Technical Appendix I1

Traffic Impact Analysis

URBAN CROSSROADS

41 Corporate Park, Suite 300
Irvine, CA 92606

Prepared by:

Aric Evatt, PTP
Charlene So, PE

REGISTERED PROFESSIONAL ENGINEER
CHARLENE HWANG SO
No. TR2414
Exp. 6/30/2015
TRAFFIC
STATE OF CALIFORNIA

FIRST NANDINA LOGISTICS CENTER
TRAFFIC IMPACT ANALYSIS
CITY OF MORENO VALLEY, CALIFORNIA

June 6, 2014

JN:08578-07 Report
AE:CS:PT:rd

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FIRST NANDINA LOGISTICS CENTER
TRAFFIC IMPACT ANALYSIS
CITY OF MORENO VALLEY, CALIFORNIA

1.0 INTRODUCTION

This report presents the results of the traffic impact analysis (TIA) for the proposed First Nandina Logistics Center (referred to as "Project"), which is located west of Indian Street and south of Nandina Avenue in the City of Moreno Valley as shown on Exhibit 1-1.

The purpose of this traffic impact analysis is to evaluate the potential impacts to traffic and circulation associated with the development of the proposed Project, and recommend improvements to mitigate impacts considered significant in comparison to established regulatory thresholds. As directed by City of Moreno Valley staff, this TIA has been prepared in accordance with the City of Moreno Valley Transportation Engineering Division's *Traffic Impact Analysis Preparation Guide* (August 2007). The approved Project Traffic Study Scoping agreement is provided in Appendix "1.1" of this TIA.

1.1 PROJECT OVERVIEW

The proposed Project is anticipated to include the development of approximately 1,450,000 square feet of high-cube warehouse/distribution facility on the southwest corner of Indian Street and Nandina Avenue. Per the City's traffic study guidelines, the Opening Year will have a five (5) year minimum horizon. As such, the Opening Year analysis will assess 2018 traffic conditions.

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) and presented in ITE's most recent edition of *Trip Generation* (9th Edition, 2012). The Project is estimated to generate a net total of approximately 3,423 net passenger car equivalents (PCE) trip-ends per day on a typical weekday with approximately 224 net AM PCE peak hour trips and 244 net PM PCE peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in detail in Section 4.1 *Project Trip Generation* of this report.

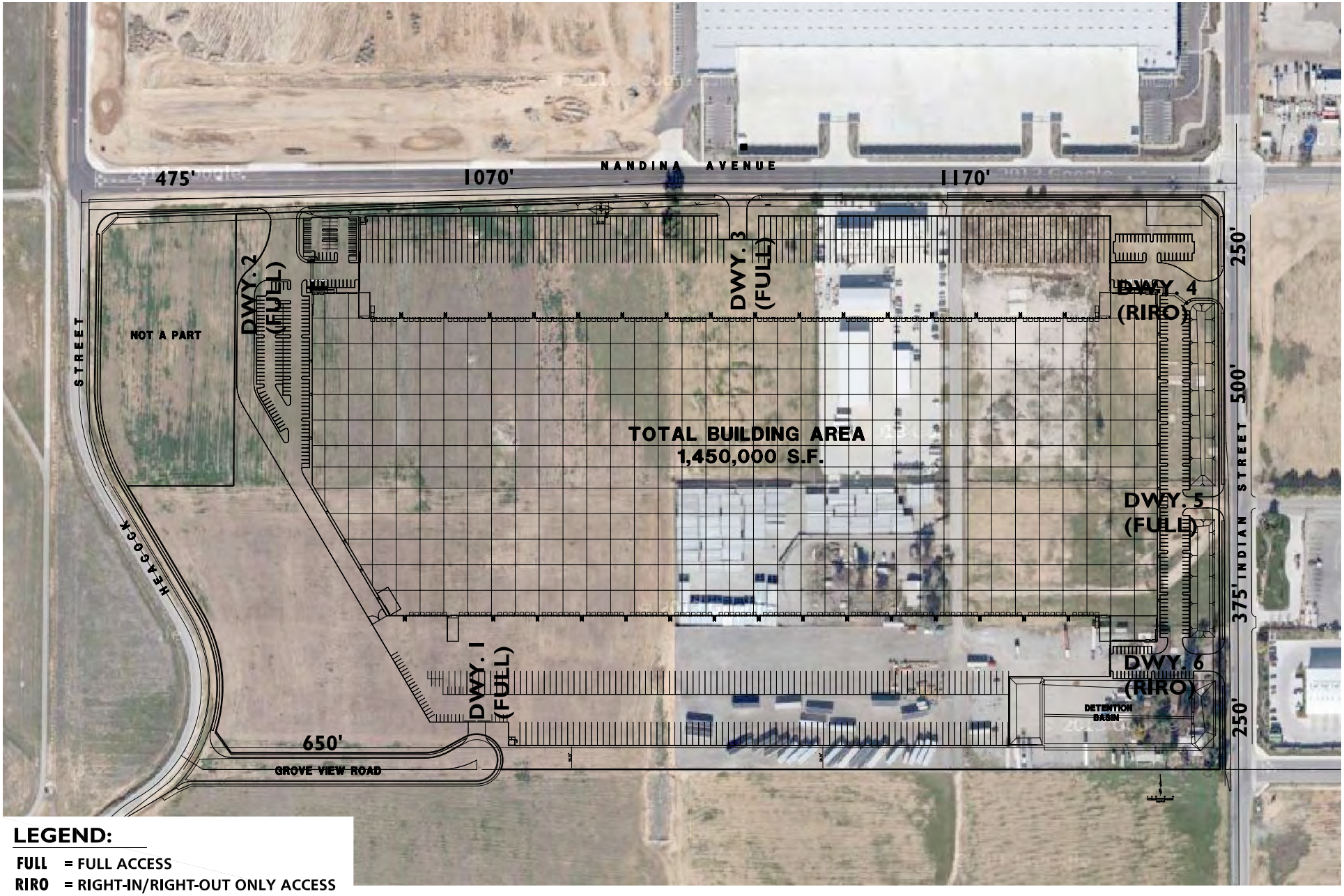
1.2 ANALYSIS SCENARIOS

Consistent with the City of Moreno Valley traffic study guidelines, potential impacts to traffic and circulation will be assessed for each of the following conditions:

- Existing (2013) Conditions (1 scenario)
- Existing plus Project Conditions (1 scenario)
- Opening Year Cumulative (2018), Without and With Project (2 scenarios) – ambient growth and cumulative development projects (EAC and EAPC)

EXHIBIT 1-1

PRELIMINARY SITE PLAN



LEGEND:

FULL = FULL ACCESS
RIRO = RIGHT-IN/RIGHT-OUT ONLY ACCESS

N

First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:siteplan-131007)

URBAN CROSSROADS

1.2.1 EXISTING (2013) CONDITIONS

Information for Existing (2013) 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 (2013) plus Project (E+P) analysis has been utilized to determine direct project-related traffic impacts that would occur on the existing roadway system based on a comparison of the E+P traffic conditions to the Existing (2013) traffic conditions.

1.2.3 OPENING YEAR CUMULATIVE (2018) CONDITIONS

The Opening Year Cumulative (2018) conditions analysis will be utilized to determine if improvements funded through local and regional transportation mitigation fee programs such as the Transportation Uniform Mitigation Fee (TUMF) program, City of Moreno Valley Development Impact Fee (DIF) program, or other approved funding mechanism can accommodate the near-term cumulative traffic at the target LOS identified in the City of Moreno Valley General Plan. If the "funded" improvements can provide the target LOS, then the Project's payment into the TUMF and DIF will be considered as cumulative mitigation through the conditions of approval. Other improvements needed beyond the "funded" improvements (such as localized improvements to non-TUMF or non-DIF facilities) are identified as such. To account for background traffic, sixty-four (64) other known cumulative development projects in the study area were included in addition to 10.4% of ambient growth. This comprehensive list was compiled from information provided by the City of Moreno Valley Planning Department, City of Perris, City of Riverside, unincorporated Riverside County and the March Air Reserve Base.

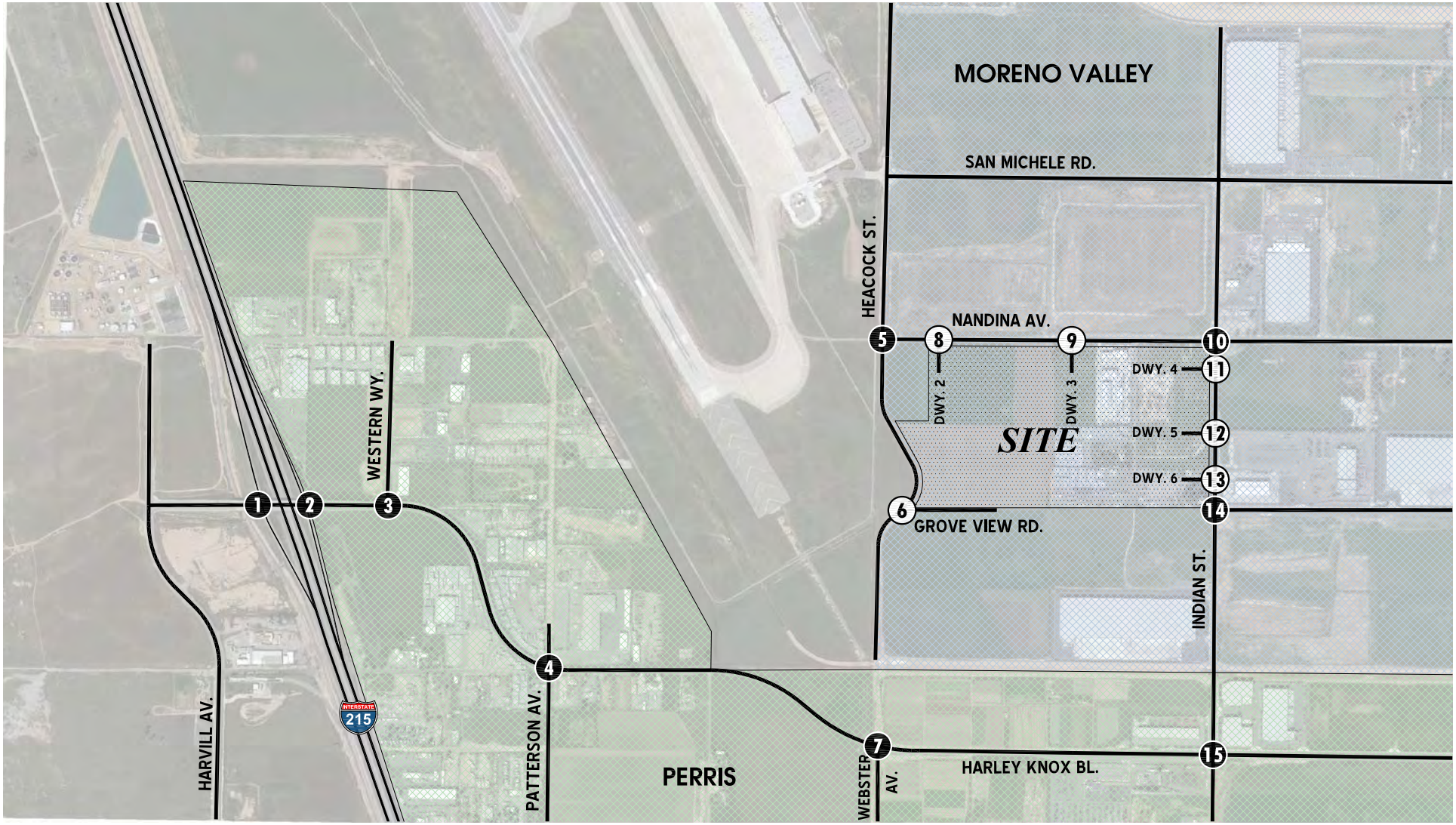
1.3 STUDY AREA

The traffic impact study area was defined in coordination with the City of Moreno Valley and in conformance with the requirements of the City's TIA preparation guidelines. Based on these guidelines, the minimum area to be studied shall include any intersection of "Collector" or higher classification street, with "Collector" or higher classification streets, at which the proposed project will add 50 or more peak hour trips. Exhibit 1-2 presents the study area roadway network, intersection analysis locations, and freeway mainline segments.

It should be pointed out that the "50 peak hour trip" criteria utilized by the City of Moreno Valley is consistent with the methodology employed by other jurisdictions throughout Riverside County and generally represents a threshold of trips at which a typical intersection would have the potential to be impacted. Although each intersection may have unique operating characteristics, this traffic

EXHIBIT 1-2

LOCATION MAP



LEGEND:

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

N

engineering rule of thumb is a widely utilized tool for estimating a potential area of impact (i.e., study area).

To ensure that this TIA satisfies the needs of the City of Moreno Valley and complies with the City's TIA preparation guidelines, Urban Crossroads, Inc. prepared a Project Traffic Study Scoping Agreement for review by City staff prior to the preparation of this TIA. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology. The Agreement approved by the City of Moreno Valley is included in Appendix "1.1".

1.3.1 INTERSECTIONS

The following fifteen (15) Project study area intersection locations shown on Exhibit 1-2 and listed on Table 1-1 were selected for this TIA based on the following: (1) City's TIA analysis methodology that requires analysis of intersection locations with 50 or more peak-hour Project trips and (2) input from the City of Moreno Valley Traffic Engineering Division.

Table 1-1 Intersection Analysis Locations

ID	Intersection Location	Jurisdiction
1	I-215 Southbound Ramps / Harley Knox Boulevard	Caltrans
2	I-215 Northbound Ramps / Harley Knox Boulevard	Caltrans
3	Western Way / Harley Knox Boulevard	Perris
4	Patterson Avenue / Harley Knox Boulevard	Perris
5	Heacock Street / Nandina Avenue	Moreno Valley
6	Heacock Street / Grove View Road – Future Intersection	Moreno Valley
7	Webster Avenue / Harley Knox Boulevard	Perris
8	Driveway 2 / Nandina Avenue – Future Intersection	Moreno Valley
9	Driveway 3 / Nandina Avenue – Future Intersection	Moreno Valley
10	Indian Street / Nandina Avenue	Moreno Valley
11	Indian Street / Driveway 4 – Future Intersection	Moreno Valley
12	Indian Street / Driveway 5/N. Waste Management Driveway	Moreno Valley
13	Indian Street / Driveway 6 – Future Intersection	Moreno Valley
14	Indian Street / Grove View Road	Moreno Valley
15	Indian Street / Harley Knox Boulevard	Perris

1.3.2 ROADWAY SEGMENTS

The roadway segment study area utilized for this analysis is based on a review of the key roadway segments in which the Project is anticipated to contribute 50 or more peak hour trips as shown on

Exhibit 1-2. The study area identifies a total of thirty-one (31) existing/future roadway segments. Table 1-2 provides a summary of the study area roadway segments.

Table 1-2 Roadway Segment Analysis Locations

ID	Roadway Segments
1	Harley Knox Boulevard, West of I-215 Freeway
2	Harley Knox Boulevard, I-215 SB Ramps to I-215 NB Ramps
3	Harley Knox Boulevard, I-215 NB Ramps to Western Way
4	Harley Knox Boulevard, East of Western Way
5	Harley Knox Boulevard, West of Patterson Avenue
6	Harley Knox Boulevard, East of Patterson Avenue
7	Harley Knox Boulevard, West of Webster Avenue
8	Harley Knox Boulevard, East of Webster Avenue
9	Harley Knox Boulevard, West of Indian Street
10	Harley Knox Boulevard, East of Indian Street
11	Western Way, North of Harley Knox Boulevard
12	Patterson Avenue, North of Harley Knox Boulevard
13	Patterson Avenue, South of Harley Knox Boulevard
14	Heacock Street, North of Nandina Avenue
15	Heacock Street, Nandina Avenue to Grove View Road
16	Heacock Street, South of Grove View Road
17	Webster Avenue, North of Harley Knox Boulevard
18	Webster Avenue, South of Harley Knox Boulevard
19	Indian Street, North of Nandina Avenue
20	Indian Street, Nandina Avenue to Driveway 4
21	Indian Street, Driveway 4 to Driveway 5
22	Indian Street, Driveway 5 to Driveway 6
23	Indian Street, Driveway 6 to Grove View Road
24	Indian Street, South of Grove View Road
25	Indian Street, North of Harley Knox Boulevard
26	Indian Street, South of Harley Knox Boulevard
27	Nandina Avenue, Heacock Street to Driveway 2
28	Nandina Avenue, Driveway 2 to Driveway 3
29	Nandina Avenue, Driveway 3 to Indian Street
30	Nandina Avenue, East of Indian Street
31	Grove View Road, East of Indian Street

1.3.3 FREEWAY MAINLINE SEGMENTS

Consistent with Caltrans traffic study guidelines, the freeway mainline analysis locations include the segments on either side of the two interchanges where the proposed Project is anticipated to contribute 100 two-way peak hour trips on the segments. The study area freeway mainline analysis locations include ten (10) SR-60 Freeway and I-215 Freeway mainline segments for the eastbound, westbound, northbound and southbound directions of flow as shown on Table 1-3:

Table 1-3 Freeway Mainline Segment Analysis Locations

ID	Freeway Mainline Segments
1	SR-60 Freeway – Westbound, West of I-215 Freeway
2	SR-60 Freeway – Eastbound, West of I-215 Freeway
3	I-215 Freeway – Southbound, South of SR-60 Freeway
4	I-215 Freeway – Southbound, North of Harley Knox Boulevard
5	I-215 Freeway – Southbound, South of Harley Knox Boulevard
6	I-215 Freeway – Northbound, South of SR-60 Freeway
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 four (4) I-215 freeway ramp junctions for both northbound and southbound directions of flow as shown on Table 1-4:

Table 1-4 Freeway Merge/Diverge Ramp Junction Analysis Locations

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off Ramp at Harley Knox Boulevard (Diverge)
2	I-215 Freeway – Southbound , On Ramp at Harley Knox Boulevard (Merge)
3	I-215 Freeway – Northbound, On-Ramp at Harley Knox Boulevard (Merge)
4	I-215 Freeway – Northbound, Off-Ramp at Harley Knox Boulevard (Diverge)

1.4 SUMMARY OF PROJECT IMPACTS AND RECOMMENDED IMPROVEMENTS

This section provides a summary of project-related impacts and associated mitigation measures. Section 2.0 *Methodologies* provides information on the methodologies used in the analyses and Section 5.0 *Existing Plus Project Traffic Analysis* includes the detailed analysis.

Based on a comparison of E+P to Existing (2013) traffic conditions, the study area intersections are anticipated to continue to operate at acceptable LOS during the AM and PM peak hours. As such, mitigation measures are not necessary and have not been identified.

1.5 SUMMARY OF CUMULATIVE IMPACTS AND RECOMMENDED IMPROVEMENTS

A summary of the cumulatively impacted study area intersections and recommended improvements to reduce cumulative impacts to less-than-significant are described in detail within Section 6.0 *Opening Year Cumulative (2018) Traffic Analysis* of this report. Cumulative impacts are deficiencies in the transportation network's LOS that would not be directly caused by the Project. The Project would, however, contribute traffic to these deficient facilities, resulting in a finding that the Project's contribution to the cumulative impact is considered cumulatively considerable.

In 2002, the Transportation Uniform Mitigation Fee (TUMF) program was initiated in Western Riverside County. Under the TUMF, developers of residential, industrial and commercial property are required to pay a development fee to fund regional transportation projects, which mitigates cumulative impacts to the roadway segments and intersections included in the TUMF program. The TUMF funds both local and regional arterial projects. 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 required Western Riverside County TUMF, in addition to City of Moreno Valley Development Impact Fees (DIF) and other fair share contributions as directed by the City. 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.

It is anticipated that the improvements required to maintain or to improve the LOS operations of transportation facilities in the vicinity of the project will be constructed through either the City's local transportation impact fee or regional transportation improvement programs (i.e., the Transportation Uniform Mitigation Fee (TUMF) or the City of Moreno Valley's Development Impact Fee (DIF)). These fee programs utilize the fees collected from new development to fund the construction of new transportation facilities included in each of the funding programs. As development increases within the region, the amount of fees collected also increases thereby accelerating the construction of transportation facilities included in each funding program. Similarly, if development within the region experiences reduced growth, the amount of fees collected also is reduced. However, a slower growth cycle would likely result in a slower growth in traffic volumes, thereby lengthening the timeline necessary to complete transportation infrastructure improvements.

Intersection and roadway improvements that were identified in the analysis found in Section 6.0 *Opening Year Cumulative (2018) Traffic Analysis* as necessary to maintain or improve the operational level of service of the street system in the vicinity of the project site are shown in Table 1-5. The table lists the total improvements that are required by Opening Year Cumulative (2018) With Project traffic

Table 1-5

Summary of Transportation Impact Fee Program Improvements for Opening Year Cumulative (2018) Conditions

#	Intersection Location	2018 With Project Recommended Improvements	Program Improvements[1]	Non-Program Improvements	Fair Share[2]
1	I-215 SB Ramps / Harley Knox Bl.	1.SBL; 1.WBL; Re-stripe for 1.SBL and 1.SBT/R	1.SBL; 1.WBL; Re-stripe for 1.SBL and 1.SBT/R	None	--
2	I-215 NB Ramps / Harley Knox Bl.	1.WB Free Right; Re-stripe for 1.NBL/T/R	1.WB Free Right; Re-stripe for 1.NBL/T/R	None	--
3	Western Wy. / Harley Knox Bl.	Install Traffic Signal; 1.EBL	None	Install Traffic Signal; 1.EBL	8.0%
4	Patterson Av. / Harley Knox Bl.	1.EBT, 1.WBT	1.EBT, 1.WBT	None	--
7	Webster Av. / Harley Knox Bl.	1.EBT, 1.WBT	1.EBT, 1.WBT	None	--
14	Indian St. / Grove View Rd.	Install Traffic Signal; 1.NBT, 1.SBT	1.NBT, 1.SBT	Install Traffic Signal	11.8%
15	Indian St. / Harley Knox Bl.	1.SBR w/ overlap phasing, 1.EBL, 1.EBT	1.EBT	1.SBR w/ overlap phasing, 1.EBL	7.7%

[1] Improvements included in TUMF Nexus or City of Moreno Valley DIF programs.
[2] Program improvements constructed by project may be eligible for fee credit. In lieu fee payment is at discretion of City.

conditions. It is anticipated that the improvements required to maintain or to improve the LOS operations of transportation facilities in the vicinity of the Project will be constructed through the City's local transportation impact fee and regional transportation improvement programs, such as the Transportation Uniform Mitigation Fee (TUMF) and the City of Moreno Valley's Development Impact Fee (DIF). In addition, Table 1-5 identifies which of the near-term improvements are not included in the TUMF or DIF programs, but may instead be covered by a fair share contribution as directed by the City.

1.6 ON-SITE ROADWAY AND SITE ACCESS IMPROVEMENTS

The Project is proposed to have access on Heacock Street via Grove View Road, Nandina Avenue and Indian Street. All Project access points are proposed to be full-access, with the exception of Driveway 4 and Driveway 6 on Indian Street. Regional access to the Project site will be provided by the I-215 Freeway (located to the west) via Harley Knox Boulevard.

As part of the development, the Project will construct improvements on the site adjacent roadways of Grove View Road, Heacock Street, Nandina Avenue and Indian Street. Roadway improvements necessary to provide site access and on-site circulation are assumed to be constructed in conjunction with site development and are described below. These improvements should be in place prior to occupancy.

1.6.1 ON-SITE ROADWAY IMPROVEMENTS

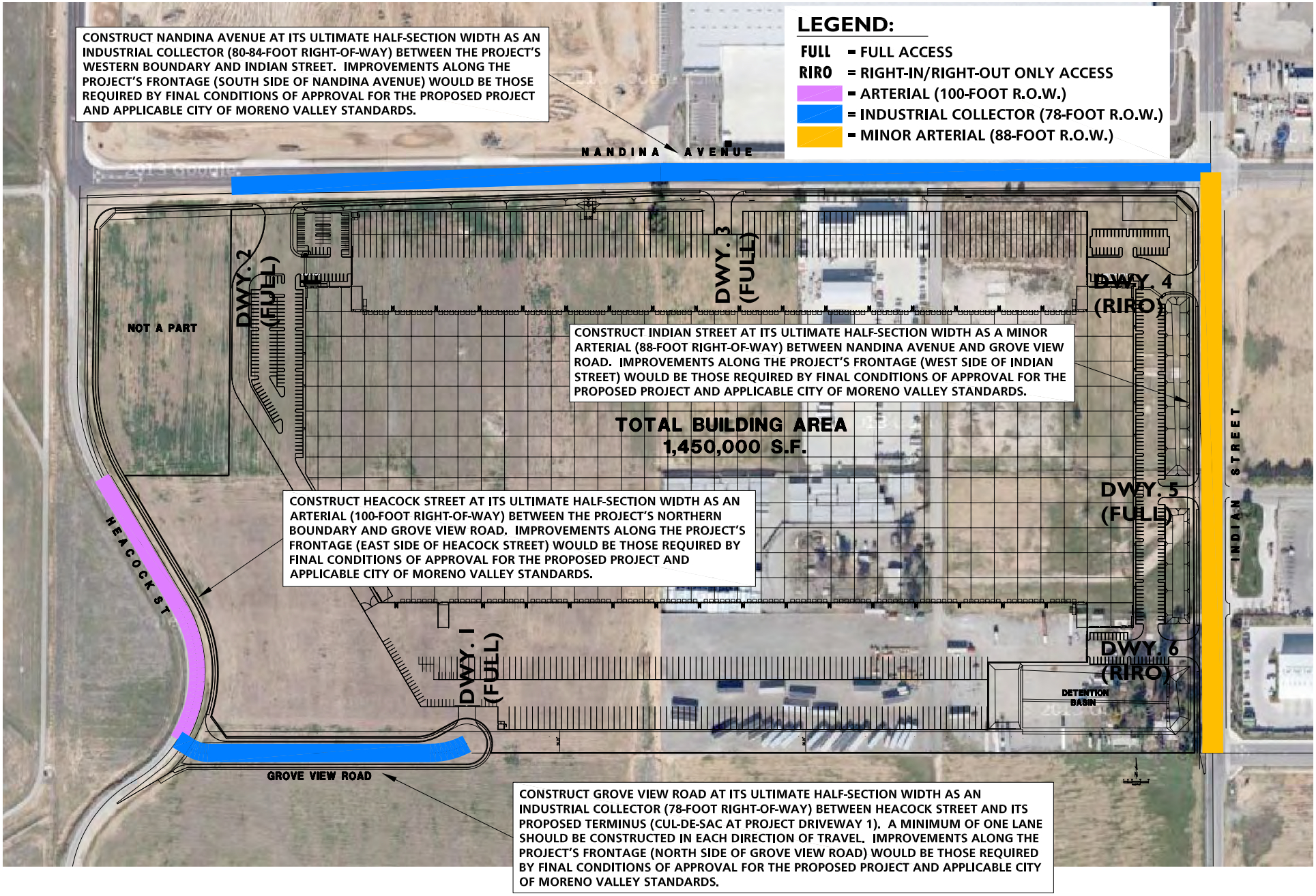
The recommended site-adjacent roadway improvements for the Project are described below. Exhibit 1-3 illustrates the site-adjacent roadway improvement recommendations.

Grove View Road – Grove View Road is an east-west oriented roadway located along the Project's southern boundary. Construct Grove View Road at its ultimate half-section width as an Industrial Collector (78-foot right-of-way) between Heacock Street and its proposed terminus (cul-de-sac at Project Driveway 1). A minimum of one lane should be constructed in each direction of travel. Improvements along the Project's frontage (north side of Grove View Road) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

Heacock Street – Heacock Street is a north-south oriented roadway located along the Project's western boundary. Construct Heacock Street at its ultimate half-section width as an Arterial Highway (100-foot right-of-way) between the Project's northern boundary and Grove View Road. Improvements along the Project's frontage (east side of Heacock Street) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

EXHIBIT 1-3

SITE ADJACENT ROADWAY RECOMMENDATIONS



First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:site_131007_001)

URBAN CROSSROADS

Nandina Avenue – Nandina Avenue is an east-west oriented roadway located along the Project's northern boundary. Construct Nandina Avenue at its ultimate half-section width as an Industrial Collector (78-foot right-of-way) between the Project's western boundary and Indian Street. Improvements along the Project's frontage (south side of Nandina Avenue) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

Indian Street – Indian Street is a north-south oriented roadway located along the Project's eastern boundary. Construct Indian Street at its ultimate half-section width as a Minor Arterial (88-foot right-of-way) between Nandina Avenue and Grove View Road. Improvements along the Project's frontage (west side of Indian Street) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

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.

1.6.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 1-4 illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

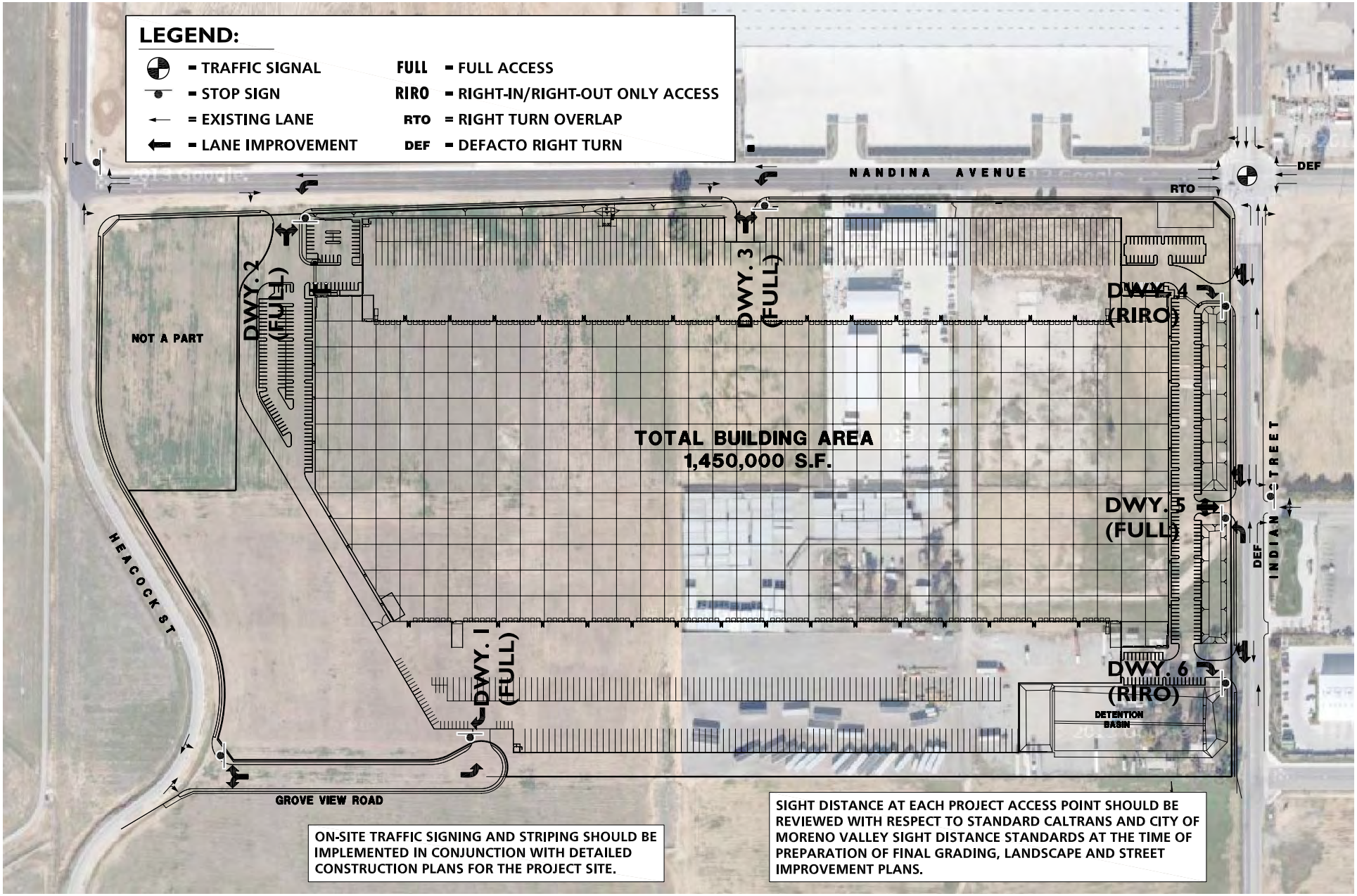
Heacock Street / Nandina Avenue – Maintain the existing stop control on the westbound approach and maintain the existing lanes. No additional improvements are necessary at this intersection.

Heacock Street / Grove View Road – Install a stop control on the westbound approach and construct the intersection with the following geometrics:
Northbound Approach: One shared through-right turn lane.
Southbound Approach: One shared left-through lane.
Eastbound Approach: N/A
Westbound Approach: One shared left-right turn lane.

Driveway 1 / Grove View Road – This driveway is proposed to be located at the terminus of Grove View Road within the cul-de-sac. Install a stop control on the southbound approach and construct the intersection with the following geometrics:
Northbound Approach: N/A
Southbound Approach: One right turn lane.
Eastbound Approach: One left turn lane
Westbound Approach: N/A

EXHIBIT 1-4

ON-SITE CIRCULATION RECOMMENDATIONS



Driveway 2 / Nandina Avenue – Install a stop control on the northbound approach and construct the intersection with the following geometrics:
Northbound Approach: One shared left-through lane.
Southbound Approach: N/A
Eastbound Approach: One shared through-right turn lane.
Westbound Approach: One left turn lane (to be accommodated within existing two-way-left-turn lane [TWLTL]) and one through lane.

Driveway 3 / Nandina Avenue – Install a stop control on the northbound approach and construct the intersection with the following geometrics:
Northbound Approach: One shared left-through lane.
Southbound Approach: N/A
Eastbound Approach: One shared through-right turn lane.
Westbound Approach: One left turn lane (to be accommodated within existing two-way-left-turn lane [TWLTL]) and one through lane.

Indian Street / Nandina Avenue – Maintain the existing traffic signal control and the existing lanes. No additional improvements are necessary at this intersection.

Indian Street / Driveway 4 – Due to its proximity to Nandina Avenue, design the intersection to restrict access to right-in/right-out only. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:
Northbound Approach: One though lane.
Southbound Approach: One through lane and one shared through-right turn lane.
Eastbound Approach: One right turn lane.
Westbound Approach: N/A

Indian Street / Driveway 5 – Construct the intersection to align with the existing northern Waste Management driveway on the east side. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:
Northbound Approach: One left turn lane (to be accommodated within existing TWLTL) and one shared through-right turn lane.
Southbound Approach: One left turn lane (to be accommodated within existing TWLTL), one through lane and one shared through-right turn lane.
Eastbound Approach: One shared left-through-right turn lane.
Westbound Approach: One shared left-through-right turn lane.

Indian Street / Driveway 6 – Due to its proximity to Grove View Road, design the intersection to restrict access to right-in/right-out only. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:

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

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.

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2.0 METHODOLOGIES

This section documents the methodologies and assumptions used to perform this TIA.

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) (Transportation Research Board 2000) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control.

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2013. 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)

2.2.1 SIGNALIZED INTERSECTIONS

The City of Moreno Valley requires signalized intersection operations analysis based on the methodology described in Chapter 16 of the HCM. Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described in Table 2-1.

Table 2-1 Signalized Intersection LOS Thresholds

Level of Service	Description	Average Control Delay (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00
D	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
E	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
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths	80.01 and up

Source: HCM 2000, Chapter 16

Per the Caltrans *Guide for the Preparation of Traffic Impact Studies*, the traffic modeling and signal timing optimization software package Synchro (Version 8 Build 804) has 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). Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the Chapter 16 of the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network. All other study area intersections within the City of Moreno Valley have been analyzed using the software package Traffix (Version 8.0 R1, 2008).

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-mintue 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, with the exception of Opening Year Cumulative (2018) traffic conditions. A PHF of 0.92 or higher has been used for all intersections along Harley Knox Boulevard and Indian Street for Opening Year Cumulative (2018) Without and With Project traffic conditions.

2.2.2 UNSIGNALIZED INTERSECTIONS

The City of Moreno Valley requires the operations of unsignalized intersections be evaluated using the methodology described in Chapter 17 of the HCM. The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

At two-way or side-street stop-controlled intersections, 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. All unsignalized study area intersections have utilized the Traffix software (Version 8.0 R1, 2008).

Table 2-2 Unsignalized Intersection LOS Thresholds

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

Source: HCM 2000, Chapter 17

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* (dated August 2007). 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 daily roadway segment capacities for each type of roadway are summarized in Table 2-3. 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. 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]

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.

2.4 FREEWAY RAMP QUEUING ANALYSIS

The study area for this TIA includes segments of the I-215 Freeway from north of Harley Knox Boulevard to south of Harley Knox Boulevard and includes the freeway-to-arterial interchanges of the I-215 Freeway with the Harley Knox Boulevard ramps. Consistent with Caltrans requirements, the interchange has been assessed to determine potential queuing impacts at the freeway ramp intersections on Harley Knox Boulevard and the I-215 Freeway. Specifically, the ramp 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 queuing analysis. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. The queue length reported is for the lane with the highest queue in the lane group.

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 FREEWAY MAINLINE SEGMENT ANALYSIS

The freeway system in the study area, from north of and south of Harley Knox Boulevard, has been broken into segments defined by the freeway-to-arterial interchange locations. The City of Moreno Valley has also requested that a basic freeway segment analysis be conducted for the freeway segments along the SR-60 Freeway adjacent to the I-215 Freeway and the I-215 Freeway south of the SR-60 Freeway. 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 Chapter 23 of the HCM and performed using HCS+ 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 2-4 illustrates the freeway segment LOS thresholds for each density range utilized for this analysis.

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in October 2013. The Riverside County Transportation Commission (RCTC) has plans in place for the widening of I-215 Freeway through the study area; however, a schedule for the widening of Interstate 215 between Nuevo Road in the City of Perris and Box Springs Road in the City of Riverside has not been set, due to the state's ongoing budget challenges. The I-215 North Project will add a carpool lane (high-occupancy vehicle lane) in each direction to a 10.75-mile section of the I-215 freeway, the northernmost section of the RCTC's widening efforts along this freeway. Once project costs and funding are determined, project development will begin and last about three (3) years. As indicated on project documents found on the I-215 North Project website, final design will follow for about two and a half (2 ½) years, followed by three (3) years for construction. As such, the future expansion of the I-215 Freeway has been assumed for "with improvements" conditions only and not assumed as the base condition in the basic freeway segment analysis. The SR-60 Freeway carpool lanes are currently under construction to connect the existing carpool lanes on either side of the I-215 Freeway along the SR-60 Freeway. Based on information on the RCTC website, this construction is anticipated to be completed by Summer 2014.

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/SR-60 Freeway interchange and I-215 Freeway at Harley Knox Boulevard interchange. The data obtained was for the October 2013. In an effort to conduct a conservative analysis, the maximum value observed within the three (3) day period was utilized for the morning (AM) and evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and potential impacts. As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the basic freeway segment analysis.

Table 2-4 Freeway Mainline LOS Thresholds

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 2000, Chapter 23*

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in four (4) existing on and off ramp locations. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this traffic study has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on along the I-215 corridor. As the segments along the SR-60 Freeway

on either side of the I-215 Freeway and I-215 Freeway south of the SR-60 Freeway do not meet the criteria for a weaving segment, both directions of travel for each of the six (6) freeway segments have been analyzed based on the HCM 2000 basic freeway segment methodology only.

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

Similar to the basic freeway segment analysis, 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 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 and determine the I-215 Freeway mainline volumes south of Harley Knox Boulevard. The data obtained was for October 2013. In an effort to conduct a conservative analysis, the maximum value observed within the three (3) day period was utilized for the morning (AM) and evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic, has been utilized for the purposes of this analysis in an effort to not overstate traffic volumes and potential impacts. As such, actual vehicles (as opposed to passenger-car-equivalent volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis.

Table 2-5 Freeway Merge and Diverge LOS Thresholds

Level of Service	Density Range (pc/mi/ln)[1]
A	0.0 – 11.0
B	11.1 – 18.0
C	18.1 – 26.0
D	26.1 – 35.0
E	35.1 – 45.0
F	>45.0

[1] *pc/mi/ln = passenger cars per mile per lane. Source: HCM 2000, Chapter 25*

2.7 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 *2012 California MUTCD (CA MUTCD)*, for all study area intersections.

The signal warrant criteria for Existing (2012) conditions 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 *2012 CA MUTCD* indicate that the installation of a traffic signal should be considered if one or more of the signal warrants are met. 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 *2012 CA MUTCD*. 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 (new) unsignalized intersections and existing intersections under future traffic conditions have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed at the following unsignalized study area intersections:

ID	Intersection Location	Jurisdiction
3	Western Way / Harley Knox Boulevard	Perris
5	Heacock Street / Nandina Avenue	Moreno Valley
7	Webster Avenue / Harley Knox Boulevard	Perris
8	Driveway 2 / Nandina Avenue – Future Intersection	Moreno Valley
9	Driveway 3 / Nandina Avenue – Future Intersection	Moreno Valley
12	Indian Street / Driveway 5/N. Waste Management Driveway	Moreno Valley
14	Indian Street / Grove View Road	Moreno Valley

The Existing (2013) conditions traffic signal warrant analysis is presented in the subsequent section, Section 3.0 *Area Conditions* of this report. The traffic signal warrant analysis for future conditions is presented in Section 5.0 *Existing plus Project Traffic Analysis* and Section 6.0 *Opening Year Cumulative (2018) 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 level of service. An intersection may satisfy a signal warrant condition and operate at or above LOS “D” or operate below LOS “D” and not meet a signal warrant.

2.8 LOS CRITERIA

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. LOS “D" is considered to be the limit of acceptable traffic operations during the peak hour in the City of Perris

Regarding Caltrans’ ramp to arterial intersections and other Caltrans maintained facilities, the published Caltrans traffic study guidelines (December 2002) states the following:

> *“Caltrans endeavors to maintain a target LOS at the transition between LOS “C” and LOS “D” on State highway facilities, however, Caltrans acknowledges that this may not be always feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS.”*

Caltrans has worked with the County of Riverside and local jurisdictions such as the City of Moreno Valley to establish a local threshold for freeway-to-arterial interchange intersections. Consistent with City’s stated threshold, LOS “D" is considered to be the limit of acceptable traffic operations during the peak hour at the freeway-to-arterial interchange intersections maintained by Caltrans.

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) (March 10, 2010). 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.

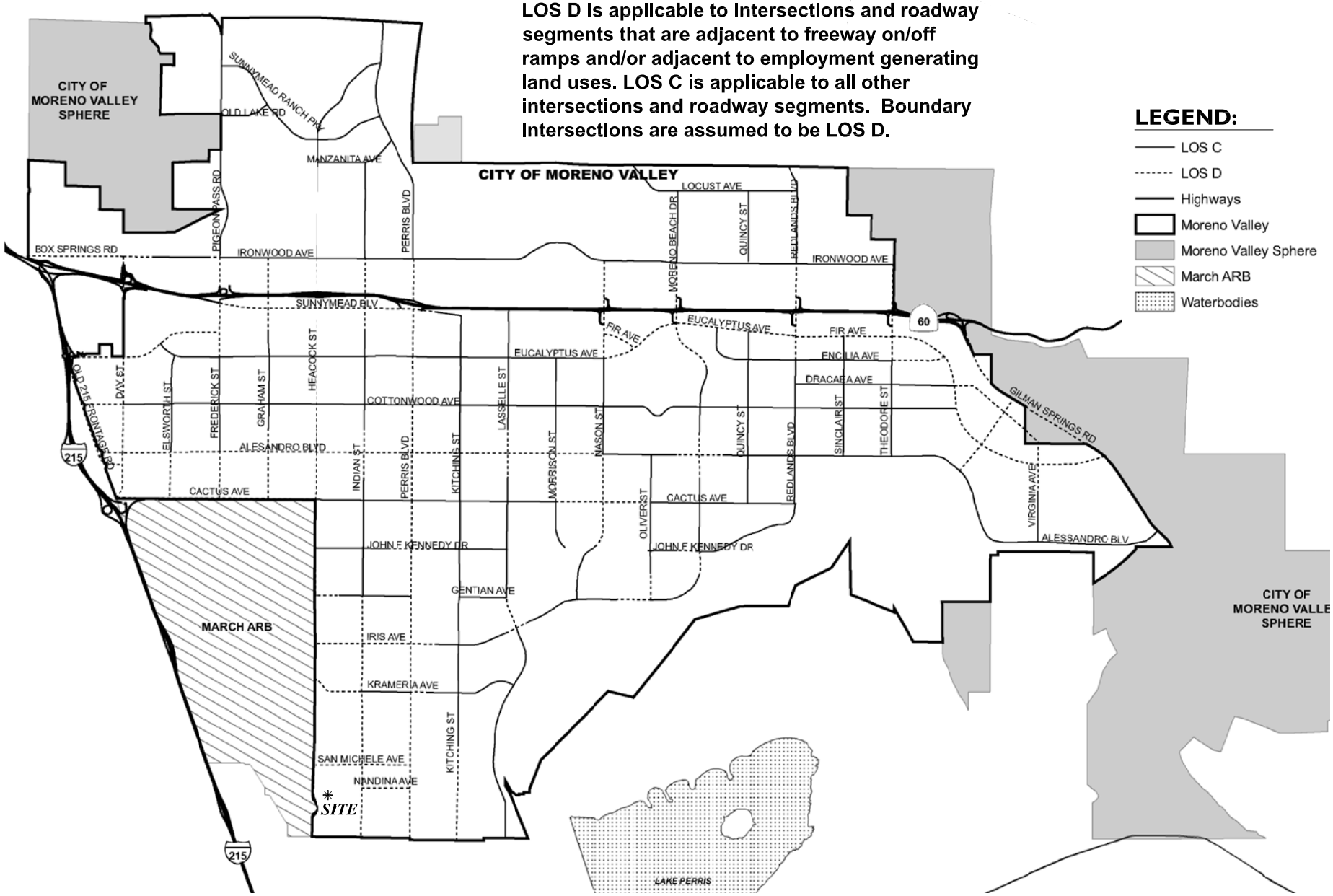
2.9 THRESHOLDS OF SIGNIFICANCE

This section outlines the significance criteria used in this analysis relating to roadway system impacts. The Criteria are based on California Environmental Quality Act (CEQA).

EXHIBIT 2-1

CITY OF MORENO VALLEY LEVEL OF SERVICE (LOS) STANDARDS

LOS D is applicable to intersections and roadway segments that are adjacent to freeway on/off ramps and/or adjacent to employment generating land uses. LOS C is applicable to all other intersections and roadway segments. Boundary intersections are assumed to be LOS D.



2.9.1 INTERSECTIONS/ROADWAYS

Based on the City of Moreno Valley traffic study guidelines, a "significant" traffic impact under CEQA occurs when the addition of Project traffic as defined by the E+P scenario causes an intersection that operates at an acceptable LOS under Existing (2013) traffic conditions (i.e., LOS "D" or better) to fall to an unacceptable LOS (i.e., LOS "E" or "F"). Therefore, E+P traffic conditions are compared to Existing (2013) traffic conditions to identify significant project-related impacts.

A significant cumulative impact is identified when a facility is projected to operate below the level of service standards due to local and regional traffic growth (i.e., cumulative development and ambient growth) along with the addition of project traffic. A project's contribution to a cumulatively significant traffic impact can be reduced to less-than-significant if the Project is required to implement or fund its fair share of improvements designed to alleviate the potential cumulative impact. If full funding of future cumulative improvements is not reasonably assured, a temporary unmitigated cumulative impact may occur until the needed improvement is fully funded and constructed.

2.9.2 FREEWAY

RCTC has determined that freeway segments and ramp junctions that operate below LOS "E" should be identified and improved to an acceptable LOS, however, specific criteria to identify project-related impacts is not specified by RCTC or in the Caltrans Traffic Impact Study guidelines (December 2002).

For the purposes of this traffic impact analysis and in accordance with the adopted Riverside County CMP, if a freeway segment is projected to operate at an acceptable level of service (i.e., LOS "D" or better) without the Project and the Project is expected to cause the facility to operate at an unacceptable level of service (i.e., LOS "E" or LOS "F"), the impact is considered significant.

2.10 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TIA identifies that the proposed Project would have a significant cumulative impact to a roadway facility, and the recommended mitigation measure is a fair share monetary contribution, the following methodology was applied to determine the fair share contribution. A project's fair share contribution at an off-site study area intersection is determined based on the following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future traffic subtracts existing baseline traffic:

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

The Project fair share contribution calculations are presented in Section 10.0 *Local and Regional Funding Mechanisms* of this TIA.

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3.0 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 analyses and traffic signal warrants.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the Traffic Study Scoping Agreement (Appendix "1.1") and discussion with the City of Moreno Valley staff, the study area includes a total of fifteen (15) existing and future intersections as shown on Exhibit 1-2. Of these fifteen (15) intersections, the existing study area circulation network includes ten (10) intersections analysis locations shown on Table 1-1. The other five (5) intersections in the study area are future planned intersections (Project driveways) that do not currently exist.

Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

As previously noted, the Project site is located within the City of Moreno Valley. 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.

3.3 PEDESTRIAN AND BICYCLE FACILITIES

Field observations conducted in May 2013 indicate nominal pedestrian and bicycle activity within the study area, which can be attributable to the limited residential and commercial development within and immediately surrounding the study area. Exhibit 3-4 illustrates the planned trails included on the City of Moreno Valley Master Plan of Trails. As shown, there are no proposed trails in the immediate vicinity of the proposed Project. Exhibit 3-5 illustrates the proposed City of Moreno Valley Bikeway Plan. The following bikeway is planned within the vicinity of the study area:

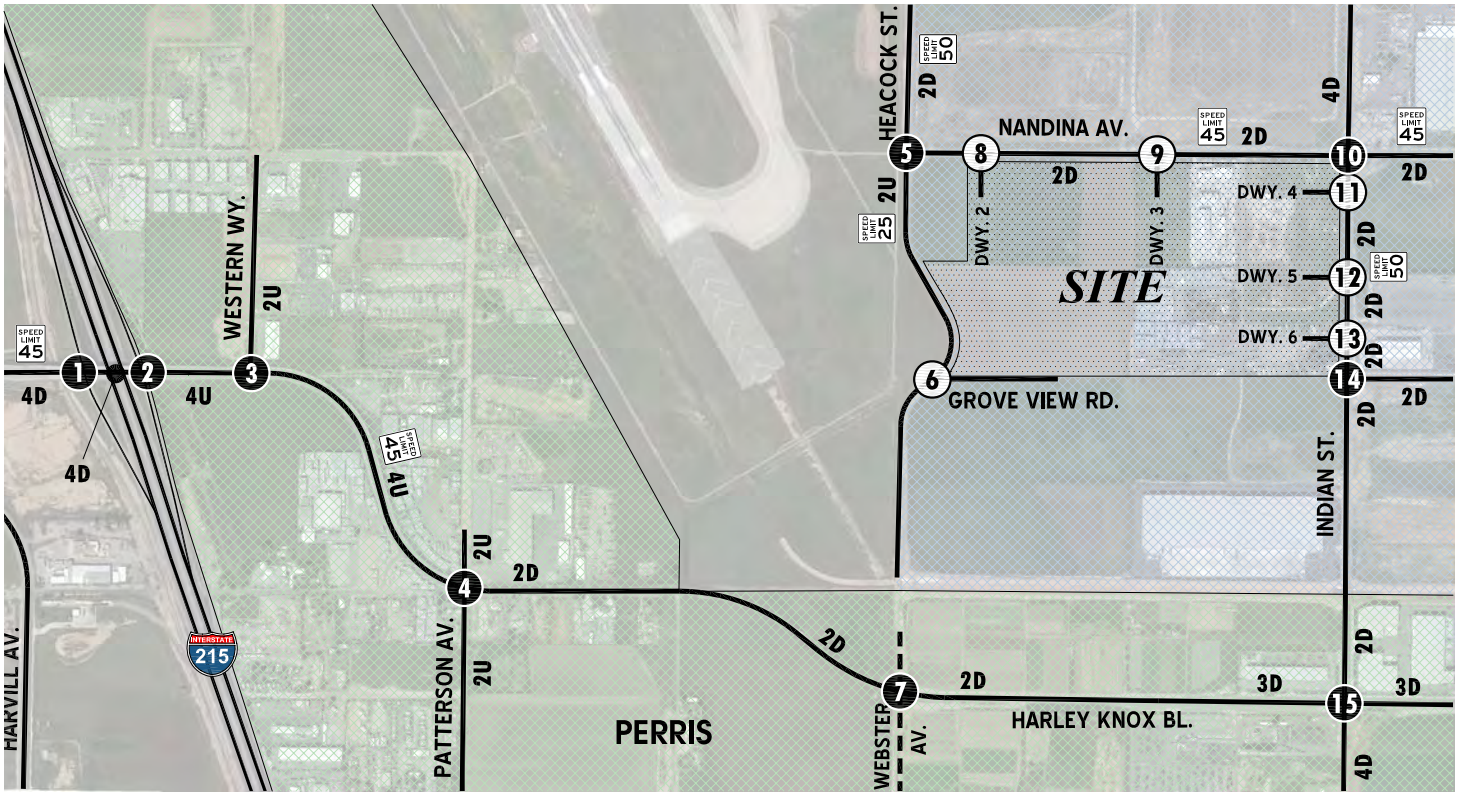
- A Class II bikeway facility is proposed along Cactus Avenue between the I-215 NB Ramps/Frontage Road and east of Veterans Way (to Heacock Street).

3.4 TRANSIT SERVICE

The study area is currently served by the Riverside Transit Agency (RTA) with bus services along Perris Boulevard (to the east) via Route 19. However, there are currently no bus services along Indian Street, Nandina Avenue or Harley Knox Boulevard in the vicinity of the proposed Project. Transit

EXHIBIT 3-1

EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS



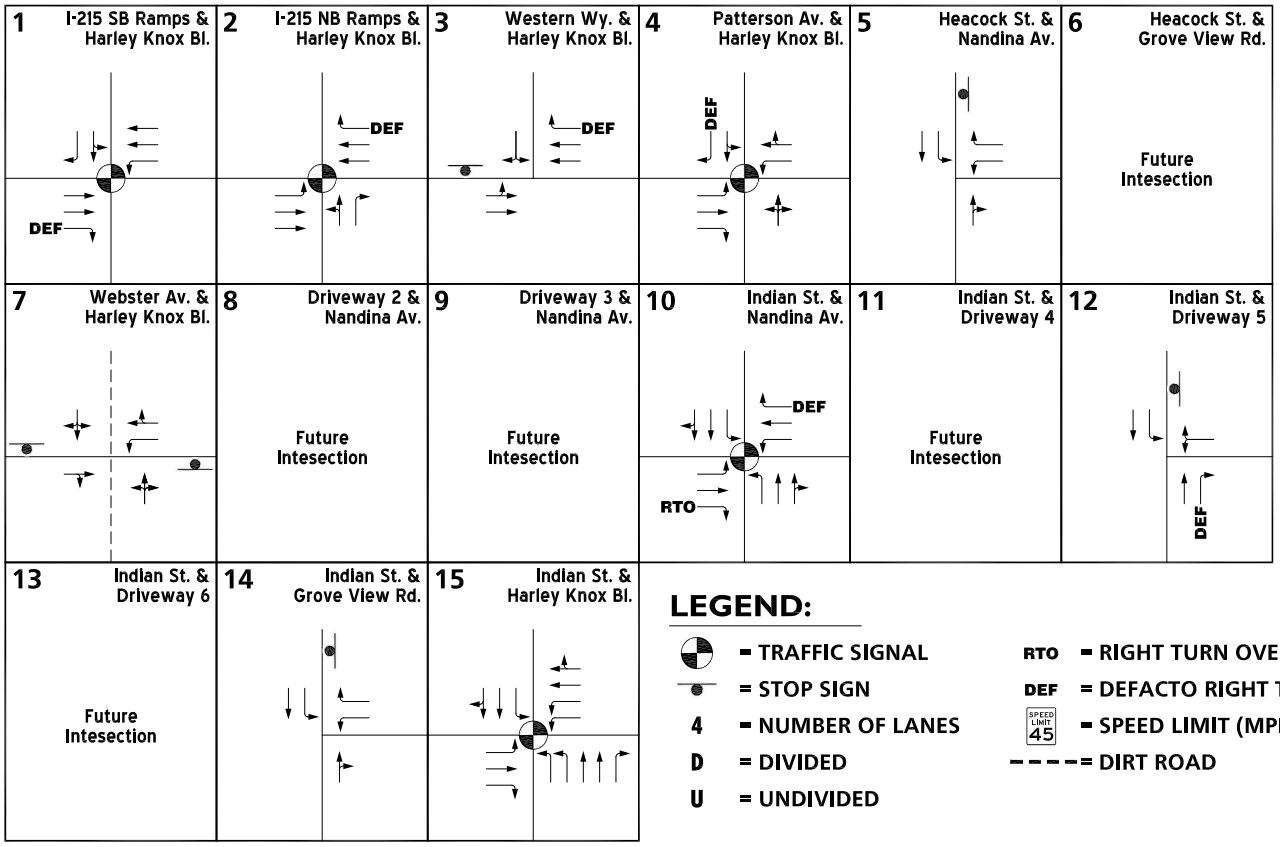
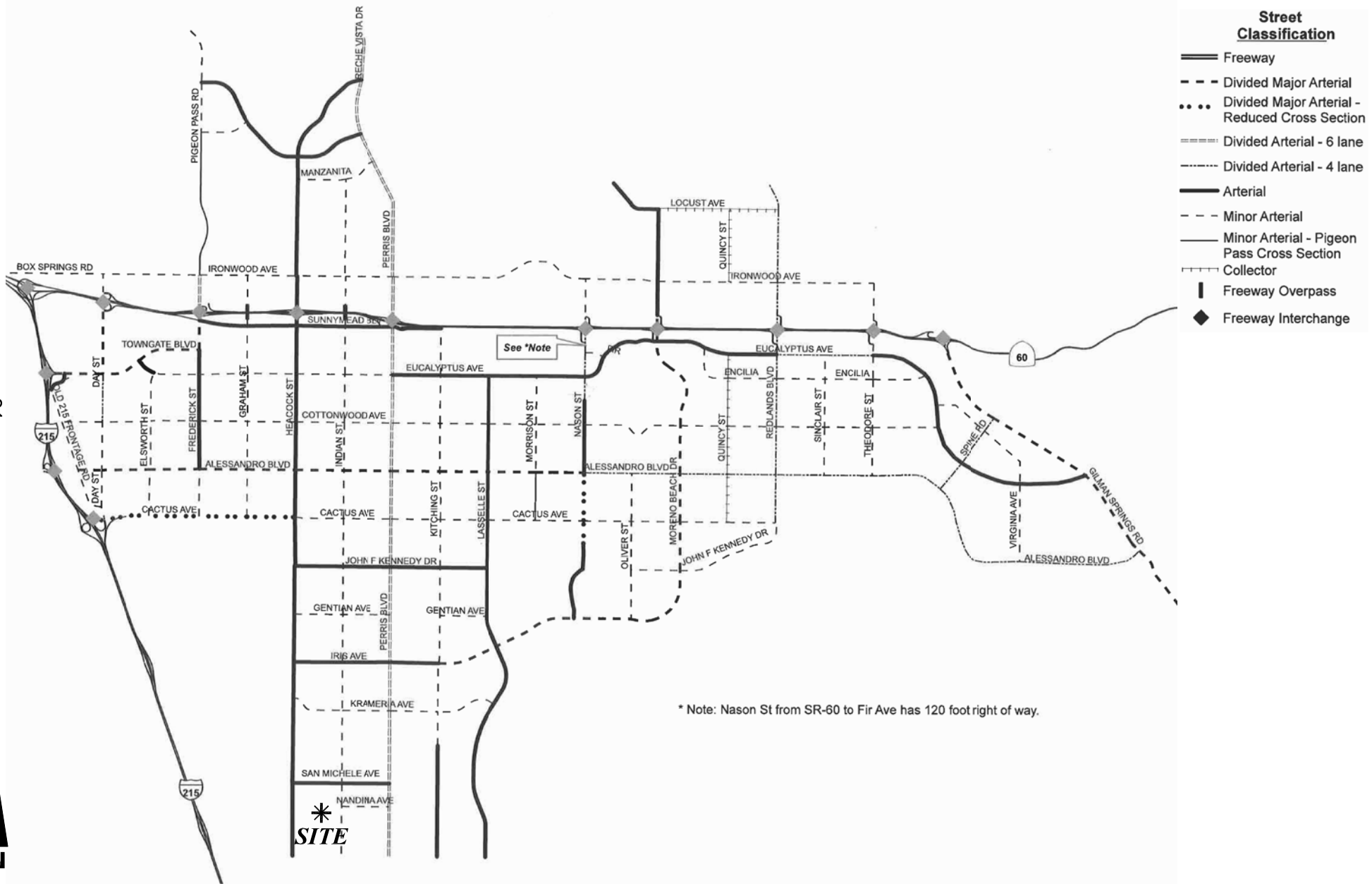


EXHIBIT 3-2

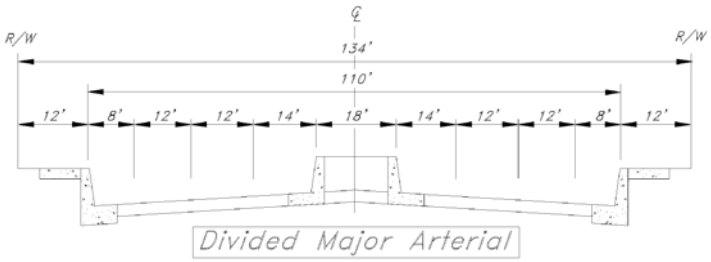
CITY OF MORENO VALLEY GENERAL PLAN CIRCULATION ELEMENT

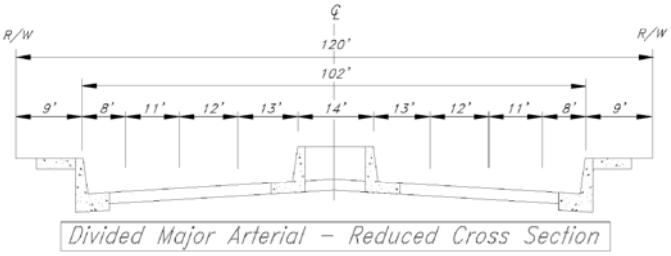


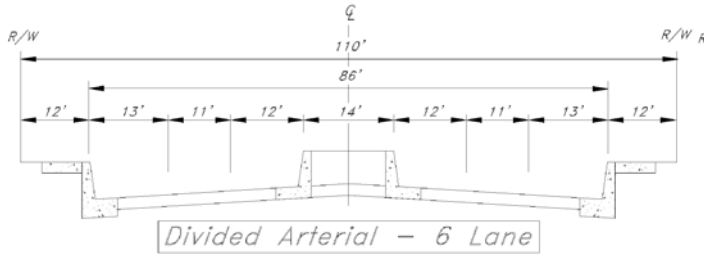
URBAN CROSSROADS

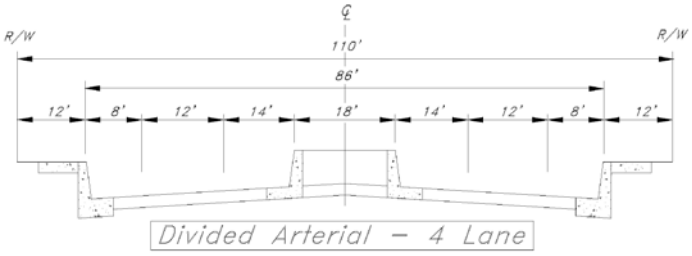
EXHIBIT 3-3

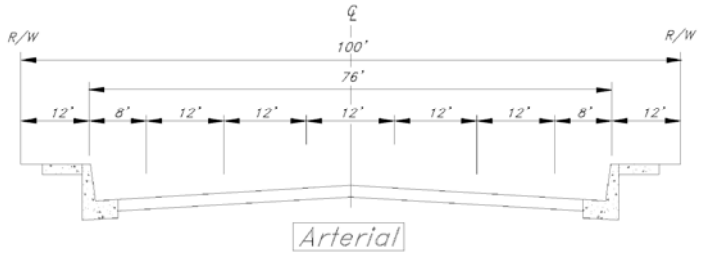
CITY OF MORENO VALLEY
GENERAL PLAN ROADWAY CROSS-SECTIONS

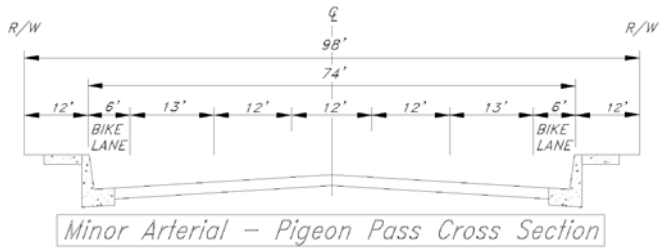


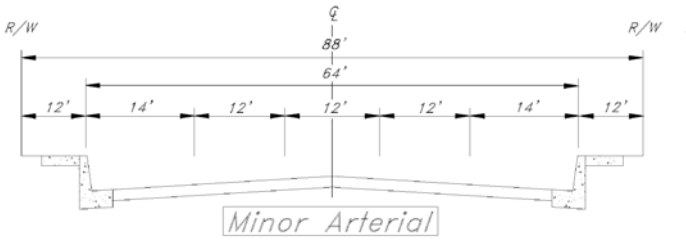


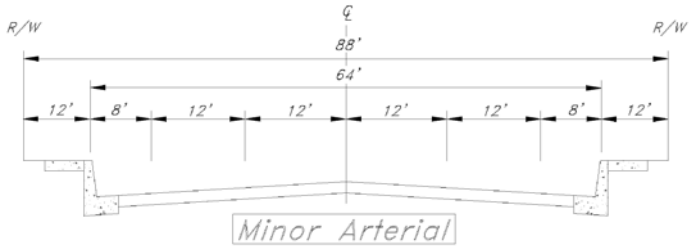


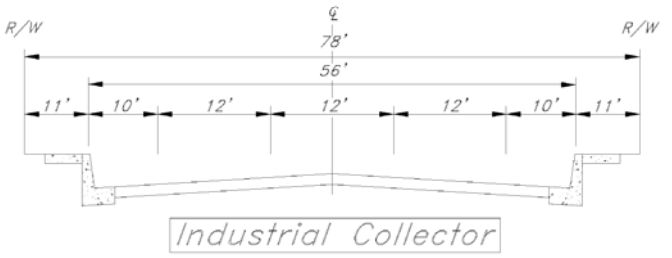










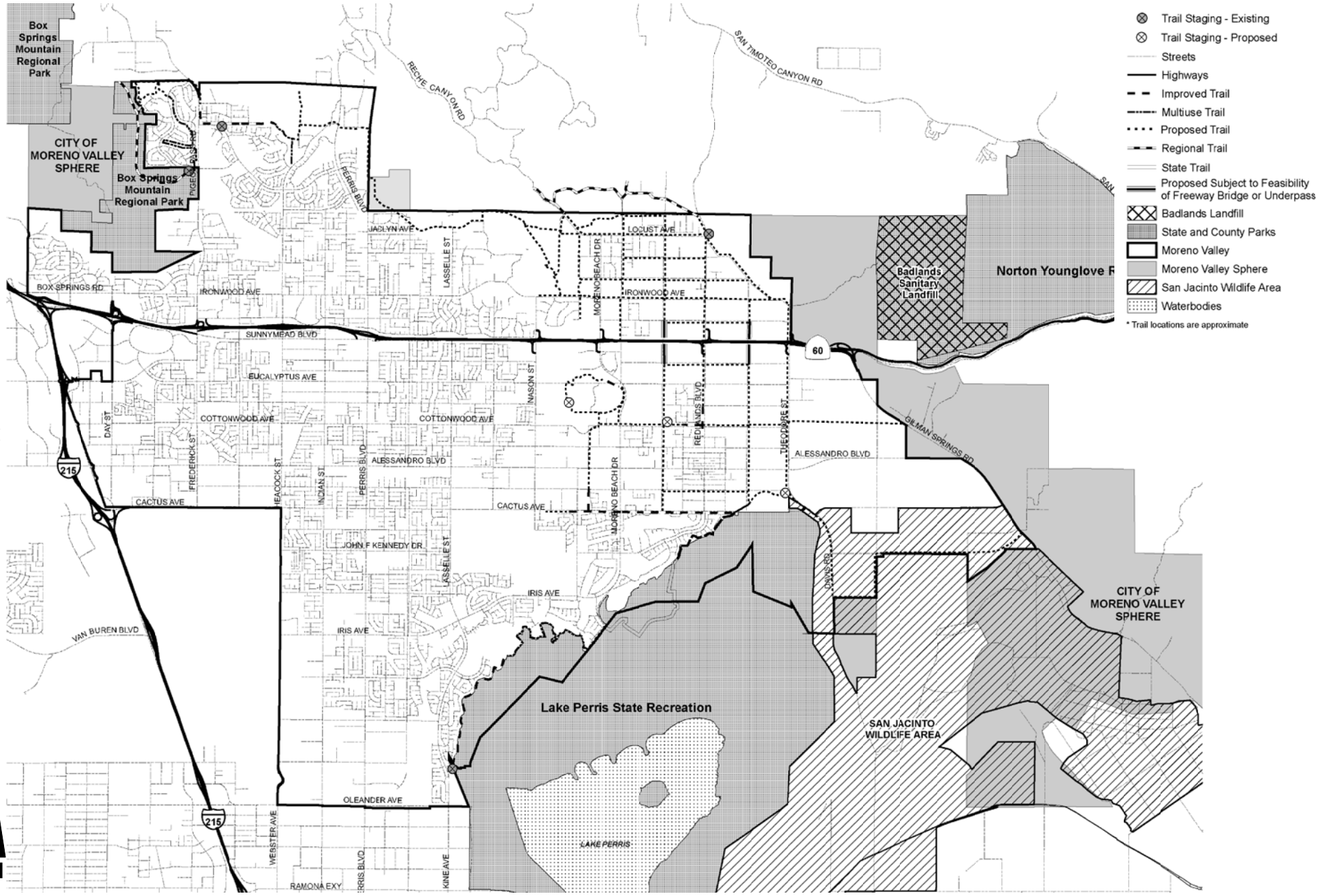


NOT TO SCALE

SOURCE: CITY OF MORENO VALLEY (July 11, 2006)

EXHIBIT 3-4

CITY OF MORENO VALLEY MASTER PLAN OF TRAILS

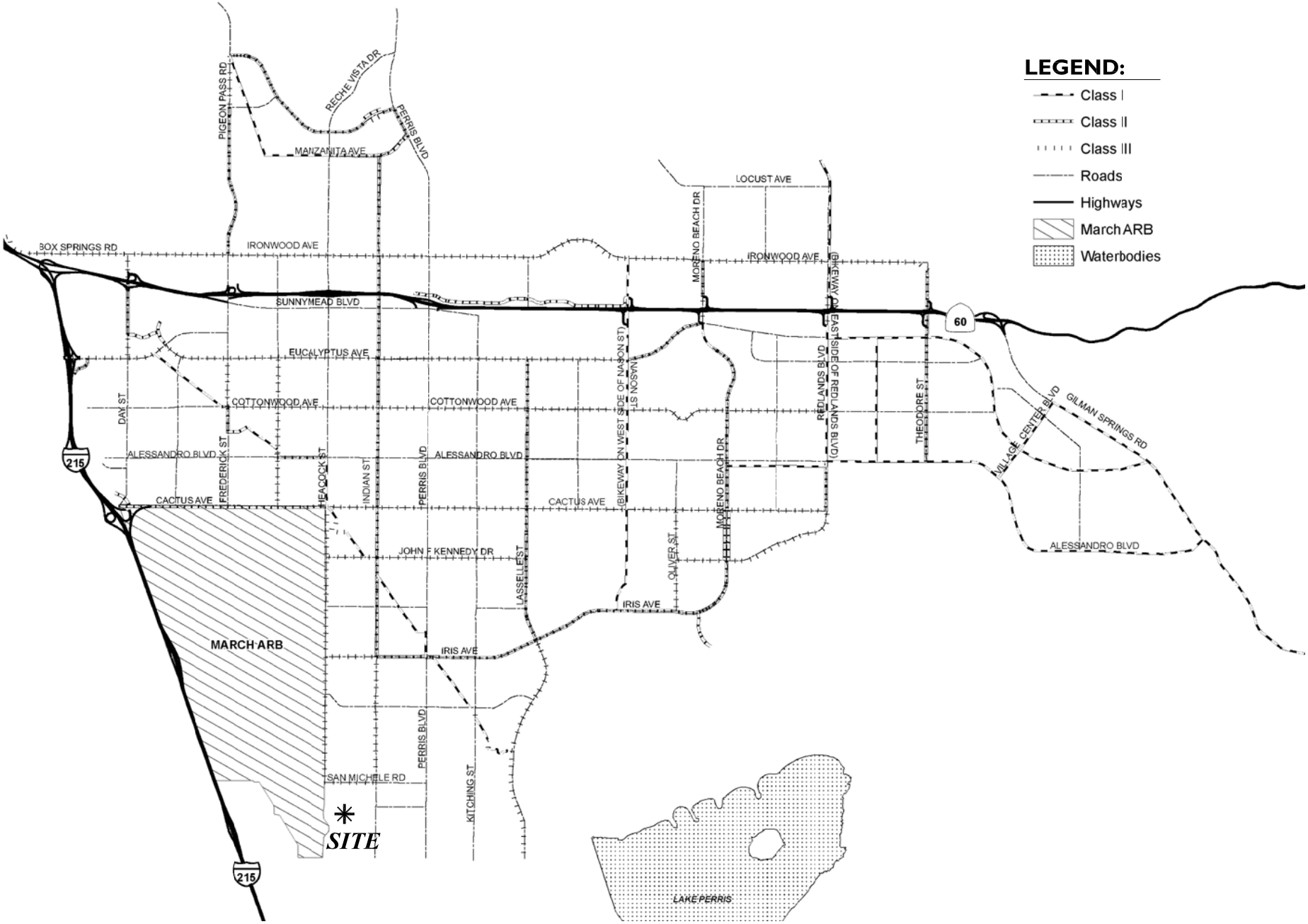


First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:010)

URBAN CROSSROADS

EXHIBIT 3-5

CITY OF MORENO VALLEY BIKE PLAN



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City of Moreno Valley, CA (JN - 08578:011)

URBAN CROSSROADS

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.

3.5 TRUCK ROUTES

The City of Moreno Valley designated truck route map is shown on Exhibit 3-6. Indian Street is identified as designated truck route. The designated truck route map has been utilized to route truck traffic from future cumulative development projects throughout the study area.

3.6 EXISTING TRAFFIC COUNTS

Manual AM and PM peak hour turning movement counts were conducted in January, May and October 2013. The AM peak hour traffic volumes were determined by counting traffic volumes in the two hour period between 7:00 and 9:00 AM. Similarly, the PM peak hour traffic volumes were identified by counting traffic volumes in the two hour period from 4:00 to 6:00 PM. The weekday AM and PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes. The raw manual peak hour turning movement traffic count data sheets are included in Appendix "3.1". The traffic counts collected in January, May and October 2013 include the vehicle classifications as shown below, per City of Moreno Valley TIA requirements:

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

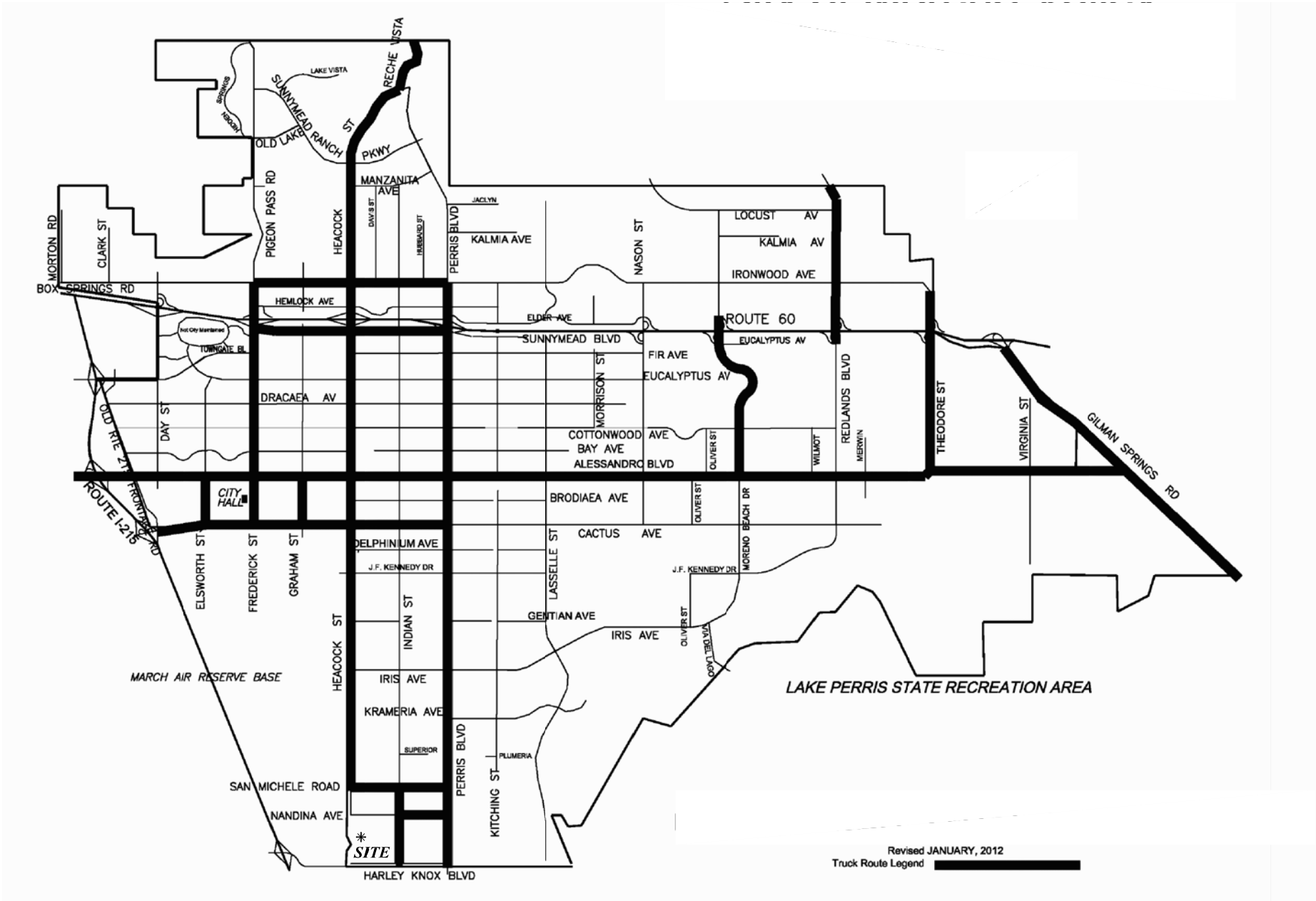
To represent the impact large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into Passenger Car Equivalents (PCEs). By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and 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.

Existing (2013) average daily traffic (ADT) volumes on arterial highways throughout the study area are shown on Exhibit 3-7. Existing (2013) ADT volumes are based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 12 = Leg Volume

EXHIBIT 3-6

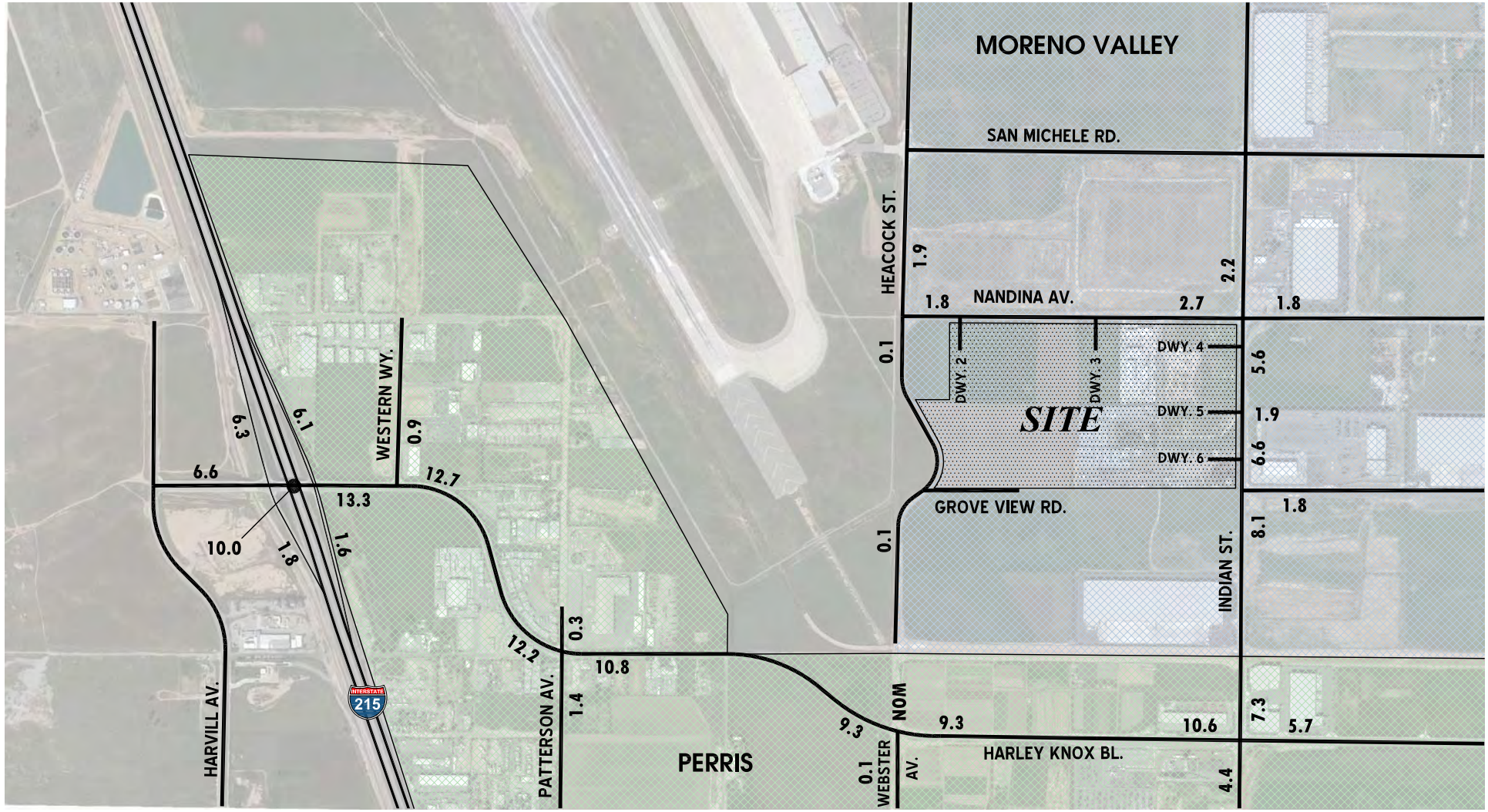
EXISTING TRUCK ROUTES



URBAN CROSSROADS

EXHIBIT 3-7

EXISTING (2013) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES (P.C.E.) PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

Based on a comparison of PM peak hour traffic count data to 24-hour tube count data along roadway segments in close proximity to the study area, it was determined that the PM peak hour volumes were approximately eight (8) to nine (9) percent of the total 24-hour daily volume on select segments. As such, it was determined that the above equation could be utilized to approximate the ADT volume on the study area segments based on the same relationship (i.e., 8-9 percent PM peak-to-daily relationship).

Existing (2013) AM and PM peak hour intersection volumes are shown on Exhibits 3-8 and 3-9, respectively. All of the traffic volumes illustrated on the exhibits and used in the traffic analysis are shown in terms of PCE.

3.7 EXISTING CONDITIONS INTERSECTION OPERATIONS ANALYSIS

Existing (2013) 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. The Existing (2013) conditions operations analysis shows that all of the study area intersection currently operate at acceptable LOS (i.e., LOS "D" or better) during the peak hours.

Exhibit 3-10 summarizes the weekday AM and weekday PM peak hour study area intersection LOS under Existing (2013) conditions, consistent with the summary provided in Table 3-1. The intersection operations analysis worksheets are included in Appendix "3.2" of this TIA.

3.8 EXISTING CONDITIONS ROADWAY SEGMENT CAPACITY ANALYSIS

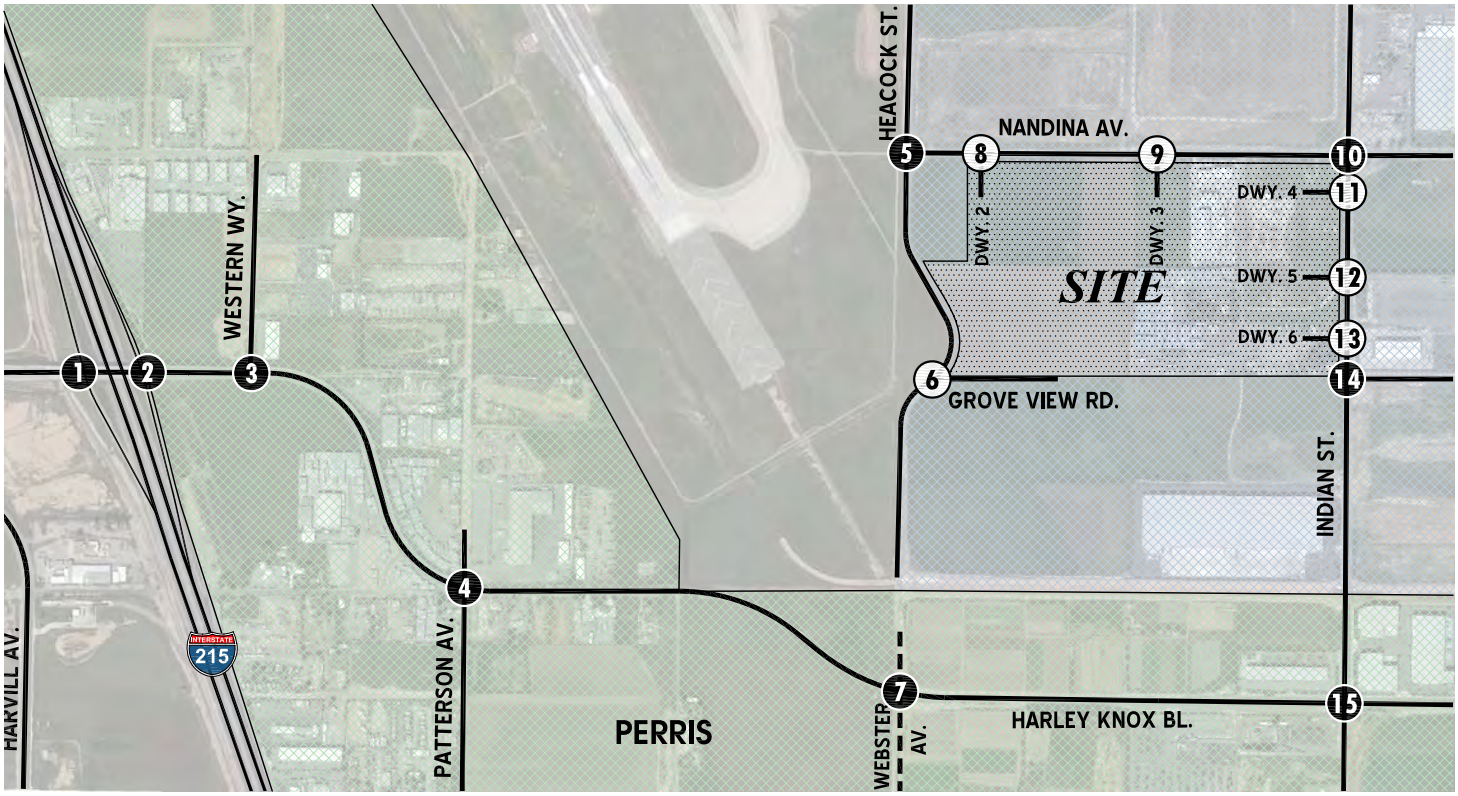
The City of Moreno Valley General Plan Circulation Element provides roadway volume capacity values presented previously on Table 2-3. The roadway segment capacities are approximate figures only, and are used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet traffic demand. Table 3-2 provides a summary of the Existing (2013) conditions roadway segment capacity analysis based on the City of Moreno Valley General Plan Circulation Element Roadway Segment Capacity/ (LOS) Thresholds identified previously on Table 2-3. As shown on Table 3-2, all of the study area roadway segments currently operate at acceptable LOS based on the City's planning level daily roadway capacity thresholds.

3.9 EXISTING CONDITIONS TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection volumes. For Existing (2013) conditions, there are no traffic signals that currently appear to be warranted (see Appendix "3.3").

EXHIBIT 3-8

EXISTING (2013) AM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



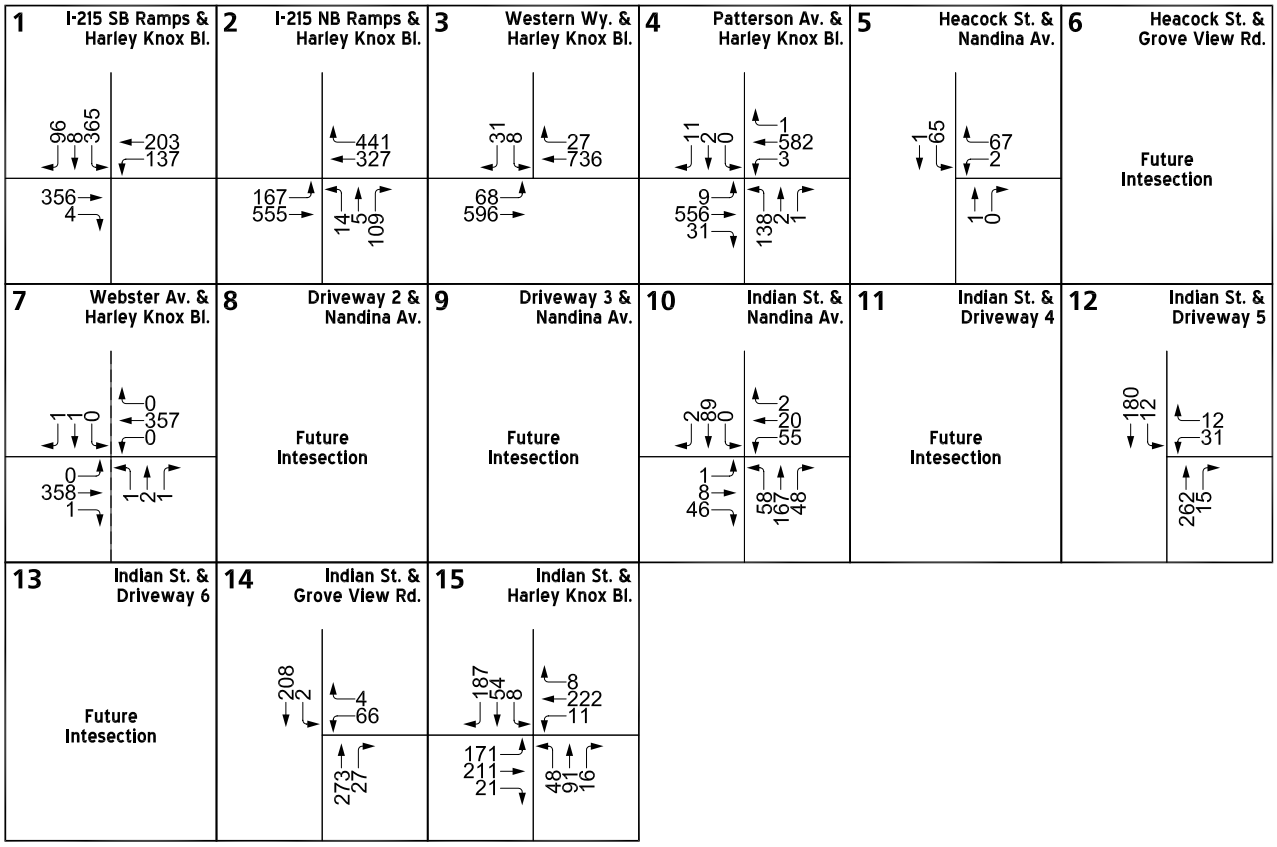
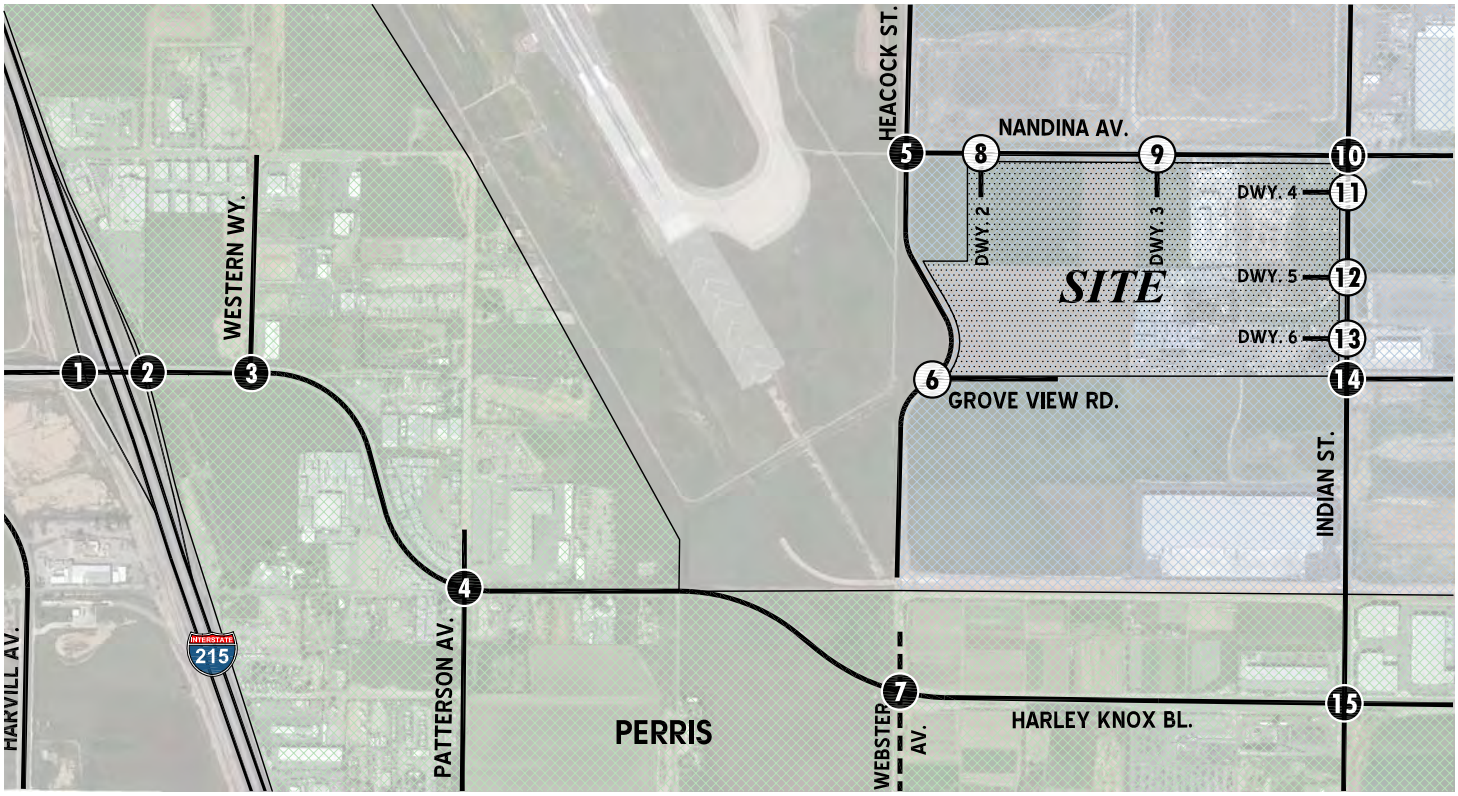


EXHIBIT 3-9

EXISTING (2013) PM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



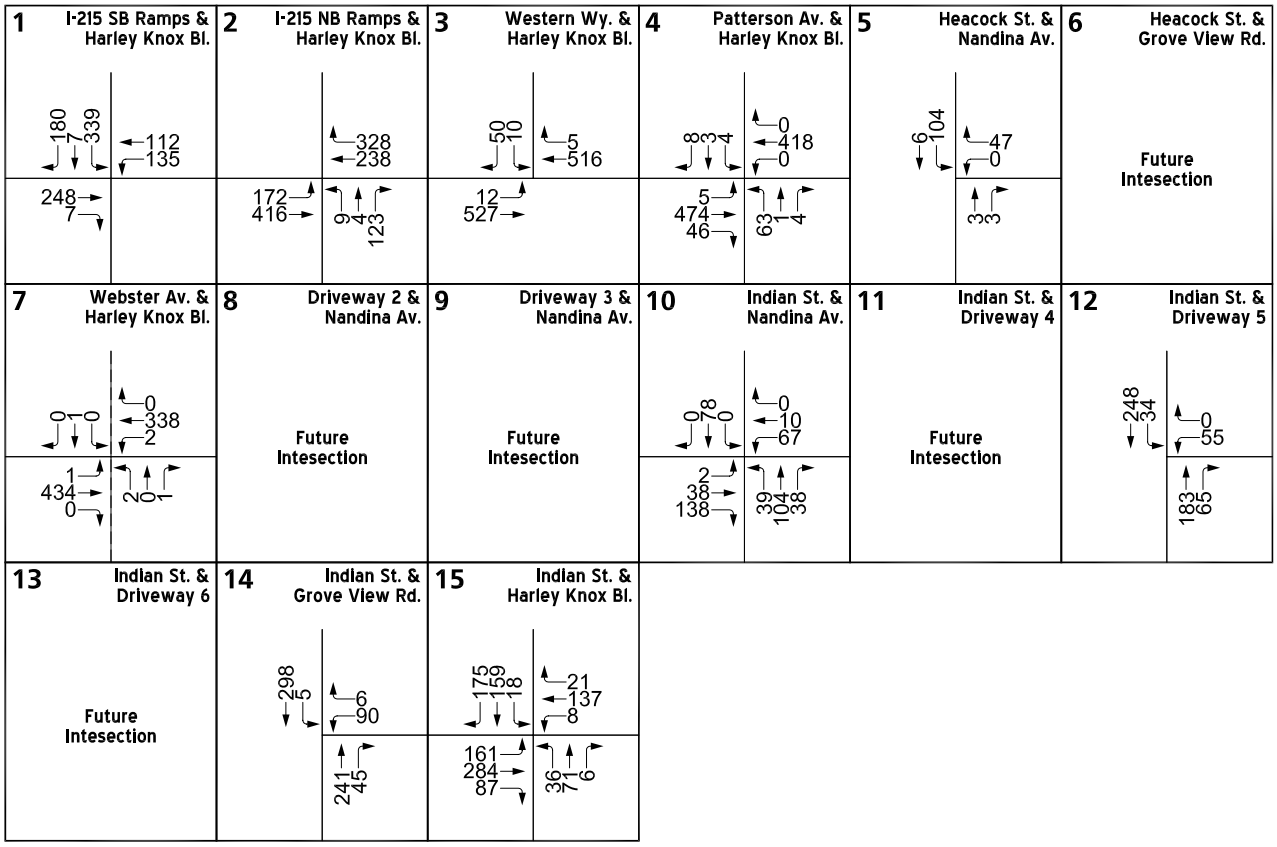


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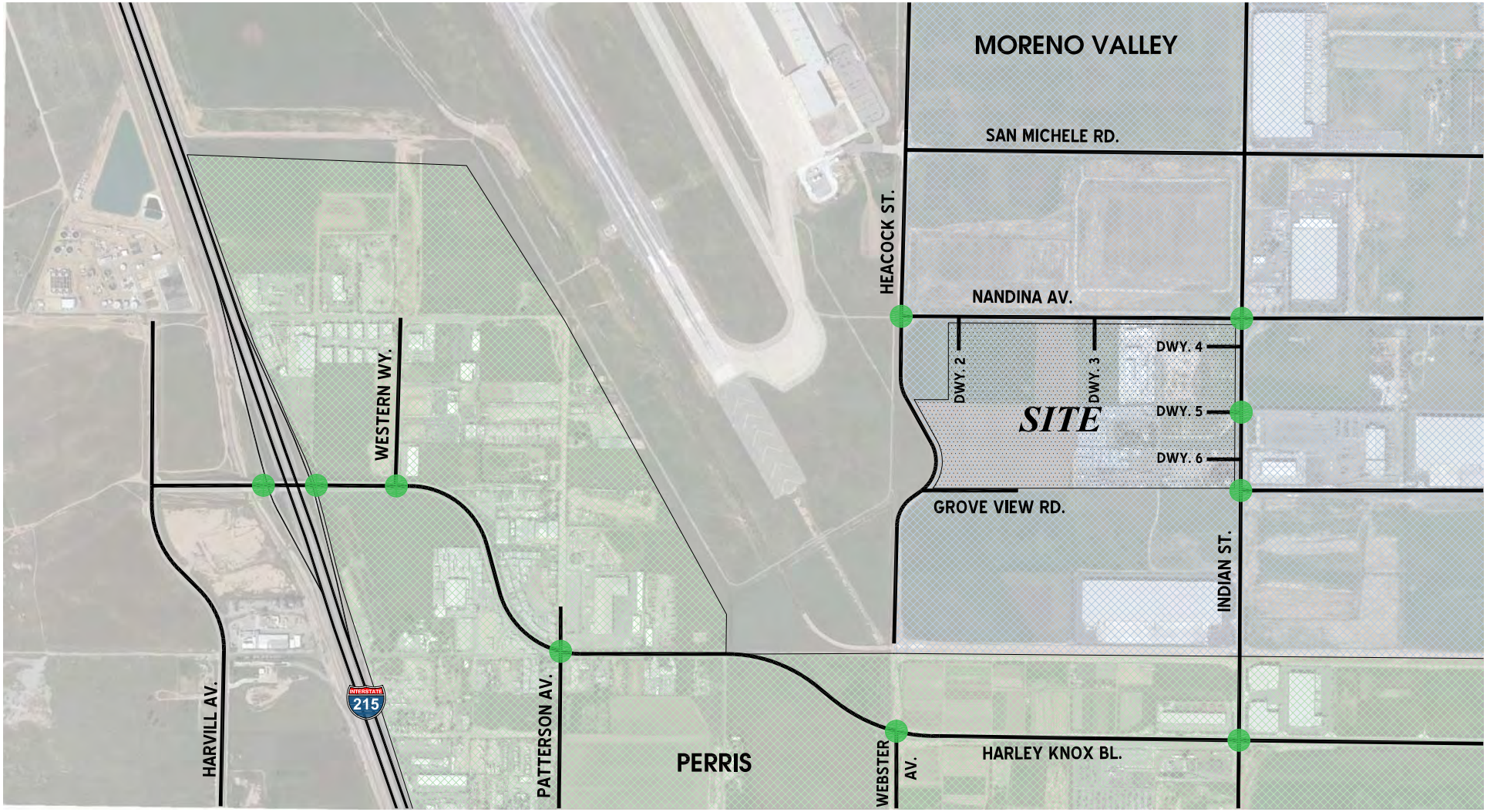
EXHIBIT 3-10

SUMMARY OF PEAK HOUR INTERSECTION LOS FOR EXISTING (2013) CONDITIONS



LEGEND:

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

N

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City of Moreno Valley, CA (JN - 08578:100)

URBAN CROSSROADS

Table 3-1

Intersection Analysis for Existing (2013) 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 / Harley Knox Bl.	TS	0	0	0	0	1	1	0	2	d	1	2	0	28.1	29.8	C	C
2	I-215 NB Ramps / Harley Knox Bl.	TS	0	1	1	0	0	0	1	2	0	0	2	d	17.6	18.3	B	B
3	Western Wy. / Harley Knox Bl.	CSS	0	0	0	0	1	0	0	2	0	0	2	d	16.2	11.9	C	B
4	Patterson Av. / Harley Knox Bl.	TS	0	1	0	0	1	d	1	1	1	1	1	0	20.6	13.2	C	B
5	Heacock St. / Nandina Av.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	9.3	8.5	A	A
6	Heacock St. / Grove View Rd.		Future Intersection															
7	Webster Av. / Harley Knox Bl.	CSS	0	1	0	0	1	0	1	1	0	1	1	0	16.4	17.1	C	C
8	Driveway 2 / Nandina Av.		Future Intersection															
9	Driveway 3 / Nandina Av.		Future Intersection															
10	Indian St. / Nandina Av.	TS	1	2	0	1	2	0	1	1	1	1	1	d	23.3	22.9	C	C
11	Indian St. / Driveway 4		Future Intersection															
12	Indian St. / Driveway 5	CSS	0	1	d	1	1	0	0	0	0	0	1	0	12.0	13.7	B	B
13	Indian St. / Driveway 6		Future Intersection															
14	Indian St. / Grove View Rd.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	13.3	16.4	B	C
15	Indian St. / Harley Knox Bl.	TS	2	2	1	1	2	0	1	1	1	2	2	0	32.2	31.7	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; d= Defacto Right Turn Lane

2 Per the 2000 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. The I-215 ramp locations at Harley Knox Boulevard have been analyzed using the Synchro software (Version 8).

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

Table 3-2

Existing (2013) Conditions
Roadway Volume/Capacity Analysis

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing (2013)	V/C	LOS	Acceptable LOS
1	Harley Knox Boulevard	West of I-215 Freeway	4D	37,500	6,564	0.18	A	D
2		I-215 SB Ramps to I-215 NB Ramps	4D	37,500	10,020	0.27	A	D
3		I-215 NB Ramps to Western Way	4U	25,000	13,260	0.53	A	D
4		East of Western Way	4U	25,000	12,696	0.51	A	D
5		West of Patterson Avenue	4U	25,000	12,168	0.49	A	D
6		East of Patterson Avenue	2D	18,750	10,800	0.58	A	D
7		West of Webster Avenue	2D	18,750	9,300	0.50	A	D
8		East of Webster Avenue	2D	18,750	9,300	0.50	A	D
9		West of Indian Street	3D	28,150	10,560	0.38	A	D
10		East of Indian Street	3D	28,150	5,688	0.20	A	D
11	Western Way	North of Harley Knox Boulevard	2U	12,500	924	0.07	A	D
12	Patterson Avenue	North of Harley Knox Boulevard	2U	12,500	252	0.02	A	D
13		South of Harley Knox Boulevard	2U	12,500	1,404	0.11	A	D
14	Heacock Street	North of Nandina Avenue	2D	18,750	1,920	0.10	A	D
15		Nandina to Grove View Rd.	2U	12,500	144	0.01	A	D
16		South of Grove View Rd.	2U	12,500	144	0.01	A	D
17	Webster Avenue	North of Harley Knox Boulevard	2U	12,500	24	0.00	A	D
18		South of Harley Knox Boulevard	2U	12,500	72	0.01	A	D
19	Indian Street	North of Nandina Avenue	4D	37,500	2,208	0.06	A	D
20		Nandina Avenue to Driveway 4	2D	18,750	5,580	0.30	A	D
21		Driveway 4 to Driveway 5	2D	18,750	5,580	0.30	A	D
22		Driveway 5 to Driveway 6	2D	18,750	6,612	0.35	A	D
23		Driveway 6 to Grove View Road	2D	18,750	6,600	0.35	A	D
24		South of Grove View Road	2D	18,750	8,088	0.43	A	D
25		North of Harley Knox Boulevard	2D	18,750	7,260	0.39	A	D
26		South of Harley Knox Boulevard	4D	37,500	4,404	0.12	A	D
27	Nandina Avenue	Heacock Street to Driveway 2	2D	18,750	1,788	0.10	A	D
28		Driveway 2 to Driveway 3	2D	18,750	1,788	0.10	A	D
29		Driveway 3 to Indian Street	2D	18,750	2,724	0.15	A	D
30		East of Indian Street	2D	18,750	1,836	0.10	A	D
31	Grove View Road	East of Indian Street	2D	18,750	1,752	0.09	A	D

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

[1] These maximum roadway capacities have been extracted from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis 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 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.

3.10 EXISTING CONDITIONS RAMP QUEUING ANALYSIS

A ramp queuing analysis was performed for southbound and northbound off-ramps at the I-215/Harley Knox Boulevard interchange to assess vehicle queues for the off ramps at the I-215 Freeway that may potentially impact peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline. Ramp queuing analysis findings are presented in Table 3-3. It is important to note that segment lengths are consistent with the measured distance between the ramps and the adjacent signalized/full-access intersection. As shown on Table 3-3, there are currently no queuing issues during either the AM and PM peak 95th percentile traffic flows.

Worksheets for Existing (2013) conditions queuing analysis are provided in Appendix "3.4".

3.11 EXISTING CONDITIONS BASIC FREEWAY SEGMENT ANALYSIS

Existing (2013) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 3-11. As shown on Table 3-4, the SR-60 Freeway and I-215 Freeway segments analyzed for this study were found to operate at an acceptable LOS (i.e., LOS "D" or better) during the peak hours for Existing (2013) traffic conditions. Existing (2013) basic freeway segment analysis worksheets are provided in Appendix "3.5".

3.12 EXISTING CONDITIONS FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for Existing (2013) conditions and the results of this analysis are presented in Table 3-5. As shown in Table 3-5, the I-215 Freeway ramp merge and diverge areas at Harley Knox Boulevard currently operate at LOS "D" or better during the peak hours under Existing (2013) traffic conditions, with the exception of the following:

ID	Freeway Merge/Diverge Ramp Junctions
1	I-215 Freeway – Southbound, Off Ramp at Harley Knox Boulevard – LOS "E" PM peak hour

Existing (2013) freeway ramp junction operations analysis worksheets are provided in Appendix "3.6".

Table 3-3

Existing (2013) Conditions
AM/PM Peak Hour Stacking Length Summary at I-215/Harley Knox Boulevard

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 / Harley Knox Bl.						
	SBL/T	1,330	352 [2]	331 [2]	Yes	Yes
	SBR	270	36	48	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.						
	NBL/T	1,120	27	21	Yes	Yes
	NBR	265	41	43	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.

Table 3-4

Existing (2013) Conditions Basic Freeway Segment Analysis

Scenario	Direction	Mainline Segment	Volume		Lanes[1]	Density[2]		LOS	
			AM	PM		AM	PM	AM	PM
Existing (2013)	SR-60 WB	West of I-215 Freeway	6,435	6,327	4	27.4	26.8	D	D
	SR-60 EB	West of I-215 Freeway	3,861	6,061	5	12.7	19.9	B	C
	I-215 SB	South of SR-60 Freeway	6,376	6,535	5	21.3	21.9	C	C
		North of Harley Knox Bl.	4,728	5,541	3	25.4	32.1	C	D
		South of Harley Knox Bl.	4,480	5,211	3	23.7	29.1	C	D
	I-215 NB	South of SR-60 Freeway	3,526	3,906	3	19.6	21.8	C	C
		North of Harley Knox Bl.	3,217	4,169	3	17.0	22.1	B	C
		South of Harley Knox Bl.	2,813	3,765	3	14.8	19.8	B	C

[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

I-215 Freeway Ramp Junction Merge/Diverge Analysis
For Existing (2013) 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	Southbound	Off-Ramp at Harley Knox Bl.	3	31.3	D	**35.2**	**E**
		On-Ramp at Harley Knox Bl.	3	26.8	C	30.5	D
	Northbound	On-Ramp at Harley Knox Bl.	3	21.5	C	26.3	C
		Off-Ramp at Harley Knox Bl.	3	20.1	C	25.3	C

BOLD = LOS does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).
[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 3-11

EXISTING (2013)
I-215 PEAK HOUR FREEWAY MAINLINE VOLUMES

LEGEND:

100/ 100 = AM VOL/ PM VOL

NOTE:
VOLUMES SHOWN ARE ACTUAL VEHICLES (NOT PCE).

N

4.0 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 proposed Project is anticipated to include the development of 1,450,000 square feet of high-cube warehouse/distribution use on the southwest corner of Indian Street and Nandina Avenue. Per the City's traffic study guidelines, the Opening Year will have a five (5) year minimum horizon. As such, the Opening Year analysis will assess 2018 traffic conditions.

The Project is proposed to have access on Heacock Street via Grove View Road, Nandina Avenue and Indian Street. All Project access points are proposed to be full-access, with the exception of Driveway 4 and Driveway 6 on Indian Street. Regional access to the Project site will be provided by the I-215 Freeway (located to the west) via Harley Knox Boulevard. As part of the development, the Project will construct improvements on the site adjacent roadways of Grove View Road, Heacock Street, Nandina Avenue and Indian Street.

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 recently released an updated edition of the *Trip Generation* manual (9th Edition) in 2012. 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. The trip generation rates utilized for the purposes of this analysis are based upon data collected by the Institute of Transportation Engineers (ITE) and presented in ITE's most recent edition of *Trip Generation*, (9th Edition, 2012). Vehicle mix information has been determined based on recent vehicle classification surveys collected by Counts Unlimited on behalf of Urban Crossroads in September 2013 at six (6) various high-cube distribution warehouse facilities located in the City of Moreno Valley. The facilities surveyed were selected in consultation with City staff, and were each determined by the City of Moreno Valley to be suitable for estimating vehicle trips by vehicle classification for all high-cube distribution warehouse projects in the City of Moreno Valley going forward.

Trip generation rates used to estimate Project traffic and a summary of the Project's trip generation based on actual vehicles are shown in Table 4-1. The Project is anticipated to generate a net total of approximately 2,436 trip-ends per day with 160 AM peak hour trips and 174 PM peak hour trips. The trip

Table 4-1

Project Trip Generation Summary (Actual Vehicles)[1]

Land Use[1]	Units[3]	ITE LU Code	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total	Daily
High-Cube Warehouse[2]	TSF	152	0.08	0.03	0.11	0.04	0.08	0.12	1.68
76% Passenger Cars			0.061	0.023	0.084	0.030	0.061	0.091	1.277
3% 2-Axle Trucks			0.002	0.001	0.003	0.001	0.002	0.004	0.050
3% 3-Axle Trucks			0.002	0.001	0.003	0.001	0.002	0.004	0.050
18% 4-Axle+ Trucks			0.014	0.005	0.020	0.007	0.014	0.022	0.302
Land Use	**Quantity**	**Units[3]**	**AM Peak Hour In**	**AM Peak Hour Out**	**AM Peak Hour Total**	**PM Peak Hour In**	**PM Peak Hour Out**	**PM Peak Hour Total**	**Daily**
High-Cube Warehouse	1,450.000	TSF							
Passenger Cars:			88	33	121	44	88	132	1,851
Truck Trips:									
2-axle:			*3*	*1*	*5*	*2*	*3*	*5*	*73*
3-axle:			*3*	*1*	*5*	*2*	*3*	*5*	*73*
4+-axle:			*21*	*8*	*29*	*10*	*21*	*31*	*438*
- Net Truck Trips (Actual Vehicles)			*28*	*10*	*38*	*14*	*28*	*42*	*585*
First Nandina Logistics (Actual Vehicles)			**116**	**44**	**160**	**58**	**116**	**174**	**2,436**

[1] Trip Generation Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Ninth Edition (2012). No adjustments to heavy vehicles.

[2] Vehicle Mix Source: Based on actual vehicle classification surveys conducted at various high-cube distribution warehouse locations in the City of Moreno Valley.

[3] TSF = thousand square feet

generation summary shown in Table 4-1 does not account for any adjustments to the heavy trucks and represent actual total vehicles.

For the purposes of this traffic impact analysis, passenger car equivalents (PCE) factors have been applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). 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. PCE factors allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, for the purposes of capacity and level of service analyses. PCE factors are applied to large truck types such as large two-axles, three-axles, 4+-axles. A PCE factor of 1.5 has been applied to large 2-axle trucks, a factor of 2.0 for 3-axle trucks and a factor of 3.0 for 4+-axle trucks. These PCE factors are consistent with the values recommended by the Riverside County Transportation Commission (RCTC) and are accepted factors in the County of Riverside and City of Moreno Valley.

Trip generation rates used to estimate Project traffic and a summary of the Project's trip generation based on PCE vehicles is shown in Table 4-2. The Project is anticipated to generate a net total of approximately 3,423 PCE trip-ends per day with 224 PCE AM peak hour trips and 244 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 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.

The total volume on each roadway was divided by the total site traffic generation to indicate the percentage of Project traffic that would use each component of the regional roadway system in each relevant direction. The Project passenger car trip distribution pattern is graphically depicted on Exhibit 4-1. The Project truck trip distribution pattern is graphically depicted on Exhibit 4-2. Each of these distribution patterns was reviewed and approved by the City of Moreno Valley as part of the traffic study scoping process.

Table 4-2

Project Trip Generation Summary (Passenger Car Equivalent)[1]

Land Use[1]	Units[3]	ITE LU Code	AM Peak Hour Inbound	AM Peak Hour Outbound	AM Peak Hour Total	PM Peak Hour Inbound	PM Peak Hour Outbound	PM Peak Hour Total	Daily
High-Cube Warehouse[2]	TSF	152	0.08	0.03	0.11	0.04	0.08	0.12	1.68
76% Passenger Cars			0.061	0.023	0.084	0.030	0.061	0.091	1.277
3% 2-Axle Trucks (PCE = 1.5)			0.004	0.001	0.005	0.002	0.004	0.005	0.076
3% 3-Axle Trucks (PCE = 2.0)			0.005	0.002	0.007	0.002	0.005	0.007	0.101
18% 4-Axle+ Trucks (PCE = 3.0)			0.043	0.016	0.059	0.022	0.043	0.065	0.907
Land Use	**Quantity**	**Units[3]**	**AM Peak Hour In**	**AM Peak Hour Out**	**AM Peak Hour Total**	**PM Peak Hour In**	**PM Peak Hour Out**	**PM Peak Hour Total**	**Daily**
High-Cube Warehouse	1,450.000	TSF							
Passenger Cars:			88	33	121	44	88	132	1,851
Truck Trips:									
2-axle:			*5*	*2*	*7*	*3*	*5*	*8*	*110*
3-axle:			*7*	*3*	*10*	*3*	*7*	*10*	*146*
4+-axle:			*63*	*23*	*86*	*31*	*63*	*94*	*1,315*
- Net Truck Trips (PCE) [4]			*75*	*28*	*103*	*37*	*75*	*112*	*1,571*
First Nandina Logistics (PCE) [5]			**163**	**61**	**224**	**81**	**163**	**244**	**3,423**

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

[2] Vehicle Mix Source: Based on actual vehicle classification surveys conducted at various high-cube distribution warehouse locations in the City of Moreno Valley. PCE rates are per SANBAG.

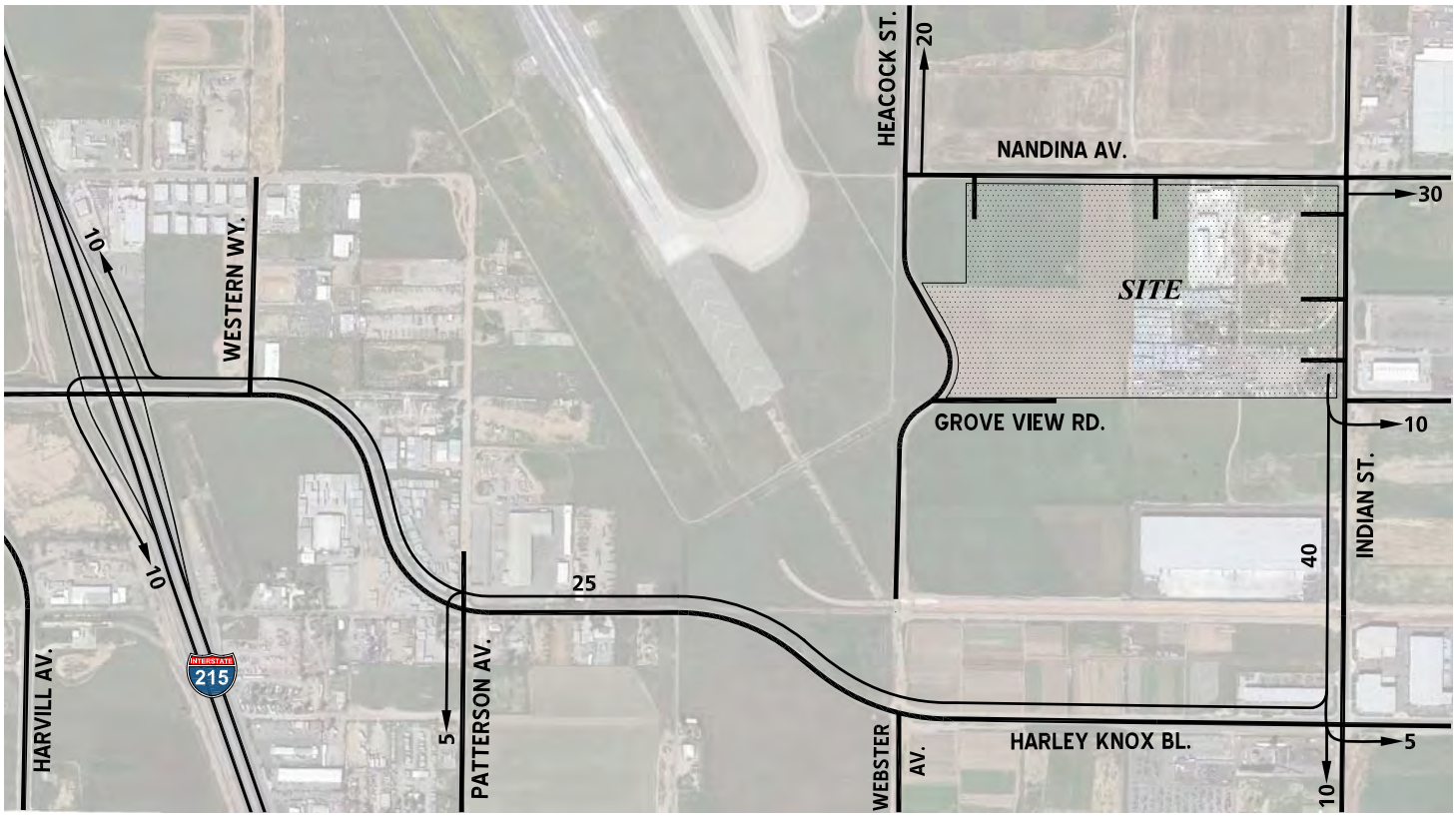
[3] TSF = thousand square feet

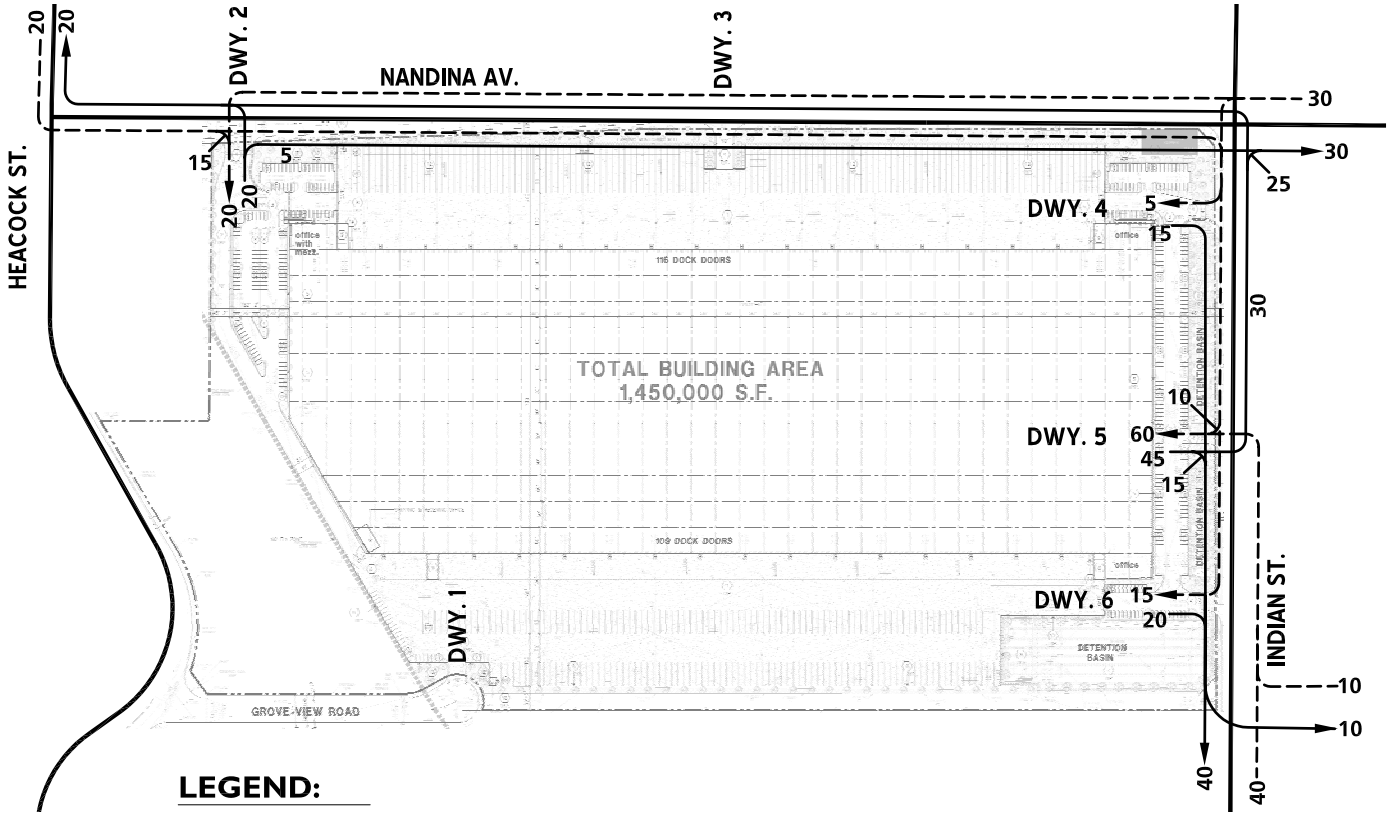
[4] Based on the following Passenger Car Equivalent Factors: 2-axle = 1.5 PCE, 3-axle = 2.0 PCE, 4+-axle = 3.0 PCE.

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

EXHIBIT 4-1

PROJECT (PASSENGER CAR) TRIP DISTRIBUTION





LEGEND:

10 = PERCENT TO/FROM PROJECT

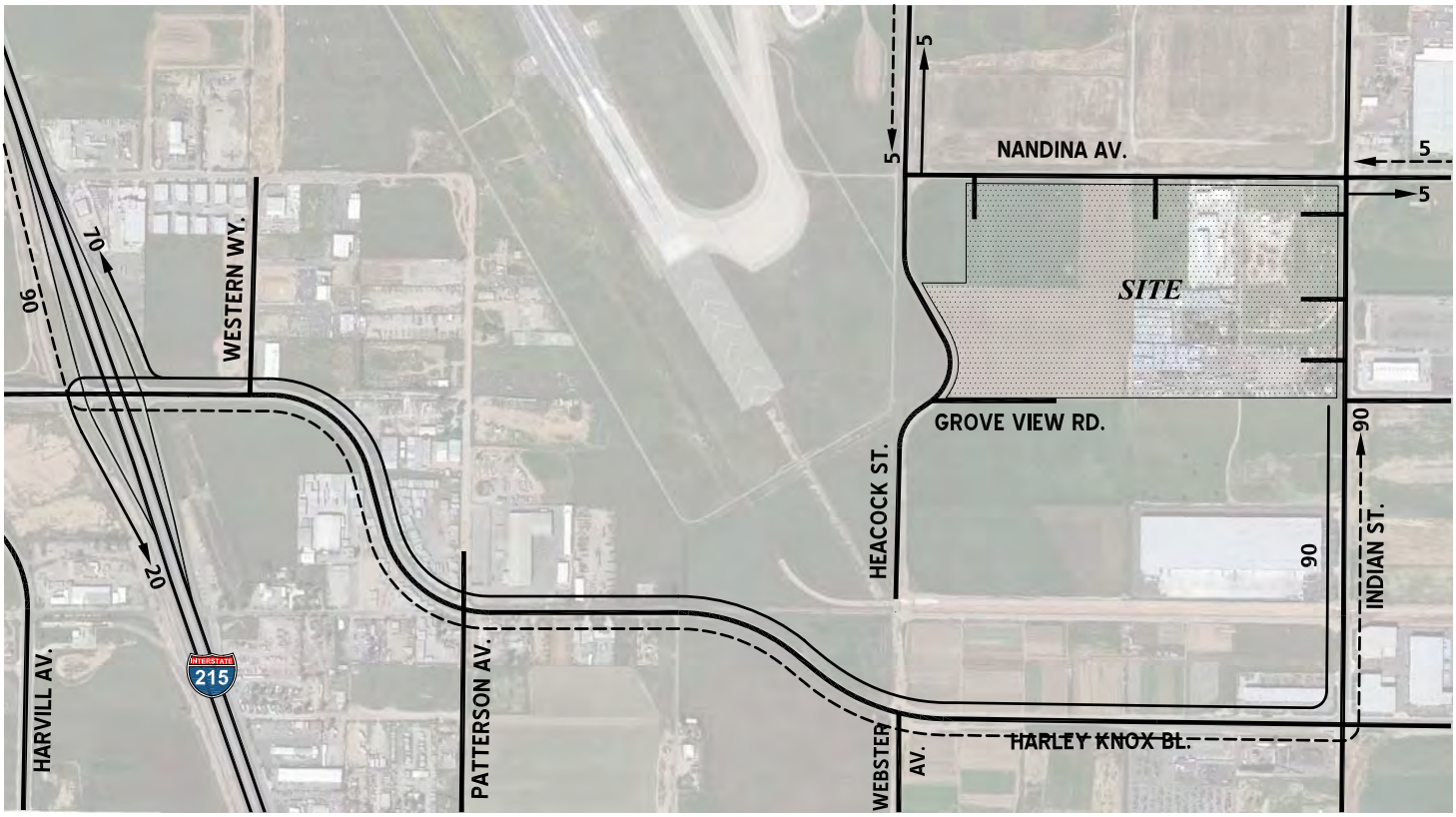
——— = OUTBOUND

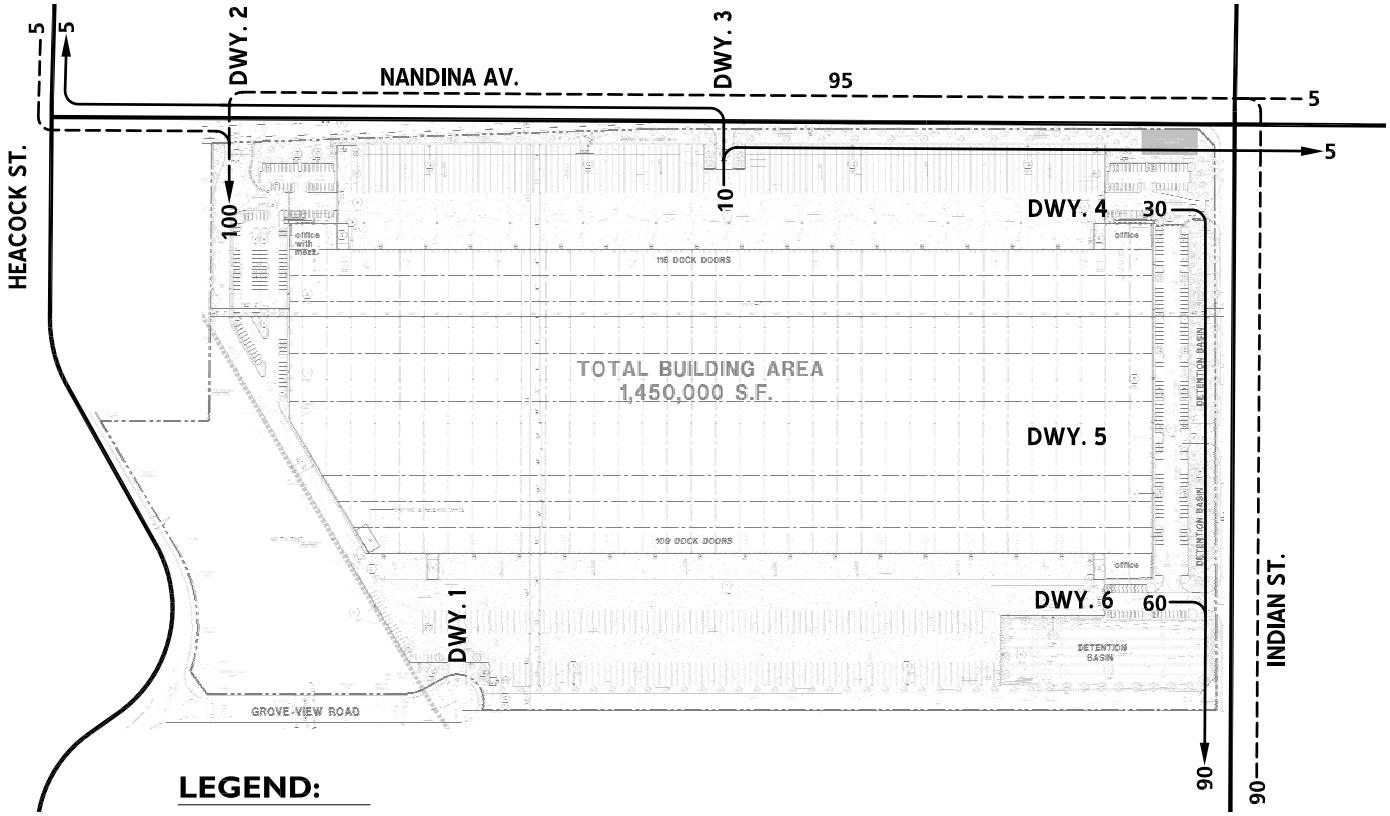
– – – – = INBOUND

N

EXHIBIT 4-2

PROJECT (TRUCK) TRIP DISTRIBUTION





LEGEND:

10 = PERCENT TO/FROM PROJECT

——— = OUTBOUND

– – – – = INBOUND

N

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.

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 average daily traffic (ADT) volumes for the weekday are shown on Exhibit 4-3. Project AM and PM peak hour volumes are shown on Exhibits 4-4 and 4-5.

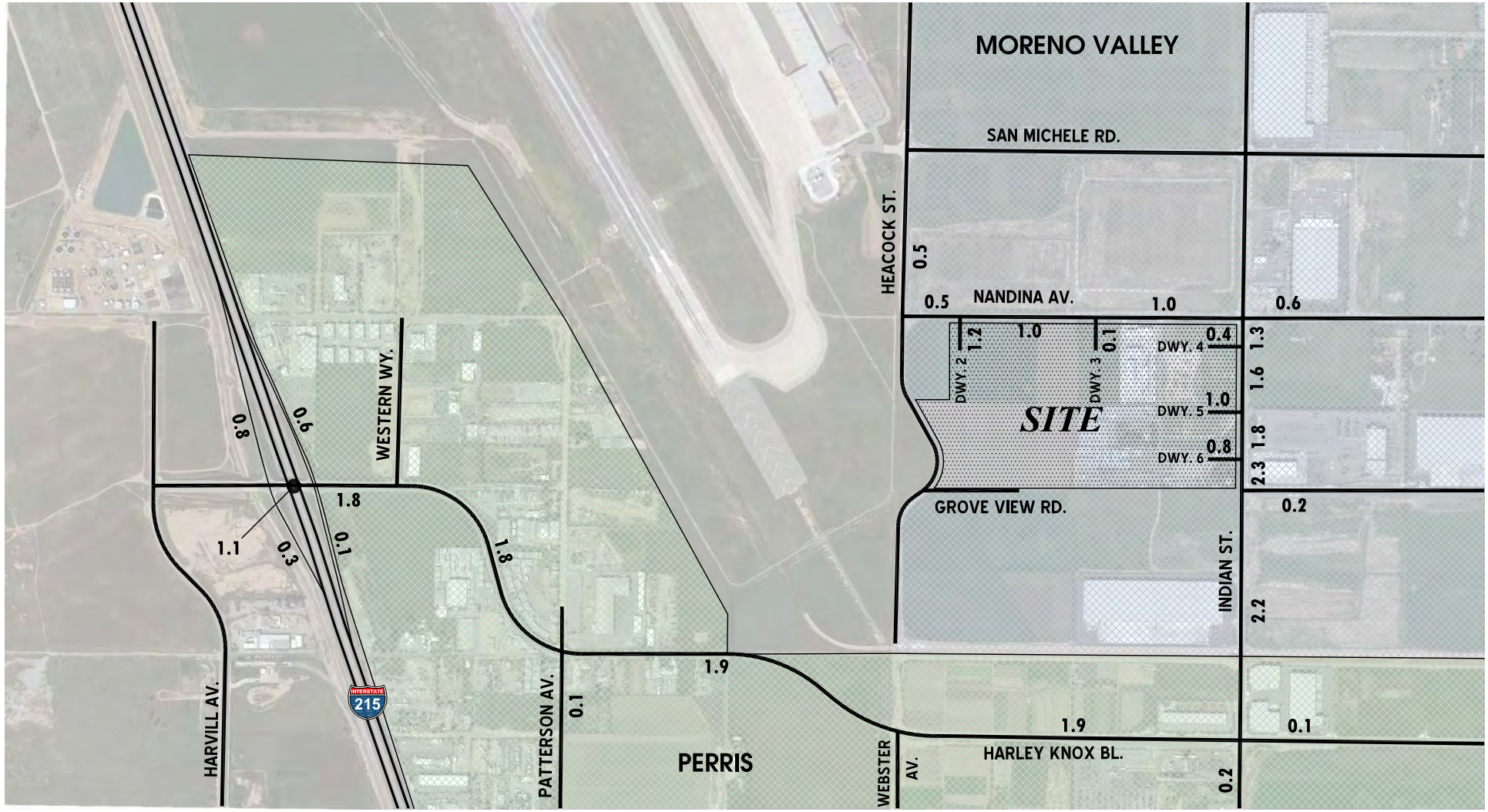
4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon five (5) years of background (ambient) growth at 2% per year for 2018 traffic conditions. The ambient growth factor is intended to approximate regional traffic growth. The total ambient growth is 10.4% for 2018 traffic conditions (compounded growth of two percent per year over five years or $1.02^{5\ \text{years}}$). 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, <u>in addition</u> 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.

According to information published by the Riverside County Information Technology GIS staff as input to the Southern California Association of Governments (SCAG) Regional Transportation Plan (2012), the population of Western Riverside County is projected to increase by 41% in the period between 2010 and 2035, a compounded rate of approximately 1.38% annually. During the same period, employment in Western Riverside County is expected to increase by 112% or 3.06% compounded annually. Therefore, the use of an annual growth rate of 2.0 percent would appear to accurately approximate the anticipated regional growth in traffic volumes in the City of Moreno Valley, especially when considered along with the addition of project-related traffic and traffic generated by other known development projects. 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.

EXHIBIT 4-3

PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES (P.C.E.) PER DAY (1000'S)

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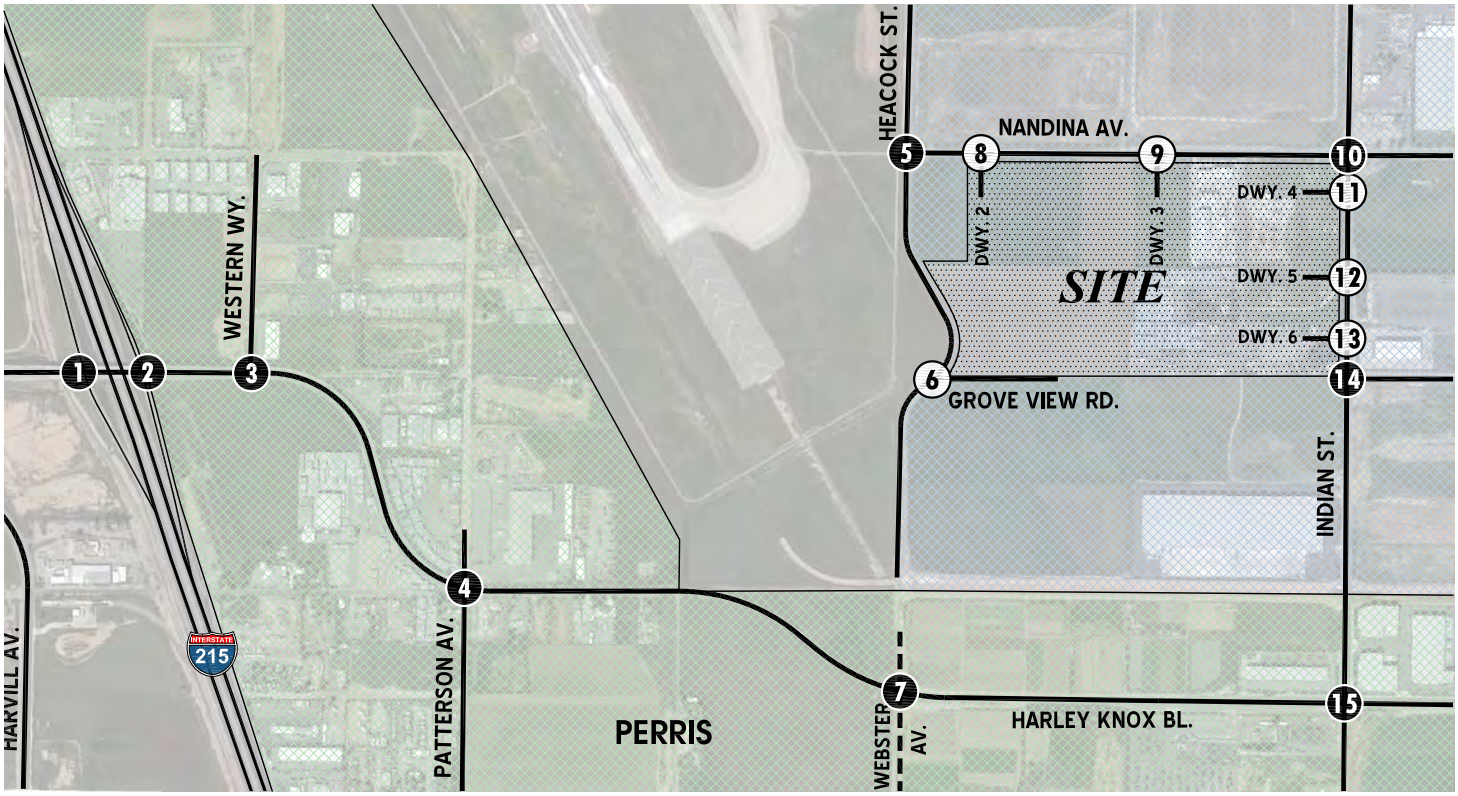
URBAN CROSSROADS

EXHIBIT 4-4

PROJECT ONLY
AM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



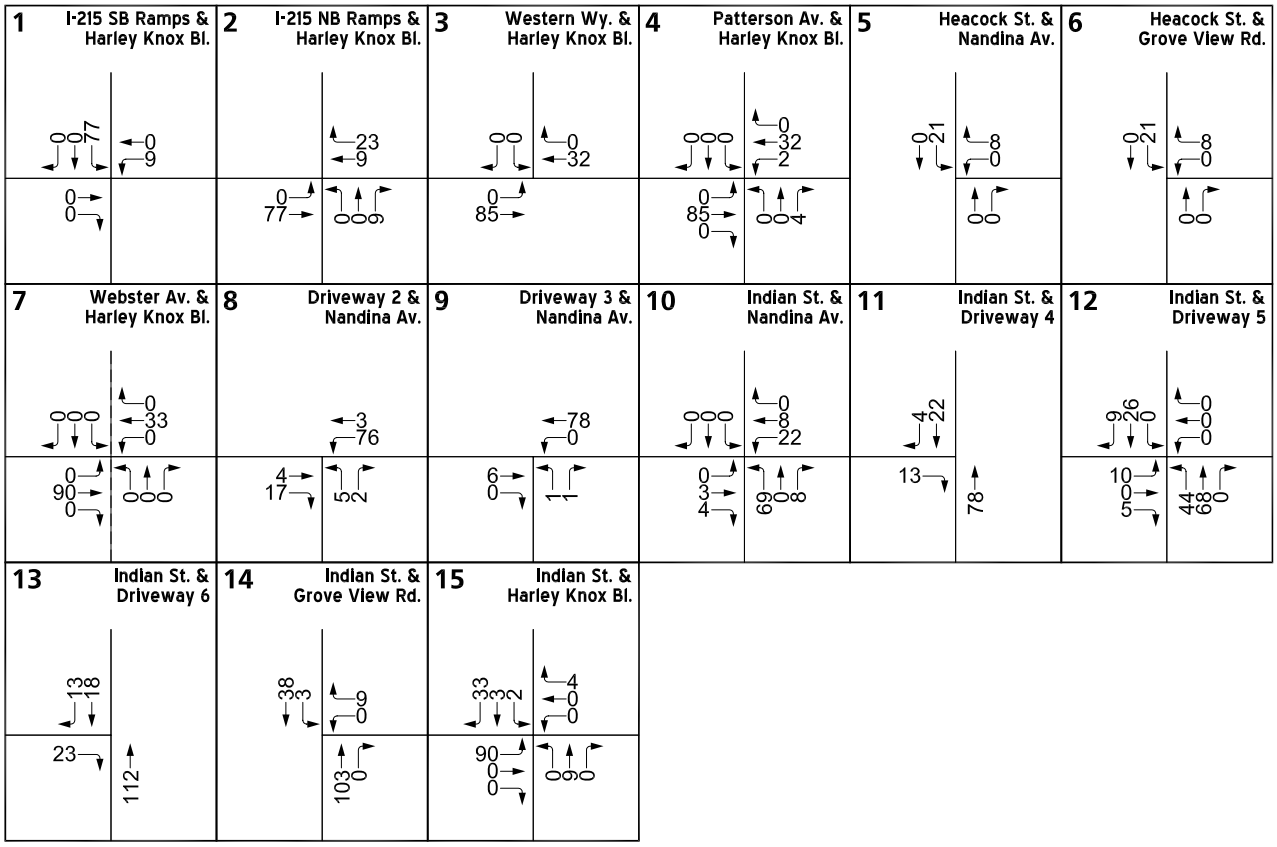
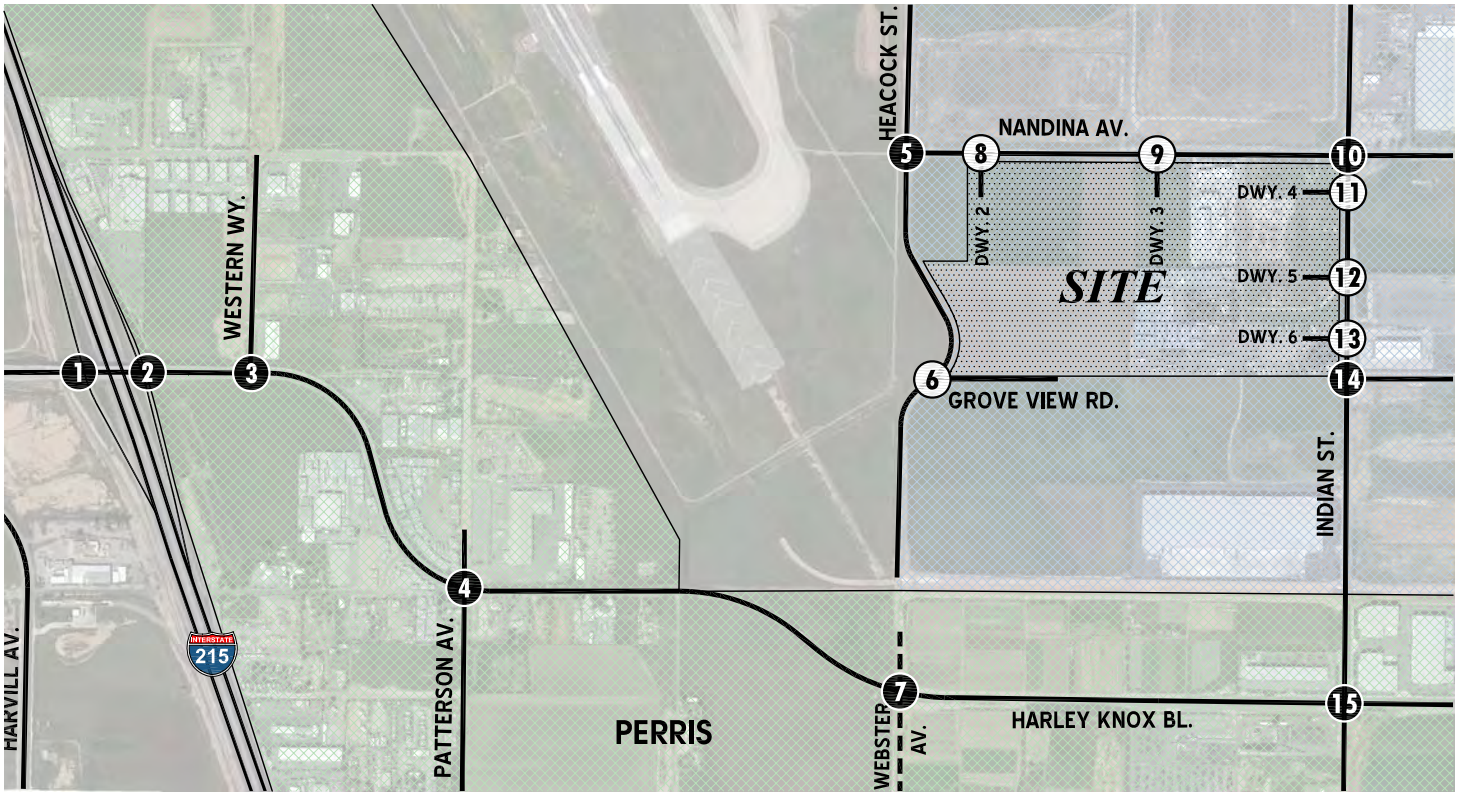
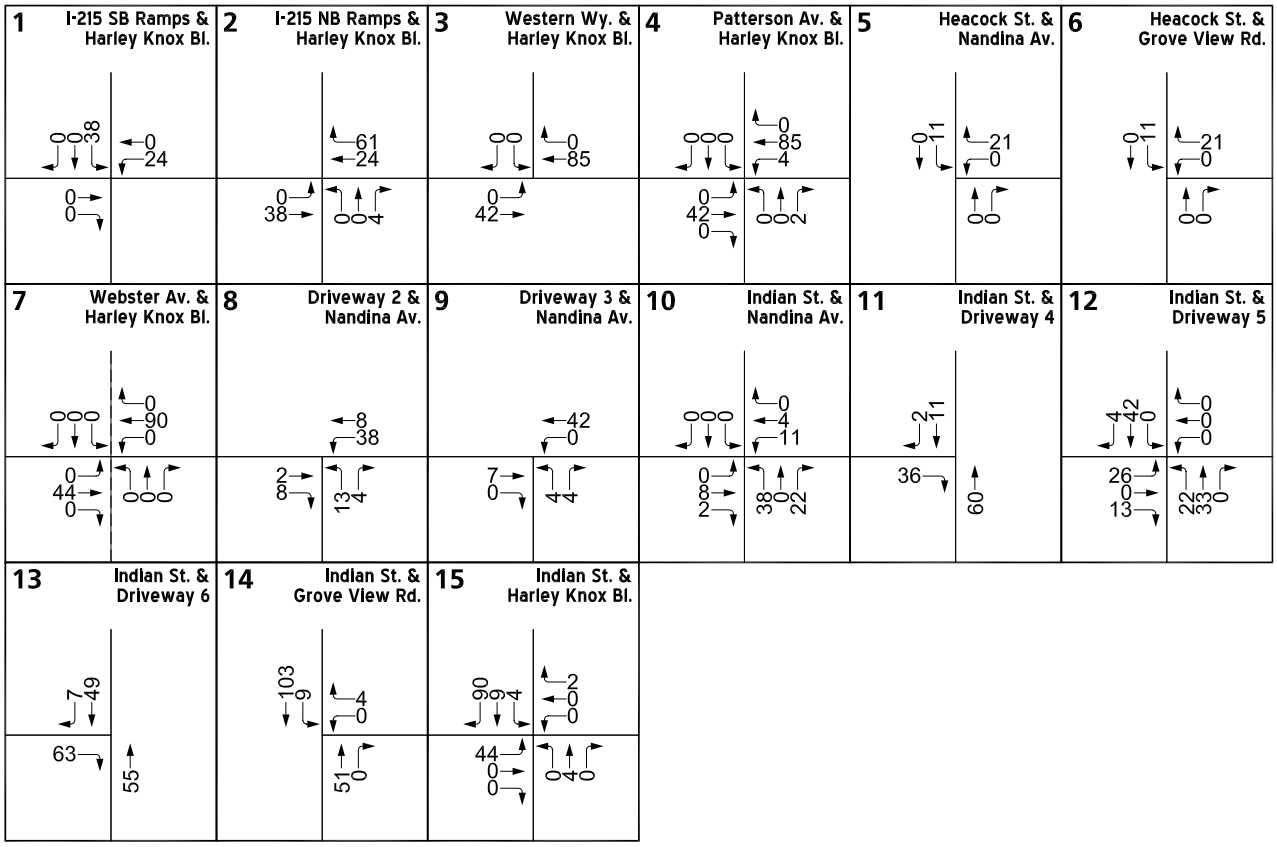


EXHIBIT 4-5

PROJECT ONLY
PM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)





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. Exhibit 4-6 illustrates the cumulative development location map. A summary of cumulative development land uses are shown on Table 4-3.

4.7 TRAFFIC FORECASTS

An Existing plus Project (E+P) analysis scenario has been included to address a recent CEQA case ruling, which asserts that impacts of a proposed project must be measured against the current existing physical conditions. However, for the purposes of this TIA, the results for the E+P scenario has been provided for informational purposes only as the City of Moreno Valley TIA guidelines requires the EAP (Opening Year 2018 With Project) analysis scenario to identify project-related impacts.

To provide a comprehensive assessment of the potential project-related and cumulative traffic impacts, the "buildup" analyses were performed in support of this work effort. The buildup method was utilized to approximate the Opening Year Cumulative conditions for the study year of 2018, and is intended to identify the near-term cumulative impacts on both the existing and planned near-term circulation system. The Opening Year Cumulative traffic condition includes background traffic, traffic generated by other cumulative development projects within the study area and the traffic generated by the proposed Project.

4.8 NEAR-TERM (2018) CONDITIONS

The buildup approach combines existing traffic counts with a background ambient growth factor to forecast the near-term 2018 traffic conditions. An ambient growth factor of 10.4% accounts for background (area-wide) traffic increases that occur over time up to the year 2018 from the year 2013 (compounded two percent per year growth over a minimum five year period). Traffic volumes generated by the Project are then added to assess the 2018 With Project traffic conditions. The 2018 roadway network is similar to the Existing (2013) conditions roadway network, with the exception of future driveways proposed to be developed by the Project.

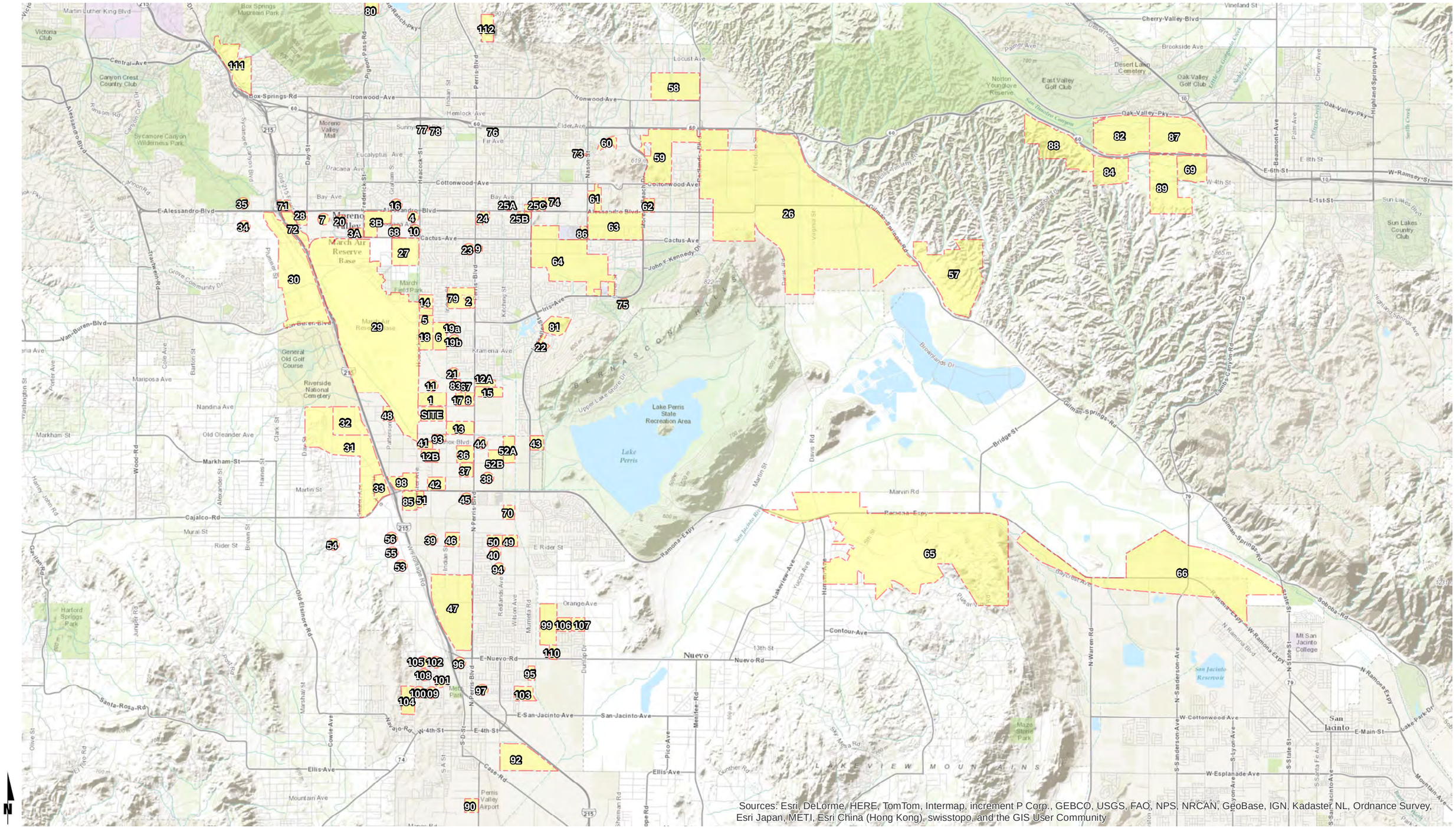
The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2018) Without Project
    - Existing 2013 counts
    - Ambient growth traffic (10.4%)
    - Cumulative Development Project traffic

- Opening Year Cumulative (2018) With Project
    - Existing 2013 counts
    - Ambient growth traffic (10.4%)
    - Cumulative Development Project traffic
    - Project traffic

EXHIBIT 4-6

CUMULATIVE DEVELOPMENT PROJECTS LOCATION MAP



First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:cd11x17-2.mxd)

URBAN CROSSROADS

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Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
1	PA 06-0152 & PA 06-0153 (First Park Nandina I & II)	High-Cube Warehouse	1,182.918	TSF
2	Moreno Valley Walmart	Free-Standing Discount Store	189.520	TSF
		Gas Station	16	VFP
3A	PA 08-0072 (Overton Moore Properties)	High-Cube Warehouse	520.000	TSF
3B	Harbor Freight Expansion	High-Cube Warehouse	1,279.910	TSF
4	PA 04-0063 (Centerpointe Buildings 8 and 9)	General Light Industrial	361.384	TSF
5	PA 07-0035; PA 07-0039 (Moreno Valley Industrial Park)	General Light Industrial	204.657	TSF
		High-Cube Warehouse	409.920	TSF
6	PA 07-0079 (Indian Business Park)	High-Cube Warehouse	1,560.046	TSF
7	PA 08-0047-0052 (Komar Cactus Plaza)[3]	Hotel	110	RMS
		Fast Food w/Drive Thru	8.000	TSF
		Commercial	42.400	TSF
8	First Inland Logistics Center	High-Cube Warehouse	400.130	TSF
9	TM 33607	Condo/Townhomes	54	DU
10	PA 08-0093 (Centerpointe Business Park II)	General Light Industrial	99.988	TSF
11	PA 06-0021; PA 06-0022; PA 06-0048; PA 06-0049 (Komar Investments)	Warehousing	2,057.400	TSF
12A	PA 06-0017 (Ivan Devries)	Industrial Park	569.200	TSF
12B	Integra Pacific Industrial Facility	High-Cube Warehouse	880.000	TSF
13	PA 09-0004 (Vogel)	High-Cube Warehouse	1,616.133	TSF
14	TM 34748	SFDR	135	DU
15	Modular Logistics Center	High-Cube Warehouse	1,109.378	TSF
16	PA 09-0031	Gas Station	12	VFP
17	First Park Nandina III	High-Cube Warehouse	691.960	TSF
	Moreno Valley Commerce Park	High-Cube Warehouse	354.321	TSF
18	March Business Center	General Light Industrial	16.732	TSF
		Warehousing	87.429	TSF
		High-Cube Warehouse	1,380.246	TSF
19A	TM 33810	SFDR	16	DU
19B	TM 34151	SFDR	37	DU
20	373K Industrial Facility	High-Cube Warehouse	373.030	TSF
21	TM 32716	SFDR	57	DU
22	TM 32917	Condo/Townhomes	227	DU
23	TM 33417	Condo/Townhomes	10	DU
24	TM 34988	Condo/Townhomes	251	DU
25A	TM 34216	Condo/Townhomes	40	DU
25B	TM 34681	Condo/Townhomes	49	DU
25C	PA 08-0079-0081 (Winco Foods)	Discount Supermarket	95.440	TSF
		Specialty Retail	14.800	TSF

Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
26	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	1,916.190	TSF
		Warehousing	328.448	TSF
	World Logistics Center	High-Cube Warehouse	41,400.000	TSF
		Warehousing	200.000	TSF
		Gas Station w/ Market	12	VFP
		Existing SFDR	7	DU
27	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
28	Alessandro Metrolink Station	Light Rail Transit Station	300	SP
29	Airport Master Plan	Airport Use	559.000	TSF
30	Meridian Business Park North	Industrial Park	5,985.000	TSF
31	SP 341; PP 21552 (Majestic Freeway Business Center)	High-Cube Warehouse	6,200.000	TSF
32	PP 20699 (Oleander Business Park)	Warehousing	1,206.710	TSF
33	Ramona Metrolink Station	Light Rail Transit Station	300	SP
34	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
35	P07-1028 (Alessandro Business Park)	General Light Industrial	652.018	TSF
36	P 05-0113 (IDI)	High-Cube Warehouse	1,750.000	TSF
37	P 05-0192 (Oakmont I)	High-Cube Warehouse	697.600	TSF
38	P 05-0477	High-Cube Warehouse	462.692	TSF
39	Rados Distribution Center	High-Cube Warehouse	1,200.000	TSF
40	Investment Development Services (IDS) II	High-Cube Warehouse	350.000	TSF
41	P 07-09-0018	Warehousing	170.000	TSF
42	P 07-07-0029 (Oakmont II)	High-Cube Warehouse	1,600.000	TSF
43	TR 32707	SFDR	137	DU
44	TR 34716	SFDR	318	DU
45	P 05-0493 (Ridge I)	High-Cube Warehouse	700.000	TSF
46	Ridge II	High-Cube Warehouse	2,000.000	TSF

Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
47	Harvest Landing Specific Plan	SFDR	717	DU
		Condo/Townhomes	1,139	DU
		Sports Park	16.700	AC
		Business Park	1,233.401	TSF
		Shopping Center	73.181	TSF
	Perris Marketplace	Shopping Center	450.000	TSF
48	P 06-0411 (Concrete Batch Plant)	Manufacturing	2.000	TSF
49	Jordan Distribution	High-Cube Warehouse	378.000	TSF
50	Aiere	High-Cube Warehouse	642.000	TSF
51	P 08-11-0005; P 08-11-0006 (Starcrest)	High-Cube Warehouse	454.088	TSF
52A	Stratford Ranch Specific Plan	High-Cube Warehouse	1,725.411	TSF
52B	Stratford Ranch Specific Plan	High-Cube Warehouse	480.000	TSF
		General Light Industrial	120.000	TSF
53	PP 18908	General Light Industrial	133.000	TSF
54	Tract 33869	SFDR	39.000	DU
55	PP 16976	General Light Industrial	85.000	TSF
56	PP 21144	Industrial Park	190.802	TSF
57	Quail Ranch Specific Plan	Private School (K-12)	300	STU
		Golf Course	18	Holes
		Hotel	500	ROOMS
		Specialty Retail	66.667	TSF
		General office	66.667	TSF
		Assisted Living	500	Beds
		Senior Living (Detached)	200	DU
		SFDR	600	DU
58	a TR 32460 (Sussex Capital)	SFDR	58	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
59	a Westridge Commerce Center	High-Cube Warehouse	937.260	TSF
	b P06-158 (Gascon)	Commercial Retail	116.360	TSF
	c Auto Mall Specific Plan (PAC)	Commercial Retail	304.500	TSF
	d ProLogis	Warehousing	367.000	TSF
		High-Cube Warehouse	1,901.000	TSF
	e TR 35823 (Stowe Passco)	SFDR	262	DU
		Apartments	216	DU
60	TR 36340	SFDR	275	DU

Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
61	a TR 31771 (Sanchez)	SFDR	25	DU
	b TR 34397 (Winchester Associates)	SFDR	52	DU
	c TR 32645 (Winchester Associates)	SFDR	54	DU
62	Lowe's (Moreno Beach Marketplace)	Home Improvement Store	175.000	TSF
63	a Convenience Store/ Fueling Station	Gas Station w/ Market	30.750	TSF
	b Senior Assisted Living	Assisted Living Units	139	DU
	c TR 31590 (Winchester Associates)	SFDR	96	DU
	d TR 32548 (Gabel, Cook & Associates)	SFDR	107	DU
	e 26th Corp. & Granite Capitol	SFDR	32	DU
	f TR 32218 (Whitney)	SFDR	63	DU
	g Moreno Marketplace	Commercial Retail	93.788	TSF
	h Medical Plaza	Medical Offices	311.633	TSF
64	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
65	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	8.900	AC
		County Park	8.100	AC
		Regional Park	107.100	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	177.000	AC
66	Gateway Area Specific Plan	Commercial Retail	255.000	AC
		General Office	510.000	AC
		Business Park	595.000	AC
		Residential	340.000	AC
67	Moreno Valley Industrial Center (Industrial Area SP)	General Light Industrial	354.810	TSF
68	Centerpointe Business Park	General Light Industrial	356.000	TSF
69	ProLogis/Rolling Hills Ranch Industrial	Heavy Industrial	2,565.684	TSF
70	P05-0493	Logistics	597.370	TSF

Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
71	P07-1028, -0102; and P09-0416, -0418, -0419	General Light Industrial	652.018	TSF
72	Amstar/Kaliber Development, PP22925	General Light Industrial	42.222	TSF
		Heavy Industrial	409.312	TSF
		Commercial Retail	10.000	TSF
		General Office	258.102	TSF
73	TR 31305 / Richmond American	Residential	87	DU
74	TR 32505 / DR Horton	Residential	71	DU
75	TR 34329 / Granite Capitol	Residential	90	DU
76	TR 31814 / Moreno Valley Investors	Residential	60	DU
77	TR 33771 / Creative Design Associates	Residential	12	DU
78	TR 35663 / Kha	Residential	12	DU
79	TR 22180 / Young Homes	Residential	87	DU
80	TR 32515	Residential	161	DU
81	TR 32142	Residential	81	DU
82	Heartland	Residential	922	DU
83	San Michele Industrial Center (Industrial Area SP)	General Light Industrial	865.960	TSF
84	Hidden Canyon	General Light Industrial	2,890.000	TSF
85	Starcrest, P011-0005; 08-11-0006	General Light Industrial	454.088	TSF
86	Commercial Medical Plaza	Medical Offices	311.633	TSF
87	Mountain Bridge Regional Commercial Community	Commercial	1,853.251	TSF
88	Jack Rabbit Trail	Residential	2,000	DU
89	The Preserve / Legacy Highlands SP	Commercial	595.901	TSF
		Residential	3,412	DU
90	South Perris Industrial Phase 1	Logistics	787.700	TSF
91	South Perris Industrial Phase 2	Logistics	3,448.734	TSF
92	South Perris Industrial Phase 3	Logistics	3,166.857	TSF
93	P 04-0343	Warehousing	41.650	TSF
94	P 06-0228	General Light Industrial	149.738	TSF
95	P 06-0378	Senior Housing	429	DU
96	P 11-09-0011	Retail	80.000	TSF
97	P 12-05-0013	Apartments	75	DU
98	P 12-10-0005	High-Cube Warehouse	1,463.887	TSF
99	TR 30850	Residential	496	DU
100	TR 30973	Residential	35	DU
101	TR 31225	Residential	57	DU
102	TR 31226	Residential	82	DU
103	TR 31240	Residential	114	DU
104	TR 31407	Residential	243	DU
105	TR 31650	SFDR	61	DU
106	TR 31659	SFDR	161	DU
107	TR 32041	Residential	122	DU

Table 4-3

Cumulative Development Land Use Summary

TAZ	Project Name	Land Use[1]	Quantity	Units[2]
108	TR 32406	SFDR	15	DU
109	TR 33193	Townhomes	94	DU
110	TR 33338	Residential	75	DU
111	The Gateway Center	SFDR	1,342	DU
		Condo/Townhomes	402	DU
		Apartments	307	DU
		Shopping Center	5.7	AC
		Mixed-Use/Metrolink Station	15.2	AC
		Parks	15.9	AC
112	TTM 31592 (P 13-078) Covey Ranch	SFDR	115	DU

[1] SFDR = Single Family Detached Residential

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

[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).

5.0 EXISTING PLUS PROJECT TRAFFIC ANALYSIS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, roadway segment analyses and traffic signal warrants. As noted previously, the E+P analysis scenario has been utilized to determine direct project-related traffic impacts that would occur on the existing roadway system based on a comparison of the E+P traffic conditions to the Existing (2013) traffic conditions.

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:

- At 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 turn lane improvements at the Project driveways).

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2013) traffic volumes plus Project traffic. Exhibit 5-1 shows the ADT volumes which can be expected for E+P traffic conditions. E+P AM and PM peak hour intersection turning movement volumes are shown on Exhibits 5-2 and 5-3, respectively.

5.3 INTERSECTION OPERATIONS ANALYSIS

E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.0 *Methodologies* of this TIA. The intersection analysis results are summarized in Table 5-1 which indicates that all of the study area intersections will experience acceptable LOS (i.e., LOS “D” or better) during the peak hours.

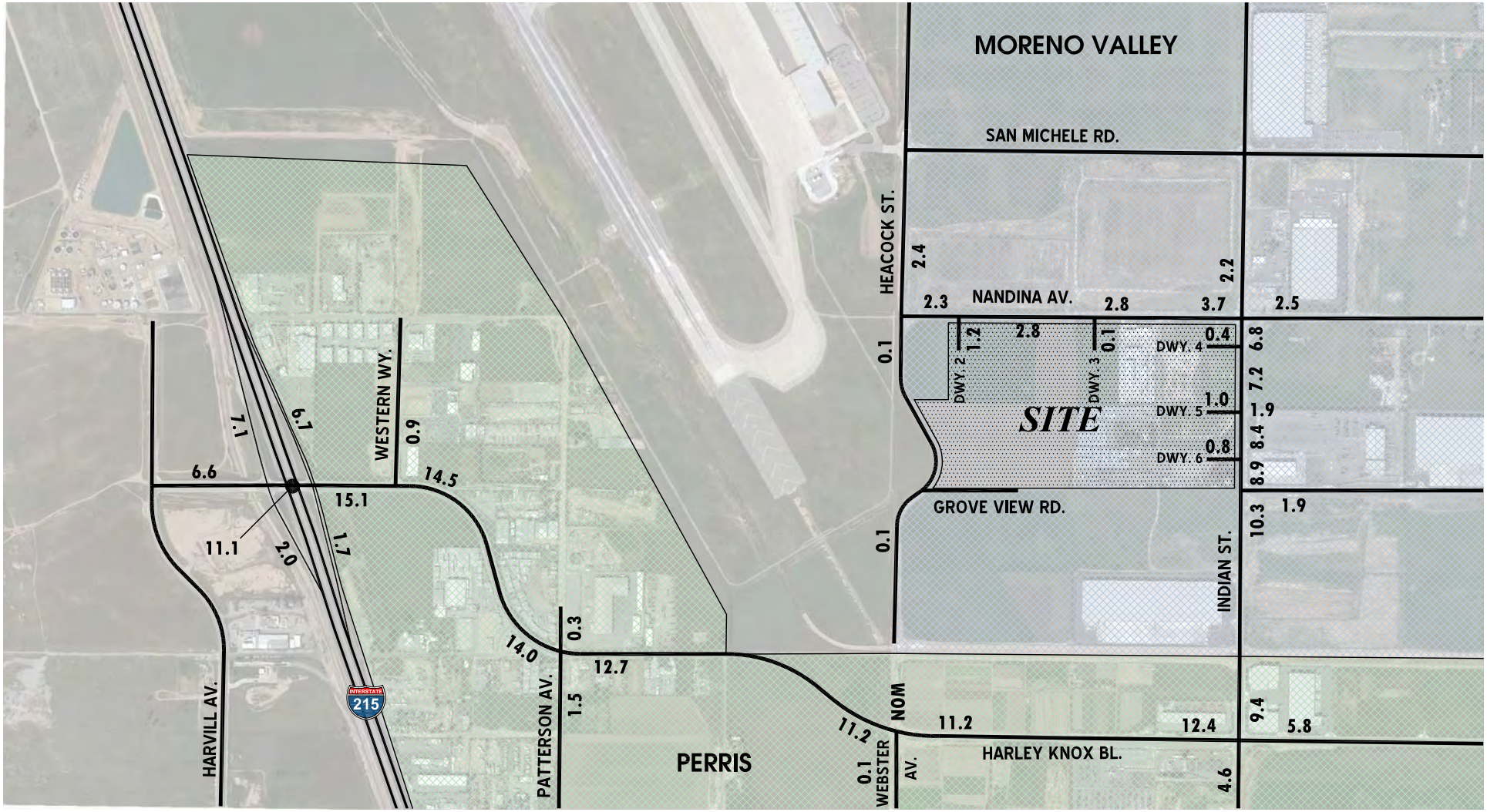
These findings are consistent with the Existing (2013) conditions LOS analysis. Exhibit 5-4 summarizes the weekday AM and weekday PM peak hour study area intersection LOS under E+P traffic conditions, consistent with the summary provided in Table 5-1. The intersection operations analysis worksheets are included in Appendix “5.1” of this TIA.

5.4 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. Table 5-2 provides a

EXHIBIT 5-1

EXISTING PLUS PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES (P.C.E.) PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

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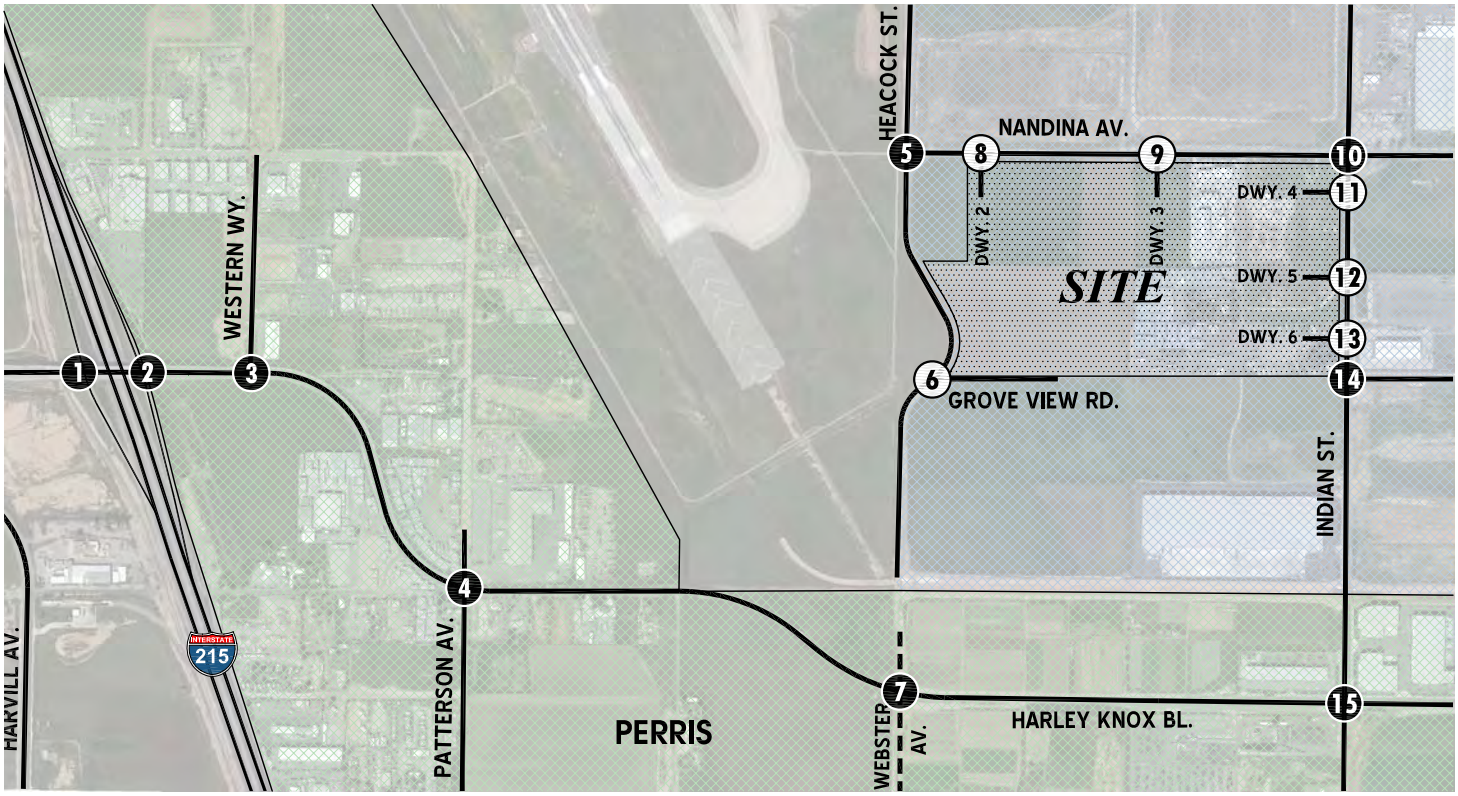
City of Moreno Valley, CA (JN - 08578:202)

URBAN CROSSROADS

EXHIBIT 5-2

EXISTING PLUS PROJECT AM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



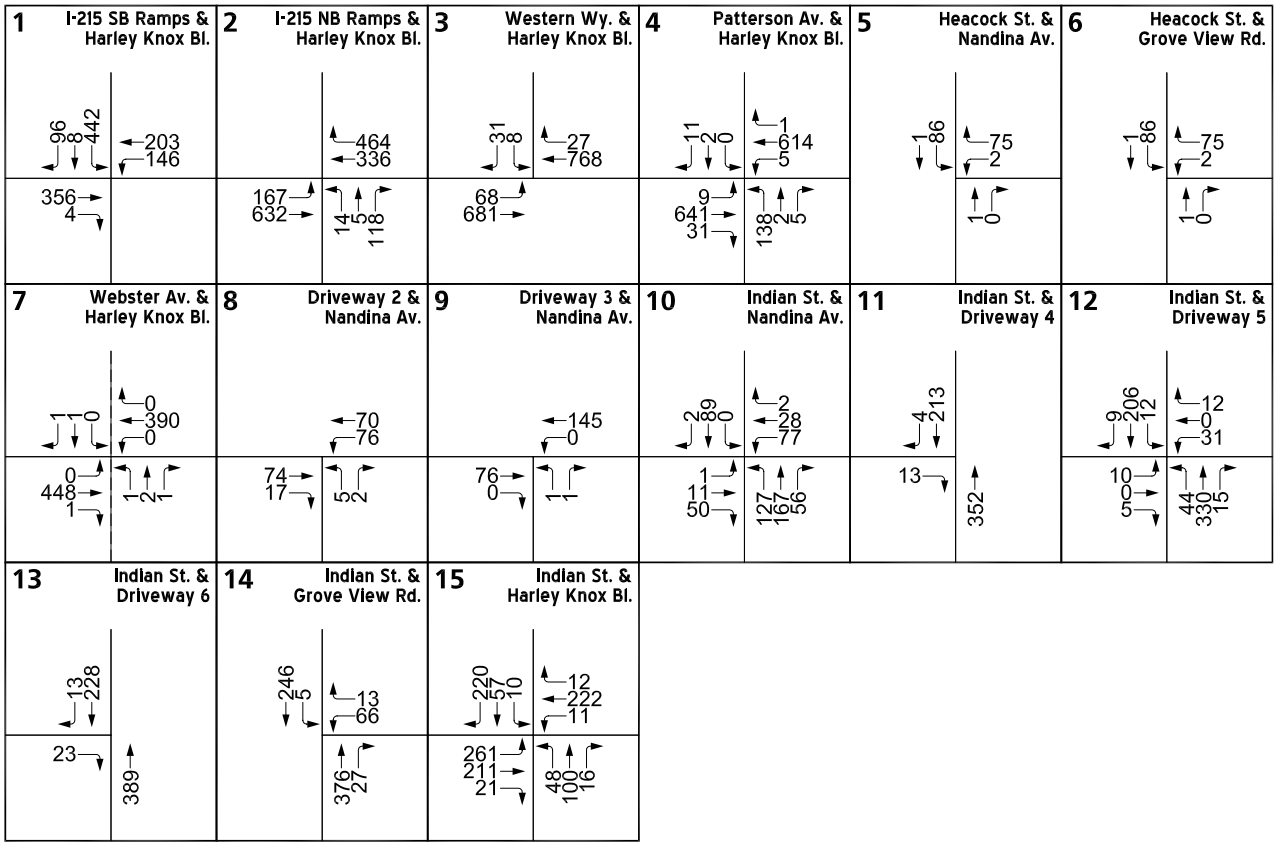
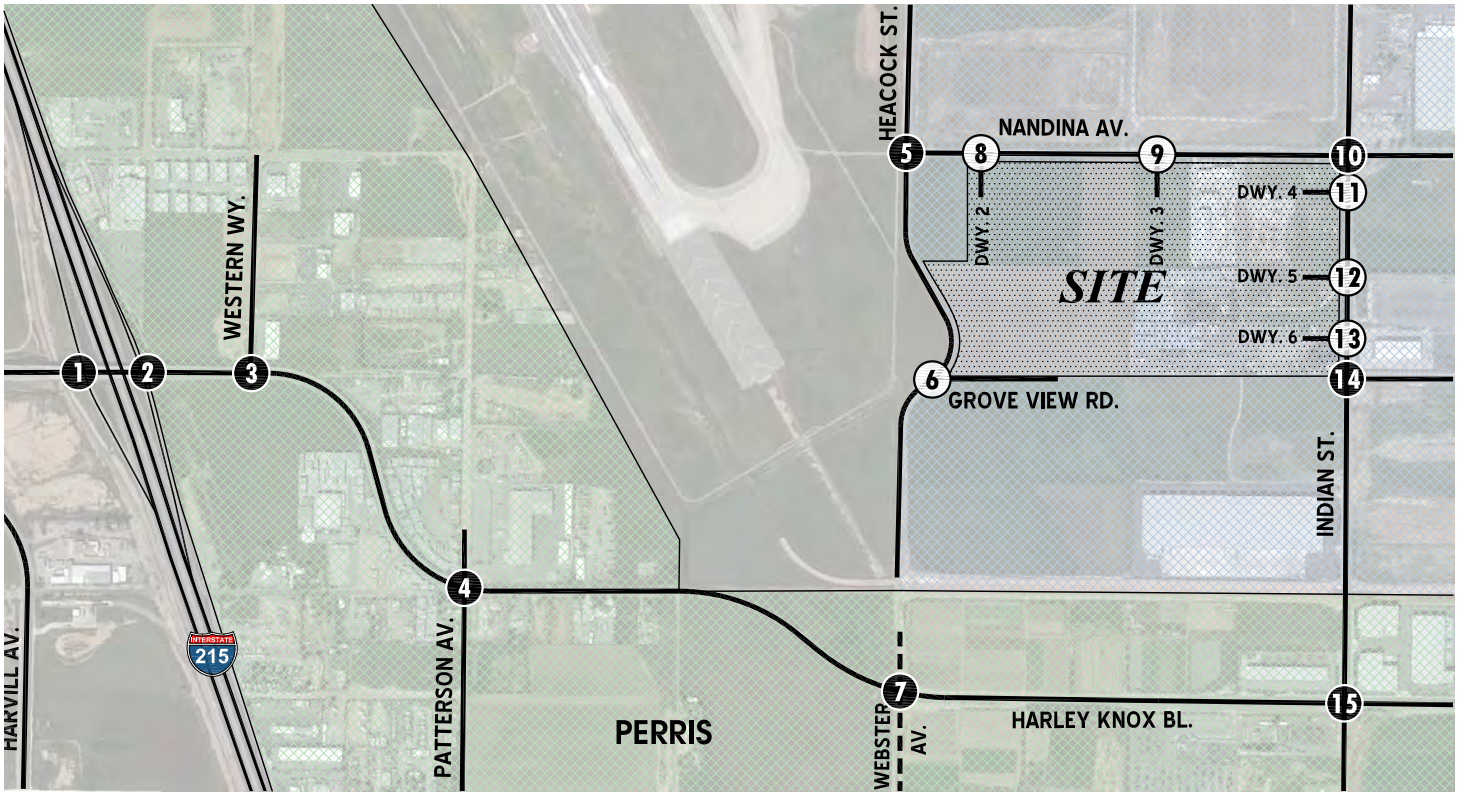


EXHIBIT 5-3

EXISTING PLUS PROJECT
PM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



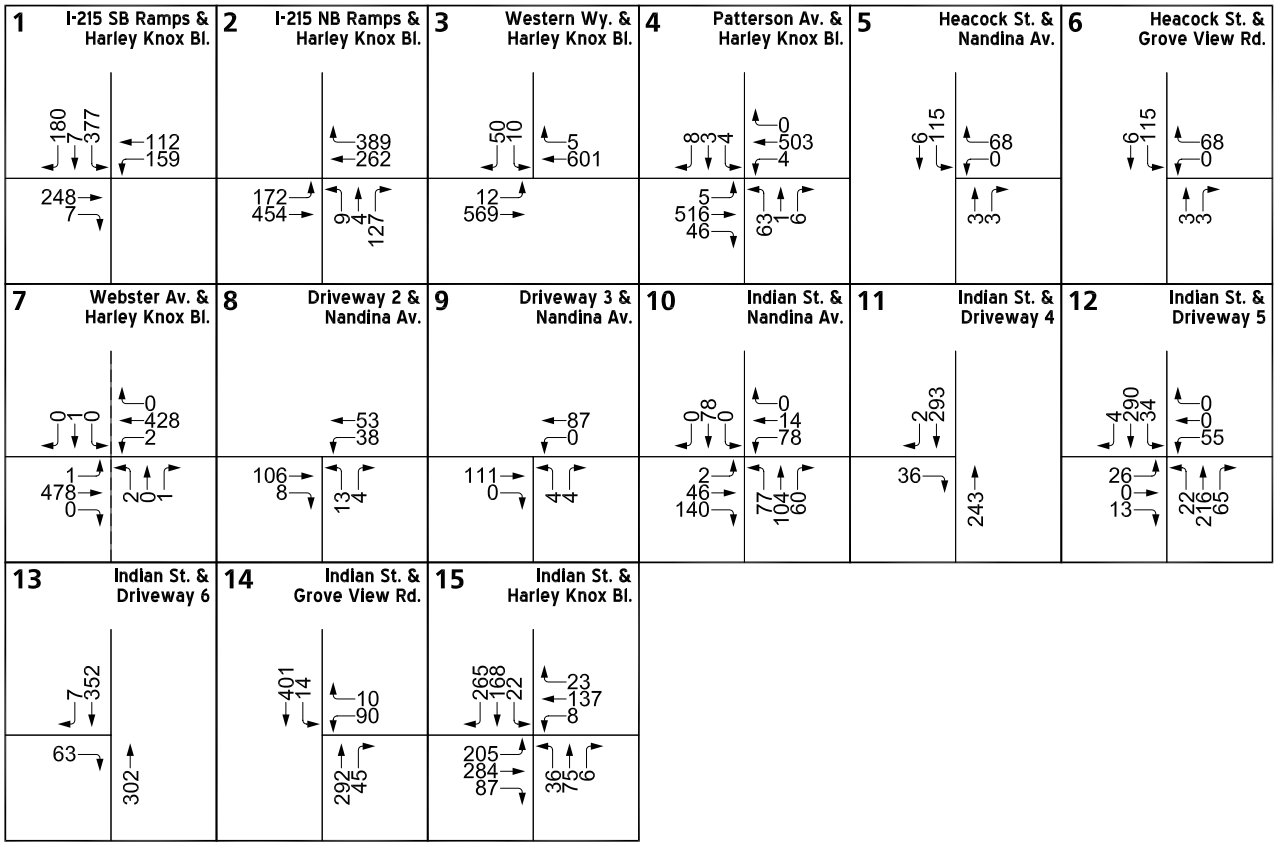
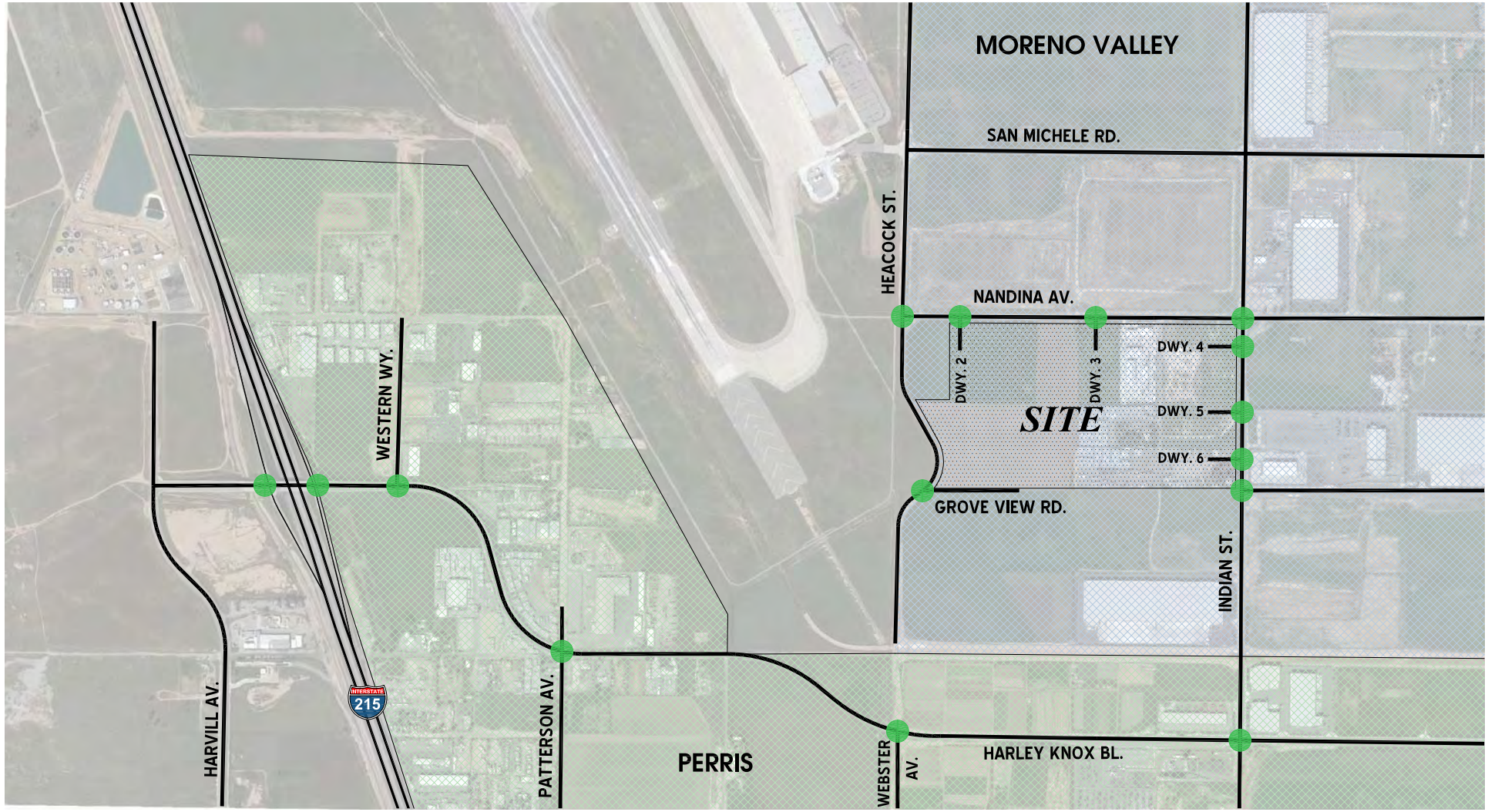


EXHIBIT 5-4

SUMMARY OF PEAK HOUR INTERSECTION LOS FOR EXISTING PLUS PROJECT CONDITIONS



LEGEND:

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

N

First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:101)

URBAN CROSSROADS

Table 5-1

Intersection Analysis for Existing Plus Project Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Existing (2013)				Existing Plus Project			
			Northbound			Southbound			Eastbound			Westbound			Delay[2] (secs.)		Level of Service		Delay[2] (secs.)		Level of Service	
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Harley Knox Bl.	TS	0	0	0	0	1	1	0	2	d	1	2	0	28.1	29.8	C	C	44.6	35.5	D	D
2	I-215 NB Ramps / Harley Knox Bl.	TS	0	1	1	0	0	0	1	2	0	0	2	d	17.6	18.3	B	B	17.4	18.2	B	B
3	Western Wy. / Harley Knox Bl.	CSS	0	0	0	0	1	0	0	2	0	0	2	d	16.2	11.9	C	B	17.3	12.7	C	B
4	Patterson Av. / Harley Knox Bl.	TS	0	1	0	0	1	d	1	1	1	1	1	0	20.6	13.2	C	B	21.2	18.6	C	B
5	Heacock St. / Nandina Av.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	9.3	8.5	A	A	9.7	8.6	A	A
6	Heacock St. / Grove View Rd.	**CSS**	0	1	0	0	1	0	0	0	0	0	**1**	0	Future Intersection				0.0	0.0	A	A
7	Webster Av. / Harley Knox Bl.	CSS	0	1	0	0	1	0	1	1	0	1	1	0	16.4	17.1	C	C	19.1	19.8	C	C
8	Driveway 2 / Nandina Av.	**CSS**	0	**1**	0	0	0	0	0	1	0	**1**	1	0	Future Intersection				10.4	10.1	B	B
9	Driveway 3 / Nandina Av.	**CSS**	0	**1**	0	0	0	0	0	1	0	**1**	1	0	Future Intersection				9.3	9.4	A	A
10	Indian St. / Nandina Av.	TS	1	2	0	1	2	0	1	1	1	1	1	d	23.3	22.9	C	C	26.1	24.2	C	C
11	Indian St. / Driveway 4	**CSS**	0	1	0	0	1	0	0	0	**1**	0	0	0	Future Intersection				9.6	10.4	A	B
12	Indian St. / Driveway 5	CSS	**1**	1	d	1	1	0	0	**1**	0	0	1	0	12.0	13.7	B	B	16.0	18.6	C	C
13	Indian St. / Driveway 6	**CSS**	0	1	0	0	1	0	0	0	**1**	0	0	0	Future Intersection				9.8	11.2	A	B
14	Indian St. / Grove View Rd.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	13.3	16.4	B	C	15.7	21.9	C	C
15	Indian St. / Harley Knox Bl.	TS	2	2	1	1	2	0	1	1	1	2	2	0	32.2	31.7	C	C	39.0	32.5	D	C

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

BOLD = Significant Impact: 1) the pre-Project condition is at or above LOS "D" and Project traffic causes deterioration below LOS "D" or 2) if the pre-Project condition is already below LOS "D" (i.e., LOS "E" or "F") and the Project contributes 50 or more peak hour vehicle trips, the Project's impact is considered "significant". Consistent with County traffic study guidelines, the impact will be improved back to acceptable LOS (i.e., LOS "D" or better), thus reducing the Project's contribution to the impact "less-than-significant".

[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; d= Defacto Right Turn Lane

[2] Per the 2000 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. The I-215 ramp locations at Harley Knox Boulevard have been analyzed using the Synchro software (Version 8).

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

Table 5-2

Existing Plus Project Conditions
Roadway Volume/Capacity Analysis

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	Existing Plus Project	V/C	LOS	Acceptable LOS
1	Harley Knox Boulevard	West of I-215 Freeway	4D	37,500	6,564	0.18	A	D
2		I-215 SB Ramps to I-215 NB Ramps	4D	37,500	11,072	0.30	A	D
3		I-215 NB Ramps to Western Way	4U	25,000	15,047	0.60	A	D
4		East of Western Way	4U	25,000	14,483	0.58	A	D
5		West of Patterson Avenue	4U	25,000	13,955	0.56	A	D
6		East of Patterson Avenue	2D	18,750	12,679	0.68	B	D
7		West of Webster Avenue	2D	18,750	11,179	0.60	A	D
8		East of Webster Avenue	2D	18,750	11,179	0.60	A	D
9		West of Indian Street	3D	28,150	12,439	0.44	A	D
10		East of Indian Street	3D	28,150	5,780	0.21	A	D
11	Western Way	North of Harley Knox Boulevard	2U	12,500	924	0.07	A	D
12	Patterson Avenue	North of Harley Knox Boulevard	2U	12,500	252	0.02	A	D
13		South of Harley Knox Boulevard	2U	12,500	1,496	0.12	A	D
14	Heacock Street	North of Nandina Avenue	2D	18,750	2,368	0.13	A	D
15		Nandina to Grove View Rd.	2U	12,500	144	0.01	A	D
16		South of Grove View Rd.	2U	12,500	144	0.01	A	D
17	Webster Avenue	North of Harley Knox Boulevard	2U	12,500	24	0.00	A	D
18		South of Harley Knox Boulevard	2U	12,500	72	0.01	A	D
19	Indian Street	North of Nandina Avenue	4D	37,500	2,208	0.06	A	D
20		Nandina Avenue to Driveway 4	2D	18,750	6,843	0.36	A	D
21		Driveway 4 to Driveway 5	2D	18,750	7,172	0.38	A	D
22		Driveway 5 to Driveway 6	2D	18,750	8,436	0.45	A	D
23		Driveway 6 to Grove View Road	2D	18,750	8,943	0.48	A	D
24		South of Grove View Road	2D	18,750	10,245	0.55	A	D
25		North of Harley Knox Boulevard	2D	18,750	9,417	0.50	A	D
26		South of Harley Knox Boulevard	4D	37,500	4,590	0.12	A	D
27	Nandina Avenue	Heacock Street to Driveway 2	2D	18,750	2,236	0.12	A	D
28		Driveway 2 to Driveway 3	2D	18,750	2,763	0.15	A	D
29		Driveway 3 to Indian Street	2D	18,750	3,699	0.20	A	D
30		East of Indian Street	2D	18,750	2,469	0.13	A	D
31	Grove View Road	East of Indian Street	2D	18,750	1,938	0.10	A	D

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

BOLD = Significant Impact: 1) the pre-Project condition is at or above LOS "D" and Project traffic causes deterioration below LOS "D" or 2) if the pre-Project condition is already below LOS "D" (i.e., LOS "E" or "F") and the Project contributes 50 or more peak hour vehicle trips, the Project's impact is considered "significant".

[1] These maximum roadway capacities have been extracted from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis 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 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

summary of the E+P conditions roadway segment capacity analysis based on the City of Moreno Valley General Plan Circulation Element Roadway Segment Capacity/(LOS) Thresholds identified previously on Table 2-3. As shown on Table 5-2, there are no roadway segments anticipated to operate unacceptable LOS under E+P traffic conditions, consistent with Existing (2013) traffic conditions.

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for E+P traffic conditions are based on E+P ADT volumes. For E+P conditions, the following study area intersection appears to warrant a traffic signal (see Appendix "5.2"):

ID	Intersection Location	Jurisdiction
14	Indian Street / Grove View Road	Moreno Valley

As noted previously, 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 level of service.

The intersection of Indian Street at Grove View Road is anticipated to operate at acceptable LOS during the AM and PM peak hours without the installation of a traffic signal. As such, the installation of a traffic signal has not been recommended as part of this traffic study. It is recommended that this intersection be monitored and the City's Traffic Engineer use their engineering judgment on the installation of a traffic signal.

5.6 RAMP QUEUING ANALYSIS

A ramp queuing analysis was performed for southbound and northbound off-ramps at the I-215/Harley Knox Boulevard interchange to assess vehicle queues for the off ramps at the I-215 Freeway that may potentially impact peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline for E+P traffic conditions. Ramp queuing analysis findings are presented in Table 5-3. As shown on Table 5-3 and consistent with Existing (2013) traffic conditions, there are no potential queuing issues anticipated during both AM and PM peak 95th percentile traffic flows for E+P traffic conditions.

Worksheets for E+P conditions queuing analysis is provided in Appendix "5.3".

Table 5-3

Existing Plus Project Conditions
AM/PM Peak Hour Stacking Length Summary at I-215/Harley Knox Boulevard

Intersection	Movement	Stacking Distance (Feet)	Existing (2013)				Existing Plus 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 / Harley Knox Bl.	SBL/T	1,330	352 [2]	331 [2]	Yes	Yes	452 [2]	382 [2]	Yes	Yes
	SBR	270	36	48	Yes	Yes	36	48	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	27	21	Yes	Yes	27	21	Yes	Yes
	NBR	265	41	43	Yes	Yes	42	44	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.

5.7 BASIC FREEWAY SEGMENT ANALYSIS

E+P mainline directional volumes for the AM and PM peak hours are provided on Exhibit 5-5. Mainline segment analysis results for the AM and PM peak hours are summarized on Table 5-4. As shown on Table 5-4, the segments along the SR-60 Freeway and I-215 Freeway are anticipated to operate at acceptable levels of service (LOS "D" or better) during the peak hours for E+P traffic conditions. E+P basic freeway segment analysis worksheets are provided in Appendix "5.4".

5.8 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations were also evaluated for E+P conditions and are presented in Table 5-5. Consistent with the analysis results presented for Existing (2013) traffic conditions, the I-215 Freeway ramp merge and diverge areas operate at LOS "D" or better during the peak hours under E+P traffic conditions, with the exception of the I-215 Southbound Off-ramp at Harley Knox Boulevard during the PM peak hour. The addition of Project traffic did not result in any new deficiencies, as such, the Project's contribution to the freeway ramp junctions are assumed to be less-than-significant.

E+P freeway ramp junction operations analysis worksheets are provided in Appendix "5.5".

5.9 PROJECT IMPACTS AND RECOMMENDED IMPROVEMENTS

Based on a comparison of E+P to Existing (2013) traffic conditions, the study area intersections are anticipated to continue to operate at acceptable LOS during the AM and PM peak hours. As such, mitigation measures are not necessary and have not been identified for the purposes of this analysis.

EXHIBIT 5-5

EXISTING PLUS PROJECT
I-215 PEAK HOUR FREEWAY MAINLINE VOLUMES

LEGEND:

100/ 100 = AM VOL/ PM VOL

NOTE:
VOLUMES SHOWN ARE ACTUAL VEHICLES (NOT PCE).

N

Table 5-4

Existing Plus Project Conditions Basic Freeway Segment Analysis

Scenario	Direction	Mainline Segment	E+P Volume		Lanes[1]	Existing (2013)				Existing Plus Project			
						Density[2]		LOS		Density[2]		LOS	
			AM	PM		AM	PM	AM	PM	AM	PM	AM	PM
Existing Plus Project	SR-60 WB	West of I-215 Freeway	6,451	6,370	4	27.4	26.8	D	D	27.5	27.0	D	D
	SR-60 EB	West of I-215 Freeway	3,915	6,088	5	12.7	19.9	B	C	12.9	20.0	B	C
	I-215 SB	South of SR-60 Freeway	6,453	6,573	5	21.3	21.9	C	C	21.6	22	C	C
		North of Harley Knox Bl.	4,805	5,579	3	25.4	32.1	C	D	26.1	32.7	D	D
		South of Harley Knox Bl.	4,489	5,235	3	23.7	29.1	C	D	23.7	29.3	C	D
	I-215 NB	South of SR-60 Freeway	3,549	3,967	3	19.6	21.8	C	C	19.7	22.3	C	C
		North of Harley Knox Bl.	3,240	4,230	3	17.0	22.1	B	C	17.2	22.6	B	C
		South of Harley Knox Bl.	2,822	3,769	3	14.8	19.8	B	C	14.8	19.8	B	C

[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

I-215 Freeway Ramp Junction Merge/Diverge Analysis
For Existing Plus Project Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2013)				Existing Plus 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	Southbound	Off-Ramp at Harley Knox Bl.	3	31.3	D	**35.2**	**E**	32.0	D	**35.5**	**E**
		On-Ramp at Harley Knox Bl.	3	26.8	C	30.5	D	26.9	C	30.8	D
	Northbound	On-Ramp at Harley Knox Bl.	3	21.5	C	26.3	C	21.8	C	27.0	C
		Off-Ramp at Harley Knox Bl.	3	20.1	C	25.3	C	20.2	C	25.4	C

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

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6.0 OPENING YEAR CUMULATIVE (2018) TRAFFIC ANALYSIS

This section discusses the methods used to develop Opening Year Cumulative (2018) traffic forecasts for Without and With Project conditions, and the resulting intersection, roadway segment and freeway mainline operations.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2018) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- At 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 (2018) With Project conditions only (e.g., intersection turn lane improvements at the Project driveways).

6.2 OPENING YEAR CUMULATIVE (2018) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2013) traffic volumes plus an ambient growth factor of 10.4% plus traffic from pending and approved but not yet constructed known development projects in the area. The ADT volumes which can be expected for Opening Year Cumulative (2018) Without Project traffic conditions are shown on Exhibit 6-1. Exhibits 6-2 and 6-3 show the AM and PM peak hour intersection turning movement volumes for Opening Year Cumulative (2018) Without Project traffic conditions.

6.3 OPENING YEAR CUMULATIVE (2018) WITH PROJECT TRAFFIC VOLUME FORECASTS

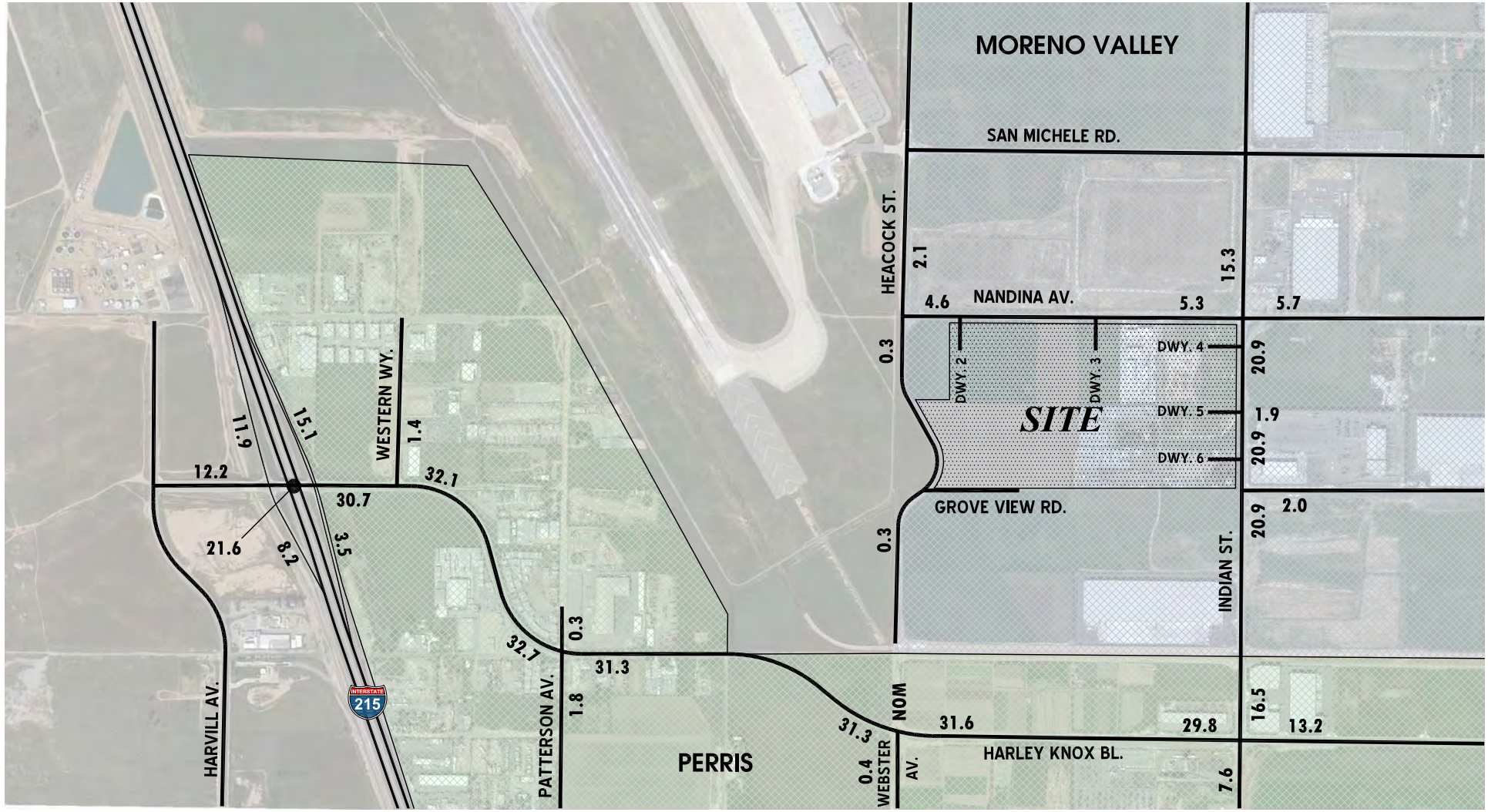
This scenario includes Existing (2013) traffic volumes, an ambient growth factor of 10.4%, traffic from pending and approved but not yet constructed known development projects in the area and the addition of Project traffic. The ADT volumes which can be expected for Opening Year Cumulative (2018) With Project traffic conditions are shown on Exhibit 6-4. Exhibits 6-5 and 6-6 show the AM and PM peak hour intersection turning movement volumes for Opening Year Cumulative (2018) With Project traffic conditions.

6.4 INTERSECTION OPERATIONS ANALYSIS

Level of service calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2018) conditions with existing roadway and intersection geometrics consistent with Exhibit 3-1. The intersection analysis results are summarized in Table 6-1 which indicates that the following intersections are anticipated to experience unacceptable LOS (i.e., LOS “E”

EXHIBIT 6-1

OPENING YEAR (2018) WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES (P.C.E.) PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

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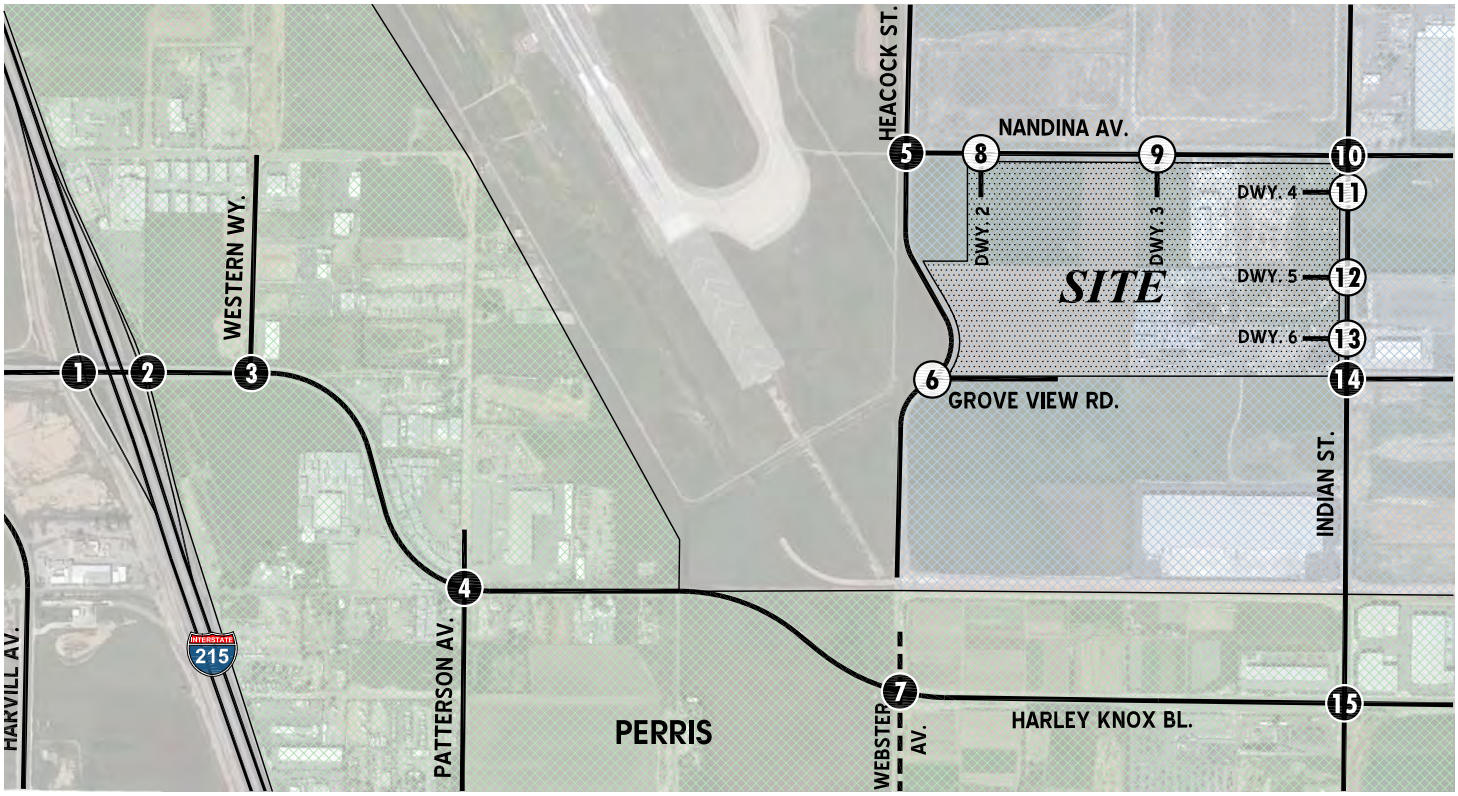
EXHIBIT 6-2

OPENING YEAR (2018) WITHOUT PROJECT AM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



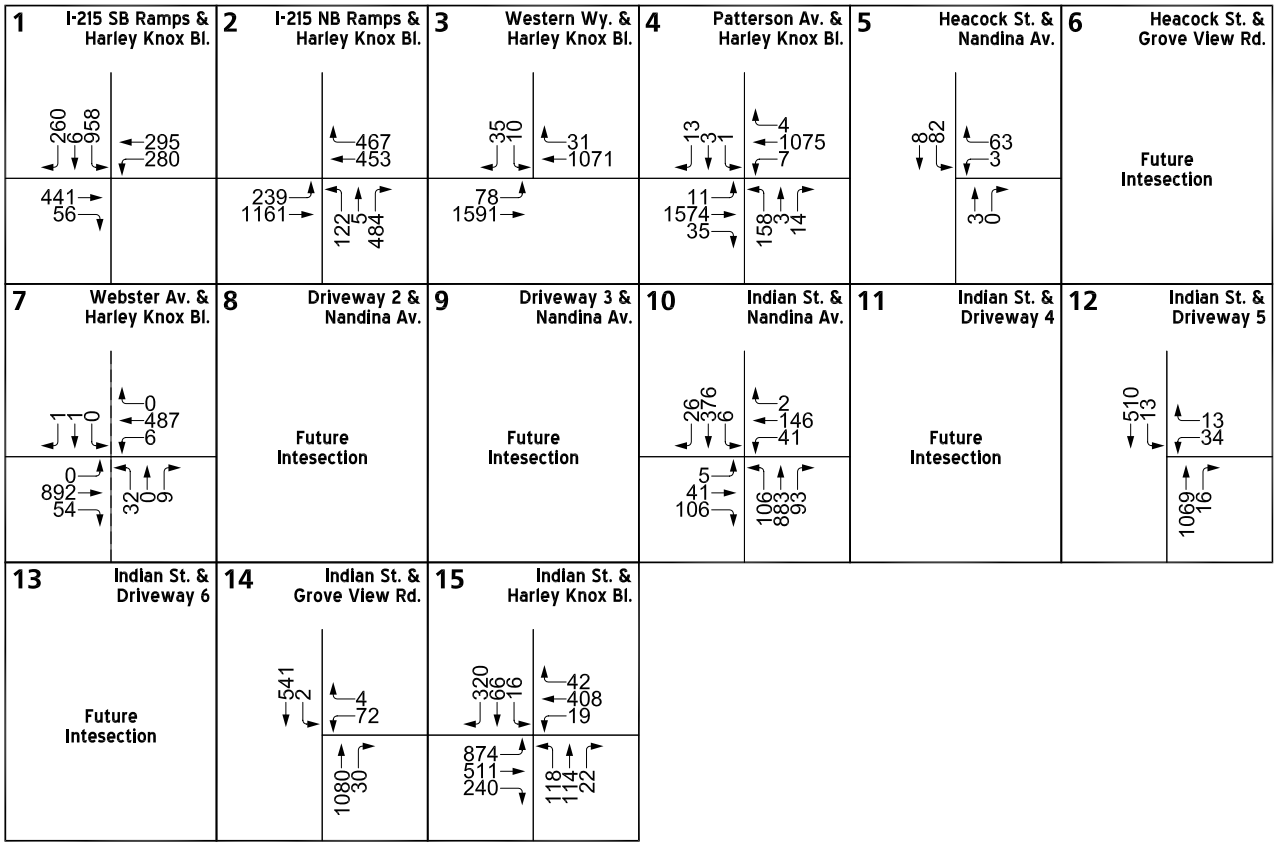
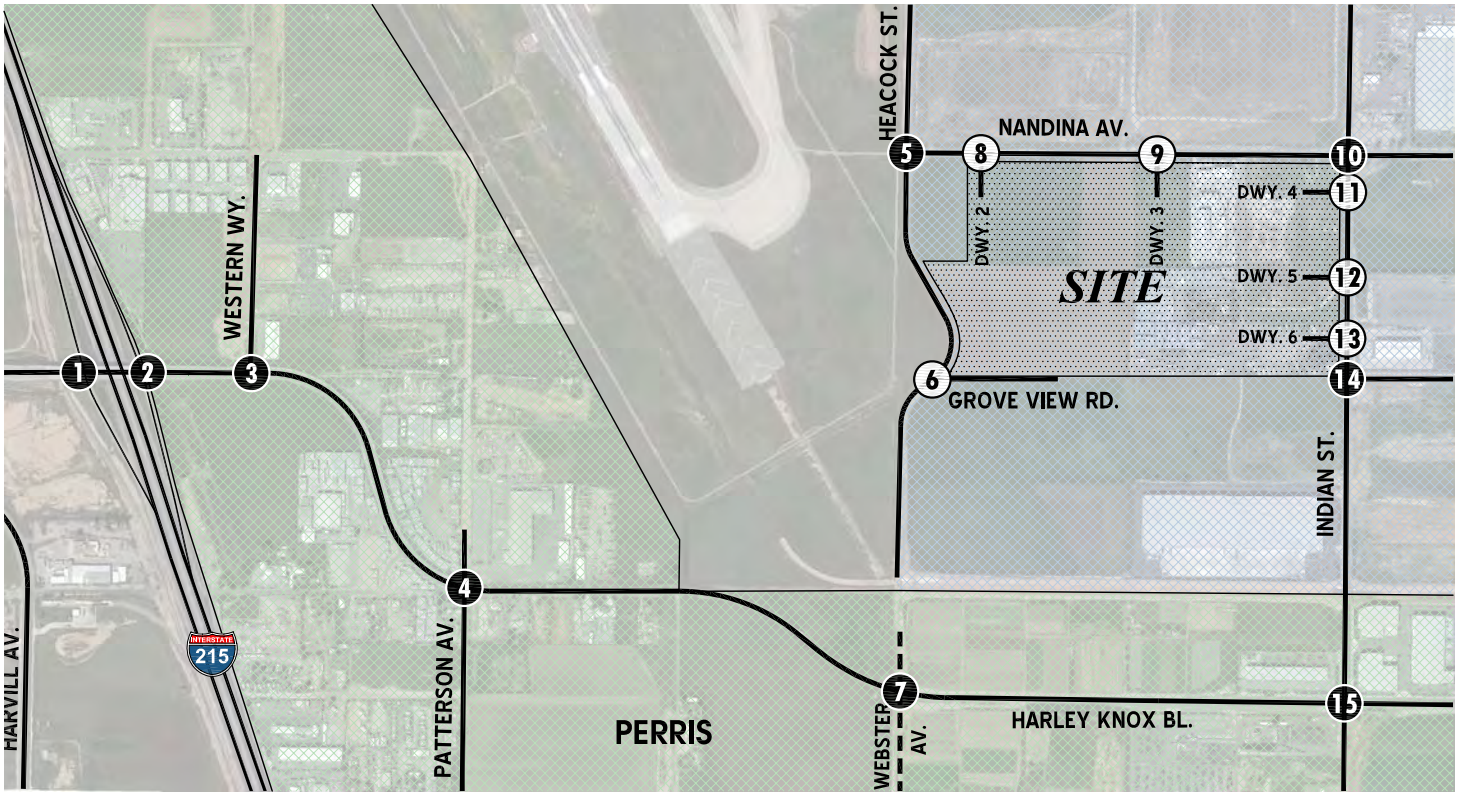


EXHIBIT 6-3

OPENING YEAR (2018) WITHOUT PROJECT PM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



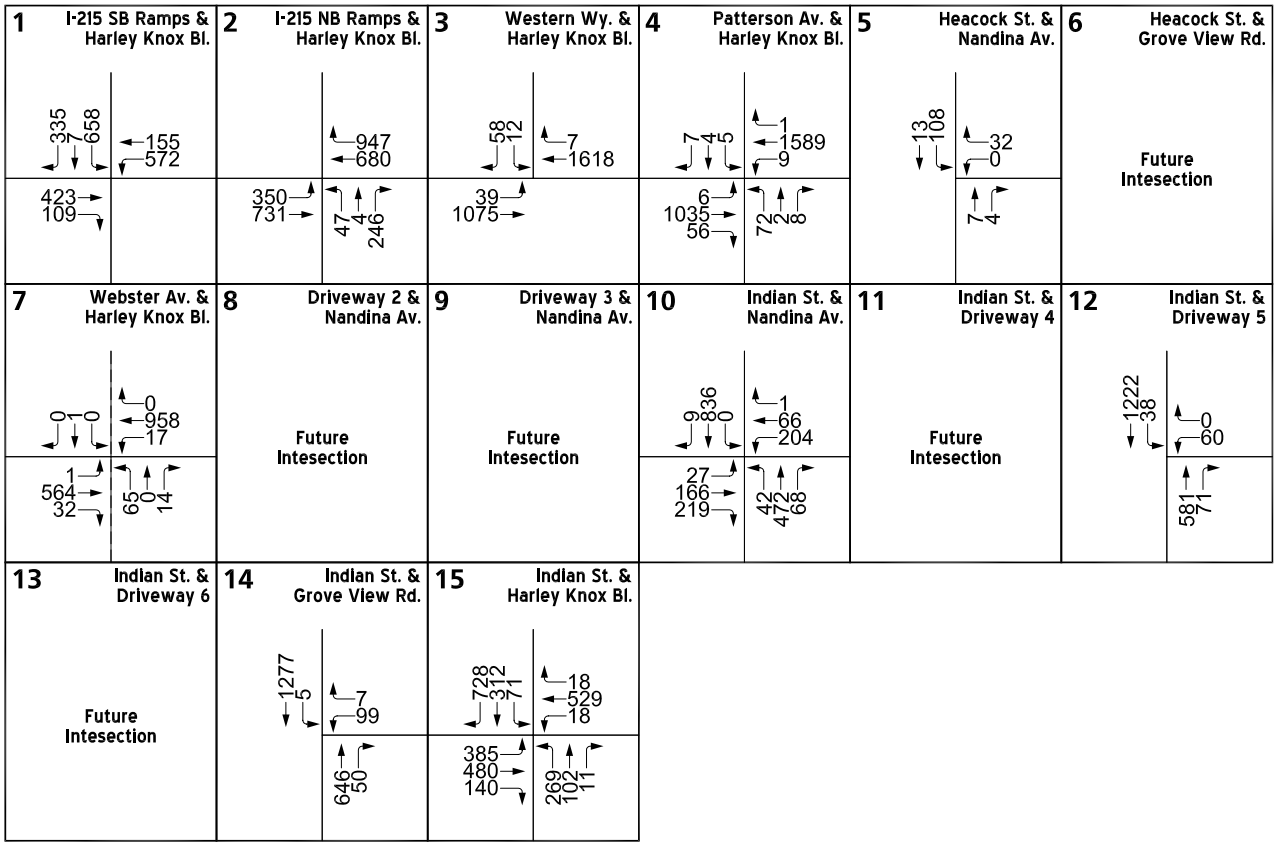
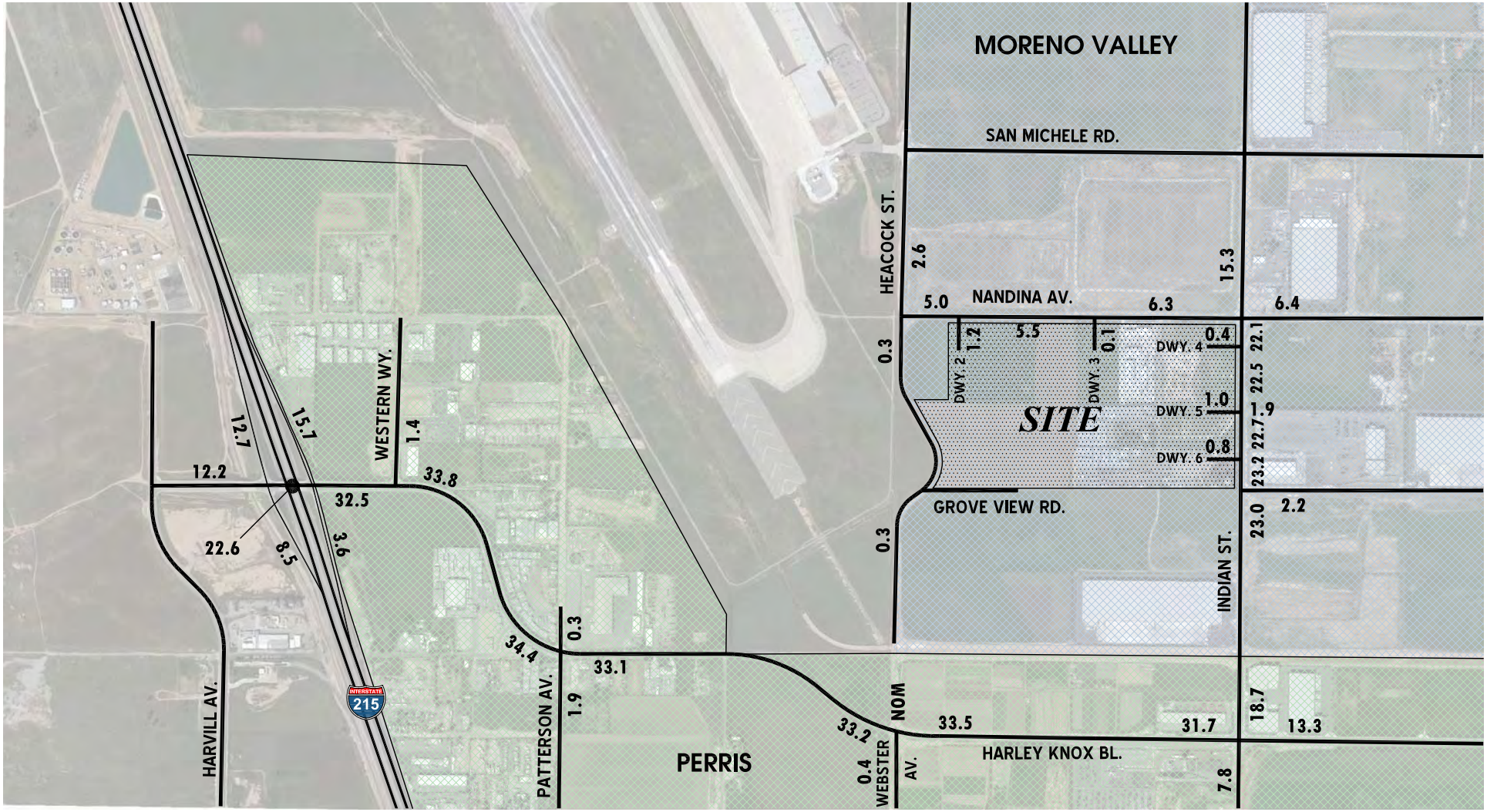


EXHIBIT 6-4

OPENING YEAR (2018) WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES (P.C.E.) PER DAY (1000'S)

NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

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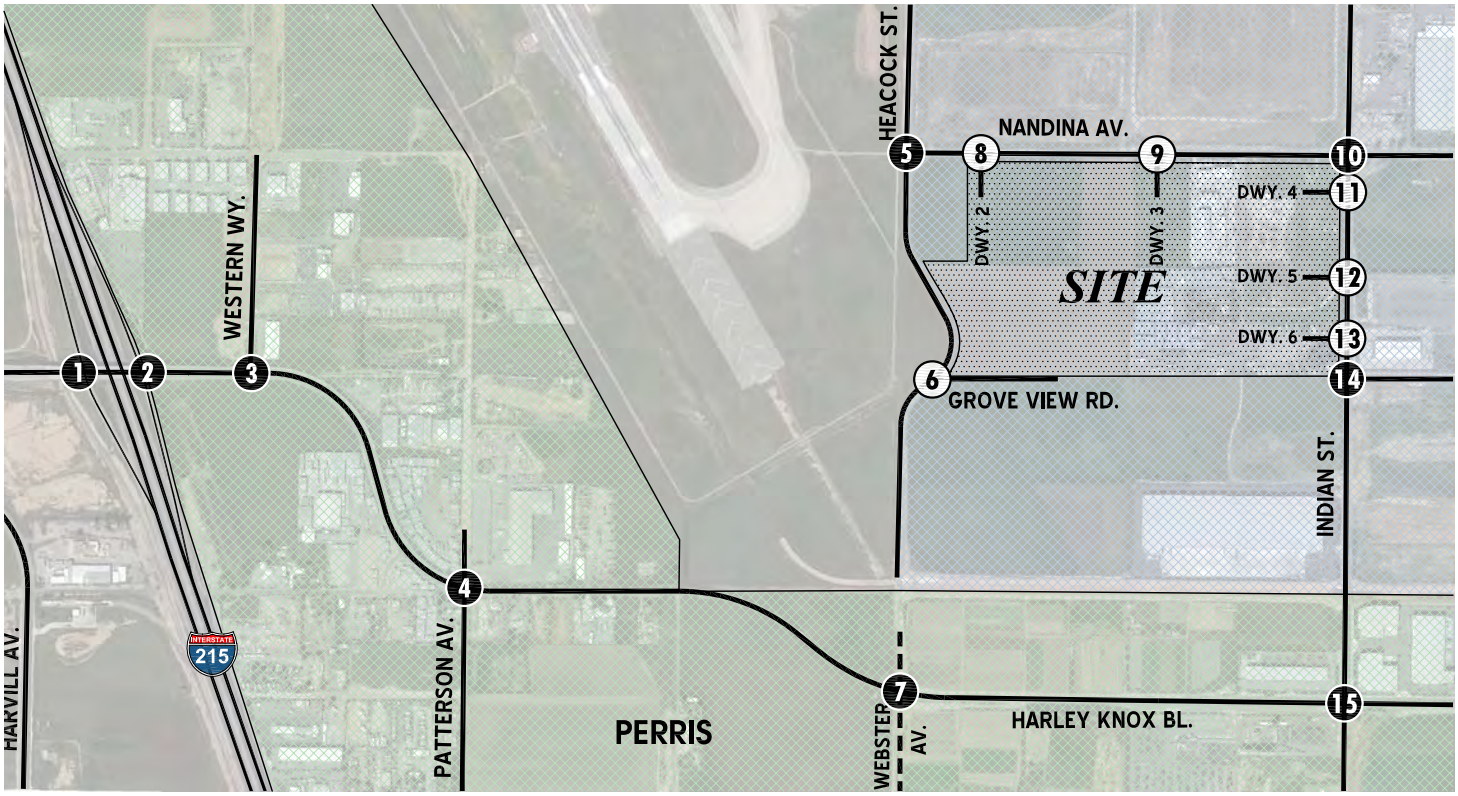
City of Moreno Valley, CA (JN - 08578:204)

URBAN CROSSROADS

EXHIBIT 6-5

OPENING YEAR (2018) WITH PROJECT AM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



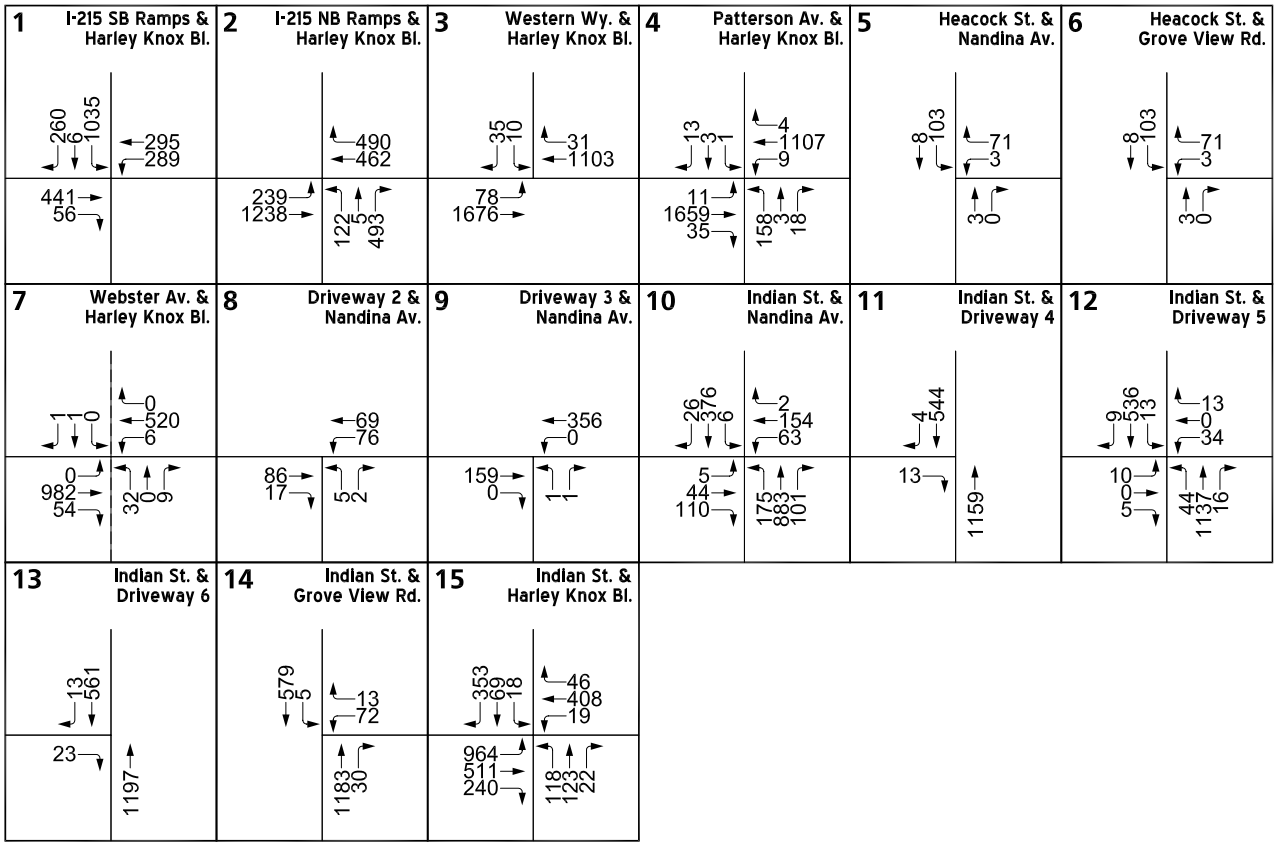
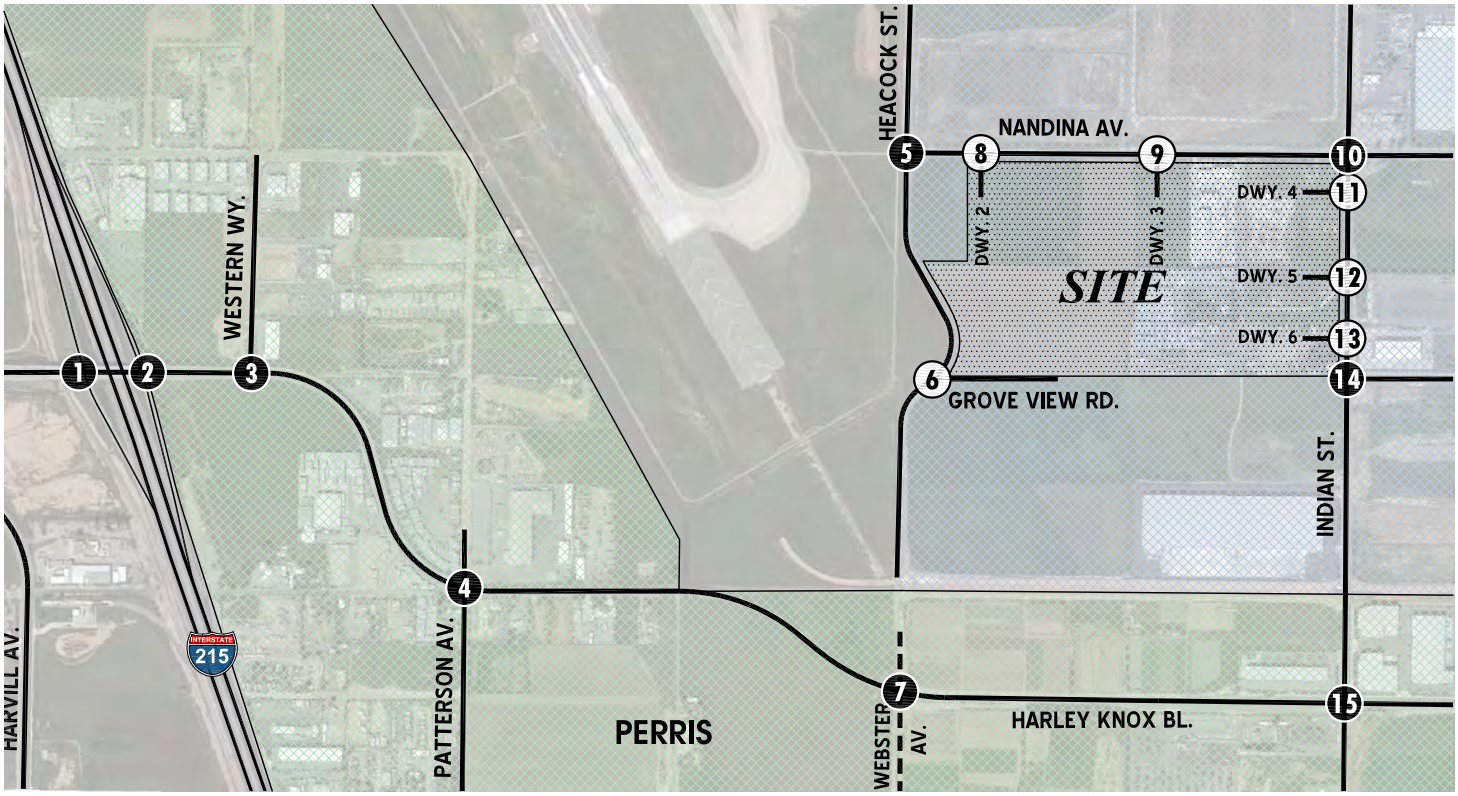


EXHIBIT 6-6

OPENING YEAR (2018) WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES (P.C.E.)



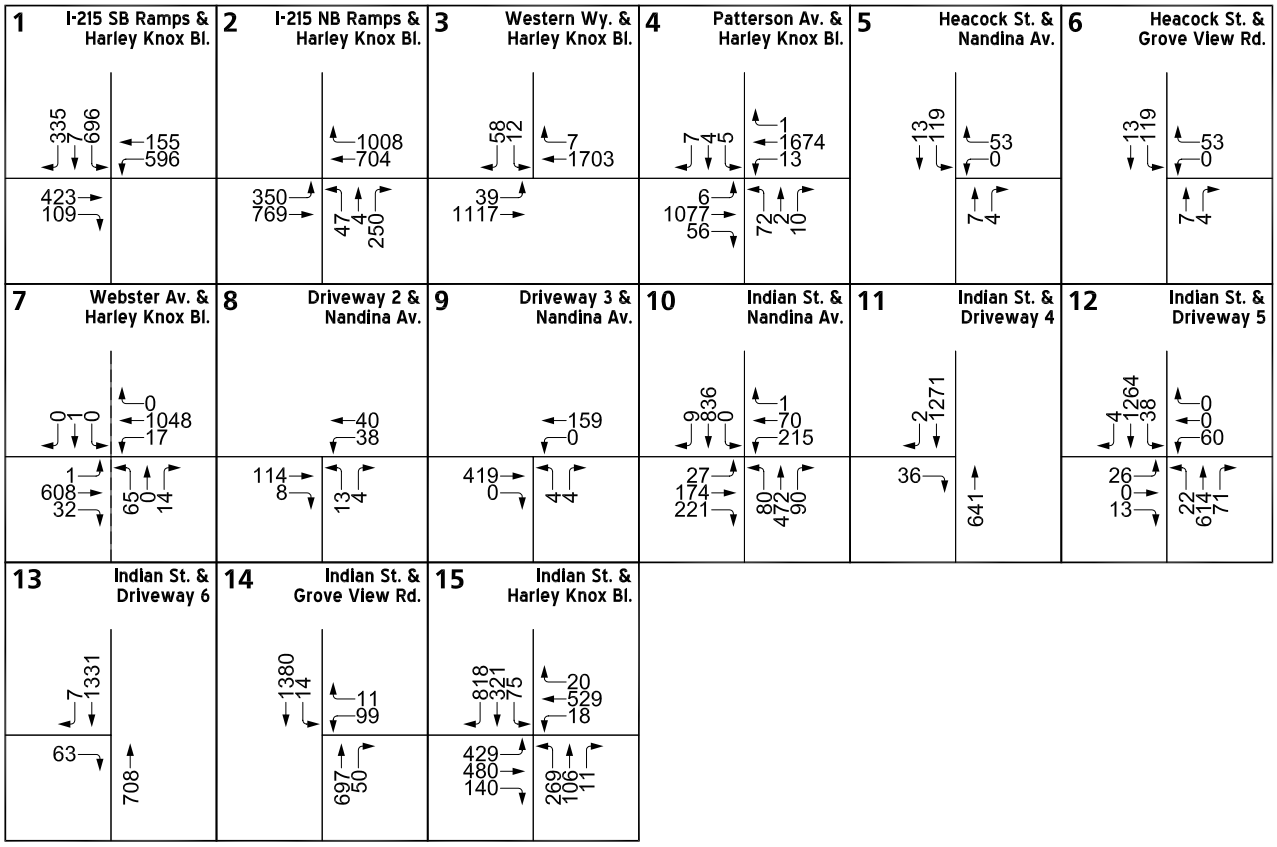


Table 6-1

Intersection Analysis for Opening Year Cumulative (2018) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												2018 Without Project				2018 With Project			
			Northbound			Southbound			Eastbound			Westbound			Delay[2] (secs.)		Level of Service		Delay[2] (secs.)		Level of Service	
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	AM	PM	AM	PM
1	I-215 SB Ramps / Harley Knox Bl.	TS	0	0	0	0	1	1	0	2	d	1	2	0	**>200.0**	**>200.0**	**F**	**F**	**>200.0**	**>200.0**	**F**	**F**
2	I-215 NB Ramps / Harley Knox Bl.	TS	0	1	1	0	0	0	1	2	0	0	2	d	34.1	46.0	C	D	36.7	**59.5**	D	**E**
3	Western Wy. / Harley Knox Bl.	CSS	0	0	0	0	1	0	0	2	0	0	2	d	**52.1**	**88.9**	**F**	**F**	**61.1**	**>100.0**	**F**	**F**
4	Patterson Av. / Harley Knox Bl.	TS	0	1	0	0	1	d	1	1	1	1	1	0	**166.2**	**175.0**	**F**	**F**	**191.1**	**>200.0**	**F**	**F**
5	Heacock St. / Nandina Av.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	9.7	8.5	A	A	10.0	8.5	A	A
6	Heacock St. / Grove View Rd.	**CSS**	0	1	0	0	1	0	0	0	0	0	**1**	0	Future Intersection				0.0	0.0	A	A
7	Webster Av. / Harley Knox Bl.	CSS	0	1	0	0	1	0	1	1	0	1	1	0	**58.6**	**>100.0**	**F**	**F**	**80.6**	**>100.0**	**F**	**F**
8	Driveway 2 / Nandina Av.	**CSS**	0	**1**	0	0	0	0	0	1	0	**1**	1	0	Future Intersection				10.5	10.1	B	B
9	Driveway 3 / Nandina Av.	**CSS**	0	**1**	0	0	0	0	0	1	0	**1**	1	0	Future Intersection				11.1	12.9	B	B
10	Indian St. / Nandina Av.	TS	1	2	0	1	2	0	1	1	1	1	1	d	28.4	32.0	C	C	30.0	32.9	C	C
11	Indian St. / Driveway 4	**CSS**	0	1	0	0	**2**	0	0	0	**1**	0	0	0	Future Intersection				9.9	13.8	A	B
	- With Heacock Extension	**CSS**	0	1	0	0	**2**	0	0	0	**1**	0	0	0	Future Intersection				9.5	12.5	A	B
12	Indian St. / Driveway 5	**CSS**	**1**	**2**	0	1	**2**	0	**1**	0	**1**	1	0	1	12.1	13.5	B	B	14.1	14.9	B	B
	- With Heacock Extension	**CSS**	**1**	1	d	1	**2**	0	**1**	0	**1**	1	0	1	12.6	18.1	B	C	16.8	27.7	C	D
13	Indian St. / Driveway 6	**CSS**	0	1	0	0	**2**	0	0	0	**1**	0	0	0	Future Intersection				10.1	15.0	B	C
	- With Heacock Extension	**CSS**	0	1	0	0	**2**	0	0	0	**1**	0	0	0	Future Intersection				9.5	13.8	A	B
14	Indian St. / Grove View Rd.	CSS	0	1	0	1	1	0	0	0	0	1	0	1	**>100.0**	**>100.0**	**F**	**F**	**>100.0**	**>100.0**	**F**	**F**
	- With Heacock Extension	CSS	0	1	0	1	1	0	0	0	0	1	0	1	13.6	22.7	B	C	16.1	32.1	C	D
15	Indian St. / Harley Knox Bl.	TS	2	2	1	1	2	0	1	1	1	2	2	0	**>200.0**	**68.3**	**F**	**E**	**>200.0**	**87.8**	**F**	**F**

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; d= Defacto Right Turn Lane

2 Per the 2000 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. The I-215 ramp locations at Harley Knox Boulevard have been analyzed using the Synchro software (Version 8).

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

or worse) during both the AM and PM peak hours for Opening Year Cumulative (2018) With Project traffic conditions:

ID	Intersection Location
1	I-215 Southbound Ramps / Harley Knox Boulevard – LOS “F” AM and PM peak hours
2	I-215 Northbound Ramps / Harley Knox Boulevard – LOS “E” PM peak hour only
3	Western Way / Harley Knox Boulevard – LOS “F” AM and PM peak hours
4	Patterson Avenue / Harley Knox Boulevard – LOS “F” AM and PM peak hours
7	Webster Avenue / Harley Knox Boulevard – LOS “F” AM and PM peak hours
14	Indian Street / Grove View Road – LOS “F” AM and PM peak hours
15	Indian Street / Harley Knox Boulevard – LOS “F” AM and PM peak hours

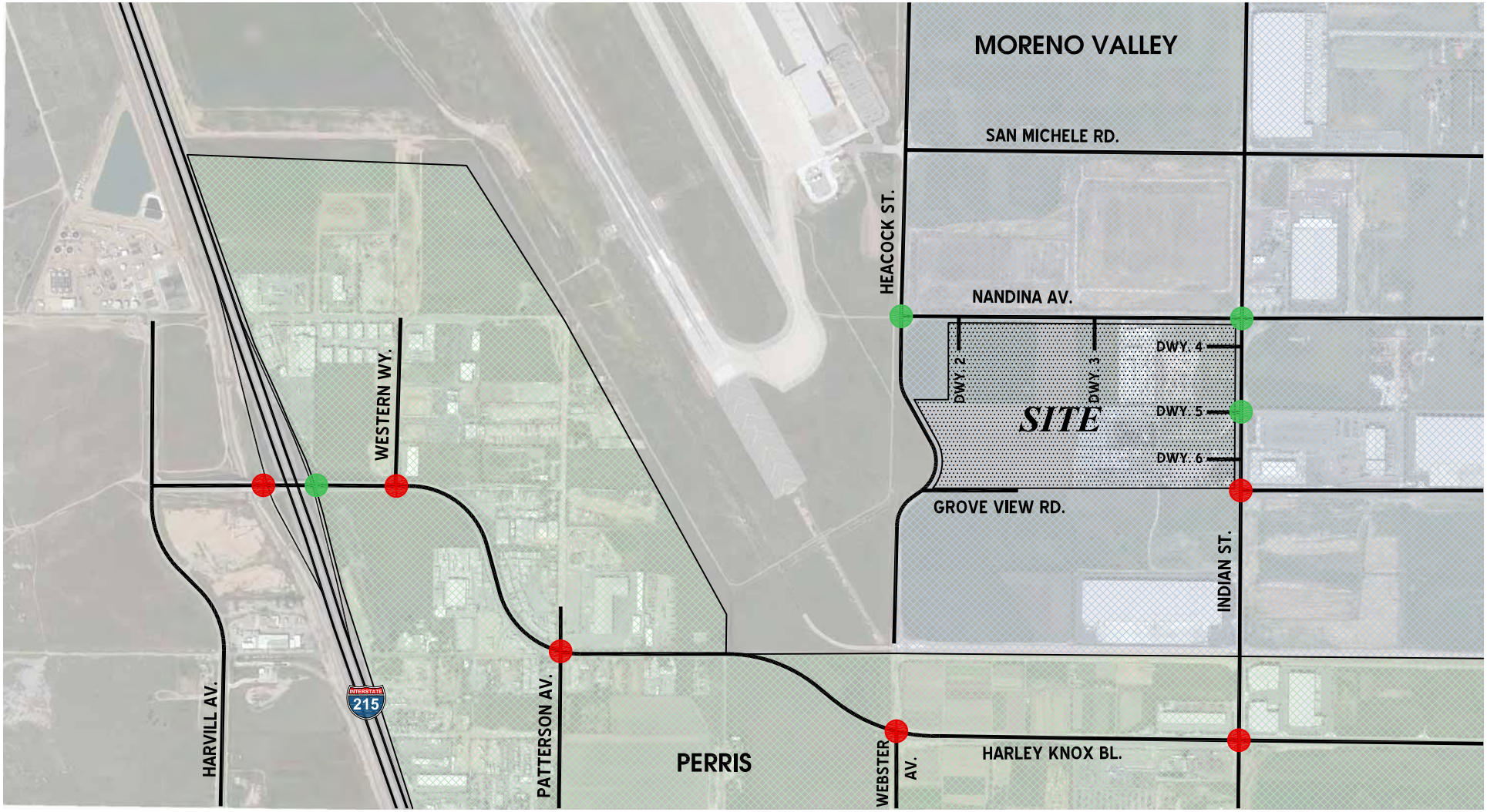
Exhibit 6-7 summarizes the weekday AM and weekday PM peak hour study area intersection LOS under Opening Year Cumulative (2018) Without Project traffic conditions, consistent with the summary provided in Table 6-1. Exhibit 6-8 summarizes the weekday AM and weekday PM peak hour study area intersection LOS under Opening Year Cumulative (2018) With Project traffic conditions, consistent with the summary provided in Table 6-1.

The traffic study is conservative in that the Opening Year (2018) Cumulative peak hour intersection operations and roadway segment analysis does not assume the planned future roadway extension of Heacock Street to Harley Knox Boulevard. With the future Heacock Street extension in place, future traffic volumes on Indian Street would be diverted to Heacock Street in the near-term cumulative scenario and would no longer need to utilize Nandina Avenue to make that diversion to access Harley Knox Boulevard (via Indian Street). An alternative analysis has been included for the driveways and Grove View Road along Indian Street to demonstrate that reductions in traffic due to the Heacock Street extension would result in reduced impacts under cumulative traffic conditions.

The intersection operations analysis worksheets for Opening Year Cumulative (2018) Without Project conditions are included in Appendix “6.1” of this TIA. The intersection operations analysis worksheets for Opening Year Cumulative (2018) With Project conditions are included in Appendix “6.2” of this TIA. Measures to address cumulative impacts for Opening Year Cumulative (2018) traffic conditions are discussed in Section 6.10 *Cumulative Impacts and Recommended Improvements*.

EXHIBIT 6-7

SUMMARY OF PEAK HOUR INTERSECTION LOS FOR OPENING YEAR (2018) WITHOUT PROJECT CONDITIONS



LEGEND:

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

N

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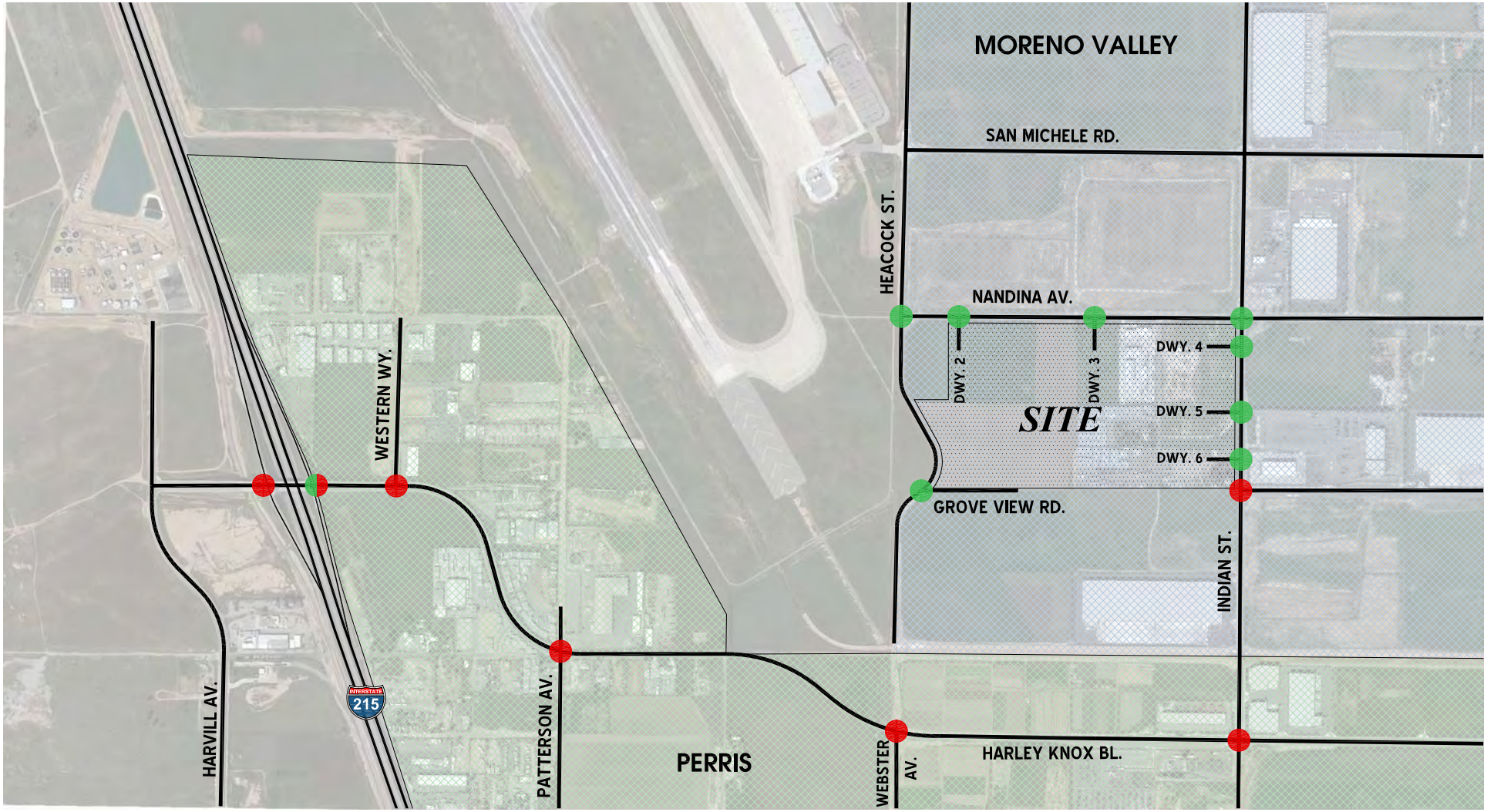
EXHIBIT 6-8

SUMMARY OF PEAK HOUR INTERSECTION LOS FOR OPENING YEAR (2018) WITH PROJECT CONDITIONS



LEGEND:

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

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6.5 ROADWAY SEGMENT CAPACITY ANALYSIS

As noted previously, the roadway segment capacities are approximate figures only, and are typically used at the General Plan level to assist in determining the roadway functional classification (number of through lanes) needed to meet future forecasted traffic demand. Table 6-2 provides a summary of the Opening Year Cumulative (2018) conditions roadway segment capacity analysis based on the City of Moreno Valley 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 (2018) With Project conditions:

ID	Roadway Segments
3	Harley Knox Boulevard, I-215 NB Ramps to Western Way – LOS "F"
4	Harley Knox Boulevard, East of Western Way – LOS "F"
5	Harley Knox Boulevard, West of Patterson Avenue – LOS "F"
6	Harley Knox Boulevard, East of Patterson Avenue – LOS "F"
7	Harley Knox Boulevard, West of Webster Avenue – LOS "F"
8	Harley Knox Boulevard, East of Webster Avenue – LOS "F"
9	Harley Knox Boulevard, West of Indian Street – LOS "F"
20	Indian Street, Nandina Avenue to Driveway 4 – LOS "F"
21	Indian Street, Driveway 4 to Driveway 5 – LOS "F"
22	Indian Street, Driveway 5 to Driveway 6 – LOS "F"
23	Indian Street, Driveway 6 to Grove View Road – LOS "F"
24	Indian Street, South of Grove View Road – LOS "F"
25	Indian Street, North of Harley Knox Boulevard – 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.

The traffic study is conservative in that the Opening Year (2018) Cumulative peak hour intersection operations and roadway segment analysis does not assume the planned future roadway extension of Heacock Street to Harley Knox Boulevard. With the future Heacock Street extension in place future year traffic on Heacock Street shown in this study to be diverted to Indian Street in the near-term cumulative scenario would no longer need to make that diversion to access Harley Knox Boulevard. It is assumed that as a result of a reduction in traffic volumes along Indian Street due to the Heacock Street extension potentially significant impacts to intersections and roadway segments along Indian Street between Nandina Avenue and Harley Knox Boulevard would be reduced.

Table 6-2

Opening Year Cumulative (2018) Conditions
Roadway Volume/Capacity Analysis

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2018 Without Project	V/C	LOS	Acceptable LOS	2018 With Project	V/C	LOS	Acceptable LOS
1	Harley Knox Boulevard	West of I-215 Freeway	4D	37,500	12,221	0.33	A	D	12,221	0.33	A	D
2		I-215 SB Ramps to I-215 NB Ramps	4D	37,500	21,572	0.58	A	D	22,624	0.60	A	D
3		I-215 NB Ramps to Western Way	4U	25,000	**30,735**	**1.23**	**F**	D	**32,522**	**1.30**	**F**	D
4		East of Western Way	4U	25,000	**32,048**	**1.28**	**F**	D	**33,835**	**1.35**	**F**	D
5		West of Patterson Avenue	4U	25,000	**32,654**	**1.31**	**F**	D	**34,441**	**1.38**	**F**	D
6		East of Patterson Avenue	2D	18,750	**31,249**	**1.67**	**F**	D	**33,128**	**1.77**	**F**	D
7		West of Webster Avenue	2D	18,750	**31,321**	**1.67**	**F**	D	**33,200**	**1.77**	**F**	D
8		East of Webster Avenue	2D	18,750	**31,621**	**1.69**	**F**	D	**33,500**	**1.79**	**F**	D
9		West of Indian Street	3D	28,150	**29,821**	**1.06**	**F**	D	**31,700**	**1.13**	**F**	D
10		East of Indian Street	3D	28,150	13,208	0.47	A	D	13,300	0.47	A	D
11	Western Way	North of Harley Knox Boulevard	2U	12,500	1,414	0.11	A	D	1,414	0.11	A	D
12	Patterson Avenue	North of Harley Knox Boulevard	2U	12,500	303	0.02	A	D	303	0.02	A	D
13		South of Harley Knox Boulevard	2U	12,500	1,827	0.15	A	D	1,919	0.15	A	D
14	Heacock Street	North of Nandina Avenue	2D	18,750	2,100	0.11	A	D	2,548	0.14	A	D
15		Nandina to Grove View Rd.	2U	12,500	306	0.02	A	D	306	0.02	A	D
16		South of Grove View Rd.	2U	12,500	306	0.02	A	D	306	0.02	A	D
17	Webster Avenue	North of Harley Knox Boulevard	2U	12,500	26	0.00	A	D	26	0.00	A	D
18		South of Harley Knox Boulevard	2U	12,500	400	0.03	A	D	400	0.03	A	D
19	Indian Street	North of Nandina Avenue	4D	37,500	15,251	0.41	A	D	15,251	0.41	A	D
20		Nandina Avenue to Driveway 4	2D	18,750	**20,856**	**1.11**	**F**	D	**22,119**	**1.18**	**F**	D
21		Driveway 4 to Driveway 5	2D	18,750	**20,856**	**1.11**	**F**	D	**22,448**	**1.20**	**F**	D
22		Driveway 5 to Driveway 6	2D	18,750	**20,856**	**1.11**	**F**	D	**22,680**	**1.21**	**F**	D
23		Driveway 6 to Grove View Road	2D	18,750	**20,855**	**1.11**	**F**	D	**23,198**	**1.24**	**F**	D
24		South of Grove View Road	2D	18,750	**20,856**	**1.11**	**F**	D	**23,013**	**1.23**	**F**	D
25		North of Harley Knox Boulevard	2D	18,750	16,543	0.88	D	D	**18,700**	**1.00**	**E**	D
26		South of Harley Knox Boulevard	4D	37,500	7,614	0.20	A	D	7,800	0.21	A	D
27	Nandina Avenue	Heacock Street to Driveway 2	2D	18,750	4,551	0.24	A	D	4,999	0.27	A	D
28		Driveway 2 to Driveway 3	2D	18,750	4,550	0.24	A	D	5,525	0.29	A	D
29		Driveway 3 to Indian Street	2D	18,750	5,288	0.28	A	D	6,263	0.33	A	D
30		East of Indian Street	2D	18,750	5,730	0.31	A	D	6,363	0.34	A	D
31	Grove View Road	East of Indian Street	2D	18,750	1,987	0.11	A	D	2,173	0.12	A	D

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

[1] These maximum roadway capacities have been extracted from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis 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 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.

As shown on Table 6-1 and Table 6-6, the peak hour analysis indicates that the adjacent study area intersections of each of these deficient roadway segments are anticipated to operate at acceptable LOS with the mitigation measures discussed in Section 6.10 *Cumulative Impacts and Recommended Improvements*. It should be noted that in some cases, the recommended intersection improvements discussed in Section 6.10 *Cumulative Impacts and Recommended Improvements* includes the addition of through lanes. No additional roadway segment widening is recommended beyond those identified and discussed in Section 6.10 *Cumulative Impacts and Recommended Improvements*.

6.6 TRAFFIC SIGNAL WARRANTS ANALYSIS

For Opening Year Cumulative (2018) Without and With Project conditions, there are no intersections that appear to warrant a traffic (see Appendix "6.3" and Appendix "6.4").

6.7 RAMP QUEUING ANALYSIS

A ramp queuing analysis was performed for southbound and northbound off-ramps at the I-215/Harley Knox Boulevard interchange to assess vehicle queues for the off ramps at the I-215 Freeway that may potentially impact peak hour operations at the ramp-to-arterial intersections and may potentially "spill back" onto the I-215 Freeway mainline for Opening Year Cumulative (2018) traffic conditions. Ramp queuing analysis findings are presented in Table 6-3 for Opening Year Cumulative (2018) Without and With Project traffic conditions. As shown on Table 6-3, the following movement is anticipated to experience potential queuing issues under for both Opening Year Cumulative (2018) Without and With Project traffic conditions:

Intersection Location	Movement
I-215 Northbound Ramps / Harley Knox Boulevard	Northbound Right – AM Peak Hour Only

Review of the 50th percentile queues indicates that the northbound right turn movement at the I-215 Northbound Ramps at Cactus Avenue may potentially experience queuing issues during the AM peak hour only. It is important to note that although the stacking analysis results identifies potential queuing impacts during the AM peak hour only based on the 50th percentile queues, these potential queues are less than the anticipated 95th percentile queues.

There are approximately 1,120-feet of stacking distance available currently between Harley Knox Boulevard and the I-215 Freeway mainline. The 95th percentile queues for both the northbound right turn and northbound shared left-through lanes are not anticipated to exceed the existing storage available between Harley Knox Boulevard and the I-215 Freeway mainline during the AM peak hour. As such, the adjacent northbound shared left-through lane provides enough existing storage to accommodate the potential queues for both the shared left-through lane and the right turn lane without any potential spill-back

Table 6-3

Opening Year Cumulative (2018) Conditions
AM/PM Peak Hour Stacking Length Summary at I-215/Harley Knox Boulevard

Intersection	Movement	Stacking Distance (Feet)	2018 Without Project				2018 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 / Harley Knox Bl.	SBL/T	1,330	1,083 [2]	731 [2]	Yes	Yes	1,175 [2]	778 [2]	Yes	Yes
	SBR	270	106	68	Yes	Yes	114	80	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	117	55	Yes	Yes	117	55	Yes	Yes
	NBR	265	**521** [2]	85	**No**	Yes	**549** [2]	100	**No**	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.

onto the I-215 Freeway mainline.

Worksheets for Opening Year Cumulative (2018) Without and With Project conditions queuing analysis is provided in Appendix “6.5” and Appendix “6.6” respectively.

6.8 BASIC FREEWAY SEGMENT ANALYSIS

Opening Year Cumulative (2018) Without and With Project peak hour mainline directional volumes are provided on Exhibits 6-9 and 6-10, respectively. The Opening Year Cumulative (2018) freeway analysis assumes the existing mixed-flow lanes only, and does not include any improvements that may be constructed by Caltrans at a later date. Segment analysis results for the AM and PM peak hours are summarized on Table 6-4. As shown on Table 6-4, the study area mainline segments are anticipated to operate at acceptable service levels for Opening Year Cumulative (2018) Without and With Project conditions (i.e., LOS “D” or better), with the exception of the following:

ID	Freeway Mainline Segments
1	SR-60 Freeway – Westbound, West of I-215 Freeway – LOS “E” AM and PM peak hours
4	I-215 Freeway – Southbound, North of Harley Knox Boulevard – LOS “F” AM and PM peak hours
5	I-215 Freeway – Southbound, South of Harley Knox Boulevard – LOS “E” AM peak hour; LOS “F” PM peak hour
6	I-215 Freeway – Northbound, South of SR-60 Freeway – LOS “F” PM peak hour only
7	I-215 Freeway – Northbound, North of Harley Knox Boulevard – LOS “F” PM peak hour only

A schedule for the widening of I-215 Freeway between Nuevo Road in the City of Perris and Box Springs Road in the City of Riverside has not been set, due to the state’s ongoing budget challenges. The widening project includes the addition of a carpool lane in each direction of travel over a 10.75-mile section of the I-215 Freeway. The proposed carpool lanes along the SR-60 Freeway at the I-215 Freeway junction is currently under construction, but is not anticipated to be completed until Summer 2014. As such, these widening projects have been analyzed as future improvements in Section 6.10.3 *Recommended Improvements to Address Cumulative Impacts on Freeway Facilities* of this TIA.

Opening Year Cumulative (2018) Without Project freeway mainline level of service analysis worksheets are provided in Appendix “6.7”. Opening Year Cumulative (2018) With Project freeway mainline level of service analysis worksheets are provided in Appendix “6.8”.

EXHIBIT 6-9

OPENING YEAR (2018) WITHOUT PROJECT
I-215 PEAK HOUR FREEWAY MAINLINE VOLUMES

LEGEND:

100/ 100 = AM VOL/ PM VOL

NOTE:
VOLUMES SHOWN ARE ACTUAL VEHICLES (NOT PCE).

N

EXHIBIT 6-10

OPENING YEAR (2018) WITH PROJECT I-215 PEAK HOUR FREEWAY MAINLINE VOLUMES

LEGEND:

100/ 100 = AM VOL/ PM VOL

NOTE:
VOLUMES SHOWN ARE ACTUAL VEHICLES (NOT PCE).

N

Table 6-4

Opening Year Cumulative (2018) Conditions Basic Freeway Segment Analysis

Scenario	Direction	Mainline Segment	Lanes[1]	2018 Without Project				2018 With Project			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
Opening Year (2018)	SR-60 WB	West of I-215 Freeway	4	**37.0**	**44.1**	**E**	**E**	**37.2**	**44.7**	**E**	**E**
	SR-60 EB	West of I-215 Freeway	5	15.5	23.0	B	C	15.8	23.2	B	C
	I-215 SB	South of SR-60 Freeway	5	31.8	28.8	D	D	32.3	29.0	D	D
		North of Harley Knox Bl.	3	**--**	**--**	**F**	**F**	**--**	**--**	**F**	**F**
		South of Harley Knox Bl.	3	**39.6**	**--**	**E**	**F**	**39.7**	**--**	**E**	**F**
	I-215 NB	South of SR-60 Freeway	3	27.6	**44.7**	D	**E**	28.0	**--**	D	**F**
		North of Harley Knox Bl.	3	23.2	**--**	C	**F**	23.3	**--**	C	**F**
		South of Harley Knox Bl.	3	21.7	30.3	C	D	21.8	30.4	C	D

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

[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).

6.9 FREEWAY MERGE/DIVERGE ANALYSIS

Ramp merge and diverge operations have been evaluated for Opening Year Cumulative (2018) traffic conditions at the I-215/Harley Knox Boulevard interchange. As shown on Table 6-5, it is anticipated that the ramp junctions along the I-215 Freeway are projected to operate at acceptable service levels for both Opening Year Cumulative (2018) Without and With Project conditions (i.e., LOS "D" or better), with the exception of the following:

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

Similar to the basic freeway segment analysis, the proposed addition of a carpool lane in each direction of travel on the I-215 Freeway and through the I-215 Freeway interchange on the SR-60 Freeway has been analyzed as future improvements in Section 6.10 *Cumulative Impacts and Recommended Improvements* of this TIA.

Opening Year Cumulative (2018) Without Project freeway ramp operations analysis worksheets are provided in Appendix "6.9" and Opening Year Cumulative (2018) With Project freeway mainline level of service analysis worksheets are provided in Appendix "6.10".

6.10 CUMULATIVE IMPACTS AND RECOMMENDED IMPROVEMENTS

Improvement strategies have been recommended at intersections that have been identified as cumulatively impacted in an effort to reduce each location's peak hour delay and improve the associated LOS grade to LOS "D" or better. The effectiveness of the recommended improvement strategies discussed below to address Opening Year Cumulative (2018) cumulative traffic impacts are presented in Table 6-6.

6.10.1 RECOMMENDED IMPROVEMENTS TO ADDRESS OPENING YEAR CUMULATIVE (2018) CUMULATIVE IMPACTS AT INTERSECTIONS

Table 6-6 indicates the physical improvements needed to address LOS deficiencies at each of the study area intersections found to be impacted under Opening Year (2018) cumulative traffic conditions. Furthermore, the improvements identified in Table 6-6 are consistent with improvement plans as identified by either the City of Moreno Valley General Plan or the Perris Valley Commerce Center

Table 6-5

I-215 Freeway Ramp Junction Merge/Diverge Analysis
For Opening Year Cumulative (2018) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2018 Without Project				2018 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	Southbound	Off-Ramp at Harley Knox Bl.	3	**48.4**	**F**	**47.4**	**F**	**49.5**	**F**	**48.1**	**F**
		On-Ramp at Harley Knox Bl.	3	**36.0**	**E**	**43.0**	**F**	**36.1**	**E**	**43.2**	**F**
	Northbound	On-Ramp at Harley Knox Bl.	3	28.5	D	**41.2**	**F**	28.8	D	**41.9**	**F**
		Off-Ramp at Harley Knox Bl.	3	28.2	D	33.4	D	28.3	D	33.4	D

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

Recommended Improvements for Opening Year Cumulative (2018) With Project Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1] Northbound L	Northbound T	Northbound R	Southbound L	Southbound T	Southbound R	Eastbound L	Eastbound T	Eastbound R	Westbound L	Westbound T	Westbound R	Delay[2] (secs.) AM	Delay[2] (secs.) PM	Level of Service AM	Level of Service PM
1	I-215 SB Ramps / Harley Knox Bl.																	
	- Without Improvements	TS	0	0	0	0	1	1	0	2	d	1	2	0	**>200.0**	**>200.0**	**F**	**F**
	- With Improvements	TS	0	0	0	**2**	1	**0**	0	2	d	**2**	2	0	28.8	22.7	C	C
2	I-215 NB Ramps / Harley Knox Bl.																	
	- Without Improvements	TS	0	1	1	0	0	0	1	2	0	0	2	d	36.7	**59.5**	D	**E**
	- With Improvements	TS	0	1	1	0	0	0	1	2	0	0	2	**1>>**	19.6	13.1	B	B
3	Western Wy. / Harley Knox Bl.																	
	- Without Improvements	CSS	0	0	0	0	1	0	0	2	0	0	2	d	**61.1**	**>100.0**	**F**	**F**
	- With Improvements	**TS**	0	0	0	0	1	0	**1**	2	0	0	2	d	28.2	14.4	C	B
4	Patterson Av. / Harley Knox Bl.																	
	- Without Improvements	TS	0	1	0	0	1	d	1	1	1	1	1	0	**191.1**	**>200.0**	**F**	**F**
	- With Improvements	TS	0	1	0	0	1	d	1	**2**	1	1	**2**	0	23.1	22.7	C	C
7	Webster Av. / Harley Knox Bl.																	
	- Without Improvements	CSS	0	1	0	0	1	0	1	1	0	1	1	0	**80.6**	**>100.0**	**F**	**F**
	- With Improvements	**TS**	0	1	0	0	1	0	1	**2**	0	1	**2**	0	10.4	15.6	B	B
14	Indian St. / Grove View Rd.																	
	- Without Improvements	CSS	0	1	0	1	1	0	0	0	0	1	0	1	**>100.0**	**>100.0**	**F**	**F**
	- With Improvements	**TS**	0	**2**	0	1	**2**	0	0	0	0	1	0	1	13.7	17.5	B	B
15	Indian St. / Harley Knox Bl.																	
	- Without Improvements	TS	2	2	1	1	2	0	1	1	1	2	2	0	**>200.0**	**87.8**	**F**	**F**
	- With Improvements	TS	2	2	1	1	2	**1>**	**2**	**2**	1	2	2	0	38.5	50.8	D	D

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

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

[2] Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop co
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

Specific Plan, for intersections located within the City of Perris. As described in more detail in Chapter 8.0 *Local and Regional Funding Mechanisms*, many of these improvements are included under existing transportation fee programs in which this project will be required to participate (i.e., City of Moreno Valley DIF, TUMF).

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 Western Riverside County Transportation Uniform Mitigation Fees (TUMF), City of Moreno Valley Development Impact Fees (DIF) or a fair share contribution as directed by the City. These fees are collected as part of a funding mechanism aimed at ensuring that regional highways and arterial expansions keep pace with the projected population increases. If the improvements identified on Table 6-6 are not included in an existing fee program, then the Project would mitigate its cumulative contribution to an impact through a fair share payment.

Worksheets for Opening Year Cumulative (2018) With Project conditions, with improvements, HCM calculations are provided in Appendix "6.11".

It is important to note that with the implementation of the recommended intersection improvements discussed above, which are necessary to reduce cumulative impacts to less-than-significant, there are no potential queuing issues anticipated for Opening Year Cumulative (2018) With Project conditions (see Table 6-7). As such, no spill-back onto the I-215 Freeway northbound mainline is anticipated. Worksheets for Opening Year Cumulative (2018) With Project conditions, with improvements, queuing analysis is provided in Appendix "6.12".

6.10.2 Recommended Improvements to Address Opening Year Cumulative (2018) Cumulative Impacts along Roadway Segments

Improvement strategies have been recommended along roadway segments that have been identified as cumulatively impacted to reduce each segment's volume-to-capacity (v/c) ratio through the addition of through lanes, consistent with the intersection operations analysis. The effectiveness of the recommended roadway segment improvement strategies discussed below to address Opening Year Cumulative (2018) traffic impacts and is presented in Table 6-8.

Consistent with the peak hour intersection analysis and recommended improvements shown previously on Table 6-6, the following roadway segment improvements are recommended:

ID	Roadway Segments
3	Harley Knox Boulevard, I-215 NB Ramps to Western Way – Widen to a 4-lane divided roadway
4	Harley Knox Boulevard, East of Western Way – Widen to a 4-lane divided roadway

Table 6-7

Opening Year Cumulative (2018) Conditions With Recommended Improvements
AM/PM Peak Hour Stacking Length Summary at I-215/Harley Knox Boulevard

Intersection	Movement	Stacking Distance (Feet)	2018 With Project				2018 With Project, With Improvements			
			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 / Harley Knox Bl.	SBL/T	1,330	1,175 [2]	778 [2]	Yes	Yes	350	244	Yes	Yes
	SBR	270	114	80	Yes	Yes	44	67	Yes	Yes
I-215 NB Ramps / Harley Knox Bl.	NBL/T	1,120	117	55	Yes	Yes	285	94	Yes	Yes
	NBR	265	**549** [2]	100	**No**	Yes	266	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.

Table 6-8

Opening Year Cumulative (2018) Conditions With Recommended Improvements
Roadway Volume/Capacity Analysis

#	Roadway	Segment Limits	Roadway Section	LOS Capacity[1]	2018 With Project	V/C	LOS	Acceptable LOS
3	Harley Knox Boulevard	I-215 NB Ramps to Western Way	**4D**	**37,500**	32,522	0.87	D	D
4		East of Western Way	**4D**	**37,500**	33,835	0.90	D	D
5		West of Patterson Avenue	**4D**	**37,500**	**34,441**	**0.92**	**E**	D
6		East of Patterson Avenue	**4D**	**37,500**	33,128	0.88	D	D
7		West of Webster Avenue	**4D**	**37,500**	33,200	0.89	D	D
8		East of Webster Avenue	**4D**	**37,500**	33,500	0.89	D	D
9		West of Indian Street	**4D**	**37,500**	31,700	0.85	D	D
20	Indian Street	Nandina Avenue to Driveway 4	**4D**	**37,500**	22,119	0.59	A	D
21		Driveway 4 to Driveway 5	**4D**	**37,500**	22,448	0.60	A	D
22		Driveway 5 to Driveway 6	**4D**	**37,500**	22,680	0.60	A	D
23		Driveway 6 to Grove View Road	**4D**	**37,500**	23,198	0.62	B	D
24		South of Grove View Road	**4D**	**37,500**	23,013	0.61	B	D
25		North of Harley Knox Boulevard	**4D**	**37,500**	18,700	0.50	A	D

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

[1] These maximum roadway capacities have been extracted from the City of Moreno Valley's Transportation Division's Traffic Impact Analysis 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 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.

ID	Roadway Segments
5	Harley Knox Boulevard, West of Patterson Avenue – Widen to a 4-lane divided roadway
6	Harley Knox Boulevard, East of Patterson Avenue – Widen to a 4-lane divided roadway
7	Harley Knox Boulevard, West of Webster Avenue – Widen to a 4-lane divided roadway
8	Harley Knox Boulevard, East of Webster Avenue – Widen to a 4-lane divided roadway
9	Harley Knox Boulevard, West of Indian Street – Widen to a 4-lane divided roadway
20	Indian Street, Nandina Avenue to Driveway 4 – Widen to a 4-lane divided roadway
21	Indian Street, Driveway 4 to Driveway 5 – Widen to a 4-lane divided roadway
22	Indian Street, Driveway 5 to Driveway 6 – Widen to a 4-lane divided roadway
23	Indian Street, Driveway 6 to Grove View Road – Widen to a 4-lane divided roadway
24	Indian Street, South of Grove View Road – Widen to a 4-lane divided roadway
25	Indian Street, North of Harley Knox Boulevard – Widen to a 4-lane divided roadway

Even with the improvements to four (4) travel lanes on Harley Knox Boulevard, General Plan LOS "D" standard will not be achieved under Opening Year Cumulative (2018) traffic conditions for the roadway segment of Harley Knox Boulevard, west of Patterson Avenue. However, the intersection of Patterson Avenue at Harley Knox Boulevard, adjacent to the deficient roadway segment, is anticipated to operate at an acceptable LOS with the recommended intersection improvements discussed in Section 6.10.1 *Recommended Improvements to Address Cumulative Impacts at Intersections* and thus does not require any additional roadway widening beyond four (4) travel lanes.

6.10.3 Recommended Improvements to Address Opening Year Cumulative (2018) Cumulative Impacts on Freeway Facilities

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. The SR-60 Freeway carpool lanes are currently under construction to connect the existing carpool lanes on either side of the I-215 Freeway along the SR-60 Freeway. Based on information on the RCTC website, this construction is anticipated to be completed by Summery 2014.

Caltrans typically assumes a reduction of fourteen (14) percent to the SR-60 Freeway and I-215 Freeway mainline through volumes in this region to account for vehicles utilizing the carpool (high-occupancy vehicle) lanes. Although the reduction to SR-60 Freeway and 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 6-9, 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
4	I-215 Freeway – Southbound, North of Harley Knox Boulevard – LOS “E” AM and PM peak hours
5	I-215 Freeway – Southbound, South of Harley Knox Boulevard – LOS “E” PM peak hour only

Similarly, Table 6-10 shows that the same freeway ramp junctions are anticipated to operate at an unacceptable LOS with the construction of a carpool lane in both directions of travel although the density has reduced and LOS has been improved from LOS “F” to LOS “E”.

Worksheets for Opening Year Cumulative (2018) With Project conditions freeway mainline level of service analysis, with improvements, is provided in Appendix “6.13”. Opening Year Cumulative (2018) With Project freeway ramp junction level of service analysis worksheets, with improvements are provided in Appendix “6.14”.

Table 6-9

Opening Year Cumulative (2018) Conditions Basic Freeway Segment Analysis
With I-215 North and SR-60/I-215 Freeway Project Improvements

Scenario	Direction	Mainline Segment	Lanes[1]	2018 With Project				2018 With Project, With Improvements			
				Density[2]		LOS		Density[2]		LOS	
				AM	PM	AM	PM	AM	PM	AM	PM
Opening Year (2018)	SR-60 WB	West of I-215 Freeway	4	**37.2**	**44.7**	**E**	**E**	31.4	33.1	D	D
	SR-60 EB	West of I-215 Freeway	5	15.8	23.2	B	C	13.7	20.0	B	C
	I-215 SB	South of SR-60 Freeway	5	32.3	29.0	D	D	26.4	24.3	D	C
		North of Harley Knox Bl.	3	**--**	**--**	**F**	**F**	**43.5**	**40.6**	**E**	**E**
		South of Harley Knox Bl.	3	**39.7**	**--**	**E**	**F**	29.3	**38.8**	D	**E**
	I-215 NB	South of SR-60 Freeway	3	28.0	**--**	D	**F**	23.4	34.0	C	D
		North of Harley Knox Bl.	3	23.3	**--**	C	**F**	20.1	34.9	C	D
		South of Harley Knox Bl.	3	21.8	30.4	C	D	18.6	24.1	C	C

[1] Number of lanes are in the specified direction and is based on existing conditions plus the construction of an HOV lane in each direction.
[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

Table 6-10

I-215 Freeway Ramp Junction Merge/Diverge Analysis

For Opening Year Cumulative (2018) Conditions With I-215 North Project Improvements

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2018 With Project				2018 With Project, With Improvements			
				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	Southbound	Off-Ramp at Harley Knox Bl.	3	**49.5**	**F**	**48.1**	**F**	**40.7**	**E**	**38.9**	**E**
		On-Ramp at Harley Knox Bl.	3	**36.1**	**E**	**43.2**	**F**	31.6	D	**37.0**	**E**
	Northbound	On-Ramp at Harley Knox Bl.	3	28.8	D	**41.9**	**F**	25.9	C	**38.1**	**E**
		Off-Ramp at Harley Knox Bl.	3	28.3	D	33.4	D	25.3	C	29.6	D

[1] Number of lanes are in the specified direction and is based on existing conditions plus the construction of an HOV lane in each direction.
[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

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7.0 LOCAL CIRCULATION AND SITE ACCESS

This section summarizes Project site access and on-site circulation recommendations.

The Project is proposed to have access on Heacock Street via Grove View Road, Nandina Avenue and Indian Street. All Project access points are proposed to be full-access, with the exception of Driveway 4 and Driveway 6 on Indian Street. Regional access to the Project site will be provided by the I-215 Freeway (located to the west) via Harley Knox Boulevard.

7.1 ON-SITE ROADWAY IMPROVEMENTS

The recommended site-adjacent roadway improvements for the Project are described below. Exhibit 7-1 illustrates the site-adjacent roadway improvement recommendations.

Grove View Road – Grove View Road is an east-west oriented roadway located along the Project's southern boundary. Construct Grove View Road at its ultimate half-section width as an Industrial Collector (78-foot right-of-way) between Heacock Street and its proposed terminus (cul-de-sac at Project Driveway 1). A minimum of one lane should be constructed in each direction of travel. Improvements along the Project's frontage (north side of Grove View Road) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

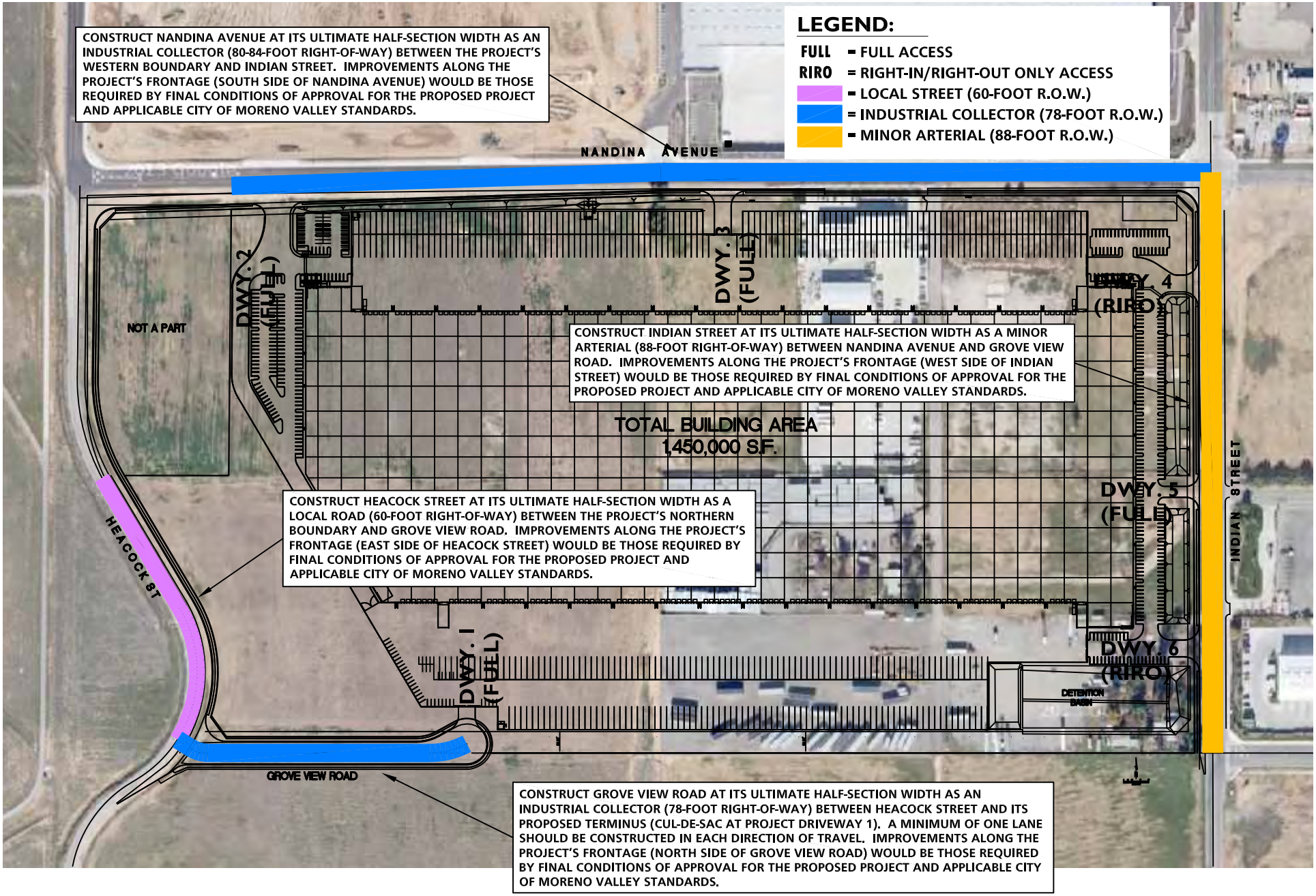
Heacock Street – Heacock Street is a north-south oriented roadway located along the Project's western boundary. Construct Heacock Street at its ultimate half-section width as an Arterial Highway (100-foot right-of-way) between the Project's northern boundary and Grove View Road. Improvements along the Project's frontage (east side of Heacock Street) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

Nandina Avenue – Nandina Avenue is an east-west oriented roadway located along the Project's northern boundary. Construct Nandina Avenue at its ultimate half-section width as an Industrial Collector (78-foot right-of-way) between the Project's western boundary and Indian Street. Improvements along the Project's frontage (south side of Nandina Avenue) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

Indian Street – Indian Street is a north-south oriented roadway located along the Project's eastern boundary. Construct Indian Street at its ultimate half-section width as a Minor Arterial (88-foot right-of-way) between Nandina Avenue and Grove View Road. Improvements along the Project's frontage (west side of Indian Street) would be those required by final conditions of approval for the proposed Project and applicable City of Moreno Valley standards.

EXHIBIT 7-1

SITE ADJACENT ROADWAY RECOMMENDATIONS



First Nandina Logistics Center
City of Moreno Valley, CA (JN - 08578:site_131007_001)

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.

7.2 SITE ACCESS IMPROVEMENTS

The recommended site access driveway improvements for the Project are described below. Exhibit 7-2 illustrates the on-site and site adjacent recommended roadway lane improvements. Construction of on-site and site adjacent improvements shall occur in conjunction with adjacent Project development activity or as needed for Project access purposes.

Heacock Street / Nandina Avenue – Maintain the existing stop control on the westbound approach and maintain the existing lanes. No additional improvements are necessary at this intersection.

Heacock Street / Grove View Road – Install a stop control on the westbound approach and construct the intersection with the following geometrics:
Northbound Approach: One shared through-right turn lane.
Southbound Approach: One shared left-through lane.
Eastbound Approach: N/A
Westbound Approach: One shared left-right turn lane.

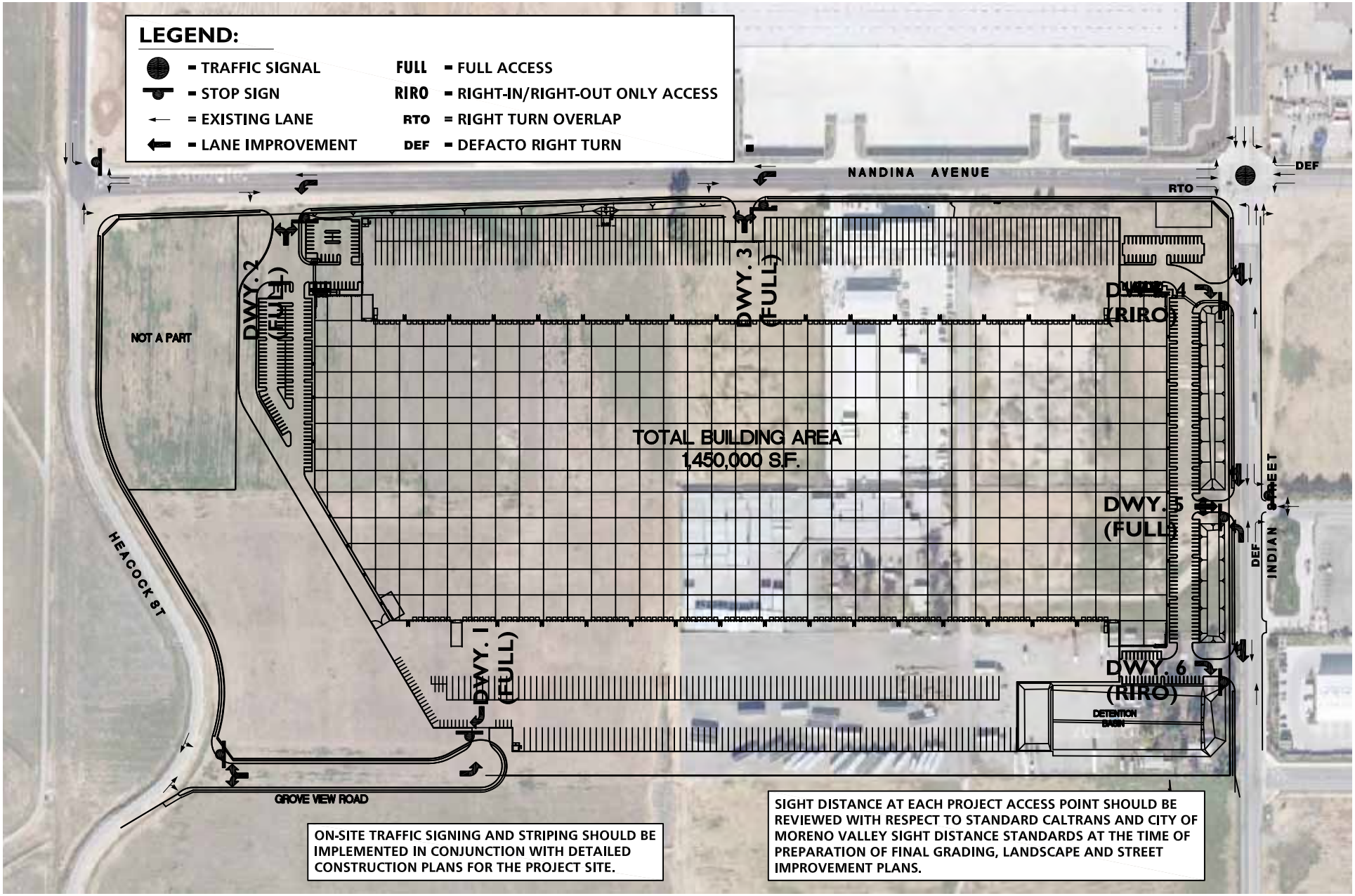
Driveway 1 / Grove View Road – This driveway is proposed to be located at the terminus of Grove View Road within the cul-de-sac. Install a stop control on the southbound approach and construct the intersection with the following geometrics:
Northbound Approach: N/A
Southbound Approach: One right turn lane.
Eastbound Approach: One left turn lane
Westbound Approach: N/A

Driveway 2 / Nandina Avenue – Install a stop control on the northbound approach and construct the intersection with the following geometrics:
Northbound Approach: One shared left-through lane.
Southbound Approach: N/A
Eastbound Approach: One shared through-right turn lane.
Westbound Approach: One left turn lane (to be accommodated within existing two-way-left-turn lane [TWLTL]) and one through lane.

Driveway 3 / Nandina Avenue – Install a stop control on the northbound approach and construct the intersection with the following geometrics:

EXHIBIT 7-2

ON-SITE CIRCULATION RECOMMENDATIONS



Northbound Approach: One shared left-through lane.
Southbound Approach: N/A
Eastbound Approach: One shared through-right turn lane.
Westbound Approach: One left turn lane (to be accommodated within existing two-way-left-turn lane [TWLTL]) and one through lane.

Indian Street / Nandina Avenue – Maintain the existing traffic signal control and the existing lanes. No additional improvements are necessary at this intersection.

Indian Street / Driveway 4 – Due to its proximity to Nandina Avenue, design the intersection to restrict access to right-in/right-out only. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:
Northbound Approach: One though lane.
Southbound Approach: One through lane and one shared through-right turn lane.
Eastbound Approach: One right turn lane.
Westbound Approach: N/A

Indian Street / Driveway 5 – Construct the intersection to align with the existing northern Waste Management driveway on the east side. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:
Northbound Approach: One left turn lane (to be accommodated within existing TWLTL) and one shared through-right turn lane.
Southbound Approach: One left turn lane (to be accommodated within existing TWLTL), one through lane and one shared through-right turn lane.
Eastbound Approach: One shared left-through-right turn lane.
Westbound Approach: One shared left-through-right turn lane.

Indian Street / Driveway 6 – Due to its proximity to Grove View Road, design the intersection to restrict access to right-in/right-out only. Install a stop control on the eastbound approach and construct the intersection with the following geometrics:
Northbound Approach: One though lane.
Southbound Approach: One through lane and one shared through-right turn lane.
Eastbound Approach: One right turn lane.
Westbound Approach: N/A

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.

8.0 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements throughout Riverside County are funded through a combination of direct project mitigation, fair share contributions or development impact fee programs. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

Table 8-1 lists the incremental improvements that are required by Opening Year Cumulative (2018) traffic conditions to mitigate the long-range cumulative traffic impacts. The regional and local transportation impact fee programs have each been reviewed and compared to the recommended improvements for each impacted facility. Recommended improvements already identified and included in one of the pre-existing fee programs (i.e., TUMF and City of Moreno Valley DIF) are clearly denoted. If an impacted facility was found to require improvements beyond those already identified within one of the pre-existing regional or local fee programs, the project may be required to contribute the associated intersection or roadway fair-share percentage toward the costs of the recommended improvements. The fair-share calculations, also presented in Table 8-1, indicate that the Project contributes approximately 7.0% to 11.8% of new vehicle trips.

The improvements listed in Table 8-1 are comprised of lane additions, installation of signals and signal modifications. As noted, the identified improvements are covered either by the TUMF Program, the City of Moreno Valley DIF Program or as a fair-share contribution if not covered by a fee program. Lane additions are shown as the number of lanes required and the direction of travel, for example, "1.EBT" indicates one additional eastbound through lane. Depending on the width of the existing pavement and right-of-way, these improvements may involve only striping modifications or they may involve construction of additional pavement width. Additional discussion of the relevant pre-existing transportation impact fee programs is provided below.

8.1 TRANSPORTATION UNIFORM MITIGATION FEE (TUMF) PROGRAM

The TUMF program is administered by Western Riverside Council of Governments (WRCOG) based upon a regional Nexus Study completed in early 2003 and updated in 2009 to address major changes in right of way acquisition and improvement cost factors. TUMF identifies a network of backbone and local roadways that are needed to accommodate growth through 2035. This regional program was put into place to ensure that development pays its fair share and that funding is in place for construction of facilities needed to maintain the requisite level of service and critical to mobility in the region.

TUMF fees are imposed on new residential, industrial, and commercial development through application of the TUMF fee ordinance and fees are collected at the building or occupancy permit stage. The fee for industrial use is $1.73 per square foot with an adjustment to the baseline square footage for high cube buildings (applicable to the proposed project). In addition, an annual inflation

Table 8-1

Summary of Transportation Impact Fee Program Improvements for Opening Year Cumulative (2018) Conditions

#	Intersection Location	2018 With Project Recommended Improvements	Program Improvements[1]	Non-Program Improvements	Fair Share[2]
1	I-215 SB Ramps / Harley Knox Bl.	1.SBL; 1.WBL; Re-stripe for 1.SBL and 1.SBT/R	1.SBL; 1.WBL; Re-stripe for 1.SBL and 1.SBT/R	None	--
2	I-215 NB Ramps / Harley Knox Bl.	1.WB Free Right; Re-stripe for 1.NBL/T/R	1.WB Free Right; Re-stripe for 1.NBL/T/R	None	--
3	Western Wy. / Harley Knox Bl.	Install Traffic Signal; 1.EBL	None	Install Traffic Signal; 1.EBL	8.0%
4	Patterson Av. / Harley Knox Bl.	1.EBT, 1.WBT	1.EBT, 1.WBT	None	--
7	Webster Av. / Harley Knox Bl.	1.EBT, 1.WBT	1.EBT, 1.WBT	None	--
14	Indian St. / Grove View Rd.	Install Traffic Signal; 1.NBT, 1.SBT	1.NBT, 1.SBT	Install Traffic Signal	11.8%
15	Indian St. / Harley Knox Bl.	1.SBR w/ overlap phasing, 1.EBL, 1.EBT	1.EBT	1.SBR w/ overlap phasing, 1.EBL	7.7%

[1] Improvements included in TUMF Nexus or City of Moreno Valley DIF programs.
[2] Program improvements constructed by project may be eligible for fee credit. In lieu fee payment is at discretion of City.

adjustment is considered each year in January. In this way, TUMF fees are adjusted upwards on a regular basis to ensure that the development impact fees collected keep pace with construction and labor costs, etc.

As shown in Table 8-1, a number of the facilities forecast to be impacted by the proposed project are programmed for improvements through the TUMF program. The project applicant will be subject to the TUMF fee program and will pay the requisite TUMF fees at the rates then in effect pursuant to the TUMF Ordinance.

WRCOG has a successful track record funding and overseeing the construction of improvements funded through the TUMF program. In total, the TUMF program is anticipated to generate nearly $5 billion in transportation projects for Western Riverside County. The project's payment of TUMF fees appear to be sufficient to mitigate its fair share of cumulative impacted TUMF-funded facilities.

8.2 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 8-1, 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.

8.3 FAIR SHARE CONTRIBUTION

Project mitigation may include a combination of fee payments to established programs, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Table 8-1 presents improvements not included in an impact fee programs in the column labeled "Non-Program Improvements". Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate.

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations for each peak hour have been provided on Table 8-2.

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 should be prepared to determine the appropriate contribution value based upon the project's fair share of traffic as part of the project approval process. The cost basis should be determined by the City based upon physical and community constraints, current bidding experiences and engineering preferences.

Table 8-2

Project Fair Share Calculations

#	Intersection		Existing	Project	2018 With Project	Total New Traffic	Project % of New
3	Western Wy. / Harley Knox Bl.						
		AM:	1,466	117	2,933	1,467	**8.0%**
		PM:	1,120	127	2,936	1,816	7.0%
14	Indian St. / Grove View Rd.						
		AM:	580	153	1,882	1,302	**11.8%**
		PM:	685	167	2,251	1,566	10.7%
15	Indian St. / Harley Knox Bl.						
		AM:	1,048	141	2,891	1,843	**7.7%**
		PM:	1,163	153	3,216	2,053	7.5%

BOLD = Higher of the two peak hours.

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