of Perris General Plan Circulation Element Roadway Segment Capacity/ (LOS) 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.

EXHIBIT 3-14 (1 OF 2): EXISTING (2015) TRAFFIC VOLUMES (IN PCE)

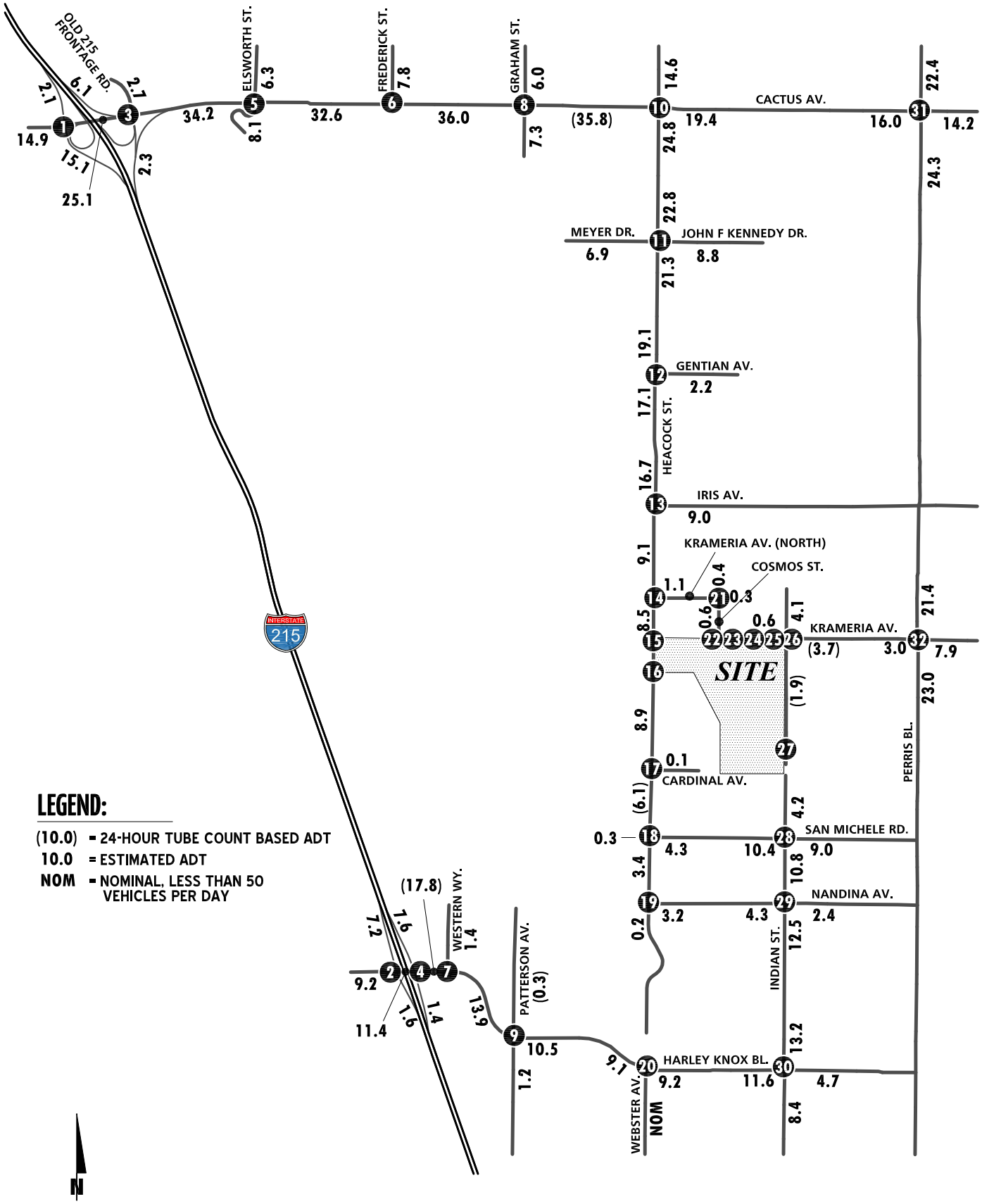


EXHIBIT 3-14 (2 OF 2): EXISTING (2015) TRAFFIC VOLUMES (IN PCE)

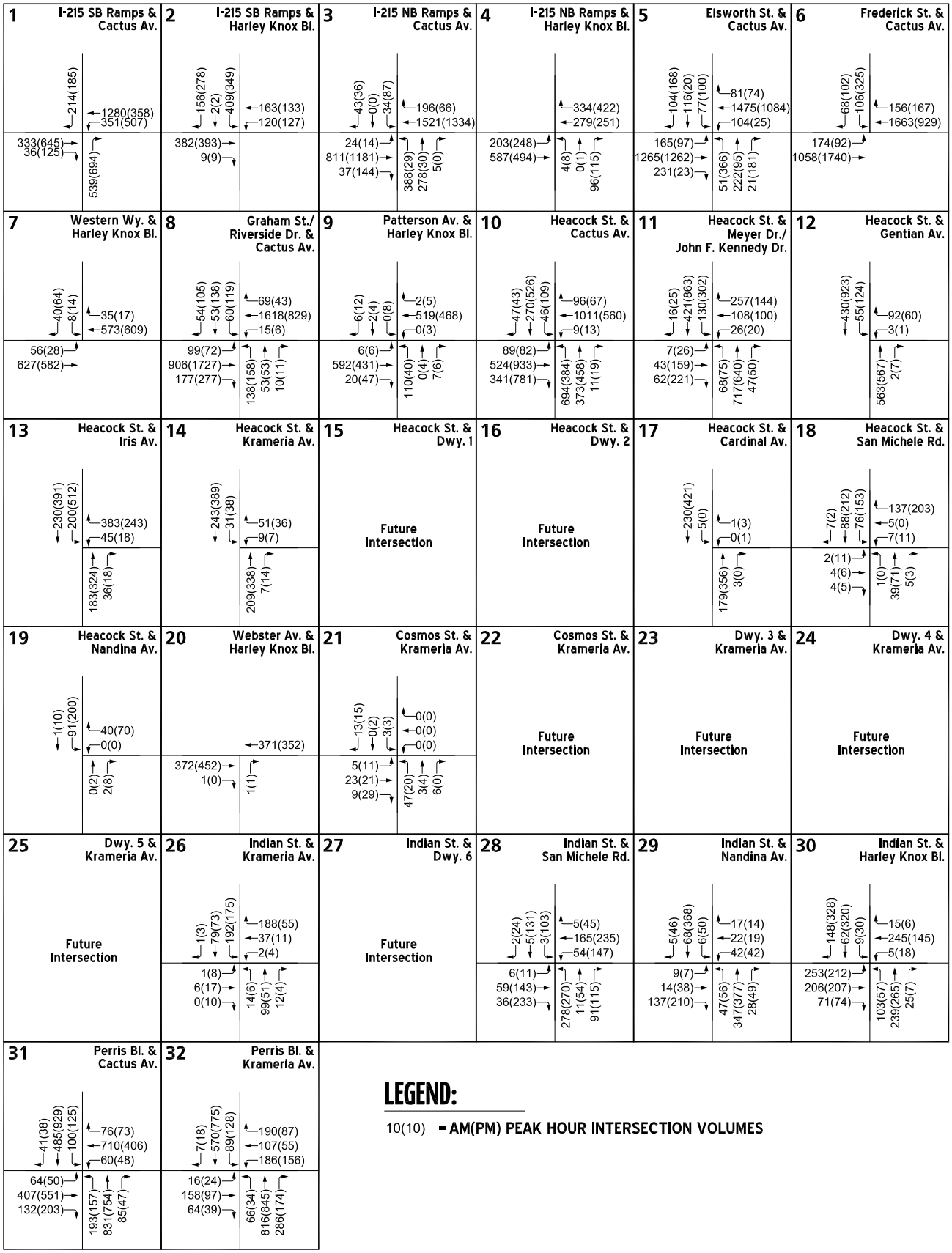


EXHIBIT 3-15: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR EXISTING (2015) CONDITIONS

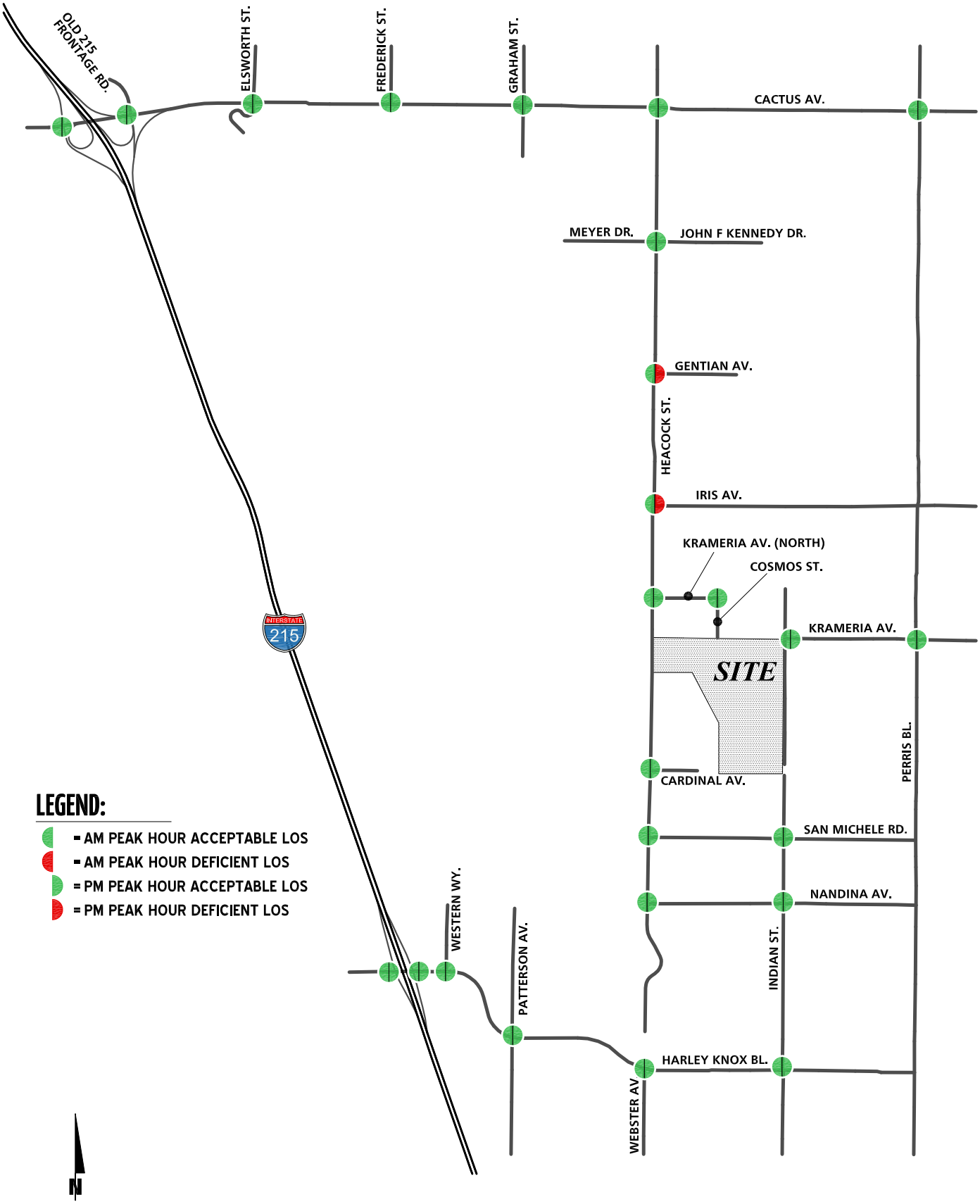


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Table 3-1

Intersection Analysis for Existing (2015) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av	TS	0	0	1>>	0	0	1	0	2	1	1	2	0	14.4	39.0	B	D
2	I-215 SB Ramps / Harley Knox Bl	TS	0	0	0	0	1	1	0	2	d	1	2	0	33.8	31.2	C	C
3	I-215 NB Ramps / Cactus Av	TS	1	1	0	1	1	0	1	2	0	0	2	0	19.1	13.7	B	B
4	I-215 NB Ramps / Harley Knox Bl	TS	0	1	1	0	0	0	1	2	0	0	2	d	13.6	17.0	B	B
5	Elsworth St / Cactus Av	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	38.9	30.2	D	C
6	Frederick St / Cactus Av	TS	0	0	0	2	0	1>	1	2	0	0	3	1>	24.9	21.9	C	C
7	Western Wy / Harley Knox Bl	CSS	0	0	0	0	1	0	0	2	0	0	2	d	12.0	12.1	B	B
8	Graham St / Cactus Av	TS	2	2	0	1	2	1>	1	2	1>>	1	3	0	21.3	24.5	C	C
9	Patterson Av / Harley Knox Bl	TS	0	1	0	0	1	d	1	1	1	1	1	0	27.6	26.3	C	C
10	Heacock St / Cactus Av	TS	2	2	0	1	2	0	1	2	1>	1	2	0	34.3	18.6	C	B
11	Heacock St / John F. Kennedy Dr	TS	1	2	d	1	2	d	1	1	1	1	2	0	23.3	21.8	C	C
12	Heacock St / Gentian Av	CSS	0	1	1	1	1	0	0	0	0	0	1	d	22.8	**58.0**	C	**F**
13	Heacock St / Iris Av	AWS	0	1	0	1	1	0	0	0	0	1	0	d	15.2	**37.5**	C	**E**
14	Heacock St / Krameria Av (North)	TS	0	1	1	1	1	0	0	0	0	1	0	1	11.1	9.0	B	A
15	Heacock St / Driveway 1		Future Intersection															
16	Heacock St / Driveway 2		Future Intersection															
17	Heacock St / Cardinal Av	CSS	0	2	d	1	1	0	0	0	0	1	0	1	9.0	13.4	A	B
18	Heacock St / San Michele Rd	TS	1	1	1	1	1	1	1	1	1	1	1	1	25.6	39.5	C	D
19	Heacock St / Nandina Av	CSS	0	1	0	1	1	0	0	0	0	1	0	1	8.4	8.6	A	A
20	Webster Av / Harley Knox Bl	CSS	0	0	1	0	0	0	0	1	0	0	1	0	10.0	10.1	B	B
21	Cosmos St / Krameria Av (North)	CSS	1	1	d	1	1	0	0	1	0	0	1	0	9.8	9.3	A	A
22	Cosmos St / Krameria Av		Future Intersection															
23	Driveway 3 / Krameria Av		Future Intersection															
24	Driveway 4 / Krameria Av		Future Intersection															
25	Driveway 5 / Krameria Av		Future Intersection															
26	Indian St / Krameria Av	AWS	1	1	1	1	1	1	1	1	0	1	1	1	10.7	9.2	B	A
27	Indian St / Driveway 6		Future Intersection															
28	Indian St / San Michele Rd	TS	2	1	1	1	2	0	1	1	1>	1	2	d	29.3	35.8	C	D
29	Indian St / Nandina Av	TS	1	2	0	1	2	0	1	1	1	1	1	d	18.4	19.9	B	B
30	Indian St / Harley Knox Bl	TS	2	2	1	1	2	0	1	1	1	2	2	0	17.0	24.2	B	C
31	Perris Bl / Cactus Av	TS	1	3	0	1	2	1	1	2	0	1	2	0	24.8	32.4	C	C
32	Perris Bl / Krameria Av	TS	1	3	0	1	3	0	0	1	1	0	2	1	31.2	22.9	C	C

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

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

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

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

[3] CSS = Cross-street Stop; TS = Traffic Signal; AWS= All ways stop

Table 3-2

Roadway Volume/Capacity Analysis for Existing (2015) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2015	V/C[2]	LOS[3]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	4D	37,500	25,080	0.67	B	D
2		East of I-215 NB Ramps	4D	37,500	31,154	0.83	D	D
3		West of Elsworth Street	6D	56,300	34,154	0.61	B	D
4		East of Elsworth Street	6D	56,300	31,029	0.55	A	D
5		West of Frederick Street	5D	46,900	32,583	0.69	B	D
6		East of Frederick Street	5D	46,900	35,981	0.77	C	D
7		West of Graham Street	5D	46,900	36,044	0.77	C	D
8		East of Graham Street	5D	46,900	31,120	0.66	B	D
9		West of Heacock Street	5D	46,900	35,778	0.76	C	D
10		East of Heacock Street	4D	37,500	19,360	0.52	A	C
11		West of Perris Boulevard	4D	37,500	15,973	0.43	A	C
12	Krameria Avenue	Heacock Street to Cosmos Street	2U	12,500	1,076	0.09	A	D
13		Cosmos Street to Driveway 3	2U	12,500	620	0.05	A	D
14		Driveway 3 to Driveway 4	2U	12,500	620	0.05	A	D
15		Driveway 4 to Driveway 5	2U	12,500	620	0.05	A	D
16		Driveway 5 to Indian Street	2D	18,750	620	0.03	A	D
17		East of Indian Street	2D	18,750	3,716	0.20	A	D
18		West of Perris Boulevard	2U	12,500	3,040	0.24	A	D
19	Cardinal Avenue	East of Heacock Street	2U	12,500	46	0.00	A	C
20	San Michele Road	East of Heacock Street	2D	18,750	4,269	0.23	A	D
21		West of Indian Street	2D	18,750	10,411	0.56	A	D
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	4D	35,900	11,390	0.32	A	D
23		I-215 NB Ramps to Western Way	4D	35,900	17,815	0.50	A	D
24		East of Western Way	4U	25,900	13,901	0.54	A	D
25		West of Patterson Avenue	4U	25,900	11,444	0.44	A	D
26		East of Patterson Avenue	2D	18,000	10,492	0.58	A	D
27		West of Webster Avenue	2D	18,000	9,144	0.51	A	D
28		East of Webster Avenue	2D	18,000	9,156	0.51	A	D
29		West of Indian Street	3D	26,925	11,624	0.43	A	D
30	Heacock Street	South of Cactus Avenue	4D	37,500	24,824	0.66	B	D
31		North of John F. Kennedy Drive	4D	37,500	22,764	0.61	B	D
32		South of John F. Kennedy Drive	4D	37,500	21,272	0.57	A	D
33		North of Gentian Avenue	3D	28,150	19,047	0.68	B	D
34		South of Gentian Avenue	2U	12,500	**17,054**	**1.36**	**F**	D
35		North of Iris Avenue	2D	18,750	16,730	0.89	D	D
36		Iris Avenue to Krameria Avenue (N)	2U	12,500	9,113	0.73	C	D
37		Krameria Avenue (N) to Driveway 1	2U	12,500	8,516	0.68	B	D
38		Driveway 1 to Driveway 2	2U	12,500	8,516	0.68	B	D
39		Driveway 2 to Cardinal Avenue	4D	37,500	8,874	0.24	A	D
40		Cardinal Avenue to San Michele Road	3D	28,150	7,400	0.26	A	D
41		San Michele Road to Nandina Avenue	2D	18,750	3,427	0.18	A	D
42		South of Nandina Avenue	2U	12,500	228	0.02	A	D
43		North of Harley Knox Boulevard	2U	13,000	0	0.00	A	D

Table 3-2

Roadway Volume/Capacity Analysis for Existing (2015) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2015	V/C[2]	LOS[3]	Acceptable LOS
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	2U	12,500	620	0.05	A	D
45	Indian Street	Driveway 6 to San Michele Road	4D	37,500	0	0.00	A	D
46		San Michele Road to Nandina Avenue	4D	37,500	10,793	0.29	A	D
47		South of Nandina Avenue	2D	18,750	12,523	0.67	B	D
48		North of Harley Knox Boulevard	4D	35,900	13,201	0.37	A	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 Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

As shown below, the following roadway segment is currently operating at an unacceptable LOS based on daily roadway segment capacities:

ID	Street	Segment
34	Heacock Street	South of Gentian Avenue – LOS F

3.9 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway Cactus Avenue and Harley Knox Boulevard interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 3-3. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-3, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.3.

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:

ID	Intersection Location	Jurisdiction	CMP?
7	Western Way / Harley Knox Boulevard	Perris	No
12	Heacock Street / Gentian Avenue	Moreno Valley, March JPA	No
13	Heacock Street / Iris Avenue	Moreno Valley, March JPA	No

Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.4.

3.11 BASIC FREEWAY SEGMENT ANALYSIS

Existing mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 3-16. As shown on Table 3-4, the basic freeway segments evaluated for the purposes of this TIA were found to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours. Existing basic freeway segment analysis worksheets are provided in Appendix 3.5.

3.12 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing conditions and the results of this analysis are presented in Table 3-5. As shown in Table 3-5, the freeway ramp merge and diverge areas currently operate at acceptable LOS (i.e., LOS D or better). Existing freeway ramp junction operations analysis worksheets are provided in Appendix 3.6.

Table 3-3

Peak Hour Off-Ramp Queuing Analysis for Existing (2015) Conditions

Intersection	Movement	Stacking Distance (Feet)	95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.						
	NBR	1,850	51	285 [2]	Yes	Yes
	SBR	1,115	87	0	Yes	Yes
I-215 SB Ramps / Harley Knox Bl.						
	SBL/T	1,330	382	336	Yes	Yes
	SBR	270	44	59	Yes	Yes
I-215 NB Ramps / Cactus Av.						
	NBL	145	321 [2]	26	Yes[3]	Yes
	NBT	1,650	164	26	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.						
	NBL/T	1,120	13	22	Yes	Yes
	NBR	265	47	51	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound left turn lane without spilling back and affecting the I-215 Freeway mainline.

Table 3-4

Basic Freeway Segment Analysis for Existing (2015) Conditions

Freeway	Direction	Mainline Segment	Lanes[1]	Volume		Truck %	Truck %	Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	4,985	5,540	5%	5%	19.9	22.5	C	C
		South of Cactus Avenue	4	4,693	5,354	4%	4%	18.6	21.5	C	C
		North of Harley Knox Boulevard	3	2,544	3,855	4%	4%	13.4	20.5	B	C
		South of Harley Knox Boulevard	3	2,186	3,445	2%	3%	11.4	18.1	B	C
	NB	North of Cactus Avenue	4	2,724	2,523	7%	5%	10.9	10.0	A	A
		South of Cactus Avenue	4	3,679	2,678	5%	4%	14.6	10.6	B	A
		North of Harley Knox Boulevard	3	4,092	3,247	4%	4%	22.0	17.1	C	B
		South of Harley Knox Boulevard	3	3,721	2,779	3%	3%	19.6	14.6	C	B

* **BOLD** = Unacceptable Level of Service

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

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

Table 3-5

Freeway Ramp Junction Merge/Diverge Analysis for Existing (2015) Conditions

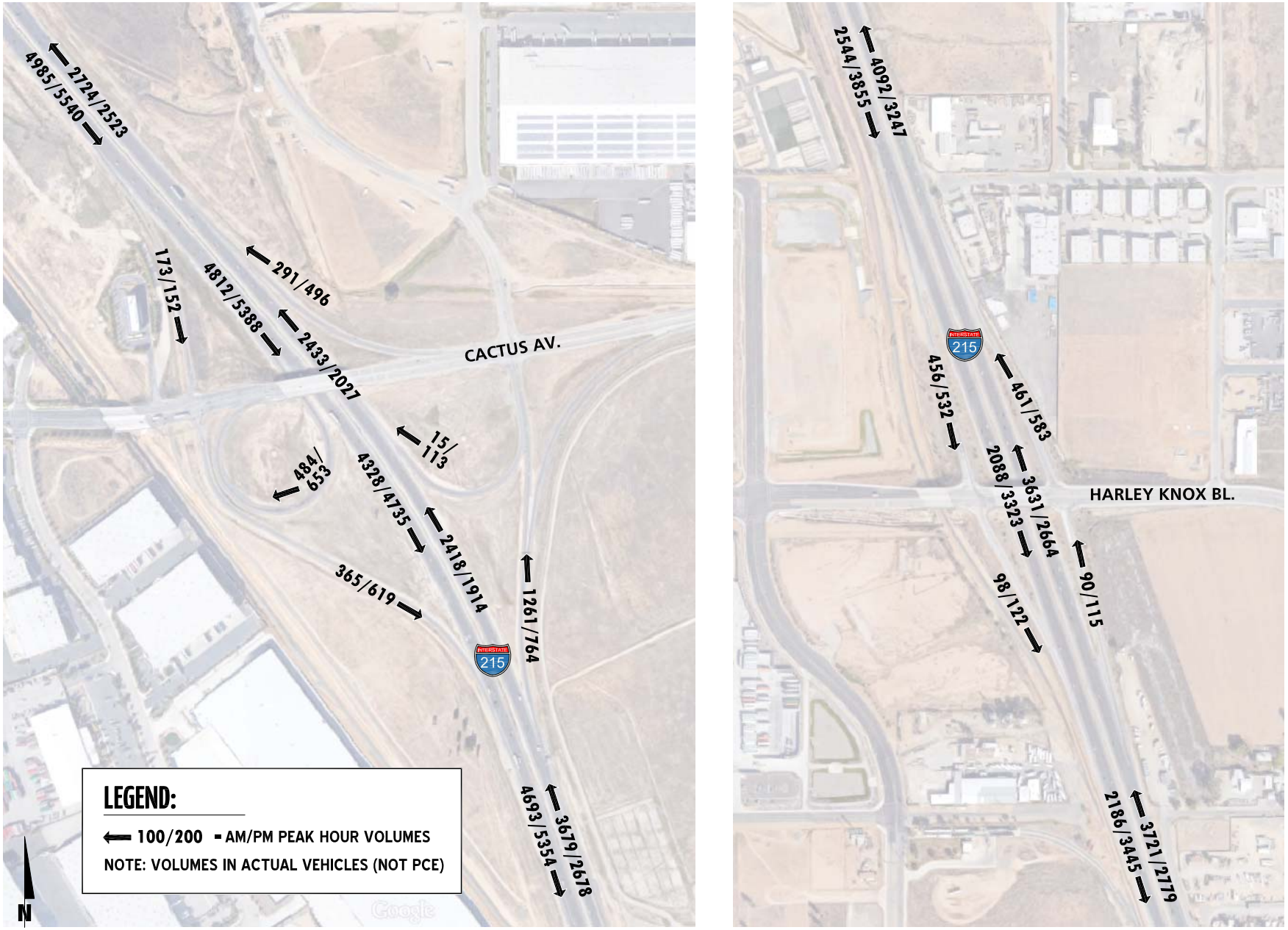
Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS	Density[2]	LOS
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	26.9	C	30.2	D
		Loop Off-Ramp at Cactus Avenue - Downstream	4	26.9	C	30.2	D
		Off-Ramp at Harley Knox Boulevard	3	20.2	C	27.5	C
		On-Ramp at Harley Knox Boulevard	3	15.1	B	21.6	C
	NB	On-Ramp at Cactus Avenue	3	20.2	C	19.8	B
		On-Ramp at Harley Knox Boulevard	3	25.8	C	21.9	C
		Off-Ramp at Harley Knox Boulevard	3	25.1	C	20.0	B

* **BOLD** = Unacceptable Level of Service

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

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

EXHIBIT 3-16: EXISTING (2015) FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

3.13 RECOMMENDED IMPROVEMENTS

3.13.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient 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). The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative traffic deficiencies is presented in Table 3-6.

Worksheets for Existing (2015) conditions, with improvements, HCM calculation worksheets are provided in Appendix 3.7.

3.13.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

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

As shown on Table 3-6, the Existing (2015) peak hour analysis indicates that the adjacent study area intersections on either side of the deficient roadway segment of Heacock Street between Gentian Avenue and Iris Avenue are anticipated to operate at acceptable LOS with the recommended intersection improvements. As such, roadway segment widening does not appear necessary to address the deficiencies at the identified roadway segment.

3.13.3 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

As shown previously on Table 3-3, there are no peak hour queuing issues at the I-215 Freeway at Cactus Avenue or Harley Knox Boulevard interchanges. As such, no improvements have been recommended.

3.13.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Table 3-4 and Table 3-5, there are no deficient freeway mainline segments or merge/diverge ramp junctions. As such, no improvements have been recommended.

Table 3-6

Intersection Analysis for Existing (2015) 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
12	Heacock St / Gentian Av																	
	- Without Improvements	CSS	0	1	1	1	1	0	0	0	0	0	1	d	22.8	**58.0**	C	**F**
	- With Improvements	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	12.4	14.7	B	B
13	Heacock St / Iris Av																	
	- Without Improvements	AWS	0	1	0	1	1	0	0	0	0	1	0	d	15.2	**37.5**	C	**E**
	- With Improvements	**TS**	0	1	0	1	1	0	0	0	0	1	0	d	26.7	38.5	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 rig 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 o 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

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of 1,351,770 square feet (sf) of high-cube warehouse use/distribution center within a single building (Building 1) and 385,748 square feet of general light industrial use. Building 2 located on the southwest corner of Cosmos Street and Krameria Avenue is proposed to consist of 122,516 sf of general light industrial use, Building 3 located at the eastern terminus of Cardinal Avenue is proposed to consist of 97,222 sf of general light industrial use, and Building 4 located on the east of Heacock Street and south of Krameria Avenue (North) is proposed to consist of 166,010 sf of general light industrial use. Per the City's traffic study guidelines, the Opening Year will have a 5 year minimum horizon. As such, the Opening Year analysis will assess 2020 traffic conditions.

The Project is proposed to have access on Heacock Street via Driveways 1 and 2, Cardinal Avenue, Krameria Avenue via a future southern extension of Cosmos Street and Driveways 3 through 5, and Indian Street via Driveway 6. All Project access points are assumed to allow full-access. Driveways 2, 3, and 5 are proposed to allow for truck access, while passenger cars would access all proposed driveways. Regional access to the project site is provided via the I-215 Freeway at Cactus Avenue and Harley Knox Boulevard interchanges.

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. The ITE Trip Generation manual is a nationally recognized source for estimating site specific trip generation. ITE's most current version of the Trip Generation manual is based on more than 4,800 trip generation studies submitted to ITE by public agencies, consulting firms, universities/colleges, developers, associations and local sections/districts/student chapters of ITE. (3)

4.1.1 HIGH-CUBE WAREHOUSE/DISTRIBUTION CENTER LAND USE

High-cube warehouse/distribution centers (ITE Land Use Code 152) are a unique land use type within the larger, more generalized industrial land use category. ITE's most recent edition of the *Trip Generation* manual (ITE 9th Edition), published in 2012, defines "high-cube warehouses" as *"…used for storage of materials, goods and merchandise prior to their distribution to retail outlets, distribution centers or other warehouses. These facilities are typically characterized by ceiling heights of at least 24 feet with small employment counts due to a high level of mechanization."* The average square footage for the sites surveyed for high-cube warehouse/distribution center (Land Use 152) use is above 500,000 square feet. The number of sites observed in the compilation of this data ranges from 57-70 sites of which more than 20 sites exceed 1,000,000 square feet in gross floor area. The weighted average daily trip

generation rate for high-cube warehouse (Land Use 152) use is 1.68 trips per thousand square feet (TSF).

The ITE *Trip Generation* manual includes data regarding the types of vehicles that are generated (passenger cars and trucks), but provides no guidance on vehicle mix (different sizes of trucks). While trucks, as a percentage of total traffic, has been based on the ITE *Trip Generation* manual, data regarding the vehicle mix has been obtained from a separate report; the South Coast Air Quality Management District's (SCAQMD) recent Warehouse Truck Trip Study. (12) (13) The SCAQMD is currently recommending the use of the ITE Trip Generation manual in conjunction with 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 prepared for the Project.

As noted on Table 4-1, refinements to the raw trip generation estimates have been made to provide a more detailed breakdown of trips between passenger cars and trucks. The percentage of trucks has been determined from the table shown on page 267 of the ITE *Trip Generation* manual. As shown on page 267, the truck trip generation rate for weekday daily traffic is 0.64 or 38.1% of the total traffic. Similarly, the truck trip generation rate for the weekday AM peak hour is 0.03 (27.3% of the total traffic) and 0.04 (or 33.3% of the total traffic) for the weekday PM peak hour.

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: 22.0% of the total trucks as 2-axle trucks, 17.7% of the total trucks as 3-axle trucks, and 60.3% of the total trucks as 4+-axle trucks. Lastly, PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles).

4.1.2 GENERAL LIGHT INDUSTRIAL LAND USE

General light industrial (ITE Land Use Code 110) has been used to derive site specific trip generation estimates for Buildings 2 through 4. ITE's most recent edition of the *Trip Generation* manual (ITE 9th Edition), published in 2012, defines "light industrial facilities" as "*…free-standing facilities devoted to a single use. The facilities have an emphasis on activities other than manufacturing and typically have minimal office space. Typical light industrial activities include printing, material testing, and assembly of data processing equipment.*" The average square footage for the sites surveyed for general light industrial (Land Use 110) use is above 200,000 square feet. The number of sites observed in the compilation of this data ranges from 18-29 sites of which the majority are less than 500,000 square feet in gross floor area. The weighted average daily trip generation rate for general light industrial (Land Use 110) use is 6.97 trips per thousand square feet (TSF).

Table 4-1

Project Trip Generation Rates (in PCE)

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
General Light Industrial[3]	TSF	110	0.810	0.110	0.920	0.120	0.850	0.970	6.970
Passenger Cars			0.637	0.086	0.723	0.094	0.668	0.762	5.478
2-Axle Trucks (PCE = 1.5)			0.097	0.013	0.110	0.014	0.102	0.116	0.836
3-Axle Trucks (PCE = 2.0)			0.063	0.009	0.072	0.009	0.066	0.076	0.544
4-Axle+ Trucks (PCE = 3.0)			0.231	0.031	0.262	0.034	0.242	0.276	1.986
High-Cube Warehouse/Distribution Center[4]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks (PCE = 1.5)			0.007	0.003	0.010	0.004	0.009	0.013	0.211
3-Axle Trucks (PCE = 2.0)			0.007	0.003	0.011	0.004	0.010	0.014	0.226
4-Axle+ Trucks (PCE = 3.0)			0.037	0.017	0.054	0.022	0.050	0.072	1.158

Project Trip Generation Rates (in Actual Vehicles)

Land Use[1]	Units[3]	ITE LU Code	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
General Light Industrial[3]	TSF	110	0.810	0.110	0.920	0.120	0.850	0.970	6.970
Passenger Cars			0.637	0.086	0.723	0.094	0.668	0.762	5.478
2-Axle Trucks (PCE = 1.5)			0.065	0.009	0.074	0.010	0.068	0.078	0.558
3-Axle Trucks (PCE = 2.0)			0.032	0.004	0.036	0.005	0.033	0.038	0.272
4-Axle+ Trucks (PCE = 3.0)			0.077	0.010	0.087	0.011	0.081	0.092	0.662
High-Cube Warehouse/Distribution Center[4]	TSF	152	0.076	0.034	0.110	0.037	0.083	0.120	1.680
Passenger Cars			0.055	0.025	0.080	0.025	0.055	0.080	1.040
2-Axle Trucks (PCE = 1.5)			0.005	0.002	0.007	0.003	0.006	0.009	0.141
3-Axle Trucks (PCE = 2.0)			0.004	0.002	0.005	0.002	0.005	0.007	0.113
4-Axle+ Trucks (PCE = 3.0)			0.012	0.006	0.018	0.007	0.017	0.024	0.386

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

[2] TSF = thousand square feet

[3] Light Industrial Vehicle Mix Source: City of Fontana Truck Trip Generation Study for LU 150, August 2003. PCE rates are per SANBAG.

[4] High Cube Warehouse Vehicle Mix Source: Total truck percentage source from ITE Trip Generation manual.

Truck mix (by axle type) source from SCAQMD. PCE rates are per SANBAG.

AM peak hour = 72.7% passenger cars, 6.01% 2-Axle trucks, 4.83% 3-Axle trucks, 16.46% 4-Axle trucks

PM peak hour = 66.7% passenger cars, 7.33% 2-Axle trucks, 5.89% 3-Axle trucks, 20.08% 4-Axle trucks

ADT = 61.9% passenger cars, 8.38% 2-Axle trucks, 6.74% 3-Axle trucks, 22.98% 4-Axle trucks

The ITE *Trip Generation* manual includes very limited data regarding the types of vehicles that are generated for general light industrial 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 general light industrial uses proposed as part of the Project. (14) Buildings 2 through 4 have been identified as light industrial. The "Light Industrial" vehicle mix data has been utilized for all 3 buildings.

Trip generation rates used to estimate Project traffic are shown in Table 4-1 in both PCE and actual vehicles. 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 comparative purposes). For purposes of this analysis, ITE land use code 152 (High-Cube Warehousing) and land use code 110 (General Light Industrial) have been used to derive site specific trip generation estimates. In order to accurately reflect the impact that heavy trucks would have on the street system, Project trips have been further broken down between passenger cars and trucks for each of the peak hours and weekday daily trip generation

As directed by the City of Moreno Valley and consistent with standard traffic engineering practice in Southern California, PCE factors have been utilized due to the expected heavy truck component for the proposed Project uses. 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. These PCE factors are consistent with the values recommended by the San Bernardino County CMP and are accepted factors in the City of Moreno Valley. (11) Although the County of Riverside has a recommended PCE factor of 2.0, the San Bernardino County CMP PCE factors have been utilized in an effort to conduct a more conservative analysis.

As shown on Table 4-2, the proposed Project is anticipated to generate a net total of 6,975 PCE trip-ends per day with 660 net PCE AM peak hour trips and 718 net PCE PM peak hour trips.

4.2 PROJECT TRIP DISTRIBUTION

Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered, to identify the route where the Project traffic would distribute.

The Project trip distribution was developed based on anticipated travel patterns to and from the Project site for both passenger cars and truck traffic. The truck trip distribution patterns have been developed based on the anticipated travel patterns for the high-cube warehousing and light industrial trucks. The Project trip distribution patterns for both passenger cars and trucks were developed based on an understanding of existing travel patterns in the area, the geographical location of the site, and the site's proximity to the regional arterial and state highway system.

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	
Building 1 (High-Cube Warehouse)	1,351.770	TSF							
Passenger Cars:			75	34	108	34	75	108	1,406
Truck Trips:									
2-axle:			*9*	*4*	*13*	*6*	*12*	*18*	*285*
3-axle:			*10*	*4*	*14*	*6*	*13*	*19*	*306*
4+-axle:			*51*	*23*	*73*	*30*	*67*	*98*	*1,566*
- Net Truck Trips (PCE) [2]			*70*	*31*	*101*	*42*	*93*	*135*	*2,157*
BUILDING 1 TOTAL NET TRIPS (PCE) [3]			***144***	***65***	***209***	***75***	***168***	***243***	***3,563***
Building 2 (Light Industrial)	122.516	TSF							
Passenger Cars:			78	11	89	12	82	93	671
Truck Trips:									
2-axle:			*12*	*2*	*14*	*2*	*12*	*14*	*102*
3-axle:			*8*	*1*	*9*	*1*	*8*	*9*	*67*
4+-axle:			*28*	*4*	*32*	*4*	*30*	*34*	*243*
- Net Truck Trips (PCE) [2]			*48*	*7*	*54*	*7*	*50*	*57*	*412*
BUILDING 2 TOTAL NET TRIPS (PCE) [3]			***126***	***17***	***143***	***19***	***132***	***151***	***1,084***
Building 3 (Light Industrial)	97.222	TSF							
Passenger Cars:			62	8	70	9	65	74	533
Truck Trips:									
2-axle:			*9*	*1*	*11*	*1*	*10*	*11*	*81*
3-axle:			*6*	*1*	*7*	*1*	*6*	*7*	*53*
4+-axle:			*22*	*3*	*25*	*3*	*24*	*27*	*193*
- Net Truck Trips (PCE) [2]			*38*	*5*	*43*	*6*	*40*	*46*	*327*
BUILDING 3 TOTAL NET TRIPS (PCE) [3]			***100***	***14***	***114***	***15***	***105***	***120***	***860***
Building 4 (Light Industrial)	166.010	TSF							
Passenger Cars:			106	14	120	16	111	127	909
Truck Trips:									
2-axle:			*16*	*2*	*18*	*2*	*17*	*19*	*139*
3-axle:			*10*	*1*	*12*	*2*	*11*	*13*	*90*
4+-axle:			*38*	*5*	*44*	*6*	*40*	*46*	*330*
- Net Truck Trips (PCE) [2]			*65*	*9*	*74*	*10*	*68*	*78*	*559*
BUILDING 4 TOTAL NET TRIPS (PCE) [3]			***171***	***23***	***194***	***25***	***179***	***204***	***1,468***
TOTAL (PCE)			**541**	**119**	**660**	**134**	**584**	**718**	**6,975**

[1] TSF = thousand square feet

[2] Light Industrial Vehicle Mix Source: City of Fontana Truck Trip Generation Study for LU 110, August 2003. PCE rates are per SANBAG.
High Cube Warehouse Vehicle Mix Source: Total truck percentage source from ITE Trip Generation manual.
Truck mix (by axle type) source from SCAQMD.

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

Table 4-3

Project Trip Generation Summary (Without PCE)[4]

Land Use	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Building 1 (High-Cube Warehouse)	1,351.770	TSF							
Passenger Cars:			75	34	108	34	75	108	1,406
Truck Trips:									
2-axle:			*6*	*3*	*9*	*4*	*8*	*12*	*190*
3-axle:			*5*	*2*	*7*	*3*	*7*	*10*	*153*
4+-axle:			*17*	*8*	*24*	*10*	*22*	*33*	*522*
- Net Truck Trips (Actual Vehicles)[2]			*28*	*13*	*41*	*17*	*37*	*54*	*865*
BUILDING 1 TOTAL NET TRIPS (Actual Vehicles)[3]			***103***	***46***	***149***	***50***	***112***	***162***	***2,271***
Building 2 (Light Industrial)	122.516	TSF							
Passenger Cars:			78	11	89	12	82	93	671
Truck Trips:									
2-axle:			*8*	*1*	*9*	*1*	*8*	*10*	*68*
3-axle:			*4*	*1*	*4*	*1*	*4*	*5*	*33*
4+-axle:			*9*	*1*	*11*	*1*	*10*	*11*	*81*
- Net Truck Trips (Actual Vehicles)[2]			*21*	*3*	*24*	*3*	*22*	*25*	*183*
BUILDING 2 TOTAL NET TRIPS (Actual Vehicles)[3]			***99***	***13***	***113***	***15***	***104***	***119***	***854***
Building 3 (Light Industrial)	97.222	TSF							
Passenger Cars:			62	8	70	9	65	74	533
Truck Trips:									
2-axle:			*6*	*1*	*7*	*1*	*7*	*8*	*54*
3-axle:			*3*	*0*	*3*	*0*	*3*	*4*	*26*
4+-axle:			*7*	*1*	*8*	*1*	*8*	*9*	*64*
- Net Truck Trips (Actual Vehicles)[2]			*17*	*2*	*19*	*2*	*18*	*20*	*145*
BUILDING 3 TOTAL NET TRIPS (Actual Vehicles)[3]			***79***	***11***	***89***	***12***	***83***	***94***	***678***
Building 4 (Light Industrial)	166.010	TSF							
Passenger Cars:			106	14	120	16	111	127	909
Truck Trips:									
2-axle:			*11*	*1*	*12*	*2*	*11*	*13*	*93*
3-axle:			*5*	*1*	*6*	*1*	*6*	*6*	*45*
4+-axle:			*13*	*2*	*15*	*2*	*13*	*15*	*110*
- Net Truck Trips (Actual Vehicles)[2]			*29*	*4*	*33*	*4*	*30*	*34*	*248*
BUILDING 4 TOTAL NET TRIPS (Actual Vehicles)[3]			***134***	***18***	***153***	***20***	***141***	***161***	***1,157***
TOTAL (Actual Vehicles)			**415**	**89**	**504**	**97**	**440**	**536**	**4,960**

[1] TSF = thousand square feet

[2] Vehicle Mix Source: City of Fontana Truck Trip Generation Study for LU 110, August 2003. PCE rates are per SANBAG.

Vehicle Mix Source: Total truck percentage source from ITE Trip Generation manual. Truck mix (by axle type) source from SCAQMD.

[3] TOTAL NET TRIPS (Actual Vehicles) = Passenger Cars + Net Truck Trips (Actual Vehicles).

[4] The trip generation in this table has been provided for informational purposes only. The trip generation shown in Table 4-2 has been utilized for the purposes of this analysis.

The passenger car and truck trip distributions utilized for the purposes of this analysis are shown on the following exhibits:

- **Exhibit 4-1:** Project (Without Indian Street Bridge) Passenger Car Trip Distribution (to be utilized for E+P Without Indian Street Bridge and Opening Year Cumulative traffic conditions). This trip distribution pattern assumes the currently existing roadway network.
- **Exhibit 4-2:** Project (Without Indian Street Bridge) Truck Trip Distribution (to be utilized for E+P Without Indian Street Bridge and Opening Year Cumulative traffic conditions). This trip distribution pattern assumes the currently existing roadway network.
- **Exhibit 4-3:** Project (With Indian Street Bridge) Passenger Car Trip Distribution (to be utilized for E+P With Indian Street). This trip distribution pattern assumes the Indian Street Bridge over the Perris Valley Storm Drain Channel.
- **Exhibit 4-4:** Project (With Indian Street Bridge) Truck Trip Distribution (to be utilized for E+P With Indian Street). This trip distribution pattern assumes the Indian Street Bridge over the Perris Valley Storm Drain Channel. As shown on Exhibit 4-4, the distribution of trucks with the proposed extension of Indian Street would require the City's truck routes to be extended to the north from its current terminus on Indian Street to Driveway 6.
- **Exhibit 4-5:** General Plan Buildout Project (Passenger Car) Trip Distribution (to be utilized for General Plan Buildout traffic conditions). This distribution pattern assumes both the Indian Street Bridge over the Perris Valley Storm Drain Channel and the Heacock Street extension at Harley Knox Boulevard are both in place.
- **Exhibit 4-6:** General Plan Buildout Project (Truck) Trip Distribution (to be utilized for General Plan Buildout traffic conditions). This distribution pattern assumes both the Indian Street Bridge over the Perris Valley Storm Drain Channel and the Heacock Street extension at Harley Knox Boulevard are both in place. As shown on Exhibit 4-6, the distribution of trucks with the proposed extension of Indian Street would require the City's truck routes to be extended to the north from its current terminus on Indian Street to Driveway 6.

4.3 MODAL SPLIT

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

4.4 PROJECT TRIP ASSIGNMENT

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

- Exhibit 4-7: Project Only (Without Indian Street Bridge) Traffic Volumes (in PCE)
- Exhibit 4-8: Project Only (With Indian Street Bridge) Traffic Volumes (in PCE)
- Exhibit 4-9: Project Only (General Plan Buildout) Traffic Volumes (in PCE)

EXHIBIT 4-1 (1 OF 2): PROJECT PASSENGER CAR TRIP DISTRIBUTION (WITHOUT INDIAN STREET BRIDGE)

NOTE: TO BE UTILIZED FOR E+P
(WITHOUT INDIAN STREET BRIDGE)
AND OPENING YEAR CUMULATIVE CONDITIONS

LEGEND:

10 = PERCENT TO/FROM PROJECT

EXHIBIT 4-1 (2 OF 2): PROJECT PASSENGER CAR TRIP DISTRIBUTION (WITHOUT INDIAN STREET BRIDGE)

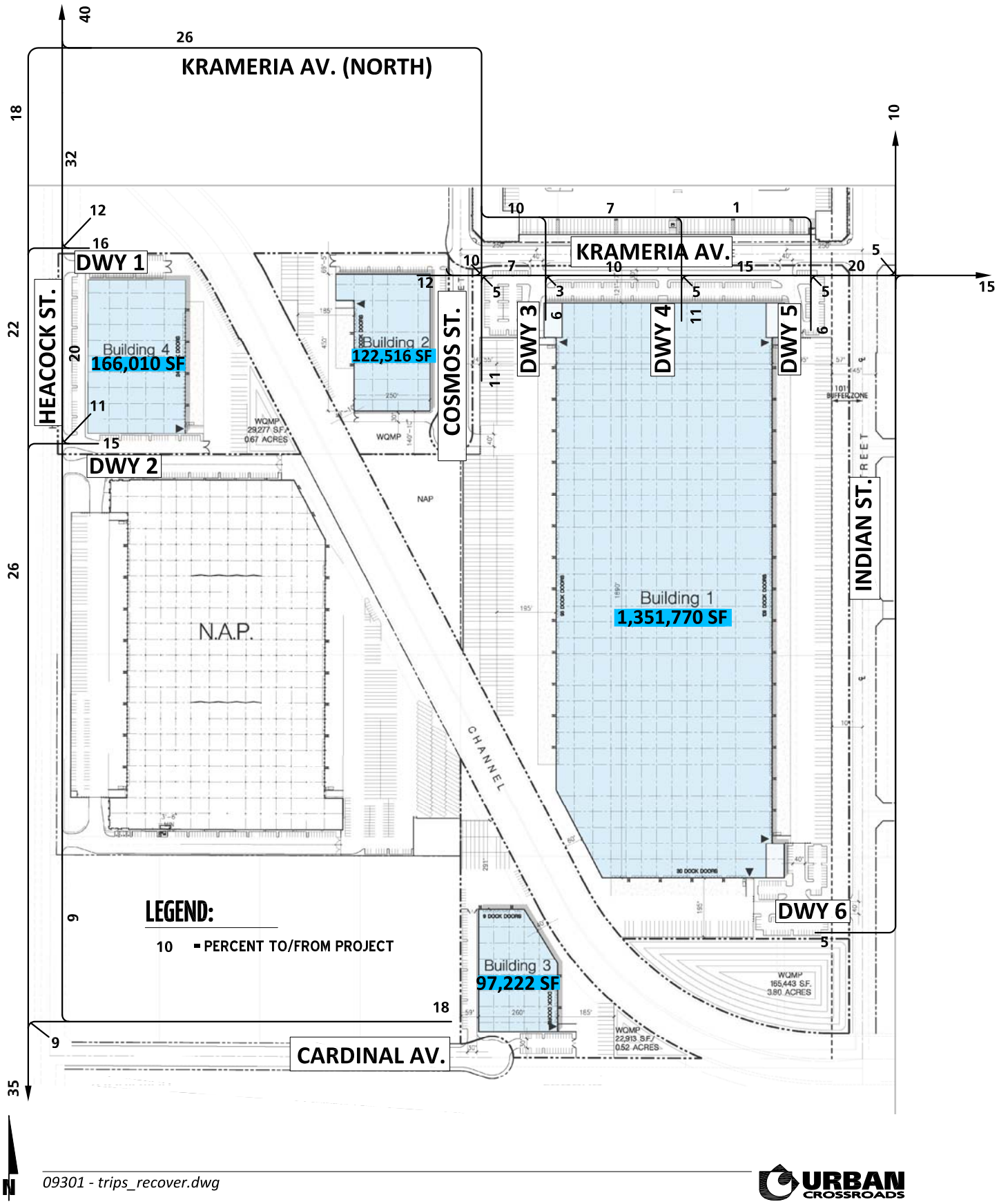
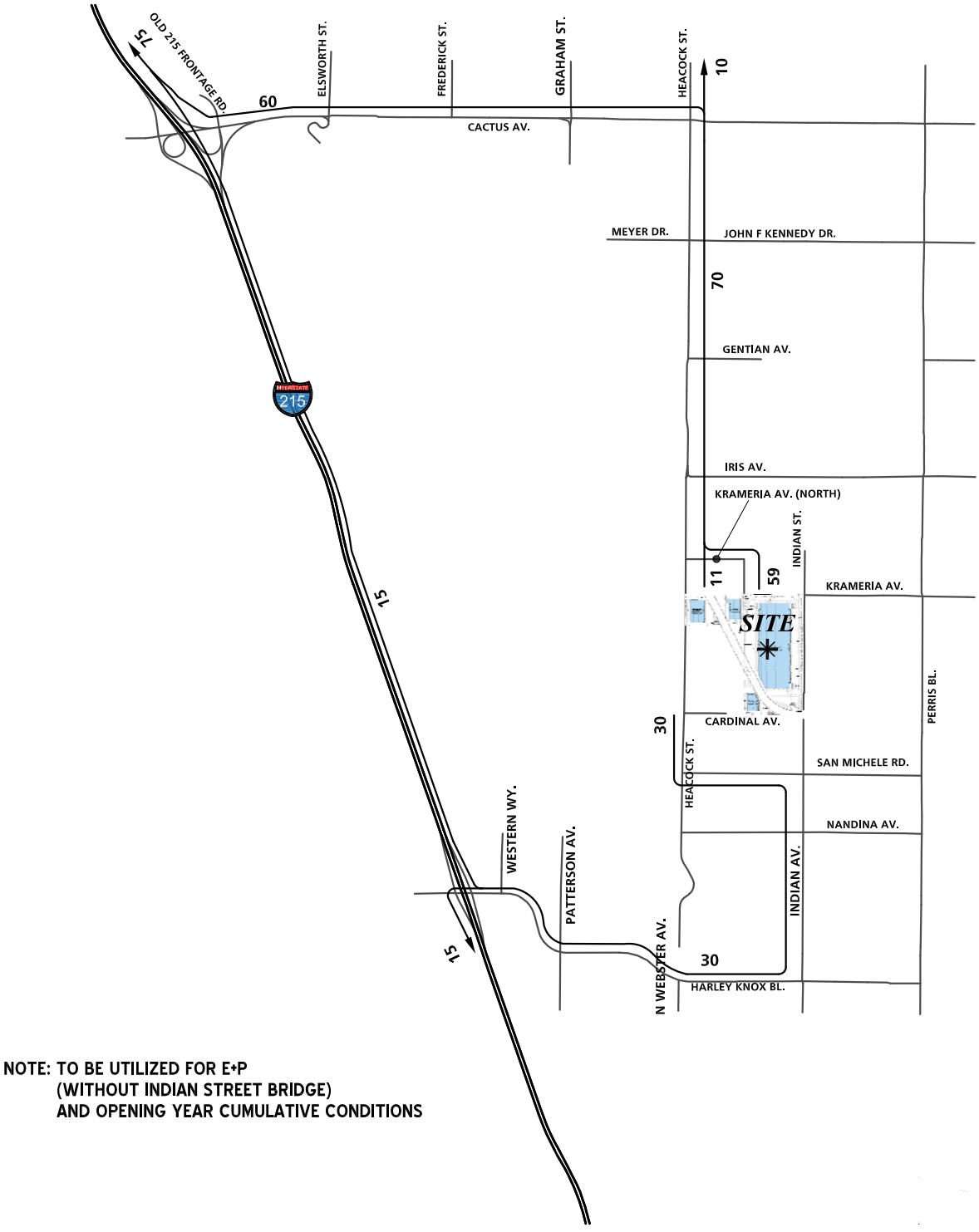


EXHIBIT 4-2 (1 OF 2): PROJECT TRUCK TRIP DISTRIBUTION (WITHOUT INDIAN STREET BRIDGE)



NOTE: TO BE UTILIZED FOR E+P
(WITHOUT INDIAN STREET BRIDGE)
AND OPENING YEAR CUMULATIVE CONDITIONS

LEGEND:

10 = PERCENT TO/FROM PROJECT

← = OUTBOUND

N

EXHIBIT 4-2 (2 OF 2): PROJECT TRUCK TRIP DISTRIBUTION (WITHOUT INDIAN STREET BRIDGE)

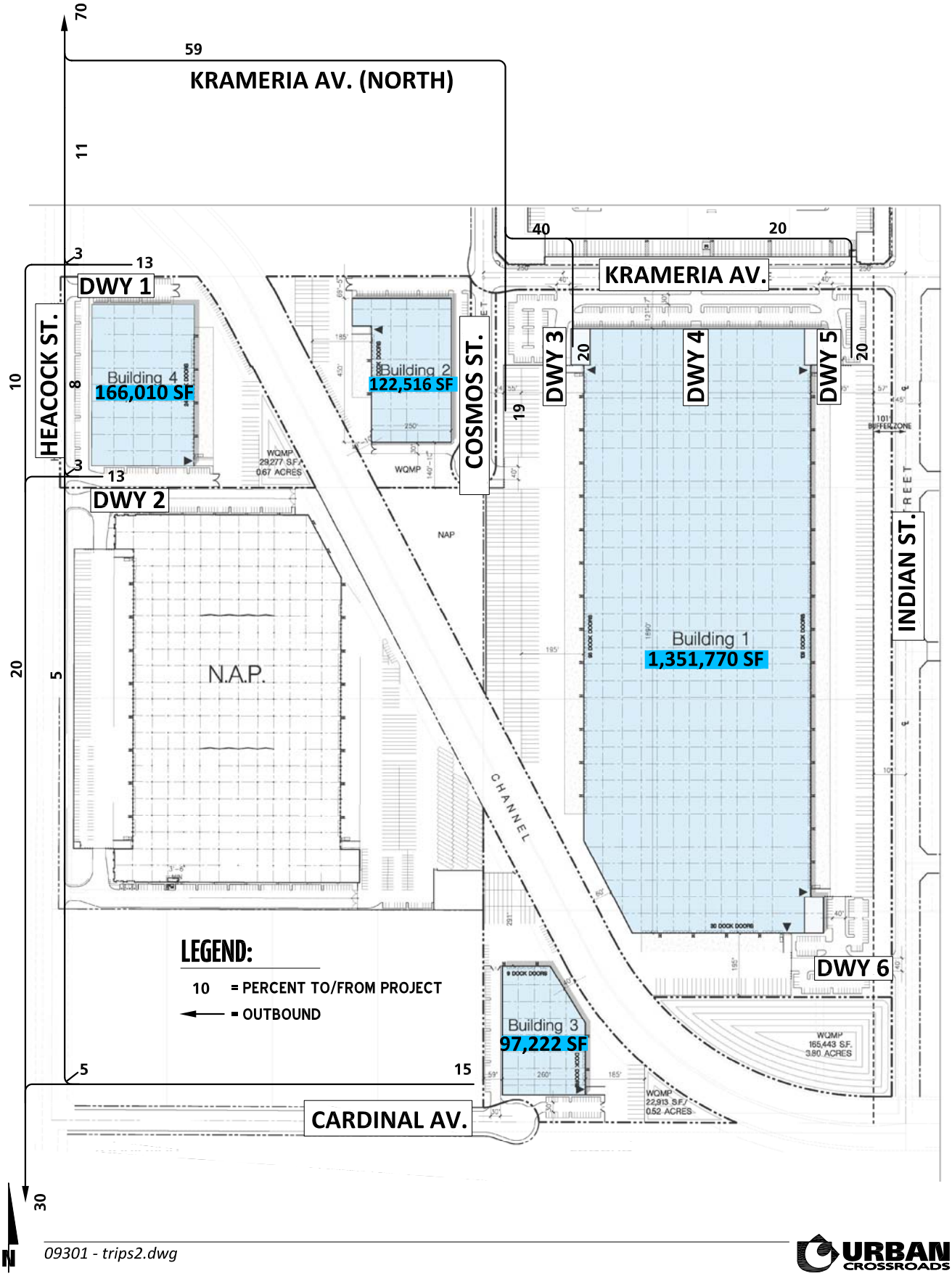


EXHIBIT 4-3 (1 OF 2): PROJECT PASSENGER CAR TRIP DISTRIBUTION (WITH INDIAN STREET BRIDGE)

NOTE: TO BE UTILIZED FOR E+P (WITH INDIAN STREET BRIDGE) CONDITIONS

LEGEND:

10 = PERCENT TO/FROM PROJECT

EXHIBIT 4-3 (2 OF 2): PROJECT PASSENGER CAR TRIP DISTRIBUTION (WITH INDIAN STREET BRIDGE)

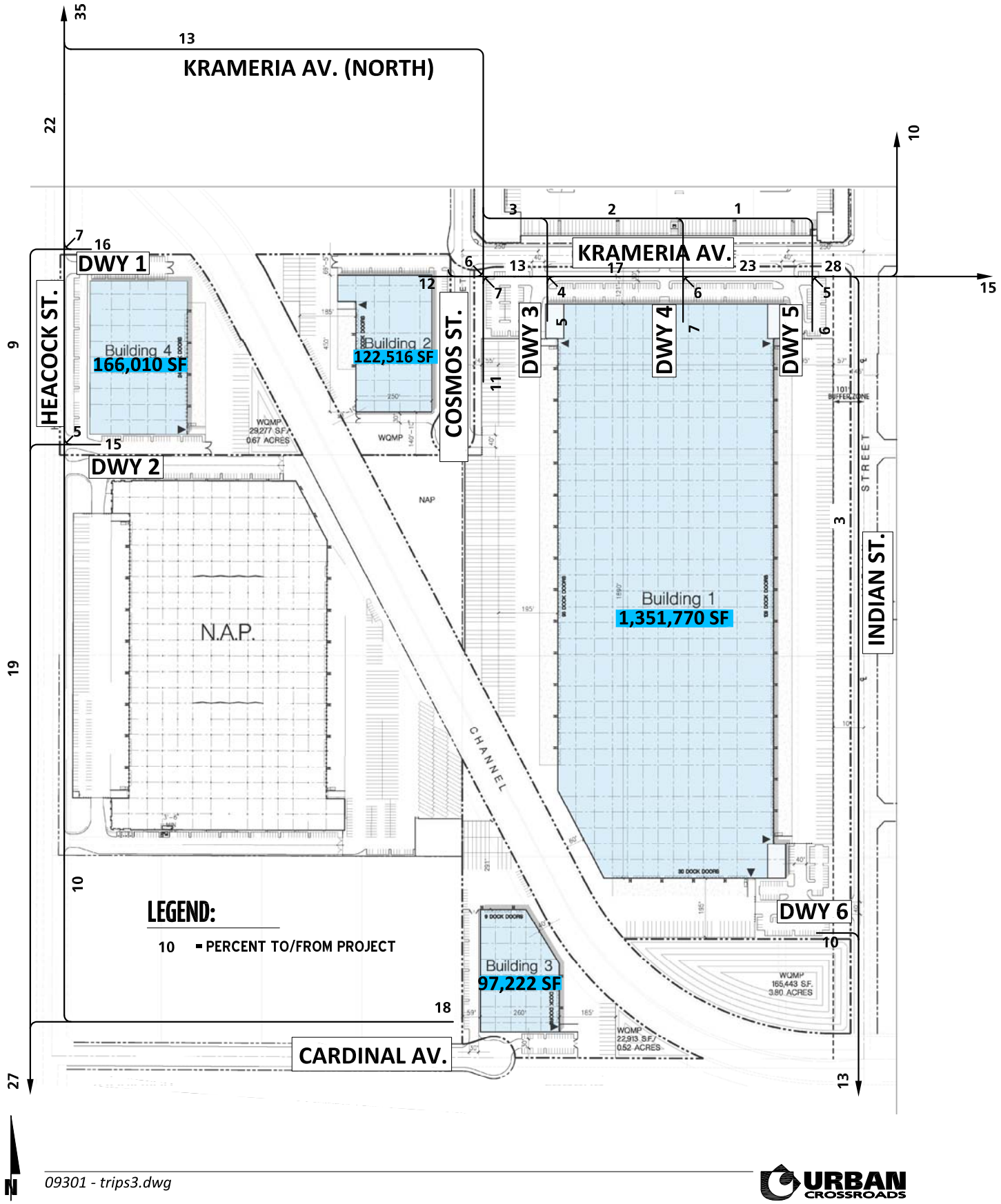
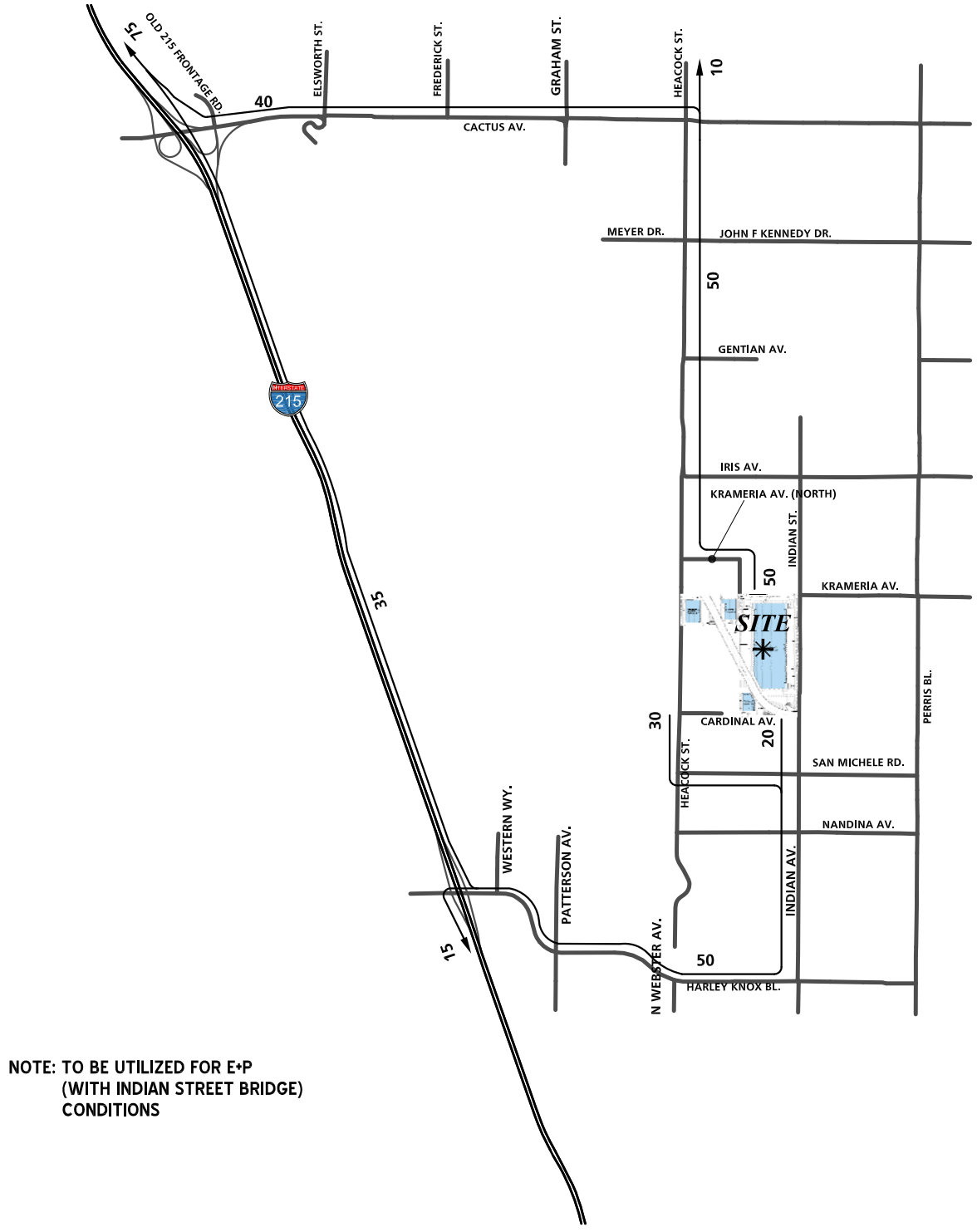


EXHIBIT 4-4 (1 OF 2): PROJECT TRUCK TRIP DISTRIBUTION (WITH INDIAN STREET BRIDGE)



NOTE: TO BE UTILIZED FOR E+P (WITH INDIAN STREET BRIDGE) CONDITIONS

LEGEND:

10 = PERCENT TO/FROM PROJECT

⟵ = OUTBOUND

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EXHIBIT 4-4 (2 OF 2): PROJECT TRUCK TRIP DISTRIBUTION (WITH INDIAN STREET BRIDGE)

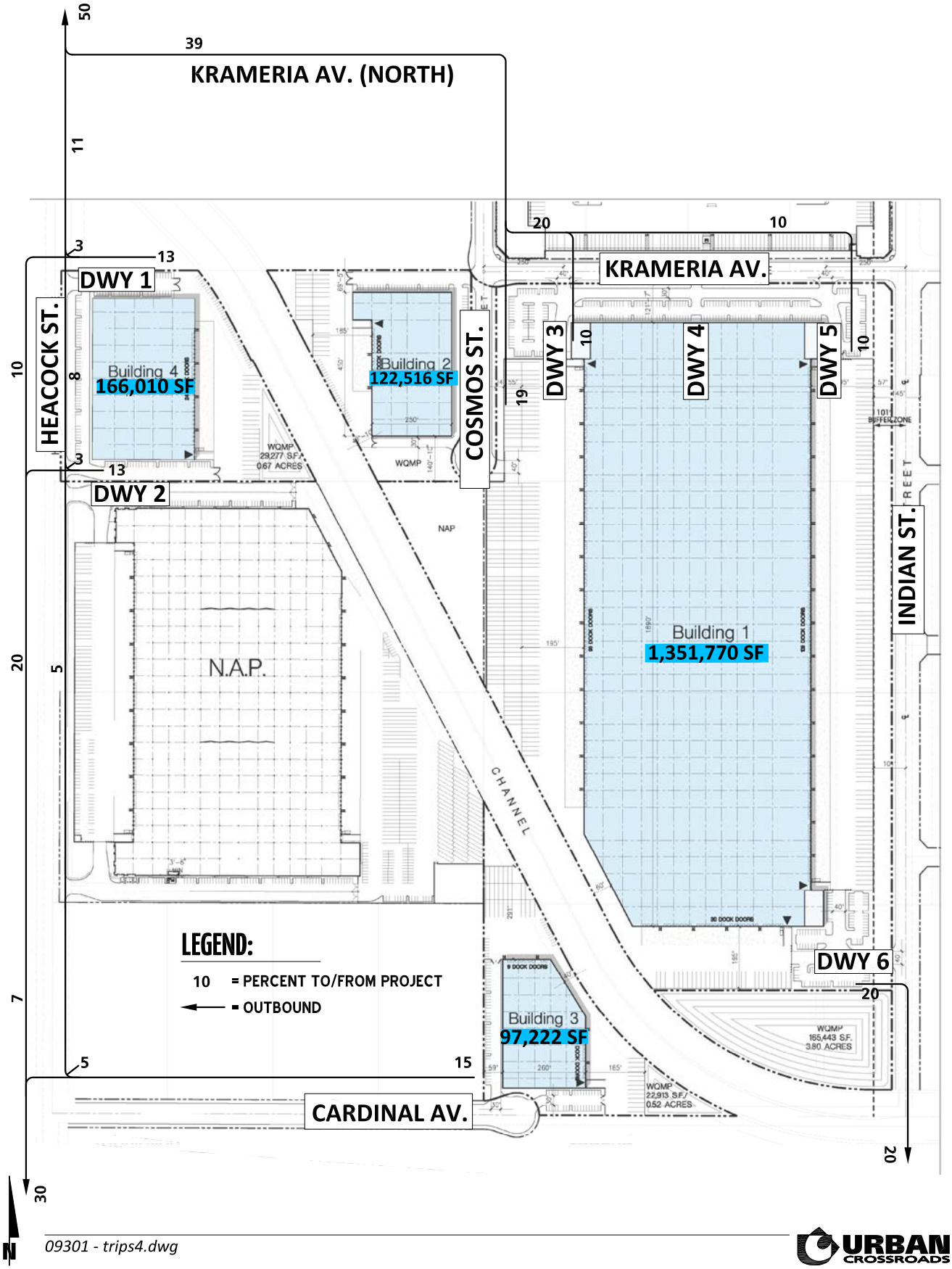


EXHIBIT 4-5 (1 OF 2): GENERAL PLAN BUILDOUT PROJECT PASSENGER CAR TRIP DISTRIBUTION

NOTE: ASSUMES BOTH HEACOCK STREET EXTENSION AT HARLEY KNOX BOULEVARD AND INDIAN STREET BRIDGE ARE BOTH IN PLACE

LEGEND:

10 = PERCENT TO/FROM PROJECT

EXHIBIT 4-5 (2 OF 2): GENERAL PLAN BUILDOUT PROJECT PASSENGER CAR TRIP DISTRIBUTION

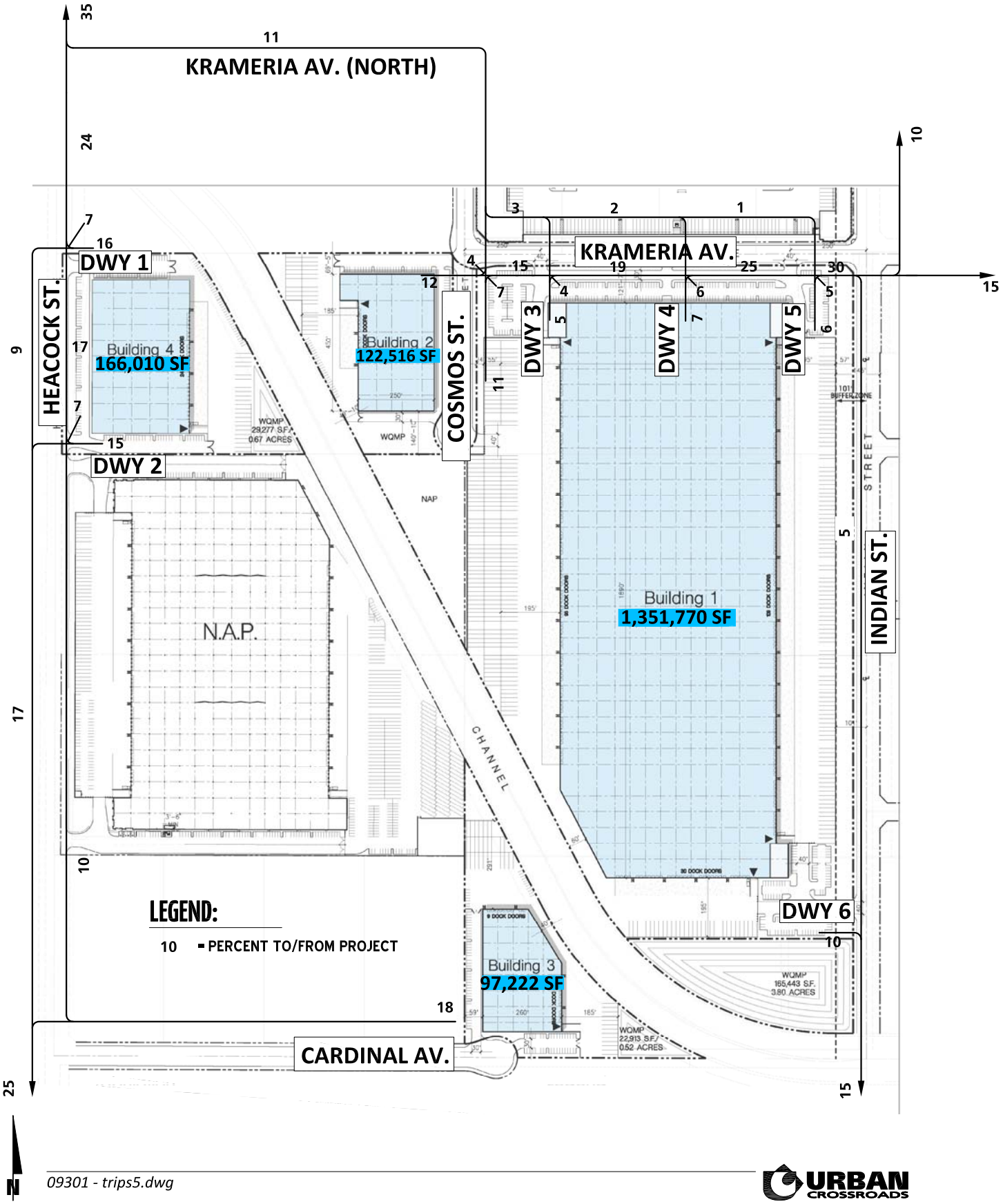
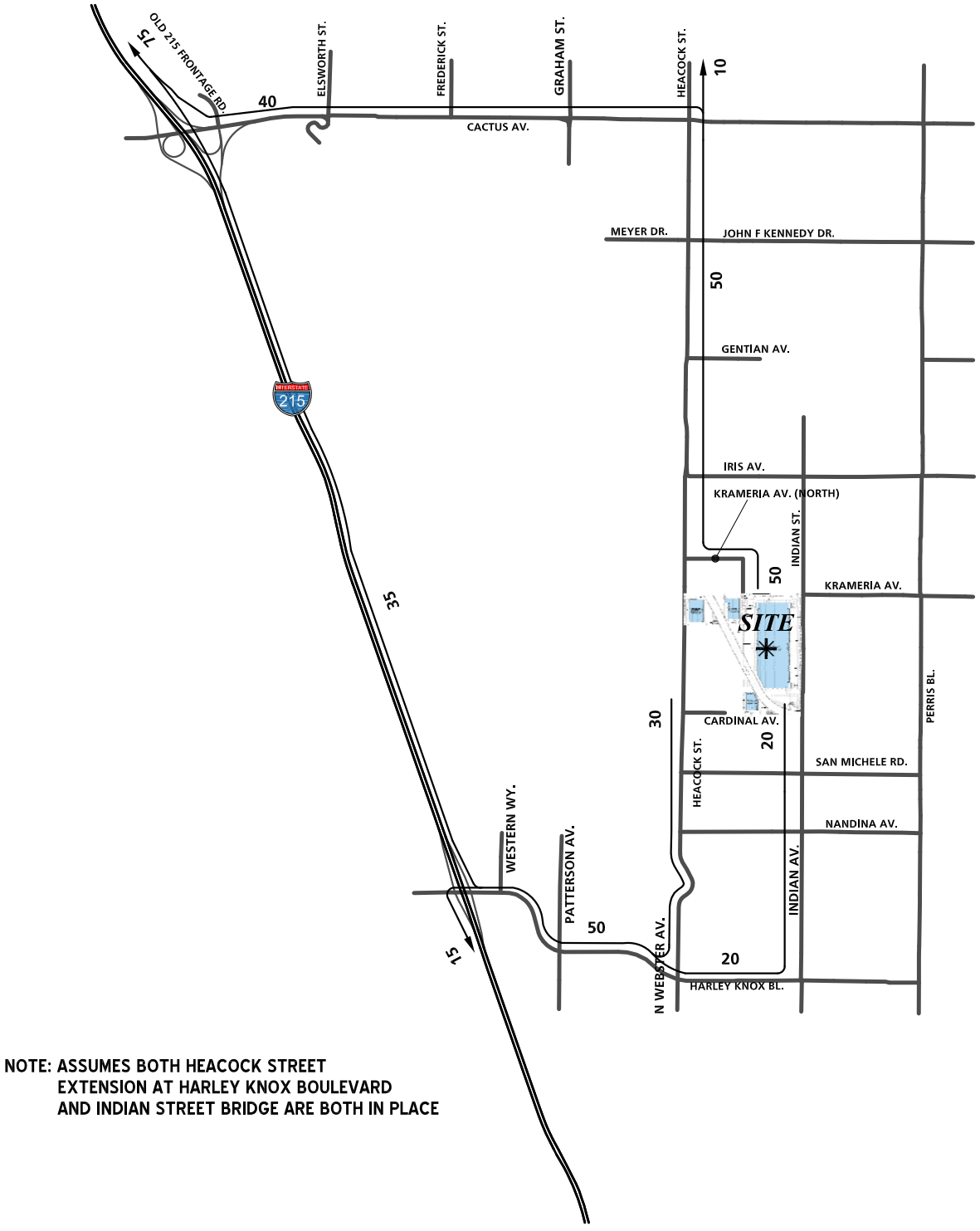


EXHIBIT 4-6 (1 OF 2): GENERAL PLAN BUILDOUT PROJECT TRUCK TRIP DISTRIBUTION



NOTE: ASSUMES BOTH HEACOCK STREET EXTENSION AT HARLEY KNOX BOULEVARD AND INDIAN STREET BRIDGE ARE BOTH IN PLACE

LEGEND:

10 = PERCENT TO/FROM PROJECT

⟵ = OUTBOUND

N

EXHIBIT 4-6 (2 OF 2): GENERAL PLAN BUILDOUT PROJECT TRUCK TRIP DISTRIBUTION

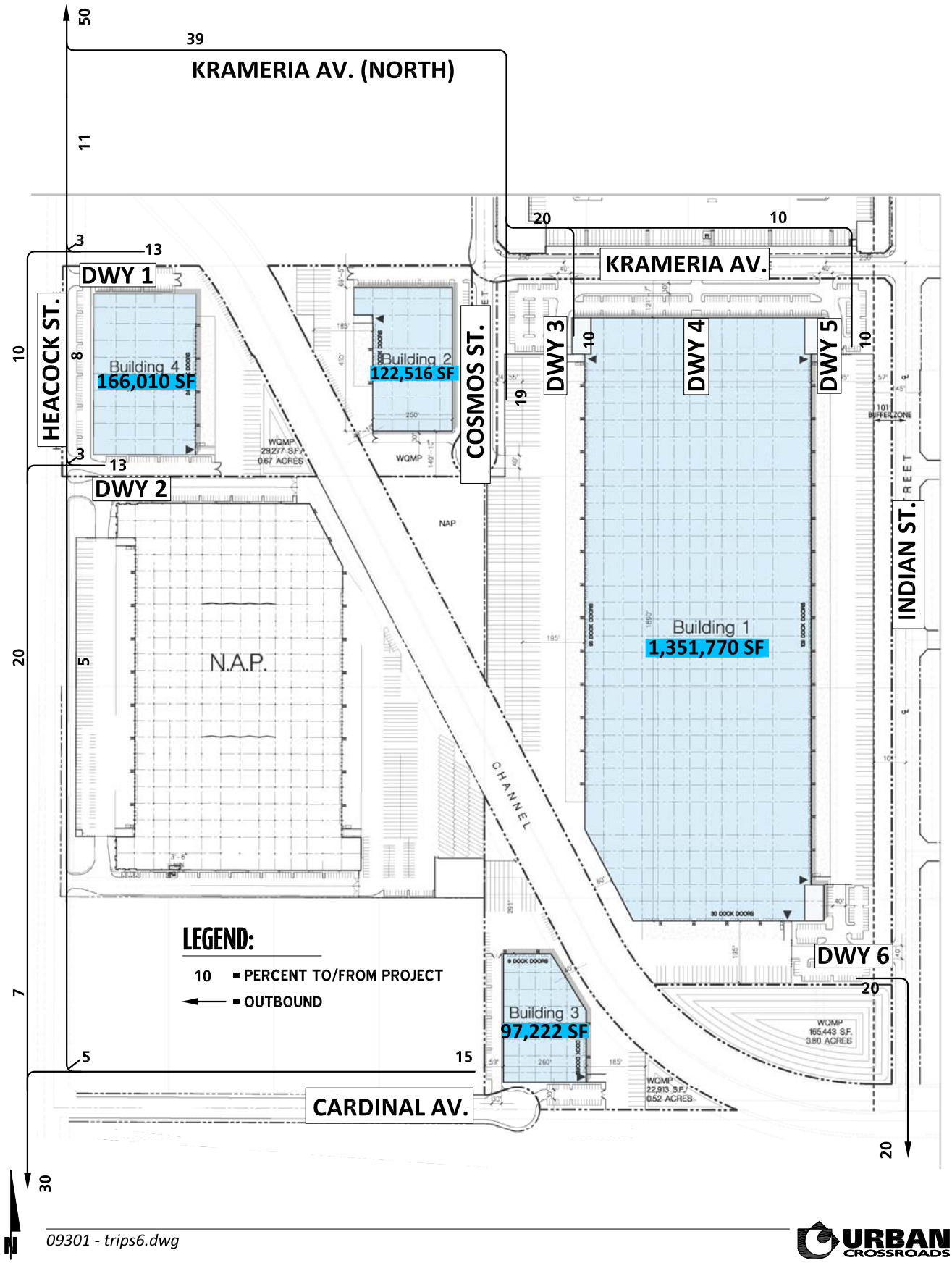


EXHIBIT 4-7 (1 OF 2): PROJECT ONLY (WITHOUT INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

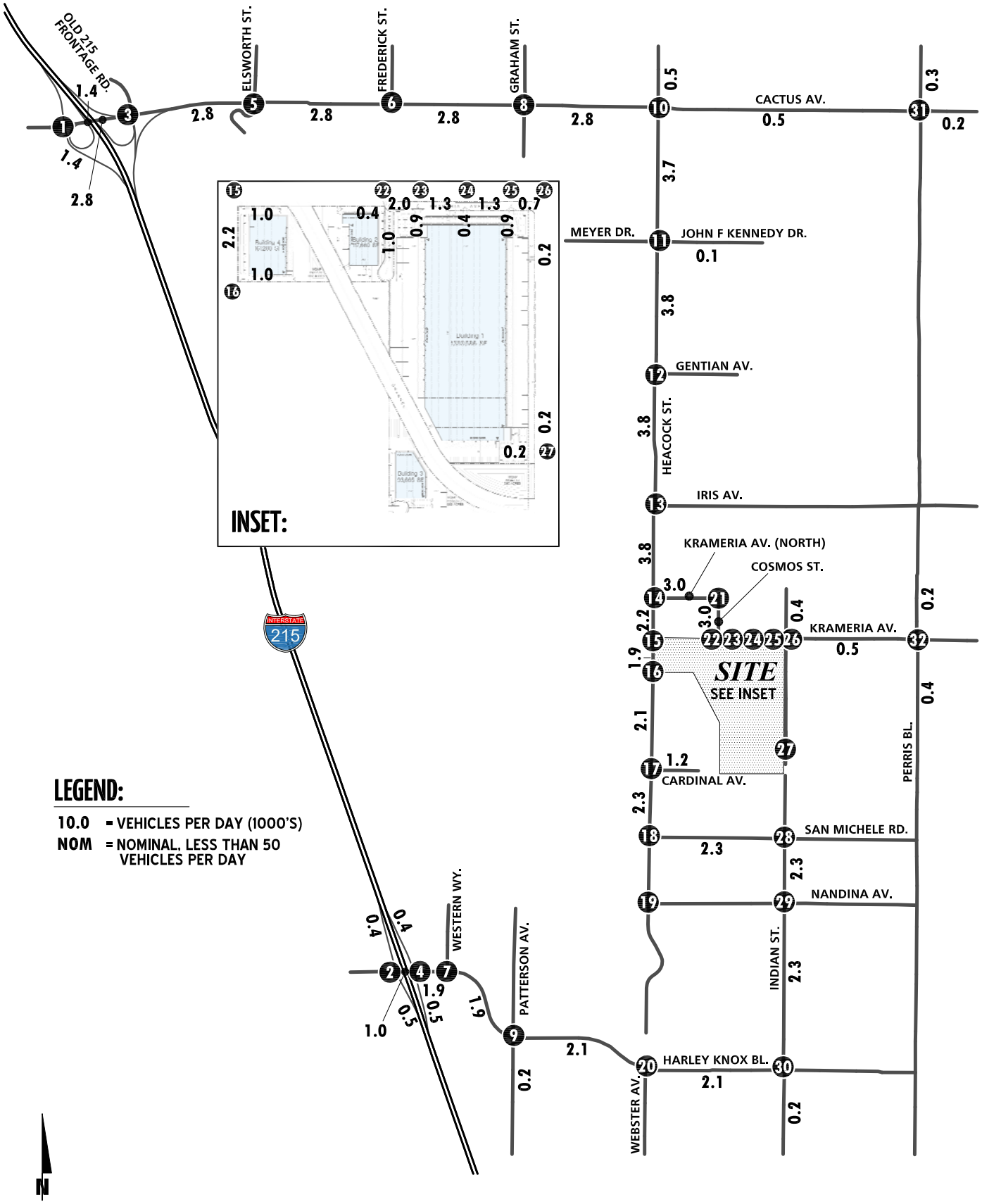


EXHIBIT 4-7 (2 OF 2): PROJECT ONLY (WITHOUT INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

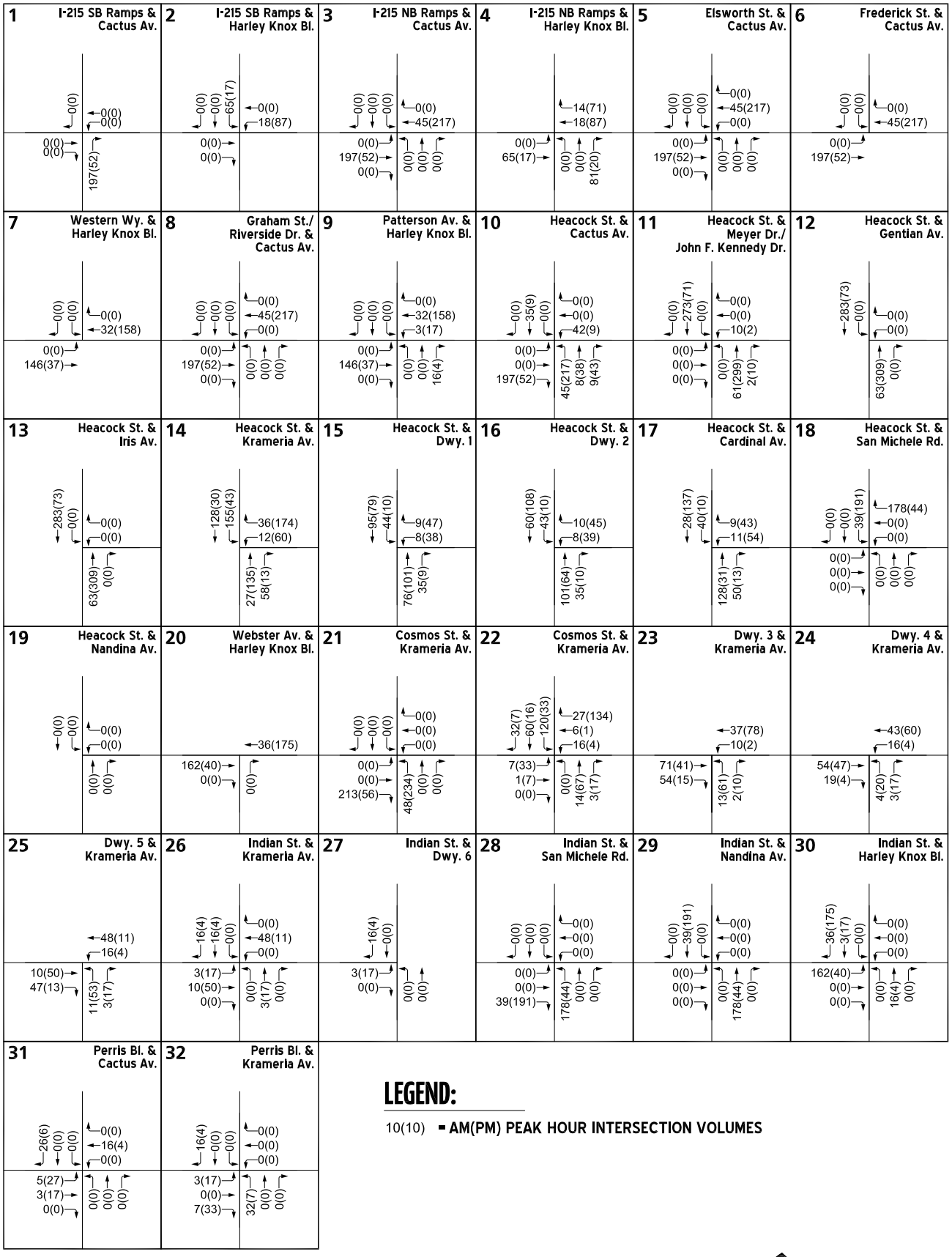


EXHIBIT 4-8 (1 OF 2): PROJECT ONLY (WITH INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

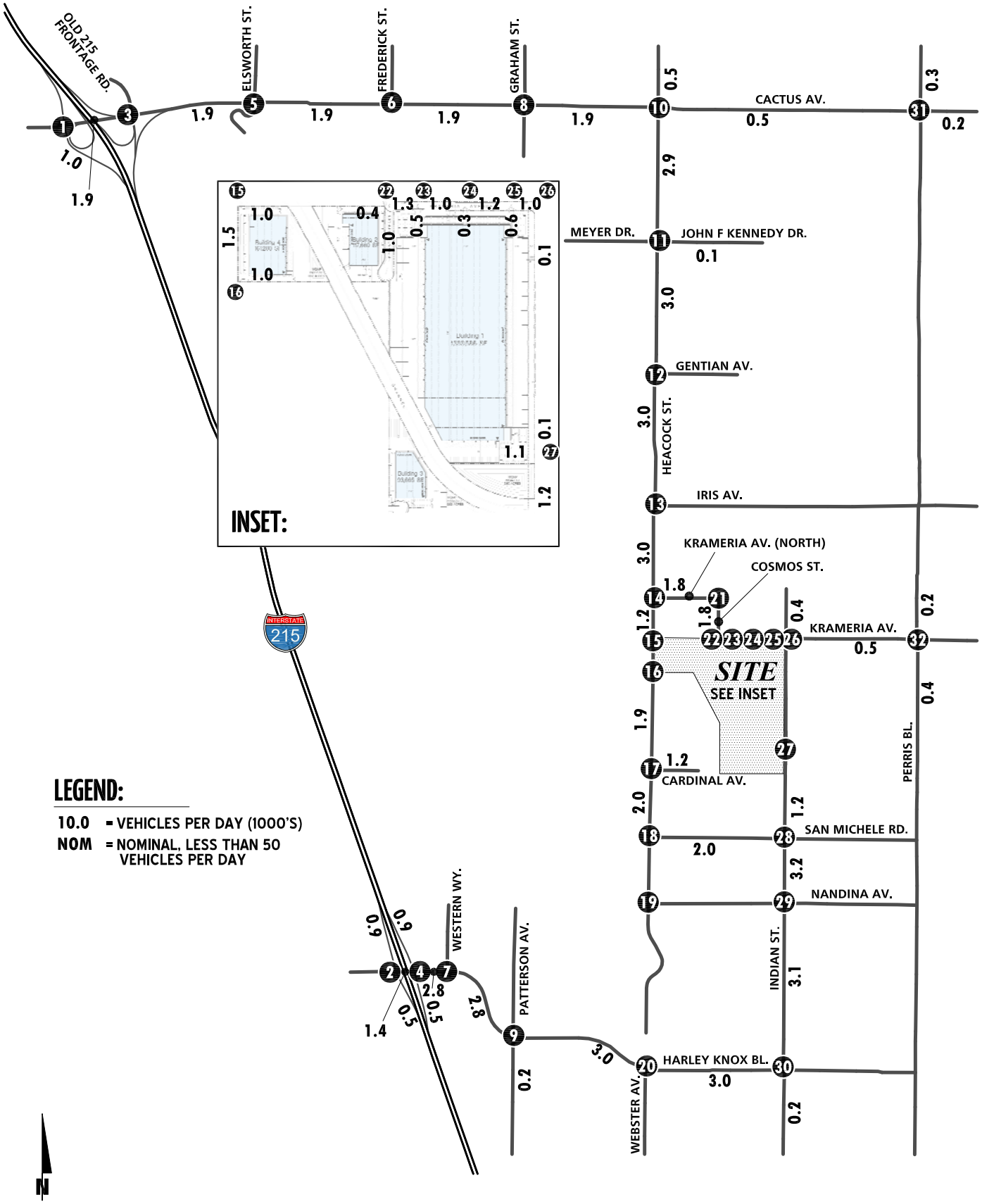


EXHIBIT 4-8 (2 OF 2): PROJECT ONLY (WITH INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

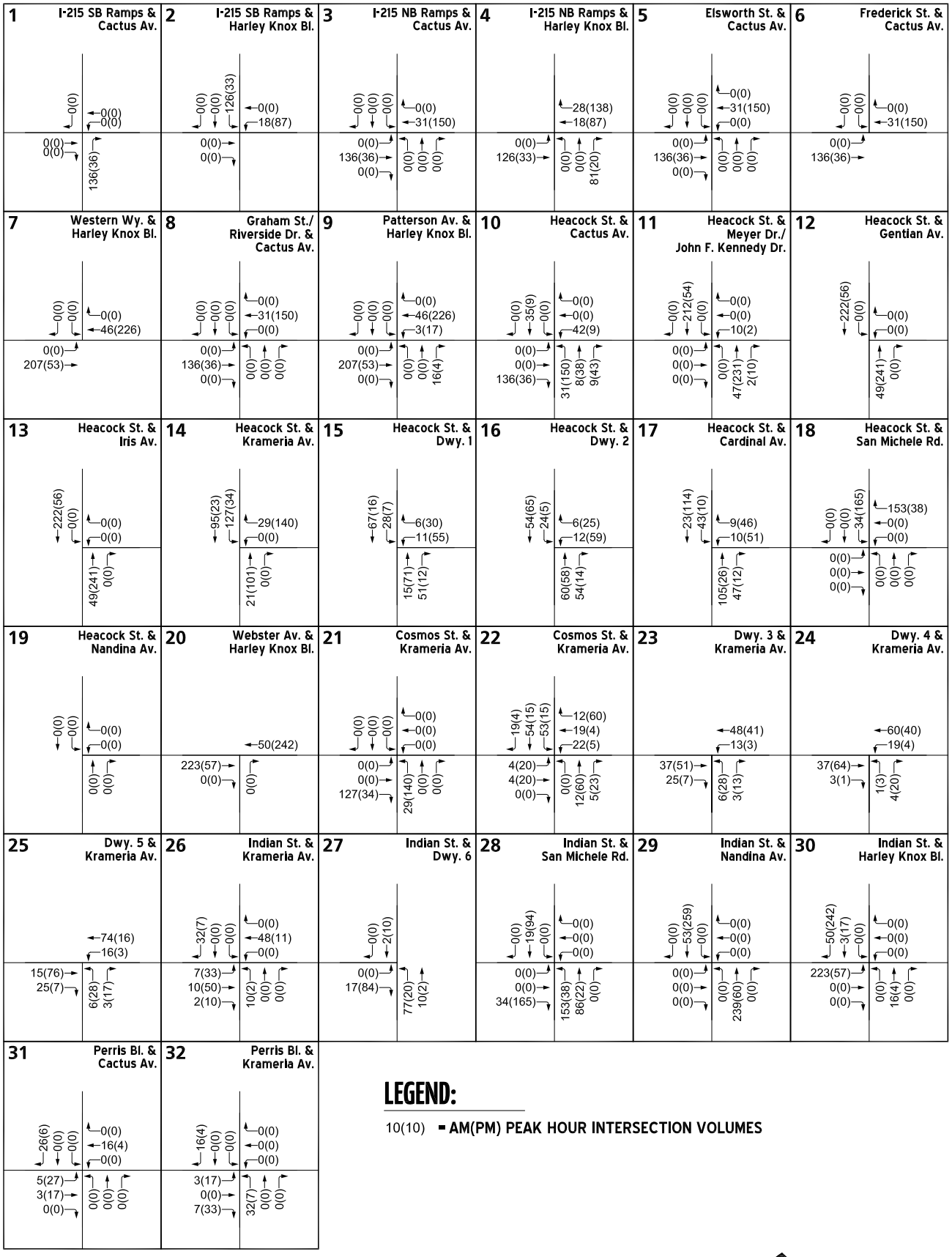


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EXHIBIT 4-9 (1 OF 2): PROJECT ONLY (GENERAL PLAN BUILDOUT) TRAFFIC VOLUMES (IN PCE)

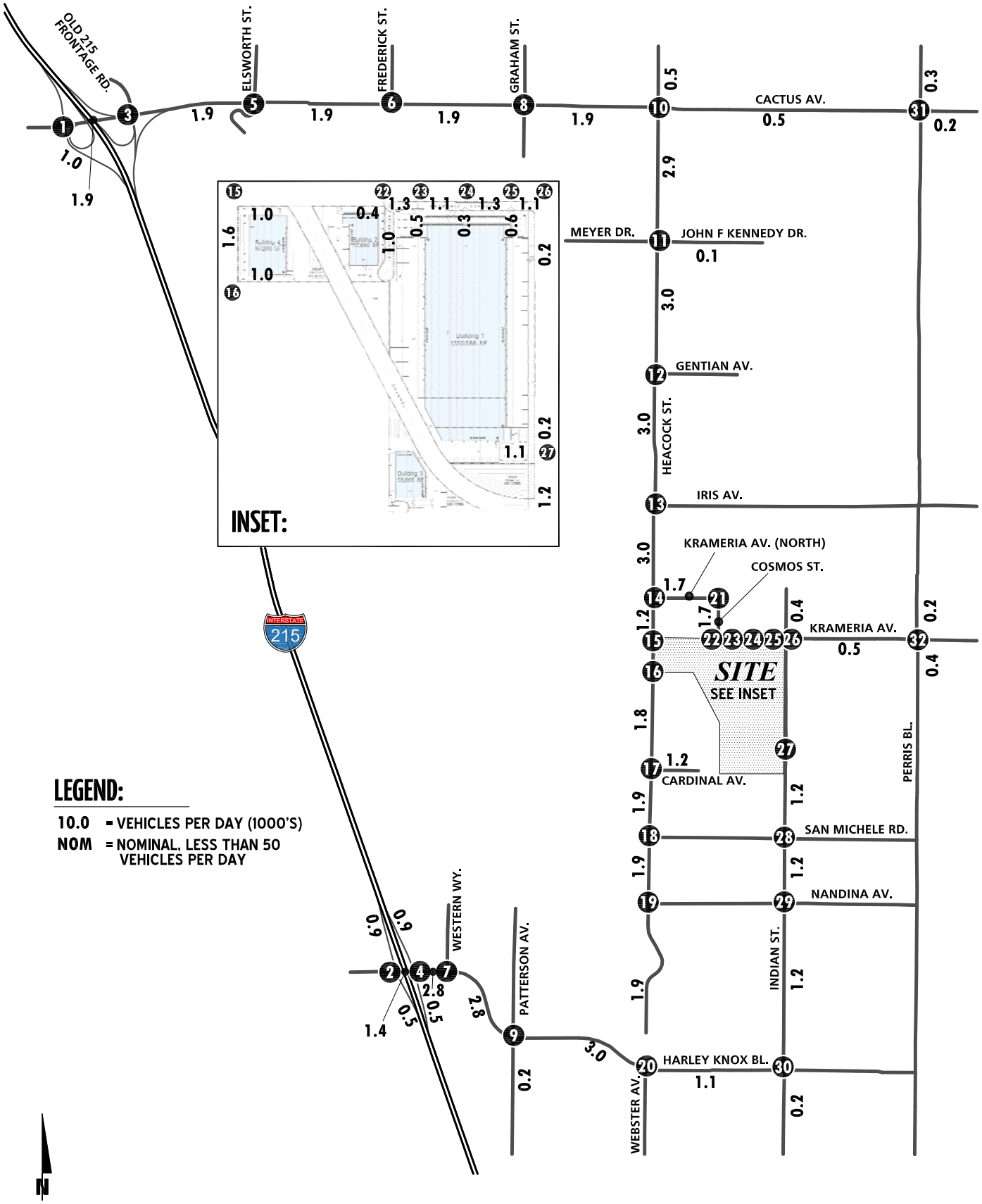
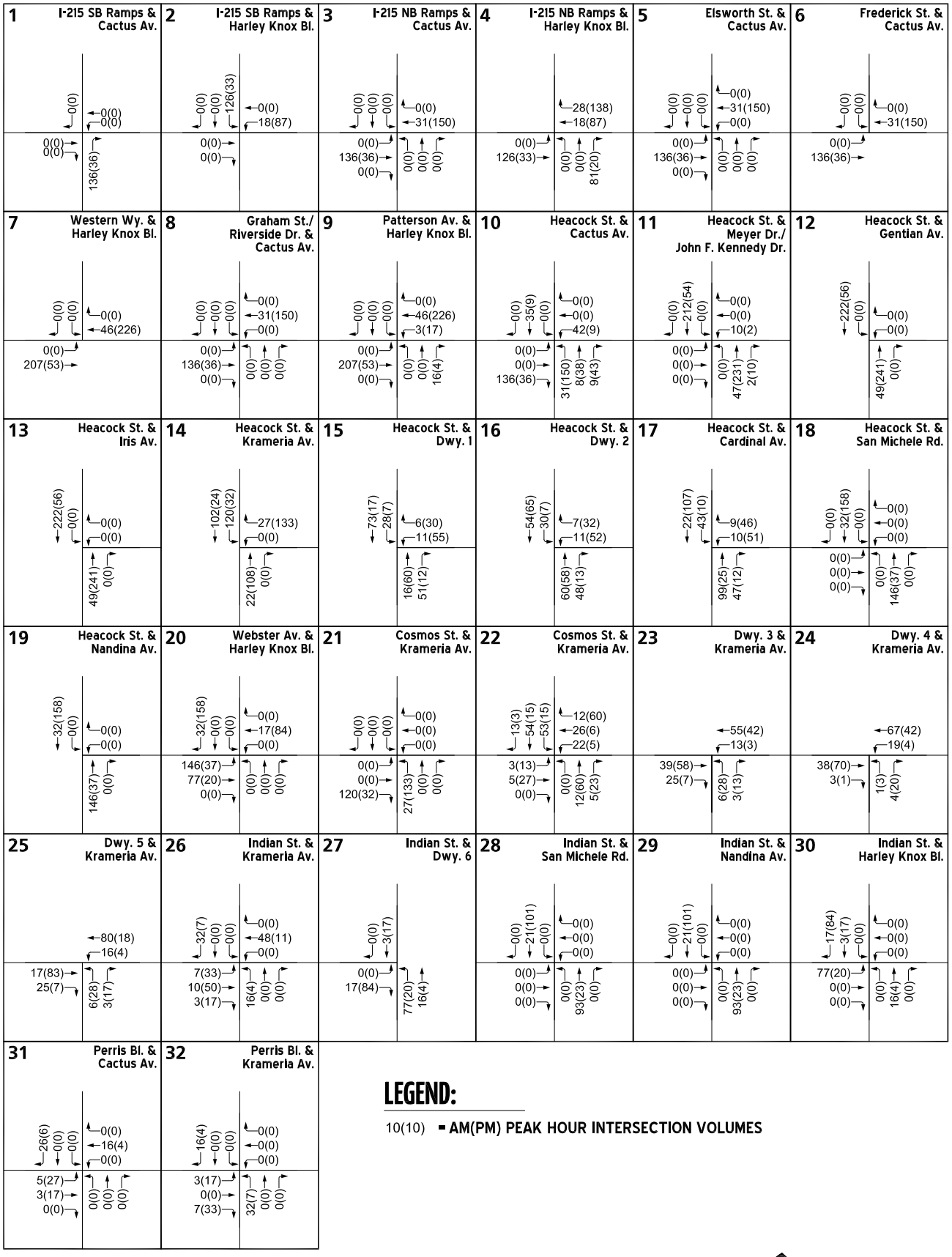


EXHIBIT 4-9 (2 OF 2): PROJECT ONLY (GENERAL PLAN BUILDOUT) TRAFFIC VOLUMES (IN PCE)



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4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year for 2020 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies.

The currently adopted SCAG 2012 RTP (April 2012) growth forecasts for the unincorporated areas of the City of Moreno Valley identifies projected growth in population of 187,400 in 2008 to 255,200 in 2035, or a 36.2 percent increase over the 27 year period. (5) The change in population equates to roughly a 1.15 percent growth rate compounded annually. Similarly, growth over the same 27 year period in households is projected to increase by 42.5 percent, or 1.32 percent annual growth rate. Finally, growth in employment over the same 27 year period is projected to increase by 99.4 percent, or a 2.59 percent annual growth rate.

Based on a comparison of Existing traffic volumes to the General Plan Buildout (Post 2035) forecasts, the average growth rate is estimated at approximately 5.68 percent compounded annually between Existing and General Plan Buildout (Post 2035) traffic conditions. The annual growth rate at each individual intersection is not lower than 2.49 percent compounded annually to as high as 10.64 percent 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 Moreno Valley for both Opening Year Cumulative and General Plan Buildout (Post 2035) traffic conditions, especially when considered along with the addition of project-related traffic. As such, the growth in traffic volumes assumed in this traffic impact analysis would tend to overstate as opposed to understate the potential impacts to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

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 Moreno Valley, the cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. Adjacent jurisdictions of the County of Riverside, March JPA, City of Riverside, and the City of Perris have also been contacted to obtain the most current list of cumulative projects from their respective jurisdictions. The correspondence and cumulative projects provided by each of the applicable jurisdictions are provided in Appendix 4.1.

Where applicable, cumulative projects anticipated to contribute measurable traffic (i.e. 50 or more peak hour trips) to study area intersections have been manually added to the study area network to generate Opening Year Cumulative forecasts. In other words, this list of cumulative development projects has been reviewed to determine which projects would likely contribute measurable traffic through the study area intersections (e.g., those cumulative projects in close proximity to the proposed Project). For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-10 and listed on Table 4-4 have been considered for inclusion.

Although it is unlikely that the majority of these cumulative projects would be fully built and occupied by Year 2020, these have been considered in an effort to conduct a conservative analysis and overstate and opposed to understate potential traffic impacts. Any other cumulative projects that are not expected to contribute measurable traffic to study area intersections since the traffic would dissipate due to the distance from the Project site and study area intersections, have not been accounted for. Any additional traffic generated by other projects not on the cumulative projects list is accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 *Background Traffic*. Cumulative development project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-11.

4.7 NEAR-TERM TRAFFIC FORECASTS

To provide a comprehensive assessment of potential transportation network deficiencies, two types of analyses, "buildup" and "buildout", were performed in support of this work effort. The "buildup" method was used to approximate the Opening Year Cumulative traffic forecasts, and is intended to identify the cumulative impacts on both the existing and planned near-term circulation system. The Opening Year Cumulative traffic forecasts include background traffic, traffic generated by other cumulative development projects within the study area, and the traffic generated by the proposed Project. The "buildout" approach is used to forecast the General Plan Buildout Without and With Project conditions of the study area.

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast the near-term 2020 traffic conditions. An ambient growth factor of 10.41% (2020) accounts for background (area-wide) traffic increases that occur over time, up to the year 2020 from the year 2015 (compounded two percent per year growth over a five year period). Traffic volumes generated by the Project are then added to assess the EAP and Opening Year Cumulative traffic conditions. The 2020 roadway network is similar to the existing conditions roadway network with the exception of future roadways and intersections proposed to be developed by the Project.

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EXHIBIT 4-10: CUMULATIVE DEVELOPMENT PROJECTS LOCATION MAP

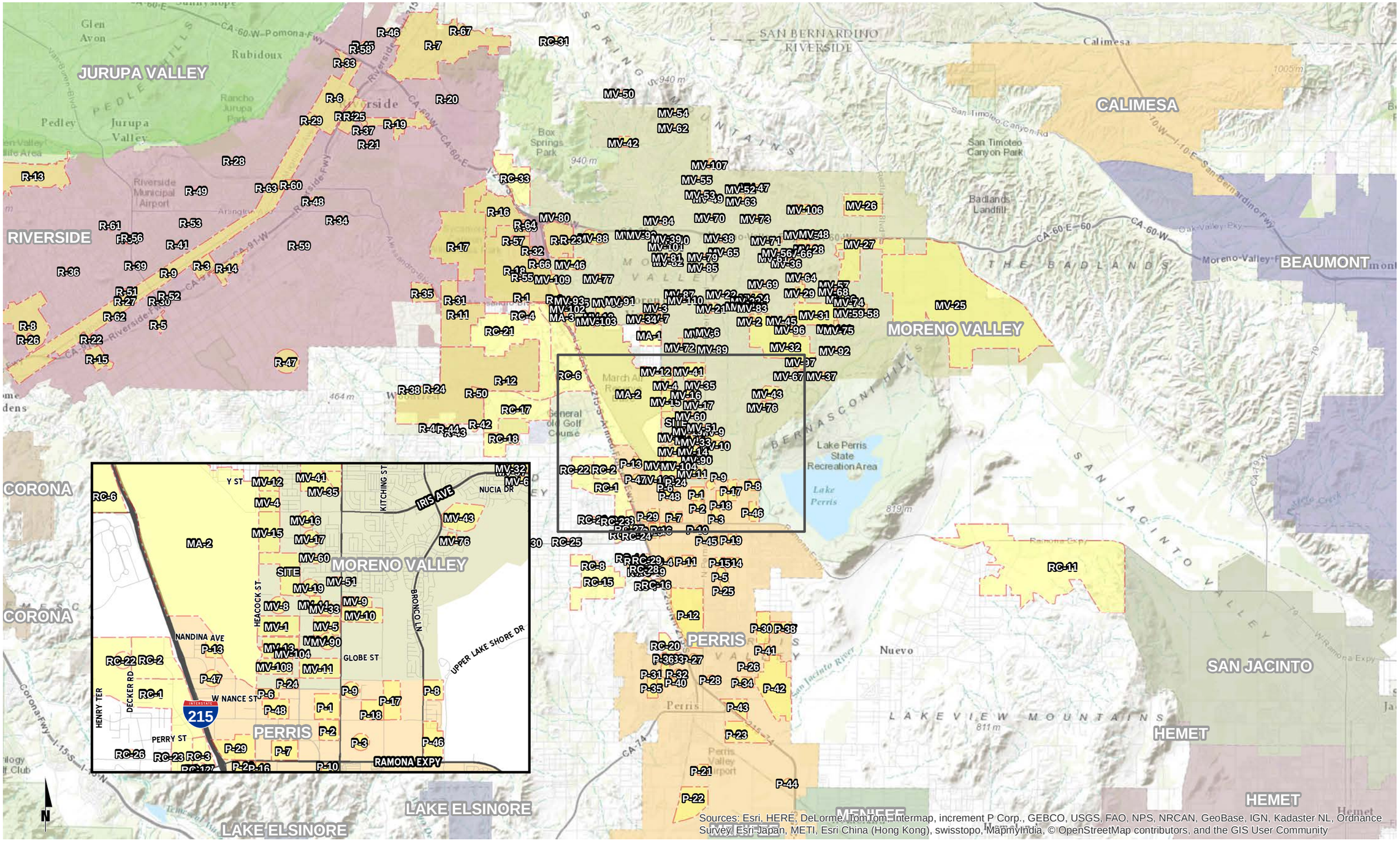

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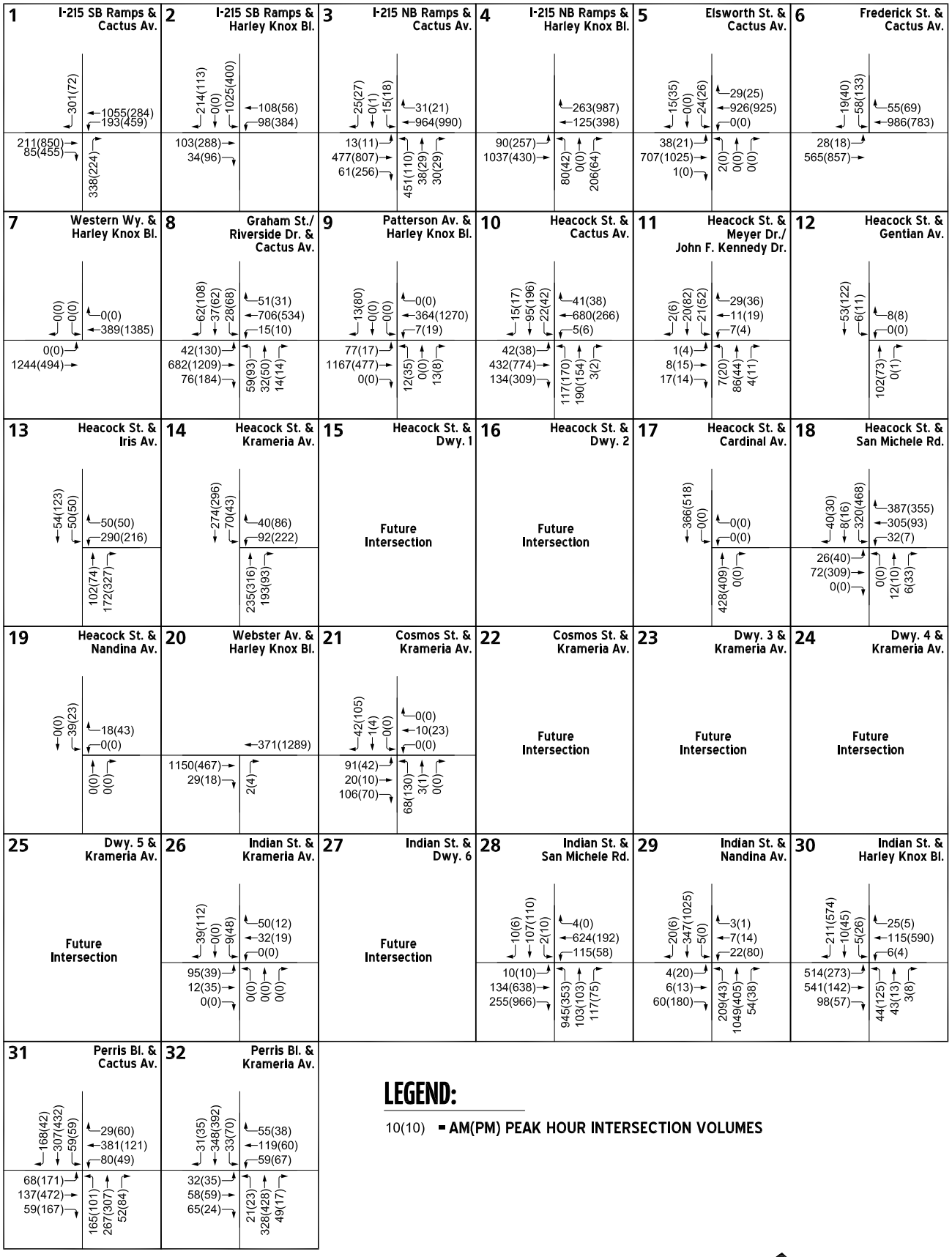
EXHIBIT 4-11 (1 OF 2): CUMULATIVE DEVELOPMENT ONLY TRAFFIC VOLUMES (IN PCE)

EXHIBIT 4-11 (2 OF 2): CUMULATIVE DEVELOPMENT ONLY TRAFFIC VOLUMES (IN PCE)



Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
CITY OF MORENO VALLEY				
MV-1	PA 06-0152 & PA 06-0153 (First Park Nandina I & II)	High-Cube Warehouse	483.767	TSF
MV-2	Bella Vista Apartments	Apartments	220.00	DU
MV-3	PA 04-0063 (Centerpointe Buildings 8 and 9)	General Light Industrial	361.384	TSF
MV-4	PA 07-0035; PA 07-0039 (Moreno Valley Industrial Park)	General Light Industrial	204.657	TSF
		High-Cube Warehouse	409.920	TSF
MV-5	First Inland Logistics Center	High-Cube Warehouse	400.130	TSF
MV-6	TM 33607	Condo/Townhomes	52	DU
MV-7	PA 08-0093 (Centerpointe Business Park II)	General Light Industrial	99.988	TSF
MV-8	PA 06-0021; PA 06-0022; PA 06-0048; PA 06-0049 (Komar Investments)	Warehousing	287.100	TSF
MV-9	PA 06-0017 (Ivan Devries)	Industrial Park	569.200	TSF
MV-10	Modular Logistics (Dorado Property)	High-Cube Warehouse	1109.378	TSF
MV-11	PA 09-0004 (Vogel)	High-Cube Warehouse	800.000	TSF
	Sares Regis	High-Cube Warehouse	1600.000	TSF
MV-12	TM 34748	SFDR	135	DU
MV-13	First Nandina Logistics Center	High-Cube Warehouse	1450.000	TSF
MV-14	First Park Nandina III	High-Cube Warehouse	691.960	TSF
	Moreno Valley Commerce Park	High-Cube Warehouse	354.321	TSF
MV-15	March Business Center	General Light Industrial	16.732	TSF
		Warehousing	87.429	TSF
		High-Cube Warehouse	1380.246	TSF
MV-16	TM 33810	SFDR	16	DU
MV-17	TM 34151	SFDR	37	DU
MV-18	373K Industrial Facility	High-Cube Warehouse	373.030	TSF
MV-19	TM 32716	SFDR	57	DU
MV-20	TM 33417	Condo/Townhomes	60	DU
MV-21	TM 34988	Condo/Townhomes	271	DU
MV-22	TM 34216	Condo/Townhomes	39	DU
MV-23	TM 34681	Condo/Townhomes	49	DU
MV-24	PA 08-0079-0081 (Winco Foods)	Discount Supermarket	95.440	TSF
		Specialty Retail	14.800	TSF
MV-25	Moreno Beach Marketplace (Lowe's)	Commercial Retail	175.000	TSF
	Auto Mall Specific Plan (Planning Area C)	Commercial Retail	304.500	TSF
	Westridge	High-Cube Warehouse	937.260	TSF
	ProLogis	High-Cube Warehouse	1916.190	TSF
		Warehousing	328.448	TSF
	World Logistics Center	High-Cube Warehouse	41400.000	TSF
		Warehousing	200.000	TSF
		Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
MV-26	a TR 32460 (Sussex Capital)	SFDR	57	DU
	b TR 32459 (Sussex Capital)	SFDR	11	DU
	c TR 30411 (Pacific Communities)	SFDR	24	DU
	d TR 33962 (Pacific Scene Homes)	SFDR	31	DU
	e TR 30998 (Pacific Communities)	SFDR	47	DU
MV-27	a P06-158 (Gascon)	Commercial Retail	116.360	TSF
	b Auto Mall Specific Plan (PAC)	Commercial Retail	304.500	TSF
	c ProLogis	SFDR	126	DU
		High-Cube Warehouse	1529.498	TSF
	d TR 35823 (Stowe Passco)	SFDR	261	DU
		Apartments	216	DU
MV-28	TR 36340	SFDR	275	DU
MV-29	a TR 31771 (Sanchez)	SFDR	25	DU
	b TR 34397 (Winchester Associates)	SFDR	52	DU
	c TR 32645 (Winchester Associates)	SFDR	53	DU
MV-30	Lowe's (Moreno Beach Marketplace)	Home Improvement Store	175.000	TSF
MV-31	a Senior Assisted Living	Assisted Living Units	139	DU
	b TR 31590 (Winchester Associates)	SFDR	96	DU
	c TR 32548 (Gabel, Cook & Associates)	SFDR	107	DU
	d TR 32218 (Whitney)	SFDR	63	DU
	e Medical Plaza	Medical Offices	311.633	TSF

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
MV-32	a Moreno Medical Campus	Medical Offices	80.000	TSF
	b Aqua Bella Specific Plan	SFDR	2,922	DU
	c TR 34329 (Granite Capitol)	SFDR	90	DU
	d Cresta Bella	General Office	30.000	TSF
MV-33	Moreno Valley Industrial Center (Industrial Area SP)	General Light Industrial	354.810	TSF
MV-34	Centerpointe Business Park	General Light Industrial	356.000	TSF
MV-35	Moreno Valley Shopping Center	Free Standing Discount Store	189.520	TSF
		Gas Station w/ Market / Car Wash	16	VFP
MV-36	TR 31305 / Richmond American	Residential	87	DU
MV-37	TR 34329 / Granite Capitol	Residential	90	DU
MV-38	TR 31814 / Moreno Valley Investors	Residential	60	DU
MV-39	TR 33771 / Creative Design Associates	Residential	12	DU
MV-40	TR 35663 / Kha	Residential	12	DU
MV-41	TR 22180 / Young Homes	Residential	140	DU
MV-42	TR 32515	Residential	161	DU
MV-43	TR 32142	Residential	81	DU
MV-44	San Michele Industrial Center (Industrial Area SP)	General Light Industrial	865.960	TSF
MV-45	Commercial Medical Plaza	Medical Offices	311.633	TSF
MV-46	Edgemont Street, South of Eucalyptus Av. (PA14-0042)	Apartments	112	DU
MV-47	28860 Professor's Fun IV, LLC/Winchester Associates, Inc.	SFDR	9	DU
MV-48	20636 Pacific Communities	SFDR	67	DU
MV-49	31297 Randy McFarland	SFDR	7	DU
MV-50	31394 Pigeon Pass, Ltd.	SFDR	78	DU
MV-51	31442 SKG Pacific Enterprises Inc.	SFDR	63	DU
MV-52	31517 Professors Prop Six/Winchester Assoc.	SFDR	83	DU
MV-53	31621 Peter Sanchez	SFDR	25	DU
MV-54	32005 Red Hill Village, LLC	SFDR	214	DU
MV-55	32126 Salvador Torres	SFDR	35	DU
MV-56	32194 Arman Pezeshkifar	SFDR	32	DU
MV-57	32408 Sanstone Inc.	SFDR	80	DU
MV-58	32844 Winchester Associates	SFDR	17	DU
MV-59	32978 Focus Estates	SFDR	19	DU
MV-60	33024 Adam Wislar	SFDR	8	DU
MV-61	33275 Jose Guzman	SFDR	4	DU
MV-62	33388 SCH Development, LLC	SFDR	16	DU
MV-63	33436 Winchester Associates	SFDR	105	DU
MV-64	33963 Rance Garrett	SFDR	31	DU
MV-65	34043 RM3 Building and Development	SFDR	12	DU
MV-66	31621 Beazer Homes	SFDR	274	DU
MV-67	30268 Pacific Communities	SFDR	83	DU
MV-68	31414 GRF - Majestic Hills	SFDR	31	DU
	Tract 31618	SFDR	55	DU
MV-69	31494 Winchester Associates	SFDR	12	DU
MV-70	32715 GFR - Trinity	SFDR	30	DU
MV-71	33256 Granite Homes	SFDR	79	DU
MV-72	32711 Isaac Genah	SFDR	9	DU
MV-73	35530 Moreno Gilman 650, LLC-Quail Ranch	SFDR	1,105	DU
MV-74	35534 Leedco Engineers	SFDR	12	DU
MV-75	36436 CV Communities	SFDR	159	DU
MV-76	36401 Continental East Fund III, LLC	SFDR	92	DU
MV-77	32215 Winchester Associates "Scottish Village"	MFDR	194	DU
MV-78	32756 Jimmy Lee	MFDR	24	DU
MV-79	35369 Tason Myers Property	MFDR	12	DU
MV-80	35414 Lincoln Property Co. Southwest	MFDR	266	DU
MV-81	35769 Michael Chen	MFDR	16	DU
MV-82	PA09-0006 Jim Nydam	MFDR	15	DU
MV-83	35861 Frederick Homes	MFDR	24	DU
MV-84	36038 Alessandro Village Plaza, LLC	MFDR	96	DU
MV-85	35304 Jimmy Lee	MFDR	12	DU
MV-86	Alessandro & Lasselle	Shopping Center	140.000	TSF
MV-87	Food 4 Less - Fueling Station	Gas Station with Convenience Market	16	VFP
MV-88	El Paso (food court)	Fast Food no Drive Thru	--	TSF
MV-89	O'Reilly Automotive	Automobile Parts Sale	7.500	TSF
	PA15-004	Retail/Restaurant/Fast Food	2.973	TSF
MV-90	Moval Assemblage	High-Cube Warehouse	456.337	TSF

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
MV-91	Restaurant	Restaurant	9.000	TSF
MV-92	Rancho Belago Plaza - Retail	Retail	14.000	TSF
MV-93	Yum Yum Donut Shop	Coffee/Donut Shop w/o Drive-Thru	4.351	TSF
MV-94	Hawthorn Inn & Suites	Hotel	79	RMS
MV-95	Sleep Inn Suites	Hotel	66	RMS
MV-96	Integrated Care Communities	Nursing Home	44.000	TSF
MV-97	Kaiser Permanente - Emergency Room Expansion	Medical Offices	--	TSF
MV-98	Moreno Valley Professional Center	General Office	84.000	TSF
MV-99	Olivewood Plaza - Office Building	General Office	23.000	TSF
MV-100	Renaissance Village of Moreno Valley	Senior Adult Housing-Attached	44	DU
MV-101	Riverside County Office Building	General Office	52.000	TSF
MV-102	Gateway Business Park	Residential Condo/Townhouse	34	DU
MV-103	Shaw Development	High-Cube Warehouse	367.000	TSF
MV-104	IDS/Real Estate Group - Nandina Distribution Center	High-Cube Warehouse	697.000	TSF
MV-105	Stoneridge Town Centre - Vacant Restaurant	Restaurant	5700.000	TSF
MV-106	Ironwood Residential	SFDR	144	DU
MV-107	TTM 31592 (P 13-078) Covey Ranch	SFDR	115	DU
MV-108	PA 06-0014 (Pierce Hardy Limited Partnership)	Lumbar Yard	67.000	TSF
MV-109	P06-1408	Retail	75.300	TSF
MV-110	PA13-009	Gas Station	16	VFP
MARCH JOINT POWERS AUTHORITY				
MA-1	March Lifecare Campus Specific Plan[4]	Medical Offices	190.000	TSF
		Commercial Retail	210.000	TSF
		Research & Education	200.000	TSF
		Hospital	50	Beds
		Institutional Residential	660	Beds
MA-2	Airport Master Plan	Airport Use	559.000	TSF
MA-3	Freeway Business Center (March JPA)	High-Cube Warehouse	710.083	TSF
COUNTY OF RIVERSIDE				
RC-1	SP 341; PP 21552 (Majestic Freeway Business Center)	High-Cube Warehouse	6100.715	TSF
RC-2	PP 20699 (Oleander Business Park)	Warehousing	1206.710	TSF
RC-3	Ramona Metrolink Station	Light Rail Transit Station	300	SP
RC-4	PP 22925 (Amstar/Kaliber Development)	Office (258.102 TSF)	258.102	TSF
		Warehousing	409.312	TSF
		General Light Industrial	42.222	TSF
		Retail	10.000	TSF
RC-5	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
RC-6	Meridian Business Park North	Industrial Park	5985.000	TSF
RC-7	PP 18908	General Light Industrial	133.000	TSF
RC-8	Tract 33869	SFDR	39.000	DU
RC-9	PP 16976	General Light Industrial	85.000	TSF
RC-10	PP 21144	Industrial Park	190.802	TSF
RC-11	a Villages of Lakeview	SFDR	860	DU
		Condo/Townhomes	1,920	DU
		Elementary School	1,200	STU
		Commercial Retail	100.000	TSF
		Soccer Complex	12	Fields
		City Park	8.9	AC
		County Park	8.1	AC
		Regional Park	107.1	AC
	b Motte Lakeview Ranch	SFDR	847	DU
		Condo/Townhomes	686	DU
		Apartments	467	DU
		Elementary School	650	STU
		Middle School	300	STU
		Commercial Retail	120.000	TSF
		Regional Park	177.0	AC
RC-12	CUP03315	Gas Station w/ Market	17	VFP
		Fast Food w/o Drive Thru	5.600	TSF
		High-Turnover Restaurant	6.500	TSF
RC-13	PP23342	Industrial Park	180.600	TSF
RC-14	TR30592	SFDR	131	DU
RC-15	Rider Street Quarry	Quarry	2500.0	AC
RC-16	PP 20711	Manufacturing	20.0	AC
	Yocum Baldwin	Warehousing	46.8	AC

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
RC-17	March Business Center - South Campus	Shopping Center	108.900	TSF
		Industrial Park	1336.700	TSF
		Large Industrial Park	3269.000	TSF
		General Office Building	140.600	TSF
		Manufacturing	215.600	TSF
		Warehousing	1379.200	TSF
		Park	50.0	AC
		R&D	1611.800	TSF
RC-18	Ben Clark Training Facility	Students	5,045	STU
		Employees	354	EMP
RC-19	PP 20103	Gen. Light Industrial	290.985	TSF
RC-20	Nuevo Business Park	Gen. Light Industrial	357.156	TSF
		Warehousing	1767.618	TSF
RC-21	Meridian (March Business Park SP)	Business Park	41917.000	TSF
RC-22	Blanding Assemblage	High-Cube Warehouse	707.880	TSF
RC-23	CUP 03527	Warehousing	8.000	TSF
RC-24	CUP 03599	Hotel	52.798	TSF
RC-25	PP 24608	Retail	9.280	TSF
RC-26	PM 32699	SFDR	2.00	DU
RC-27	PP 25699	Fast-Food w/Drive Thru	2.800	TSF
		Retail	19.000	TSF
RC-28	TR 30592	SFDR	131.00	DU
RC-29	PP 25768	Manufacturing	52.450	TSF
RC-30	CUP 03620R1	Gas Station w/ Market	8.00	VFP
RC-31	TTM 33410 Box Springs	SFDR	142	DU
RC-32	Knox Logistics	High-Cube Warehouse	1,259.050	TSF
RC-33	University Highlands	SFDR	405	DU
		Condo/Townhomes	320	DU
		Apartments	1,475	DU
		Shopping Center	50.0	TSF
		Parks	42.4	AC
CITY OF RIVERSIDE				
R-1	P07-1028 (Alessandro Business Park)	General Light Industrial	662.018	TSF
	Alessandro and Gorgonio	Fast Food w/Drive Thru	4.050	TSF
R-2	Alessandro Bl. (APN 263-091-008; 263-100-019; 263-100-005; P14-0841 to 0848)	Commercial and Industrial Complex	101.580	TSF
R-3	California Baptist University Specific Plan	University	157.0	AC
R-4	Canyon Springs Specific Plan	Hospital	280	BEDS
		Medical-Dental Office	370.000	TSF
		Senior Adult Housing-Attached	234	DU
		Assisted Living	267	BEDS
R-5	Citrus Business Park Specific Plan	Industrial Business Park	49.0	AC
R-6	Downtown Specific Plan	Residential	5,000	DU
R-7	Hunter Business Park	Industrial	1300.0	AC
R-8	La Sierra University Specific Plan	Mixed-Use		
R-9	Magnolia Avenue Specific Plan	Mixed-Use/Very High Residential	1473.0	AC
R-10	Marketplace Specific Plan	Commercial Retail/Office	200.0	AC
R-11	Mission Grove Specific Plan	Business/Office Park	56.8	AC
		Commercial Retail	68.1	AC
		High Density Residential	53.8	AC
		Low Density Residential	78.4	AC
		Medium Density Residential	155.3	AC
R-12	Orangecrest Specific Plan	Rural Residential	2.1	AC
		Business/Office Park	2.7	AC
		Commercial Retail	139.0	AC
		High Density Residential	13.7	AC
		Low Density Residential	540.8	AC
		Medium Density Residential	1217.8	AC
		Public Facilities/Institutions	121.6	AC
		Public Park	59.5	AC
R-13	Rancho La Sierra Specific Plan	SFDR	598	DU
R-14	Riverside Auto Center Specific Plan	Auto Center		
R-15	Riverwalk Vista Specific Plan	Residential	402	DU

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
R-16	Sycamore Canyon Specific Plan	Hillside Residential	41.8	AC
		Low Density Residential	97.3	AC
		Medium Density Residential	14.8	AC
		Very Low Density Residential	884.2	AC
		Public Park	27.9	AC
R-17	Sycamore Canyon Business Park Specific Plan	Business/Office Park	847.2	AC
		Commercial Retail	10.3	AC
R-18	Sycamore-Highlands Specific Plan	Commercial Retail	14.6	AC
		High Density Residential	52.2	AC
		Medium Density Residential	99.1	AC
		Public Facilities	1.6	AC
			144.2	AC
		Very Low Density Residential	49.1	AC
R-19	University Avenue Specific Plan	Mixed-Use	Varies	
R-20	807 Blaine Street (P09-0717; P09-0718)	Apartments	55	DU
R-21	2340 Fourteenth Street (P09-0808; P08-0809)	Senior Housing	134	BEDS
R-22	Park Sierra Avenue (P14-0026; P14-0027)	Fast Food w/Drive Thru	3.500	TSF
R-23	6287 Day Street (P10-0090; P10-0091)	Gas Station	2	VFP
	2570 Canyon Springs Parkway (P08-0274; P08-0275)	Bank w/ Drive Thru	2.746	TSF
	6211 Valley Springs Parkway (Steak 'N Shake Restaurant; P14-0536)	Fast Food w/Drive Thru	3.750	TSF
R-24	N. of Van Buren Boulevard; W. of Wood Street (P10-0808; P10-0708)	Fast Food w/Drive Thru	2.361	TSF
R-25	E. of Commerce St., between Mission Inn Av. and Ninth St. (P14-0045; P14-0046; P14-0047; P14-0048; P14-0049)	Apartments	208	DU
R-26	NWC of Riverwalk Parkway and Flat Rock Drive (P12-0019; P12-0156; P12-0158)	Convenience Store	2.400	TSF
		Coffee Shop	3.946	TSF
R-27	3875 Dawes Street (P10-0438; Magnolia Garden Condominiums)	Condo/Townhomes	62	DU
R-28	5938-5944 Grand Avenue (P12-0266; P12-0267; P12-0268)	Senior Housing	37	DU
R-29	4445 Magnolia Avenue (P13-0207; P13-0208; P13-0209; P13-0210; P13-0211)	Hospital Expansion	Varies	
R-30	SR-91/Van Buren Commercial	Commercial Retail	23.565	TSF
R-31	360 Alessandro Boulevard (P12-0419; P12-0557; P12-0558; P12-0559)	Bank	3.858	TSF
R-32	6465 Sycamore Canyon Boulevard	Health Club	4.000	TSF
R-33	2450 Market Street (P13-0087; P13-0262)	Apartments	77	DU
R-34	6091 Victoria Avenue (P13-0432)	Day Care	1.831	TSF
R-35	14601 Dauchy Av. - TM 36370 (P12-0601; P12-0697; P12-0698)	SFDR	10	DU
	TM 32180 (P07-1073)	SFDR	9	DU
	18875 Moss Road	SFDR	8	DU
	South of Clarke St., west of Crystal View Terrace (PM 34583' {09-0141; P09-173)	SFDR	3	DU
R-36	4824 Jones Avenue (P13-0181; P13-0182)	Church	23.124	TSF
R-37	2586 University avenue (P13-0650; P13-0651)	Bed and Breakfast	3.618	TSF
R-38	18580 Van Buren Boulevard (P08-0402; P13-0822)	Auto Repair Shop	8.142	TSF
R-39	4247 Van Buren Boulevard (P13-0785; P13-0787)	Church Expansion	12.166	TSF
R-40	SWC of Lurin Avenue and Wood Road (P06-0900; P08-0269; P08-0270; TTM 32301)	SFDR	20	DU
R-41	8616 California Avenue (P08-0084; PM 35852)	Condo/Townhomes	21	DU
R-42	19811 Lurin Avenue (P06-1355; TM 33480)	SFDR	32	DU
R-43	APN:266140029, 030 (P06-1396; Mariposa Avenue; TM 33481)	SFDR	25	DU
R-44	APN:266140002, 021, 022 (P06-1404; Lurin Avenue; TM 33482)	SFDR	29	DU
R-45	3719 Strong Street (P05-0269; P08-0416; TM 33550)	SFDR	9	DU
R-46	1006 & 1008 Clark Street (P06-0782; TM 34908)	SFDR	15	DU
R-47	E. of Gratton St., W. of Corsica Av., N. of Van Buren Bl. (P05-1528; P09-0087; TM 34509)	SFDR	50	DU
R-48	NWC of Dominion Avenue and Division Street (P08-0396; P08-0397; P08-0398; P08-0399; TM 35620)	Condo/Townhomes	36	DU
R-49	6639 Hillside Avenue (P08-0727; PM 35901)	Industrial	5	LOTS
R-50	19985 Van Buren Boulevard (P10-0118; Gless Ranch)	Commercial Retail	425.447	TSF
R-51	3990 Reynolds Road (P12-0021; P12-0022; P12-0074; PM 36442)	Condo/Townhomes	102	DU
R-52	NEC of Martha Way & Everest Avenue (P13-0389; TM 36579)	SFDR	5	DU
R-53	4325, 4335, 4345, 4355, 4375 Adams Street (P13-0723; P13-0724; P13-0725; TM 36654)	SFDR	62	DU
R-54	5200 Van Buren Boulevard (P09-0600; P09-0601; Walmart Expansion)	Free Standing Discount Store	22.272	TSF
R-55	P06-0160	Gen. Light Industrial	316.224	TSF
	P06-1281	Warehousing	107.732	TSF

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
R-56	9241 & 9265 Audrey Avenue (P12-0184; P12-0185; P12-0187; Azar Plaza)	Commercial Retail	6.150	TSF
R-57	Office, Magnon & Panattoni	Office	131.000	TSF
		Warehousing	1400.000	TSF
		Warehousing	300.000	TSF
		Warehousing	216.000	TSF
R-58	1710 Main Street (P12-0717)	Family Dollar Store	8.039	TSF
R-59	2861 Mary Street (P12-0442; P12-0443; P12-0444)	Shopping Center	56.101	TSF
R-60	3545 Central Avenue (P12-0741; P12-0743)	Riverside Plaza Renovations	35.0	AC
R-61	5731, 5741, 5761 & 5797 Pickler Street (P13-0198; P13-0199; P13-0200; P13-0201)	Apartments	30	DU
R-62	3705 Tyler Street (P13-0501; P13-0502)	Restaurant	6.000	TSF
R-63	6570 Magnolia Avenue; 3739 & 3747 Central Avenue (P13-0196; P13-0197)	Fast Food w/Drive Thru	3.795	TSF
R-64	5940-5980 Sycamore Canyon Boulevard (P13-0553; P13-0554; P13-0583; P14-0065)	Apartments	275	DU
R-65	SEC Sycamore Canyon Boulevard & Box Springs Road (P13-0607; P13-0608; P0609; P13-0854)	General Light Industrial	171.616	TSF
R-66	P06-0591	Office	37.939	TSF
		Warehousing	782.188	TSF
		Manufacturing	168.294	TSF
R-67	474 Palmyrita Avenue (P13-0956; P13-0959; P13-0960; P13-0963; P13-0964; P13-0965; P13-0966)	High-Cube Warehouse	1461.449	TSF
	CITY OF PERRIS			
P-1	P 05-0113 (IDI)	High-Cube Warehouse	1750.000	TSF
P-2	P 05-0192 (Oakmont I)	High-Cube Warehouse	697.600	TSF
P-3	P 05-0477	High-Cube Warehouse	462.692	TSF
P-4	Rados Distribution Center	High-Cube Warehouse	1200.000	TSF
P-5	Investment Development Services (IDS) II	High-Cube Warehouse	350.000	TSF
P-6	P 07-09-0018	Warehousing	170.000	TSF
P-7	P 07-07-0029 (Oakmont II)	High-Cube Warehouse	1600.000	TSF
P-8	TR 32707	SFDR	137	DU
P-9	TR 34716	SFDR	318	DU
P-10	P 05-0493 (Ridge I)	High-Cube Warehouse	700.000	TSF
P-11	Ridge II	High-Cube Warehouse	2000.000	TSF
P-12	Harvest Landing Specific Plan	SFDR	717	DU
		Condo/Townhomes	1,139	DU
		Sports Park	16.7	AC
		Business Park	1233.401	TSF
		Shopping Center	73.181	TSF
	Perris Marketplace	Shopping Center	450.000	TSF
P-13	P 06-0411 (Concrete Batch Plant)	Manufacturing	2.000	TSF
P-14	Jordan Distribution	High-Cube Warehouse	378.000	TSF
P-15	Aiere	High-Cube Warehouse	642.000	TSF
P-16	P 08-11-0005; P 08-11-0006 (Starcrest)	High-Cube Warehouse	454.088	TSF
P-17	Stratford Ranch Specific Plan	High-Cube Warehouse	1725.411	TSF
P-18	Stratford Ranch Specific Plan	High-Cube Warehouse	480.000	TSF
		General Light Industrial	120.000	TSF
P-19	P05-0493	Logistics	597.370	TSF
P-20	Starcrest, P011-0005; 08-11-0006	General Light Industrial	454.088	TSF
P-21	South Perris Industrial Phase 1	Logistics	787.700	TSF
P-22	South Perris Industrial Phase 2	Logistics	3448.734	TSF
P-23	South Perris Industrial Phase 3	Logistics	3166.857	TSF
P-24	P 04-0343	Warehousing	41.650	TSF
P-25	P 06-0228	General Light Industrial	149.738	TSF
P-26	P 06-0378	Senior Housing	429	DU
P-27	P 11-09-0011	Retail	80.000	TSF
P-28	P 12-05-0013	Apartments	75	DU
P-29	P 12-10-0005	High-Cube Warehouse	1463.887	TSF
P-30	TR 30850	Residential	496	DU
P-31	TR 30973	Residential	35	DU
P-32	TR 31225	Residential	57	DU
P-33	TR 31226	Residential	82	DU
P-34	TR 31240	Residential	114	DU
P-35	TR 31407	Residential	243	DU

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
P-36	TR 31650	SFDR	61	DU
P-37	TR 31659	SFDR	161	DU
P-38	TR 32041	Residential	122	DU
P-39	TR 32406	SFDR	15	DU
P-40	TR 33193	Townhomes	94	DU
P-41	TR 33338	Residential	75	DU
P-42	Park West Specific Plan	SFDR	521	DU
		Elementary School	750	STU
		Neighborhood Park	5.0	AC
P-43	The Venue	Commercial Retail	642.627	TSF
	Retail on San Jacinto	Commercial Retail	217.800	TSF
	Retail on Redlands	Fast Food w/ Drive Thru	4.500	TSF
		Pharmacy w/ Drive Thru	14.000	TSF
		Specialty Retail	31.500	TSF
P-44	South Perris Metrolink Station	Light Rail Transit Station	680	SP
P-45	IDS 04-0464	High-Cube Warehouse	1686.760	TSF
P-46	TTM 32708 (50% Complete)	SFDR	238	DU
P-47	PM 34199	Gen. Light Industrial	46.500	TSF
	DPR 05-0387	Gen. Light Industrial	9.854	TSF
	DPR 05-0452	Warehousing	31.200	TSF
	TPM 34697	Gen. Light Industrial	47.400	TSF
	DPR 06-0396	Warehousing	159.823	TSF
P-48	Integra Pacific Industrial Facility	High-Cube Warehouse	880.000	TSF

[1] SFDR = Single Family Detached Residential ; MFDR = Multi-Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; SP = Spaces; VFP = Vehicle Fueling Positions; RMS = Rooms; AC = Acres; EMP = Employees

[3] Source: Cactus Avenue and Commerce Center Drive Commercial Center TIA, Urban Crossroads, Inc., December 9, 2008 (Revised).

[4] Source: March Lifecare Campus Specific Plan Traffic Impact Analysis, Mountain Pacific, Inc., May 2009 (Revised).

As noted previously, an analysis of the proposed Project at various development tiers has been assessed for the purposes of this traffic study. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2020)
    - Existing 2015 counts
    - Ambient growth traffic (10.41%)
    - Cumulative Development Project traffic
    - Project traffic

4.8 GENERAL PLAN BUILDOUT (POST 2035) VOLUME DEVELOPMENT

The General Plan Buildout (Post 2035) With Project traffic conditions were derived from the Riverside County Transportation Analysis Model (RivTAM) modified to represent General Plan Buildout conditions for the City of Moreno Valley using accepted procedures for model forecast refinement and smoothing. The traffic forecasts reflect the area-wide growth anticipated between Existing conditions and General Plan Buildout 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 General Plan Buildout With Project peak hour forecasts were refined using the model derived long-range forecasts, along with existing peak hour traffic count data collected at each analysis location in April 2015. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the General Plan Buildout With Project peak hour 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.

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Long Range traffic conditions. However, review of the resulting model growth indicates negative growth for several study area intersections. 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 General Plan Buildout forecasts. General Plan Buildout turning volumes were compared to Opening Year Cumulative 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 and General Plan Buildout traffic conditions that is not accounted for by the

traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2015) and Opening Year Cumulative traffic 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 General Plan Buildout peak hour forecasts.

The future General Plan Buildout without Project peak hour turning movements were then reviewed by Urban Crossroads for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two freeway ramp locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there are 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 truck competent of RivTAM has 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 traffic forecasts, which are presented and evaluated in PCE (see *Section 3.6 Existing (2015) Traffic Counts* for discussion on PCE). As such, the General Plan Buildout forecasts are also assumed to be in PCE for the purposes of this analysis.

Post-processing worksheets for General Plan Buildout Without Project traffic conditions are provided in Appendix 4.2.

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5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations 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 E+P (WITHOUT INDIAN STREET BRIDGE) TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic and assumes the existing roadway network without the Indian Street Bridge over the Perris Valley Storm Drain. Exhibit 5-1 shows the ADT and peak hour intersection turning movement volumes, which can be expected for E+P (Without Indian Street Bridge) traffic conditions.

5.3 E+P (WITH INDIAN STREET BRIDGE) TRAFFIC VOLUME FORECASTS

Pursuant to the request of City staff, the E+P analysis scenario has also been evaluated assuming the Indian Street Bridge over the Perris Valley Storm Drain. This scenario includes Existing traffic volumes plus Project traffic and assumes the Indian Street Bridge over the Perris Valley Storm Drain is in place. Exhibit 5-2 shows the ADT and peak hour intersection turning movement volumes, which can be expected for E+P (With Indian Street Bridge) traffic conditions.

5.4 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.

5.4.1 E+P (WITHOUT INDIAN STREET BRIDGE)

The intersection analysis results are summarized in Table 5-1, the addition of Project traffic for E+P (Without Indian Street Bridge) is anticipated to result in the following additional intersection deficiency, in addition to those previously identified for Existing traffic conditions:

ID	Intersection Location
18	Heacock Street / San Michele Road – LOS E PM peak hour only

EXHIBIT 5-1 (1 OF 2): E+P (WITHOUT INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

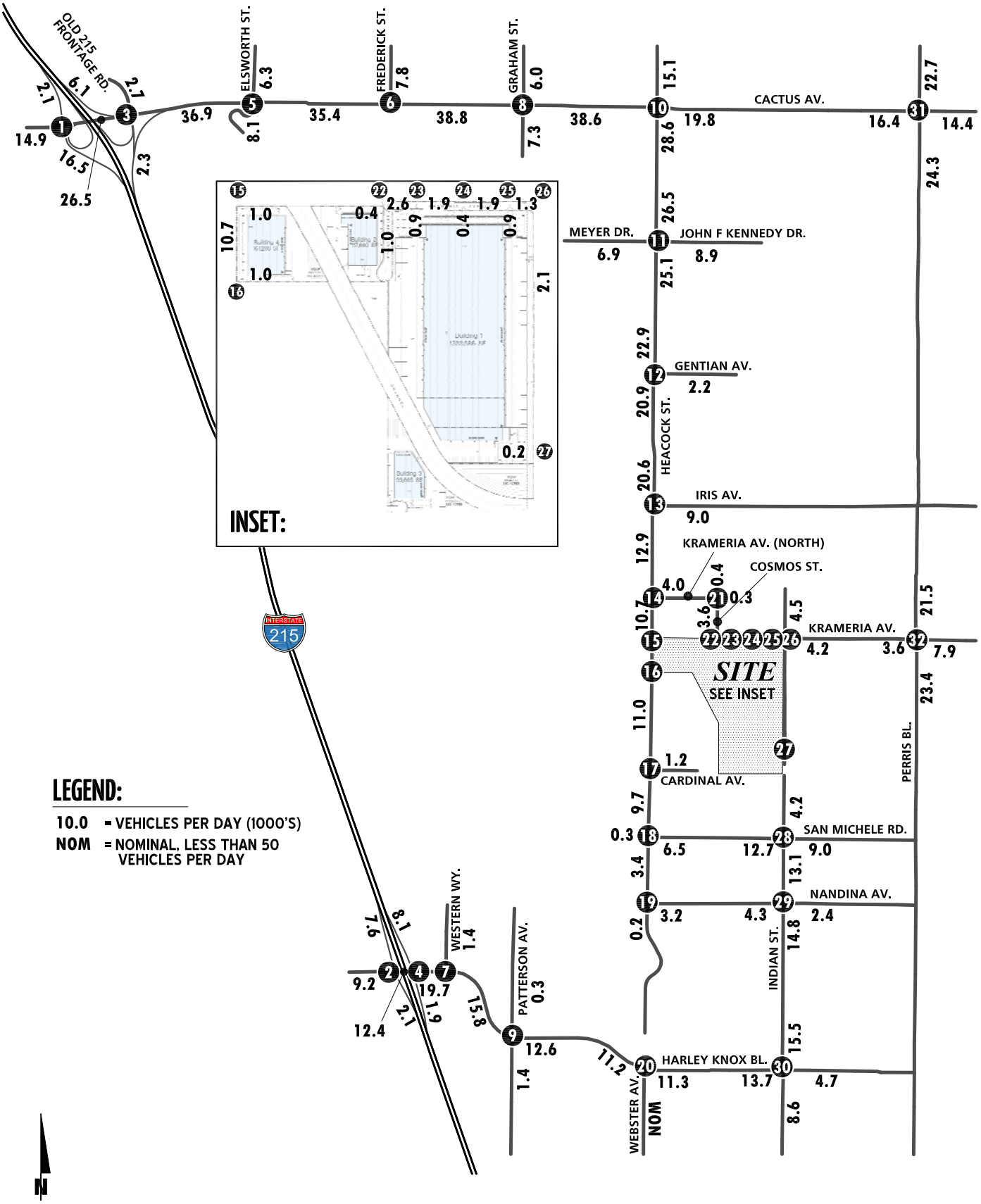
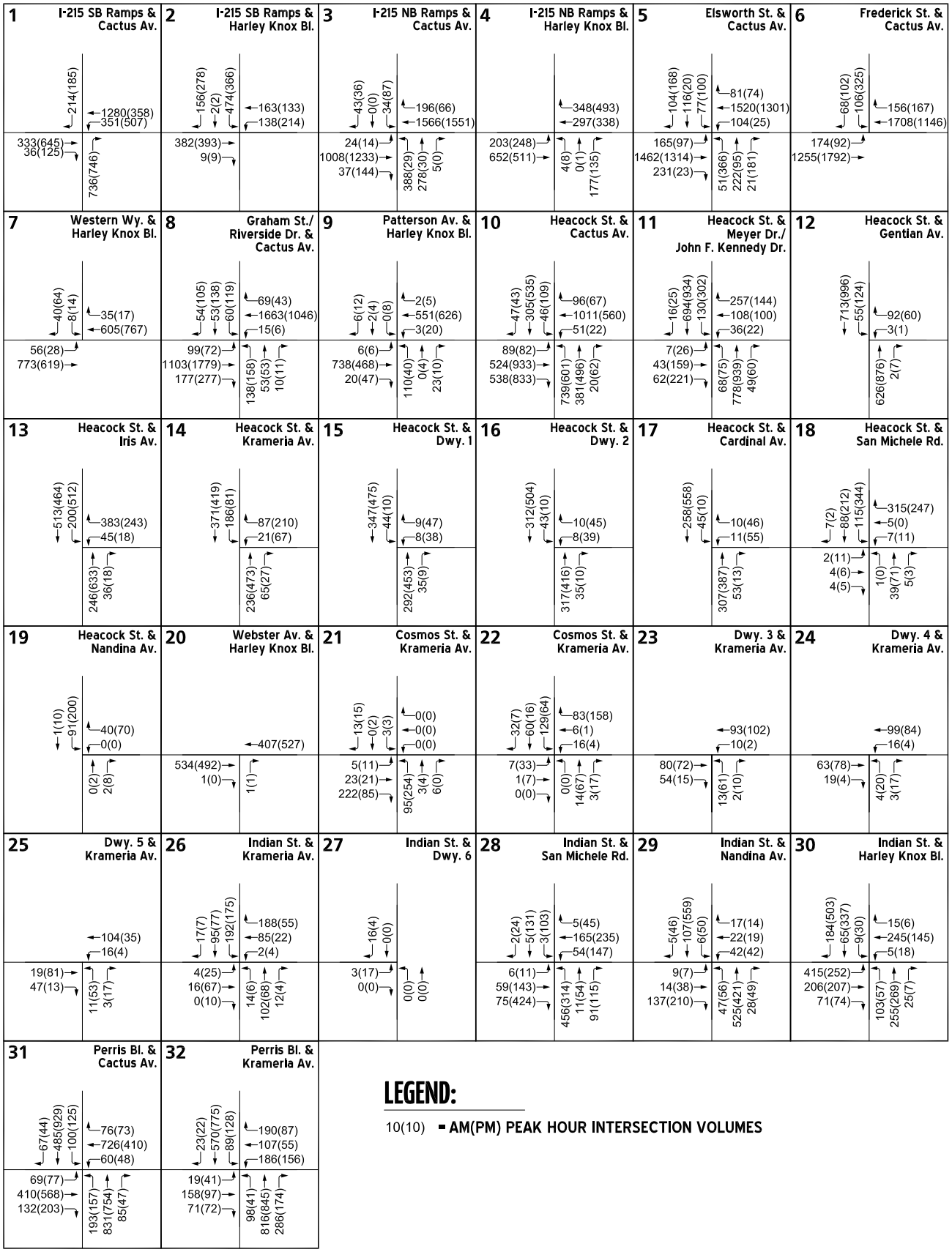


EXHIBIT 5-1 (2 OF 2): E+P (WITHOUT INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)



LEGEND:

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

EXHIBIT 5-2 (1 OF 2): E+P (WITH INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

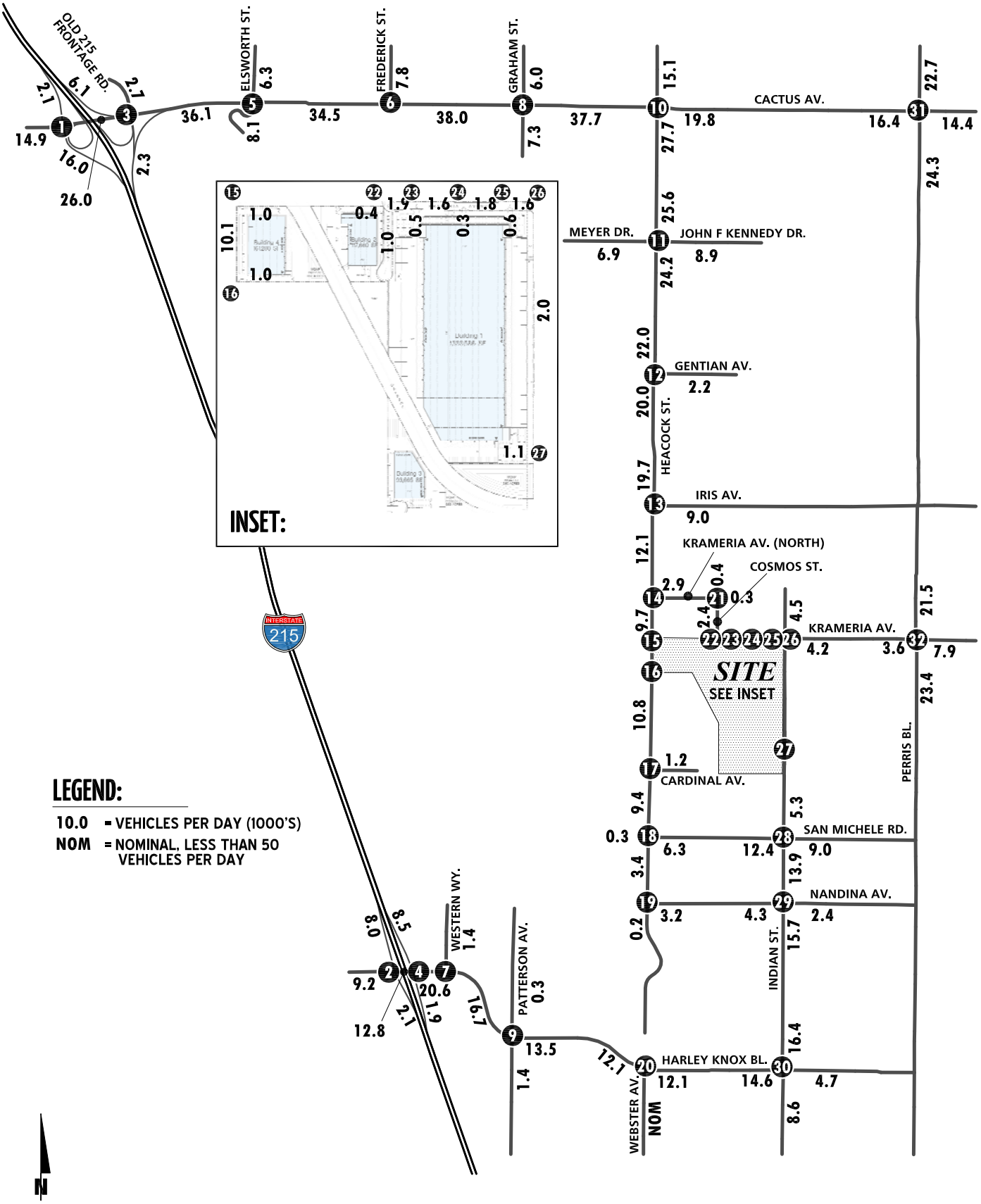


EXHIBIT 5-2 (2 OF 2): E+P (WITH INDIAN STREET BRIDGE) TRAFFIC VOLUMES (IN PCE)

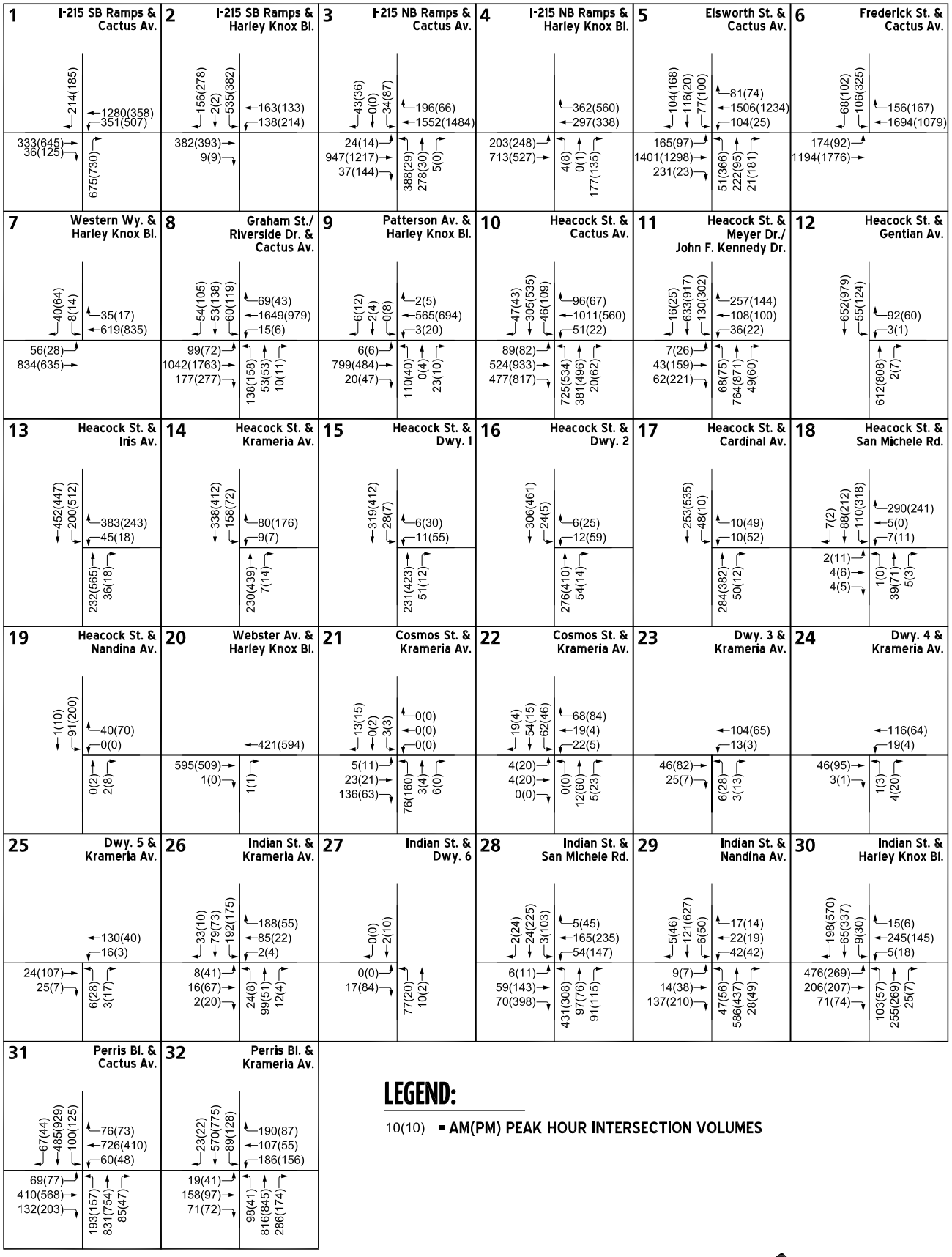


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control [2]	Existing (2015)				E+P w/o Indian				E+P With Indian			
			Delay [1] (secs.)		Level of Service		Delay [1] (secs.)		Level of Service		Delay [1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av	TS	14.4	39.0	B	D	19.4	39.0	B	D	16.4	39.0	B	D
2	I-215 SB Ramps / Harley Knox Bl	TS	33.8	31.2	C	C	34.5	36.0	C	D	35.5	36.0	D	D
3	I-215 NB Ramps / Cactus Av	TS	19.1	13.7	B	B	19.5	15.7	B	B	19.3	14.9	B	B
4	I-215 NB Ramps / Harley Knox Bl	TS	13.6	17.0	B	B	14.8	18.0	B	B	14.3	19.0	B	B
5	Elsworth St / Cactus Av	TS	38.9	30.2	D	C	38.9	30.2	D	C	38.9	30.2	D	C
6	Frederick St / Cactus Av	TS	24.9	21.9	C	C	25.5	23.2	C	C	25.3	22.7	C	C
7	Western Wy / Harley Knox Bl	CSS	12.0	12.1	B	B	12.1	14.1	B	B	12.3	14.8	B	B
8	Graham St / Cactus Av	TS	21.3	24.5	C	C	21.9	25.1	C	C	22.1	25.3	C	C
9	Patterson Av / Harley Knox Bl	TS	27.6	26.3	C	C	32.2	45.7	C	D	28.7	28.7	C	C
10	Heacock St / Cactus Av	TS	34.3	18.6	C	B	39.9	44.5	D	D	38.3	33.7	D	C
11	Heacock St / John F. Kennedy Dr	TS	23.3	21.8	C	C	24.4	27.9	C	C	27.8	25.3	C	C
12	Heacock St / Gentian Av	CSS	22.8	**58.0**	C	**F**	**35.0**	**>100.0**	**E**	**F**	31.7	**93.0**	D	**F**
13	Heacock St / Iris Av	AWS	15.2	**37.5**	C	**E**	**36.1**	**56.1**	**E**	**F**	25.7	**53.9**	D	**F**
14	Heacock St / Krameria Av (North)	TS	11.1	9.0	B	A	14.3	30.6	B	C	13.7	21.7	B	C
15	Heacock St / Driveway 1	**CSS**	Future Intersection				10.9	12.4	B	B	10.8	12.8	B	B
16	Heacock St / Driveway 2	**CSS**	Future Intersection				10.7	12.4	B	B	10.9	13.1	B	B
17	Heacock St / Cardinal Av	CSS	9.0	13.4	A	B	12.9	18.1	B	C	12.8	17.5	B	C
18	Heacock St / San Michele Rd	TS	25.6	39.5	C	D	37.0	**70.9**	D	**E**	35.7	**59.9**	D	**E**
19	Heacock St / Nandina Av	CSS	8.4	8.6	A	A	8.4	8.6	A	A	8.4	8.6	A	A
20	Webster Av / Harley Knox Bl	CSS	10.0	10.1	B	B	11.4	10.2	B	B	12.1	10.4	B	B
21	Cosmos St / Krameria Av (North)	CSS	9.8	9.3	A	A	10.2	11.5	B	B	9.6	10.4	A	B
22	Cosmos St / Krameria Av	**AWS**	Future Intersection				8.5	8.5	A	A	8.0	8.1	A	A
23	Driveway 3 / Krameria Av	**CSS**	Future Intersection				9.5	9.6	A	A	9.2	9.3	A	A
24	Driveway 4 / Krameria Av	**CSS**	Future Intersection				9.1	9.2	A	A	8.7	8.9	A	A
25	Driveway 5 / Krameria Av	**CSS**	Future Intersection				9.3	9.4	A	A	9.2	9.3	A	A
26	Indian St / Krameria Av	AWS	10.7	9.2	B	A	11.1	9.9	B	A	11.2	9.9	B	A
27	Indian St / Driveway 6	**CSS**	Future Intersection				8.7	8.8	A	A	8.4	8.7	A	A
28	Indian St / San Michele Rd	TS	29.3	35.8	C	D	31.0	36.4	C	D	29.9	36.6	C	D
29	Indian St / Nandina Av	TS	18.4	19.9	B	B	18.5	20.0	B	C	23.2	20.1	C	C
30	Indian St / Harley Knox Bl	TS	17.0	24.2	B	C	17.7	50.8	B	D	22.4	**72.3**	C	**E**
31	Perris Bl / Cactus Av	TS	24.8	32.4	C	C	25.1	32.9	C	C	25.1	32.9	C	C
32	Perris Bl / Krameria Av	TS	31.2	22.9	C	C	32.3	30.1	C	C	32.3	30.1	C	C

BOLD = 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; TS = Traffic Signal: AWS= All-way stop

5.4.2 E+P (WITH INDIAN STREET BRIDGE)

The intersection analysis results are summarized in Table 5-1, the addition of Project traffic (With Indian Street Bridge) is anticipated to result in the following additional intersection deficiencies, in addition to those previously identified for E+P (Without Indian Street Bridge) traffic conditions:

ID	Intersection Location
30	Indian Street / Harley Knox Boulevard – LOS E PM peak hour only

A summary of the peak hour intersection LOS for E+P (Without Indian Street Bridge) conditions are shown on Exhibit 5-3 and on Exhibit 5-4 for E+P (With Indian Street Bridge) traffic conditions. The intersection operations analysis worksheets for E+P, without and with Indian Street bridge, traffic conditions are included in Appendix 5.1 and Appendix 5.2 of this TIA, respectively.

5.5 ROADWAY SEGMENT CAPACITY ANALYSIS

As noted previously, the City of Moreno Valley 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.

5.5.1 E+P (WITHOUT INDIAN STREET BRIDGE)

Table 5-2 provides a summary of the E+P (Without Indian Street Bridge) conditions roadway segment capacity analysis based on the City of Moreno Valley and City of Perris General Plan Circulation Element Roadway Segment Capacity/(LOS) Thresholds identified previously on Table 2-3. As shown on Table 5-2, the following additional roadway segments are anticipated to operate at an unacceptable LOS under E+P (Without Indian Street Bridge) traffic conditions, in addition to those previously identified under Existing (2015) traffic conditions:

ID	Street	Segment
35	Heacock Street	North of Iris Avenue – LOS F
36		Iris Avenue to Krameria Avenue (N) – LOS F

5.5.2 E+P (WITH INDIAN STREET BRIDGE)

As shown on Table 5-2, there are no additional roadway segments anticipated to operate at unacceptable LOS under (E+P (With Indian Street Bridge), in addition to those previously identified for E+P (Without Indian Street Bridge) traffic conditions.

EXHIBIT 5-3: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR E+P (WITHOUT INDIAN STREET BRIDGE) CONDITIONS

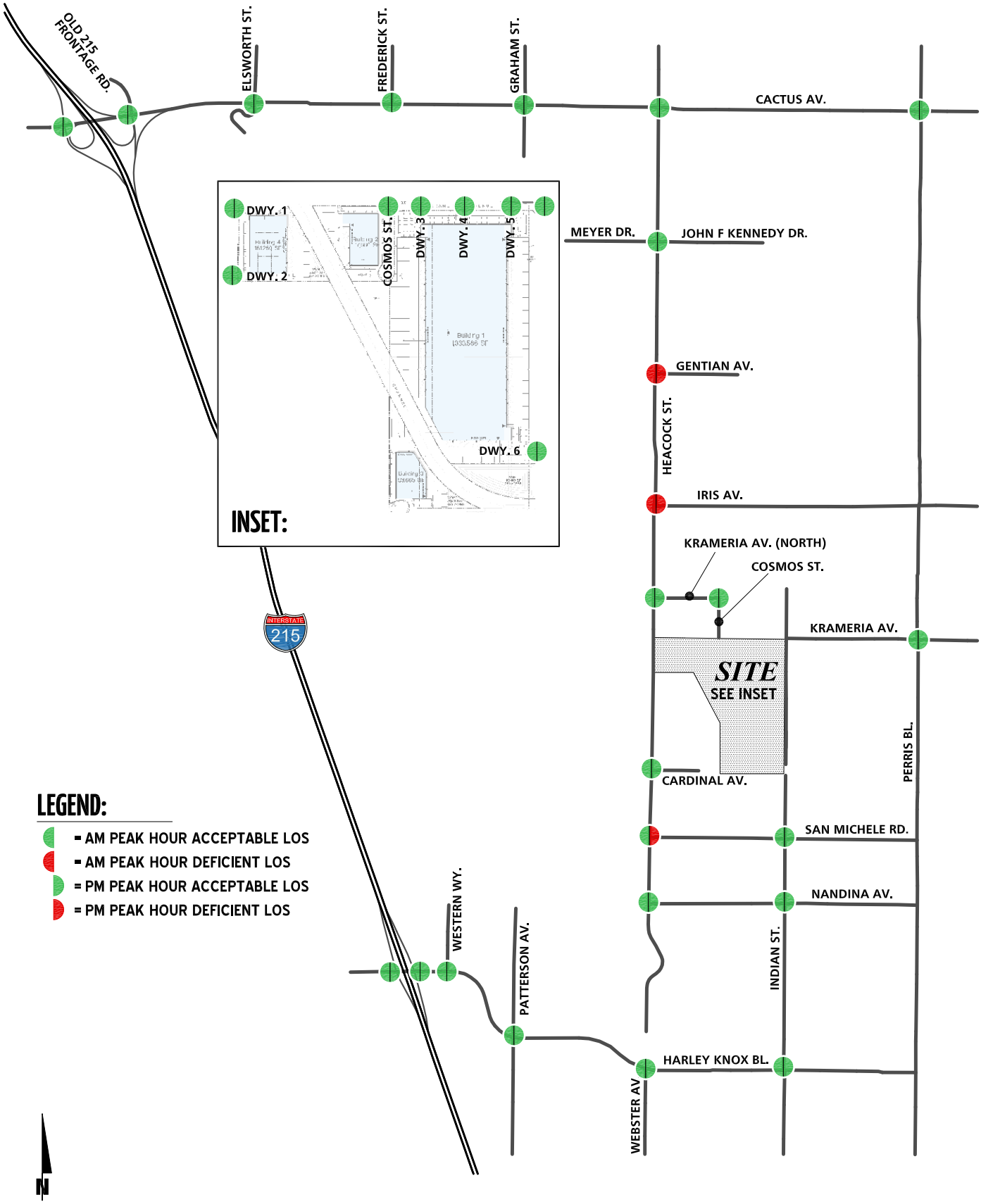


EXHIBIT 5-4: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR E+P (WITH INDIAN STREET BRIDGE) CONDITIONS

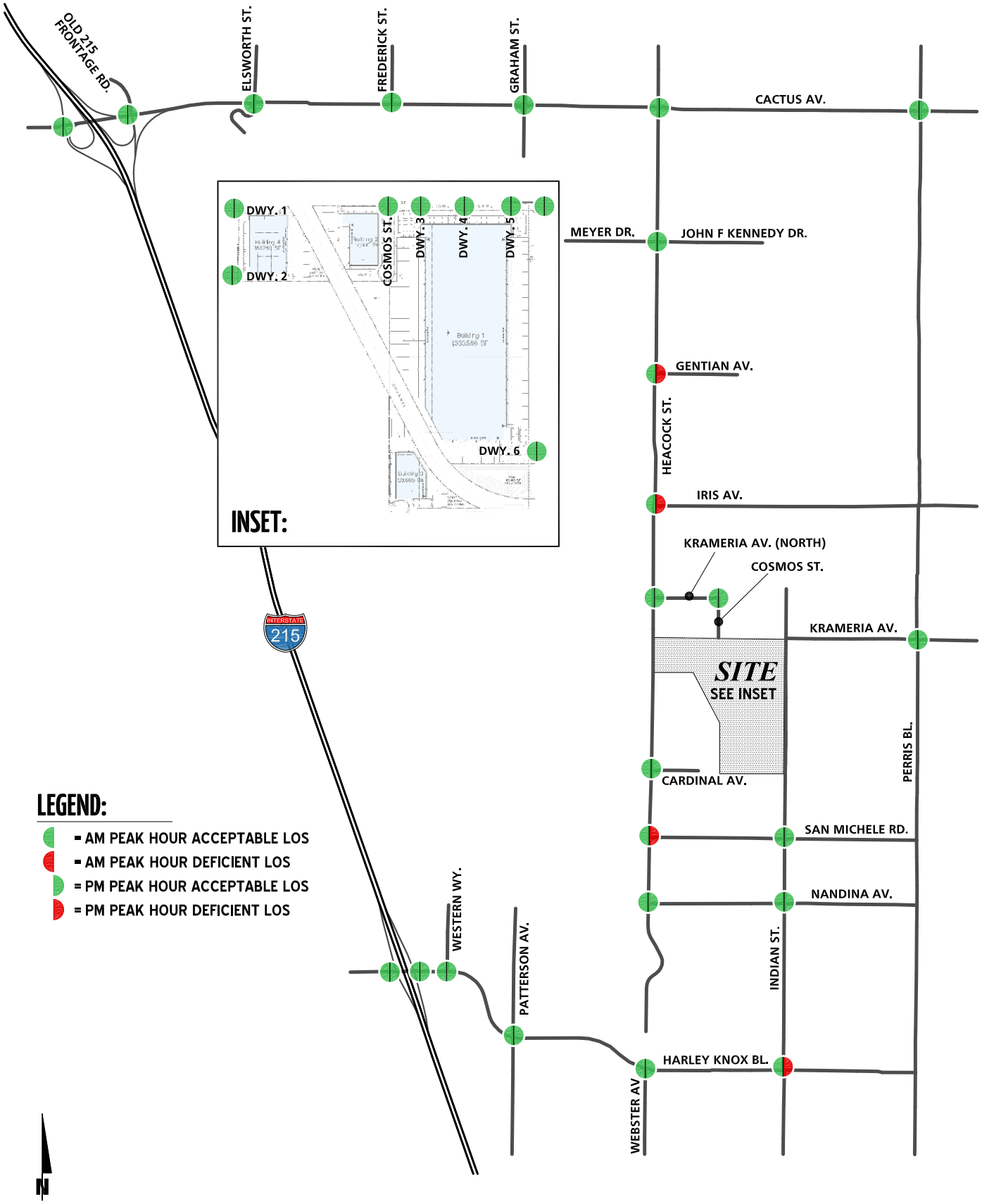


Table 5-2

Roadway Volume/Capacity Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2015	V/C[2]	LOS[3]	E+P w/o Indian	V/C[2]	LOS[3]	E+P w/ Indian	V/C[2]	LOS[3]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	4D	37,500	25,080	0.67	B	26,470	0.71	C	26,031	0.69	B	D
2		East of I-215 NB Ramps	4D	37,500	31,154	0.83	D	33,935	0.90	D	33,056	0.88	D	D
3		West of Elsworth Street	6D	56,300	34,154	0.61	B	36,935	0.66	B	36,056	0.64	B	D
4		East of Elsworth Street	6D	56,300	31,029	0.55	A	33,810	0.60	A	32,931	0.58	A	D
5		West of Frederick Street	5D	46,900	32,583	0.69	B	35,364	0.75	C	34,485	0.74	C	D
6		East of Frederick Street	5D	46,900	35,981	0.77	C	38,762	0.83	D	37,883	0.81	D	D
7		West of Graham Street	5D	46,900	36,044	0.77	C	38,825	0.83	D	37,946	0.81	D	D
8		East of Graham Street	5D	46,900	31,120	0.66	B	33,901	0.72	C	33,022	0.70	B	D
9		West of Heacock Street	5D	46,900	35,778	0.76	C	38,559	0.82	D	37,680	0.80	C	D
10		East of Heacock Street	4D	37,500	19,360	0.52	A	19,818	0.53	A	19,818	0.53	A	C
11		West of Perris Boulevard	4D	37,500	15,973	0.43	A	16,431	0.44	A	16,431	0.44	A	C
12	Krameria Avenue	Heacock Street to Cosmos Street	2U	12,500	1,076	0.09	A	4,022	0.32	A	2,864	0.23	A	D
13		Cosmos Street to Driveway 3	2U	12,500	620	0.05	A	2,602	0.21	A	1,866	0.15	A	D
14		Driveway 3 to Driveway 4	2U	12,500	620	0.05	A	1,902	0.15	A	1,634	0.13	A	D
15		Driveway 4 to Driveway 5	2U	12,500	620	0.05	A	1,866	0.15	A	1,811	0.14	A	D
16		Driveway 5 to Indian Street	2D	18,750	620	0.03	A	1,324	0.07	A	1,606	0.09	A	D
17		East of Indian Street	2D	18,750	3,716	0.20	A	4,244	0.23	A	4,244	0.23	A	D
18		West of Perris Boulevard	2U	12,500	3,040	0.24	A	3,568	0.29	A	3,568	0.29	A	D
19	Cardinal Avenue	East of Heacock Street	2U	12,500	46	0.00	A	1,198	0.10	A	1,198	0.10	A	C
20	San Michele Road	East of Heacock Street	2D	18,750	4,269	0.23	A	6,534	0.35	A	6,256	0.33	A	D
21		West of Indian Street	2D	18,750	10,411	0.56	A	12,676	0.68	B	12,398	0.66	B	D
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	4D	35,900	11,390	0.32	A	12,346	0.34	A	12,786	0.36	A	D
23		I-215 NB Ramps to Western Way	4D	35,900	17,815	0.50	A	19,727	0.55	A	20,607	0.57	A	D
24		East of Western Way	4U	25,900	13,901	0.54	A	15,814	0.61	B	16,693	0.64	B	D
25		West of Patterson Avenue	4U	25,900	11,444	0.44	A	13,357	0.52	A	14,236	0.55	A	D
26		East of Patterson Avenue	2D	18,000	10,492	0.58	A	12,581	0.70	B	13,460	0.75	C	D
27		West of Webster Avenue	2D	18,000	9,144	0.51	A	11,233	0.62	B	12,112	0.67	B	D
28		East of Webster Avenue	2D	18,000	9,156	0.51	A	11,245	0.62	B	12,124	0.67	B	D
29		West of Indian Street	3D	26,925	11,624	0.43	A	13,713	0.51	A	14,592	0.54	A	D

Table 5-2
Page 2 of 2

Roadway Volume/Capacity Analysis for E+P Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing 2015	V/C[2]	LOS[3]	E+P w/o Indian	V/C[2]	LOS[3]	E+P w/ Indian	V/C[2]	LOS[3]	Acceptable LOS
30	Heacock Street	South of Cactus Avenue	4D	37,500	24,824	0.66	B	28,549	0.76	C	27,670	0.74	C	D
31		North of John F. Kennedy Drive	4D	37,500	22,764	0.61	B	26,489	0.71	C	25,610	0.68	B	D
32		South of John F. Kennedy Drive	4D	37,500	21,272	0.57	A	25,103	0.67	B	24,224	0.65	B	D
33		North of Gentian Avenue	3D	28,150	19,047	0.68	B	22,877	0.81	D	21,998	0.78	C	D
34		South of Gentian Avenue	2U	12,500	**17,054**	**1.36**	**F**	**20,884**	**1.67**	**F**	**20,005**	**1.60**	**F**	D
35		North of Iris Avenue	2D	18,750	16,730	0.89	D	**20,560**	**1.10**	**F**	**19,681**	**1.05**	**F**	D
36		Iris Avenue to Krameria Avenue (N)	2U	12,500	9,113	0.73	C	**12,943**	**1.04**	**F**	**12,064**	**0.97**	**E**	D
37		Krameria Avenue (N) to Driveway 1	3D	28,150	8,516	0.30	A	10,668	0.38	A	9,679	0.34	A	D
38		Driveway 1 to Driveway 2	3D	28,150	8,516	0.30	A	10,386	0.37	A	9,748	0.35	A	D
39		Driveway 2 to Cardinal Avenue	4D	37,500	8,874	0.24	A	10,984	0.29	A	10,768	0.29	A	D
40		Cardinal Avenue to San Michele Road	3D	28,150	7,400	0.26	A	9,666	0.34	A	9,387	0.33	A	D
41		San Michele Road to Nandina Avenue	2D	18,750	3,427	0.18	A	3,427	0.18	A	3,427	0.18	A	D
42		South of Nandina Avenue	2U	12,500	228	0.02	A	228	0.02	A	228	0.02	A	D
43		North of Harley Knox Boulevard	2U	13,000	0	0.00	A	0	0.00	A	0	0.00	A	D
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	2U	12,500	620	0.05	A	3,566	0.29	A	2,408	0.19	A	D
45	Indian Street	Driveway 6 to San Michele Road	4D	37,500	0	0.00	A	0	0.00	A	1,158	0.03	A	D
46		San Michele Road to Nandina Avenue	4D	37,500	10,793	0.29	A	13,058	0.35	A	13,938	0.37	A	D
47		South of Nandina Avenue	2D	18,750	12,523	0.67	B	14,788	0.79	C	15,667	0.84	D	D
48		North of Harley Knox Boulevard	4D	35,900	13,201	0.37	A	15,466	0.43	A	16,345	0.46	A	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 Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

5.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Cactus Avenue and Harley Knox Boulevard interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 5-3 for E+P traffic conditions. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline.

5.6.1 E+P (WITHOUT INDIAN STREET BRIDGE)

As shown on Table 5-3, consistent with Existing traffic conditions, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for E+P (Without Indian Street Bridge) traffic conditions. Worksheets for E+P (Without Indian Street Bridge) traffic conditions off-ramp queuing analysis are provided in Appendix 5.3.

5.6.2 E+P (WITH INDIAN STREET BRIDGE)

As shown on Table 5-3, consistent with Existing traffic conditions, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for E+P (With Indian Street Bridge) traffic conditions. Worksheets for E+P (With Indian Street Bridge) traffic conditions off-ramp queuing analysis are provided in Appendix 5.4.

5.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

5.7.1 E+P (WITHOUT INDIAN STREET BRIDGE)

The following additional study area intersections are anticipated to meet peak hour volume based traffic signal warrants under E+P (Without Indian Street Bridge) traffic conditions, in addition to those previously warranted under Existing traffic conditions (see Appendix 5.5):

ID	Intersection Location	Jurisdiction	CMP?
17	Heacock Street / Cardinal Avenue	Moreno Valley, March JPA	No
26	Indian Street / Krameria Avenue	Moreno Valley	No

5.7.2 E+P (WITH INDIAN STREET BRIDGE)

The following additional study area intersection is anticipated to meet peak hour volume based traffic signal warrant under E+P (With Indian Street Bridge) traffic conditions, in addition to those previously warranted under E+P (Without Indian Street Bridge) traffic conditions (see Appendix 5.6):

ID	Intersection Location	Jurisdiction	CMP?
19	Heacock Street / Nandina Avenue	Moreno Valley, March JPA	No

Table 5-3

Peak Hour Off-Ramp Queuing Analysis for E+P Conditions

Intersection	Movement	Stacking Distance (Feet)	E+P Without Indian Street Bridge				E+P With Indian Street Bridge			
			95th Percentile Stacking Distance Required (Feet)		Acceptable?[1]		95th Percentile Stacking Distance Required (Feet)		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.										
	NBR	1,850	249 [2]	334 [2]	Yes	Yes	192 [2]	318 [2]	Yes	Yes
	SBR	1,115	87	0	Yes	Yes	87	0	Yes	Yes
I-215 SB Ramps / Harley Knox Bl.										
	SBL/T	1,330	427	348	Yes	Yes	472	360	Yes	Yes
	SBR	270	41	58	Yes	Yes	39	57	Yes	Yes
I-215 NB Ramps / Cactus Av.										
	NBL	145	321 [2]	26	Yes[3]	Yes	321 [2]	26	Yes[3]	Yes
	NBT	1,650	164	26	Yes	Yes	164	26	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.										
	NBL/T	1,120	13	22	Yes	Yes	13	22	Yes	Yes
	NBR	265	62	54	Yes	Yes	62	54	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound left turn lane without spilling back and affecting the I-215 Freeway mainline.

5.8 BASIC FREEWAY SEGMENT ANALYSIS

5.8.1 E+P (WITHOUT INDIAN STREET BRIDGE)

E+P (Without Indian Street Bridge) mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibits 5-5. As shown on Table 5-4, the basic freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours, with the addition of Project traffic. E+P (Without Indian Street Bridge) basic freeway segment analysis worksheets are provided in Appendix 5.7.

5.8.2 E+P (WITH INDIAN STREET BRIDGE)

E+P (With Indian Street Bridge) mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibits 5-6. As shown on Table 5-4, the basic freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS C or better) during the peak hours, with the addition of Project traffic. E+P (With Indian Street Bridge) basic freeway segment analysis worksheets are provided in Appendix 5.8.

5.9 FREEWAY MERGE/DIVERGE ANALYSIS

5.9.1 E+P (WITHOUT INDIAN STREET BRIDGE)

Ramp merge and diverge operations were also evaluated for E+P (Without Indian Street Bridge) traffic conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5, the freeway ramp merge and diverge areas are anticipated to operate at acceptable LOS (i.e., LOS D or better). E+P (Without Indian Street Bridge) freeway ramp junction operations analysis worksheets are provided in Appendix 5.9.

5.9.2 E+P (WITH INDIAN STREET BRIDGE)

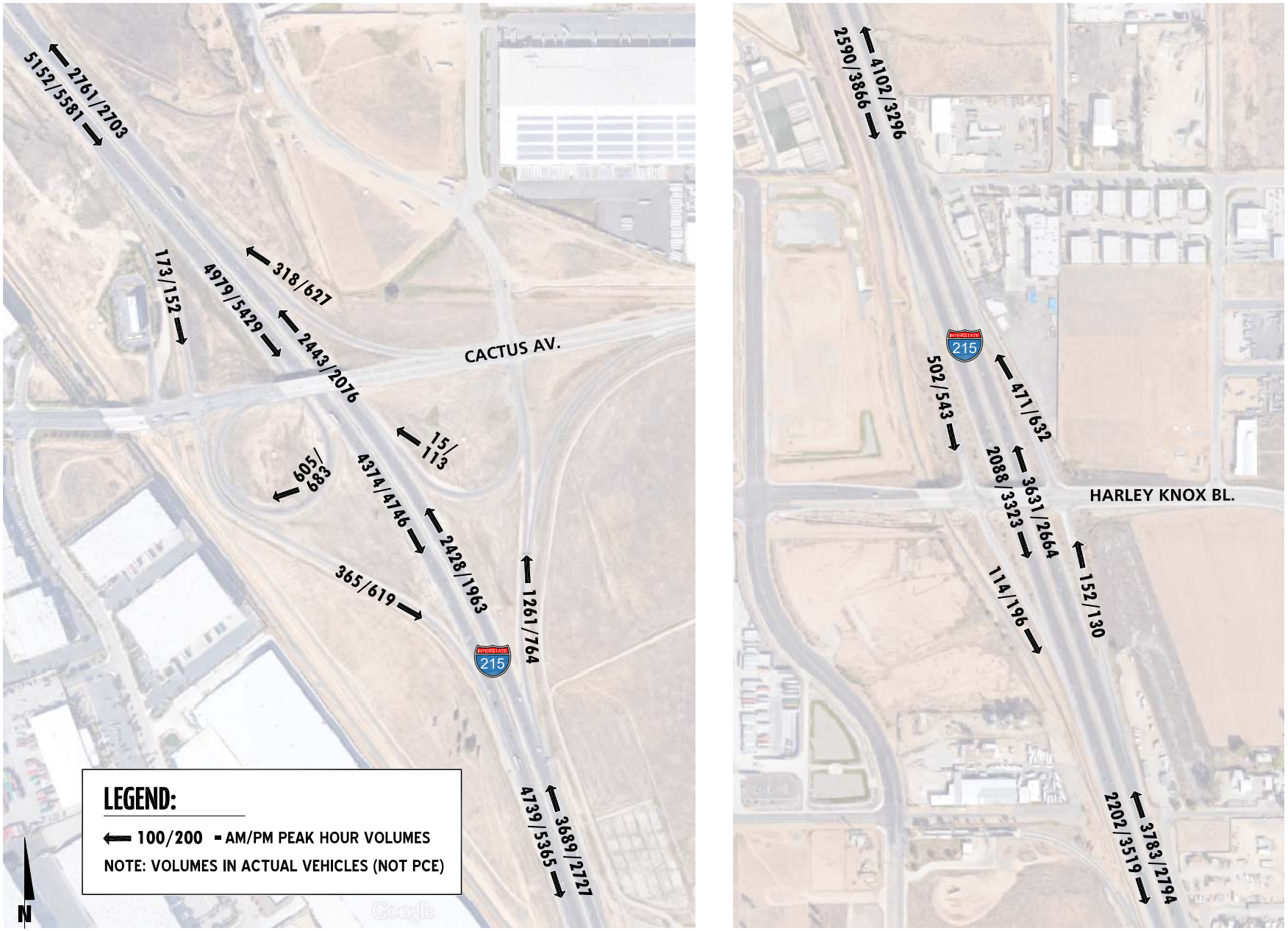
Ramp merge and diverge operations were also evaluated for E+P (With Indian Street Bridge) traffic conditions and the results of this analysis are presented in Table 5-5. As shown in Table 5-5, the freeway ramp merge and diverge areas are anticipated to operate at acceptable LOS (i.e., LOS D or better). E+P (With Indian Street Bridge) freeway ramp junction operations analysis worksheets are provided in Appendix 5.10.

5.10 PROJECT IMPACTS AND MITIGATION MEASURES

5.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvements necessary to reduce project-related traffic impacts to less-than-significant are also discussed below. The effectiveness of the proposed recommended mitigation measures are presented in Table 5-6 for E+P traffic conditions. As shown on Table 5-6, the recommended improvements for each of the impacted intersections are the same for each Project alternative (without and with the Indian Street extension), with the exception of the intersection of Indian Street and Harley Knox Boulevard. With the implementation of the intersection mitigation measures discussed below, there are no project-related impacts anticipated to the study area intersections.

EXHIBIT 5-5: E+P (WITHOUT INDIAN STREET BRIDGE) FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

EXHIBIT 5-6: E+P (WITH INDIAN STREET BRIDGE) FREEWAY MAINLINE VOLUMES

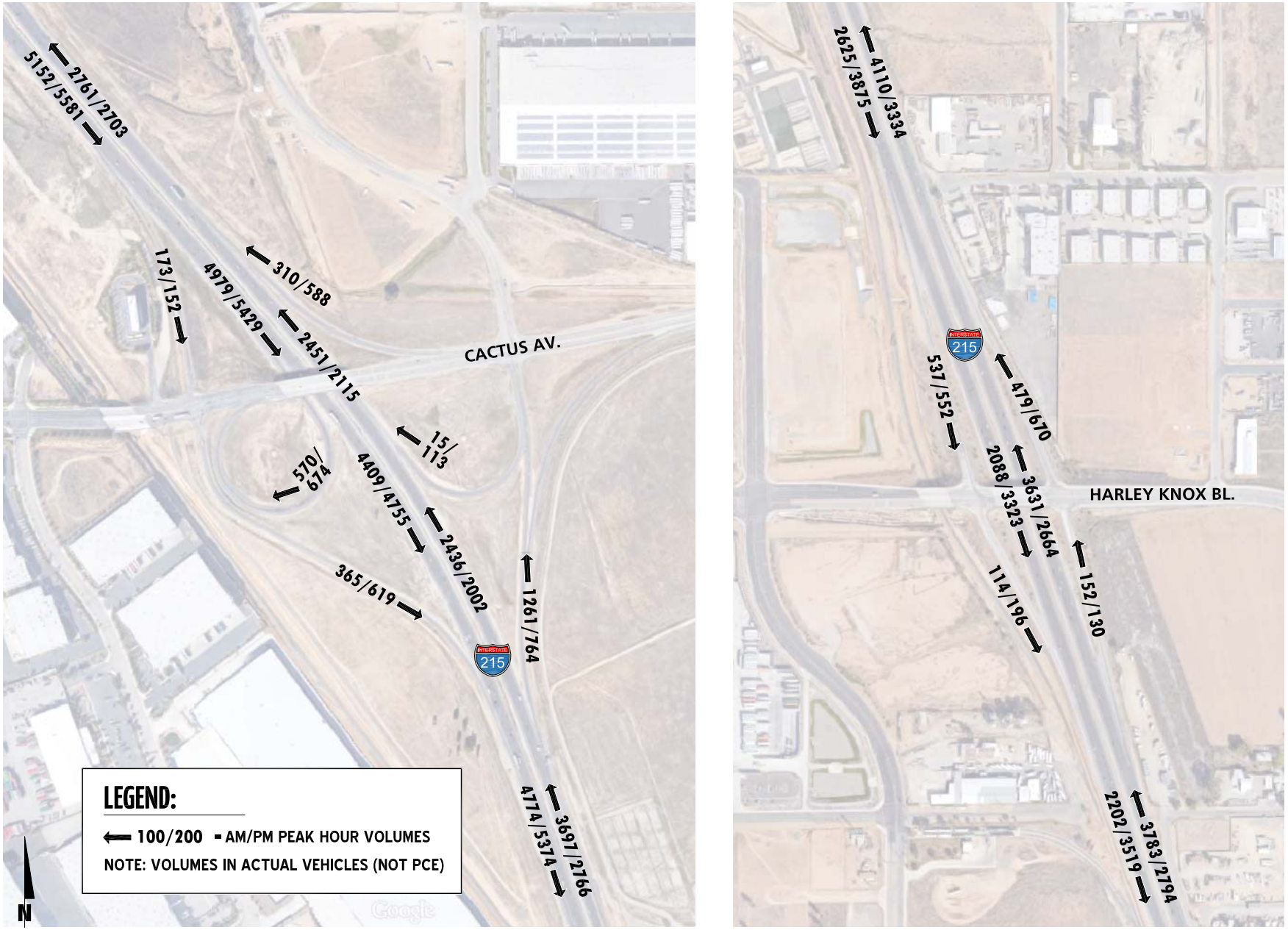


Table 5-4

Basic Freeway Segment Analysis for E+P Conditions

Freeway	Direction	Mainline Segment	Lanes[1]	Existing (2015)				E+P w/o Indian				E+P w/ Indian			
				Density[2]		LOS		Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	19.9	22.5	C	C	20.8	22.7	C	C	20.8	22.7	C	C
		South of Cactus Avenue	4	18.6	21.5	C	C	18.8	21.5	C	C	19.1	21.6	C	C
		North of Harley Knox Boulevard	3	13.4	20.5	B	C	13.7	20.7	B	C	13.9	20.8	B	C
		South of Harley Knox Boulevard	3	11.4	18.1	B	C	11.6	18.6	B	C	11.6	18.6	B	C
	NB	North of Cactus Avenue	4	10.9	10.0	A	A	11.1	10.9	B	A	11.1	10.9	B	A
		South of Cactus Avenue	4	14.6	10.6	B	A	14.7	10.8	B	A	14.7	11.0	B	A
		North of Harley Knox Boulevard	3	22.0	17.1	C	B	22.0	17.4	C	B	22.1	17.7	C	B
		South of Harley Knox Boulevard	3	19.6	14.6	C	B	20.1	14.7	C	B	20.1	14.7	C	B

* **BOLD** = Unacceptable Level of Service

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

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

Table 5-5

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

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2015)				E+P w/o Indian				E+P w/ Indian			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	26.9	C	30.2	D	28.6	D	30.6	D	28.4	D	30.6	D
		Loop Off-Ramp at Cactus Avenue - Downstream	4	26.9	C	30.2	D	28.6	D	30.6	D	28.4	D	30.6	D
		Off-Ramp at Harley Knox Boulevard	3	20.2	C	27.5	C	20.6	C	27.6	C	20.9	C	27.7	C
		On-Ramp at Harley Knox Boulevard	3	15.1	B	21.6	C	15.3	B	22.3	C	15.3	B	22.3	C
	NB	On-Ramp at Cactus Avenue	3	20.2	C	19.8	B	20.5	C	21.3	C	20.5	C	21.2	C
		On-Ramp at Harley Knox Boulevard	3	25.8	C	21.9	C	25.9	C	22.3	C	26.0	C	22.7	C
		Off-Ramp at Harley Knox Boulevard	3	25.1	C	20.0	B	25.6	C	20.1	C	25.6	C	20.1	C

* **BOLD** = Unacceptable Level of Service

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

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

Table 5-6

Intersection Analysis for E+P Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[2] (secs.) AM	PM	Level of Service AM	PM
12	Heacock St / Gentian Av																	
	- Existing (2015)	CSS	0	1	1	1	1	0	0	0	0	0	1	d	22.8	**58.0**	C	**F**
	- Without Improvements																	
	Without Indian St Bridge	CSS	0	1	1	1	1	0	0	0	0	0	1	d	**35.0**	**>100.0**	**E**	**F**
	With Indian St Bridge	CSS	0	1	1	1	1	0	0	0	0	0	1	d	31.7	**93.0**	D	**F**
	- With Improvements																	
	Existing (2015)	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	12.4	14.7	B	B
	Without Indian St Bridge	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	20.0	26.1	C	C
	With Indian St Bridge	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	19.5	27.1	B	C
13	Heacock St / Iris Av																	
	- Existing (2015)	AWS	0	1	0	1	1	0	0	0	0	1	0	d	15.2	**37.5**	C	**E**
	- Without Improvements																	
	Without Indian St Bridge	AWS	0	1	0	1	1	0	0	0	0	1	0	d	**36.1**	**56.1**	**E**	**F**
	With Indian St Bridge	AWS	0	1	0	1	1	0	0	0	0	1	0	d	25.7	**53.9**	D	**F**
	- With Improvements																	
	Existing (2015)	**TS**	0	1	0	1	1	0	0	0	0	1	0	d	26.7	38.5	C	D
	Without Indian St Bridge	**TS**	0	1	0	1	1	0	0	0	0	1	0	**1>**	25.5	48.9	C	D
	With Indian St Bridge	**TS**	0	1	0	1	1	0	0	0	0	1	0	**1>**	21.7	43.0	C	D
18	Heacock St / San Michele Rd																	
	- Existing (2015)	TS	1	1	1	1	1	1	1	1	1	1	1	1	25.6	39.5	C	D
	- Without Improvements																	
	Without Indian St Bridge	TS	1	1	1	1	1	1	1	1	1	1	1	1	37.0	**70.9**	D	**E**
	With Indian St Bridge	TS	1	1	1	1	1	1	1	1	1	1	1	1	35.7	**59.9**	D	**E**
	- With Improvements																	
	Existing (2015)		Improvements Not Necessary															
	Without Indian St Bridge	TS	1	1	1	1	1	1	1	1	1	1	1	**1>**	17.9	20.9	B	C
	With Indian St Bridge	TS	1	1	1	1	1	1	1	1	1	1	1	**1>**	17.7	20.5	B	C
30	Indian St / Harley Knox Bl																	
	- Existing (2015)	TS	2	2	1	1	2	0	1	1	1	2	2	0	17.0	24.2	B	C
	- Without Improvements																	
	Without Indian St Bridge	TS	2	2	1	1	2	0	1	1	1	2	2	0	17.7	50.8	B	D
	With Indian St Bridge	TS	2	2	1	1	2	0	1	1	1	2	2	0	22.4	**72.3**	C	**E**
	- With Improvements																	
	Existing (2015)		Improvements Not Necessary															
	Without Indian St Bridge		Improvements Not Necessary															
	With Indian St Bridge[4]	TS	2	2	1	1	2	**1>**	1	**3**	**0**	**1**	**3**	0	20.8	17.8	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 rig 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 o 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

[4] The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussion with City staff, the improvements are anticipated to be completed by Fall 2015

Potential Impact 1.1 – Heacock Street / Cactus Avenue (#10) – Although this intersection was found to operate at an acceptable LOS for the overall intersection (LOS D or better) during the peak hours under E+P traffic conditions, the addition of Project traffic is anticipated to worsen the northbound left turn lane's individual LOS from acceptable to unacceptable LOS, for both without and with the Indian Street extension. The addition of Project traffic is anticipated to also worsen the northbound left turn 95th percentile queue, which would likely exceed the existing available storage. As such, the impact is considered significant (Impact 1.1).

Mitigation Measure 1.1 – Heacock Street / Cactus Avenue (#10) – The following improvement is necessary to reduce the Project's proportionate increase in queues, thus reducing the Project's impact to less-than-significant:

- Restripe the northbound left turn lane to provide 315-feet of storage from the existing 215-feet in order to accommodate the anticipated 95th percentile queues.

Potential Impact 2.1 – Heacock Street / Gentian Avenue (#12) – Although this intersection was found to operate at an unacceptable LOS (LOS F) during the PM peak hour under Existing traffic conditions, the intersection is anticipated to continue to operate at unacceptable levels during one or more of the peak hours with the addition of Project traffic, for both without and with the Indian Street extension. As such, the impact is considered cumulatively significant (Impact 2.1).

Mitigation Measure 2.1 – Heacock Street / Gentian Avenue (#12) – 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:

- Payment of the Project's DIF fees to be applied towards the installation of a traffic signal to improve the existing deficiency.

Potential Impact 3.1 – Heacock Street / Iris Avenue (#13) – 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 one or more of the peak hours with the addition of Project traffic, for both without and with the Indian Street extension. As such, the impact is considered cumulatively significant (Impact 3.1).

Mitigation Measure 3.1 – Heacock Street / Iris Avenue (#13) – The following improvements are 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:

- Payment of the Project's DIF fees to be applied towards the installation of a traffic signal to improve the existing deficiency.
- Mitigation measure also consists of a westbound right turn lane with overlap phasing. The Project would pay its fair share to the City of Moreno Valley towards the addition of a westbound right turn lane with overlap phasing.

Potential Impact 4.1 – Heacock Street / San Michele Road (#18) – This intersection was found to operate at acceptable LOS (LOS D or better) during the peak hours under Existing traffic

conditions, however, the addition of Project traffic is anticipated to result in deficient peak hour operations during the PM peak hour only, for both without and with the Indian Street extension. As such, the impact is considered significant (Impact 4.1).

Mitigation Measure 4.1 – Heacock Street / San Michele Road (#18) – 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 impact to less-than-significant:

- Modify the existing traffic signal to implement overlap phasing on the westbound right turn lane.

Potential Impact 5.1 – Indian Street / Harley Knox Boulevard (#30) – This intersection was found to operate at acceptable LOS (LOS C or better) during the peak hours under Existing traffic conditions, however, the addition of Project traffic (with Indian Street extension alternative only) is anticipated to result in deficient peak hour operations during the PM peak hour only. The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussions with City staff, the improvements are anticipated to be completed by Fall 2015. With the implementation of the planned improvements, there are no LOS deficiencies anticipated with the addition of Project traffic. As such, the impact is considered less-than-significant.

The potential off-site impacts to the study area intersections are anticipated to be relatively the same for the proposed Project, without or with the bridge. As such, the development of the proposed Project is not anticipated to drive the need for the Indian Street bridge over the Perris Valley Storm Drain Channel.

Worksheets for E+P without and with Indian Street Bridge traffic conditions, with improvements, HCM calculation worksheets are provided in Appendix 5.11 and Appendix 5.12, respectively.

5.10.2 Recommended Improvements to Address Deficiencies on Roadway Segments

As shown on Table 5-6, the E+P 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. As such, roadway segment widening does not appear necessary to address the deficiencies at the identified roadway segments.

5.10.3 Recommended Improvements to Address Off-Ramp Queues

As shown previously on Table 5-3, there are no peak hour queuing issues at the I-215 Freeway at Cactus Avenue or Harley Knox Boulevard interchanges for E+P traffic conditions. As such, no improvements have been recommended.

5.10.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Table 5-4 and Table 5-5, there are no deficient freeway mainline segments or merge/diverge ramp junctions anticipated for E+P traffic conditions. As such, no improvements have been recommended.

6 OPENING YEAR CUMULATIVE (2020) TRAFFIC CONDITIONS

This section discusses the methods used to develop Existing plus Ambient Growth plus Project plus Cumulative (Opening Year Cumulative) (2020) traffic forecasts, and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2020) 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).

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

To account for background traffic, other known cumulative development projects in the study area were included in addition to 10.41% of ambient growth for Opening Year Cumulative traffic conditions. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2020) Without Project traffic conditions are shown on Exhibit 6-1.

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

To account for background traffic, other known cumulative development projects in the study area were included in addition to 10.41% of ambient growth for Opening Year Cumulative traffic conditions in conjunction with traffic associated with the proposed Project. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2020) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

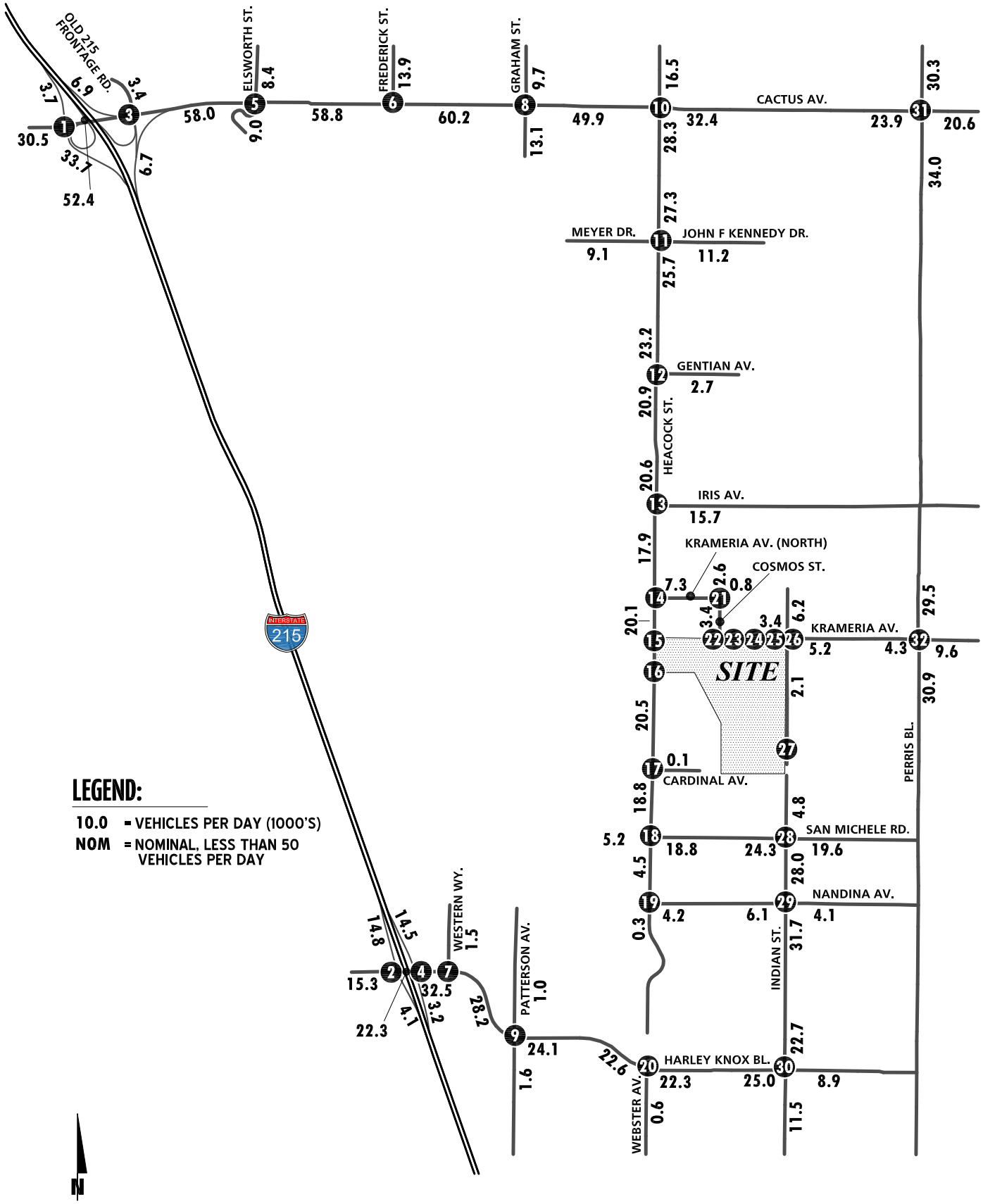


EXHIBIT 6-1 (2 OF 2): OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

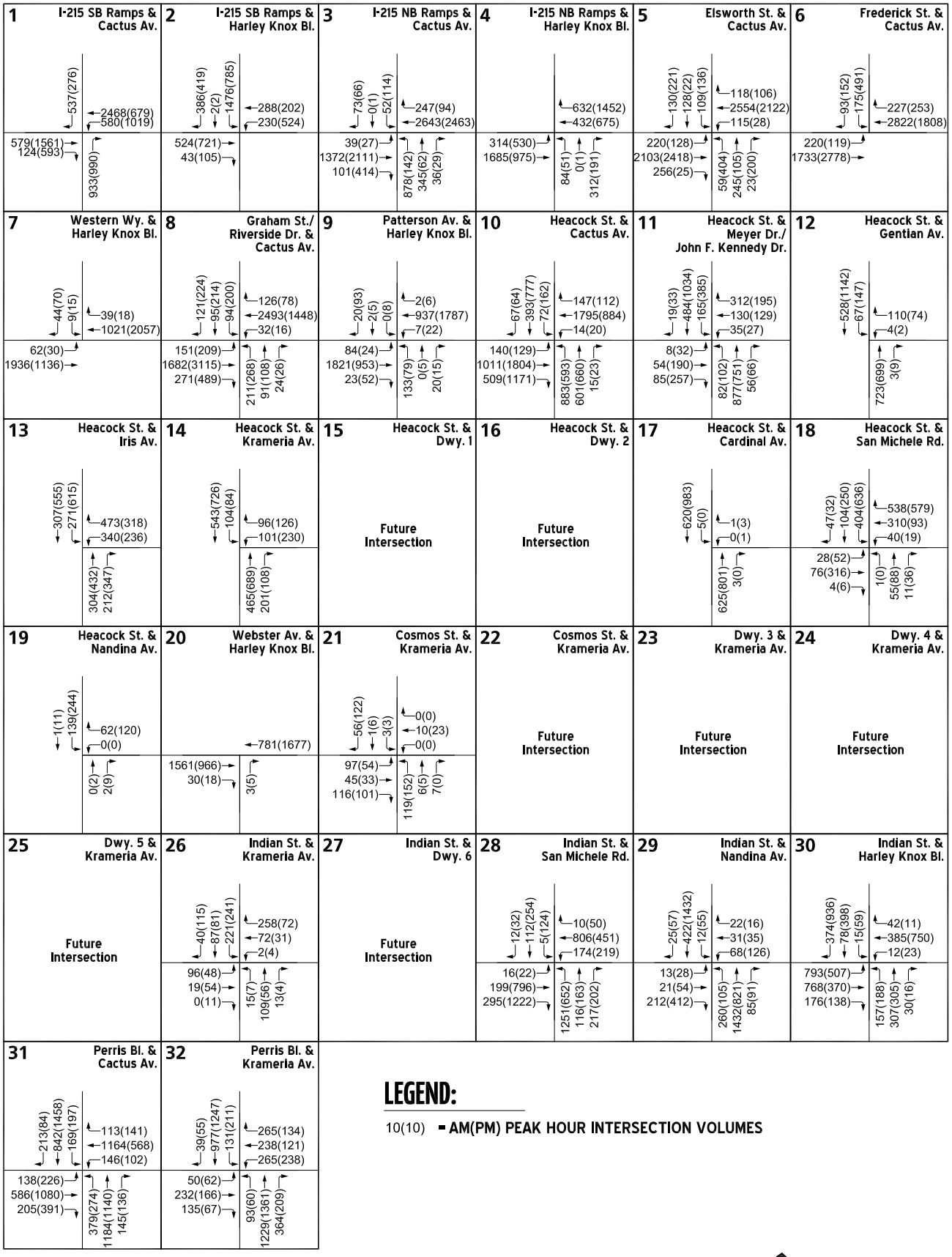


EXHIBIT 6-2 (1 OF 2): OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES (IN PCE)

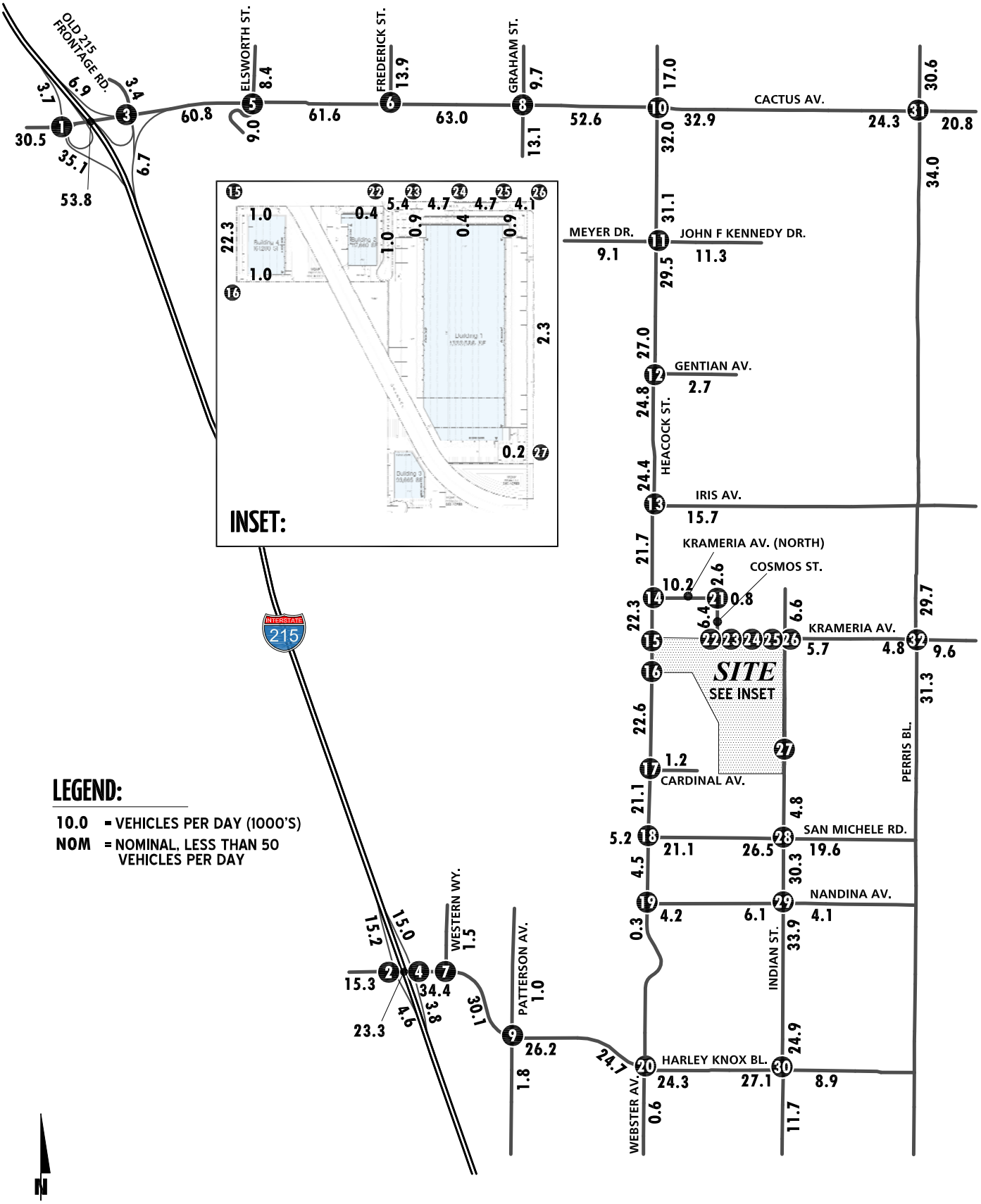
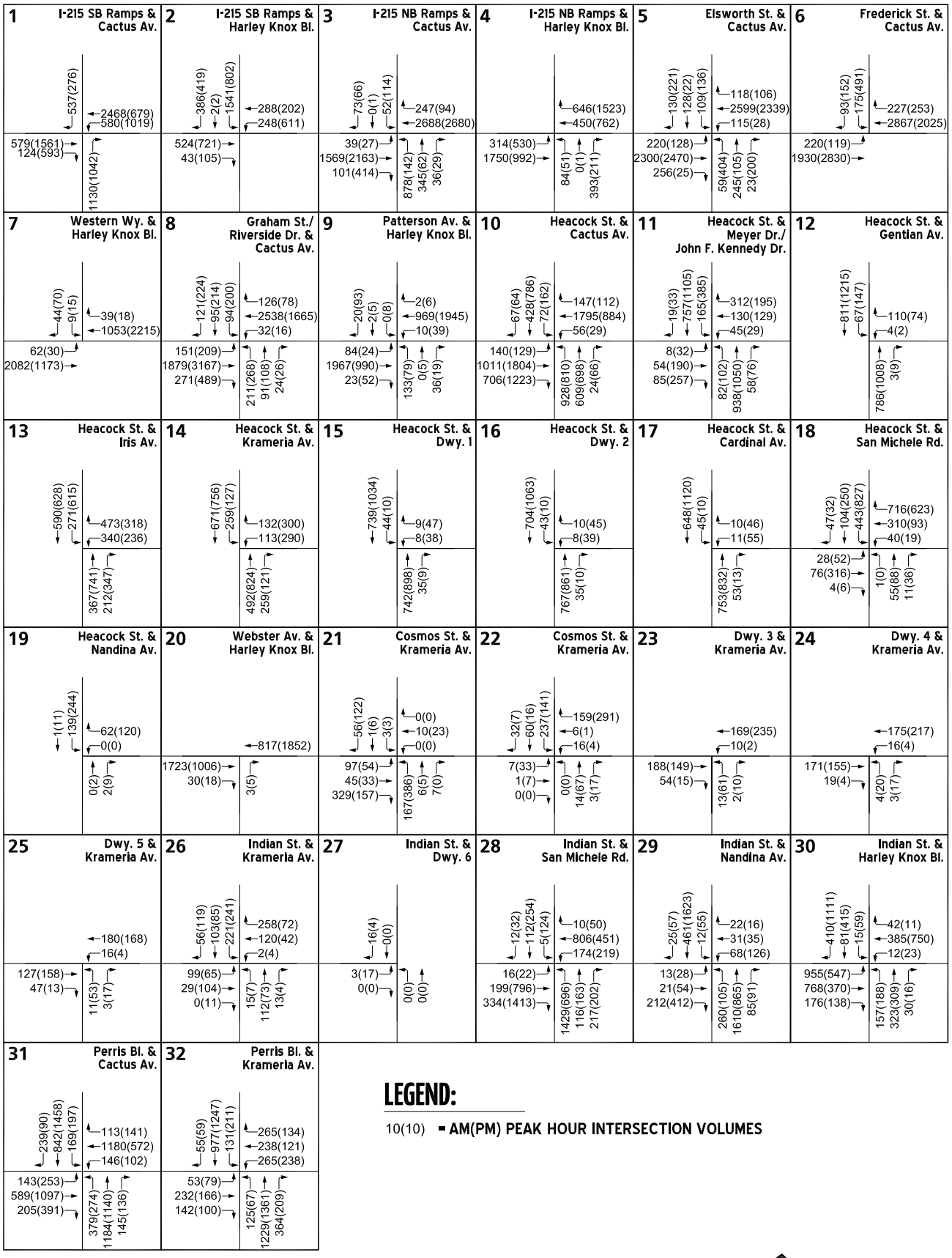


EXHIBIT 6-2 (2 OF 2): OPENING YEAR CUMULATIVE (2020) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



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6.4 INTERSECTION OPERATIONS ANALYSIS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative 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 unacceptable LOS during the peak hours under Opening Year Cumulative (2020) traffic conditions, in addition to those previously identified for Existing traffic conditions:

ID	Intersection Location
1	I-215 Southbound Ramps / Cactus Avenue – LOS F AM and PM peak hours
2	I-215 Southbound Ramps / Harley Knox Boulevard – LOS F AM and PM peak hours
3	I-215 Northbound Ramps / Cactus Avenue – LOS F AM and PM peak hours
4	I-215 Northbound Ramps / Harley Knox Boulevard – LOS F PM peak hour only
5	Elsworth Street / Cactus Avenue – LOS F AM peak hour only
7	Western Way / Harley Knox Boulevard – LOS F PM peak hour only
8	Graham Street / Cactus Avenue – LOS F AM and PM peak hours
9	Patterson Avenue / Harley Knox Boulevard – LOS F AM and PM peak hours
10	Heacock Street / Cactus Avenue – LOS E AM peak hour only
18	Heacock Street / San Michele Road – LOS F AM and PM peak hours
28	Indian Street / San Michele Road 0 LOS F AM and PM peak hours
29	Indian Street / Nandina Avenue – LOS F AM and PM peak hours
30	Indian Street / Harley Knox Boulevard – LOS F PM peak hour only
31	Perris Boulevard / Cactus Avenue – LOS E AM peak hour; LOS F PM peak hour
32	Perris Boulevard / Krameria Avenue – LOS E PM peak hour only

There are no additional intersections anticipated to operate at unacceptable LOS with the addition of Project traffic, in addition to those previously identified for Opening Year Cumulative Without Project traffic conditions. A summary of the peak hour intersection LOS for Opening Year Cumulative (2020) Without Project conditions are shown on Exhibit 6-3 and on Exhibit 6-4 for Opening Year Cumulative (2020) With Project traffic conditions. The intersection operations analysis worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions are included in Appendix 6.1 and Appendix 6.2 of this TIA, respectively. Measures to address near-term cumulative deficiencies for Opening Year Cumulative traffic conditions are discussed in Section 7.10 *Recommended Improvements.*

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 6-1

Intersection Analysis for Opening Year Cumulative (2020) Conditions

#	Intersection	Traffic Control [2]	2020 Without Project				2020 With Project			
			Delay [1] (secs.)		Level of Service		Delay [1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av	TS	**117.6**	**172.3**	**F**	**F**	**183.6**	**172.3**	**F**	**F**
2	I-215 SB Ramps / Harley Knox Bl	TS	**>200.0**	**118.6**	**F**	**F**	**>200.0**	**158.4**	**F**	**F**
3	I-215 NB Ramps / Cactus Av	TS	**174.3**	**126.7**	**F**	**F**	**174.7**	**153.7**	**F**	**F**
4	I-215 NB Ramps / Harley Knox Bl	TS	19.2	**>200.0**	B	**F**	25.9	**>200.0**	C	**F**
5	Elsworth St / Cactus Av	TS	**88.7**	43.5	**F**	D	**97.0**	53.6	**F**	D
6	Frederick St / Cactus Av	TS	30.0	47.9	C	D	33.0	51.1	C	D
7	Western Wy / Harley Knox Bl	CSS	18.6	**>100.0**	C	**F**	18.1	**>100.0**	C	**F**
8	Graham St / Cactus Av	TS	**123.8**	**117.6**	**F**	**F**	**125.3**	**117.8**	**F**	**F**
9	Patterson Av / Harley Knox Bl	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
10	Heacock St / Cactus Av	TS	**59.3**	48.9	**E**	D	**64.6**	**85.6**	**E**	**F**
11	Heacock St / John F. Kennedy Dr	TS	25.9	24.1	C	C	26.9	36.7	C	D
12	Heacock St / Gentian Av	CSS	33.2	**>100.0**	D	**F**	**53.8**	**>100.0**	**F**	**F**
13	Heacock St / Iris Av	AWS	**46.2**	**58.5**	**E**	**F**	**57.2**	**59.6**	**F**	**F**
14	Heacock St / Krameria Av (North)	TS	17.1	36.4	B	D	21.2	52.0	C	D
15	Heacock St / Driveway 1	**CSS**	Future Intersection				15.0	20.8	C	C
16	Heacock St / Driveway 2	**CSS**	Future Intersection				14.9	20.9	B	C
17	Heacock St / Cardinal Av	CSS	11.3	26.6	B	D	23.8	28.4	C	D
18	Heacock St / San Michele Rd	TS	**198.9**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
19	Heacock St / Nandina Av	CSS	8.5	8.9	A	A	8.5	8.9	A	A
20	Webster Av / Harley Knox Bl	CSS	0.0	18.4	A	C	0.0	18.4	A	C
21	Cosmos St / Krameria Av (North)	CSS	13.6	15.3	B	C	21.6	25.7	C	D
22	Cosmos St / Krameria Av	**AWS**	Future Intersection				10.1	10.2	B	B
23	Driveway 3 / Krameria Av	**CSS**	Future Intersection				10.2	10.6	B	B
24	Driveway 4 / Krameria Av	**CSS**	Future Intersection				9.8	9.9	A	A
25	Driveway 5 / Krameria Av	**CSS**	Future Intersection				9.9	10.2	A	B
26	Indian St / Krameria Av	AWS	14.0	10.7	B	B	14.9	12.0	B	B
27	Indian St / Driveway 6	**CSS**	Future Intersection				8.7	8.8	A	A
28	Indian St / San Michele Rd	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
29	Indian St / Nandina Av	TS	**125.5**	**135.1**	**F**	**F**	**137.9**	**169.4**	**F**	**F**
30	Indian St / Harley Knox Bl	TS	19.1	**181.4**	B	**F**	19.5	**>200.0**	B	**F**
31	Perris Bl / Cactus Av	TS	**77.5**	**155.6**	**E**	**F**	**79.6**	**165.4**	**E**	**F**
32	Perris Bl / Krameria Av	TS	46.8	**60.4**	D	**E**	48.4	**74.8**	D	**E**

BOLD = 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; TS = Traffic Signal: AWS= All-way stop

EXHIBIT 6-3: SUMMARY OF PEAK HOUR INTERSECTION LOS
FOR OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT CONDITIONS

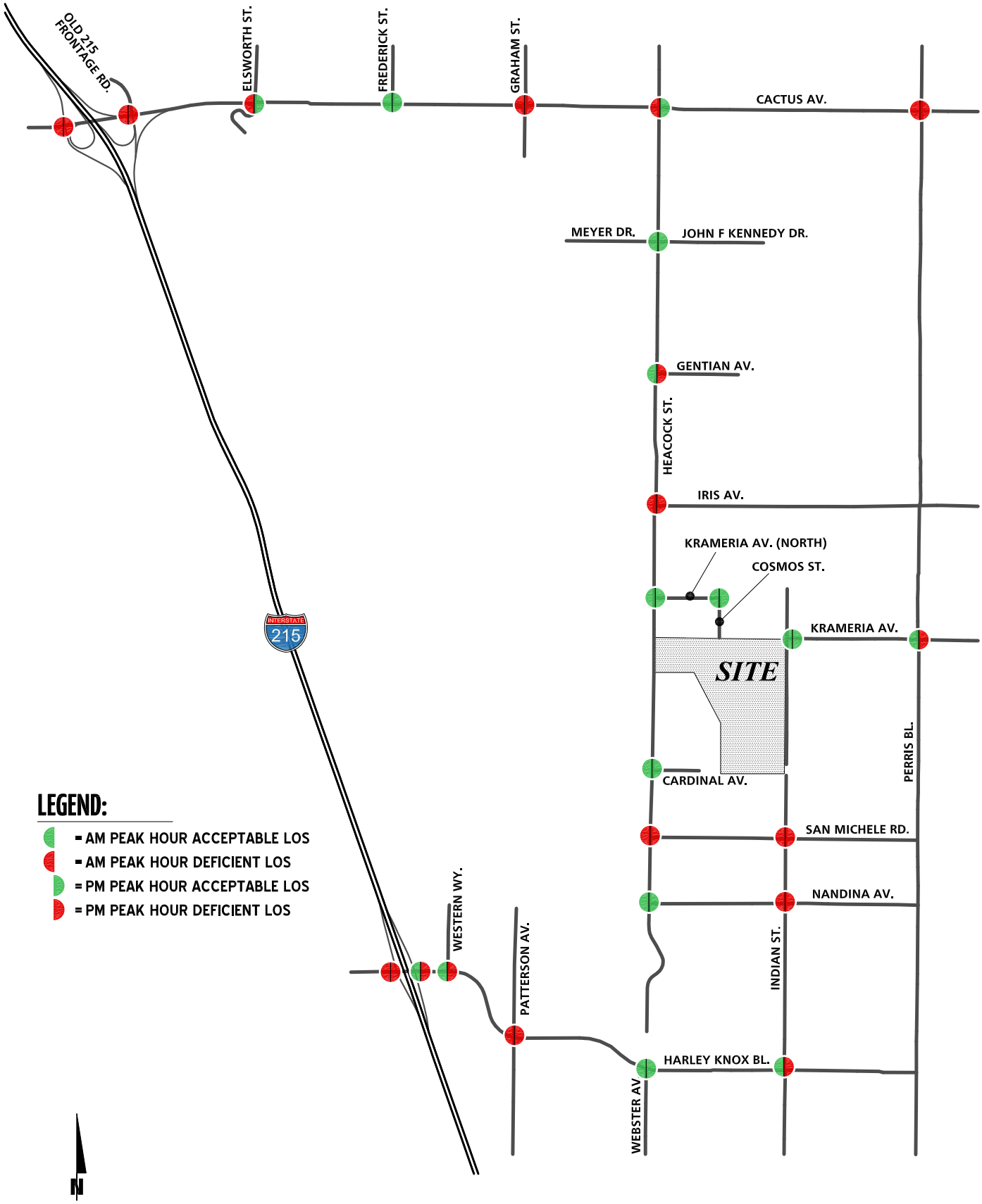


EXHIBIT 6-4: SUMMARY OF PEAK HOUR INTERSECTION LOS
FOR OPENING YEAR CUMULATIVE (2020) WITH PROJECT CONDITIONS

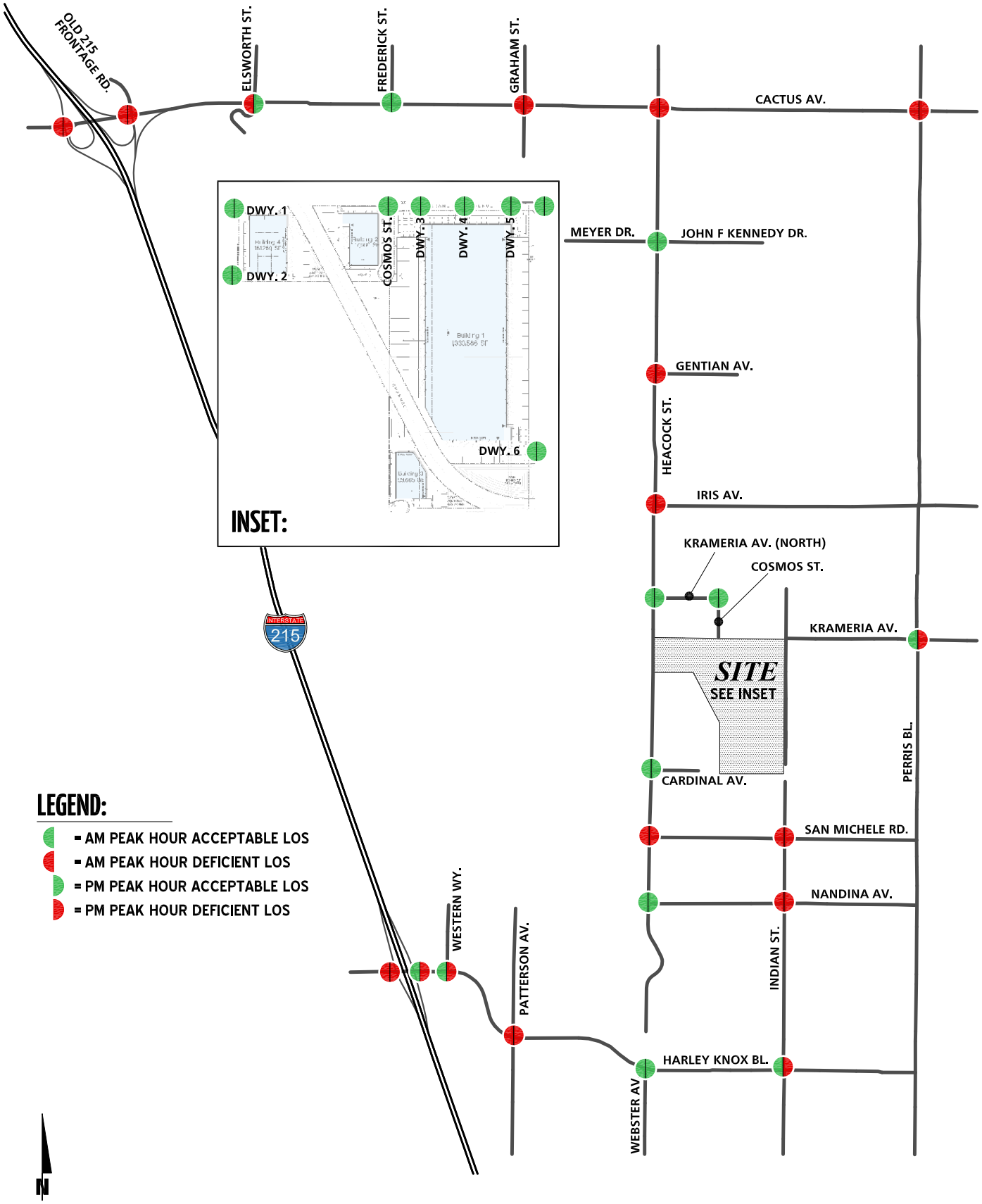


Table 6-2 provides a summary of the Opening Year Cumulative (2020) conditions roadway segment capacity analysis based on the City of Moreno Valley and City of Perris General Plan Circulation Element Roadway Segment Capacity/(LOS) Thresholds identified previously on Table 2-3. As shown on Table 6-2, the following roadway segments are anticipated to operate at unacceptable LOS (based on daily roadway segment capacities) under Opening Year Cumulative (2020) Without Project traffic conditions:

ID	Street	Segment
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps – LOS F
2		East of I-215 NB Ramps – LOS F
3		West of Elsworth Street – LOS F
4		East of Elsworth Street – LOS E
5		West of Frederick Street – LOS F
6		East of Frederick Street – LOS F
7		West of Graham Street – LOS F
8		East of Graham Street – LOS F
9		West of Heacock Street – LOS F
20	San Michele Road	East of Heacock Street – LOS E
21		West of Indian Street – LOS F
23	Harley Knox Boulevard	I-215 NB Ramps to Western Way – LOS E
24		East of Western Way – LOS F
25		West of Patterson Avenue – LOS E
26		East of Patterson Avenue – LOS F
27		West of Webster Avenue – LOS F
28		East of Webster Avenue – LOS F
29		West of Indian Street – LOS E
34	Heacock Street	South of Gentian Avenue – LOS F
35		North of Iris Avenue – LOS F
36		Iris Avenue to Krameria Avenue (N) – LOS F
47	Indian Street	South of Nandina Avenue – LOS F

The following roadway segment is anticipated to operate at a deficient LOS with the addition of Project traffic, in addition to those previously identified for Opening Year Cumulative Without Project traffic conditions.

ID	Street	Segment
33	Heacock Street	North of Gentian Avenue – LOS E

Table 6-2

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

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2020 w/o Project	V/C[2]	LOS[3]	2020 w/ Project	V/C[2]	LOS[3]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	4D	37,500	**52,440**	**1.40**	**F**	**53,830**	**1.44**	**F**	D
2		East of I-215 NB Ramps	4D	37,500	**52,541**	**1.40**	**F**	**55,322**	**1.48**	**F**	D
3		West of Elsworth Street	6D	56,300	**57,997**	**1.03**	**F**	**60,778**	**1.08**	**F**	D
4		East of Elsworth Street	6D	56,300	**54,501**	**0.97**	**E**	**57,282**	**1.02**	**F**	D
5		West of Frederick Street	5D	46,900	**58,823**	**1.25**	**F**	**61,604**	**1.31**	**F**	D
6		East of Frederick Street	5D	46,900	**60,223**	**1.28**	**F**	**63,004**	**1.34**	**F**	D
7		West of Graham Street	5D	46,900	**59,505**	**1.27**	**F**	**62,286**	**1.33**	**F**	D
8		East of Graham Street	5D	46,900	**48,625**	**1.04**	**F**	**51,406**	**1.10**	**F**	D
9		West of Heacock Street	5D	46,900	**49,854**	**1.06**	**F**	**52,635**	**1.12**	**F**	D
10		East of Heacock Street	4D	37,500	32,432	0.86	D	32,890	0.88	D	C
11		West of Perris Boulevard	4D	37,500	23,845	0.64	B	24,303	0.65	B	C
12	Krameria Avenue	Heacock Street to Cosmos Street	2U	12,500	7,254	0.58	A	10,200	0.82	D	D
13		Cosmos Street to Driveway 3	2U	12,500	3,420	0.27	A	5,402	0.43	A	D
14		Driveway 3 to Driveway 4	2U	12,500	3,420	0.27	A	4,702	0.38	A	D
15		Driveway 4 to Driveway 5	2U	12,500	3,420	0.27	A	4,666	0.37	A	D
16		Driveway 5 to Indian Street	2D	18,750	3,420	0.18	A	4,124	0.22	A	D
17		East of Indian Street	2D	18,750	5,173	0.28	A	5,701	0.30	A	D
18		West of Perris Boulevard	2U	12,500	4,290	0.34	A	4,818	0.39	A	D
19	Cardinal Avenue	East of Heacock Street	2U	12,500	51	0.00	A	1,203	0.10	A	C
20	San Michele Road	East of Heacock Street	2D	18,750	**18,781**	**1.00**	**E**	**21,046**	**1.12**	**F**	D
21		West of Indian Street	2D	18,750	**24,254**	**1.29**	**F**	**26,519**	**1.41**	**F**	D
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	4D	35,900	22,314	0.62	A	23,270	0.65	B	D
23		I-215 NB Ramps to Western Way	4D	35,900	**32,527**	**0.91**	**E**	**34,439**	**0.96**	**E**	D
24		East of Western Way	4U	25,900	**28,206**	**1.09**	**F**	**30,119**	**1.16**	**F**	D
25		West of Patterson Avenue	4U	25,900	**25,493**	**0.98**	**E**	**27,406**	**1.06**	**F**	D
26		East of Patterson Avenue	2D	18,000	**24,066**	**1.34**	**F**	**26,155**	**1.45**	**F**	D
27		West of Webster Avenue	2D	18,000	**22,578**	**1.25**	**F**	**24,667**	**1.37**	**F**	D
28		East of Webster Avenue	2D	18,000	**22,247**	**1.24**	**F**	**24,336**	**1.35**	**F**	D
29		West of Indian Street	3D	26,925	**24,971**	**0.93**	**E**	**27,060**	**1.01**	**F**	D

Table 6-2

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

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2020 w/o Project	V/C[2]	LOS[3]	2020 w/ Project	V/C[2]	LOS[3]	Acceptable LOS
30	Heacock Street	South of Cactus Avenue	4D	37,500	28,260	0.75	C	31,985	0.85	D	D
31		North of John F. Kennedy Drive	4D	37,500	27,327	0.73	C	31,052	0.83	D	D
32		South of John F. Kennedy Drive	4D	37,500	25,704	0.69	B	29,535	0.79	C	D
33		North of Gentian Avenue	3D	28,150	23,211	0.82	D	**27,041**	**0.96**	**E**	D
34		South of Gentian Avenue	2U	12,500	**20,916**	**1.67**	**F**	**24,746**	**1.98**	**F**	D
35		North of Iris Avenue	2D	18,750	**20,558**	**1.10**	**F**	**24,388**	**1.30**	**F**	D
36		Iris Avenue to Krameria Avenue (N)	2U	12,500	**17,912**	**1.43**	**F**	**21,742**	**1.74**	**F**	D
37		Krameria Avenue (N) to Driveway 1	3D	28,150	20,115	0.71	C	22,267	0.79	C	D
38		Driveway 1 to Driveway 2	3D	28,150	20,115	0.71	C	21,985	0.78	C	D
39		Driveway 2 to Cardinal Avenue	4D	37,500	20,511	0.55	A	22,621	0.60	A	D
40		Cardinal Avenue to San Michele Road	3D	28,150	18,883	0.67	B	21,149	0.75	C	D
41		San Michele Road to Nandina Avenue	2D	18,750	4,465	0.24	A	4,465	0.24	A	D
42		South of Nandina Avenue	2U	12,500	252	0.02	A	252	0.02	A	D
43		North of Harley Knox Boulevard	2U	13,000	0	0.00	A	0	0.00	A	D
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	2U	12,500	3,420	0.27	A	6,366	0.51	A	D
45	Indian Street	Driveway 6 to San Michele Road	4D	37,500	174	0.00	A	174	0.00	A	D
46		San Michele Road to Nandina Avenue	4D	37,500	28,062	0.75	C	30,327	0.81	D	D
47		South of Nandina Avenue	2D	18,750	**31,663**	**1.69**	**F**	**33,928**	**1.81**	**F**	D
48		North of Harley Knox Boulevard	4D	35,900	22,657	0.63	B	24,922	0.69	B	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 Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

As previously discussed in Section 3.8 *Existing Conditions Roadway Segment Capacity Analysis*, 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.

The traffic study is conservative in that the Opening Year (2020) Cumulative peak hour intersection operations and roadway segment analysis does not assume the planned future roadway extension of Heacock Street to Harley Knox Boulevard or Indian Street over the Perris Valley Storm Drain. With the future extension of Heacock Street and Indian Street in place, future year traffic on Heacock Street, Indian Street, and Perris Boulevard in the near-term cumulative scenario would have multiple alternatives in accessing Harley Knox Boulevard. It is assumed that as a result of a reduction in traffic volumes along Indian Street and Perris Boulevard due to the Heacock Street and Indian Street extensions and potentially deficiencies to intersections and roadway segments along Perris Boulevard and Indian Street towards Harley Knox Boulevard would also potentially be reduced.

6.6 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Cactus Avenue and Harley Knox Boulevard interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative traffic conditions. 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 6-3, the following movement may potentially experience queuing issues during the weekday AM peak 95th percentile traffic flows for Opening Year Cumulative traffic conditions:

ID	Intersection Location
2	I-215 SB Ramps / Harley Knox Boulevard – Southbound shared left-through lane (AM peak hour only)

The 95th percentile queues for Opening Year Cumulative traffic conditions indicates potential queuing for the movement and peak hour identified above. As shown, the analysis indicates that potential queues would exceed the length of the off-ramp and could potentially spillback into the adjacent through lanes on the freeway mainline during the AM peak hour only.

The addition of Project traffic is not anticipated to result in any additional queuing issues. However, the addition of Project traffic to the deficient turning movement is cumulatively considerable.

Worksheets for Opening Year Cumulative (2020 Without and With project traffic conditions off-ramp queuing analysis are provided in Appendix 6.3 and Appendix 6.4, respectively.

Table 6-3

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

Intersection	Movement	Stacking Distance (Feet)	2020 Without Project				2020 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable?[1]		95th Percentile Stacking Distance Required (Feet)		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.	NBR	1,850	498 [2]	584 [2]	Yes	Yes	677 [2]	631 [2]	Yes	Yes
	SBR	1,115	392 [2]	66	Yes	Yes	392 [2]	66	Yes	Yes
I-215 SB Ramps / Harley Knox Bl.	SBL/T	1,330	**2,096** [2]	891 [2]	**No**	Yes	**2,208** [2]	920 [2]	**No**	Yes
	SBR	270	198	111	Yes	Yes	202	115	Yes	Yes
I-215 NB Ramps / Cactus Av.	NBL	145	800 [2]	93	Yes[3]	Yes	800 [2]	93	Yes[3]	Yes
	NBT	1,650	235 [2]	58	Yes	Yes	235 [2]	59	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	110	76	Yes	Yes	110	76	Yes	Yes
	NBR	265	375 [2]	113	Yes[3]	Yes	534 [2]	139	Yes[3]	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound turn lane without spilling back and affecting the I-215 Freeway mainline.

6.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

There are no additional study area intersections that are anticipated to meet either peak hour or planning level (ADT) volume based traffic signal warrants for Opening Year Cumulative traffic conditions (see Appendix 6.5 and Appendix 6.6).

6.8 BASIC FREEWAY SEGMENT ANALYSIS

Opening Year Cumulative (2020) Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 6-5 and on Exhibit 6-6 for Opening Year Cumulative (2020) With Project traffic conditions. As shown on Table 6-4, the freeway segments analyzed for this study are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for both without and with Project traffic conditions. Opening Year Cumulative (2020) Without and With Project basic freeway segment analysis worksheets are provided in Appendix 6.7 and Appendix 6.8, respectively.

6.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Opening Year Cumulative conditions and the results of this analysis are presented in Table 6-5. As shown in Table 6-5, the freeway ramp merge and diverge areas are anticipated to operate at acceptable LOS (i.e., LOS D or better), with the exception of the following ramp junctions:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue – LOS E AM and PM peak hours
2	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue – LOS E AM and PM peak hours
3	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard – LOS E PM peak hour only

Although the addition of Project traffic is not anticipated to result in any new deficiencies, the Project would contribute cumulatively to the impact at the aforementioned ramp junctions. Opening Year Cumulative (2020) Without and With Project freeway ramp junction operations analysis worksheets are provided in Appendix 6.9 and Appendix 6.10, respectively.

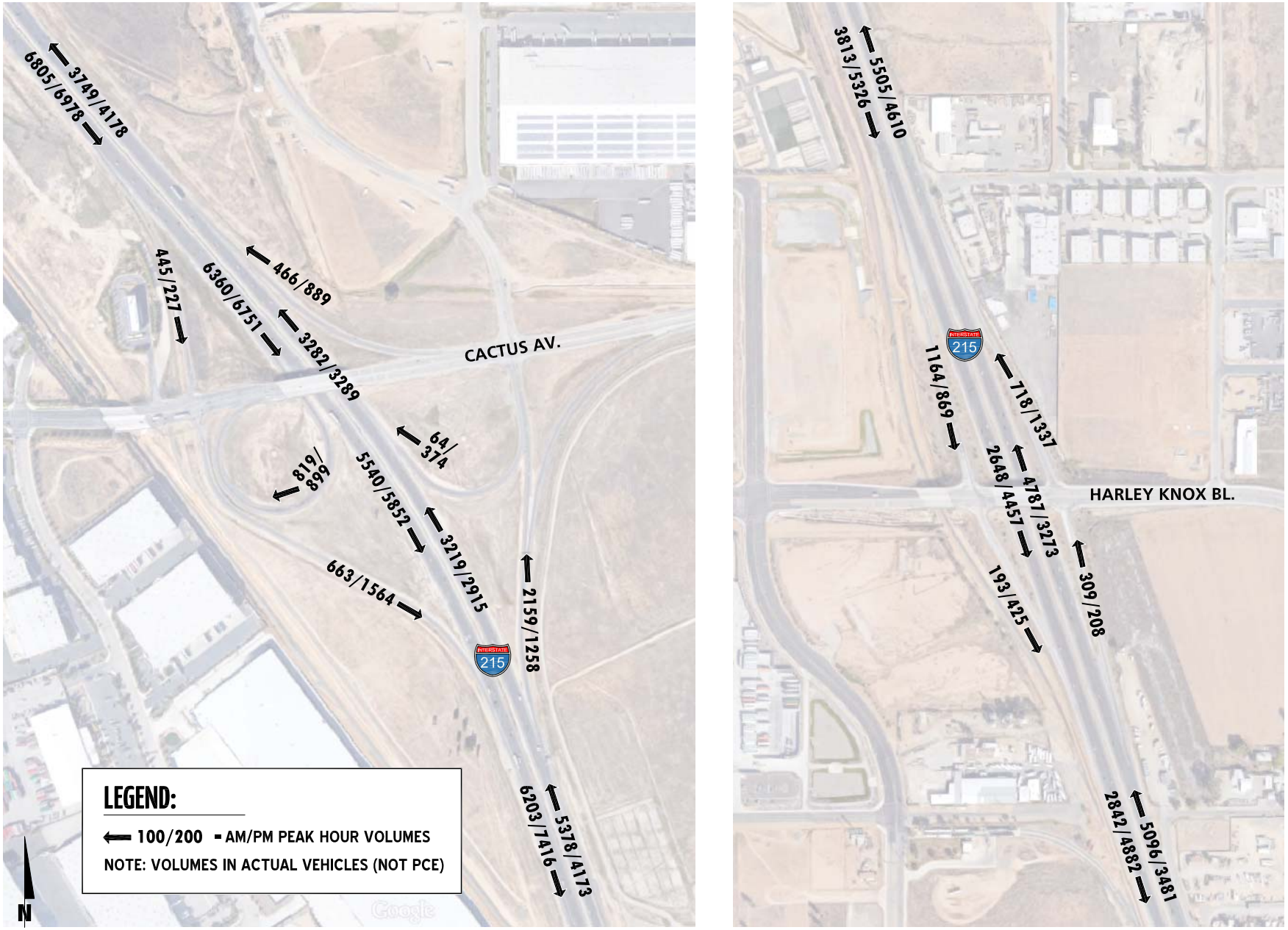
6.10 OPENING YEAR CUMULATIVE DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

6.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient 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). The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative traffic deficiencies is presented in Table 6-6.

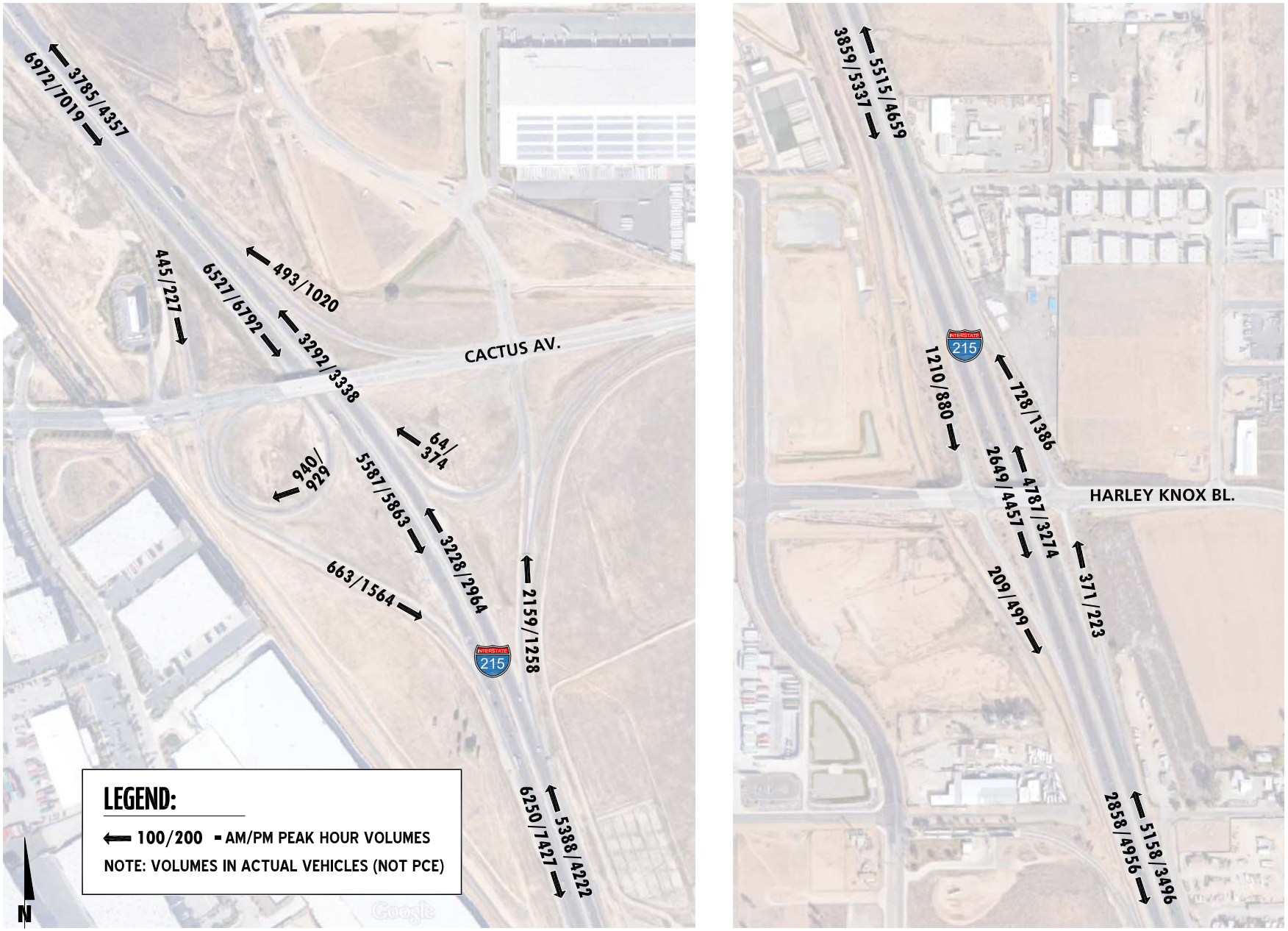
Worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.11 and Appendix 6.12, respectively.

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2020) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2020) WITH PROJECT FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

Table 6-4

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

Freeway	Direction	Mainline Segment	Lanes[1]	2020 Without Project				2020 With Project			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	30.1	30.8	D	D	31.5	31.1	D	D
		South of Cactus Avenue	4	26.0	33.7	D	D	26.3	33.8	D	D
		North of Harley Knox Boulevard	3	21.2	32.6	C	D	21.5	32.7	C	D
		South of Harley Knox Boulevard	3	15.2	28.4	B	D	15.3	29.0	B	D
	NB	North of Cactus Avenue	4	15.2	17.1	B	B	15.4	18.0	B	C
		South of Cactus Avenue	4	21.8	16.7	C	B	21.9	16.9	C	B
		North of Harley Knox Boulevard	3	34.2	26.4	D	D	34.3	26.8	D	D
		South of Harley Knox Boulevard	3	30.0	18.6	D	C	30.6	18.7	D	C

* **BOLD** = Unacceptable Level of Service

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

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

Table 6-5

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

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2020 Without Project				2020 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	**36.0**	**E**	**37.6**	**E**	**37.7**	**E**	**38.0**	**E**
		Loop Off-Ramp at Cactus Avenue - Downstream	4	**36.0**	**E**	**37.6**	**E**	**37.7**	**E**	**38.0**	**E**
		Off-Ramp at Harley Knox Boulevard	3	29.7	D	**35.7**	**E**	30.1	D	**35.8**	**E**
		On-Ramp at Harley Knox Boulevard	3	19.0	B	30.5	D	19.2	B	31.2	D
	NB	On-Ramp at Cactus Avenue	3	26.3	C	30.1	D	26.6	C	31.8	D
		On-Ramp at Harley Knox Boulevard	3	34.4	D	32.1	D	34.5	D	32.6	D
		Off-Ramp at Harley Knox Boulevard	3	32.7	D	34.3	C	33.1	D	24.4	C

* **BOLD** = Unacceptable Level of Service

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

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

Table 6-6
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Intersection Analysis for Opening Year Cumulative (2020) Conditions With Improvements*

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av																	
	- Without Project	TS	0	0	0	0	0	**2**	0	2	1	**2**	2	0	30.0	27.9	C	C
	- With Project	TS	0	0	0	0	0	**2**	0	2	1	**2**	2	0	30.1	27.9	C	C
2	I-215 SB Ramps / Harley Knox Bl																	
	- Without Project	TS	0	0	0	**2**	1	**0**	0	2	d	**2**	2	0	27.6	30.3	C	C
	- With Project	TS	0	0	0	**2**	1	**0**	0	2	d	**2**	2	0	28.1	30.9	C	C
3	I-215 NB Ramps / Cactus Av																	
	- Without Project[4]	TS	**2**	1	0	1	1	0	1	**3**	0	0	**3**	0	37.2	20.3	D	C
	- With Project[4]	TS	**2**	1	0	1	1	0	1	**3**	0	0	**3**	0	37.6	27.2	D	C
4	I-215 NB Ramps / Harley Knox Bl																	
	- Without Project	TS	0	1	1	0	0	0	**2**	2	0	0	2	**1>>**	22.4	27.1	C	C
	- With Project	TS	0	1	1	0	0	0	**2**	2	0	0	2	**1>>**	23.8	42.1	C	D
5	Elsworth St / Cactus Av																	
	- Without Project[4]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	35.0	44.0	C	D
	- With Project[4]	TS	1	1	0	1	1	1>	1	3	1>>	1	3	1	37.2	52.9	D	D
7	Western Wy / Harley Knox Bl																	
	- Without Project	**TS**	0	0	0	0	1	0	**1**	2	0	0	2	d	25.9	23.2	C	C
	- With Project	**TS**	0	0	0	0	1	0	**1**	2	0	0	2	d	39.1	34.9	D	C
8	Graham St / Cactus Av																	
	- Without Project	TS	2	2	0	1	2	1>	1	**3**	1>>	1	3	0	26.7	24.6	C	C
	- With Project	TS	2	2	0	1	2	1>	1	**3**	1>>	1	3	0	26.7	24.8	C	C
9	Patterson Av / Harley Knox Bl																	
	- Without Project[5]	TS	0	1	0	0	1	d	1	**2**	1	1	**2**	**1**	25.6	24.0	C	C
	- With Project[5]	TS	0	1	0	0	1	d	1	**2**	1	1	**2**	**1**	34.3	30.0	C	C
10	Heacock St / Cactus Av																	
	- Without Project[6]	TS	2	2	0	1	2	0	1	2	1>	1	2	0	50.7	44.8	D	D
	- With Project[6]	TS	2	2	0	1	2	0	1	2	1>	1	2	0	54.6	52.0	D	D
12	Heacock St / Gentian Av																	
	- Without Project	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	12.5	17.8	B	B
	- With Project	**TS**	0	1	1	1	1	0	0	0	0	0	1	d	19.2	19.6	B	B
13	Heacock St / Iris Av																	
	- Without Project	**TS**	0	**2**	0	**2**	**2**	0	0	0	0	1	0	**1>**	20.9	31.1	C	C
	- With Project	**TS**	0	**2**	0	**2**	**2**	0	0	0	0	1	0	**1>**	21.0	33.4	B	C
18	Heacock St / San Michele Rd																	
	- Without Project	TS	1	1	1	**2**	1	1	1	1	1	1	1	**1>**	29.1	49.6	C	D
	- With Project	TS	1	1	1	**2**	1	1	1	1	1	1	1	**1>**	38.7	49.8	D	D

Table 6-6

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

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
28	Indian St / San Michele Rd																	
	- Without Project	TS	2	1	1	1	2	0	1	**2**	1>	1	2	d	35.4	52.4	D	D
	- With Project	TS	2	1	1	1	2	0	1	**2**	1>	1	2	d	54.0	53.6	D	D
29	Indian St / Nandina Av																	
	- Without Project	TS	1	2	0	1	2	0	1	1	**1>**	1	1	d	21.1	32.2	C	C
	- With Project	TS	1	2	0	1	2	0	1	1	**1>**	1	1	d	22.3	53.8	C	D
30	Indian St / Harley Knox Bl																	
	- Without Project	TS	2	2	1	1	2	**1>**	1	**3**	**0**	**1**	**3**	0	15.0	29.8	B	C
	- With Project	TS	2	2	1	1	2	**1>**	1	**3**	**0**	**1**	**3**	0	22.2	32.2	C	C
31	Perris Bl / Cactus Av																	
	- Without Project	TS	1	3	0	1	2	1	1	2	**1>**	1	2	0	52.0	52.9	D	D
	- With Project	TS	1	3	0	1	2	1	1	2	**1>**	1	2	0	54.1	54.5	D	D
32	Perris Bl / Krameria Av																	
	- Without Project[7]	TS	1	3	0	1	3	0	**1**	1	0	**1**	1	1	52.4	49.3	D	D
	- With Project[7]	TS	1	3	0	1	3	0	**1**	1	0	**1**	1	1	54.7	52.0	D	D

* Note: The recommended improvements shown in this table are based on conservative traffic forecasts for Opening Year Cumulative traffic conditions and are driven by the amount of cumulative developments as opposed to the Project. These improvements may not be necessary, depending on the amount of growth that actually occurs over the next 5 years.

[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

[4] Improvements also include implementing protected left-turn phasing for the northbound and southbound approaches.

[5] The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussions with City staff, the improvements are anticipated to be completed by Fall 2015.

[6] Improvement includes removing the southbound crosswalk (on the west leg) to accommodate additional green time along Cactus Avenue.

[7] Improvements also include implementing protected left-turn phasing for the eastbound and westbound approaches.

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, although most roadway segments shown are anticipated to improve in LOS to acceptable levels, there are a few deficient roadway segments with the recommended intersection 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 6-6. There are also other deficient roadway segments (see Table 6-2), where additional roadway widening has not been recommended as the adjacent study area intersections (see Table 6-1) are anticipated to operate at acceptable LOS during the peak hours.

6.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

With the implementation of the recommended intersection improvements shown on Table 6-6, which are necessary to reduce near-term cumulative impacts to less than significant levels, there are no potential queuing issues anticipated for Opening Year Cumulative traffic conditions (see Table 6-8). As such, no spill-back onto the I-215 Freeway Southbound mainline is anticipated. Worksheets for Opening Year Cumulative (2020) Without and With Project traffic conditions, with improvements, queuing analysis are provided in Appendix 6.13 and Appendix 6.14, respectively.

6.10.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

The SCAG RTP includes a list of projects in the Federal Transportation Improvement Program (FTIP). The following is an applicable FTIP project within the study area: interchange improvements at I-215/Cactus Avenue, which includes the extension of the northbound auxiliary lane between Cactus Avenue and Alessandro Boulevard to the north (to be completed by 2018). However, this improvement is not anticipated to improve the LOS deficiencies at the deficient freeway merge/diverge ramp junctions.

Table 6-7

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

#	Roadway	Segment Limits	Roadway Section[1]	LOS Capacity[2]	2020 w/o Project	V/C[3]	LOS[4]	2020 w/ Project	V/C[3]	LOS[4]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	**6D**	56,300	**52,440**	**0.93**	**E**	**53,830**	**0.96**	**E**	D
2		East of I-215 NB Ramps	**6D**	56,300	**52,541**	**0.93**	**E**	**55,322**	**0.98**	**E**	D
3		West of Elsworth Street[5]	6D	56,300	**57,997**	**1.03**	**F**	**60,778**	**1.08**	**F**	D
4		East of Elsworth Street[5]	6D	56,300	**54,501**	**0.97**	**E**	**57,282**	**1.02**	**F**	D
5		West of Frederick Street[5]	5D	46,900	**58,823**	**1.25**	**F**	**61,604**	**1.31**	**F**	D
6		East of Frederick Street[5]	5D	46,900	**60,223**	**1.28**	**F**	**63,004**	**1.34**	**F**	D
7		West of Graham Street	**6D**	56,300	**59,505**	**1.06**	**F**	**62,286**	**1.11**	**F**	D
8		East of Graham Street	**6D**	56,300	48,625	0.86	D	**51,406**	**0.91**	**E**	D
9		West of Heacock Street	**6D**	56,300	49,854	0.89	D	**52,635**	**0.93**	**E**	D
10		East of Heacock Street	**6D**	56,300	32,432	0.58	A	32,890	0.58	A	C
20	San Michele Road	East of Heacock Street	**4D**	35,900	18,781	0.52	A	21,046	0.59	A	D
21		West of Indian Street	**4D**	35,900	24,254	0.68	B	26,519	0.74	C	D
23	Harley Knox Boulevard	I-215 NB Ramps to Western Way[5]	4D	35,900	**32,527**	**0.91**	**E**	**34,439**	**0.96**	**E**	D
24		East of Western Way[5]	4U	25,900	**28,206**	**1.09**	**F**	**30,119**	**1.16**	**F**	D
25		West of Patterson Avenue	**4D**	35,900	25,493	0.71	C	27,406	0.76	C	D
26		East of Patterson Avenue	**4D**	35,900	24,066	0.67	B	26,155	0.73	C	D
27		West of Webster Avenue	**6D**	53,900	22,578	0.42	A	24,667	0.46	A	D
28		East of Webster Avenue	**6D**	53,900	22,247	0.41	A	24,336	0.45	A	D
29		West of Indian Street	**6D**	53,900	24,971	0.46	A	27,060	0.50	A	D
33	Heacock Street	North of Gentian Avenue[5]	3D	28,150	23,211	0.82	D	**27,041**	**0.96**	**E**	D
34		South of Gentian Avenue[5]	2U	12,500	**20,916**	**1.67**	**F**	**24,746**	**1.98**	**F**	D
35		North of Iris Avenue	**4D**	37,500	20,558	0.55	A	24,388	0.65	B	D
36		Iris Avenue to Krameria Avenue (N)	**4D**	37,500	17,912	0.48	A	21,742	0.58	A	D
47	Indian Street	South of Nandina Avenue[5]	2D	18,750	**31,663**	**1.69**	**F**	**33,928**	**1.81**	**F**	D

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

[1] Roadway section improvements are consistent with the through lanes recommended as part of the intersection improvements shown on Table 6-6.

[2] These maximum roadway capacities have been obtained from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[3] V/C = Volume to Capacity Ratio

[4] LOS = Level of Service

[5] Additional roadway widening has not been recommended for these deficient roadway segments as the adjacent study area intersections (see Table 6-1 and Table 6-6) are anticipated to operate at acceptable LOS during the peak hours.

Table 6-8

Peak Hour Off-Ramp Queuing Analysis for Opening Year Cumulative (2020) Conditions With Improvements

Intersection	Movement	Stacking Distance (Feet)	2020 Without Project				2020 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.										
	NBR	1,850	0	0	Yes	Yes	0	0	Yes	Yes
	SBR	1,115	253	0	Yes	Yes	253	0	Yes	Yes
I-215 SB Ramps / Harley Knox Bl.										
	SBL/T	1,330	431 [2]	255 [2]	Yes	Yes	514	264 [2]	Yes	Yes
	SBR	270	46	63	Yes	Yes	46	63	Yes	Yes
I-215 NB Ramps / Cactus Av.										
	NBL	145	511 [2]	94 [2]	Yes[3]	Yes	511 [2]	94 [2]	Yes[3]	Yes
	NBT	1,650	363	105	Yes	Yes	363	105	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.										
	NBL/T	1,120	95	83	Yes	Yes	95	83	Yes	Yes
	NBR	265	279	100	Yes[3]	Yes	374	127	Yes[3]	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound turn lane without spilling back and affecting the I-215 Freeway mainline.

Table 6-9 shows the basic freeway segment analysis LOS for the segment of the I-215 Freeway Northbound, north of Cactus Avenue. 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 Moreno Valley (or other neighboring jurisdictions) on SHS roadway segments. Worksheets for Opening Year Cumulative (2020) Without and With project traffic conditions, with improvements, basic freeway segment analysis are provided in Appendix 6.15 and 6.16, respectively.

Table 6-9

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

Freeway	Direction	Mainline Segment	Lanes[1]	2020 Without Project				2020 With Project			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	NB	North of Cactus Avenue	**5**	12.2	13.7	B	B	12.3	14.4	B	B

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on proposed improvements.

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

7 GENERAL PLAN BUILDOUT (POST 2035) TRAFFIC CONDITIONS

This section discusses the methods used to develop General Plan Buildout (Post 2035) Without and With Project traffic forecasts, and the resulting intersection operations, roadway segment, traffic signal warrant, and freeway mainline operations analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for General Plan Buildout 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 General Plan Buildout 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 General Plan Buildout conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).
- The extension of Heacock Street to the north of Harley Knox Boulevard.
- The extension of Indian Street over the Perris Valley Storm Drain Channel. As traffic in the area increases and the roadway network begins to build out, the implementation of the Indian Street bridge over the Perris Valley Storm Drain Channel would only help with relieving potential heavy traffic flows along other parallel facilities, such as Heacock Street and Perris Boulevard
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for General Plan Buildout traffic conditions and would affect the travel patterns within the study area (e.g., Nandina Avenue, Markham Street, etc.).

7.2 GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the RivTAM. For additional information on the development of the General Plan Buildout Without Project traffic forecasts, see Section 4.8 *General Plan Buildout (Post 2035) Volume Development* of this TIA. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for General Plan Buildout Without Project traffic conditions are shown on Exhibit 7-1.

7.3 GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-processed volumes obtained from the RivTAM, plus Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for General Plan Buildout With Project traffic conditions are shown on Exhibit 7-2.

EXHIBIT 7-1 (1 OF 2): GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

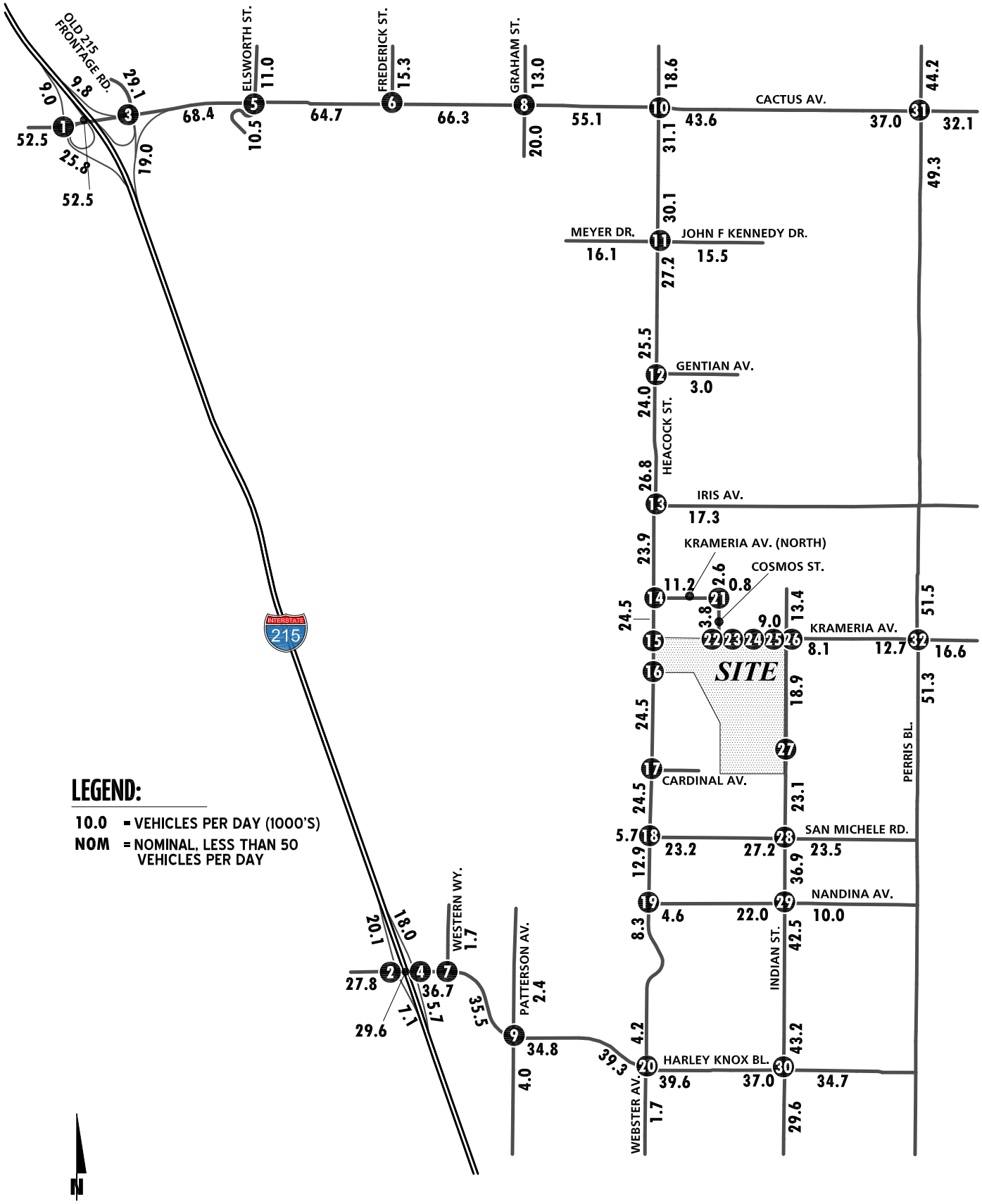


EXHIBIT 7-1 (2 OF 2): GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

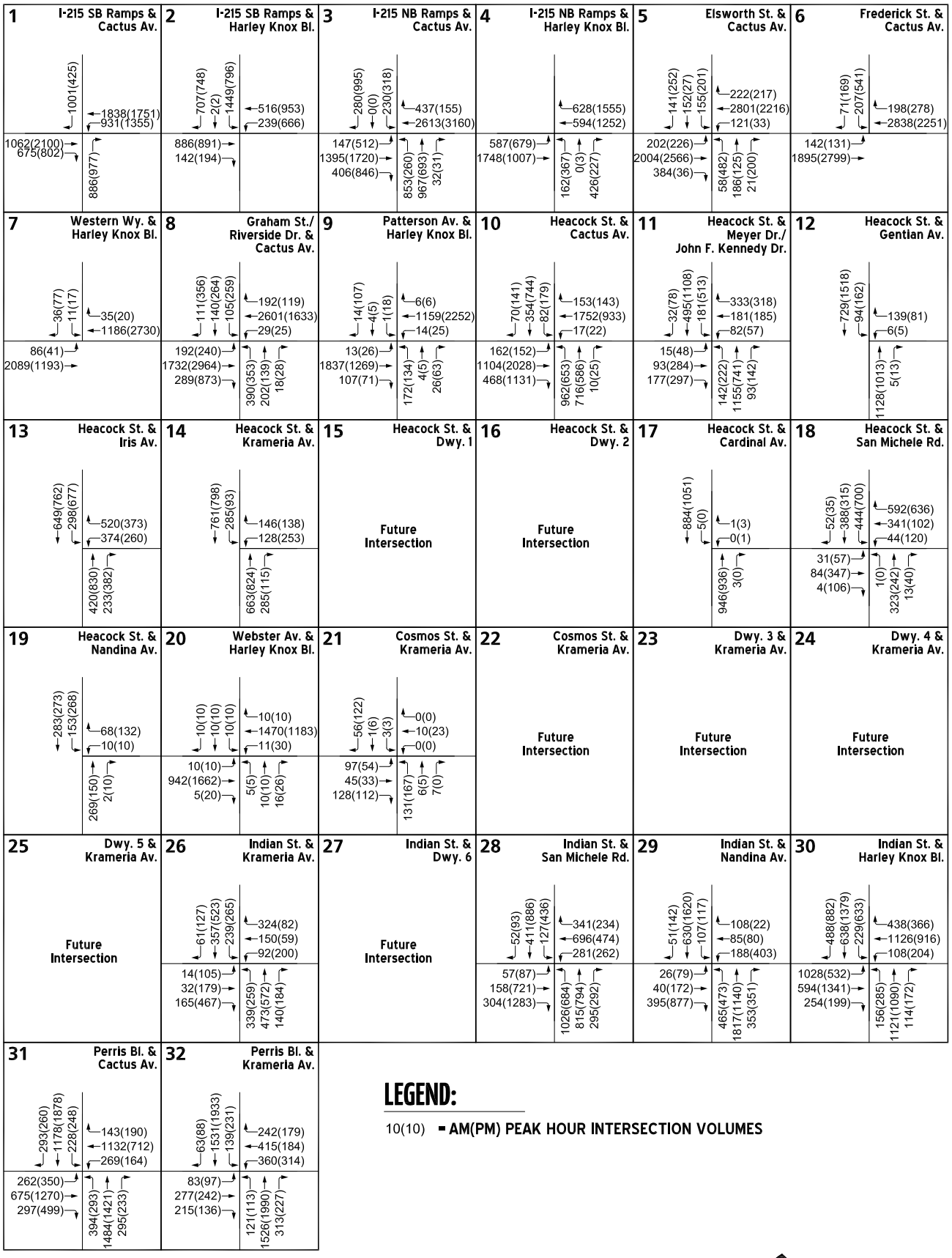


EXHIBIT 7-2 (1 OF 2): GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT TRAFFIC VOLUMES (IN PCE)

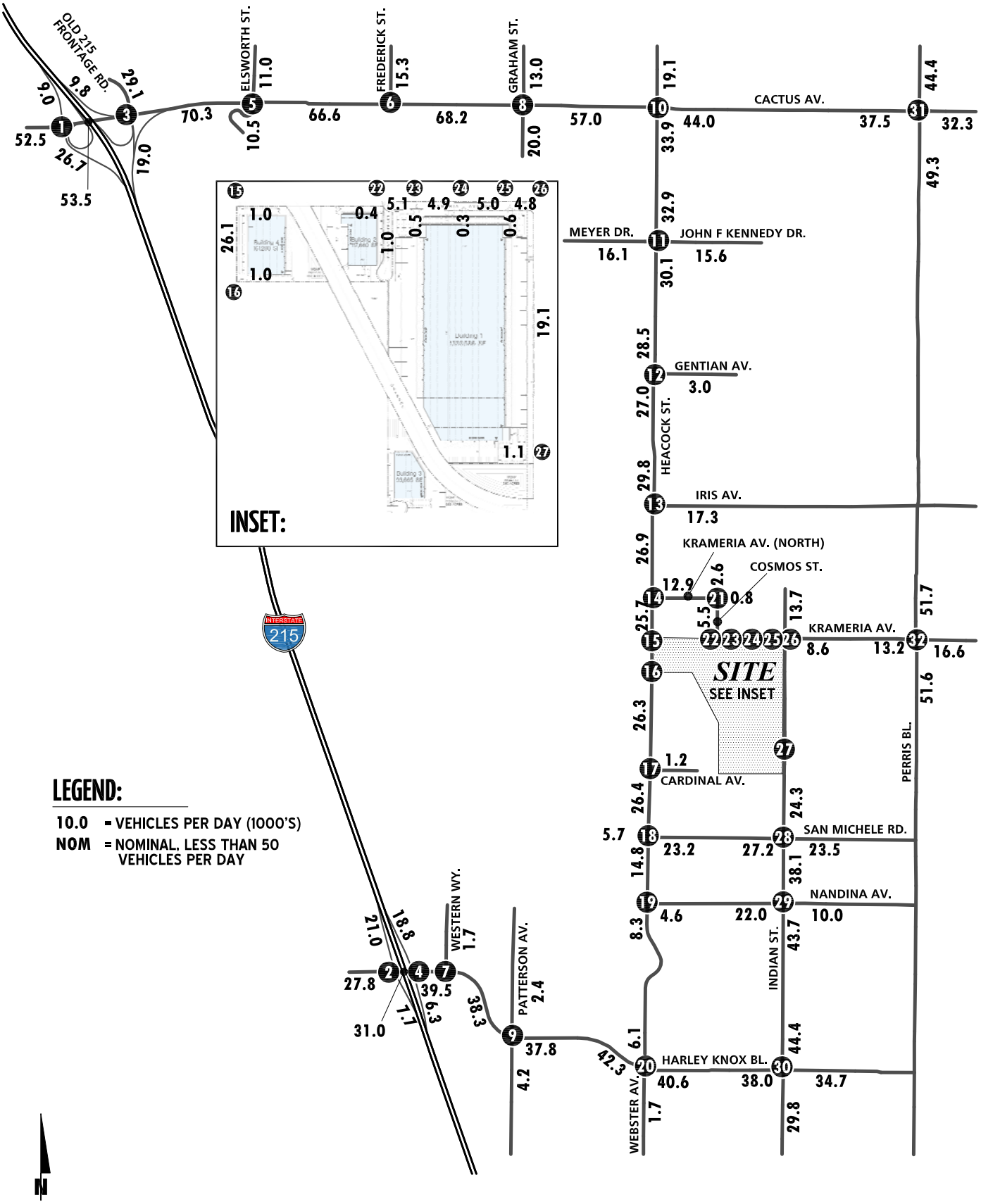
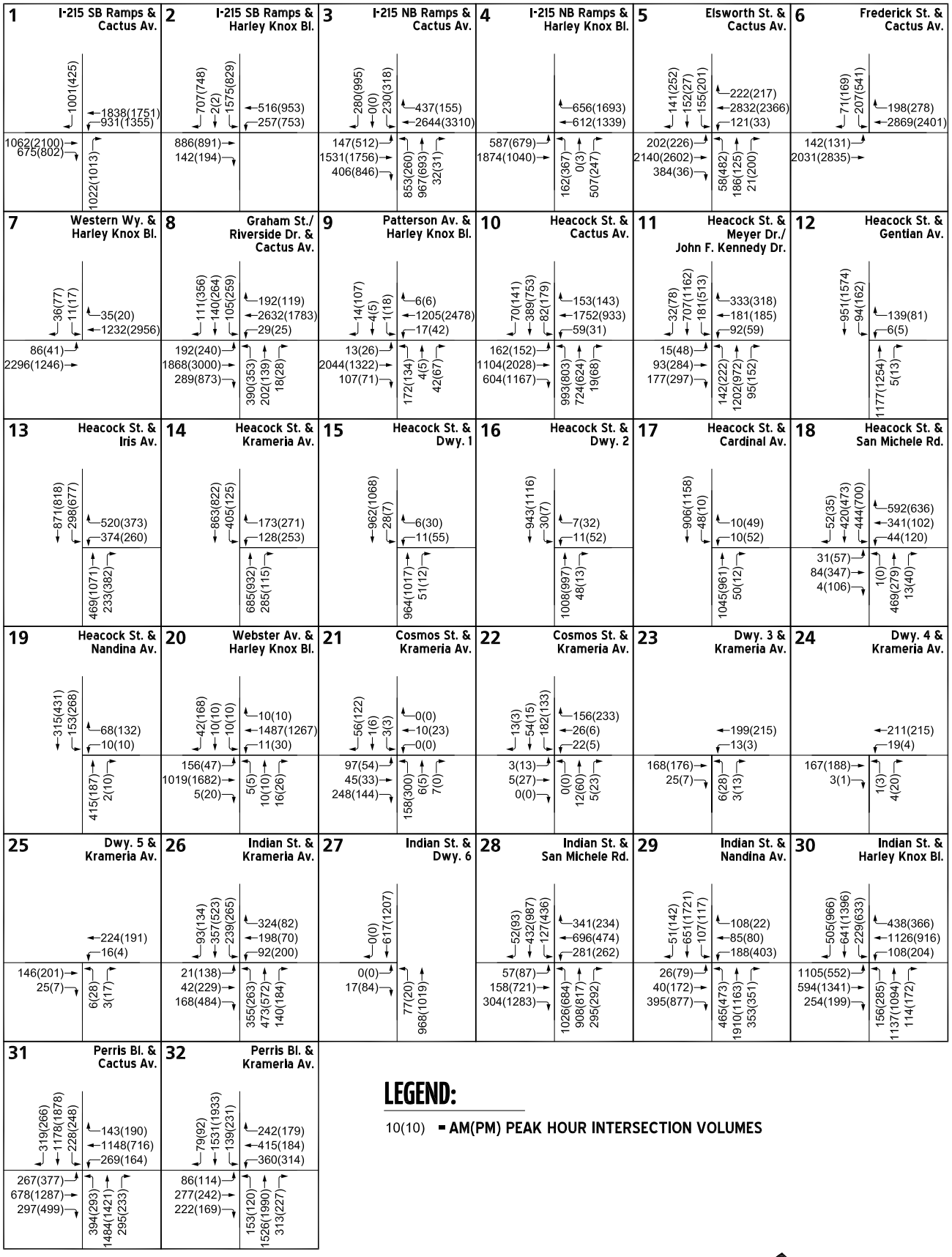


EXHIBIT 7-2 (2 OF 2): GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



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7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 GENERAL PLAN BUILDOUT WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under General Plan Buildout 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 unacceptable LOS during the peak hours under General Plan Buildout traffic conditions, in addition to those previously identified for Opening Year Cumulative traffic conditions:

ID	Intersection Location
20	Heacock Street/Webster Avenue / Harley Knox Boulevard – LOS F PM peak hour only
26	Indian Street / Krameria Avenue – LOS F AM and PM peak hours

A summary of the peak hour intersection LOS for General Plan Buildout Without Project conditions are shown on Exhibit 7-3. The intersection operations analysis worksheets for General Plan Buildout Without Project traffic conditions are included in Appendix 7.1 of this TIA.

7.4.2 GENERAL PLAN BUILDOUT WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-4, there are no additional study area intersections anticipated to experience unacceptable LOS (LOS E or worse) with the addition of Project traffic during one or more peak hours in addition to those previously identified under General Plan Buildout Without Project conditions. However, the Project's contribution to the deficient intersections identified above are significant cumulative impacts as the Project is anticipated to contribute 50 or more peak hour trips. The intersection operations analysis worksheets for Horizon Year With Project traffic conditions are included in Appendix 7.2 of this TIA. Measures to address long range deficiencies for Long Range traffic conditions are discussed in Section 7.10 *Recommended Improvements.*

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 General Plan Buildout conditions roadway segment capacity analysis based on the City of Moreno Valley and City of Perris General Plan Circulation Element Roadway Segment Capacity/(LOS) Thresholds identified previously on Table 2-3.

Table 7-1

Intersection Analysis for General Plan Buildout (Post-2035) Conditions

#	Intersection	Traffic Control [2]	Post-2035 Without Project				Post-2035 With Project			
			Delay [1] (secs.)		Level of Service		Delay [1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Cactus Av	TS	**144.4**	**148.0**	**F**	**F**	**166.4**	**148.0**	**F**	**F**
2	I-215 SB Ramps / Harley Knox Bl	TS	**136.9**	**122.0**	**F**	**F**	**175.6**	**141.6**	**F**	**F**
3	I-215 NB Ramps / Cactus Av	TS	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
4	I-215 NB Ramps / Harley Knox Bl	TS	**67.5**	**>200.0**	**E**	**F**	**85.9**	**>200.0**	**F**	**F**
5	Elsworth St / Cactus Av	TS	**116.3**	**72.9**	**F**	**E**	**133.8**	**81.9**	**F**	**F**
6	Frederick St / Cactus Av	TS	32.7	49.0	C	D	34.3	51.5	C	D
7	Western Wy / Harley Knox Bl	CSS	**47.1**	**>100.0**	**E**	**F**	**70.3**	**>100.0**	**F**	**F**
8	Graham St / Cactus Av	TS	**94.3**	**82.2**	**F**	**F**	**95.5**	**82.9**	**F**	**F**
9	Patterson Av / Harley Knox Bl	TS	**169.3**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
10	Heacock St / Cactus Av	TS	**94.7**	**148.0**	**F**	**F**	**98.0**	**166.3**	**F**	**F**
11	Heacock St / John F. Kennedy Dr	TS	38.5	38.3	D	D	40.5	46.8	D	D
12	Heacock St / Gentian Av	CSS	**97.6**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**
13	Heacock St / Iris Av	AWS	**60.8**	**60.6**	**F**	**F**	**61.7**	**61.2**	**F**	**F**
14	Heacock St / Krameria Av (North)	TS	22.6	41.4	C	D	32.5	53.0	C	D
15	Heacock St / Driveway 1	**CSS**	Future Intersection				20.3	24.9	C	C
16	Heacock St / Driveway 2	**CSS**	Future Intersection				18.1	20.3	C	C
17	Heacock St / Cardinal Av	CSS	12.1	22.2	B	C	24.9	32.2	C	D
18	Heacock St / San Michele Rd	TS	**102.8**	**198.5**	**F**	**F**	**103.1**	**199.6**	**F**	**F**
19	Heacock St / Nandina Av	CSS	13.7	17.9	B	C	14.7	22.6	B	C
20	Webster Av / Harley Knox Bl	CSS	17.1	**>100.0**	C	**F**	21.4	**>100.0**	C	**F**
21	Cosmos St / Krameria Av (North)	CSS	14.2	16.3	B	C	17.7	21.5	C	C
22	Cosmos St / Krameria Av	**AWS**	Future Intersection				9.5	9.6	A	A
23	Driveway 3 / Krameria Av	**CSS**	Future Intersection				9.9	10.1	A	B
24	Driveway 4 / Krameria Av	**CSS**	Future Intersection				9.4	9.5	A	A
25	Driveway 5 / Krameria Av	**CSS**	Future Intersection				9.9	10.2	A	B
26	Indian St / Krameria Av	AWS	**67.8**	**72.4**	**F**	**F**	**69.7**	**74.9**	**F**	**F**
27	Indian St / Driveway 6	**CSS**	Future Intersection				10.6	16.2	B	C
28	Indian St / San Michele Rd	TS	**73.1**	**>200.0**	**E**	**F**	**105.4**	**>200.0**	**F**	**F**
29	Indian St / Nandina Av	TS	**136.5**	**>200.0**	**F**	**F**	**146.3**	**>200.0**	**F**	**F**
30	Indian St / Harley Knox Bl	TS	**120.5**	**>200.0**	**F**	**F**	**125.9**	**>200.0**	**F**	**F**
31	Perris Bl / Cactus Av	TS	**112.6**	**185.1**	**F**	**F**	**115.4**	**188.7**	**F**	**F**
32	Perris Bl / Krameria Av	TS	**111.7**	**148.8**	**F**	**F**	**119.6**	**157.8**	**F**	**F**

BOLD = 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 all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual move movements sharing a single lane) are shown.

[2] CSS = Cross-street Stop; TS = Traffic Signal: AWS= All-way stop

Table 7-2

Roadway Volume/Capacity Analysis for General Plan Buildout (Post 2035) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Post-2035 w/o Project	V/C[2]	LOS[3]	Post-2035 w/ Project	V/C[2]	LOS[3]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	4D	37,500	**52,522**	**1.40**	**F**	**53,473**	**1.43**	**F**	D
2		East of I-215 NB Ramps	4D	37,500	**68,405**	**1.82**	**F**	**70,307**	**1.87**	**F**	D
3		West of Elsworth Street	6D	56,300	**63,400**	**1.13**	**F**	**65,302**	**1.16**	**F**	D
4		East of Elsworth Street	6D	56,300	**58,900**	**1.05**	**F**	**60,802**	**1.08**	**F**	D
5		West of Frederick Street	5D	46,900	**60,581**	**1.29**	**F**	**62,483**	**1.33**	**F**	D
6		East of Frederick Street	5D	46,900	**62,838**	**1.34**	**F**	**64,740**	**1.38**	**F**	D
7		West of Graham Street	5D	46,900	**59,572**	**1.27**	**F**	**61,474**	**1.31**	**F**	D
8		East of Graham Street	5D	46,900	**55,142**	**1.18**	**F**	**57,044**	**1.22**	**F**	D
9		West of Heacock Street	5D	46,900	**50,768**	**1.08**	**F**	**52,670**	**1.12**	**F**	D
10		East of Heacock Street	4D	37,500	**43,555**	**1.16**	**F**	**44,013**	**1.17**	**F**	C
11		West of Perris Boulevard	4D	37,500	**37,000**	**0.99**	**E**	**37,458**	**1.00**	**E**	C
12	Krameria Avenue	Heacock Street to Cosmos Street	2U	12,500	11,144	0.89	D	**12,862**	**1.03**	**F**	D
13		Cosmos Street to Driveway 3	2U	12,500	9,000	0.72	C	10,318	0.83	D	D
14		Driveway 3 to Driveway 4	2U	12,500	9,000	0.72	C	10,084	0.81	D	D
15		Driveway 4 to Driveway 5	2U	12,500	9,000	0.72	C	10,262	0.82	D	D
16		Driveway 5 to Indian Street	2D	18,750	9,000	0.48	A	10,056	0.54	A	D
17		East of Indian Street	2D	18,750	8,096	0.43	A	8,624	0.46	A	D
18		West of Perris Boulevard	2U	12,500	**12,689**	**1.02**	**F**	**13,217**	**1.06**	**F**	D
19	Cardinal Avenue	East of Heacock Street	2U	12,500	51	0.00	A	1,197	0.10	A	C
20	San Michele Road	East of Heacock Street	2D	18,750	**22,852**	**1.22**	**F**	**22,852**	**1.22**	**F**	D
21		West of Indian Street	2D	18,750	**27,208**	**1.45**	**F**	**27,208**	**1.45**	**F**	D
22	Harley Knox Boulevard	I-215 SB Ramps to I-215 NB Ramps	4D	35,900	29,627	0.83	D	31,023	0.86	D	D
23		I-215 NB Ramps to Western Way	4D	35,900	**36,697**	**1.02**	**F**	**39,489**	**1.10**	**F**	D
24		East of Western Way	4U	25,900	**35,500**	**1.37**	**F**	**38,292**	**1.48**	**F**	D
25		West of Patterson Avenue	4U	25,900	**35,500**	**1.37**	**F**	**38,292**	**1.48**	**F**	D
26		East of Patterson Avenue	2D	18,000	**34,800**	**1.93**	**F**	**37,768**	**2.10**	**F**	D
27		West of Webster Avenue	2D	18,000	**39,288**	**2.18**	**F**	**42,257**	**2.35**	**F**	D
28		East of Webster Avenue	2D	18,000	**39,576**	**2.20**	**F**	**40,630**	**2.26**	**F**	D
29		West of Indian Street	3D	26,925	**36,988**	**1.37**	**F**	**38,042**	**1.41**	**F**	D

Table 7-2

Roadway Volume/Capacity Analysis for General Plan Buildout (Post 2035) Conditions

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Post-2035 w/o Project	V/C[2]	LOS[3]	Post-2035 w/ Project	V/C[2]	LOS[3]	Acceptable LOS
30	Heacock Street	South of Cactus Avenue	4D	37,500	28,080	0.75	C	30,926	0.82	D	D
31		North of John F. Kennedy Drive	4D	37,500	26,995	0.72	C	29,841	0.80	C	D
32		South of John F. Kennedy Drive	4D	37,500	27,192	0.73	C	30,144	0.80	C	D
33		North of Gentian Avenue	3D	28,150	25,192	0.89	D	**28,143**	**1.00**	**E**	D
34		South of Gentian Avenue	2U	12,500	**24,000**	**1.92**	**F**	**26,951**	**2.16**	**F**	D
35		North of Iris Avenue	2D	18,750	**25,655**	**1.37**	**F**	**28,606**	**1.53**	**F**	D
36		Iris Avenue to Krameria Avenue (N)	2U	12,500	**22,634**	**1.81**	**F**	**25,585**	**2.05**	**F**	D
37		Krameria Avenue (N) to Driveway 1	3D	28,150	23,898	0.85	D	25,132	0.89	D	D
38		Driveway 1 to Driveway 2	3D	28,150	23,898	0.85	D	25,201	0.90	D	D
39		Driveway 2 to Cardinal Avenue	4D	37,500	23,898	0.64	B	25,726	0.69	B	D
40		Cardinal Avenue to San Michele Road	3D	28,150	23,898	0.85	D	**25,813**	**0.92**	**E**	D
41		San Michele Road to Nandina Avenue	2D	18,750	12,472	0.67	B	14,387	0.77	C	D
42		South of Nandina Avenue	2U	12,500	8,101	0.65	B	10,016	0.80	C	D
43		North of Harley Knox Boulevard	2U	13,000	4,051	0.31	A	5,966	0.46	A	D
44	Cosmos Street	Krameria Avenue (N) to Krameria Avenue	2U	12,500	9,000	0.72	C	10,718	0.86	D	D
45	Indian Street	Driveway 6 to San Michele Road	4D	37,500	23,076	0.62	B	24,306	0.65	B	D
46		San Michele Road to Nandina Avenue	4D	37,500	**36,880**	**0.98**	**E**	**38,110**	**1.02**	**F**	D
47		South of Nandina Avenue	2D	18,750	**42,480**	**2.27**	**F**	**43,710**	**2.33**	**F**	D
48		North of Harley Knox Boulevard	4D	35,900	**43,160**	**1.20**	**F**	**44,390**	**1.24**	**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 Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[2] V/C = Volume to Capacity Ratio

[3] LOS = Level of Service

EXHIBIT 7-3: SUMMARY OF PEAK HOUR INTERSECTION LOS
FOR GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT CONDITIONS

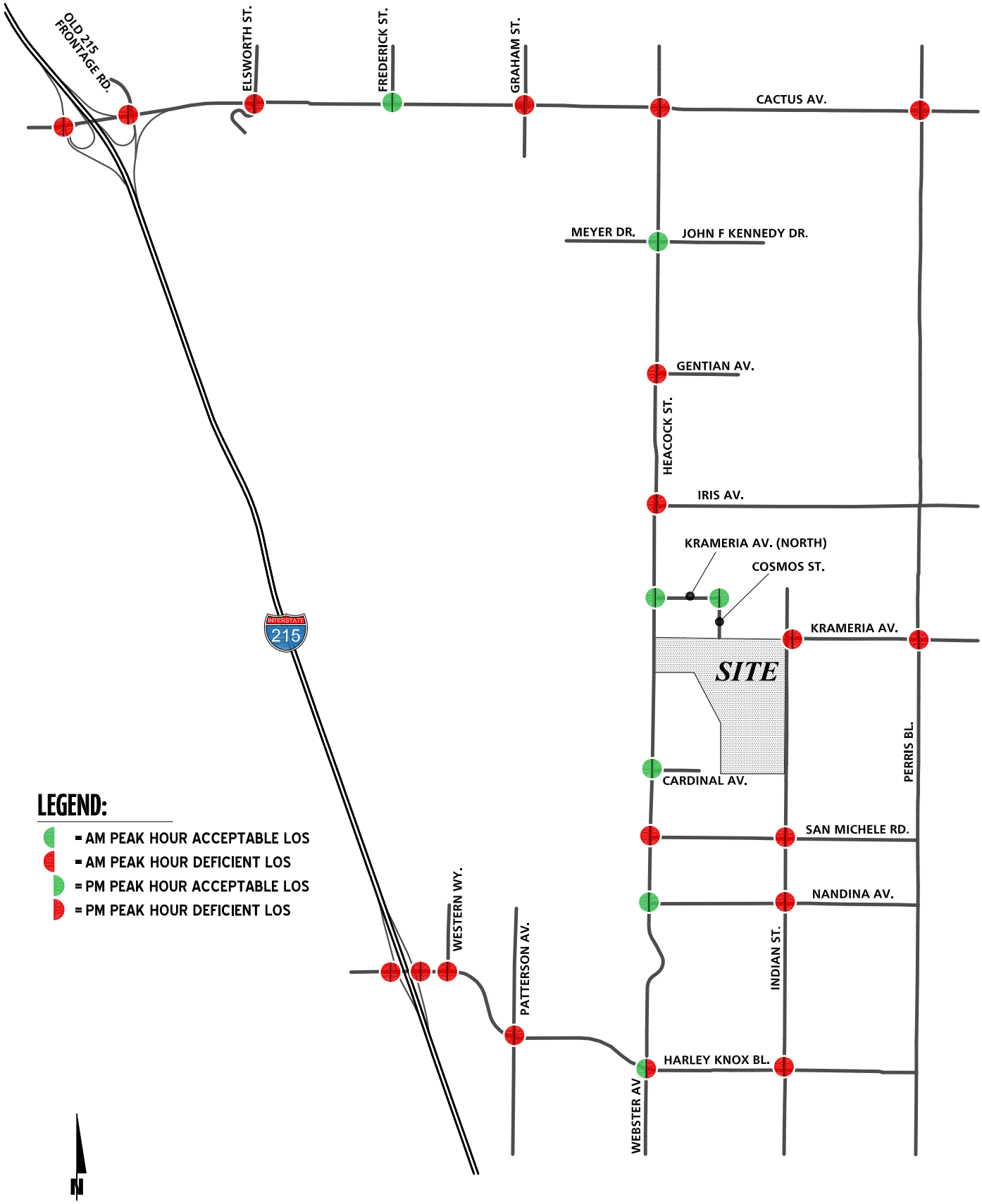
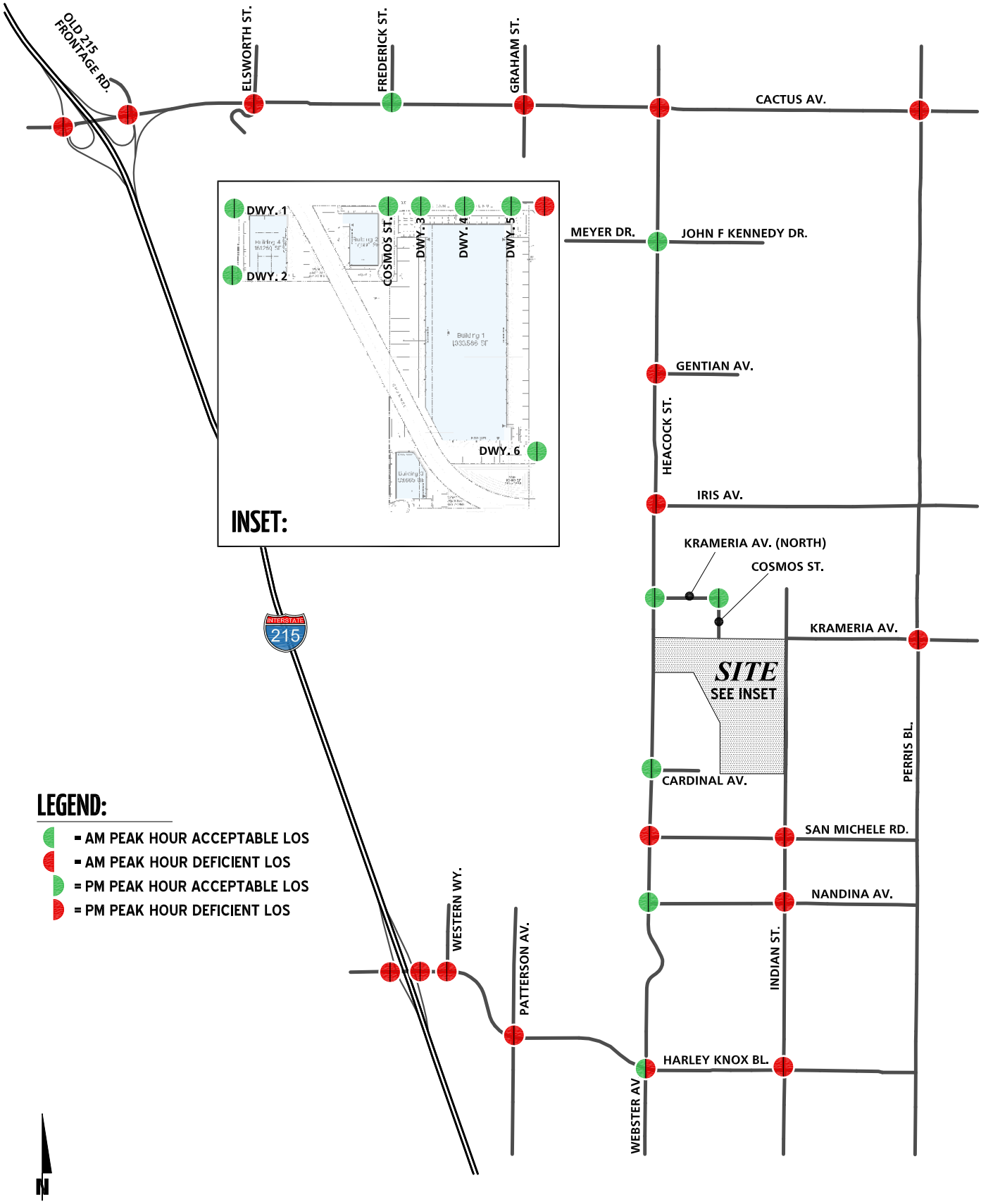


EXHIBIT 7-4: SUMMARY OF PEAK HOUR INTERSECTION LOS FOR GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT CONDITIONS



7.5.1 GENERAL PLAN BUILDOUT WITHOUT PROJECT TRAFFIC CONDITIONS

As shown on Table 7-2, the following roadway segments are anticipated to operate at unacceptable LOS (based on daily roadway segment capacities) under General Plan Buildout Without Project traffic conditions:

ID	Street	Segment
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps – LOS F
2		East of I-215 NB Ramps – LOS F
3		West of Elsworth Street – LOS F
4		East of Elsworth Street – LOS F
5		West of Frederick Street – LOS F
6		East of Frederick Street – LOS F
7		West of Graham Street – LOS F
8		East of Graham Street – LOS F
9		West of Heacock Street – LOS F
10		East of Heacock Street – LOS F
11		West of Perris Boulevard – LOS E
18	Krameria Avenue	West of Perris Boulevard – LOS F
20	San Michele Road	East of Heacock Street- LOS F
21		West of Indian Street – LOS F
23	Harley Knox Boulevard	I-215 NB Ramps to Western Way – LOS F
24		East of Western Way – LOS F
25		West of Patterson Avenue – LOS F
26		East of Patterson Avenue – LOS F
27		West of Webster Avenue – LOS F
28		East of Webster Avenue – LOS F
29		West of Indian Street – LOS F
34	Heacock Street	South of Gentian Avenue
35		North of Iris Avenue
36		Iris Avenue to Krameria Avenue (N)
46	Indian Street	San Michele Road to Nandina Avenue
47		South of Nandina Avenue
48		North of Harley Knox Boulevard

7.5.2 GENERAL PLAN BUILDOUT WITH PROJECT TRAFFIC CONDITIONS

The following roadway segments are anticipated to operate at a deficient LOS with the addition of Project traffic, in addition to those previously identified for General Plan Buildout Without Project traffic conditions:

ID	Street	Segment
12	Krameria Avenue	Heacock Street to Cosmos Street – LOS F
33	Heacock Street	North of Gentian Avenue – LOS E
40		Cardinal Avenue to San Michele Road – LOS E

As previously discussed in Section 3.8 *Existing Conditions Roadway Segment Capacity Analysis*, 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 OFF-RAMP QUEUING ANALYSIS

7.6.1 GENERAL PLAN BUILDOUT WITHOUT PROJECT TRAFFIC CONDITIONS

A queuing analysis was performed for the off-ramps at the I-215 Freeway and Cactus Avenue and Harley Knox Boulevard interchanges to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Queuing analysis findings are presented in Table 7-3 for General Plan Buildout traffic conditions. 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 7-3, the following movement may potentially experience queuing issues during the weekday AM peak 95th percentile traffic flows for General Plan Buildout traffic conditions:

ID	Intersection Location
1	I-215 SB Ramps / Cactus Avenue – Southbound right turn lane (AM peak hour only)
2	I-215 SB Ramps / Harley Knox Boulevard – Southbound shared left-through lane (AM peak hour only); Southbound right turn lane (AM and PM peak hours)
3	I-215 NB Ramps / Cactus Avenue – Northbound left turn lane (AM peak hour only)

The 95th percentile queues for General Plan Buildout Without Project traffic conditions indicates potential queuing for the movements and peak hours identified above. As shown, the analysis indicates that potential queues would exceed the length of the off-ramp and could potentially spillback into the adjacent through lanes on the freeway mainline during the AM and PM peak hours. Worksheets for General Plan Buildout Without Project conditions off-ramp queuing analysis are provided in Appendix 7.3.

Table 7-3

Peak Hour Off-Ramp Queuing Analysis for General Plan Buildout (Post-2035) Conditions

Intersection	Movement	Stacking Distance (Feet)	Post-2035 Without Project				Post-2035 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.	NBR	1,850	579 [2]	937 [2]	Yes	Yes	879 [2]	1,015 [2]	Yes	Yes
	SBR	1,115	**1,418** [2]	655 [2]	**No**	Yes	**1,476** [2]	668 [2]	**No**	Yes
I-215 SB Ramps / Harley Knox Bl.	SBL/T	1,330	**1,909** [2]	1,078 [2]	**No**	Yes	**2,172** [2]	1,136 [2]	**No**	Yes
	SBR	270	**460**	**884** [2]	**No**	**No**	**479**	**884** [2]	**No**	**No**
I-215 NB Ramps / Cactus Av.	NBL	145	**1,047** [2]	274 [2]	**No**	Yes[3]	**957** [2]	274 [2]	**No**	Yes[3]
	NBT	1,650	1,025 [2]	598 [2]	Yes	Yes	1,109 [2]	598 [2]	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	146	591 [2]	Yes	Yes	128	591 [2]	Yes	Yes
	NBR	265	414 [2]	144	Yes[3]	Yes	464 [2]	174	Yes[3]	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound turn lane without spilling back and affecting the I-215 Freeway mainline.

7.6.2 GENERAL PLAN BUILDOUT WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-3, there are no additional off-ramps anticipated to experience queues that exceed the 95th percentile with the addition of Project traffic, in addition to those previously identified under General Plan Buildout Without Project conditions. However, the addition of Project traffic to the deficient turning movements is cumulatively considerable. Worksheets for Horizon Year With Project conditions off-ramp queuing analysis are provided in Appendix 7.4.

7.7 TRAFFIC SIGNAL WARRANTS ANALYSIS

The following study area intersection is anticipated to warrant a traffic signal for General Plan Buildout Without Project traffic conditions (see Appendix 7.5):

ID	Intersection Location
20	Heacock Street/Webster Avenue / Harley Knox Boulevard

There are no additional intersections anticipated to warrant a traffic signal under General Plan Buildout With Project traffic conditions, in addition to those identified under General Plan Buildout Without Project conditions (see Appendix 7.6).

7.8 BASIC FREEWAY SEGMENT ANALYSIS

7.8.1 GENERAL PLAN BUILDOUT WITHOUT PROJECT TRAFFIC CONDITIONS

General Plan Buildout Without Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-5. As shown on Table 7-4, all of the freeway segments analyzed for this study are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours, with the exception of the following freeway segments:

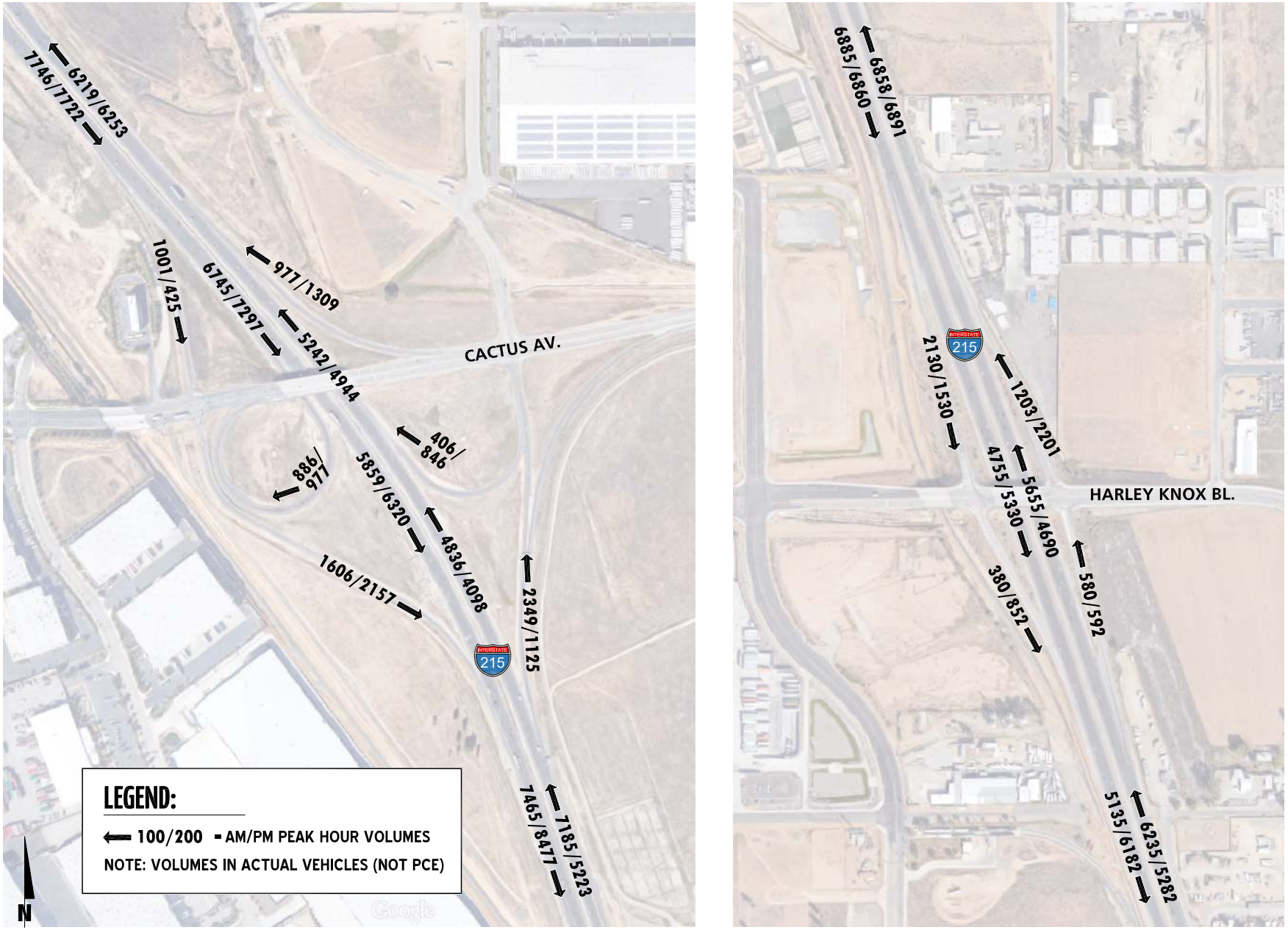
ID	Freeway Mainline Segments
5	I-215 Freeway – Northbound, North of Cactus Avenue
6	I-215 Freeway – Northbound, South of Cactus Avenue

General Plan Buildout Without Project basic freeway segment analysis worksheets are provided in Appendix 7.7.

7.8.2 GENERAL PLAN BUILDOUT WITH PROJECT TRAFFIC CONDITIONS

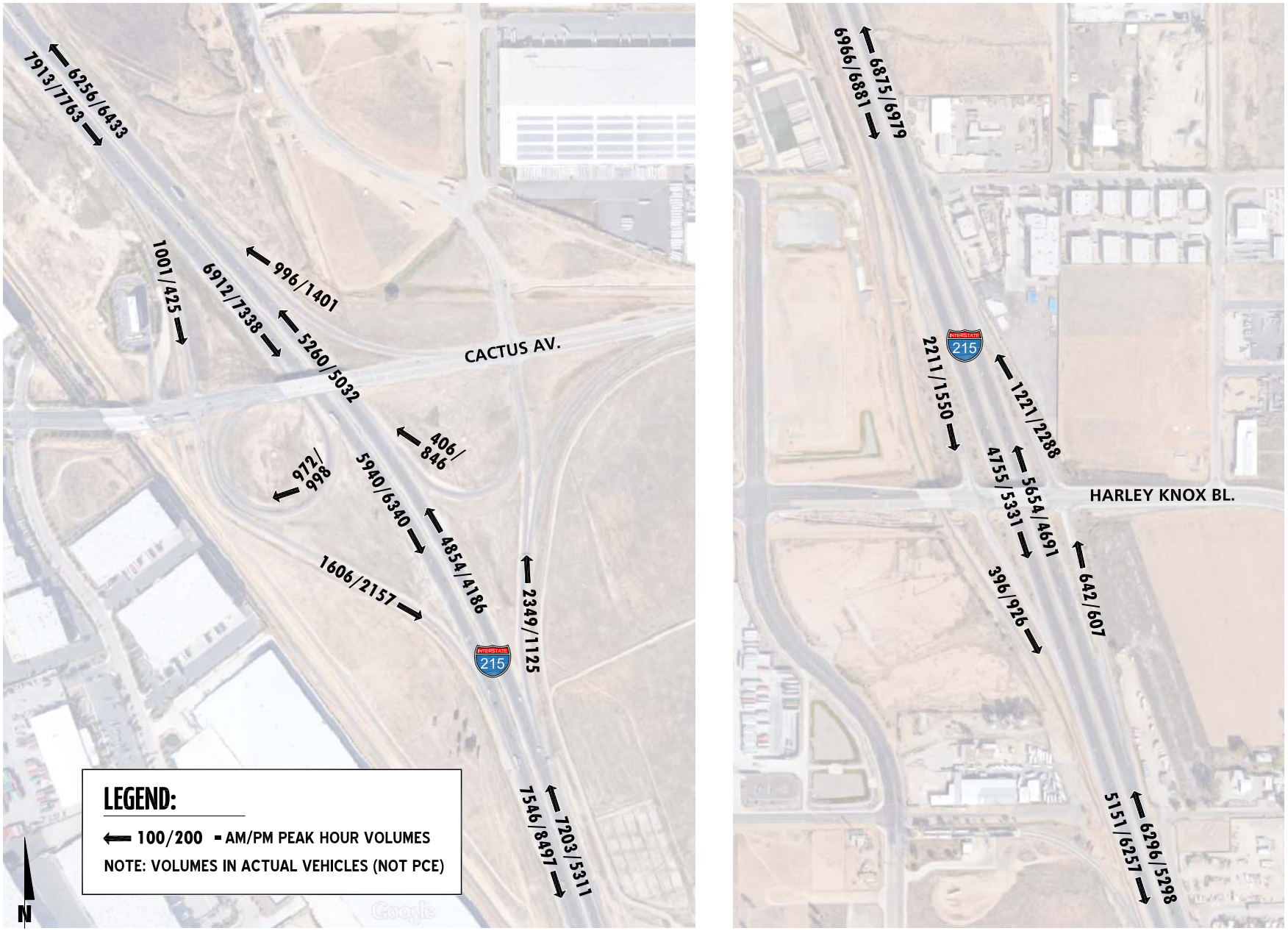
General Plan Buildout With Project mainline directional volumes for the weekday AM and PM peak hours are provided on Exhibit 7-6. As shown on Table 7-4, there are no additional freeway segments anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under General Plan Buildout Without Project conditions. Although the addition of Project traffic is not anticipated to result in any new deficiencies, the Project would contribute cumulatively to the impact at the aforementioned freeway mainline segments. Worksheets for General Plan Buildout With Project conditions basic freeway segment analysis worksheets are provided in Appendix 7.8.

EXHIBIT 7-5: GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

EXHIBIT 7-6: GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT FREEWAY MAINLINE VOLUMES



URBAN CROSSROADS

Table 7-4

Basic Freeway Segment Analysis for General Plan Buildout (Post-2035) Conditions

Freeway	Direction	Mainline Segment	Lanes[1]	Post-2035 Without Project				Post-2035 With Project			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	**37.0**	**36.8**	**E**	**E**	**38.9**	**37.1**	**E**	**E**
		South of Cactus Avenue	4	33.8	**43.9**	D	**E**	34.7	**44.1**	D	**E**
		North of Harley Knox Boulevard	3	**51.9**	**51.4**	**F**	**F**	**54.3**	**51.8**	**F**	**F**
		South of Harley Knox Boulevard	3	29.7	**40.6**	D	**E**	30.1	**41.5**	D	**E**
	NB	North of Cactus Avenue	4	26.6	26.8	D	D	26.8	28.1	D	D
		South of Cactus Avenue	4	32.2	20.9	D	C	32.6	21.4	D	C
		North of Harley Knox Boulevard	3	**51.3**	**52.0**	**F**	**F**	**51.7**	**54.5**	**F**	**F**
		South of Harley Knox Boulevard	3	**40.8**	30.8	**E**	D	**42.1**	31.2	**E**	D

* **BOLD** = Unacceptable Level of Service

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

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

7.9 FREEWAY MERGE/DIVERGE ANALYSIS

7.9.1 GENERAL PLAN BUILDOUT (POST 2035) WITHOUT PROJECT TRAFFIC CONDITIONS

Ramp merge and diverge operations were also evaluated for General Plan Buildout Without Project conditions and the results of this analysis are presented in Table 7-5. As shown in Table 7-5, all of the study area freeway merge and diverge ramp junctions are anticipated to operate at deficient LOS (i.e., LOS E or worse). General Plan Buildout Without Project freeway ramp junction operations analysis worksheets are provided in Appendix 7.9.

7.9.2 GENERAL PLAN BUILDOUT (POST 2035) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-5, there are no additional freeway merge/diverge ramp junctions anticipated to operate at an unacceptable LOS with the addition of Project traffic, in addition to those previously identified under General Plan Buildout Without Project conditions. Although the addition of Project traffic is not anticipated to result in any new deficiencies, the Project would contribute cumulatively to the impact at the aforementioned ramp junctions. Worksheets for General Plan Buildout With Project conditions freeway ramp junction operations analysis worksheets are provided in Appendix 7.10.

7.10 RECOMMENDED IMPROVEMENTS

7.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

Improvement strategies have been recommended at intersections that have been identified as deficient 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). The effectiveness of the recommended improvement strategies discussed below to address General Plan Buildout traffic deficiencies is presented in Table 7-6.

The 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 TUMF and City of Moreno Valley DIF fees (if the improvements are included in the TUMF or DIF programs) or on a fair share basis (if the improvements are not included in the TUMF or DIF programs). These fees shall be collected by the City of Moreno Valley, 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. There are no other applicable pre-existing funding programs for the study area aside from TUMF and DIF.

Worksheets for General Plan Buildout Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.11 and Appendix 7.12.

Table 7-5

Freeway Ramp Junction Merge/Diverge Analysis for General Plan Buildout (Post-2035) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Post-2035 Without Project				Post-2035 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	**38.0**	**E**	**40.5**	**E**	**39.4**	**E**	**40.9**	**E**
		Loop Off-Ramp at Cactus Avenue - Downstream	4	**38.0**	**E**	**40.5**	**E**	**39.4**	**E**	**40.9**	**E**
		Off-Ramp at Harley Knox Boulevard	3	**44.9**	**F**	**44.7**	**F**	**46.0**	**F**	**44.9**	**F**
		On-Ramp at Harley Knox Boulevard	3	31.3	D	**37.6**	**E**	31.5	D	**38.3**	**E**
	NB	On-Ramp at Cactus Avenue	3	**40.4**	**E**	**41.9**	**E**	**40.7**	**E**	**43.4**	**F**
		On-Ramp at Harley Knox Boulevard	3	41.6	D	**44.9**	**F**	41.8	F	**45.8**	**F**
		Off-Ramp at Harley Knox Boulevard	3	**37.7**	**E**	33.5	D	**38.5**	**E**	33.7	D

* **BOLD** = Unacceptable Level of Service

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

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

Table 7-6

Intersection Analysis for General Plan Buildout (Post-2035) 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	I-215 SB Ramps / Cactus Av																	
	- Without Project	TS	0	0	0	0	0	**2**	0	2	1	**2**	2	0	40.2	54.1	D	D
	- With Project	TS	0	0	0	0	0	**2**	0	2	1	**2**	2	0	40.2	54.1	D	D
2	I-215 SB Ramps / Harley Knox Bl																	
	- Without Project	TS	0	0	0	**2**	1	**0**	0	2	d	**2**	2	0	34.5	52.2	C	D
	- With Project	TS	0	0	0	**2**	1	**0**	0	2	d	**2**	2	0	35.6	52.5	D	D
3	I-215 NB Ramps / Cactus Av																	
	- Without Project[4]	TS	**2**	**2**	0	**2**	1	**2>**	**2**	**3**	**1>>**	0	**3**	0	40.4	42.3	D	D
	- With Project[4]	TS	**2**	**2**	0	**2**	1	**2>**	**2**	**3**	**1>>**	0	**3**	0	40.6	47.1	D	D
4	I-215 NB Ramps / Harley Knox Bl																	
	- Without Project	TS	0	1	1	0	0	0	**2**	2	0	0	2	**1>>**	51.4	53.6	D	D
	- With Project	TS	0	1	1	0	0	0	**2**	2	0	0	2	**1>>**	53.9	54.0	D	D
5	Elsworth St / Cactus Av																	
	- Without Project[4]	TS	**2**	1	0	1	1	1>	1	**4**	1>>	1	**4**	1	33.1	50.2	C	D
	- With Project[4]	TS	**2**	1	0	1	1	1>	1	**4**	1>>	1	**4**	1	33.1	50.3	C	D
7	Western Wy / Harley Knox Bl																	
	- Without Project	**TS**	0	0	0	0	1	0	**1**	**3**	0	0	**3**	d	16.3	16.3	B	B
	- With Project	**TS**	0	0	0	0	1	0	**1**	**3**	0	0	**3**	d	16.9	19.3	B	B
8	Graham St / Cactus Av																	
	- Without Project	TS	2	2	0	1	2	1>	**2**	**3**	1>>	1	3	0	48.5	48.1	D	D
	- With Project	TS	2	2	0	1	2	1>	**2**	**3**	1>>	1	3	0	54.2	52.4	D	D
9	Patterson Av / Harley Knox Bl																	
	- Without Project	TS	0	1	0	0	1	d	1	**3**	1	1	**3**	**1**	19.5	20.1	B	C
	- With Project	TS	0	1	0	0	1	d	1	**3**	1	1	**3**	**1**	22.5	21.4	C	C
10	Heacock St / Cactus Av																	
	- Without Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	51.6	29.3	D	C
	- With Project	TS	2	2	0	1	2	0	1	**3**	1>	1	**3**	0	54.7	37.6	D	D
12	Heacock St / Gentian Av																	
	- Without Project	**TS**	0	**2**	1	1	**2**	0	0	0	0	0	1	d	15.2	12.7	B	B
	- With Project	**TS**	0	**2**	1	1	**2**	0	0	0	0	0	1	d	16.2	14.8	B	B
13	Heacock St / Iris Av																	
	- Without Project	**TS**	0	**2**	0	**2**	**2**	0	0	0	0	1	0	**1>**	23.6	40.5	C	D
	- With Project	**TS**	0	**2**	0	**2**	**2**	0	0	0	0	1	0	**1>**	26.9	54.2	C	D

Table 7-6

Intersection Analysis for General Plan Buildout (Post-2035) 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
18	Heacock St / San Michele Rd																	
	- Without Project	TS	1	**2**	1	**2**	**2**	1	1	1	1	1	1	**1>**	31.1	38.7	C	D
	- With Project	TS	1	**2**	1	**2**	**2**	1	1	1	1	1	1	**1>**	31.3	39.8	C	D
20	Webster Av / Harley Knox Bl																	
	- Without Project	**TS**	0	**1**	0	0	**1**	0	**1**	**3**	0	**1**	**3**	0	27.8	26.0	C	C
	- With Project	**TS**	0	**1**	0	0	**1**	0	**1**	**3**	0	**1**	**3**	0	32.4	26.8	C	C
26	Indian St / Krameria Av																	
	- Without Project	**TS**	1	**2**	1	1	**2**	1	1	1	**1>**	1	1	1	35.7	41.9	D	D
	- With Project	**TS**	1	**2**	1	1	**2**	1	1	1	**1>**	1	1	1	37.9	42.2	D	D
28	Indian St / San Michele Rd																	
	- Without Project	TS	2	**2**	**1>**	1	2	0	**2**	**2**	**2>**	**2**	2	**1>**	24.8	26.7	C	C
	- With Project	TS	2	**2**	**1>**	1	2	0	**2**	**2**	**2>**	**2**	2	**1>**	25.4	26.8	C	C
29	Indian St / Nandina Av																	
	- Without Project	TS	**2**	2	**1>**	1	**3**	0	1	1	**1>**	1	1	d	34.5	28.3	C	C
	- With Project	TS	**2**	2	**1>**	1	**3**	0	1	1	**1>**	1	1	d	35.6	32.7	D	C
30	Indian St / Harley Knox Bl																	
	- Without Project	TS	2	2	1	**2**	2	**1>**	**2**	**3**	**1>**	**2**	**3**	**1>**	40.4	44.7	D	D
	- With Project	TS	2	2	1	**2**	2	**1>**	**2**	**3**	**1>**	**2**	**3**	**1>**	40.2	50.5	D	D
31	Perris Bl / Cactus Av																	
	- Without Project	TS	**2**	3	**1**	1	**3**	1	**2**	**3**	**1>**	1	2	0	53.8	43.1	D	D
	- With Project	TS	**2**	3	**1**	1	**3**	1	**2**	**3**	**1>**	1	2	0	54.4	43.4	D	D
32	Perris Bl / Krameria Av																	
	- Without Project[6]	TS	**2**	3	**1**	**2**	3	0	**1**	**2**	0	**1**	**2**	1	44.0	49.2	D	D
	- With Project[6]	TS	**2**	3	**1**	**2**	3	0	**1**	**2**	0	**1**	**2**	1	45.7	51.2	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 o 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

[4] Improvements also include implementing protected left-turn phasing for the northbound and southbound approaches

[5] The City of Perris is currently improving Harley Knox Boulevard between the I-215 Freeway and Perris Boulevard. Based on discussion with City staff, the improvements are anticipated to be completed by Fall 2015

[6] Improvements also include implementing protected left-turn phasing for the eastbound and westbound approaches

7.10.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON ROADWAY SEGMENTS

As shown on Table 7-6, the General Plan Buildout 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 are a few deficient roadway segments with the recommended intersection 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. There are also other deficient roadway segments (see Table 7-2), where additional roadway widening has not been recommended as the adjacent study area intersections (see Table 7-1) are anticipated to operate at acceptable LOS during the peak hours.

7.10.3 RECOMMENDED IMPROVEMENTS TO ADDRESS OFF-RAMP QUEUES

The 95th percentile queues for General Plan Buildout Without and With Project traffic conditions, with improvements, are shown on Table 7-8. Table 7-8 indicates there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for General Plan Buildout traffic conditions, with the improvements identified previously in Table 7-6. Worksheets for General Plan Buildout Without and With Project conditions off-ramp queuing analysis, with improvements, are provided in Appendix 7.13 and Appendix 7.14.

7.10.4 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

The SCAG RTP includes a list of projects in the Federal Transportation Improvement Program (FTIP). The following is an applicable FTIP project within the study area: interchange improvements at I-215/Cactus Avenue, which includes the extension of the northbound auxiliary lane between Cactus Avenue and Alessandro Boulevard to the north (to be completed by 2018). However, this improvement is not anticipated to improve the LOS deficiencies at the deficient freeway merge/diverge ramp junctions.

Table 7-7

Roadway Volume/Capacity Analysis for General Plan Buildout (Post 2035) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section[1]	LOS Capacity[2]	Post-2035 w/o Project	V/C[3]	LOS[4]	Post-2035 w/ Project	V/C[3]	LOS[4]	Acceptable LOS
1	Cactus Avenue	I-215 SB Ramps to I-215 NB Ramps	6D	56,300	**52,522**	**0.93**	**E**	**53,473**	**0.95**	**E**	D
2		East of I-215 NB Ramps	6D	56,300	**68,405**	**1.22**	**F**	**70,307**	**1.25**	**F**	D
3		West of Elsworth Street	8D	75,100	63,400	0.84	D	65,302	0.87	D	D
4		East of Elsworth Street	8D	75,100	58,900	0.78	C	60,802	0.81	D	D
5		West of Frederick Street	6D	56,300	**60,581**	**1.08**	**F**	**62,483**	**1.11**	**F**	D
6		East of Frederick Street	6D	56,300	**62,838**	**1.12**	**F**	**64,740**	**1.15**	**F**	D
7		West of Graham Street	6D	56,300	**59,572**	**1.06**	**F**	**61,474**	**1.09**	**F**	D
8		East of Graham Street	6D	56,300	**55,142**	**0.98**	**E**	**57,044**	**1.01**	**F**	D
9		West of Heacock Street	6D	56,300	**50,768**	**0.90**	**E**	**52,670**	**0.94**	**E**	D
10		East of Heacock Street	6D	56,300	43,555	0.77	C	44,013	0.78	C	C
11		West of Perris Boulevard	6D	56,300	37,000	0.66	B	37,458	0.67	B	C
12	Krameria Avenue	Heacock Street to Cosmos Street	2D	18,750	11,144	0.59	A	12,862	0.69	B	D
18		West of Perris Boulevard	4D	37,500	12,689	0.34	A	13,217	0.35	A	D
20	San Michele Road	East of Heacock Street	4D	37,500	22,852	0.61	B	22,852	0.61	B	D
21		West of Indian Street	4D	37,500	27,208	0.73	C	27,208	0.73	C	D
23	Harley Knox Boulevard	I-215 NB Ramps to Western Way	6D	53,900	36,697	0.68	B	39,489	0.73	C	D
24		East of Western Way	6D	53,900	35,500	0.66	B	38,292	0.71	C	D
25		West of Patterson Avenue	6D	53,900	35,500	0.66	B	38,292	0.71	C	D
26		East of Patterson Avenue	6D	53,900	34,800	0.65	B	37,768	0.70	B	D
27		West of Webster Avenue	6D	53,900	39,288	0.73	C	42,257	0.78	C	D
28		East of Webster Avenue	6D	53,900	39,576	0.73	C	40,630	0.75	C	D
29		West of Indian Street	6D	53,900	36,988	0.69	B	38,042	0.71	C	D
33	Heacock Street	North of Gentian Avenue	4D	37,500	25,192	0.67	B	28,143	0.75	C	D
34		South of Gentian Avenue	4D	37,500	24,000	0.64	B	26,951	0.72	C	D
35		North of Iris Avenue	4D	37,500	25,655	0.68	B	28,606	0.76	C	D
36		Iris Avenue to Krameria Avenue (N)	4D	37,500	22,634	0.60	A	25,585	0.68	C	D
37		Krameria Avenue (N) to Driveway 1	4D	37,500	23,898	0.64	B	25,132	0.67	B	D
38		Driveway 1 to Driveway 2	4D	37,500	23,898	0.64	B	25,201	0.67	B	D
39		Driveway 2 to Cardinal Avenue	4D	37,500	23,898	0.64	B	25,726	0.69	B	D
40		Cardinal Avenue to San Michele Road	4D	37,500	23,898	0.64	B	25,813	0.69	B	D
41		San Michele Road to Nandina Avenue	4D	37,500	12,472	0.33	A	14,387	0.38	C	D

Table 7-7

Roadway Volume/Capacity Analysis for General Plan Buildout (Post 2035) Conditions With Improvements

#	Roadway	Segment Limits	Roadway Section[1]	LOS Capacity[2]	Post-2035 w/o Project	V/C[3]	LOS[4]	Post-2035 w/ Project	V/C[3]	LOS[4]	Acceptable LOS
46	Indian Street	San Michele Road to Nandina Avenue	**5D**	46,900	36,880	0.79	C	38,110	0.81	D	D
47		South of Nandina Avenue	**5D**	46,900	**42,480**	**0.91**	**E**	**43,710**	**0.93**	**E**	D
48		North of Harley Knox Boulevard[5]	4D	37,500	**43,160**	**1.15**	**F**	**44,390**	**1.18**	**F**	D

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

[1] Roadway section improvements are consistent with the through lanes recommended as part of the intersection improvements shown on Table 7-6.

[2] These maximum roadway capacities have been obtained from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis Preparation Guidelines (August 2007), Table CE-9 of the City of Perris General Plan Circulation Element, or Figure C-2 of the County of Riverside General Plan Circulation Element.

[3] V/C = Volume to Capacity Ratio

[4] LOS = Level of Service

[5] Additional roadway widening has not been recommended for these deficient roadway segments as the adjacent study area intersections (see Table 7-1 and Table 7-6) are anticipated to operate at acceptable LOS during the peak hours.

Table 7-8

Peak Hour Off-Ramp Queuing Analysis for General Plan Buildout (Post-2035) Conditions With Improvements

Intersection	Movement	Stacking Distance (Feet)	Post-2035 Without Project				Post-2035 With Project			
			95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]		95th Percentile Stacking Distance Required (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
I-215 SB Ramps / Cactus Av.	NBR	1,850	0 [2]	0	Yes	Yes	0	0	Yes	Yes
	SBR	1,115	417 [2]	279 [2]	Yes	Yes	417 [2]	279 [2]	Yes	Yes
I-215 SB Ramps / Harley Knox Bl.	SBL/T	1,330	475	257	Yes	Yes	601 [2]	269	Yes	Yes
	SBR	270	407	710 [2]	Yes[3]	Yes[3]	407	710 [2]	Yes[3]	Yes[3]
I-215 NB Ramps / Cactus Av.	NBL	145	437 [2]	168 [2]	Yes[3]	Yes[3]	437 [2]	168 [2]	Yes[3]	Yes[3]
	NBT	1,650	453 [2]	424 [2]	Yes	Yes	453 [2]	424 [2]	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	170	415 [2]	Yes	Yes	170	427 [2]	Yes	Yes
	NBR	265	430 [2]	138	Yes[3]	Yes	604 [2]	160	Yes[3]	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] Adjacent through lane has sufficient storage to accommodate any spillover from the northbound turn lane without spilling back and affecting the I-215 Freeway mainline.

In addition, the Project Study Report/Project Development Support in Riverside County on I-215 and SR-60 between Nuevo Road (I-215) & I-215/SR-60 Junction and Box Springs Road (I-215) & Day Street (SR-60) (prepared by Caltrans in April 2008), also known as the I-215 North Project, includes the construction of an high-occupancy vehicle lane in each direction of the I-215 Freeway between Nuevo Road and Box Springs Road within the existing median. Based on information provided on the Project website, these improvements are longer range as priority has been given to the I-215 South and I-215 Central projects. (15)

Caltrans typically assumes a reduction of 14 percent to the I-215 Freeway mainline through volumes in this region to account for vehicles utilizing the carpool (high-occupancy vehicle) lanes. Although the reduction to I-215 Freeway mainline volumes has been applied to account for the proposed carpool lanes, the analysis is performed assuming the same number of mixed-flow lanes and on and off-ramp configurations as existing baseline conditions.

As shown on Table 7-9, all of the freeway mainline segments are anticipated to operate at an acceptable LOS with the construction of a carpool lane in both directions of travel (i.e., LOS D or better), with the exception of the following:

ID	Freeway Mainline Segments
3	I-215 Freeway – Southbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours
7	I-215 Freeway – Northbound, North of Harley Knox Boulevard – LOS E AM and PM peak hours

Similarly, Table 7-10 shows that the I-215 Freeway ramp junctions are anticipated to operate at an acceptable LOS with the improvements discussed above (i.e., LOS D or better), with the exception of the following freeway ramp junctions:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue – LOS E PM peak hour only
2	I-215 Freeway – Southbound, Loop Off-Ramp at Cactus Avenue – LOS E PM peak hour only
3	I-215 Freeway – Southbound, Off-Ramp at Harley Knox Boulevard – LOS F AM peak hour; LOS E PM peak hour
5	I-215 Freeway – Northbound, On-Ramp at Cactus Avenue – LOS E AM and PM peak hours
6	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard – LOS E AM and PM peak hours

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 Moreno Valley (or other neighboring jurisdictions) on SHS roadway segments. Worksheets for General Plan Buildout Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.15 and Appendix 7.16. General Plan Buildout Without and With Project freeway ramp junction level of service analysis worksheets, with improvements, are provided in Appendix 7.17 and Appendix 7.18.

Table 7-9

Basic Freeway Segment Analysis for

General Plan Buildout (Post-2035) Conditions With Improvements

Freeway	Direction	Mainline Segment	Lanes[1]	Post-2035 Without Project				Post-2035 With Project			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
I-215 Freeway	SB	North of Cactus Avenue	4	29.2	29.0	D	D	30.5	29.2	D	D
		South of Cactus Avenue	4	26.9	34.1	D	D	27.4	34.2	D	D
		North of Harley Knox Boulevard	3	**37.6**	**37.4**	**E**	**E**	**38.9**	**37.6**	**E**	**E**
		South of Harley Knox Boulevard	3	22.8	30.2	C	D	22.9	31.1	C	D
	NB	North of Cactus Avenue	**5**	17.4	17.5	B	B	17.5	18.2	B	C
		South of Cactus Avenue	4	26.8	17.3	D	B	21.8	17.6	C	B
		North of Harley Knox Boulevard	3	**37.4**	**37.7**	**E**	**E**	**37.5**	**39.0**	**E**	**E**
		South of Harley Knox Boulevard	3	30.7	23.5	D	C	31.5	23.7	D	C

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on proposed improvements.

Improvements include: One HOV lane in each direction on the I-215 Freeway (I-215 North Project) and one northbound auxiliary lane between Alessandro Boulevard and Cactus Avenue (CAG RTP FTIP Project).

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

Table 7-10

Freeway Ramp Junction Merge/Diverge Analysis for General Plan Buildout (Post-2035) Conditions With Improvements

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Post-2035 Without Project				Post-2035 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS	Density[2]	LOS	Density[2]	LOS	Density[2]	LOS
I-215 Freeway	SB	Loop Off-Ramp at Cactus Avenue - Upstream	4	33.6	D	**36.1**	**E**	34.9	D	**36.4**	**E**
		Loop Off-Ramp at Cactus Avenue - Downstream	4	33.6	D	**36.1**	**E**	34.9	D	**36.4**	**E**
		Off-Ramp at Harley Knox Boulevard	3	**40.6**	**F**	**39.0**	**E**	**41.3**	**F**	**39.1**	**E**
		On-Ramp at Harley Knox Boulevard	3	26.5	C	33.1	D	26.7	C	33.9	D
	NB	On-Ramp at Cactus Avenue	3	**36.2**	**E**	**37.7**	**E**	**36.4**	**E**	**39.0**	**E**
		On-Ramp at Harley Knox Boulevard	3	**37.3**	**E**	**40.4**	**E**	**37.4**	**E**	**41.2**	**E**
		Off-Ramp at Harley Knox Boulevard	3	33.5	D	29.2	D	34.0	D	29.3	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on proposed improvements.

Improvements include: One HOV lane in each direction on the I-215 Freeway (I-215 North Project) and one northbound auxiliary lane between Alessandro Boulevard and Cactus Avenue (CAG RTP FTIP Project).

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

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