Cedar Avenue Trucking Storage (PROJ-2020-00035)

TRAFFIC ANALYSIS

COUNTY OF SAN BERNARDINO

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13094-03 TIA Report

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
PCE	Passenger Car Equivalents
PeMS	Performance Measurement System
PHF	Peak Hour Factor
Project	Cedar Avenue Trucking Storage
OPR	Office of Planning and Research
RTP	Regional Transportation Plan
SB	Senate Bill
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
sf	Square Feet
SHS	State Highway System
TA	Traffic Analysis
v/c	Volume to Capacity
VMT	Vehicle Miles Traveled
vphgpl	Vehicles per Hour Green per Lane

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1 SUMMARY OF FINDINGS

This report presents the results of the traffic analysis (TA) for the proposed Cedar Avenue Trucking Storage ("Project"), which is located west of Cedar Avenue, between Slover Avenue and Santa Ana Avenue, in the County of San Bernardino, as shown on Exhibit 1-1.

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

1.1 SUMMARY OF FINDINGS

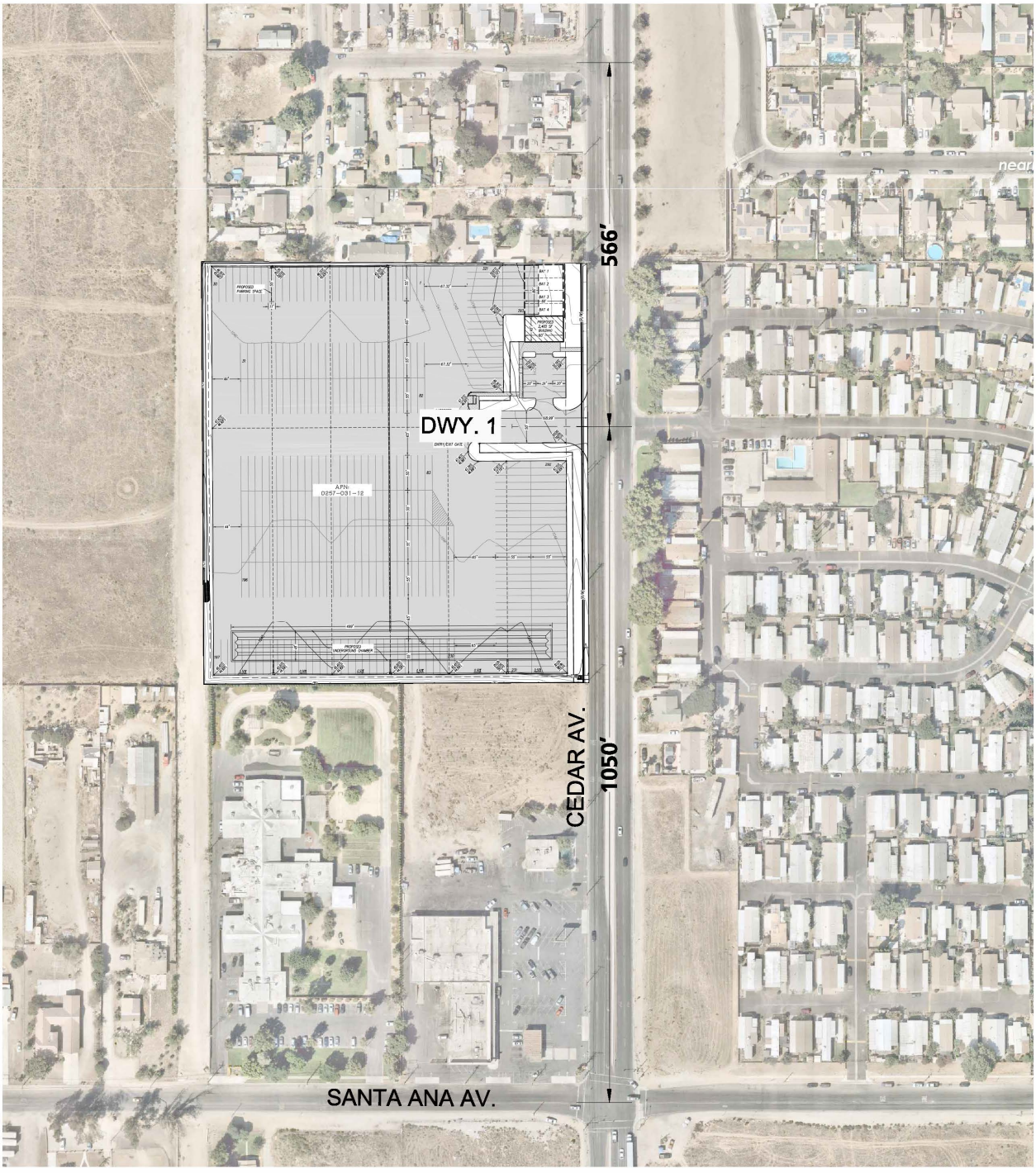
The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to install a traffic signal at the intersection of Cedar Avenue & Driveway 1 (shared with the existing Cedar Village Mobile Home Park).
- Project to construct Cedar Avenue at its ultimate half-section width as a Major Highway (104-foot right-of-way) along the west side from the Project's northbound boundary to the Project's southern boundary consistent with the County's standards.

Additional details and intersection lane geometrics are provided in Section 1.7 *Recommendations* of this report.

The development of the proposed Project is not anticipated to require the construction of any off-site improvements, however, there are improvement needs identified at off-site intersections for future traffic analysis scenarios where the Project would contribute traffic (as measured by 50 or more peak hour trips). As such, the Project Applicant's responsibility for the Project's contributions towards off-site intersection deficiencies is fulfilled through payment of fair share or participation in the pre-existing fee programs that would be assigned to construction of the identified recommended improvements. The Project Applicant would be required to pay requisite fair share contributions and fee payments consistent with the County's requirements (see Section 8 *Local and Regional Funding Mechanisms*).

EXHIBIT 1-1: PRELIMINARY SITE PLAN



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1.2 PROJECT OVERVIEW

Exhibit 1-1 illustrates the preliminary Project site plan. The Project is proposed to consist of up to 8.940 acres of truck terminal use. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2021. Access to the Project site will be provided to Cedar Avenue via a proposed full-access signalized driveway. Regional access to the Project site will be provided by the I-10 Freeway via Cedar Avenue.

Trips generated by the Project's proposed land uses have been estimated based on the trip generation trip-generation statistics published in the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003) for the Truck Terminal land use. Based on the characteristics of the proposed Project, it is assumed Project traffic will consist of passenger cars (20.0% of total traffic) and 4+-axle trucks (80.0% of total traffic). Passenger car equivalent (PCE) factors were applied to the trip generation rates to convert trips made by heavy trucks (large 4+-axles trucks) to PCE values. The proposed Project is anticipated to generate 716 actual trip ends per day, with 65 AM peak hour trips and 58 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

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

- Existing (2020)
- Existing plus Project (E+P)
- Opening Year Cumulative (2021) Without Project
- Opening Year Cumulative (2021) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.3.1 EXISTING (2020) CONDITIONS

Information for Existing (2020) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

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

1.3.3 OPENING YEAR CUMULATIVE (2021) CONDITIONS

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

from Existing conditions of 1.5% is included for Opening Year Cumulative (2021) traffic conditions. The ambient growth is consistent with the growth used by other projects in the area. This comprehensive list was compiled from information provided by the County of San Bernardino and other near-by agencies.

1.3.4 HORIZON YEAR (2040) CONDITIONS

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

1.4 STUDY AREA

To ensure that this TA satisfies the County of San Bernardino's requirements, Urban Crossroads, Inc. prepared a project TA scoping package for review by County staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology.

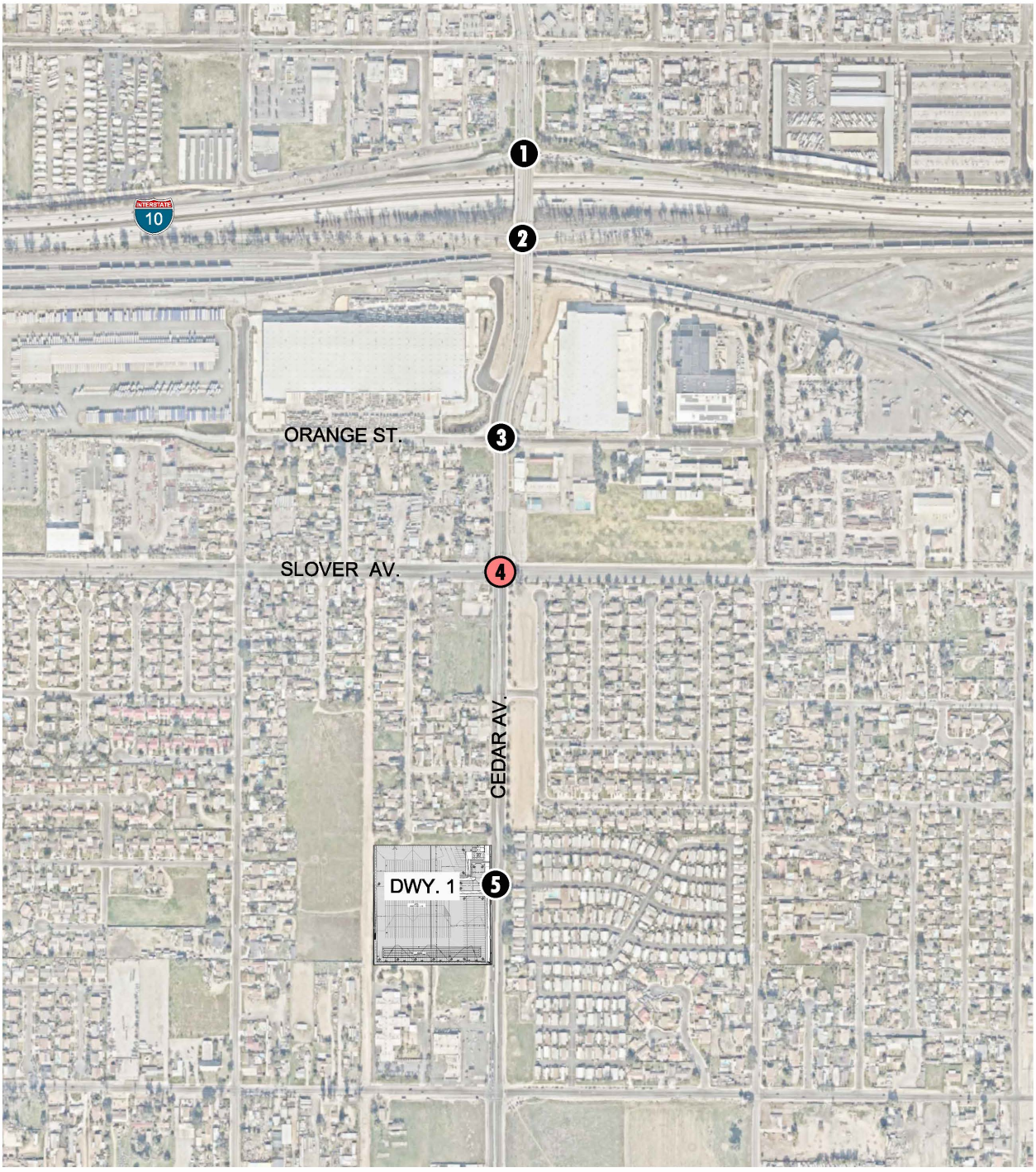
1.4.1 INTERSECTIONS

The following 5 study area intersections shown on Exhibit 1-2 and listed on Table 1-1 were selected for this TA based on consultation with County of San Bernardino staff. The "50 peak hour trip" criterion generally represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of influence (i.e., study area). Other analysis intersections, within the adjacent cities were not selected for evaluation as the Project is anticipated to contribute less than 50 peak hour trips.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Cedar Av. & I-10 Westbound Ramps	County of San Bernardino, Caltrans	No
2	Cedar Av. & I-10 Eastbound Ramps	County of San Bernardino, Caltrans	No
3	Cedar Av. & Orange Av.	County of San Bernardino	No
4	Cedar Av. & Slover Av.	County of San Bernardino	Yes
5	Cedar Av. & Driveway 1	County of San Bernardino	No

EXHIBIT 1-2: LOCATION MAP



LEGEND:

0 = EXISTING INTERSECTION ANALYSIS LOCATION

0 = CMP INTERSECTION

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URBAN CROSSROADS

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

1.4.2 FREEWAY MAINLINE AND RAMP JUNCTION ANALYSIS

Study area freeway mainline analysis locations were selected based on Caltrans TA guidelines, which may require the analysis of State highway facilities. (3) Consistent with recent Caltrans guidance, and because deficiencies to freeway segments tend to dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry typically is not required. This study evaluates the following freeway facilities adjacent to the point of entry to the SHS at the I-10 Freeway and Cedar Avenue (see Table 1-2):

TABLE 1-2: FREEWAY FACILITY ANALYSIS LOCATIONS

ID	Freeway Facilities
1	I-10 Freeway Westbound, West of Cedar Av.
2	I-10 Freeway Westbound, On-Ramp at Cedar Av.
3	I-10 Freeway Westbound, Off-Ramp at Cedar Av.
4	I-10 Freeway Westbound, East of Cedar Av.
5	I-10 Freeway Eastbound, West of Cedar Av.
6	I-10 Freeway Eastbound, Off-Ramp at Cedar Av.
7	I-10 Freeway Eastbound, On-Ramp at Cedar Av.
8	I-10 Freeway Eastbound, East of Cedar Av.

1.5 SENATE BILL 743 – VEHICLE MILES TRAVELED (VMT)

Senate Bill 743 (SB 743), approved in 2013, endeavors to change the way transportation impacts will be determined according to the California Environmental Quality Act (CEQA). The Office of Planning and Research (OPR) has recommended the use of vehicle miles traveled (VMT) as the replacement for automobile delay-based LOS. In December 2018, the Natural Resources Agency finalized updates to CEQA Guidelines to incorporate SB 743 (i.e., VMT). The VMT thresholds and methodology outlined in the County's July 2019 TA guidelines will be utilized to conduct the VMT analysis for the Project. The VMT analysis will be prepared and submitted under separate cover.

The revised Caltrans traffic impact analysis guidelines are set to be available in Summer 2020, however, Caltrans acknowledges automobile delay will no longer be considered a CEQA impact for development projects and will use VMT as the metric for determining impacts on the SHS. As such, the LOS operations included in this TA for study area intersections are informational and are not anticipated to support the environmental document.

1.6 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *E+P Traffic Conditions*, Section 6 *Opening Year Cumulative (2021) Traffic* Conditions, and Section 7 *Horizon Year (2040) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-3.

1.6.1 E+P CONDITIONS

Intersections

Consistent with Existing traffic conditions, the study area intersections are anticipated to operate at acceptable LOS during the peak hours.

Off-Ramp Queues

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

Freeway Facilities

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

1.6.2 OPENING YEAR CUMULATIVE (2021) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2021) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E PM peak hour only
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Orange Street (#3) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS F PM peak hour only
- Cedar Avenue & Driveway 1 (#5) – LOS E PM peak hour only

There are no additional intersections anticipated to operate at a deficient LOS during the peak hours with the addition of Project traffic. It should be noted with the implementation of the Project design features as discussed in Section 1.7 *Recommendations*; the intersection of Cedar Avenue & Driveway 1 is anticipated to operate at an acceptable LOS during the peak hours.

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2021) traffic conditions, consistent with Existing (2020) traffic conditions.

Freeway Facilities

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

1.6.5 HORIZON YEAR (2040) CONDITIONS

Intersections

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

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E AM peak hour; LOS F PM peak hour
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS E AM peak hour; LOS F PM peak hour

With the addition of Project traffic, there are no additional study area intersections anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions.

Off-Ramp Queues

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

Freeway Facilities

The following study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for Horizon Year (2040) Without Project and With Project traffic conditions:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, East of Cedar Avenue (#4) – LOS E AM and PM peak hours
- I-10 Freeway Eastbound, West of Cedar Avenue (#5) – LOS E PM peak hour only
- I-10 Freeway Eastbound, East of Cedar Avenue (#8) – LOS E PM peak hour only

1.7 RECOMMENDATIONS

1.7.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

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

Recommendation 1.1 – ***Cedar Avenue & Driveway 1 (#5)*** – The following improvements are necessary to accommodate site access:

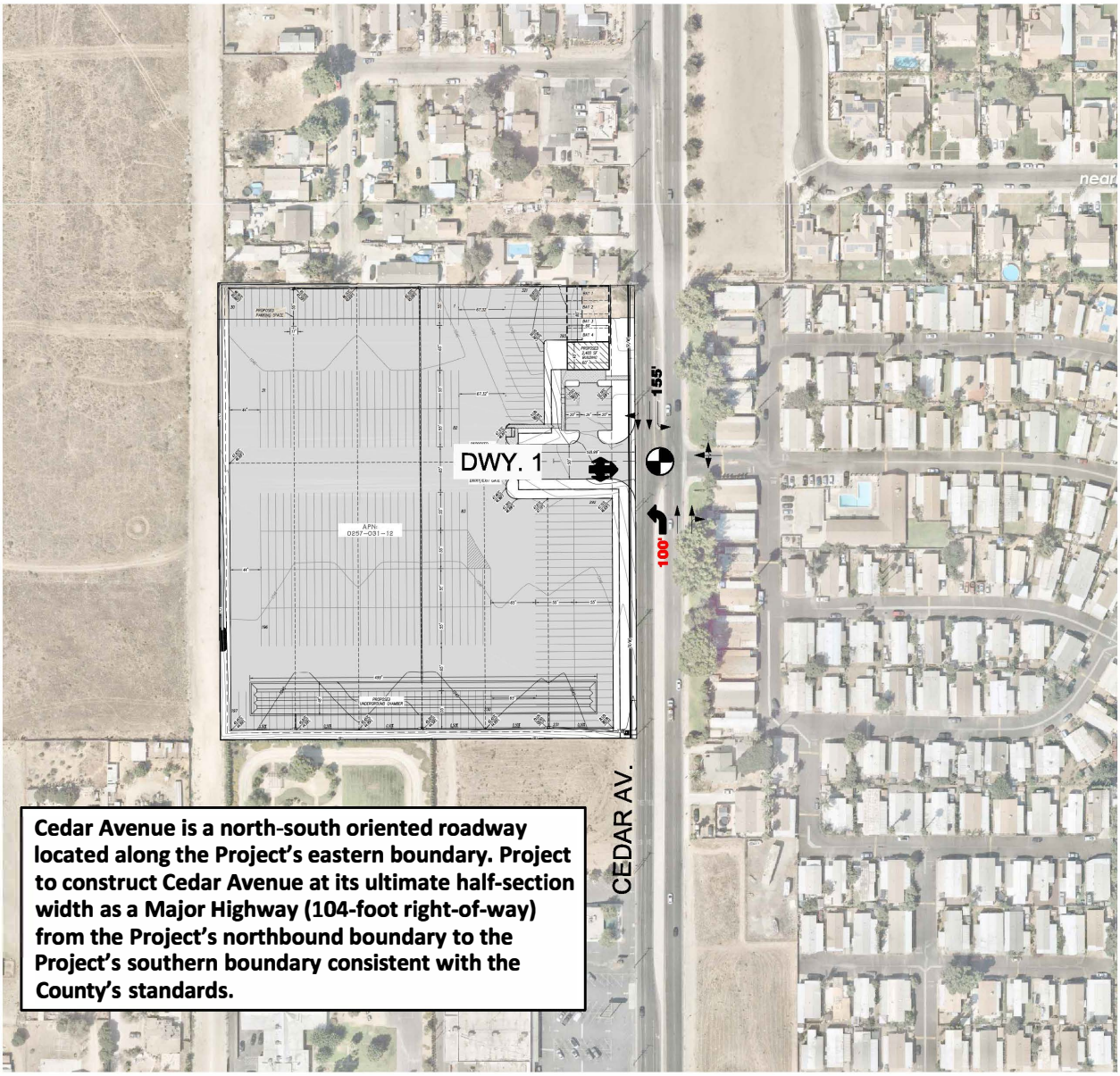
- Project to install a traffic signal. In order to support the Cedar Avenue corridor signal timing coordination efforts by SBCTA, the Project should ensure that the traffic signal is interconnected by copper or fiber.
- Project to construct a northbound left turn lane within the existing raised median with a minimum of 100-feet of storage.
- Project to construct an eastbound shared left-through-right turn lane.

Recommendation 2.1 – Cedar Avenue is a north-south oriented roadway located along the Project's eastern boundary. Project to construct Cedar Avenue at its ultimate half-section width as a Major Highway (104-foot right-of-way) from the Project's northbound boundary to the Project's southern boundary consistent with the County's standards.

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

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

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



LEGEND:

- ***= NEW TRAFFIC SIGNAL***
- ***= EXISTING LANE***
- ***= LANE IMPROVEMENT***
- 150' ***= TURN POCKET LENGTH IMPROVEMENT***
- 150' ***= EXISTING TURN POCKET LENGTH***

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

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

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1.7.2 OFF-SITE RECOMMENDATIONS

The recommended improvements needed to address the cumulative deficiencies identified under Existing (2020), E+P, Opening Year Cumulative (2021), and Horizon Year (2040) traffic conditions are summarized in Table 1-3. For those improvements listed in Table 1-3 and not constructed as part of the Project, the Project Applicant's responsibility for the Project's contributions towards deficient intersections is fulfilled through payment of fees or fair share that would be assigned to construction of the identified recommended improvements.

Table 1-3 also summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.568 to reflect current (2020) costs. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process. Based on the Project fair share percentages, the Project's fair share cost is estimated at $230,396. These estimates are a rough order of magnitude only as they are intended only for disclosure purposes and do not imply any legal responsibility or formula for contributions or mitigation.

Recommendation 3.1 – Prior to the issuance of building permits, the Project Applicant shall pay the Project's fair share amount of $128,436 for the improvements identified in Table 1-3 at intersections located within the County of San Bernardino, or as agreed to by the County and Project Applicant.

Recommendation 4.1 – The Developer's fair-share amount for the intersections that either share a mutual border with or are wholly located within the jurisdiction of Caltrans that have recommended improvements which are not covered by a pre-existing fee program is $101,960. Developer shall be required to pay the amount shown above to the County of San Bernardino prior to the issuance of building permits. The County of San Bernardino shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the County of San Bernardino and other agencies.

1.8 TRUCK ACCESS AND CIRCULATION

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

- Driveway 1 on Cedar Avenue should be modified to provide a 45-foot radius on the northwest curb.

Table 1-3

Summary of Improvements and Rough Order of Magnitude Costs

#	Intersection	Jurisdiction	Existing (2020)	E+P	2021 Without Project	2021 With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or County TUMF?[1]	Project Responsibility[2]	Total Cost[3,4]	Fair Share %[5]	Fair Share Cost[6]
1	Cedar Av. & I-10 WB Ramps	Caltrans, County of San Bernardino	None	None	Add 2nd NB left turn lane	Same	Same	Same	No	Fair Share	$858,000	7.1%	$61,236
											$858,000		**$61,236**
2	Cedar Av. & I-10 EB Ramps	Caltrans, County of San Bernardino	None	None	None	None	Add 2nd SB left turn lane	Same	No	Fair Share	$858,000	11.8%	$101,343
							Add EB right turn lane	Same	No	Fair Share	$350,000		$41,341
											$1,208,000		**$142,684**
4	Cedar Av. & Slover Av.	County of San Bernardino	None	None	Restripe the EB approach to provide two left turn lanes, one through lane, and one shared through-right turn lane	Same	Same	Same	No	Fair Share	$39,200	11.3%	$4,413
					Add SB right turn lane	Same	Same	Same	No	Fair Share	$78,400		$8,825
					Modify the traffic signal to provide a 120-second cycle length during the AM and PM peak hours	Same	Same	Same	No	Fair Share	$117,600		$13,238
											$235,200		**$26,476**
										Total Costs for Horizon Year (2040) Improvements	**$2,301,200**		**$230,396**
										Total Project Fair Share Contribution to the County of San Bernardino[7]		**$128,436**	
										Total Project Fair Share Contribution to Caltrans[8]		**$101,960**	

[1] Improvements included in City of Jurupa Valley DIF or County TUMF programs for local and regional components.

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

[3] Costs have been estimated using the data provided in Appendix "G" of the CMP (2016 Update) for preliminary construction costs.

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

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

[6] Rough order of magnitude cost estimate.

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

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

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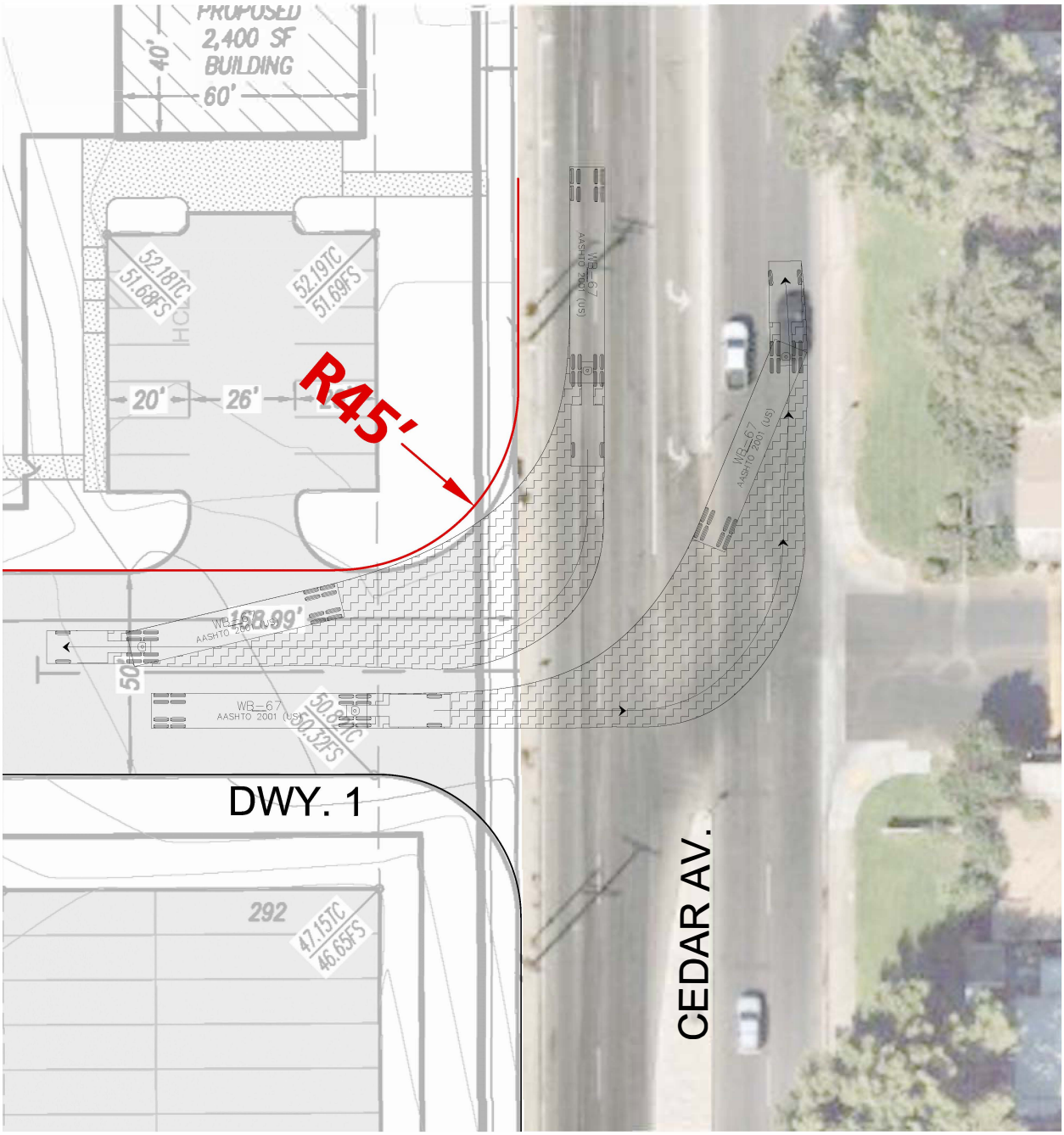
EXHIBIT 1-5: TRUCK ACCESS



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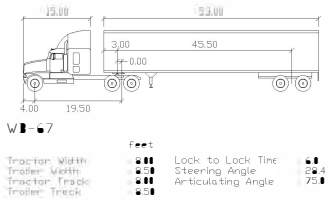

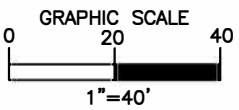

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2 METHODOLOGIES

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

2.1 LEVEL OF SERVICE

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

2.2 INTERSECTION CAPACITY ANALYSIS

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

2.2.1 SIGNALIZED INTERSECTIONS

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

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

Existing and Opening Year Cumulative Traffic Conditions:

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

Horizon Year (2040) Traffic Conditions:

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

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM (6th Edition)

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

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

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

California Department of Transportation (Caltrans)

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

Signal timing for the freeway arterial-to-ramp intersections and the signalized intersections along the Cedar Avenue corridor have been obtained from the County and reflect the SBCTA coordinated signal timing that has recently been implemented in 2020. It should be noted that for the purposes of this analysis, no optimization of signal timing has been performed for the LOS analysis unless noted otherwise (for improvements).

2.2.2 UNSIGNALIZED INTERSECTIONS

The County of San Bernardino requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

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

Source: HCM (6th Edition)

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

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

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

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

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

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

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	SBCTA CMP?
5	Cedar Avenue & Driveway 1	County of San Bernardino	No

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Conditions,* Section 6 *Opening Year Cumulative (2021) Traffic Conditions,* and Section 7 *Horizon Year (2040) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

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

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

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

2.5 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent Caltrans guidance, the TA has evaluated freeway segments where the Project is anticipated to contribute 50 or more peak hour one-way trips on either side of the Cedar Avenue interchange, in an effort to conduct a conservative analysis and overstate as opposed to understand potential deficiencies.

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

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS

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

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

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in May 2020. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative (2021), and Horizon Year (2040) conditions.

The I-10 Freeway mainline volume data was obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-10 Freeway interchanges at Cedar Avenue. The data was obtained from May 2020. A 1.5 percent growth rate has been applied to the 2019 PeMS data to reflect 2020 conditions. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. (6)

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in 4 existing on and off ramp locations where the Project is anticipated to contribute 50 or more peak hour trips (see Table 1-2) at the I-10 Freeway and Cedar Avenue interchange. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this TA has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

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

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

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

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

Similar to the basic freeway segment analysis, the I-10 Freeway mainline volume data were obtained from the Caltrans maintained PeMS website for the segments of the I-10 Freeway interchange at Cedar Avenue. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining I-10 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from May 2019. A 2 percent growth rate was applied to the May 2019 data to reflect 2020 conditions. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis. (6)

2.7 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

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

2.7.1 COUNTY OF SAN BERNARDINO

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

2.7.2 CALTRANS

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

2.7.3 SAN BERNARDINO COUNTY CMP

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

2.8 DEFICIENCY CRITERIA

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

2.8.1 INTERSECTIONS

Signalized Intersections

Per the County of San Bernardino TA Guidelines, the following LOS will be utilized for signalized study area intersections located within the Desert, Valley and Mountain regions of the County:

- Any signalized study intersection in the Valley or Mountain regions that is operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS E or F shall identify improvements to improve operations to LOS D or better.
- Any signalized study intersection in the Desert region that is operating at an LOS C or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS D, E, or F shall identify improvements to improve operations to LOS C.
- Any signalized study intersection in the Valley or Mountain regions that is operating at LOS E or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.
- Any signalized study intersection in the Desert region that is operating at LOS D, E, or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

Unsignalized Intersections

Per the County of San Bernardino TA Guidelines, the following LOS will be utilized for unsignalized study area intersections located within the Desert, Valley and Mountain regions of the County:

- The addition of project related traffic causes the intersection to degrade from an LOS D or better to a LOS E or worse in the Valley and Mountain regions or from an LOS C or better to an LOS D or worse in the Desert region.

  OR

- The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley and Mountain regions or at an LOS D, E, or F in the Desert region (per Section 10.5.2 b))

  AND

- One or both of the following conditions are met:
  - The project adds ten (10) or more trips to any approach
  - The intersection meets the peak hour traffic signal warrant after the addition of project traffic (per Section 10.5.2 c)).

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

2.8.2 CALTRANS FACILITIES

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

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

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

2.9 PROJECT FAIR SHARE CALCULATION METHODOLOGY

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

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

The project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the highest of the two has been selected. The Project fair share contribution calculations are presented in Section 8 *Local and Regional Funding Mechanisms* of this TA. The cost of implementing the improvements shown on Table 1-3 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a total cost escalation factor of 1.568 to more closely approximate current (2020) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended improvements (see Table 8-1). These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or physical improvements.

3 AREA CONDITIONS

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

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with County of San Bernardino staff (Appendix 1.1), the study area includes a total of 5 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 COUNTY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

The study area contains five intersections that exist within the County of San Bernardino. Exhibit 3-2 shows the County of San Bernardino General Plan Circulation Element, and Exhibit 3-3 illustrates the County of San Bernardino General Plan Roadway Cross-Sections. The study area roadways that lie within the unincorporated areas of the County of San Bernardino are described below.

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

- Slover Avenue
- Cedar Avenue

3.3 TRUCK ROUTES

The County of San Bernardino does not have a truck route map. The truck trip distribution patterns for the proposed Project have been developed through consultation with the County of San Bernardino during the TA scoping process and are consistent with other nearby studies.

3.4 BICYCLE & PEDESTRIAN FACILITIES

Field observations indicate nominal pedestrian and bicycle activity within the study area. As shown on Exhibit 3-4, pedestrian facilities are built out along portions Cedar Avenue and Slover Avenue. However, there are limited pedestrian facilities within close proximity to the Project site on Cedar Avenue. The County of San Bernardino does not have an exhibit showing bikeways and trails.

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

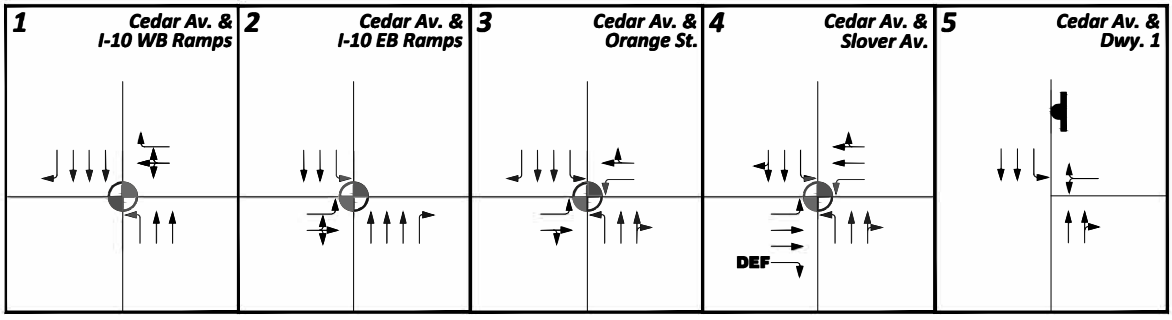

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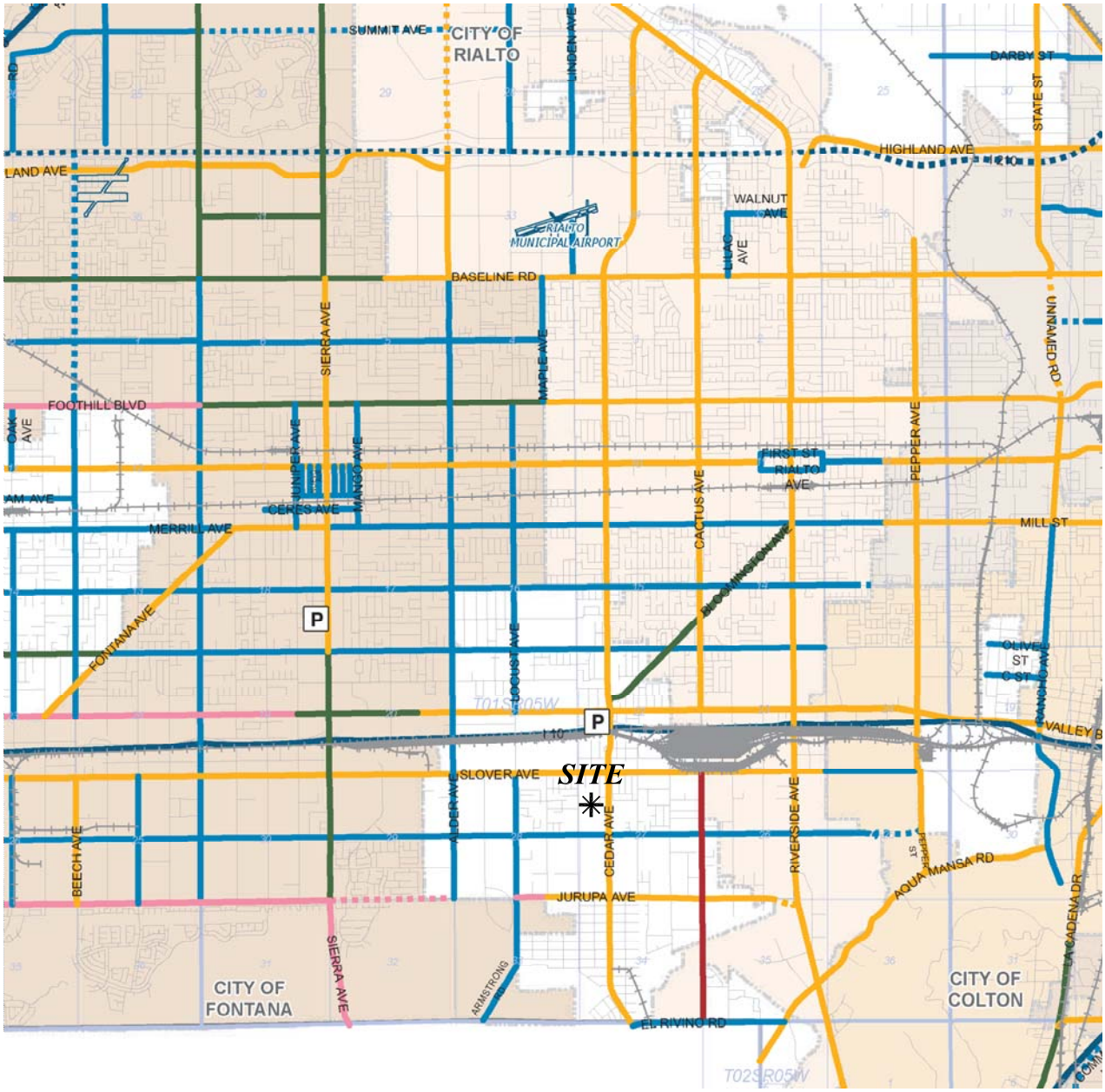
EXHIBIT 3-2: COUNTY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT



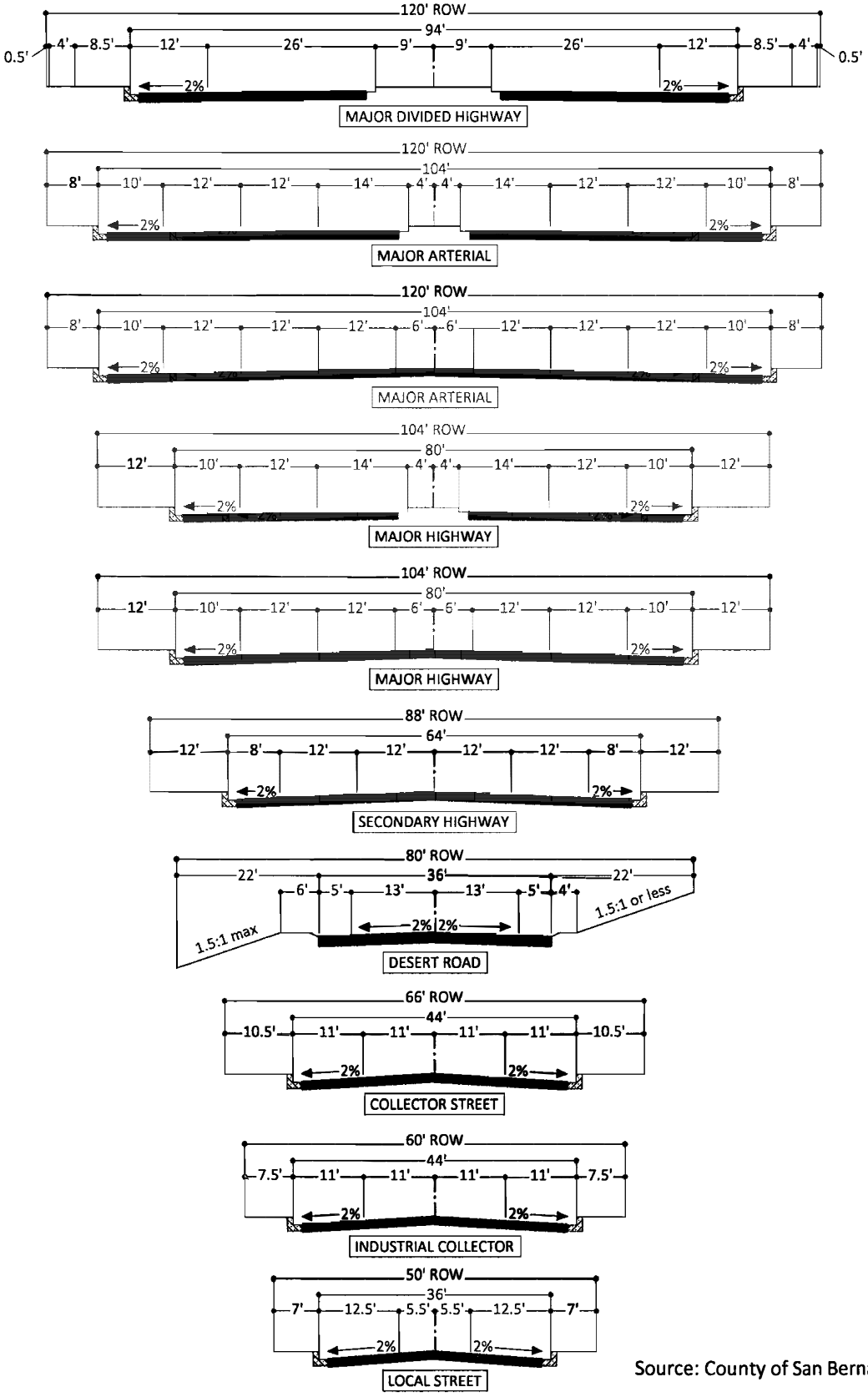
Legend

Existing	Proposed	
		Freeway
		Major Divided Highway
		Major Arterial Highway
		Major Highway
		Secondary Highway
		Controlled/Limited Access Collector
		Mountain Major Highway
		Mountain Secondary Highway
		State Highway (Special Standards or Conditions)

P Park & Ride — Railroad — Airport / Airfield

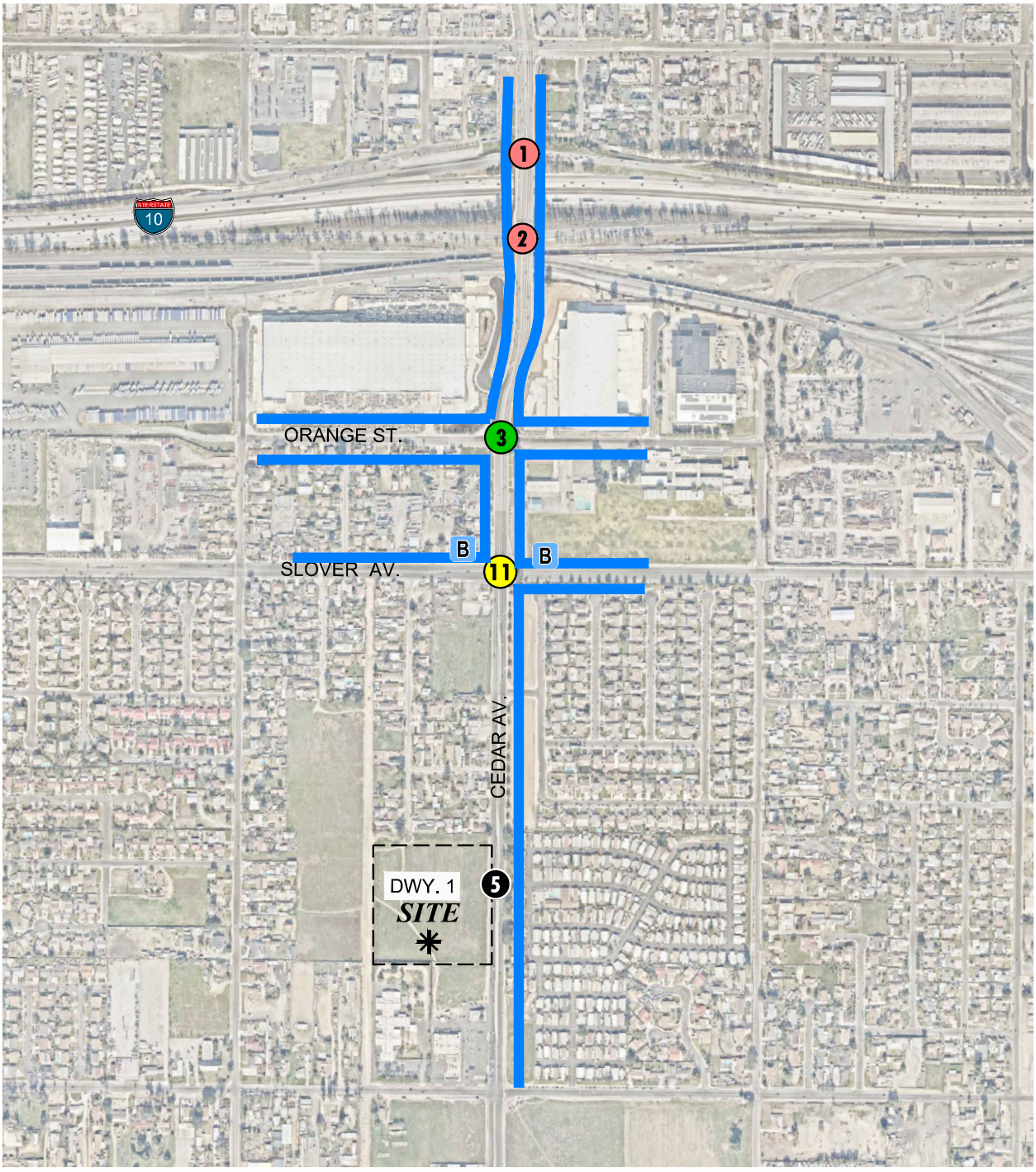
N

EXHIBIT 3-3: COUNTY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS



Source: County of San Bernardino

EXHIBIT 3-4: EXISTING PEDESTRIAN FACILITIES



LEGEND:

- = SIDEWALK
- B = BUS STOP
- 0 = NO CROSSWALK
- 0 = CROSSWALK ON ALL APPROACHES
- 0 = CROSSWALK ON TWO APPROACHES
- 0 = SCHOOL CROSSWALK ON FOUR APPROACHES

N

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URBAN CROSSROADS

3.5 TRANSIT SERVICE

The study area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County, with bus service along Cedar Avenue and Slover Avenue via Route 29. Omnitrans Route 290 runs along the I-10 Freeway but does not provide transit service to the study area. The existing transit routes within the area by Omnitrans is shown on Exhibit 3-5. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.6 EXISTING (2020) TRAFFIC COUNTS

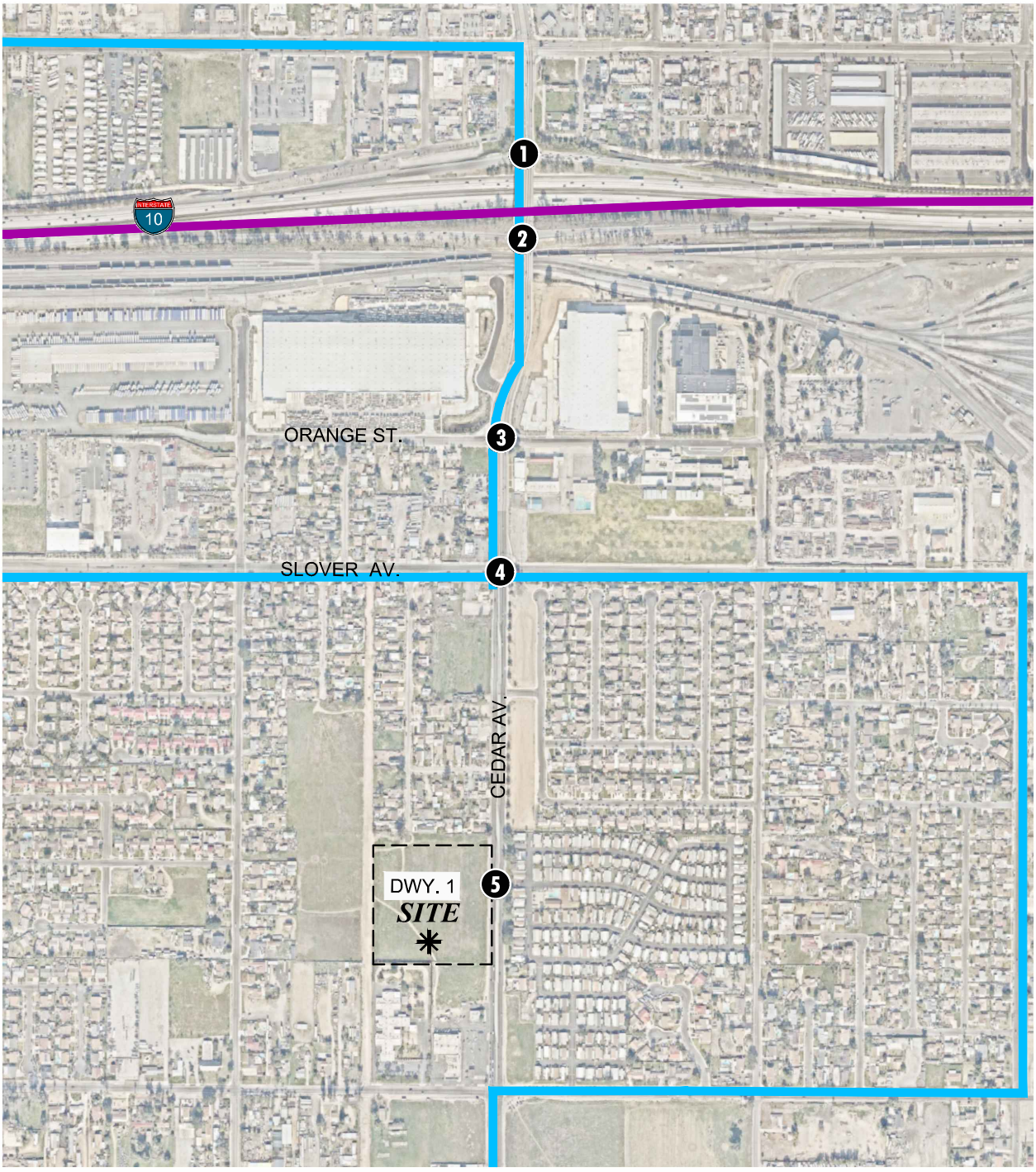
The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2019. The following peak hours were selected for analysis:

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

Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. As such, historic (2019) traffic counts were utilized in conjunction with a 2% growth rate to reflect 2020 conditions. The 2019 weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The traffic counts collected in May 2019 include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4 or More Axle Trucks. To represent the effects large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCE. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the CMP.

EXHIBIT 3-5: EXISTING TRANSIT ROUTES



A 2019 count data was not available for the existing Cedar Village Mobile Home Park entry on Cedar Avenue. As such, a 2020 traffic count was conducted at this location in June 2020. The existing Cedar Village Mobile Home Park has 239 home sites and currently has access on Cedar Avenue, Santa Ana Avenue to the south, and Larch Avenue to the east. 50% of the ITE based trip generation for a mobile home park was used to conservatively calculate the total inbound and outbound trips that could potentially access the Cedar Avenue entry. Comparison of the ITE based trip generation to the June 2020 traffic count suggests that additional modifications were not necessary to adjust for any reductions in traffic that would be attributable to the COVID-19 pandemic. However, through volumes along Cedar Avenue were understated in comparison to the historic 2019 traffic count (adjusted to 2020), so traffic along Cedar Avenue was flowed at Driveway 1 on Cedar Avenue to represent through traffic more accurately along Cedar Avenue.

Existing weekday ADT volumes are shown on Exhibit 3-6. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 14.30 = Leg Volume

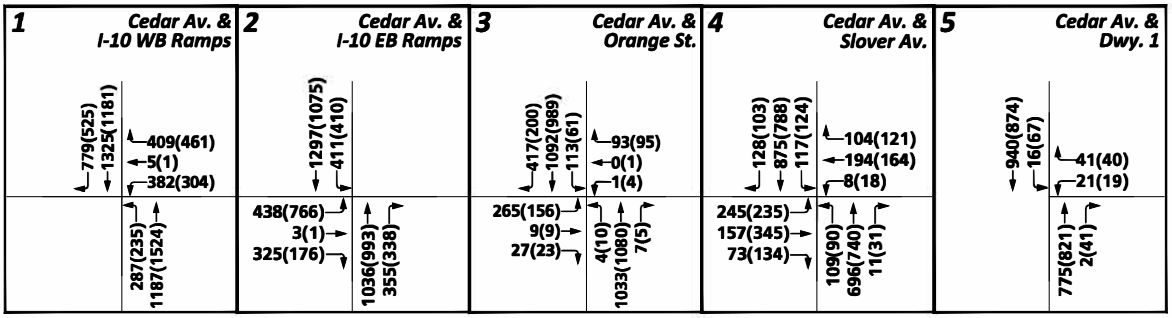
A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.00 percent. As such, the above equation utilizing a factor of 14.30 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.00 percent (i.e., 1/0.06995 = 14.30) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are shown on Exhibit 3-6.

3.7 INTERSECTION OPERATIONS ANALYSIS

Signal timing for the freeway arterial-to-ramp intersections and the signalized intersections along the Cedar Avenue corridor have been obtained from the County and reflect the SBCTA coordinated signal timing that has recently been implemented in 2020. It should be noted that for the purposes of this analysis, no optimization of signal timing has been performed for the LOS analysis unless noted otherwise (for improvements).

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates all existing study area intersections are currently operating at an acceptable LOS during the peak hours. Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-7. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

EXHIBIT 3-6: EXISTING (2020) TRAFFIC VOLUMES (IN PCE)



LEGEND:

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

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

N

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EXHIBIT 3-7: EXISTING (2020) SUMMARY OF LOS

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Table 3-1

Intersection Analysis for Existing (2020) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps	TS	1	2	0	0	3	1	0	0	0	0	1	1	23.6	23.5	C	C
2	Cedar Av. & I-10 EB Ramps	TS	0	3	1	1	2	0	1	1	0	0	0	0	26.1	28.3	C	C
3	Cedar Av. & Orange Av.	TS	1	2	0	1	2	1	1	1	0	0	1	0	22.9	22.5	C	C
4	Cedar Av. & Slover Av.	TS	1	2	0	1	2	0	1	2	d	1	2	0	44.9	42.7	D	D
5	Cedar Av. & Driveway 1	CSS	0	2	0	1	2	0	0	0	0	0	1	0	14.0	14.6	B	B

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

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

L = Left; T = Through; R = Right; d = Defacto Right Turn Lane

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

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

3.8 TRAFFIC SIGNAL WARRANTS ANALYSIS

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

3.9 OFF-RAMP QUEUING ANALYSIS

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

3.10 FREEWAY FACILITY ANALYSIS

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

3.11 RECOMMENDED IMPROVEMENTS

3.11.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

As shown on Table 3-1, there are currently no deficient intersections for Existing traffic conditions. As such, no improvements have been recommended.

3.11.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown on Table 3-2, there are currently no peak hour queuing issues at I-10 Freeway study area interchange. As such, no improvements have been recommended.

3.11.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

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

Table 3-2

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

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	454 [2]	493 [2]	Yes	Yes
	WBR	480	320	408 [2]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	370	636 [2,3]	Yes	Yes
	EBL/T/R	1,900	315	580 [2]	Yes	Yes

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

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

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

Table 3-3

Freeway Facility Analysis for Existing (2020) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C
		East of Cedar Av.	5	22.5	C	21.2	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C
		East of Cedar Av.	4	25.1	C	26.8	D

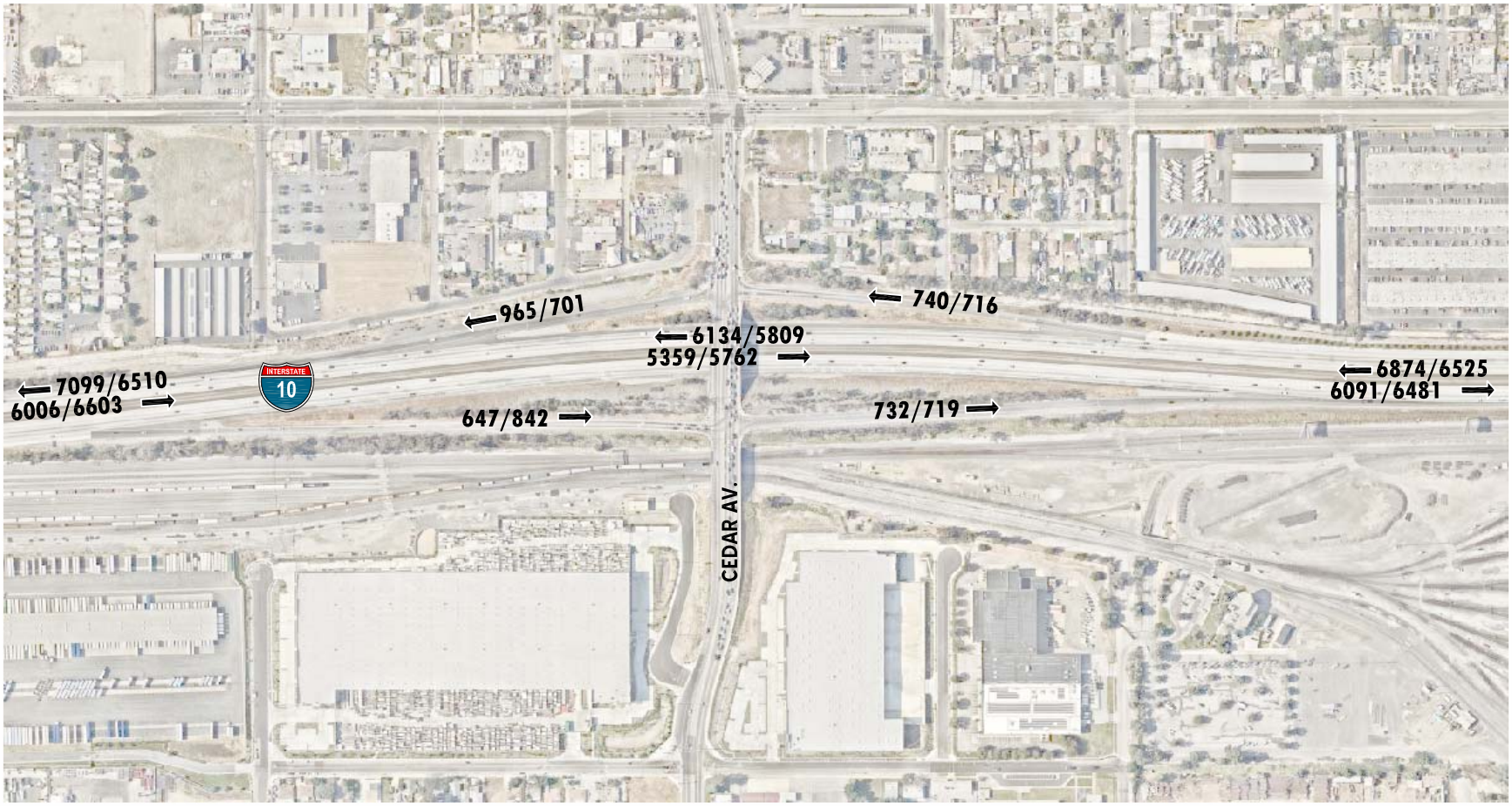
* **BOLD** = Unacceptable Level of Service

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

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

[3] LOS = Level of Service

EXHIBIT 3-8: EXISTING (2020) FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 8.940 acres of truck terminal use. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2021. Access to the Project site will be provided to Cedar Avenue via a proposed full-access signalized driveway. Regional access to the Project site will be provided by the I-10 Freeway via Cedar Avenue.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. Truck terminal rates based on acreage are not readily available in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017). In addition, the intermodal truck terminal land use in the ITE Trip Generation Manual is not consistent with the proposed use as there would be no transfer of goods on the proposed site. Lastly, the intermodal truck terminal trip generation rates published in the ITE Trip Generation Manual are based on limited survey data (2-4 sites). As such, in order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003) for the Truck Terminal land use was used to estimate the trip generation. (7) Based on the characteristics of the proposed Project, it is assumed Project traffic will consist of passenger cars (20.0% of total traffic) and 4+-axle trucks (80.0% of total traffic). This vehicle mix is based on the Wheeler Trucking Project Focused Traffic Memorandum, prepared by LSA (2017), which evaluates a truck trailer yard project located in the vicinity of the proposed Project site. Trip generation rates for the proposed Project are shown in Table 4-1. (8)

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

The resulting trip generation for the proposed Project is shown in Table 4-2. As shown in Table 4-2, the proposed Project is anticipated to generate 716 actual trip ends per day, with 65 AM peak hour trips and 58 PM peak hour trips. For the purposes of the operations analysis, the PCE values shown in Table 4-2 were utilized.

Table 4-1

Project Trip Generation Rates[1]

Land Use	Units[2]	Weekday AM Peak Hour In	Weekday AM Peak Hour Out	Weekday AM Peak Hour Total	Weekday PM Peak Hour In	Weekday PM Peak Hour Out	Weekday PM Peak Hour Total	Weekday Daily
Actual Vehicle Trip Generation Rates								
Truck Terminal[1]	AC	2.880	4.320	7.200	3.200	3.200	6.400	80.000
Passenger Cars (20%)[3]		0.576	0.864	1.440	0.640	0.640	1.280	16.000
4+-Axle Truck Trips (80%)[3]		2.304	3.456	5.760	2.560	2.560	5.120	64.000
PCE Trip Generation Rates								
Truck Terminal[1]	AC	2.880	4.320	7.200	3.200	3.200	6.400	80.000
Passenger Cars (20%)[3]		0.576	0.864	1.440	0.640	0.640	1.280	16.000
4+-Axle Truck Trips (80%) (PCE =3 .0)[3]		6.912	10.368	17.280	7.680	7.680	15.360	192.000

[1] Truck Terminal rates based on acreage not readily available in the 10th Edition Trip Generation Manual.

Source: San Diego Municipal Code Land Development Code Trip Generation Manual, May 2003 (Truck Terminal Use).

[2] AC = Acres

[3] Vehicle mix source: Wheeler Trucking Project Focused Traffic Memorandum, prepared by LSA (2017).

Table 4-2

Project Trip Generation Summary

Project	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
Cedar Avenue Truck Storage	8.940	AC							
Passenger Cars:			5	8	13	6	6	12	144
Truck Trips (4+-Axle):			21	31	52	23	23	46	572
TOTAL TRIPS (Actual Vehicles)			***26***	***39***	***65***	***29***	***29***	***58***	***716***
Passenger Car Equivalent (PCE)									
Trailer Yard	8.940	AC							
Passenger Cars:			5	8	13	6	6	12	144
Truck Trips (4+-Axle):			62	93	155	69	69	138	1,716
TOTAL TRIPS (PCE)			***67***	***101***	***168***	***75***	***75***	***150***	***1,860***

[1] AC = Acres

4.2 PROJECT TRIP DISTRIBUTION

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

4.3 MODAL SPLIT

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

4.4 PROJECT TRIP ASSIGNMENT

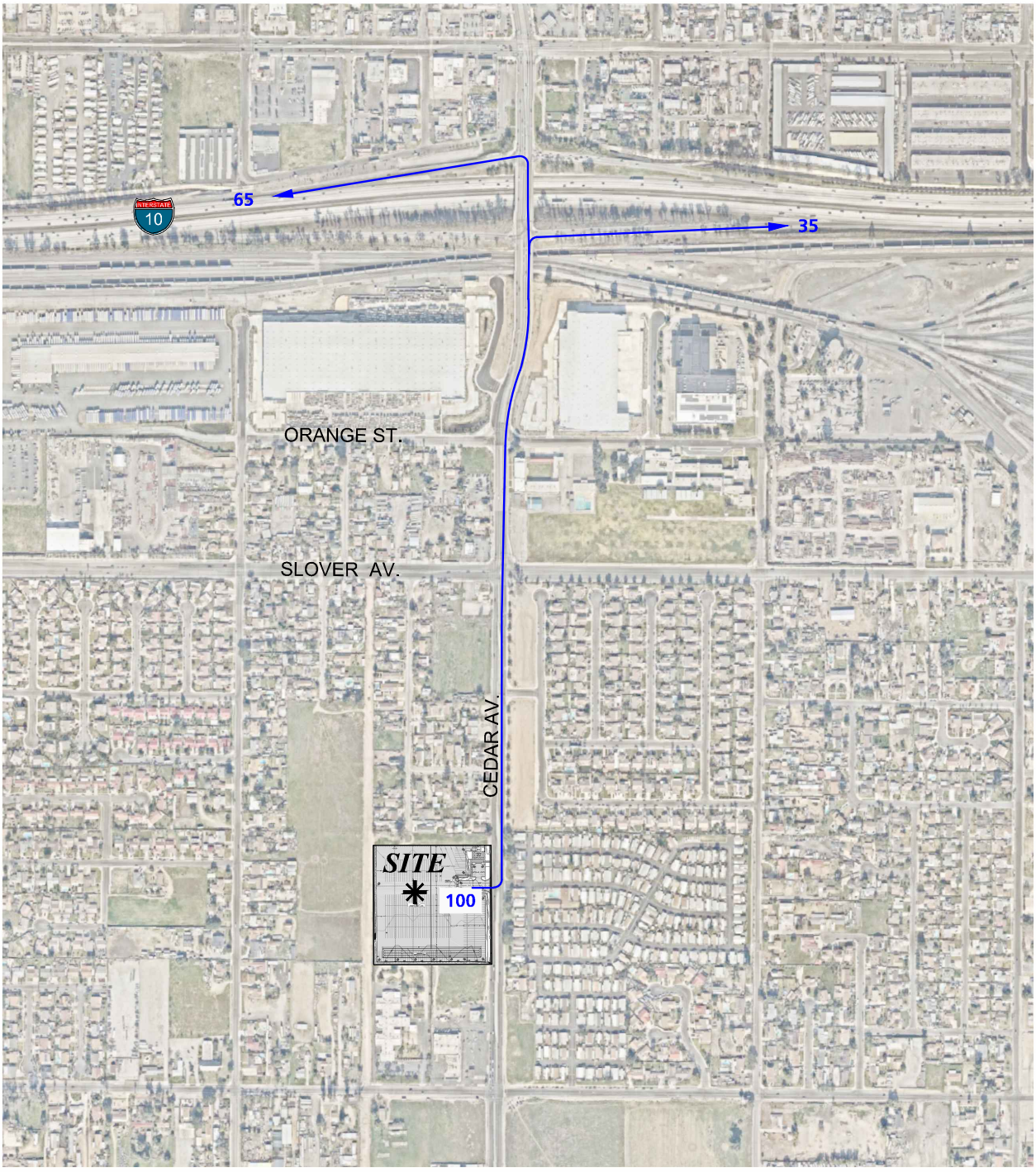
The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project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

4.5 BACKGROUND TRAFFIC

4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 1.5% per year. The total ambient growth is 1.5% for 2021 traffic conditions (compounded growth of 1.5 percent per year over 1 year). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year Cumulative (2021) traffic volumes are provided in Section 6 of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative "With Project" forecasts for each applicable phase.

EXHIBIT 4-1: PROJECT (TRUCK) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

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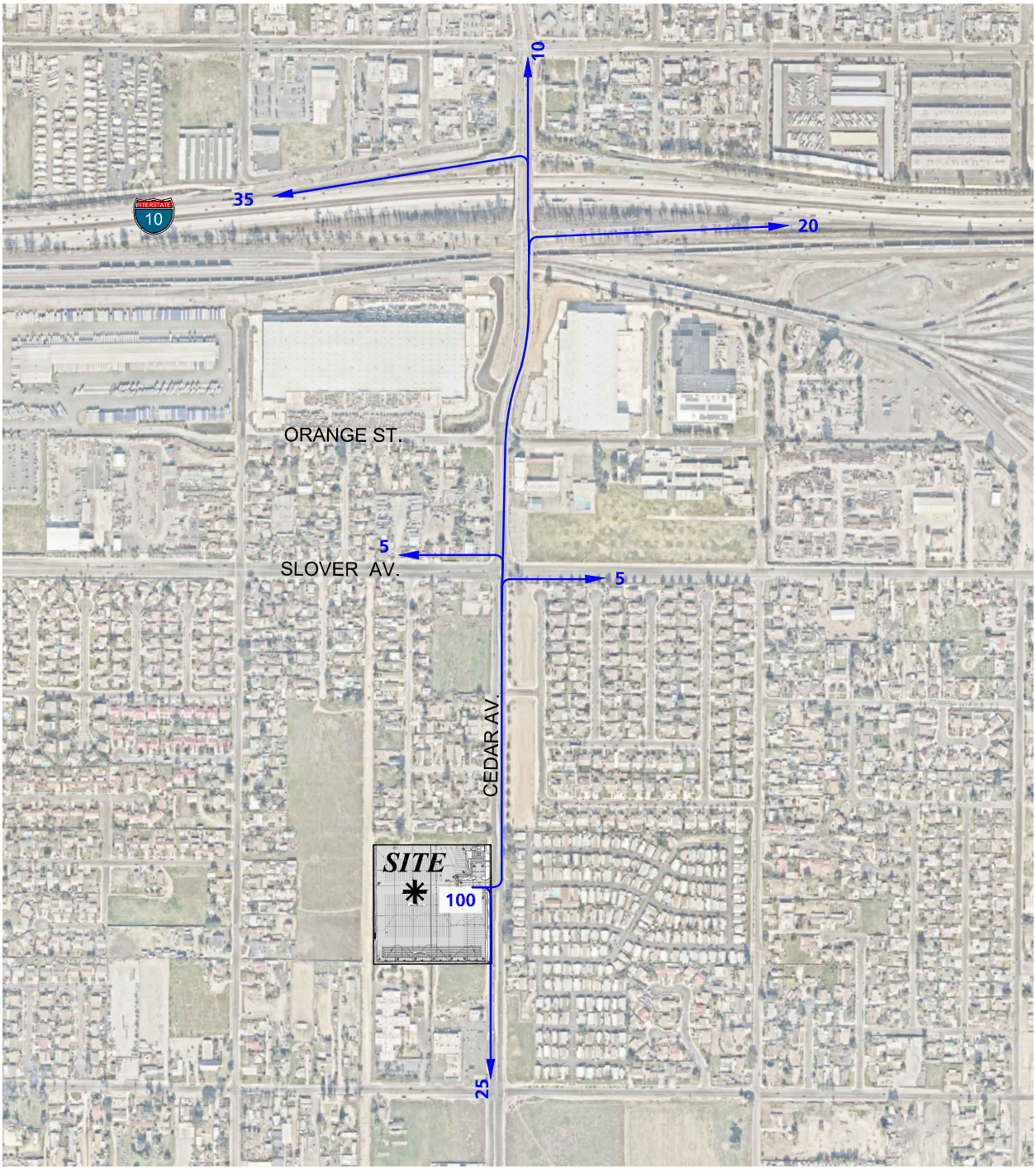
EXHIBIT 4-2: PROJECT (PASSENGER CAR) TRIP DISTRIBUTION



LEGEND:

10 = PERCENT TO/FROM PROJECT

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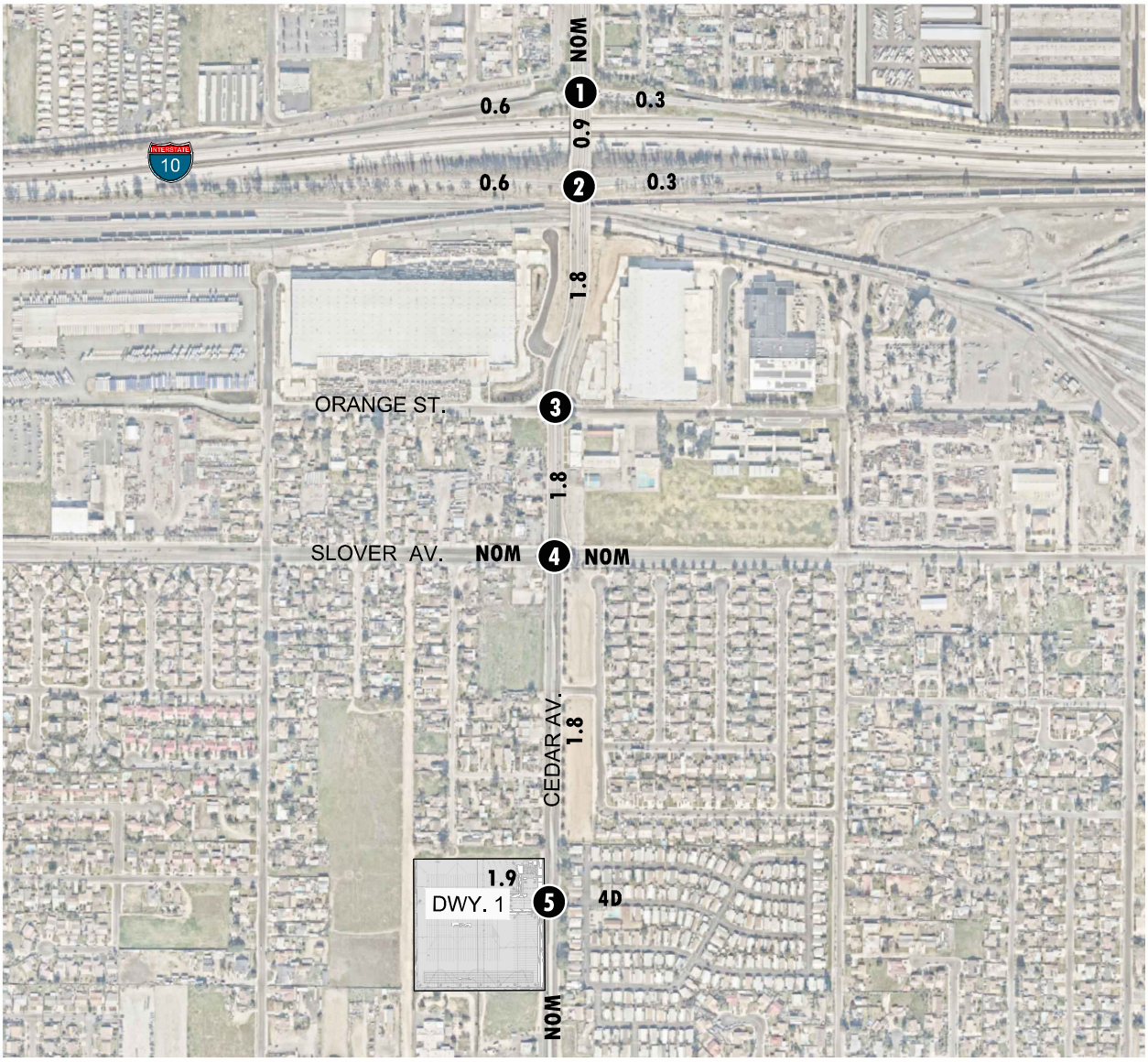
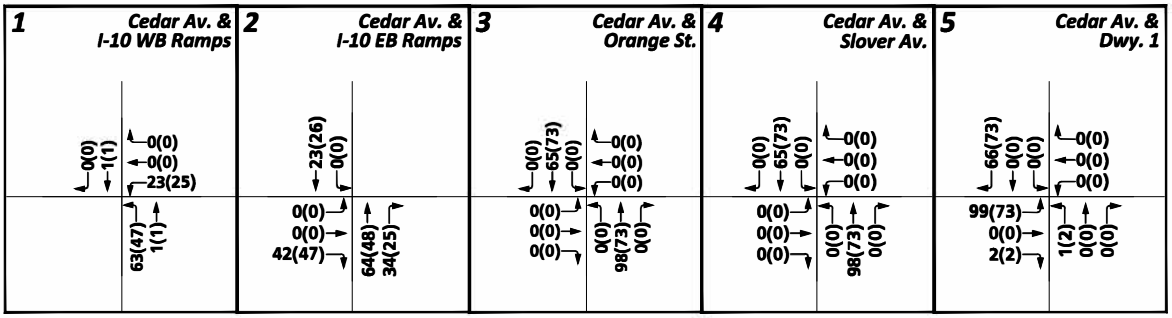
EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)





LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 = *VEHICLES PER DAY (1000'S)*
NOM = *NOMINAL, LESS THAN 50 VEHICLES PER DAY*

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URBAN CROSSROADS

4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (May 2020) growth forecasts for the County of San Bernardino identifies projected growth in population of 308,100 in 2016 to 353,100 in 2045, or a 14.61% increase over the 29-year period. (9) The change in population equates to roughly a 0.47% growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 18.43%, or a 0.59% annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 24.00%, or a 0.74% annual growth rate.

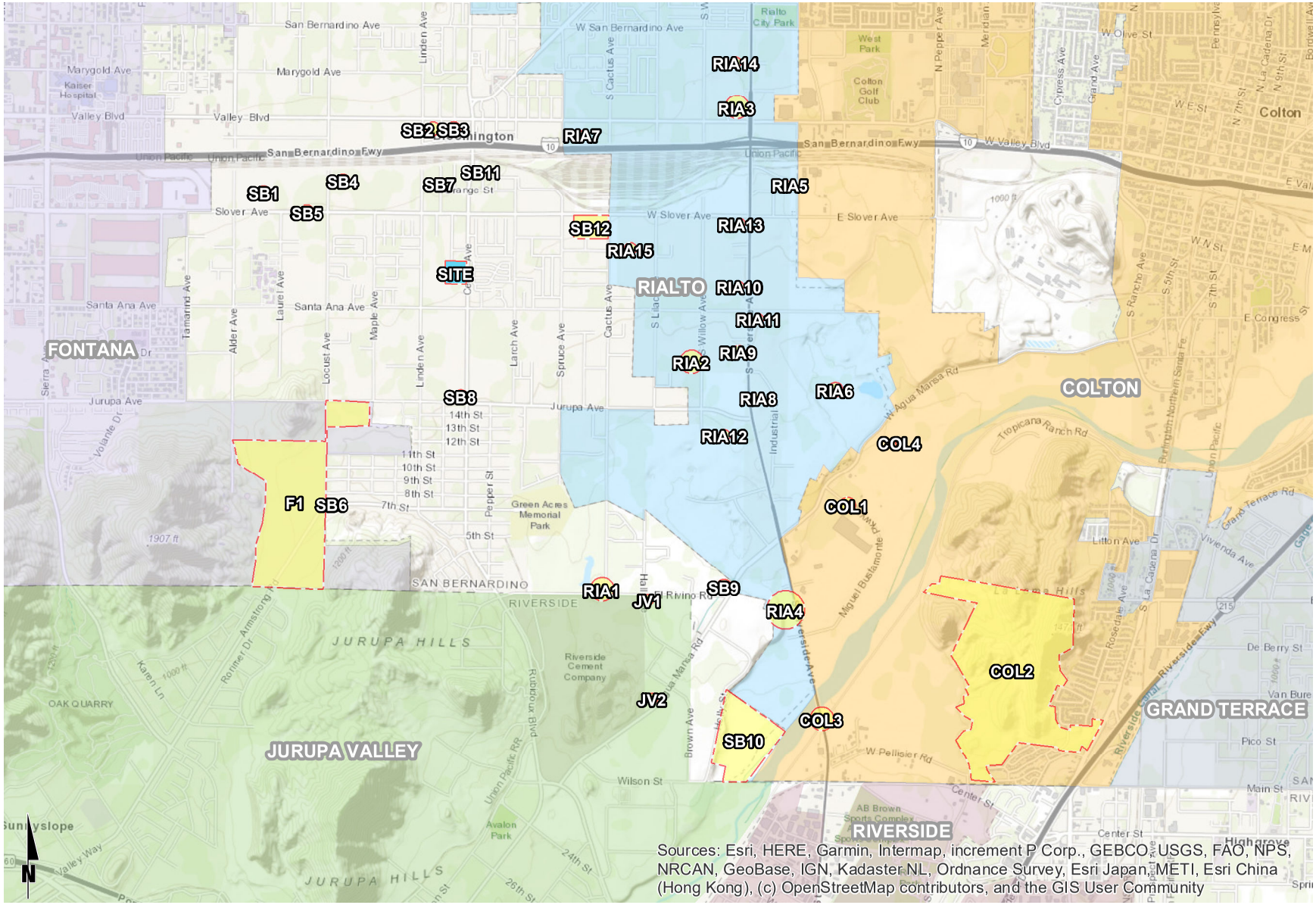
Based on a comparison of Existing (2020) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is estimated at approximately 1.65%, compounded annually between Existing (2020) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 1.13% compounded annually to as high as 2.27% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the County of San Bernardino for Opening Year Cumulative and Horizon Year (2040) traffic conditions, especially when considered along with the addition of project-related traffic, which would tend to overstate as opposed to understate the potential effects to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

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

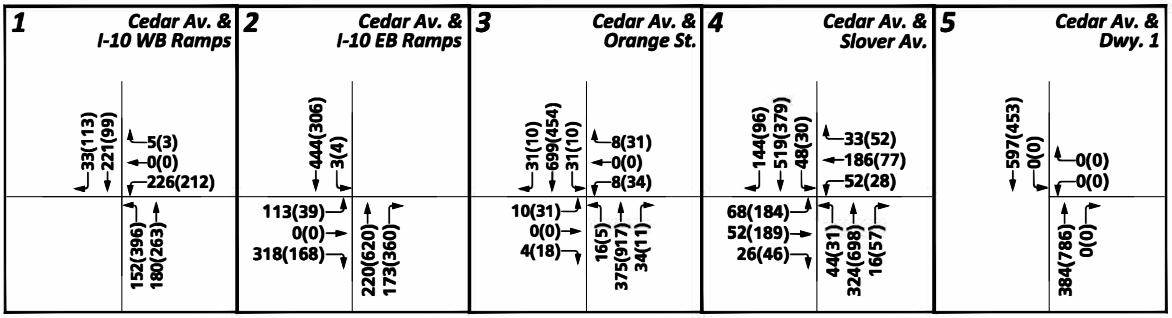
Exhibit 4-4 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects on Table 4-3 are reflected as part of the background traffic. In an effort to conduct a conservative analysis, the cumulative projects are added in conjunction with the ambient growth identified in Section 4.5.1 *Background Traffic: Opening Year Cumulative Conditions*. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-5 for near-term traffic conditions.

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP



URBAN CROSSROADS

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



LEGEND:

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

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

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Table 4-3

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
County of San Bernardino				
SB1	NWC of Slover Av. and Locust Av.	Fast Food Restaurant With Drive-Thru	3.265	TSF
		Retail Store	7.200	TSF
		Warehouse	20.750	TSF
SB2	SEC of Linden Av. and Valley Bl.	Fast Food Restaurant	1.500	TSF
SB3	Valley Bl., West of Linden Av.	Office Building	0.250	AC
SB4	Linden Av., north of Slover Av.	Tire Store	3.000	TSF
SB5	Slover Av. between Locust Av. and Laurel Av.	High-Cube Warehouse	344.000	TSF
SB6	Locust Av. and 7th St.	SFDR	198	DU
SB7	NEC and NWC of Cedar Av. and Orange St.	Warehouse	395.000	TSF
SB8	NWC of Cedar Av. and Jurupa Av.	High-Cube Warehouse	677.000	TSF
SB9	West of Agua Mansa Rd. and North of El Rivino Rd.	High-Cube Warehouse	476.000	TSF
		Warehouse	30.000	TSF
SB10	Holly Street Truck Terminal	Truck Terminal	450.000	TSF
SB11	Cedar Avenue Technology Center	Warehouse	184.770	TSF
SB12	Cactus and Slover Warehouse	Warehouse	257.855	TSF
City of Fontana				
F1	West Valley Logistics Center	High-Cube Transload & Short-Term Storage	3183.100	TSF
		Warehouse	290.590	TSF
City of Rialto				
RIA1	Panattoni I-10 (Cactus Av. & El Rivino Rd.)	Warehouse	2,475.745	TSF
RIA2	CapRock III	Warehouse	582.000	TSF
RIA3	Newmark Merrill Companies	Discount Super Store	198.000	TSF
		Tire Store	9.861	TSF
		Retail	25.436	TSF
		Fast Food w/ Drive-Thru	5.484	TSF
RIA4	Kore Infrastructure	Biosolids Facility	288	TPD
RIA5	NEC of Sycamore Av. and Cameron Wy.	Trucking	--[3]	--
RIA6	South of Santa Ana Av., East of Riverside Av.	Warehouse	370.000	TSF
RIA7	South of Valley Bl., West of Cactus Av.	Warehouse	--[3]	--
RIA8	SEC of Riverside Av. and Industrial Dr.	Trucking	--[3]	--
RIA9	NWC of Riversid Av. and Industrial Dr.	Truck Drop	--[3]	--
RIA10	NWC of Riverside Av. and Santa Ana Av.	Warehouse	527.900	TSF
RIA11	SEC of Riverside Av. and Santa Ana Av.	Super Convenience Market/Gas Station	16	VFP
		Diesel Station	2	VFP
RIA12	South of Jurupa Av., West of Riverside Av.	FedEx	--[3]	--
RIA13	SWC of Riverside Av. & Slover Av.	Speciality Retail & Fast Food w/ Drive-Thru	8.510	TSF

Table 4-3

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
RIA14	North of Valley Bl., West of Riverside Av.	Warehouse	--[3]	--
RIA15	South of Slover Av., East of Cactus Av.	Wheeler Trucking	--[3]	--
City of Colton				
COL1	2036 Miguel Bustamante Pkwy.	Warehouse	124.588	TSF
	2053 Miguel Bustamante Pkwy.	Warehouse	174.996	TSF
COL2	Roquet Ranch	SFDR	754	DU
		Condo/Townhomes	244	DU
		Active Adult - Attached	52	DU
		Shopping Center	6.500	TSF
		Coffee Shop with Drive Thru	1.500	TSF
		Fast Food with Drive Thru	4.000	TSF
		Active Park	11.1	AC
		Passive Park	8.4	AC
COL3	2163 Riverside Av.	High Cube Warehouse	447.330	TSF
COL4	North of Agua Mansa Rd., East of Hopkins Rd.	Warehouse	808.500	TSF
City of Jurupa Valley				
JV1	Inland Empire Cold Storage	Cold Storage Facility	40.800	TSF
JV2	Agua Mansa Commerce Park Specific Plan	High-Cube Warehouse	4277.000	TSF
		General Light Industrial	150.000	TSF
		Commercial Retail	25.000	TSF

[1] SFDR = Single Family Detached Residential

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

[3] Quantity and land use unknown. City of Rialto provided estimated trips and PCE AM and PM.

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

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

The traffic forecasts reflect the area-wide growth anticipated between Existing (2020) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in May 2019. The SBTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

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

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

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to Opening Year Cumulative (2021) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative (2021) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2020) and Opening Year Cumulative (2021) conditions. Future estimated peak

hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

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

5 E+P TRAFFIC CONDITIONS

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

5.1 ROADWAY IMPROVEMENTS

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

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. The ADT and weekday AM and PM peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 INTERSECTION OPERATIONS ANALYSIS

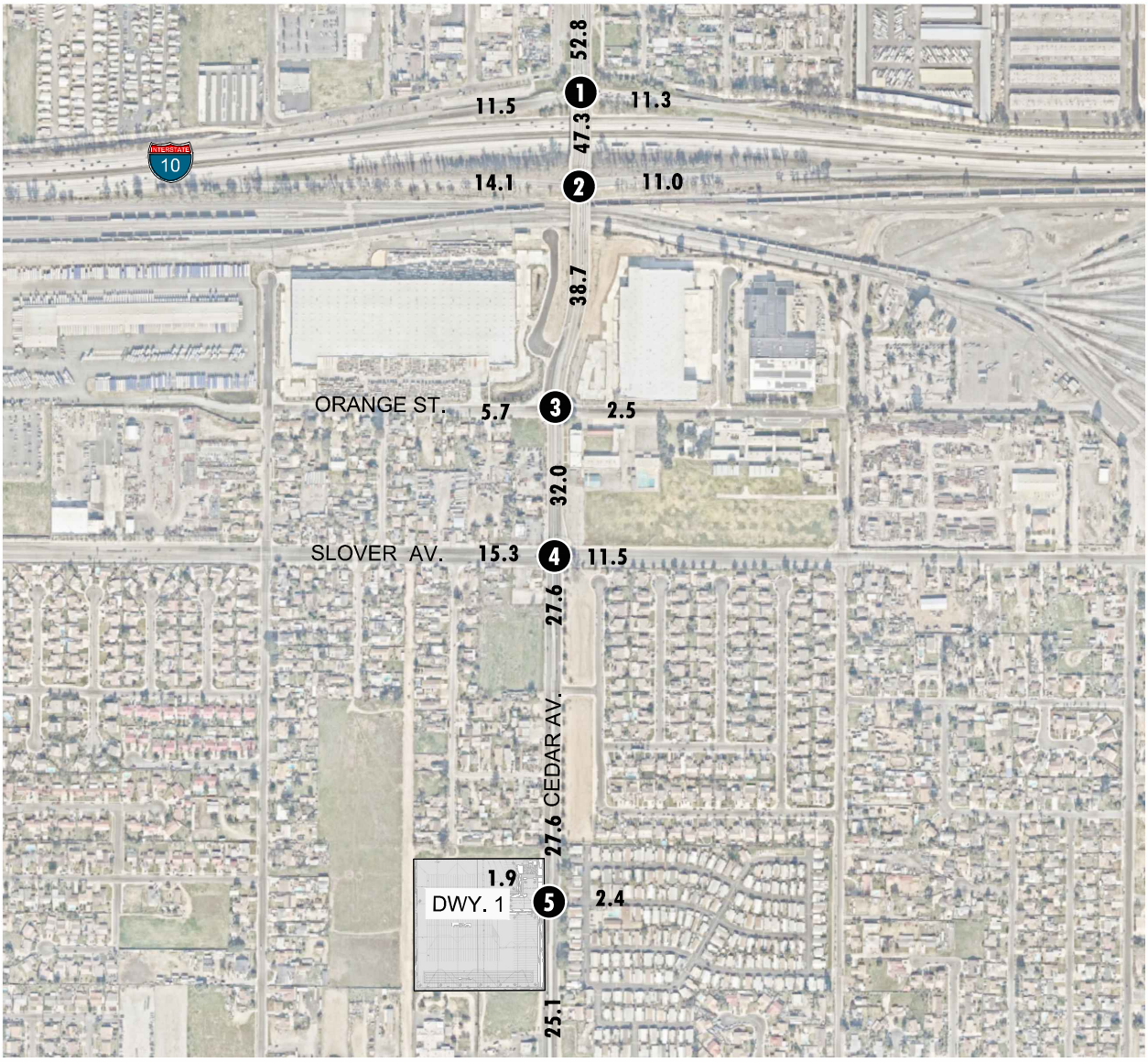
E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized on Table 5-1 for E+P traffic conditions, which indicate that consistent with Existing traffic conditions, the study area intersections are anticipated to continue to operate at an acceptable LOS under E+P traffic conditions. Consistent with Table 5-1, a summary of the peak hour intersection LOS is shown on Exhibit 5-2 for E+P traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

The following unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant for E+P traffic conditions (see Appendix 5.2):

- Cedar Avenue & Driveway 1 (#5)

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (IN PCE)



1 Cedar Av. & I-10 WB Ramps	2 Cedar Av. & I-10 EB Ramps	3 Cedar Av. & Orange St.	4 Cedar Av. & Slover Av.	5 Cedar Av. & Dwy. 1
779(525) → 1326(1182) ← 409(461) ← 5(1) ← 405(329)	1320(1101) → 411(410) ←	417(200) → 1157(1062) → 113(61) ← 93(95) ← 0(1) ← 1(4)	128(103) → 940(861) → 117(124) ← 104(121) ← 194(164) ← 8(18)	66(73) → 940(874) → 16(67) ← 41(40) ← 0(0) ← 21(19)
350(282) → 1188(1525) ←	438(766) → 3(1) → 367(223) → 1100(1041) ← 389(363) ←	265(156) → 9(9) → 27(23) → 4(10) ← 1131(1153) ← 7(5) ←	245(235) → 157(345) → 73(134) → 109(90) ← 794(813) ← 11(31) ←	99(73) → 0(0) → 2(2) → 1(2) ← 775(821) ← 2(41) ←

LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 = *VEHICLES PER DAY (1000'S)*

N

EXHIBIT 5-2: E+P SUMMARY OF LOS

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Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2020)				E+P			
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service	
			AM	PM	AM	PM	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps	TS	23.6	23.5	C	C	26.9	25.3	C	C
2	Cedar Av. & I-10 EB Ramps	TS	26.1	28.3	C	C	27.4	42.0	C	D
3	Cedar Av. & Orange Av.	TS	22.9	22.5	C	C	24.2	23.1	C	C
4	Cedar Av. & Slover Av.	TS	44.9	42.7	D	D	45.4	42.8	D	D
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	14.0	14.6	B	B	17.6	30.6	B	B

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

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

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

[3] The Project will construct a traffic signal as part of the Project design features.

5.5 OFF-RAMP QUEUING ANALYSIS

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

5.6 FREEWAY FACILITY ANALYSIS

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

5.7 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient. Improvements necessary to improve project-related traffic deficiencies are also discussed below.

5.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

As shown in Table 5-1, the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours with the addition of Project traffic. As such, no improvements have been recommended.

5.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

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

5.7.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

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

Table 5-2

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

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2020)				E+P			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	454 [2]	493 [2]	Yes	Yes	495 [2]	518 [2]	Yes	Yes
	WBR	480	320	408 [2]	Yes	Yes	321	435 [2]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	370	636 [2,3]	Yes	Yes	370	678 [2,3]	Yes	Yes
	EBL/T/R	1,900	315	580 [2]	Yes	Yes	369	620 [2]	Yes	Yes

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

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

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

Table 5-3

Freeway Facility Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2020)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D	31.7	D	27.9	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C	30.9	D	27.5	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C	22.2	C	20.9	C
		East of Cedar Av.	5	22.5	C	21.2	C	22.5	C	21.4	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D	25.1	C	28.0	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C	18.9	C	21.0	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C	25.4	C	26.5	C
		East of Cedar Av.	4	25.1	C	26.8	D	25.2	C	27.3	D

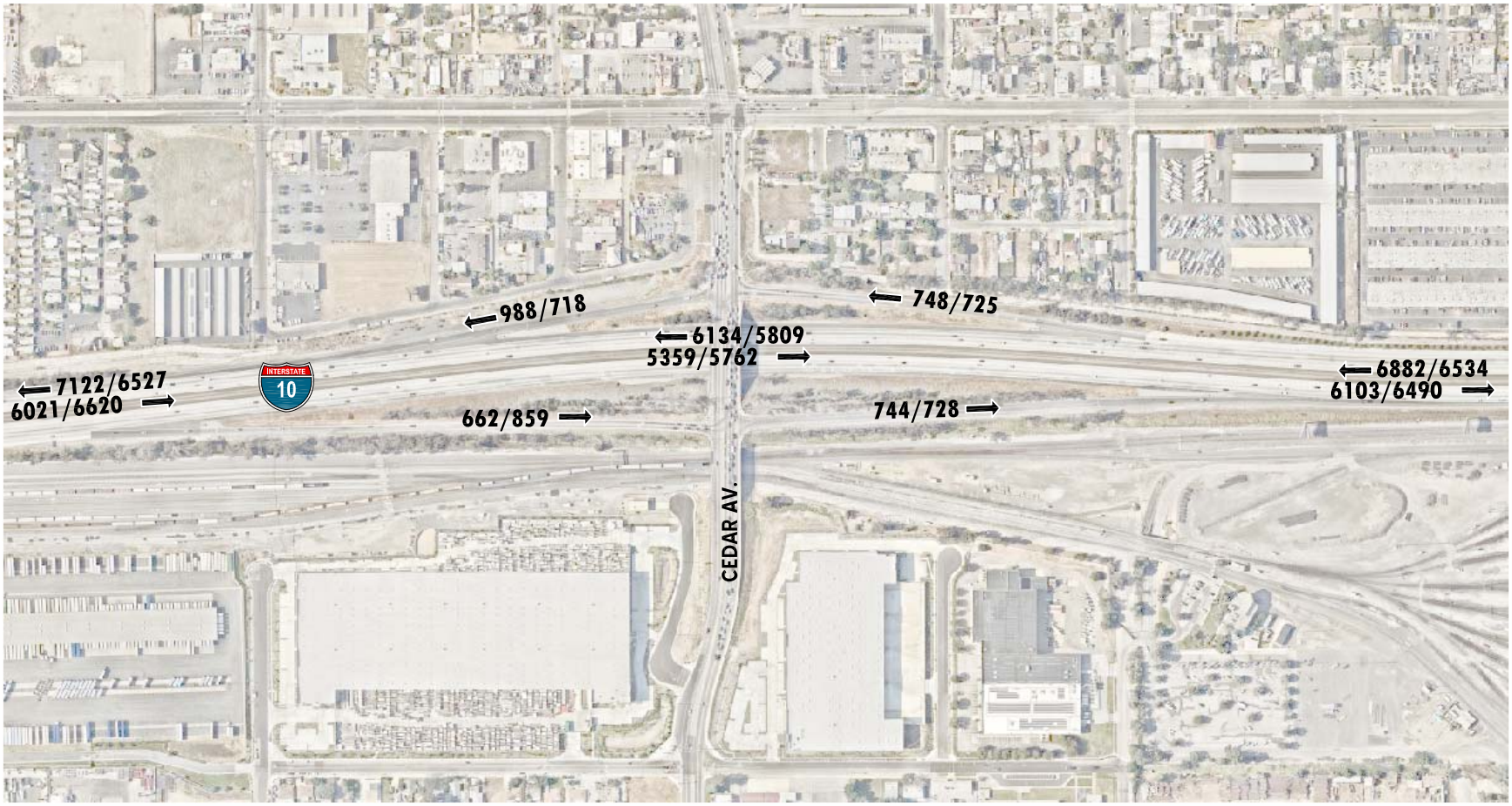
* **BOLD** = Unacceptable Level of Service

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

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

[3] LOS = Level of Service

EXHIBIT 5-3: E+P FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

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6 OPENING YEAR CUMULATIVE (2021) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2021) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2021) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only.

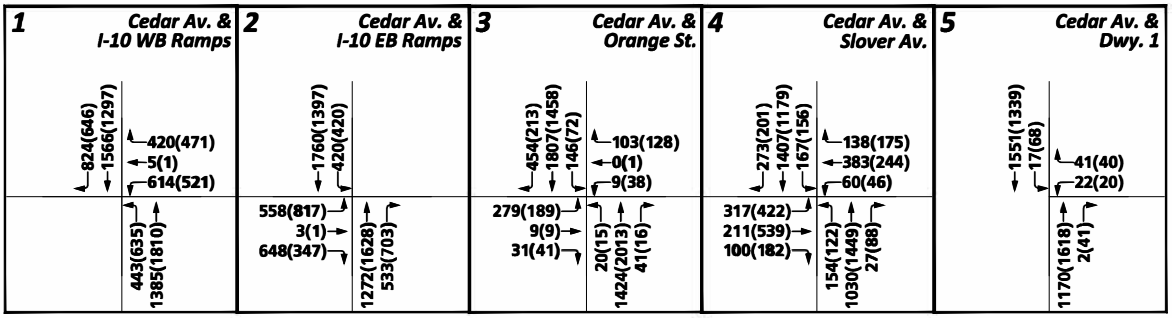
6.2 OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 1.5% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2021) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2021) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2021) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) *= AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 *= VEHICLES PER DAY (1000'S)*

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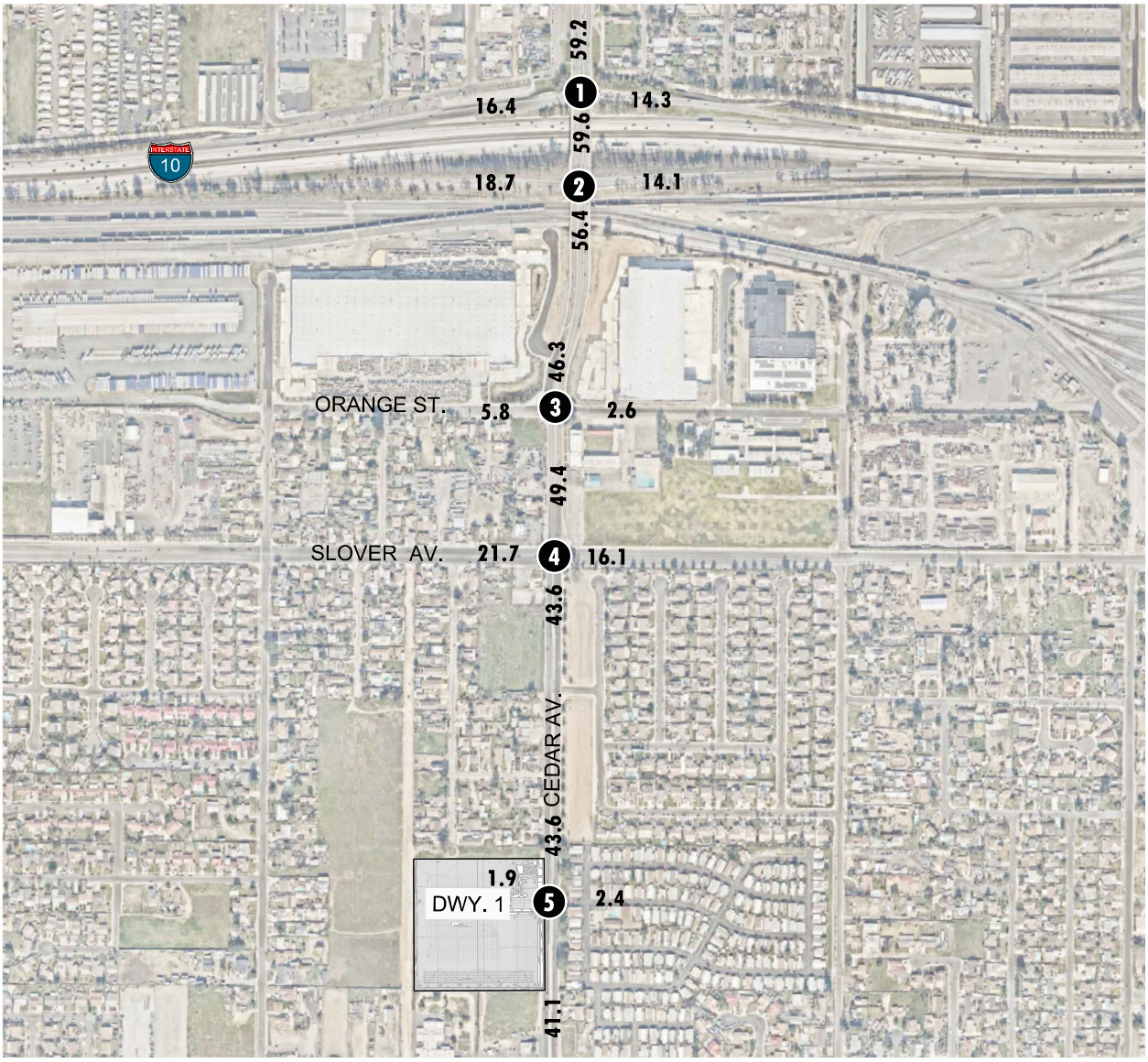
EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



1 Cedar Av. & I-10 WB Ramps	2 Cedar Av. & I-10 EB Ramps	3 Cedar Av. & Orange St.	4 Cedar Av. & Slover Av.	5 Cedar Av. & Dwy. 1
824(646) → 1567(1298) ← 420(471) ← 5(1) ← 637(546)	1783(1423) → 420(420)	454(213) → 1872(1531) → 146(72) ← 103(128) ← 0(1) ← 9(38)	273(201) → 1472(1252) → 167(156) ← 138(175) ← 383(244) ← 60(46)	66(73) → 1551(1339) → 17(68) ← 41(40) ← 0(0) ← 22(20)
506(682) → 1386(1811)	558(817) → 3(1) → 690(394) → 1336(1676) → 567(728)	279(189) → 9(9) → 31(41) → 20(15) → 1522(2086) → 41(16)	317(422) → 211(539) → 100(182) → 154(122) → 1128(1522) → 27(88)	99(73) → 0(0) → 2(2) → 1(2) → 1170(1618) → 2(41)

LEGEND:

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

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

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6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2021) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown on Table 6-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2021) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E PM peak hour only
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Orange Street (#3) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS F PM peak hour only
- Cedar Avenue & Driveway 1 (#5) – LOS E PM peak hour only

A summary of the peak hour intersection LOS for Opening Year Cumulative (2021) Without Project conditions is shown on Exhibit 6-3. The intersection operations analysis worksheets for Opening Year Cumulative (2021) Without Project traffic conditions are included in Appendix 6.1 of this TA.

6.4.2 OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-1 and illustrated on Exhibit 6-4, there are no additional study area intersections that are anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2021) With Project traffic conditions, in addition to the locations identified above for Opening Year Cumulative (2021) Without Project traffic conditions. It should be noted with the implementation of the Project design features as discussed in Section 1.7 *Recommendations* the intersection of Cedar Avenue & Driveway 1 is anticipated to operate at an acceptable LOS during the peak hours. The intersection operations analysis worksheets for Opening Year Cumulative (2021) With Project traffic conditions are included in Appendix 6.2 of this TA.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The only unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant under E+P traffic conditions. As such, no traffic signal warrants have been evaluated for Opening Year Cumulative (2021) Without Project and With Project traffic conditions.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2021) Conditions

#	Intersection	Traffic Control[2]	2021 Without Project				2021 With Project				Change in Delay[4]	
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service			
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps	TS	52.5	**71.0**	D	**E**	**61.0**	**82.2**	**E**	**F**	--	11.2
2	Cedar Av. & I-10 EB Ramps	TS	42.1	**55.5**	D	**E**	53.1	**58.6**	D	**E**	--	3.1
3	Cedar Av. & Orange Av.	TS	40.5	**66.8**	D	**E**	50.8	**67.5**	D	**E**	--	0.7
4	Cedar Av. & Slover Av.	TS	37.1	**130.4**	D	**F**	39.4	**143.4**	D	**F**	--	13.0
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	21.5	**36.5**	C	**E**	44.5	26.4	D	C	--	--

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

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

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

[3] The Project will construct a traffic signal as part of the Project design features.

[4] The change in delay is calculated between pre-Project and With Project scenarios for intersections that are operating at an unacceptable LOS for pre-Project conditions only.

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT SUMMARY OF LOS

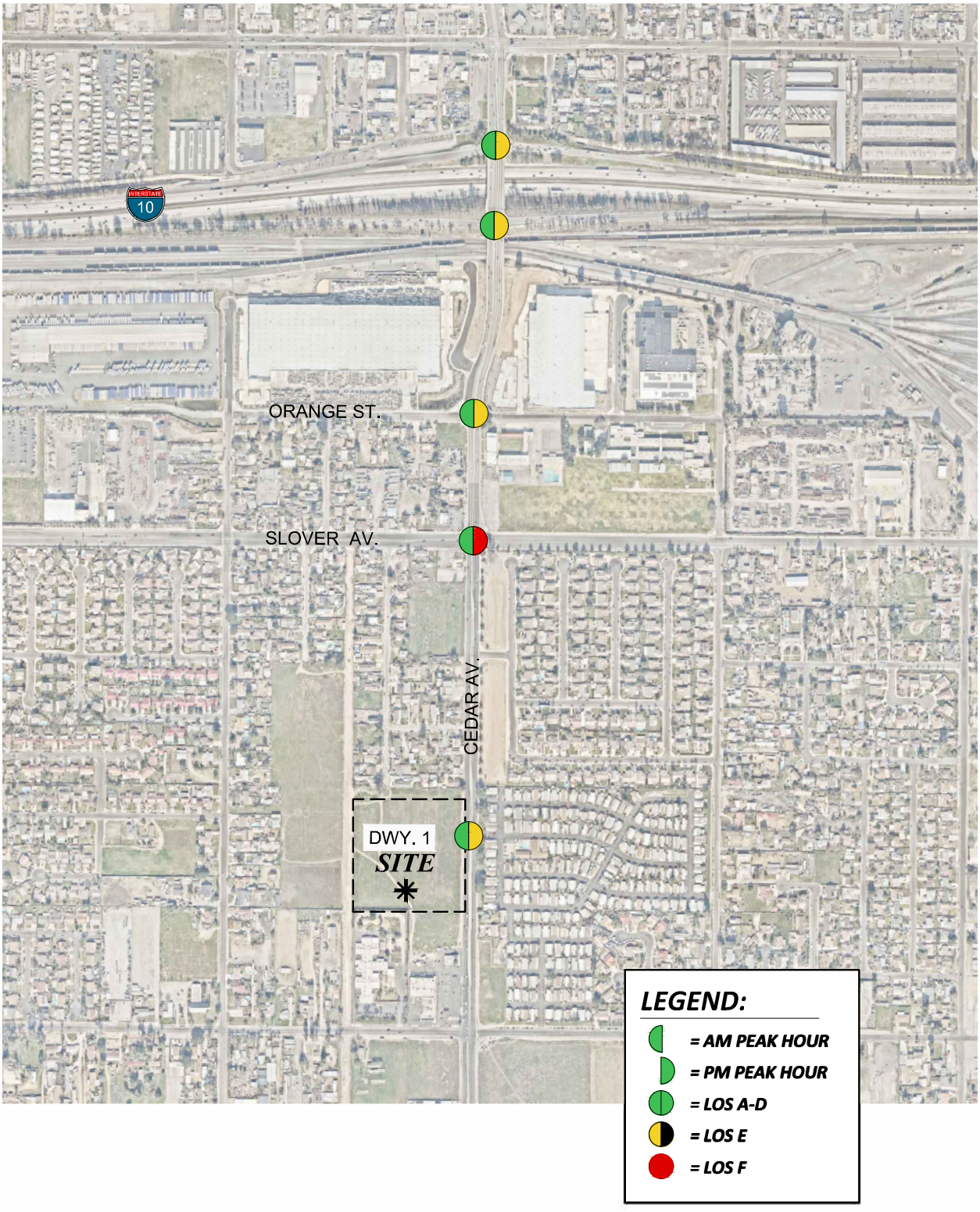

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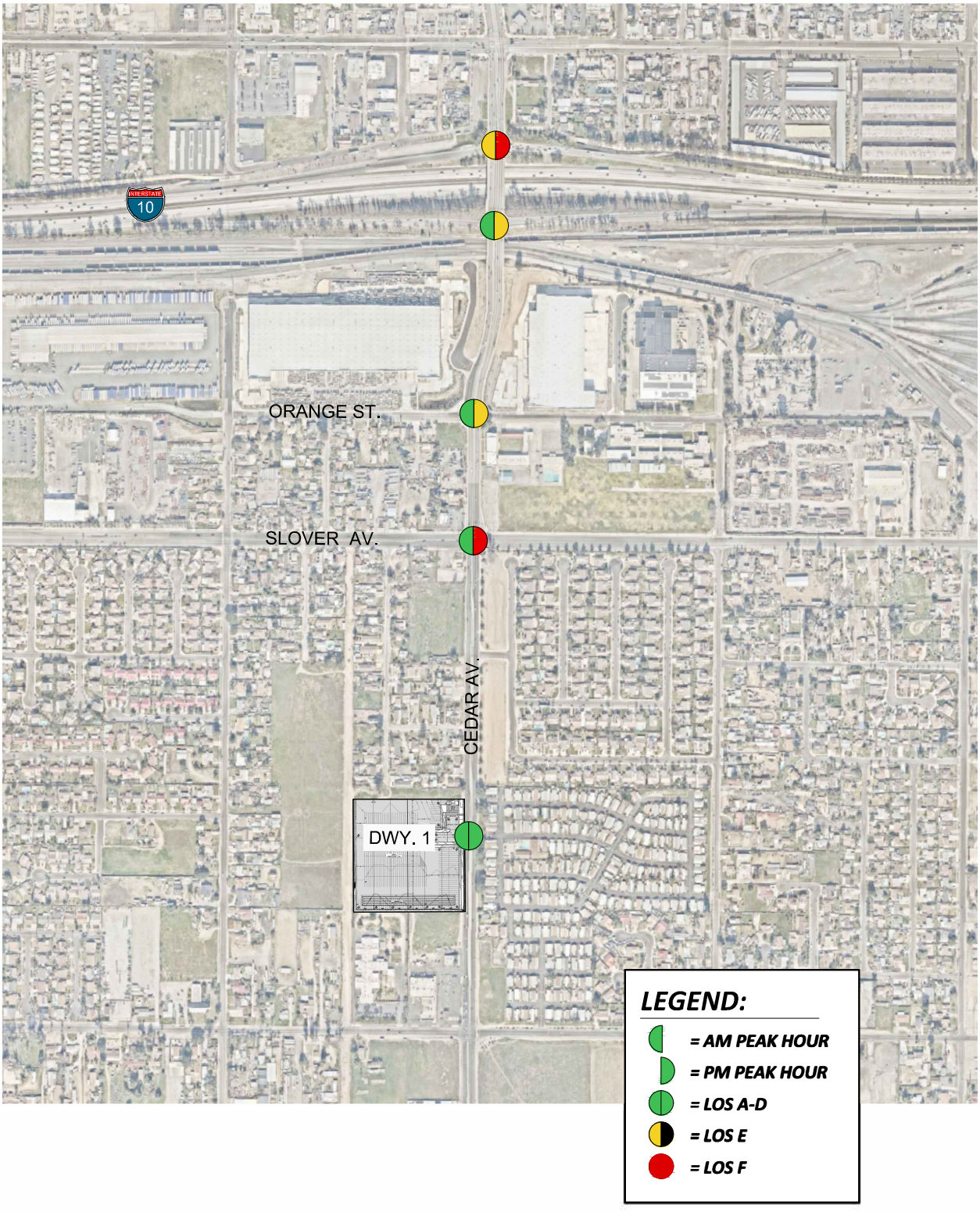
EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2021) WITH PROJECT SUMMARY OF LOS



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6.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2021) Without and With Project traffic conditions are shown on Table 6-2. As shown on Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2021) Without Project and With Project traffic conditions. Worksheets for Opening Year Cumulative (2021) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 6.3 and 6.4, respectively.

6.7 FREEWAY FACILITY ANALYSIS

Opening Year Cumulative (2021) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 6-5 and 6-6, respectively. As shown in Table 6-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2021) Without Project and With Project traffic conditions. Opening Year Cumulative (2021) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 6.5 and 6.6, respectively.

6.8 RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient.

6.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Opening Year Cumulative (2021) traffic deficiencies are presented on Table 6-4. If not constructed by the Project, the Project Applicant shall contribute to these improvements through payment of County DIF fees or fair share contribution as identified on Table 1-3. Worksheets for Opening Year Cumulative (2021) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.7 and Appendix 6.8.

6.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Opening Year Cumulative (2021) traffic conditions. As such, no improvements have been recommended.

6.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Table 6-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for Opening Year Cumulative (2021) traffic conditions. As such no improvements have been recommended.

Table 6-2

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2021) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2021 Without Project				2021 With Project			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	915 [2]	806 [2]	Yes	Yes	950 [2]	844 [2]	Yes	Yes
	WBR	480	432 [2]	538 [2,3]	Yes	Yes	432 [2]	538 [2,3]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	585 [2,3]	745 [2,3]	Yes	Yes	585 [2,3]	778 [2,3]	Yes	Yes
	EBL/T/R	1,900	877 [2]	645 [2]	Yes	Yes	937 [2]	681 [2]	Yes	Yes

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

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

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

Table 6-3

Freeway Facility Analysis for Opening Year Cumulative (2021) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2021 Without Project				2021 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D	32.6	D	28.8	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C	31.2	D	28.2	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C	22.8	C	21.4	C
		East of Cedar Av.	5	22.5	C	21.2	C	23.1	C	21.7	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D	25.9	C	28.8	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C	19.6	C	21.4	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C	25.7	C	26.9	C
		East of Cedar Av.	4	25.1	C	26.8	D	25.8	C	27.6	D

* **BOLD** = Unacceptable Level of Service

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

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

[3] LOS = Level of Service

Table 6-4

Intersection Analysis for Opening Year Cumulative (2021) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps																	
	- Without Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	35.7	30.1	D	C
	- With Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	40.9	31.9	D	C
4	Cedar Av. & Slover Av.																	
	- Without Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	46.3	50.6	D	D
	- With Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	47.8	52.7	D	D

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

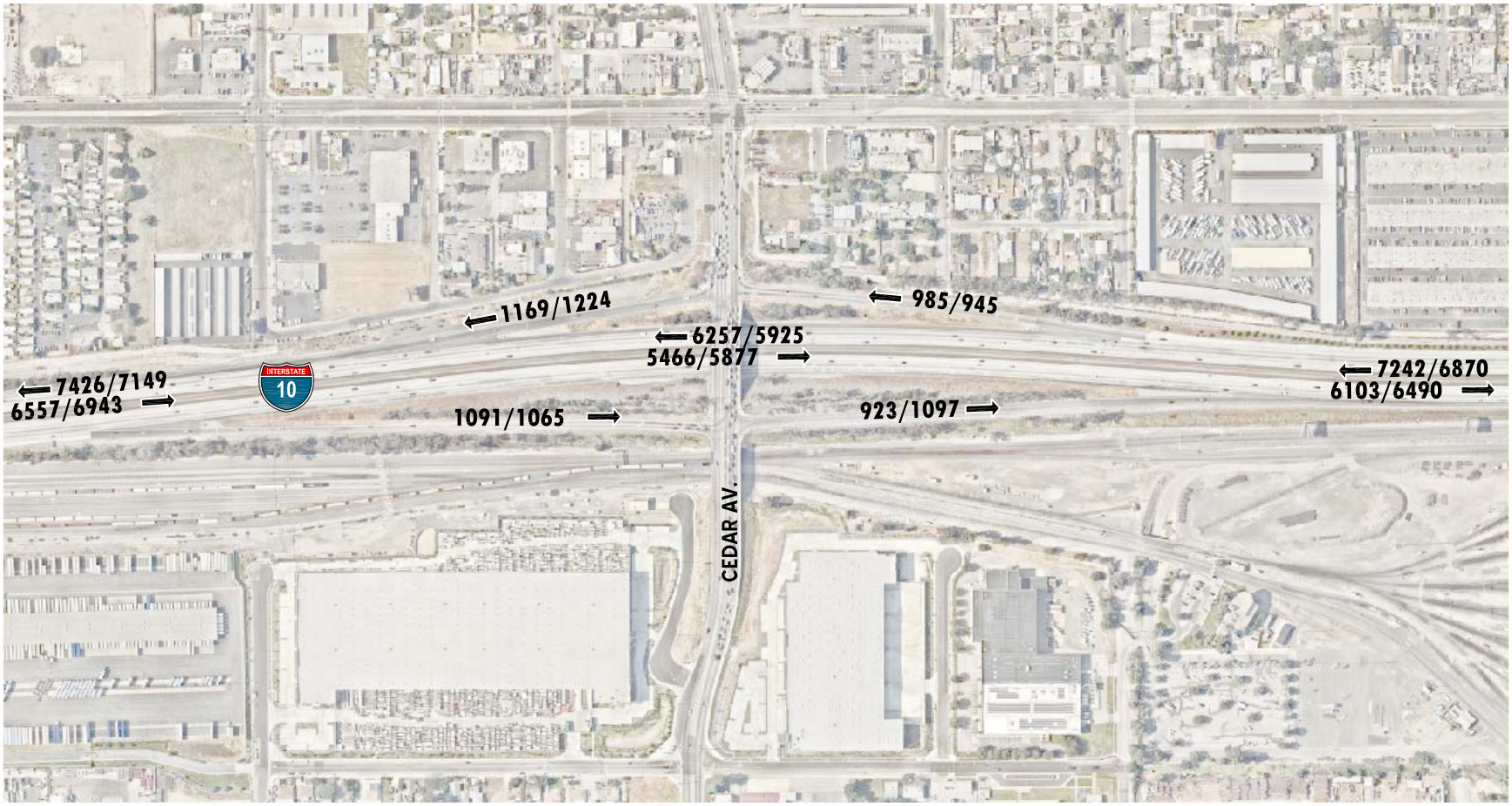
L = Left; T = Through; R = Right; **1** = Improvement

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

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

[4] Improvements are consistent with the I-10 Freeway/Cedar Avenue interchange project.

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

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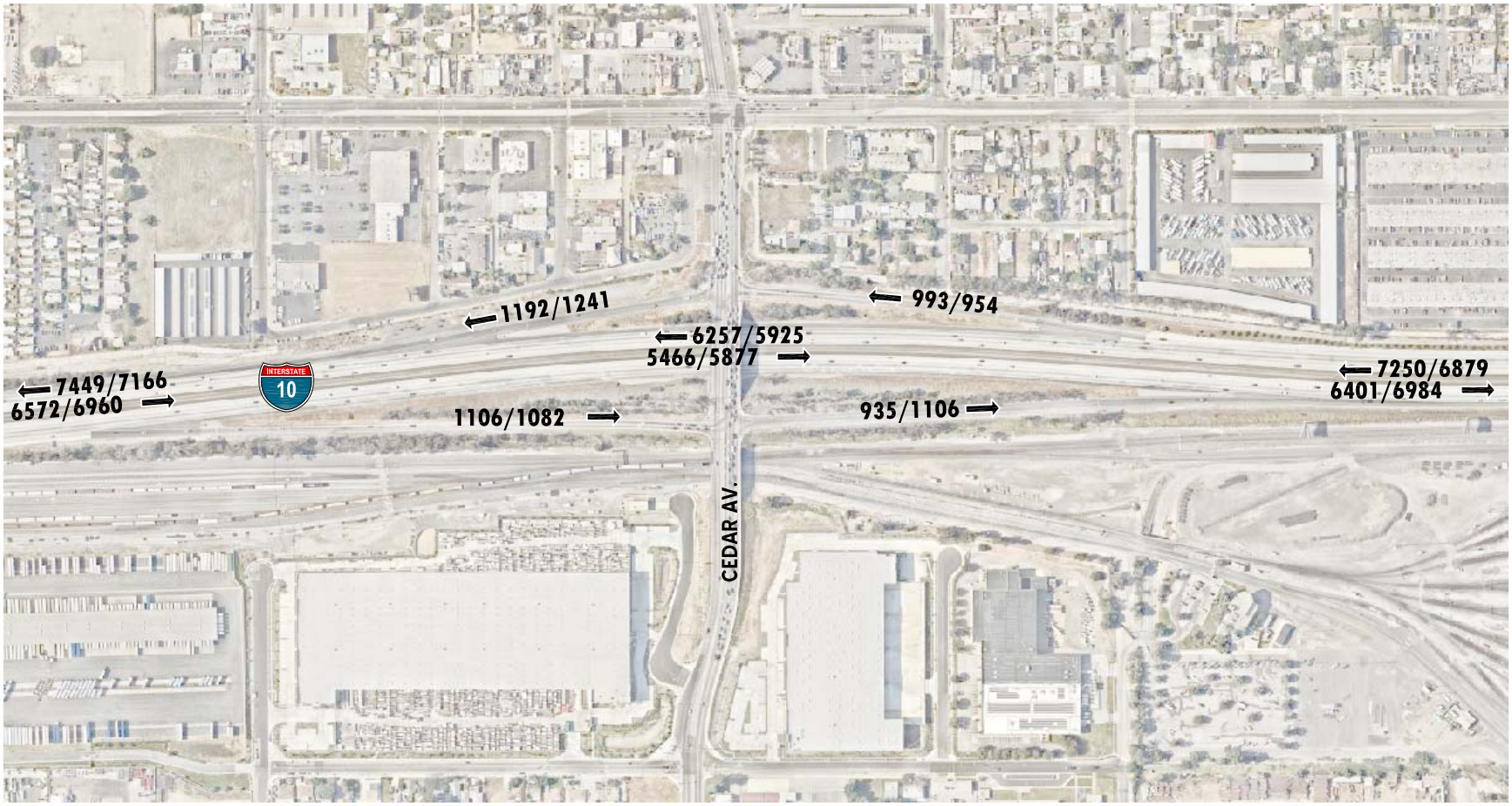
EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2021) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

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7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

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

7.1 ROADWAY IMPROVEMENTS

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

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area. One future connection includes but is not limited to a future planned interchange at Alder Avenue and the I-10 Freeway which may result in reduced through traffic along other parallel routes, such as Cedar Avenue.

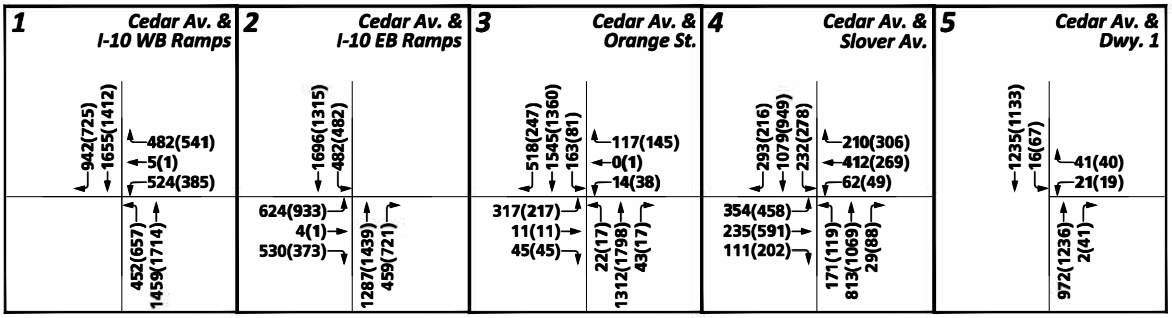
7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

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

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-2.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

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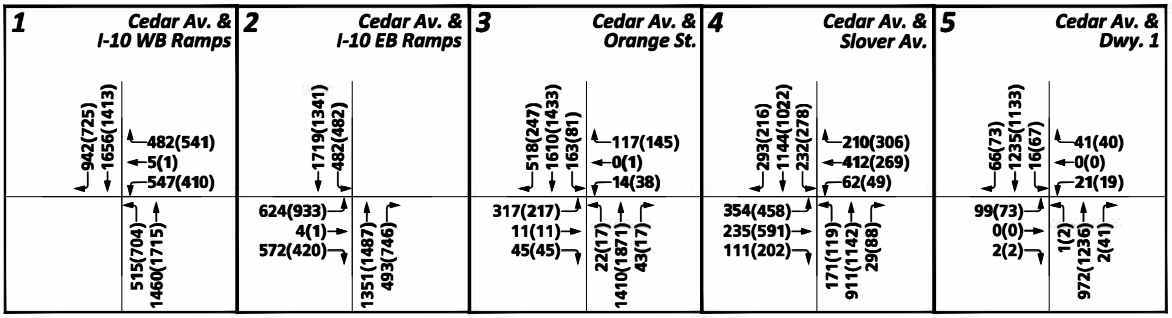
EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

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

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

N

7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

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

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E AM peak hour; LOS F PM peak hour
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS E AM peak hour; LOS F PM peak hour

Reductions to peak hour intersection deficiencies are anticipated due to lower traffic forecasts along Cedar Avenue related to new parallel routes that will be in place for Horizon Year traffic conditions. A summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions is shown on Exhibit 7-3. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendix 7.1 of this TA.

9.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-4, there are no additional study area intersections anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions. The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TA.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The only unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant under E+P traffic conditions. As such, no traffic signal warrants have been evaluated for Horizon Year (2040) Without Project and With Project traffic conditions.

7.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2040) Without and With Project traffic conditions are shown on Table 7-2. As shown on Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2040) Without Project and With Project. Worksheets for Horizon Year (2040) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 7.3 and 7.4, respectively.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project				2040 With Project				Change in Delay[4]	
			Delay[1] (secs.)		Level of Service		Delay[1] (secs.)		Level of Service			
			AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps	TS	**65.0**	**80.1**	**E**	**F**	**76.8**	**91.9**	**E**	**F**	11.8	11.8
2	Cedar Av. & I-10 EB Ramps	TS	38.8	**77.9**	D	**E**	46.5	**85.0**	D	**F**	--	7.1
3	Cedar Av. & Orange Av.	TS	29.5	37.6	C	D	33.2	44.4	C	D	--	--
4	Cedar Av. & Slover Av.	TS	**56.6**	**103.9**	**E**	**F**	**57.5**	**111.9**	**E**	**F**	0.9	8.0
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	16.7	21.9	C	C	25.7	35.3	C	D	--	--

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

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

2 CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

3 The Project will construct a traffic signal as part of the Project design features.

4 The change in delay is calculated between pre-Project and With Project scenarios for intersections that are operating at an unacceptable LOS for pre-Project conditions only.

Table 7-2

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

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	720 [2]	652 [2]	Yes	Yes	760 [2]	682 [2]	Yes	Yes
	WBR	480	454 [2]	567 [2,3]	Yes	Yes	454 [2]	587 [2,3]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	674 [2,3]	1,012 [2,3]	Yes	Yes	674 [2,3]	1,063 [2,3]	Yes	Yes
	EBL/T/R	1,900	735 [2]	881 [2]	Yes	Yes	809 [2]	922 [2]	Yes	Yes

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

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

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

EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

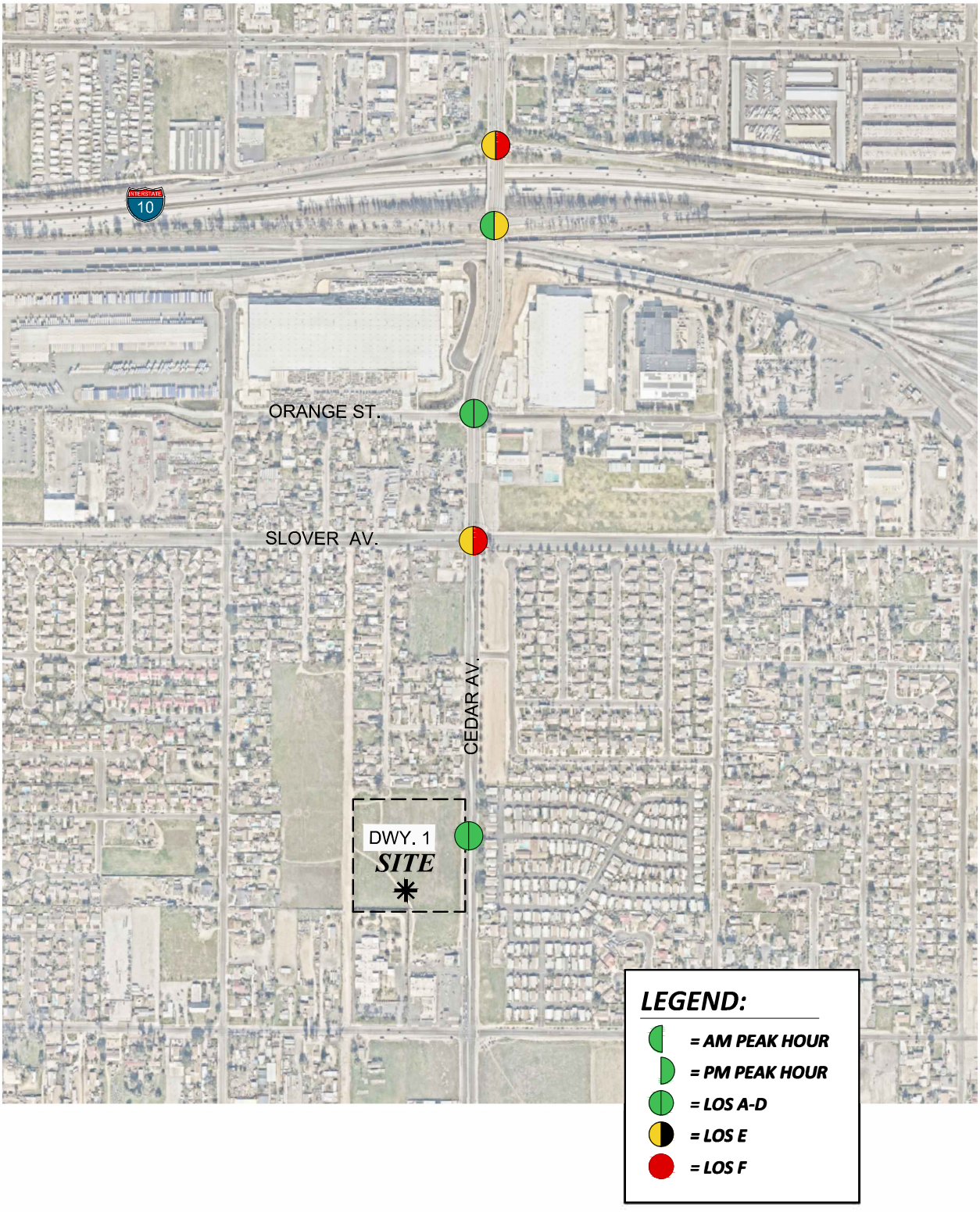


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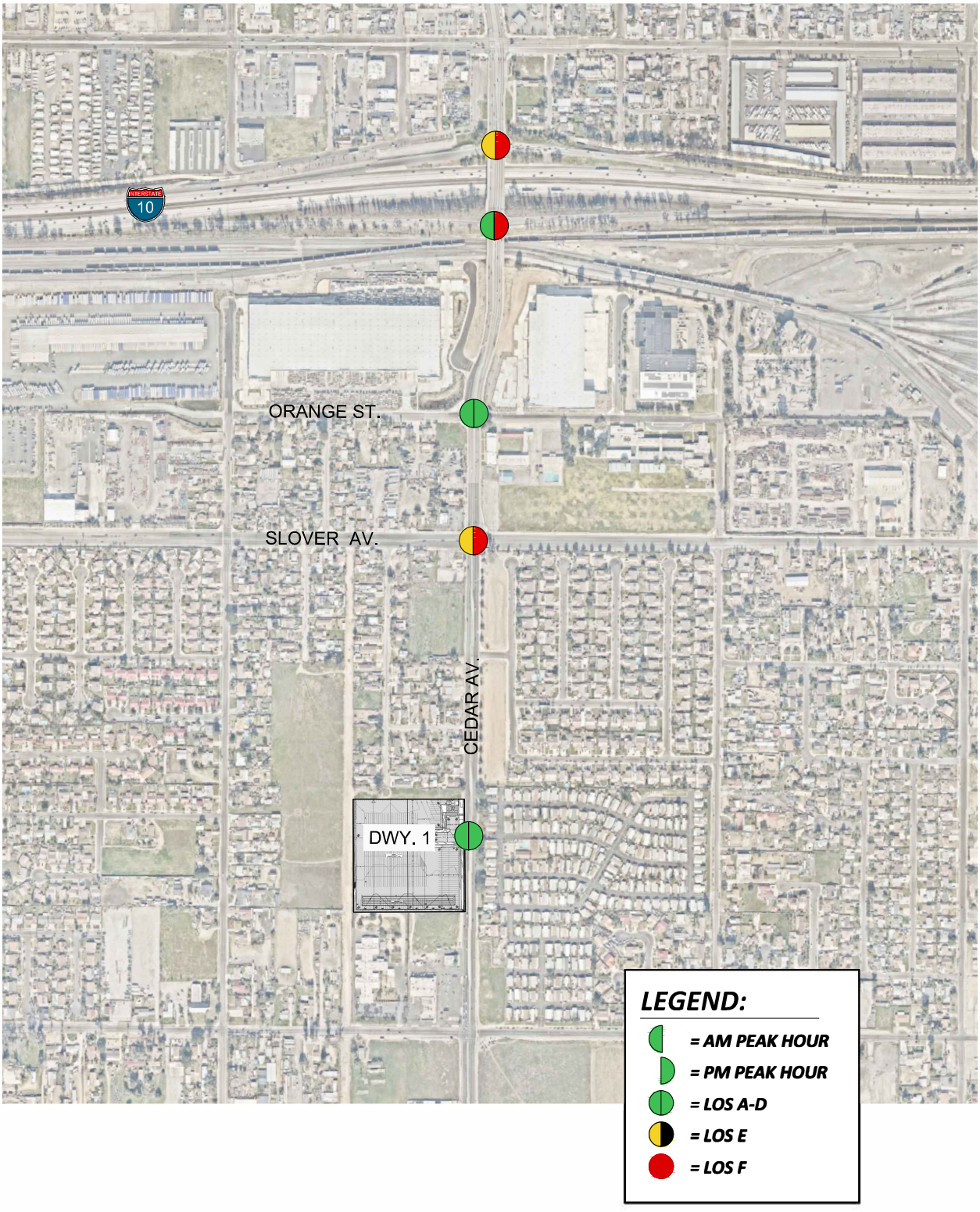
EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



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7.7 FREEWAY FACILITY ANALYSIS

Horizon Year (2040) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 7-5 and 7-6, respectively. As shown in Table 7-3, the following study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for Horizon Year (2040) Without Project and With Project traffic conditions:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, East of Cedar Avenue (#4) – LOS E AM and PM peak hours
- I-10 Freeway Eastbound, West of Cedar Avenue (#5) – LOS E PM peak hour only
- I-10 Freeway Eastbound, East of Cedar Avenue (#8) – LOS E PM peak hour only

Horizon Year (2040) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 7.5 and 7.6, respectively.

7.8 HORIZON YEAR (2040) DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient.

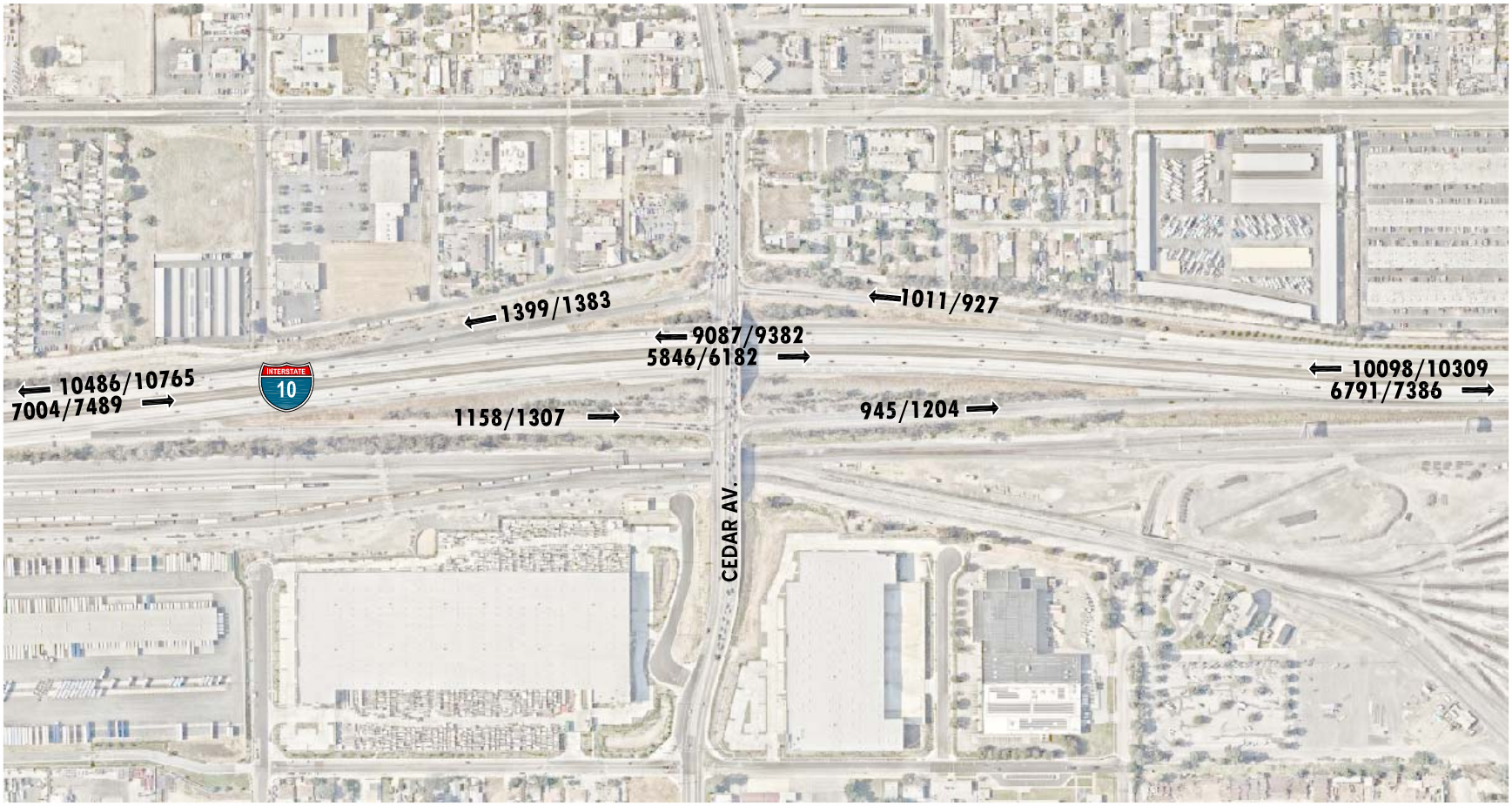
7.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Horizon Year (2040) traffic deficiencies are presented on Table 7-4. If not constructed by the Project, the Project Applicant shall contribute to these improvements through payment of County DIF fees or fair share contribution as identified on Table 1-3. Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.7 and Appendix 7.8.

7.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

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

EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES



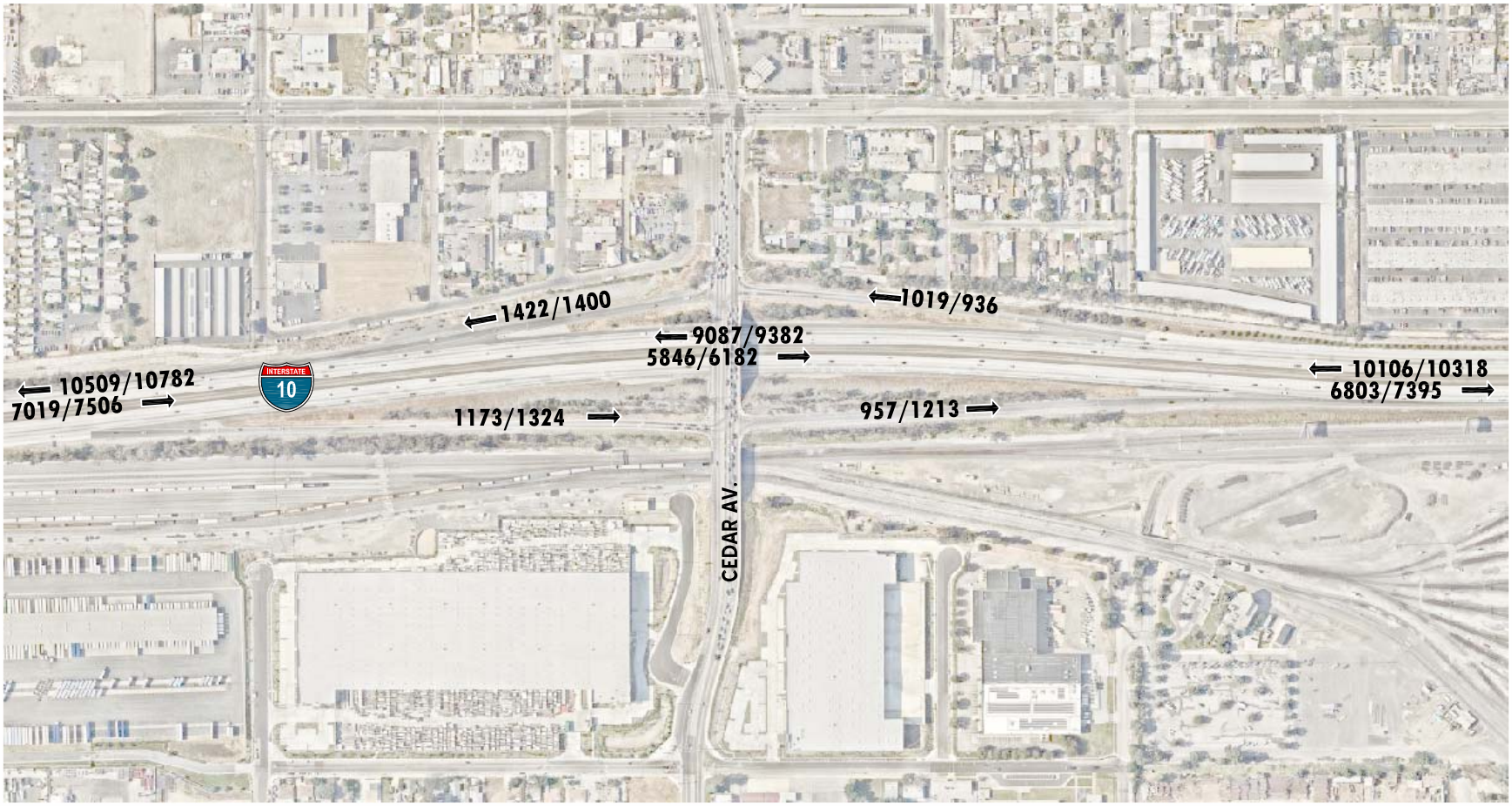
LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES



LEGEND:

⟵ 100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

Table 7-3

Freeway Facility Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**
		On-Ramp at Cedar Av.	4	**52.0**	**F**	**54.1**	**F**	**52.3**	**F**	**54.4**	**F**
		Off-Ramp at Cedar Av.	5	**77.8**	**F**	**80.1**	**F**	**77.6**	**F**	**79.5**	**F**
		East of Cedar Av.	5	**41.8**	**E**	**43.7**	**E**	**41.9**	**E**	**43.7**	**E**
	Eastbound	West of Cedar Av.	4	32.8	D	**36.1**	**E**	32.9	D	**36.9**	**E**
		Off-Ramp at Cedar Av.	5	22.4	C	25.5	C	23.8	C	25.6	C
		On-Ramp at Cedar Av.	4	29.8	D	32.8	D	30.0	D	32.9	D
		East of Cedar Av.	4	30.8	D	**35.3**	**E**	31.3	D	**35.4**	**E**

* **BOLD** = Unacceptable Level of Service

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

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

[3] LOS = Level of Service

Table 7-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps																	
	- Without Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	36.7	35.3	D	D
	- With Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	42.6	38.2	D	D
2	Cedar Av. & I-10 EB Ramps																	
	- Without Project[4]	TS	0	3	1	**2**	2	0	1	1	**1**	0	0	0	28.6	34.8	C	C
	- With Project[4]	TS	0	3	1	**2**	2	0	1	1	**1**	0	0	0	34.4	37.7	C	D
4	Cedar Av. & Slover Av.																	
	- Without Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	42.6	39.0	D	D
	- With Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	45.5	39.7	D	D

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

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

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

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

[4] Improvements are consistent with the I-10 Freeway/Cedar Avenue interchange project.

7.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

There are 3 alternatives being considered by SBCTA for the I-10 Project: Alternative 1 is no build; Alternative 2 is the addition of a carpool or high occupancy vehicle (HOV) lane; and Alternative 3 includes 2 tolled express lanes in each direction of travel on the I-10 Freeway between Haven Avenue in the City of Ontario and Ford Street in the City of Redlands. (10) According to the website, the I-10 Project is a longer-term project, and is not anticipated for completion until Year 2024.

For the purposes of this analysis, Alternative 2 has been evaluated. Caltrans typically assumes a reduction of 14 percent to the freeway mainline through volumes in this region to account for vehicles utilizing the HOV lanes. The reduction to the I-10 Freeway mainline volumes has been applied to account for the proposed HOV lanes. The analysis has been performed assuming same on and off-ramp configurations as existing baseline conditions at the I-10 Freeway/Cedar Avenue interchange.

As shown in Table 7-5, the I-10 Freeway mainline segment operations are anticipated to improve operations, however the following freeway mainline segments or merge/diverge ramp junctions are anticipated to continue to operate at an unacceptable LOS during the peak hours:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours

Worksheets for Horizon Year (2040) Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.9 and Appendix 7.10.

Table 7-5

Freeway Facility Analysis for Horizon Year (2040) Conditions With Improvements

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**
		On-Ramp at Cedar Av.	4	**40.6**	**F**	**40.7**	**F**	**40.9**	**F**	**41.0**	**F**
		Off-Ramp at Cedar Av.	5	**62.1**	**F**	**66.7**	**F**	**61.8**	**F**	**66.5**	**F**
		East of Cedar Av.	5	32.0	D	32.6	D	32.1	D	32.6	D
	Eastbound	West of Cedar Av.	4	26.6	D	28.9	D	26.8	D	29.0	D
		Off-Ramp at Cedar Av.	5	19.9	C	21.5	C	20.2	C	21.6	C
		On-Ramp at Cedar Av.	4	26.4	C	29.3	D	26.6	C	29.3	D
		East of Cedar Av.	4	25.2	C	27.9	D	25.2	C	28.3	D

* **BOLD** = Unacceptable Level of Service

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

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

[3] LOS = Level of Service

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8 LOCAL AND REGIONAL FUNDING MECHANISMS

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

8.1 COUNTY OF SAN BERNARDINO DEVELOPMENT IMPACT FEE PROGRAM

The County of San Bernardino adopted the latest update to their DIF program in September 2014. Fees from new residential, commercial, and industrial development are collected to fund Measure "I" compliant regional facilities as well as local facilities. Under the County's DIF program, the County 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.

After the County's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the County's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the County are also periodically performed by County staff and consultants. The County uses this data to determine the timing of the improvements listed in its facilities list. The County also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the County. In this way, the improvements are constructed before the LOS falls below the County's LOS performance thresholds. The County's DIF program establishes a timeline to fund, design, and build the improvements.

8.2 MEASURE "I" FUNDS

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

8.3 FAIR SHARE CONTRIBUTION

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

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

Table 8-1

Project Fair Share Calculations for Intersection

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
1	Cedar Av. & I-10 WB Ramps						
		AM:	4,374	88	5,607	1,233	**7.1%**
		PM:	4,230	74	5,509	1,279	5.8%
2	Cedar Av. & I-10 EB Ramps						
		AM:	3,865	163	5,245	1,380	**11.8%**
		PM:	3,759	146	5,411	1,652	8.8%
3	Cedar Av. & Orange St.						
		AM:	3,062	163	4,269	1,207	**13.5%**
		PM:	2,634	146	4,124	1,490	9.8%
4	Cedar Av. & Slover Av.						
		AM:	2,715	163	4,163	1,448	**11.3%**
		PM:	2,893	146	4,740	1,847	7.9%

BOLD = Denotes highest fair share percentage.

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9 REFERENCES

1. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
2. **County of San Bernardino.** *Transportation Impact Study Guidelines.* County of San Bernardino : s.n., July 9, 2019.
3. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014.
6. **Transportation, California Department of.** *Freeway Performance Measurement (PeMS).* [Online] http://pems.dot.ca.gov/.
7. **City of San Diego.** *Trip Generation Manual.* San Diego : City of San Diego Municipal Code, 2003.
8. **LSA.** *Wheeler Trucking Project Focused Traffic Memorandum.* s.l. : LSA, 2017.
9. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.
10. **San Bernardino Associated Governments.** I-10 Corridor Project. *The I-10 & I-15 Corridor Projects.* [Online] www.1015projects.com.

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September 1, 2020

Ms. Cheryl A. Tubbs
Lilburn Corporation
1905 Business Center Drive
San Bernardino, CA 92408

SUBJECT: CEDAR AVENUE TRAILOR STORAGE (PROJ-2020-00035)

VEHICLE MILES TRAVELLED (VMT) ANALYSIS

Dear Ms. Cheryl A. Tubbs:

The following Vehicle Miles Travelled (VMT) Analysis has been prepared for the proposed Cedar Avenue Trucking Storage (**Project**), which is located west of Cedar Avenue, between Slover Avenue and Santa Ana Avenue, in the County of San Bernardino.

PROJECT OVERVIEW

The Project is proposed to consist of up to 8.940 acres of truck and trailer storage use, which includes a 2,400 square foot (sf) office. The facility is to provide on-site parking for trucks and trailers. It is anticipated that there will be two full time employees on-site.

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate takes effect July 1, 2020.

It is our understanding that the County of San Bernardino utilizes the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool (**Screening Tool**). The Screening Tool allows users to input an assessor's parcel number (APN) to determine if a project's location meets one or more of the screening thresholds for land use projects identified in the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (**Technical Advisory**). (2)

The focus of this memorandum is to more thoroughly evaluate each of the applicable screening thresholds to determine if the proposed Project would be expected to cause a less-than-significant impact to VMT without requiring a more detailed VMT analysis. If the screening thresholds are not met, then project generated VMT will be calculated and compared to the applicable VMT threshold as identified in the San Bernardino County Transportation Impact Study Guidelines (**County Guidelines**) (3)

PROJECT SCREENING

The County Guidelines provides details on appropriate "screening thresholds" that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed analysis. Screening thresholds are broken into the following three types:

- Transit Priority Area (TPA) Screening
- Low VMT Area Screening
- Project Type Screening

A land use project need only to meet one of the above screening thresholds to result in a less-than-significant impact.

TPA SCREENING

Consistent with guidance identified in the Technical Advisory, County Guidelines note that projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment A, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

LOW VMT AREA SCREENING

As noted in the Technical Advisory, "residential and office projects that locate in areas with low VMT and that incorporate similar features (density, mix of uses, and transit accessibility) will tend to exhibit similarly low VMT." (2) The Screening Tool uses the sub-regional San Bernardino Transportation Analysis Model (SBTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the region. The Project's physical location, based on parcel number, is input into the Screening Tool to determine project generated VMT. The Project is located in Assessor Parcel Number (APN) 025703112 and TAZ 53742201. The parcel containing the proposed Project was selected and the Screening Tool was run for Production/Attraction (PA) Home-Based Work VMT per Worker measure of VMT. Based on the Screening Tool results (see Attachment A), it would appear that the Project TAZ may qualify as a low VMT area; however, the Project is located in an area currently shown as Commercial land use in the County's General Plan. Additionally, the socio-economic data (SED) for the base year SBTAM was compared to the proposed Project. Within TAZ 53742201, there is industrial employment which would exceed the proposed Project. The Project is not anticipated to generate more VMT per worker than the existing TAZ. As such, the Project is consistent with the existing socio-economic data and can be screened out via the Low VMT Area screening.

The Low VMT Area screening threshold is met.

PROJECT TYPE SCREENING

The County Guidelines identifies that local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition to local serving retail, other types of local serving uses (e.g., day care centers, non-destination hotels, affordable housing, places of worship, etc.) may also be presumed to have a less than significant impact as their uses are local serving in nature and would tend to shorten vehicle trips.

The proposed Project is anticipated to provide overflow or excess truck trailer storage for nearby warehouses. Although the specific end user(s) are unknown at this time, it is reasonable to assume that the future tenant will select this location, at least in part, as to how it effects their transportation costs. Businesses who have shipping as a significant part of their operations are sensitive to transportation costs and by extension their relative proximity to customers and suppliers. Therefore, the proposed truck and trailer storage lot is anticipated to serve nearby warehouse and distribution facilities that would be looking to locate overflow trailer storage as close as possible to the primary warehouse or distribution facility. As a result, the trips are expected to be local serving.

The Project Type screening threshold is met.

CONCLUSION

Based on our review of applicable VMT screening thresholds, the Project meets the Project Type and Low VMT Area screening and would therefore be presumed to result in a less than significant VMT impact. The Project was not found to meet the TPA screening, however meeting the Project Type and Low VMT Area screening is sufficient to determine a less than significant impact; no additional VMT analysis is required.

If you have any questions, please contact me directly at aevatt@urbanxroads.com.

Respectfully submitted,

URBAN CROSSROADS, INC.

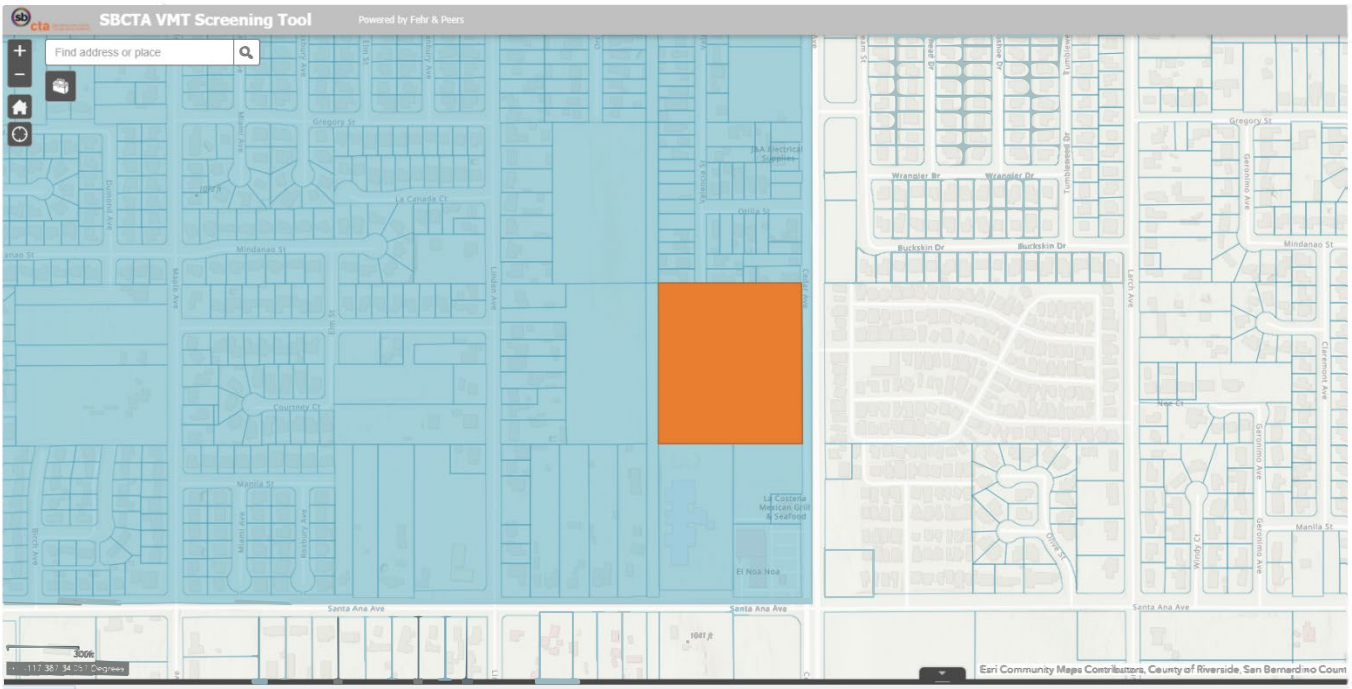
Aric Evatt, PTP
President

Robert Vu, PE
Transportation Engineer

REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.
2. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.
3. **San Bernardino County.** *Transportation Impact Study Guidelines.* July 2019.

ATTACHMENT A:
SCREENING TOOL



Output Parcels | Selected Project Area | Low VMT Generating TAZs | San Bernardino Parcels (Zoom in to view) | City Boundaries | San Bernardino County Boundary | Transit Priority Area

Options | Filter by map extent | Zoom to | Clear selection | Refresh

OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold
1	0257703112	53,742,201.00	Unincorporated San Bernardino County	No	16.60	17.10	-2.92%	PA VMT Per Worker	17.10