MEMORANDUM

URBAN | CROSSROADS

DATE: March 21, 2023
TO: Alicia Velasco, City of Cypress
FROM: Charlene So, Urban Crossroads, Inc.
JOB NO: 14915-08 RTC Memo

GOODMAN COMMERCE CENTER TRIP GENERATION UPDATE

Urban Crossroads, Inc. is pleased to provide the following Trip Generation Update to summarize the trip generation corrections made to the Goodman Commerce Center Traffic Analysis (February 9, 2023, referred to as **2023 Traffic Study**) for the Goodman Commerce Center development (**Project**), which is located at 5757 Plaza Drive (Assessor's Parcel Number: 241-101-26) in the City of Cypress.

The 2023 Traffic Study evaluated the net change in trips of the existing warehouse and office use versus the proposed Project. The existing use consists of 248,623 square feet of warehousing use and 88,020 square feet of office use. The proposed Project consists of 195,134 square feet of high-cube transload warehouse use and 195,134 square feet of high-cube cold storage use.

A comment was made by City staff on the January 27, 2023 version of the 2023 Traffic Study to identify an error in the truck summation found on the Existing Trip Generation Summary (Table 4-2). Specifically, the total trucks line highlighted in Table 1 below incorrectly referenced the total trips (passenger cars plus trucks) for the warehousing use as opposed to just the total trucks. As such, the total trips and the net change in Project trip calculations found on Table 4-4 of the 2023 Traffic Study were also incorrect. The February 9, 2023 version of the 2023 Traffic Study corrects the error in Table 4-2 and also the net change. The corrected Existing Trip Generation Summary is shown on Table 2. The resulting net change in trips is shown on Table 3 (reflected in actual vehicles which would be used in other technical studies such as the air quality analysis). There is still a net reduction in trips anticipated, although the net reduction is not as great as previously noted in the January 27, 2023 version.

Upon review of the peak hour operations analyses, the trip generation utilized in the analysis software was based on a separate trip generation calculation and did not use the incorrect totals found on Table 4-2 and Table 4-4 of the January 27, 2023 version. As such, no revisions were necessary to the operations analyses and the results presented in the January 27, 2023 and February 9, 2023 versions are identical. There were no deficiencies identified and off-site improvements were not recommended.

If you have any questions or comments, I can be reached at cso@urbanxroads.com.

TABLE 1: EXISTING TRIP GENERATION SUMMARY FROM JANUARY 27, 2023

			AM Peak Hour			PM Peak Hour			
Land Use	Quantity	Units[1]	In	Out	Total	In	Out	Total	Daily
Actual Vehicles:									
Warehousing	248.623	TSF							
Passenger Cars:			30	7	37	9	29	38	276
2-axle Trucks:			0	0	0	1	0	1	26
3-axle Trucks:			0	1	1	1	1	2	32
4+-axle Trucks:			2	1	3	2	2	4	94
Total Truck Trips (Actual Vehicles):			2	2	4	4	3	7	152
Total Trips (Actual Vehicles)[2]			32	9	41	13	32	45	428
General Office	88.020	TSF	118	16	134	22	105	127	954
Passenger Cars			148	23	171	31	134	165	1,230
Trucks			32	9	41	13	32	45	428
Total Trips (Actual Vehicles)[2]			**180**	**32**	**212**	**44**	**166**	**210**	**1,658**

[1] TSF = Thousand Square Feet

[2] Total = Passenger Cars + Trucks

TABLE 2: EXISTING TRIP GENERATION SUMMARY FROM FEBRUARY 9, 2023

			AM Peak Hour			PM Peak Hour			
Land Use	Quantity	Units[1]	In	Out	Total	In	Out	Total	Daily
Actual Vehicles:									
Warehousing	248.623	TSF							
Passenger Cars:			30	7	37	9	29	38	276
2-axle Trucks:			0	0	0	1	0	1	26
3-axle Trucks:			0	1	1	1	1	2	32
4+-axle Trucks:			2	1	3	2	2	4	94
Total Truck Trips (Actual Vehicles):			2	2	4	4	3	7	152
Total Trips (Actual Vehicles)[2]			32	9	41	13	32	45	428
General Office	88.020	TSF	118	16	134	22	105	127	954
Passenger Cars			148	23	171	31	134	165	1,230
Trucks			2	2	4	4	3	7	152
Total Trips (Actual Vehicles)[2]			**150**	**25**	**175**	**35**	**137**	**172**	**1,382**

[1] TSF = Thousand Square Feet

[2] Total = Passenger Cars + Trucks

TABLE 3: TRIP GENERATION COMPARISON (ACTUAL VEHICLES)

	AM Peak Hour			PM Peak Hour			
Land Use	In	Out	Total	In	Out	Total	Daily
Proposed Project							
Passenger Cars:	25	3	28	8	27	35	498
Total Truck Trips (Actual Vehicles):	3	4	7	4	4	8	194
Total Trips (Actual Vehicles)	**28**	**7**	**35**	**12**	**31**	**43**	**692**
Fully Occupied Existing Use							
Passenger Cars:	148	23	171	31	134	165	1,230
Total Truck Trips (Actual Vehicles):	2	2	4	4	3	7	152
Total Trips (Actual Vehicles)	**150**	**25**	**175**	**35**	**137**	**172**	**1,382**
Variance							
Passenger Cars:	-123	-20	-143	-23	-107	-130	-732
Total Truck Trips (Actual Vehicles):	1	2	3	0	1	1	42
Total Trips (Actual Vehicles)	**-122**	**-18**	**-140**	**-23**	**-106**	**-129**	**-690**

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GOODMAN COMMERCE CENTER

TRAFFIC ANALYSIS

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Aric Evatt | aevatt@urbanxroads.com

Reference Number	Agency	Date
14915-06 TA Report	City of Cypress	February 9, 2023

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APPENDICES

LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CAMUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
HCM	Highway Capacity Manual
ICU	Intersection Capacity Utilization
ITE	Institute of Transportation Engineers
LOS	Level of Service
OCTA	Orange County Transit Authority
PCE	Passenger Car Equivalent
PHF	Peak Hour Factor
Project	Goodman Commerce Center
TA	Traffic Analysis
v/c	Volume to Capacity
vphgpl	Vehicles per Hour Green per Lane

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1 INTRODUCTION

This report presents the results of the Traffic Analysis (TA) for Goodman Commerce Center development ("Project"), which is located at 5757 Plaza Drive (Assessor's Parcel Number: 241-101-26) in the City of Cypress, 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 the City's General Plan level of service goals and policies. The City does not have its own traffic study guidelines. This TA has been prepared in accordance with the County of Orange's Congestion Management Program (CMP) (November 2011) and through consultation with City of Cypress staff during the scoping process. (1) The Project traffic study scoping agreement is provided in Appendix 1.1 of this TA, which has been reviewed and approved by the City of Cypress.

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 construct the site frontage improvements needed to accommodate site access along Plaza Drive.
- Project to install stop controls for all egress traffic from each Project driveway. All driveways along Plaza Drive will accommodate full access (no turn restrictions).

Additional details and intersection lane geometrics are provided in Section 1.6 Recommendations of this report. The Project is not anticipated to require the construction any off-site improvements and would also contribute to improvement needs identified at off-site intersections for future cumulative traffic conditions.

1.2 PROJECT OVERVIEW

A preliminary site plan for the proposed Project is shown on Exhibit 1-2. The Project includes the development a of two proposed warehouse buildings: Building 1 with 204,909 square feet and Building 2 with 185,359 square feet for a total of 390,268 square feet. The proposed Project will replace an existing building which consists of 248,623 square feet of warehousing use and 88,020 square feet of office use. The existing building is shown on Exhibit 1-3. The anticipated Opening Year for the proposed Project is 2024. Access to the site will be accommodated via four driveways along Plaza Drive located where the existing access points are. In order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the Institute of Transportation Engineers (ITE) Trip Generation Manual (11th Edition, 2021). (2) The Project is anticipated to generate a total of 692 two-way trips per day with 35 AM peak hour trips and 43 PM peak hour trips (actual vehicles). 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.

EXHIBIT 1-1: LOCATION MAP

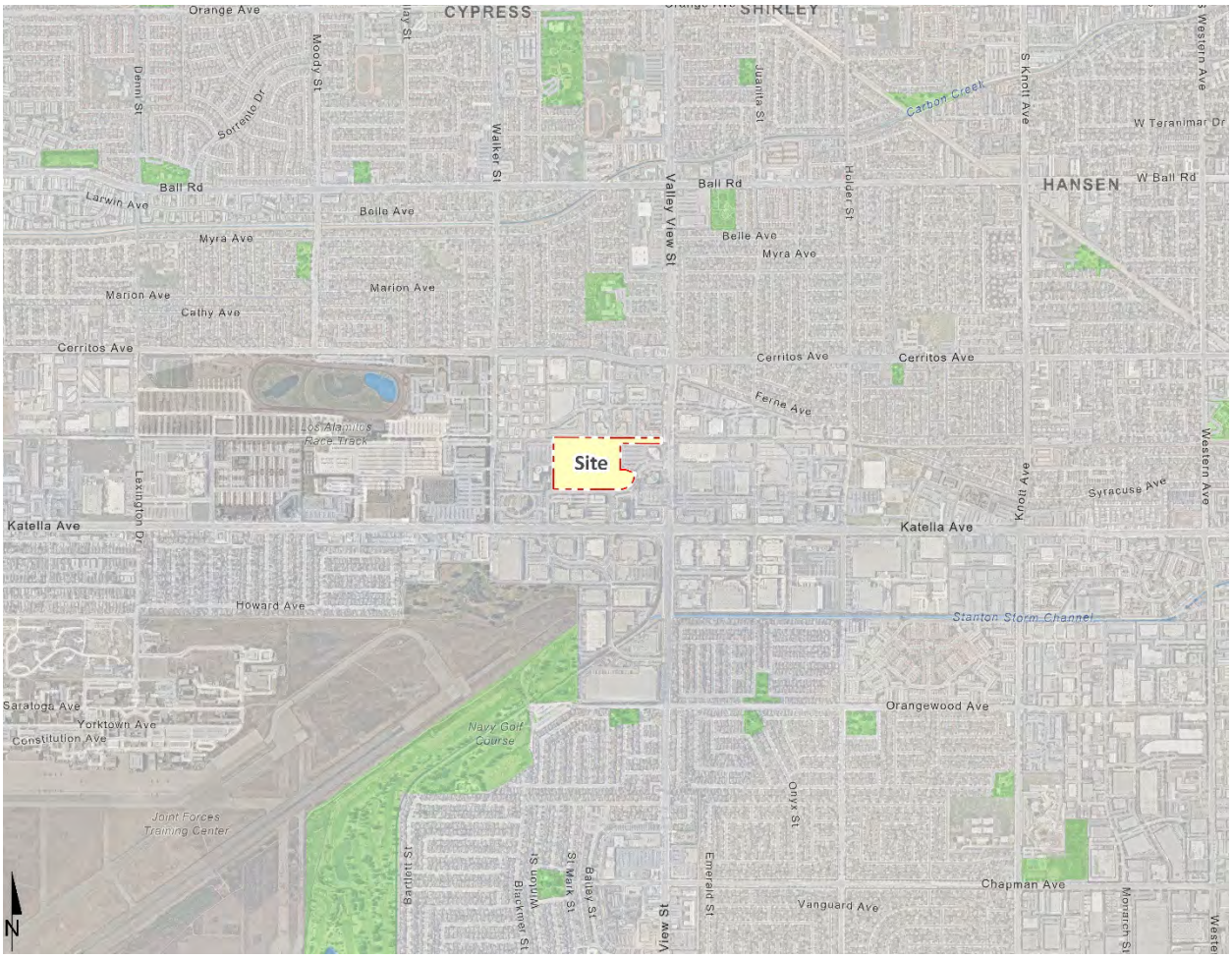


EXHIBIT 1-2: PRELIMINARY SITE PLAN

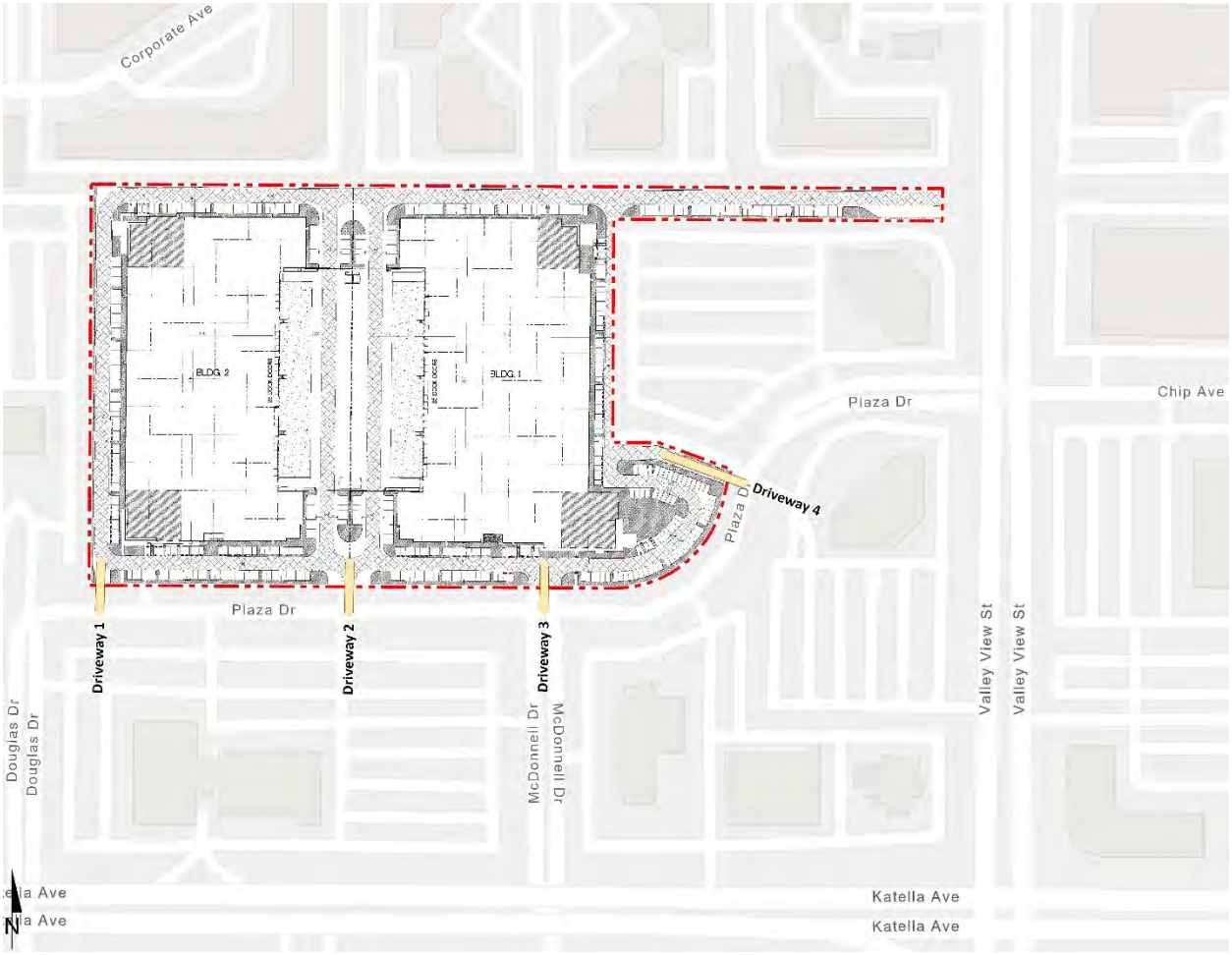
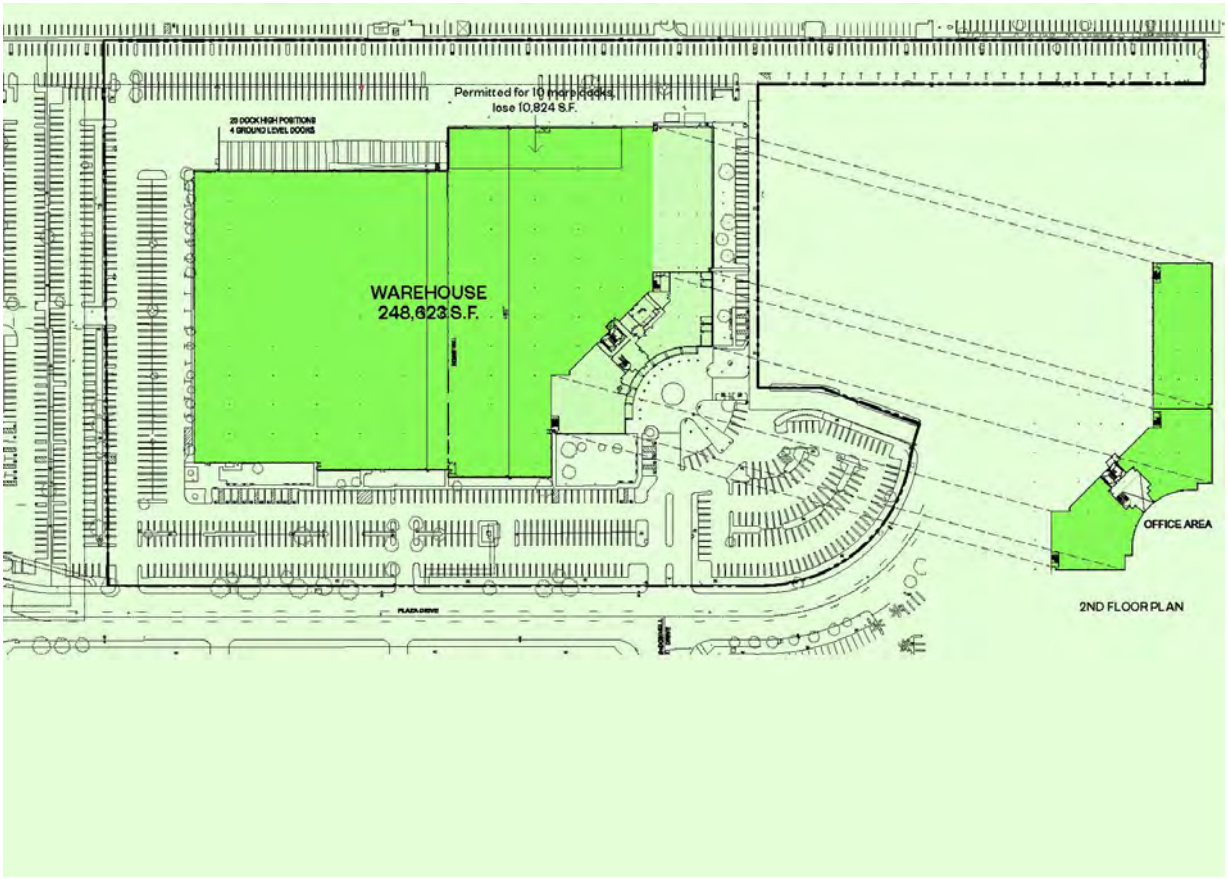


EXHIBIT 1-3: EXISTING SITE PLAN



* Note: The proposed Project will replace an existing building which consists of 248,623 square feet of warehousing use and 88,020 square feet of office use (total of 336,643 square feet).

1.3 ANALYSIS SCENARIOS

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

- Existing (2022) Conditions
- Opening Year Cumulative (2024) Without Project
- Opening Year Cumulative (2024) With Project

1.3.1 EXISTING (2022) CONDITIONS

Information for Existing (2022) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared. For a detailed discussion on the existing traffic counts, see Section 3.6 Existing Traffic Counts.

1.3.2 OPENING YEAR CUMULATIVE (2024) CONDITIONS

The Opening Year Cumulative (2024) traffic conditions analysis determines the potential near-term cumulative circulation system deficiencies. The roadway network is similar to Existing conditions except for new connections to be constructed by the Project. To account for background traffic growth, an ambient growth factor from Existing (2022) conditions of 4.04% (2 percent per year, compounded over 2 years) is included for Opening Year Cumulative (2024) traffic conditions. Conservatively, this TA estimates the area ambient traffic growth and then adds traffic generated by other known or probable related projects. These related projects are at least in part already accounted for in the assumed ambient growth rates; and some of these related projects may not be implemented and operational within the 2024 Opening Year time frame assumed for the Project. The resulting traffic growth utilized in the TA (ambient growth factor plus traffic generated by related projects) would therefore tend to overstate rather than understate background cumulative traffic deficiencies under 2024 conditions.

1.4 STUDY AREA

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

The 6 study area intersections shown on Exhibit 1-4 and listed in Table 1-1 were selected for evaluation in this TA based on consultation with City of Cypress staff. At a minimum, the study area includes intersections where the Project is anticipated to contribute 50 or more peak hour trips per the County's CMP Guidelines. (1) The "50 peak hour trip" criterion represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. The 50 peak hour trip criterion is a traffic engineering rule of thumb that is accepted and used throughout the County for the purposes of estimating a potential area of influence (i.e., study area).

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

#	Intersection	Jurisdiction	CMP?
1	Douglas Dr. & Katella Av.	City of Cypress	No
2	Driveway 1 & Plaza Dr.	City of Cypress	No
3	Driveway 2 & Plaza Dr.	City of Cypress	No
4	Driveway 3/McDonnell Dr./Cara Wy. & Plaza Dr.	City of Cypress	No
5	Driveway 4 & Plaza Dr.	City of Cypress	No
6	Valley View St. & Plaza Dr.	City of Cypress	No

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. The County of Orange CMP became effective with the passage of Proposition 111 in 1990 and most recently updated in 2021. There are no study area intersections identified as a CMP intersection.

1.5 DEFICIENCIES

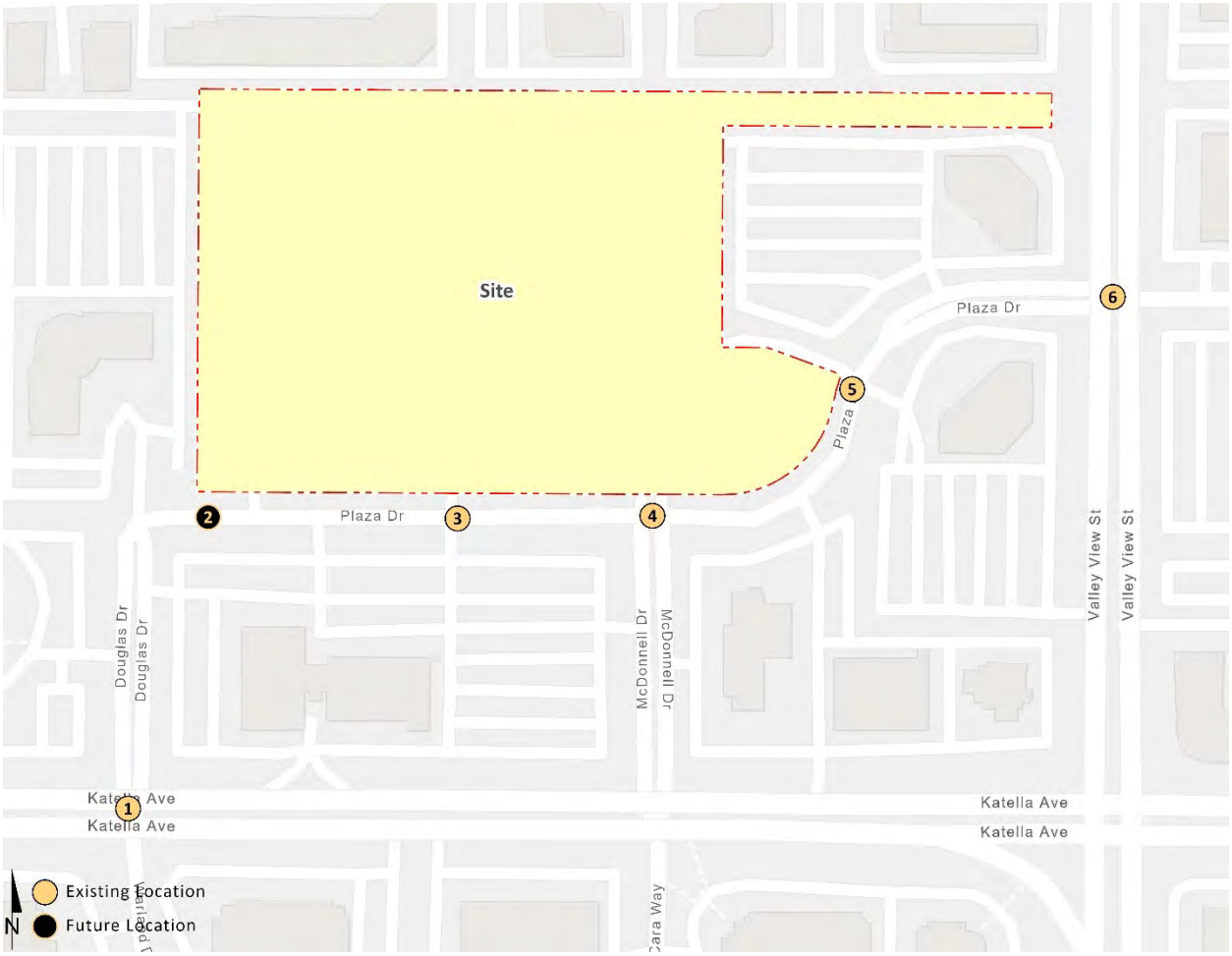
This section provides a summary of deficiencies by analysis scenario. Section 2 Methodologies provides information on the methodologies used in the analysis and Section 5 Opening Year Cumulative (2024) Traffic Conditions include the detailed analysis. A summary of level of service (LOS) results for all analysis scenarios is presented on Table 1-2.

TABLE 1-2: SUMMARY OF LOS

		Existing		2024 NP		2024 WP	
#	Intersection	AM	PM	AM	PM	AM	PM
1	Douglas Dr. & Katella Av.						
2	Driveway 1 & Plaza Dr.						
3	Driveway 2 & Plaza Dr.						
4	Driveway 3/McDonnell Dr./Cara Wy. & Plaza Dr.						
5	Driveway 4 & Plaza Dr.						
6	Valley View St. & Plaza Dr.						

= A - D = E = F

EXHIBIT 1-4: STUDY AREA



1.5.1 EXISTING (2022) CONDITIONS

The study area intersections are currently operating at an acceptable LOS during the peak hours.

1.5.2 OPEINNG YEAR CUMULATIVE (2024) CONDITIONS

The study area intersections are anticipated to continue to operate at an acceptable LOS under Opening Year Cumulative (2024) Without and With Project traffic conditions.

1.6 RECOMMENDATIONS

The following recommendations are based on the minimum improvements needed to accommodate site access and maintain acceptable peak hour operations for the proposed Project.

Recommendation 1 **–** Driveway 1 & Plaza Drive (#2) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach (egress Project traffic) to implement a cross-street stop-controlled intersection. Driveway 1 will accommodate site access for passenger cars and trucks and will accommodate full access (no turn restrictions). Left turn storage into the Project is anticipated to be accommodated by the painted median.

Recommendation 2 **–** Driveway 2 & Plaza Drive (#3) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach (egress Project traffic) to implement a cross-street stop-controlled intersection. Driveway 2 will accommodate site access for passenger cars and trucks and will accommodate full access (no turn restrictions). Left turn storage into the Project is anticipated to be accommodated by the painted median.

Recommendation 3 **–** Driveway 3 & Plaza Drive (#4) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach (egress Project traffic) to implement a cross-street stop-controlled intersection. Driveway 3 will accommodate site access for passenger cars and will accommodate full access (no turn restrictions). Left turn storage into the Project is anticipated to be accommodated by the painted median.

Recommendation 4 **–** Driveway 4 & Plaza Drive (#5) – The following improvements are necessary to accommodate site access:

- Project to install a stop control on the southbound approach (egress Project traffic) to implement a cross-street stop-controlled intersection. Driveway 4 will accommodate site access for passenger cars and will accommodate full access (no turn restrictions). Left turn storage into the Project is anticipated to be accommodated by the painted median.

Recommendation 5 **–** Plaza Drive – Driveway 2 on Plaza Drive is proposed to be widened to 80-feet from the current condition and will be located across from the former United Healthcare facility and associated parking garage. As such, it is recommended that the Project develop a striping plan to restripe Plaza Drive in order to terminate portions of the existing painted two-way left-turn lane and accommodate dedicated (striped) left turn pockets at both Driveway 2/United Healthcare and at McDonnell Drive/Driveway 3.

Recommendation 6 **–** Truck Access & Routing Plan – A revised truck access and routing plan should be prepared for the proposed Project identifying the proposed signage that needs to be implemented on-site to direct trucks per the proposed circulation of trucks as noted in this report.

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 in the master signing program and construction plans for the Project site.

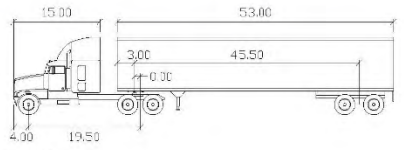
Sight distance at each project access point should be reviewed with respect to standard Caltrans and City of Cypress sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

1.7 TRUCK ACCESS

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at Driveway 2 which is 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 concept striping plans on Exhibit 1-5). A WB-67 truck (53-foot trailer) has been utilized for the purposes of this analysis. As shown previously on Exhibit 1-5, Driveway 2 on Plaza Drive is anticipated to accommodate the ingress and egress of heavy trucks as currently designed to and from the west and east on Plaza Drive. The majority of the trucks are anticipated to access the site from Driveway 2; however, trucks could also egress via Driveway 1 by circulating around the western side of the buildings (as shown on Exhibit 1-6). On-site signage will be provided to direct trucks per the proposed/allowable circulation. Lastly, trucks backing into the dock bay for the easterly building is shown on Exhibit 1-7.

EXHIBIT 1-5: TRUCK ACCESS


PLAZA DR.
15.00
50.00
3.00
45.50
3.00
4.00
19.50
WB 67
Not to Scale
Feet
Tractor Width : 8.00
Trailer Width : 8.50
Tractor Track : 8.00
Trailer Track : 8.50
Lock to Lock Time : 6.0
Steering Angle : 28.4
Articulating Angle : 75.8
GRAPHIC SCALE
0
30
60
1" = 60'
N

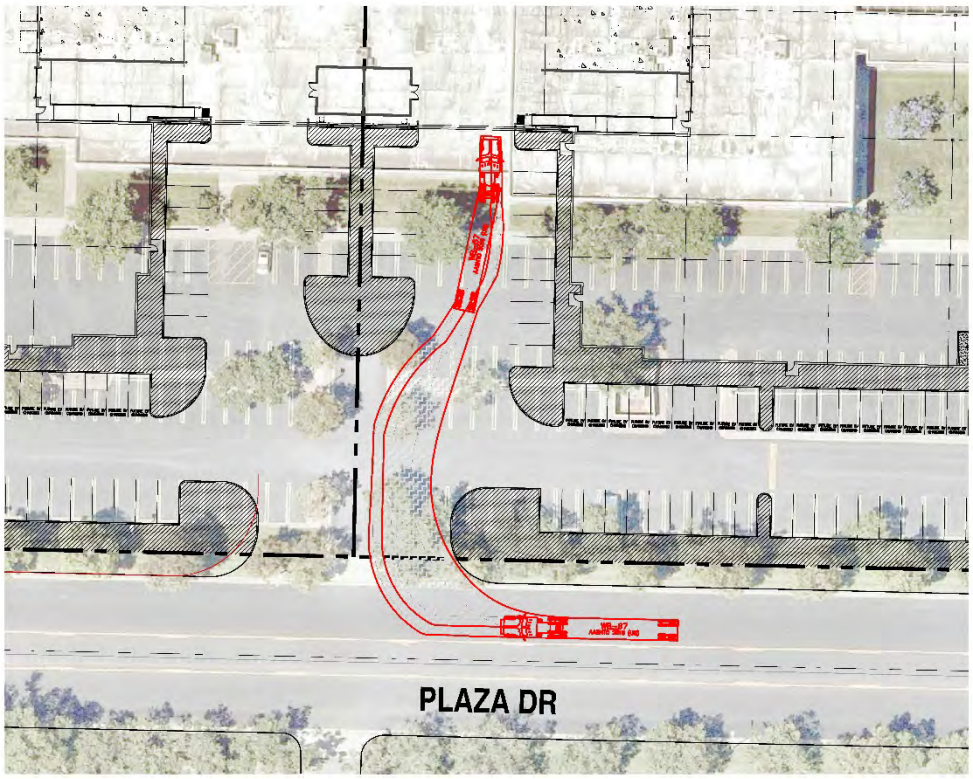


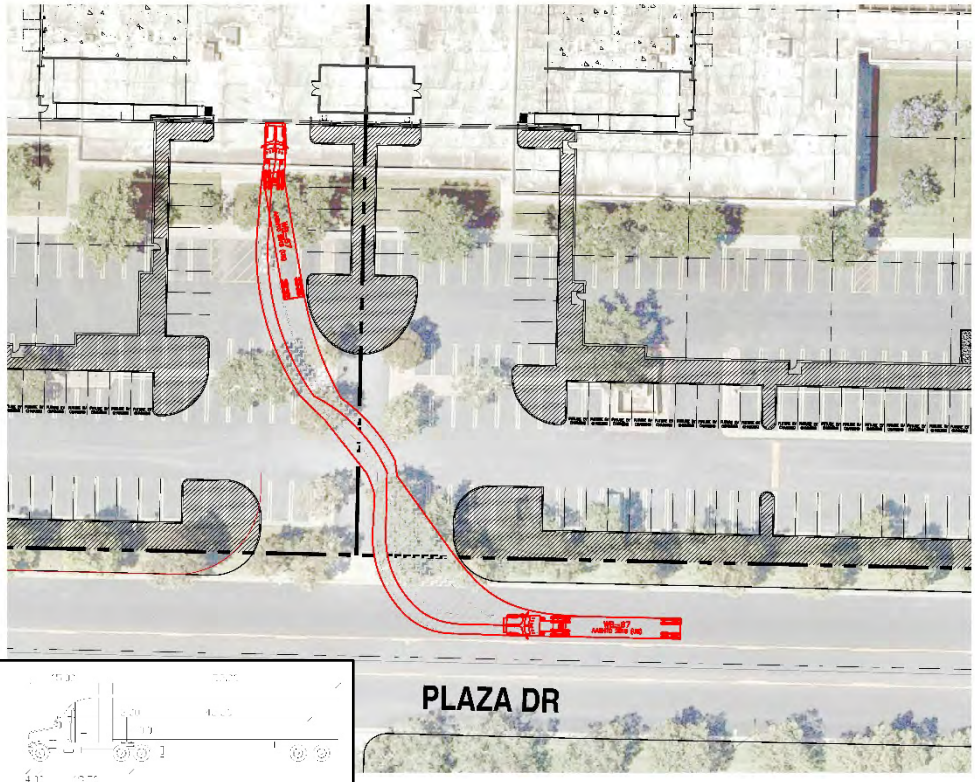
WB-67
Not to Scale

Tractor Width	8.00	Lock to Lock Time	6.0
Trailer Width	8.50	Steering Angle	23.4
Tractor Track	8.00	Articulating Angle	75.0
Trailer Track	8.50		

GRAPHIC SCALE
0 30 60
1"=60'

N


PLAZA DR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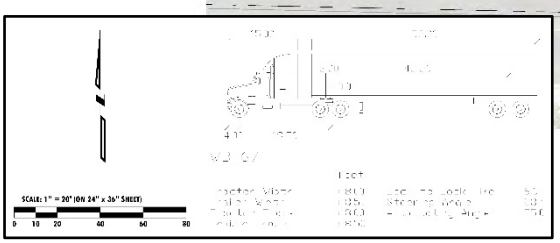
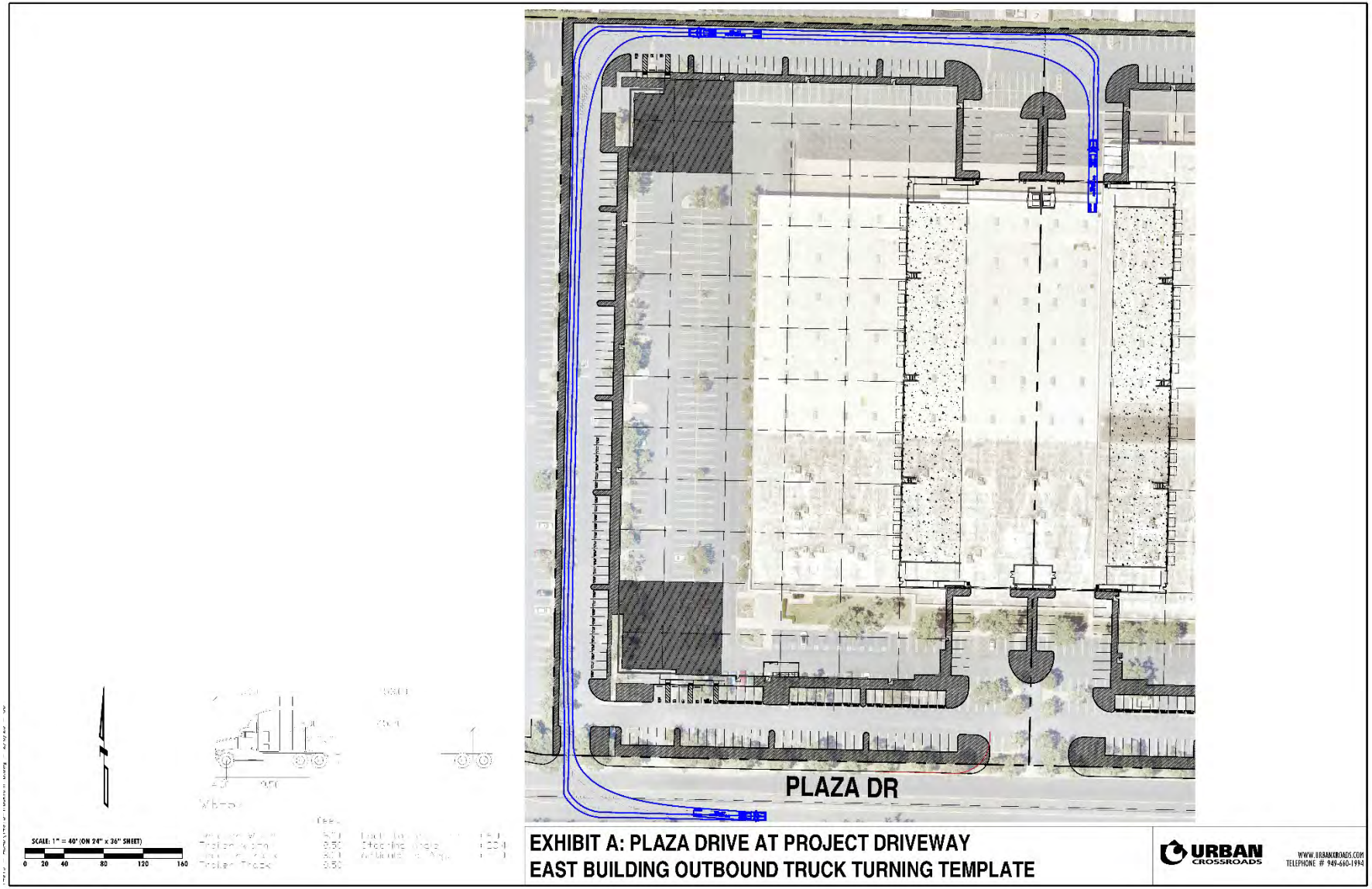


EXHIBIT 1-6: POTENTIAL OUTBOUND CIRCULATION



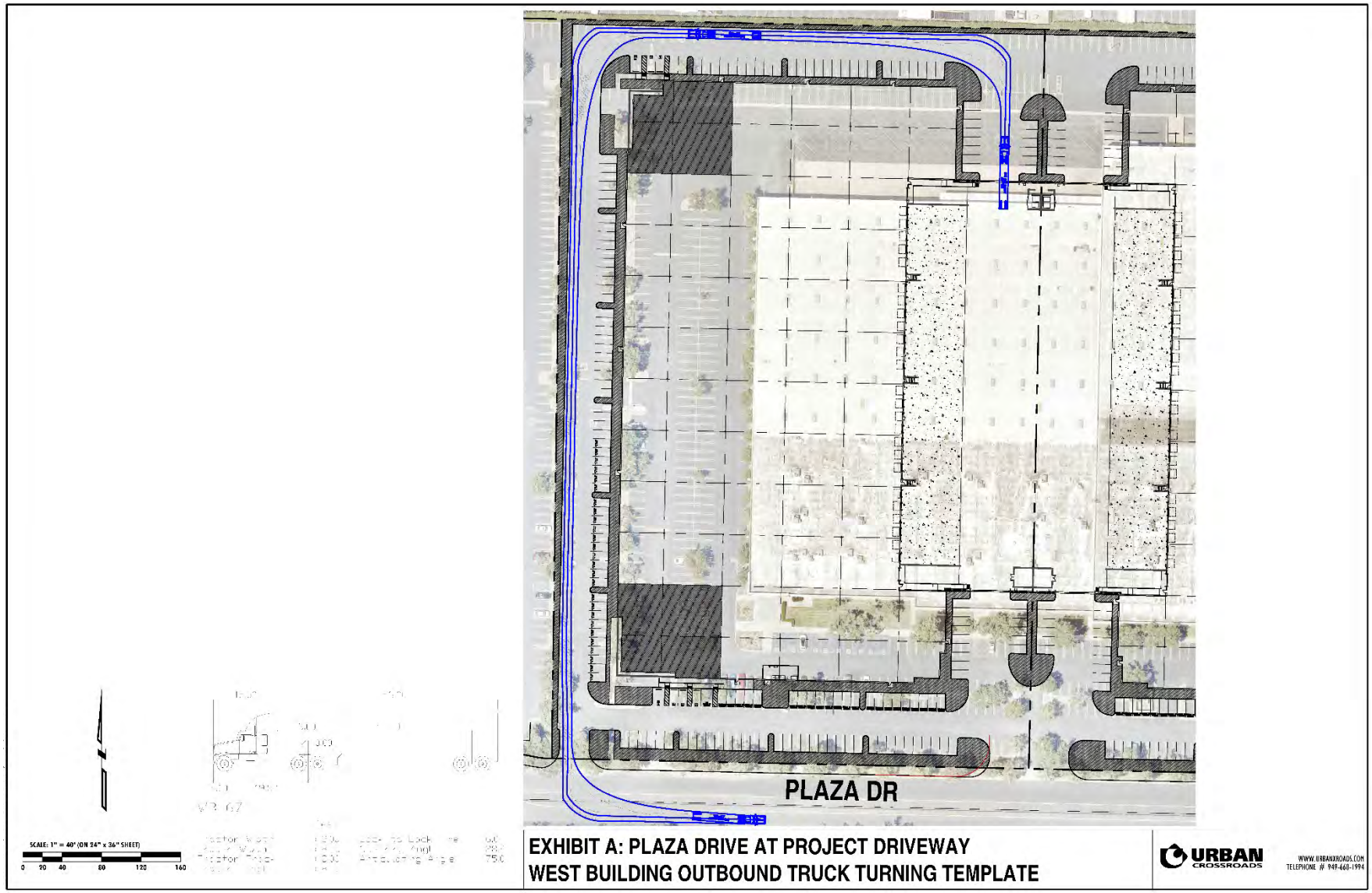
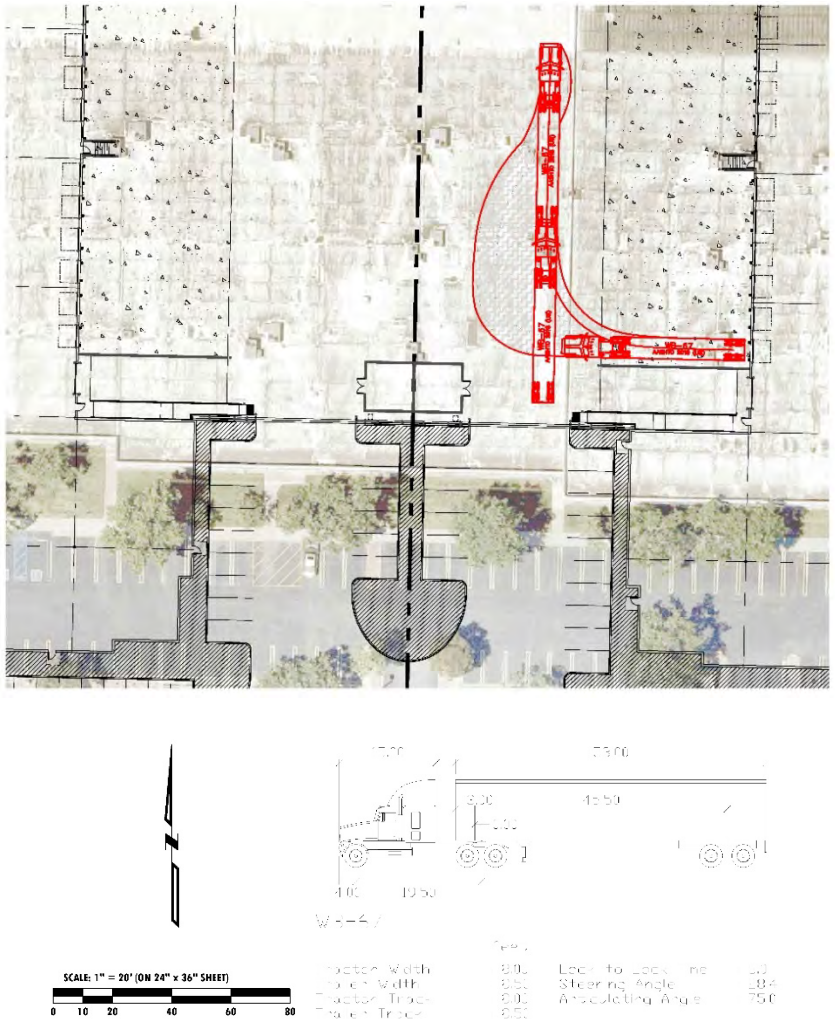

PLAZA DR
SCALE: 1" = 40' (ON 24" x 36" SHEET)
0 20 40 80 120 160
EXHIBIT A: PLAZA DRIVE AT PROJECT DRIVEWAY
WEST BUILDING OUTBOUND TRUCK TURNING TEMPLATE
URBAN CROSSROADS
WWW.URBANXROADS.COM
TELEPHONE # 949-660-1994

EXHIBIT 1-7: LOADING DOCK TRUCK CIRCULATION FOR EASTERN BUILDING



1.8 QUEUING ANALYSIS

The traffic modeling and signal timing optimization software package SimTraffic has been utilized to assess the queues. SimTraffic is designed to model networks of signalized and unsignalized intersections, with the primary purpose of checking and fine-tuning signal operations. SimTraffic uses the input parameters from Synchro to generate random simulations. These random simulations generated by SimTraffic have been utilized to determine the 95th percentile queue lengths observed for each applicable turn lane. A SimTraffic simulation has been recorded up to 5 times, during the weekday AM and weekday PM peak hours, and has been seeded for 15-minute periods with 60-minute recording intervals.

A queuing analysis has been conducted for all study area intersections under Opening Year Cumulative (2024) traffic conditions to ensure the existing and proposed left turn storage can accommodate the 95th percentile peak hour queues. The results of the queuing analysis are shown in Table 1-3 and the worksheets for the weekday AM and PM peak hours are provided in Appendix 1.2 of this report for Opening Year Cumulative (2024) traffic conditions. As shown on Table 1-3, there are no improvements needed to the turn lane storage lengths.

TABLE 1-3: PEAK HOUR QUEUING ANALYSIS

Intersection	Movement	Available Stacking Distance (Feet)[3]	95th Percentile Queue (Feet) AM Peak	95th Percentile Queue (Feet) PM Peak	Acceptable?[1] AM	Acceptable?[1] PM
Douglas Dr. & Katella Av.	NBL	115	45	76	Yes	Yes
	SBL	90	7	39	Yes	Yes
	SBR	90	27	36	Yes	Yes
	EBL	250	84	74	Yes	Yes
	EBR	100	53	69	Yes	Yes
	WBL	250	81	64	Yes	Yes
	WBR	130	48	14	Yes	Yes
Driveway 1 & Plaza Dr.	EBL	100	0	5	Yes	Yes
Driveway 2 & Plaza Dr.	EBL	100	0	0	Yes	Yes
	WBL	100	5	0	Yes	Yes
Driveway 3 & Plaza Dr.	EBL	100	0	0	Yes	Yes
	WBL	100	0	7	Yes	Yes
Driveway 4 & Plaza Dr.	EBL	100	0	0	Yes	Yes
	WBL	100	14	8	Yes	Yes
Valley View St. & Plaza Dr.	NBL	190	97	34	Yes	Yes
	SBL	160	121	70	Yes	Yes
	EBL	110	26	87	Yes	Yes
	WBL	65	20	71	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 25 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.

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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 the County's CMP 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. (5) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

Intersection Capacity Utilization (ICU)

The City of Cypress requires signalized intersections to be evaluated through ICU analysis which compares the peak hour traffic volumes to intersection capacity. Lane capacities of 1,700 vehicles per hour of green time have been assumed for the ICU calculations. 0.05 of volume to capacity (V/C) has been assumed representing 5 percent for the yellow and all-red signal indication and inherent vehicle delay between cycles with an assumed signal cycle of 100 seconds. The ICU LOS definitions based on V/C ratio are presented in Table 2-1. The Traffix software package has been utilized to evaluate the signalized intersections using the ICU methodology with the analysis parameters discussed above.

TABLE 2-1 INTERSECTION CAPACITY UTILIZATION (ICU) LOS DEFINITIONS

Level of Service	Critical Volume to Capacity Ratio
A	0.00 - 0.60
B	0.61 - 0.70
C	0.71 - 0.80
D	0.81 - 0.90
E	0.91 - 1.00
F	>1.00

Source: 2019 Orange County Congestion Management Program (CMP)

Highway Capacity Analysis (HCM)

Intersection LOS operations have also been reported based on the HCM methodology which are based on an intersection's average control delay. (3) Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-2.

The traffic modeling and signal timing optimization software package Synchro (Version 11) has been utilized to analyze signalized intersections. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

TABLE 2-2: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B
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
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
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
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

A saturation flow rate of 1900 has been utilized for all study area intersections. The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Customary 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. (5)

2.2.2 UNSIGNALIZED INTERSECTIONS

The ICU methodology is not applicable to unsignalized intersections As such, the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (5) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-3). 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. Delay for the intersection is reported for the worst individual movement at a two-way stop-controlled intersection. For all-way stop controlled intersections, LOS is computed for the intersection as a whole (average delay).

TABLE 2-3: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	Average Control Delay (Seconds), V/C ≤ 1.0	Level of Service, V/C ≤ 1.0[1]
Little or no delays.	0 to 10.00	A
Short traffic delays.	10.01 to 15.00	B
Average traffic delays.	15.01 to 25.00	C
Long traffic delays.	25.01 to 35.00	D
Very long traffic delays.	35.01 to 50.00	E
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F

Source: HCM, 6th Edition

[1] If V/C is greater than 1.0 then LOS is F per HCM.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term “signal warrants” refers to the list of established criteria used by the California Department of Transportation (Caltrans) and other public agencies to quantitatively justify or determine 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). (6)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school

areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (6) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions and for all future analysis scenarios for existing unsignalized intersections. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics. 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. Rural warrants have been used as posted speed limits on the major roadways with unsignalized intersections are over 40 miles per hour while urban warrants have been used where speeds are 40 miles per hour or below.

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. Similarly, the speed limit has been used as the basis for determining the use of Urban and Rural warrants. Traffic signal warrant analyses were performed for the following study area intersection shown on Table 2-4:

TABLE 2-4: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

#	Intersection
2	Driveway 1 & Plaza Dr.
3	Driveway 2 & Plaza Dr.
4	Driveway 3/McDonnell Dr./Cara Wy. & Plaza Dr.
5	Driveway 4 & Plaza Dr.

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 Opening Year Cumulative (2024) 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 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

The definition of an intersection deficiency has been obtained from the City's General Plan. The City of Cypress has adopted LOS D or better as the desired citywide operating standard for most City streets. However, given the influence of regional traffic on Valley View Street, Lincoln Avenue, and Katella Avenue, which are beyond the control of the City of Cypress, LOS E or better has been adopted as the minimum operating LOS for street segments and intersections on these arterials due to the high volume of traffic carried on these roadways.

2.5 DEFICIENCY CRITERIA

For the study area intersections that lie within the City of Cypress, to determine whether the addition of project traffic (as defined through the comparison of Opening Year Cumulative Without and With Project traffic conditions) at a study intersection would result in a direct project-specific traffic deficiency, the following conditions must occur:

- Any study intersection operating at an acceptable LOS D or better without project in which the addition of project traffic causes the intersection to degrade to LOS E or F shall identify improvements to improve the operations to LOS D or better.

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3 AREA CONDITIONS

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

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the scoping agreement with City of Cypress staff (Appendix 1.1), the study area includes a total of 6 existing and future intersections as shown previously on Exhibit 1-3, where the Project is anticipated to contribute 50 or more peak hour trips or were added at the City's request during the scoping process. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 CITY OF CYPRESS GENERAL PLAN CIRCULATION ELEMENT

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

Major roadways are six-lane roadways and typically include a raised median. These roadways typically have a 120-foot right-of-way and a 104-foot curb-to-curb measurement. These roadways typically direct traffic through major development areas. The following study area roadways within the City are classified as a Major:

- Katella Avenue
- Valley View Street

3.3 BICYCLE & PEDESTRIAN FACILITIES

The City's bike network is shown on Exhibit 3-4. As shown on Exhibit 3-4, both Katella Avenue and Valley View Street currently accommodate off-street bike paths. Exhibit 3-5 illustrates the existing crosswalks and sidewalks throughout the study area. As shown on Exhibit 3-5, there are pedestrian facilities in place in the vicinity of the Project site along Douglas Drive, Katella Avenue, and Valley View Street.

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

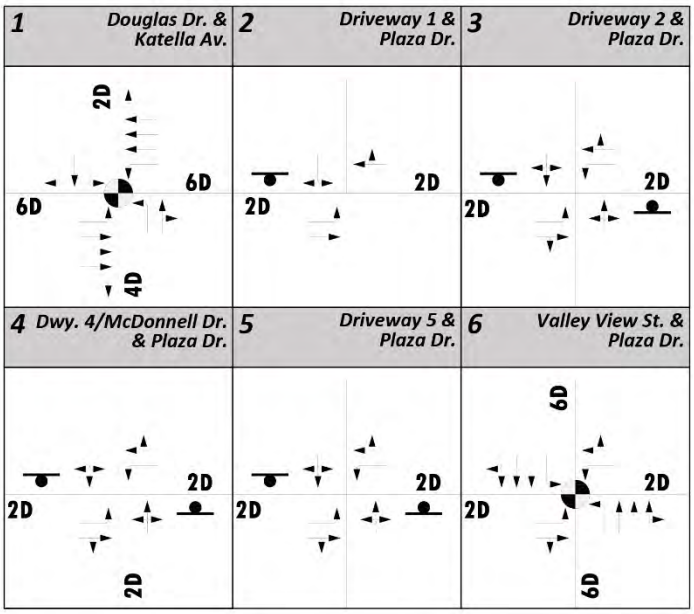
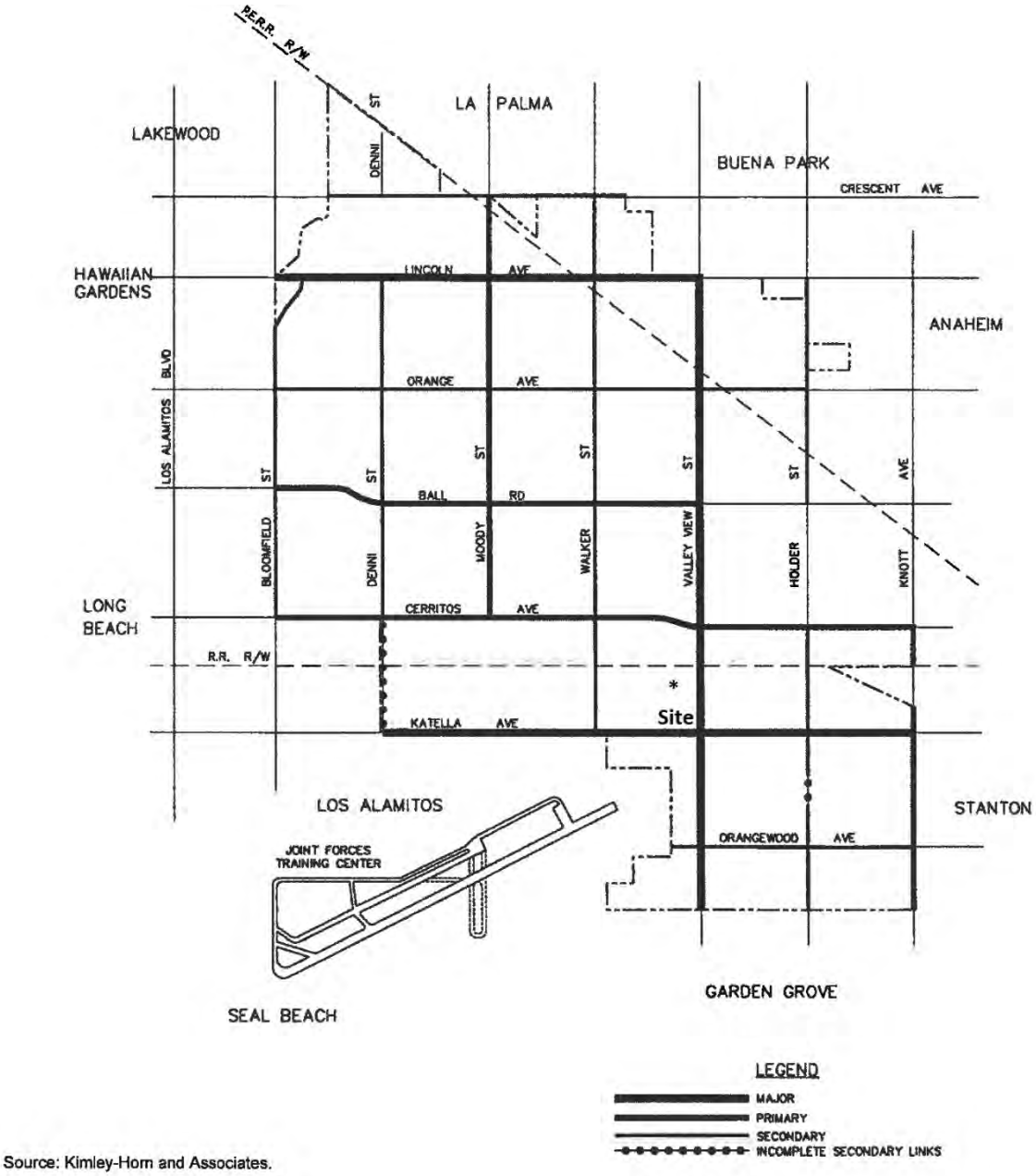


EXHIBIT 3-2: CITY OF CYPRESS GENERAL PLAN CIRCULATION ELEMENT



Source: Kimley-Horn and Associates.

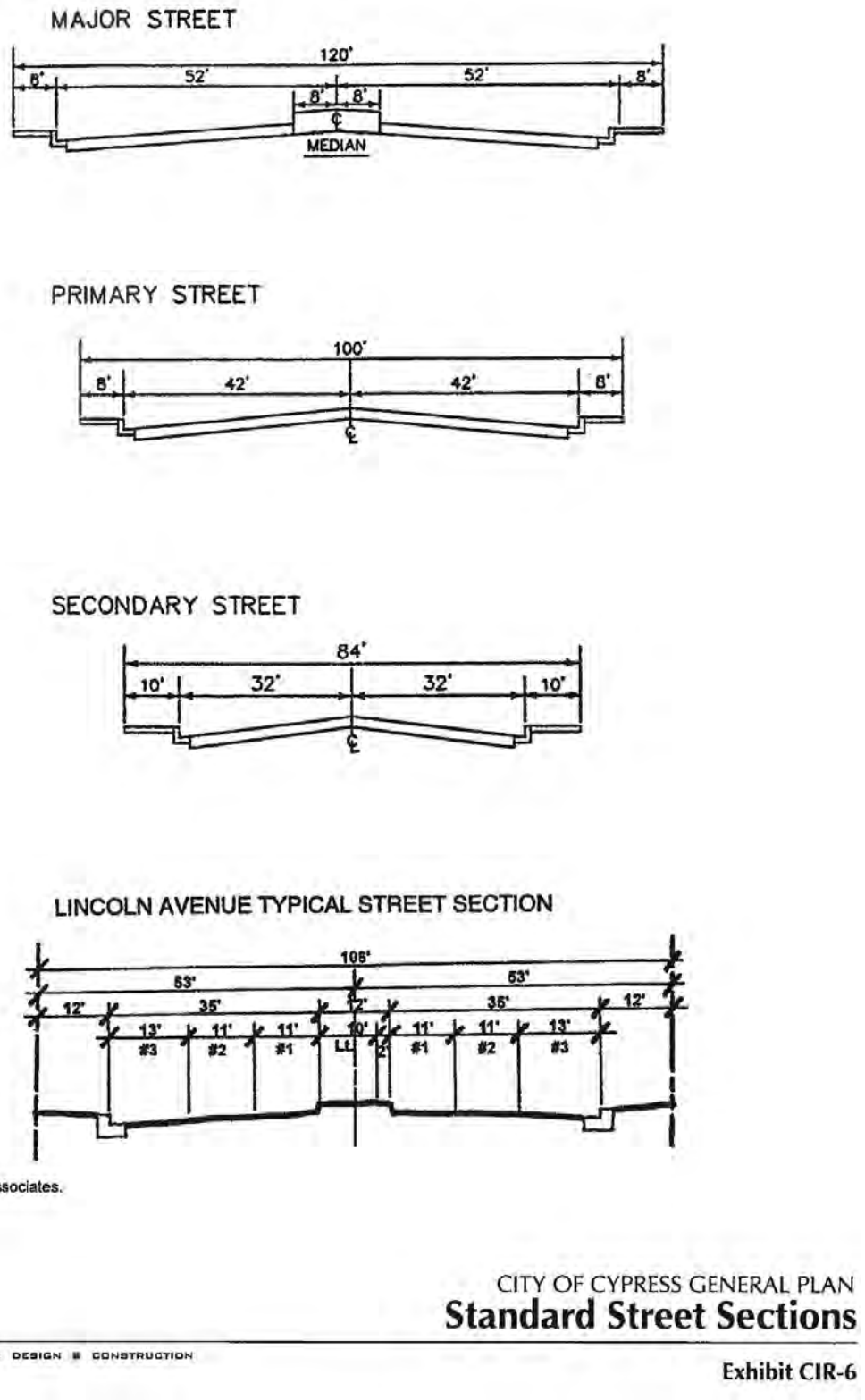
N

CITY OF CYPRESS GENERAL PLAN
General Plan Arterial System

RBF CONSULTING PLANNING ■ DESIGN ■ CONSTRUCTION

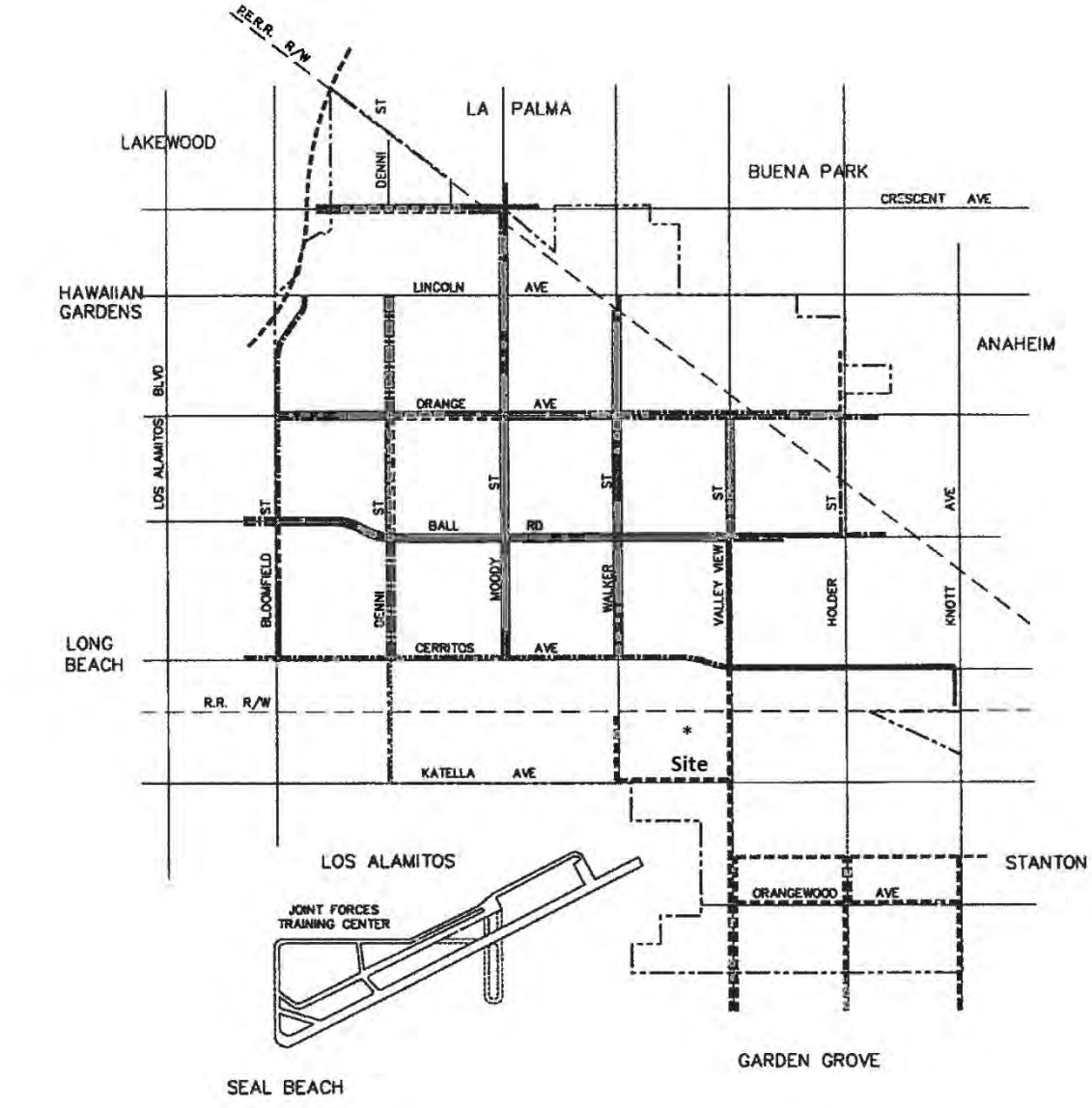
Exhibit CIR-7

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



Source: Kimley-Horn and Associates.

EXHIBIT 3-4: CITY OF CYPRESS GENERAL PLAN BIKE NETWORK



Source: Kimley-Horn and Associates.

N

RBF CONSULTING PLANNING ■ DESIGN ■ CONSTRUCTION

CITY OF CYPRESS GENERAL PLAN
Existing Bikeways

Exhibit CIR-4

EXHIBIT 3-5: EXISTING PEDESTRIAN FACILITIES

3.4 TRANSIT SERVICE

The study area is currently served by Orange County Transit Authority (OCTA) with bus service along Katella Avenue and Valley View Street. OCTA Route 50 runs along Katella Avenue and currently has existing bus stops just east of Douglas Drive and west of Valley View Street along the north side. OCTA Route 123 runs along Valley View Street and there are existing bus stops north of Plaza Drive. The existing transit stops are in close proximity to the Project site and could serve the site in the future. The transit services are illustrated on Exhibit 3-6. Transit service is reviewed and updated by OCTA periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.5 TRUCK ROUTES

The City's truck routes are shown on Exhibit 3-7. Both Katella Avenue and Valley View Street adjacent to the Project are identified as truck routes. These truck routes serve both the proposed Project and future cumulative development projects throughout the study area.

3.6 EXISTING (2022) TRAFFIC COUNTS

The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in August 2022 when local schools were in session and operating on normal bell schedules. 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)

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.

Existing weekday ADT volumes on arterial highways throughout the study area are shown on Exhibit 3-8. 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 11.3 = Leg Volume

A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 8.9 percent. As such, the above equation utilizing a factor of 11.3 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 8.9 percent (i.e., 1/0.089 = 11.3) and was assumed to sufficiently estimate ADT volumes for planning-level analyses. This factor is consistent with that used for other traffic studies within the study area. Existing weekday AM and weekday PM peak hour intersection volumes are shown on Exhibit 3-8.

EXHIBIT 3-6: EXISTING TRANSIT ROUTES

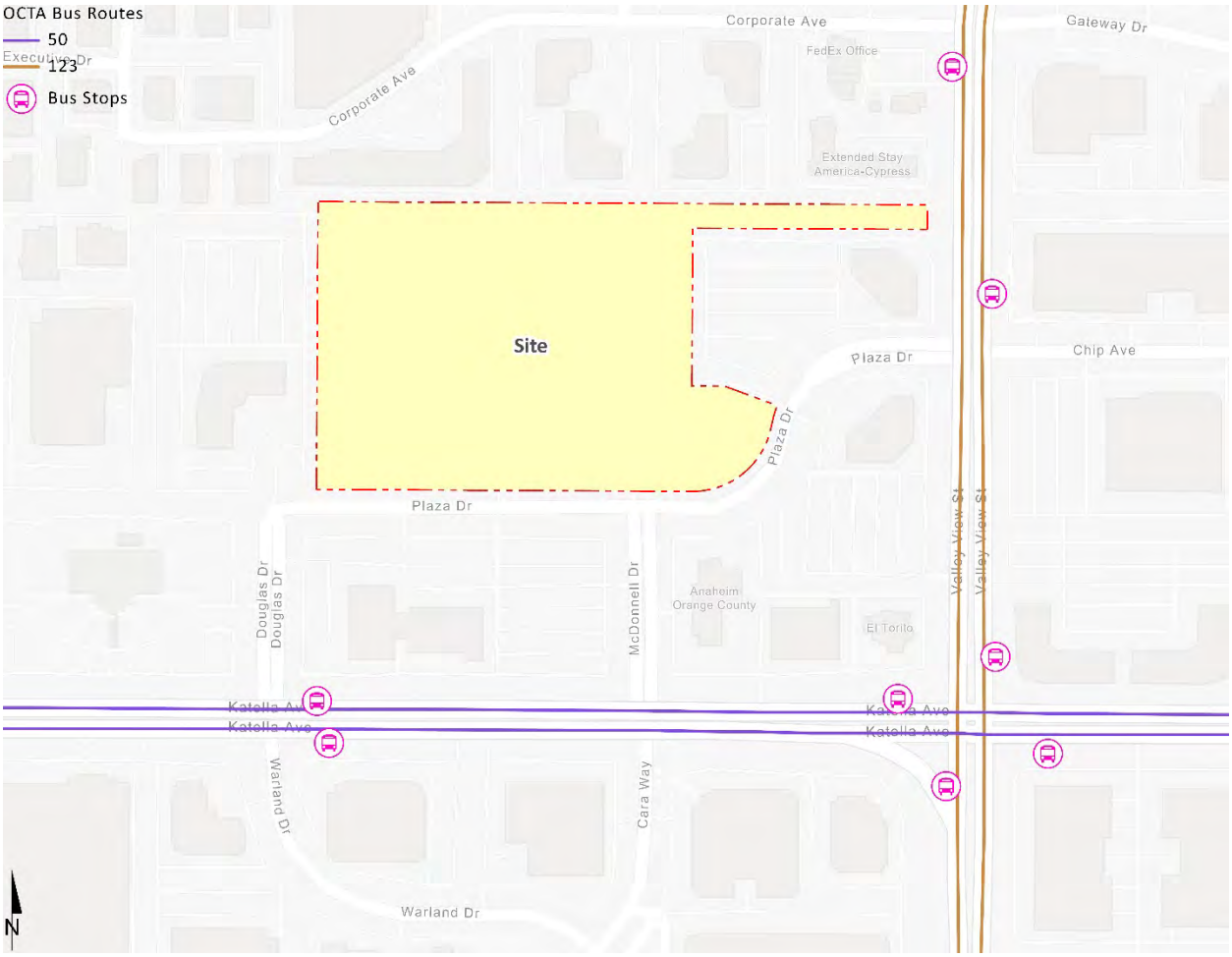


EXHIBIT 3-7: CITY OF CYPRESS TRUCK ROUTES

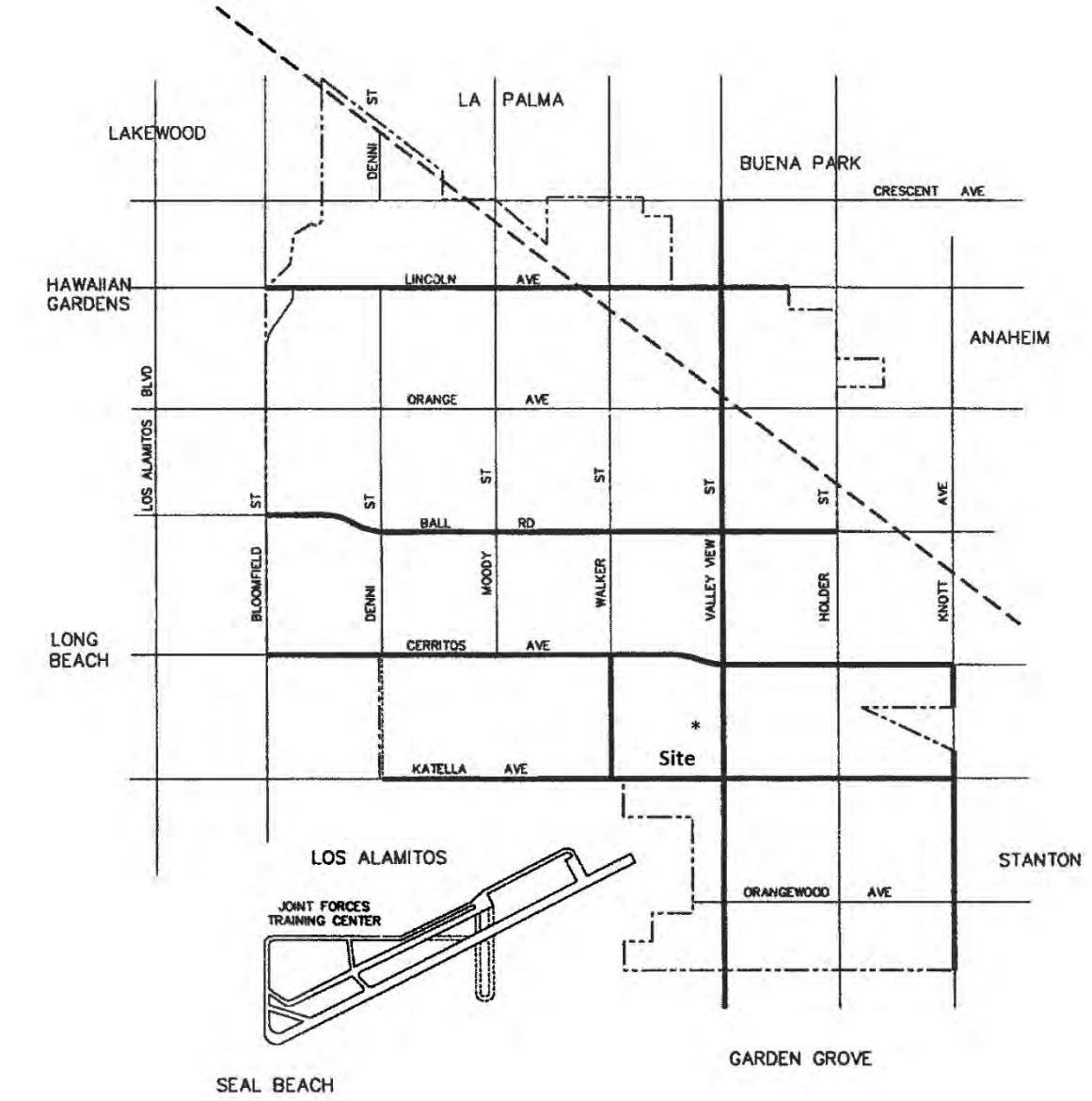


EXHIBIT 3-8: EXISTING (2022) TRAFFIC VOLUMES

1 Douglas Dr. & Katella Av.

1,000 | 39,200

	12(45) ↓	2(24) ↳
26(11) →		↰ 33(6)
1621(1888) →		← 1651(1541)
60(27) ↴		↰ 9(8)
	17(79) ↰	2(1) ↑ 5(7) ↱

42,950 | 1,400

2 Driveway 1 & Plaza Dr.

100 | 500

	2(5) ↓	0(1) ↳
2(0) →		↰ 0(2)
3(23) →		← 31(17)

500

3 Driveway 2 & Plaza Dr.

750

		← 38(18)
3(25) →		↰ 27(2)
	0(4) ↰	2(20) ↱

550 | 300

4 Driveway 3/McDonnell Dr. & Plaza Dr.

800

	0(1) ↓	
5(43) →		↰ 1(0)
0(2) ↴		← 46(15)
		↰ 6(11)
	19(5) ↰	2(0) ↑ 32(9) ↱

750 | 300

5 Driveway 4 & Plaza Dr.

Nominal | 1,600

	1(0) ↓	0(4) ↳
14(61) →		↰ 1(1)
26(2) ↴		← 58(32)
		↰ 23(3)
	0(15) ↰	↱ 4(42)

1,250 | 700

6 Valley View St. & Plaza Dr.

42,050 | 2,200

	76(23) ↓	1458(1455) ↓	83(16) ↳
3(79) →			↰ 12(116)
1(0) →			← 0(9)
14(28) ↴			↰ 4(51)
	11(4) ↰	1444(1894) ↑	59(4) ↱

1,600 | 38,750

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

Volumes reported on the exhibits are expressed in actual vehicles. However, the peak hour intersection operations analysis utilizes passenger car equivalent (PCE) volumes. 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. PCE volumes for all analysis scenarios can be found in Appendix 3.1.

3.7 INTERSECTION OPERATIONS ANALYSIS

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

TABLE 3-1: INTERSECTION ANALYSIS FOR EXISTING (2022) CONDITIONS

#	Intersection	Traffic Control[3]	Delay[1] (secs.) AM	Delay[1] (secs.) PM	Level of Service AM	Level of Service PM	ICU[2] (V/C) AM	ICU[2] (V/C) PM	Level of Service AM	Level of Service PM
1	Douglas Dr. & Katella Av.	TS	6.7	9.3	A	A	0.43	0.51	A	A
2	Driveway 1 & Plaza Dr.	CSS	8.5	8.5	A	A	--	--		
3	Driveway 2 & Plaza Dr.	CSS	8.3	8.8	A	A	--	--		
4	Driveway 3/McDonnell Dr./Cara Wy. & Plaza Dr.	CSS	9.0	10.0	A	B	--	--		
5	Driveway 4 & Plaza Dr.	CSS	8.7	10.1	A	B	--	--		
6	Valley View St. & Plaza Dr.	TS	7.3	9.7	A	A	0.41	0.52	A	A

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. HCM delay reported in seconds.

2 ICU reported as a volume-to-capacity ratio and for signalized intersections only. ICU not applicable to unsignalized inspections.

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

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.

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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 includes the development a of two proposed warehouse buildings: Building 1 with 204,909 square feet and Building 2 with 185,359 square feet for a total of 390,268 square feet. The proposed Project will replace an existing building which consists of 248,623 square feet of warehousing use and 88,020 square feet of office use. The anticipated Opening Year for the proposed Project is 2024. Access to the site will be accommodated via four driveways along Plaza Drive located where the existing access points are.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is both attracted to and produced by a development.

4.1.1 EXISTING USE

The proposed Project will replace an existing building which consists of 248,623 square feet of warehousing use and 88,020 square feet of office use. In an effort to understand the existing traffic associated with the current uses, the trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual (11th Edition, 2021) for the existing warehousing (ITE Land Use Code 150) and general office (ITE Land Use Code 710) uses (see Table 4-1). For purposes of this analysis, the following land use code and vehicle mix has been utilized for the existing warehouse component:

- ITE Land Use Code 150 (Warehousing) has been used to derive site specific trip generation estimates for the existing use (248,623 square feet of warehousing use). A warehouse is primarily devoted to the storage of materials but may also include office and maintenance areas. The vehicle mix has also been obtained from the ITE's latest Trip Generation Manual. The truck percentages were further broken down by axle type per the following South Coast Air Quality Management District (SCAQMD) recommended truck mix: 2-Axle = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.

TABLE 4-1: EXISTING TRIP GENERATION RATES

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicle Trip Generation Rates									
Warehousing[3]	TSF	150	0.131	0.039	0.170	0.050	0.130	0.180	1.710
Passenger Cars			0.120	0.030	0.150	0.034	0.116	0.150	1.110
2-Axle Trucks			0.002	0.001	0.003	0.003	0.002	0.005	0.100
3-Axle Trucks			0.002	0.002	0.004	0.003	0.003	0.006	0.124
4+-Axle Trucks			0.007	0.006	0.013	0.010	0.009	0.019	0.376
General Office (based on average rates)	TSF	710	1.34	0.18	1.52	0.24	1.20	1.44	10.84
Passenger Car Equivalent (PCE) Trip Generation Rates[6]									
Warehousing[3]	TSF	150	0.131	0.039	0.170	0.050	0.130	0.180	1.710
Passenger Cars			0.120	0.030	0.150	0.034	0.116	0.150	1.110
2-Axle Trucks (PCE = 1.5)			0.003	0.002	0.005	0.005	0.003	0.008	0.150
3-Axle Trucks (PCE = 2.0)			0.004	0.004	0.008	0.006	0.006	0.012	0.248
4+-Axle Trucks (PCE = 3.0)			0.021	0.017	0.038	0.030	0.026	0.056	1.127

[1] Trip Generation & Vehicle Mix Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

[2] TSF = thousand square feet

[3] Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.
Normalized % - Without Cold Storage: 16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks.
Normalized % - With Cold Storage: 34.7% 2-Axle trucks, 11.0% 3-Axle trucks, 54.3% 4-Axle trucks.

General Office (ITE Land Use Code 710) has been used to calculate the trip generation for the existing 88,020 square feet of office use. The trip generation summary illustrating daily, and peak hour trip generation estimates for the existing uses are shown on Table 2 in actual and PCE vehicles. As shown on Table 4-2, the existing use generates a total of 1,382 two-way trips per day with 175 AM peak hour trips and 172 PM peak hour trips (in actual vehicles). In comparison, the existing use generates a total of 1,610 PCE two-way trips per day with 183 PCE AM peak hour trips and 184 PCE PM peak hour trips (see also Table 4-2).

PCE factors were applied to the trip generation rates for heavy trucks (large 2-axles, 3-axles, 4+-axles). PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with that used for other projects within the City.

TABLE 4-2: EXISTING TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicles:									
Warehousing	248.623	TSF							
Passenger Cars:			30	7	37	9	29	38	276
2-axle Trucks:			0	0	0	1	0	1	26
3-axle Trucks:			0	1	1	1	1	2	32
4+-axle Trucks:			2	1	3	2	2	4	94
Total Truck Trips (Actual Vehicles):			2	2	4	4	3	7	152
Total Trips (Actual Vehicles)[2]			32	9	41	13	32	45	428
General Office	88.020	TSF	118	16	134	22	105	127	954
Passenger Cars			148	23	171	31	134	165	1,230
Trucks			2	2	4	4	3	7	152
Total Trips (Actual Vehicles)[2]			**150**	**25**	**175**	**35**	**137**	**172**	**1,382**
Passenger Car Equivalent (PCE):									
Warehousing	248.623	TSF							
Passenger Cars:			30	7	37	9	29	38	276
2-axle Trucks:			1	0	1	1	1	2	38
3-axle Trucks:			1	1	2	1	2	3	62
4+-axle Trucks:			5	4	9	7	7	14	280
Total Truck Trips (PCE):			7	5	12	9	10	19	380
Total Trips (PCE)[2]			37	12	49	18	39	57	656
General Office	88.020	TSF	118	16	134	22	105	127	954
Passenger Cars			148	23	171	31	134	165	1,230
Trucks (PCE)			7	5	12	9	10	19	380
Total Trips (PCE)[2]			**155**	**28**	**183**	**40**	**144**	**184**	**1,610**

[1] TSF = Thousand Square Feet

[2] Total = Passenger Cars + Trucks

4.1.2 PROPOSED PROJECT

The trip generation rates used for this analysis are based upon information collected by the ITE as provided in their Trip Generation Manual (11th Edition, 2021) for the proposed high-cube transload and short-term storge warehouse use (ITE Land use Code 154) and high-cube cold-storage warehouse use (ITE Land Use Code 157) (see Table 4-3). For purposes of this analysis, the following land use codes and vehicle mixes have been utilized for the various industrial components:

- ITE land use code 154 (High-Cube Transload and Short-Term Storage Warehouse) has been used to derive the trip generation for the proposed Project (50% of the total square footage, or 195,134 square feet). High-cube transload/short-term storage warehouse data regarding the truck percentage and vehicle mix has been obtained from the ITE's Trip Generation Manual. The truck percentages were further broken down by axle type per the following SCAQMD recommended truck mix: 2-Axle = 16.7%; 3-Axle = 20.7%; 4+-Axle = 62.6%.
- ITE land use code 157 (High-Cube Cold Storage Warehouse) has been used to derive site specific trip generation estimates for up to 195,134 square feet of the proposed Project (remaining 50% of the overall square footage). High-cube cold storage warehouses include warehouses characterized by the storage and/or consolidation of manufactured goods (and to a lesser extent, raw materials) prior to their distribution to retail locations or other warehouses. High-cube cold storage warehouses are facilities typified by temperature-controlled environments for frozen food or other perishable products. The High-Cube Cold Storage Warehouse vehicle mix (passenger cars versus trucks) has been obtained from the ITE's latest Trip Generation Manual. The truck percentages were further broken down by axle type per the following SCAQMD recommended truck mix: 2-Axle = 34.7%; 3-Axle = 11.0%; 4+-Axle = 54.3%.

TABLE 4-3: PROJECT TRIP GENERATION RATES

Land Use[1]	Units[2]	ITE LU Code	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicle Trip Generation Rates									
High-Cube Transload and Short-Term Storage Warehouse[3]	TSF	154	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars			0.052	0.008	0.060	0.023	0.067	0.090	1.180
2-Axle Trucks			0.002	0.001	0.003	0.001	0.001	0.002	0.037
3-Axle Trucks			0.002	0.002	0.004	0.001	0.001	0.002	0.046
4+-Axle Trucks			0.006	0.007	0.013	0.003	0.003	0.006	0.138
High-Cube Cold Storage Warehouse[3]	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks			0.003	0.007	0.010	0.005	0.005	0.010	0.260
3-Axle Trucks			0.001	0.002	0.003	0.002	0.001	0.003	0.083
4+-Axle Trucks			0.005	0.011	0.016	0.008	0.008	0.016	0.407
Passenger Car Equivalent (PCE) Trip Generation Rates[6]									
High-Cube Transload and Short-Term Storage Warehouse[3]	TSF	154	0.062	0.018	0.080	0.028	0.072	0.100	1.400
Passenger Cars			0.052	0.008	0.060	0.023	0.067	0.090	1.180
2-Axle Trucks (PCE = 1.5)			0.003	0.002	0.005	0.002	0.001	0.003	0.055
3-Axle Trucks (PCE = 2.0)			0.004	0.004	0.008	0.002	0.002	0.004	0.091
4+-Axle Trucks (PCE = 3.0)			0.018	0.020	0.038	0.009	0.010	0.019	0.413
High-Cube Cold Storage Warehouse[3]	TSF	157	0.085	0.025	0.110	0.034	0.086	0.120	2.120
Passenger Cars			0.076	0.004	0.080	0.019	0.071	0.090	1.370
2-Axle Trucks (PCE = 1.5)			0.005	0.011	0.016	0.008	0.008	0.016	0.390
3-Axle Trucks (PCE = 2.0)			0.002	0.005	0.007	0.004	0.003	0.007	0.165
4+-Axle Trucks (PCE = 3.0)			0.015	0.034	0.049	0.024	0.025	0.049	1.222

[1] Trip Generation & Vehicle Mix Source: Institute of Transportation Engineers (ITE), Trip Generation Manual, Eleventh Edition (2021).

[2] TSF = thousand square feet

[3] Truck Mix: South Coast Air Quality Management District's (SCAQMD) recommended truck mix, by axle type.
Normalized % - Without Cold Storage: 16.7% 2-Axle trucks, 20.7% 3-Axle trucks, 62.6% 4-Axle trucks.
Normalized % - With Cold Storage: 34.7% 2-Axle trucks, 11.0% 3-Axle trucks, 54.3% 4-Axle trucks.

As shown in Table 4-4, the proposed Project is anticipated to generate a total of 692 two-way trips per day with 35 AM peak hour trips and 43 PM peak hour trips (in actual vehicles). In comparison, the proposed Project is anticipated to generate a total of 956 PCE two-way trips per day with 53 PCE AM peak hour trips and 54 PCE PM peak hour trips (see also Table 4-4). The rip generation shown on Table 44 has been utilized for the purposes of the operations analysis.

TABLE 4-4: PROJECT TRIP GENERATION SUMMARY

Land Use	Quantity	Units[1]	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total	Daily
Actual Vehicles:									
High-Cube Transload	195.134	TSF							
Passenger Cars:			10	2	12	4	13	17	230
2-axle Trucks:			0	0	0	0	0	0	8
3-axle Trucks:			0	0	0	0	0	0	10
4+-axle Trucks:			1	1	2	1	1	2	28
Total Truck Trips (Actual Vehicles):			1	1	2	1	1	2	46
Total Trips (Actual Vehicles)[2]			11	3	14	5	14	19	276
High-Cube Cold Storage	195.134	TSF							
Passenger Cars:			15	1	16	4	14	18	268
2-axle Trucks:			1	1	2	1	1	2	52
3-axle Trucks:			0	0	0	0	0	0	16
4+-axle Trucks:			1	2	3	2	2	4	80
Total Truck Trips (Actual Vehicles):			2	3	5	3	3	6	148
Total Trips (Actual Vehicles)[2]			17	4	21	7	17	24	416
Passenger Cars			25	3	28	8	27	35	498
Trucks			3	4	7	4	4	8	194
Total Trips (Actual Vehicles)[2]			**28**	**7**	**35**	**12**	**31**	**43**	**692**
Passenger Car Equivalent (PCE):									
High-Cube Transload	195.134	TSF							
Passenger Cars:			10	2	12	4	13	17	230
2-axle Trucks:			1	0	1	0	0	0	12
3-axle Trucks:			1	1	2	0	0	0	18
4+-axle Trucks:			4	4	8	2	2	4	82
Total Truck Trips (PCE):			6	5	11	2	2	4	112
Total Trips (PCE)[2]			16	7	23	6	15	21	342
High-Cube Cold Storage	195.134	TSF							
Passenger Cars:			15	1	16	4	14	18	268
2-axle Trucks:			1	2	3	1	2	3	76
3-axle Trucks:			0	1	1	1	1	2	32
4+-axle Trucks:			3	7	10	5	5	10	238
Total Truck Trips (PCE):			4	10	14	7	8	15	346
Total Trips (PCE)[2]			19	11	30	11	22	33	614
Passenger Cars			25	3	28	8	27	35	498
Trucks (PCE)			10	15	25	9	10	19	458
Total Trips (PCE)[2]			**35**	**18**	**53**	**17**	**37**	**54**	**956**

[1] TSF = Thousand Square Feet

[2] Total = Passenger Cars + Trucks

4.1.3 TRIP GENERATION COMPARISON

Table 4-5 shows the trip generation comparison between the existing and proposed use. It is our understanding that approximately 195,017 square feet of the existing warehouse/office building (of which 37,786 SF is office) is currently occupied and generating traffic, however, should the existing site be fully occupied, then it is anticipated there would a net reduction in trips. The resulting net new trips are identified at the bottom of Table 4-5. The trip generation comparison is based on PCE as the existing and proposed uses are truck-intensive uses (any intersection operations analysis would use the PCE-based trip generation). As shown on Table 4-5, the Project is anticipated to generate 654 fewer two-way trips per day with a net reduction of 130 AM peak hour trips and net reduction of 130 PM peak hour trips (in PCE).

TABLE 4-5: TRIP GENERATION COMPARISON

	AM Peak Hour			PM Peak Hour			
Land Use	In	Out	Total	In	Out	Total	Daily
Proposed Project							
Passenger Cars:	25	3	28	8	27	35	498
Total Truck Trips (PCE):	10	15	25	9	10	19	458
Total Trips (PCE)	**35**	**18**	**53**	**17**	**37**	**54**	**956**
Fully Occupied Existing Use							
Passenger Cars:	148	23	171	31	134	165	1,230
Total Truck Trips (PCE):	7	5	12	9	10	19	380
Total Trips (PCE)	**155**	**28**	**183**	**40**	**144**	**184**	**1,610**
Variance							
Passenger Cars:	-123	-20	-143	-23	-107	-130	-732
Total Truck Trips (PCE):	3	10	13	0	0	0	78
Total Trips (PCE)	**-120**	**-10**	**-130**	**-23**	**-107**	**-130**	**-654**

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. In addition, truck routes for neighboring agencies have been taken into consideration in the development of the trip distribution patterns for heavy trucks. Exhibits 4-1 and 4-2 show the Project truck and passenger car trip distribution patterns, respectively.

EXHIBIT 4-1: PROJECT (TRUCK) TRIP DISTRIBUTION

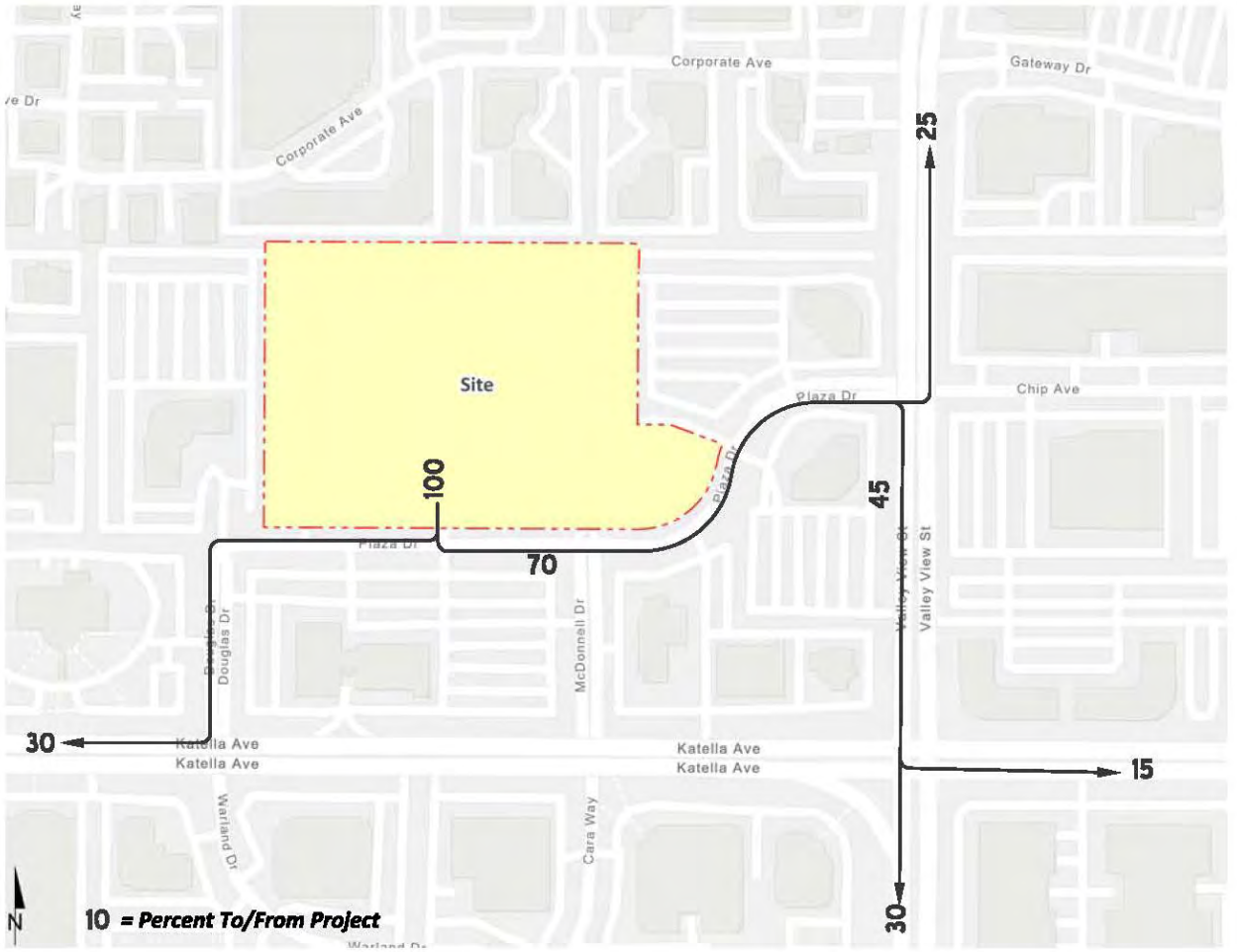
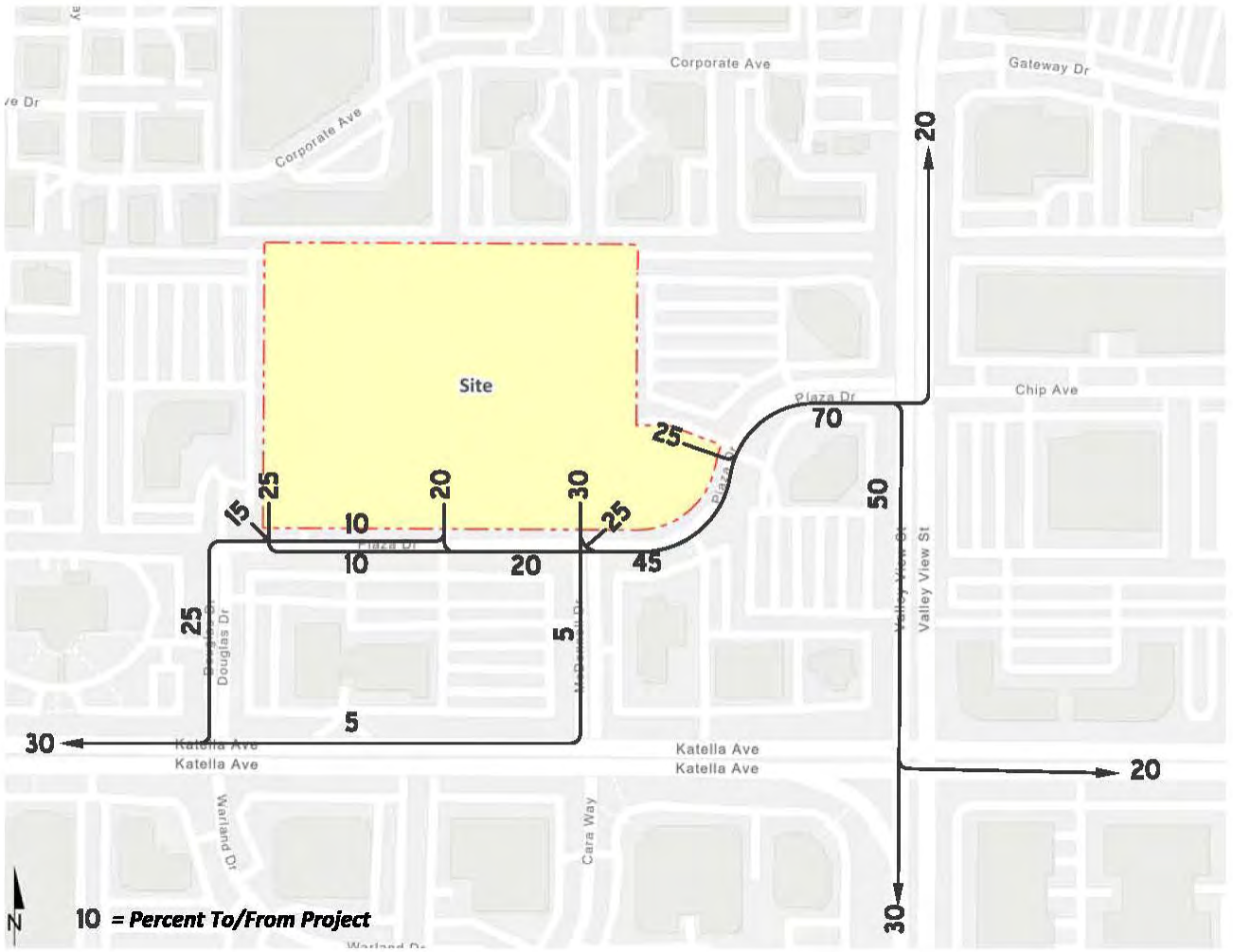


EXHIBIT 4-2: PROJECT (PASSENGER CAR) TRIP DISTRIBUTION



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.

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, the Project only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3.

4.5 BACKGROUND TRAFFIC

Future year traffic forecasts have been based upon background (ambient) growth at 2% per year, compounded annually, for 2024 conditions. The total ambient growth is 4.04% for 2024 traffic conditions (compounded growth of 2 percent per year over 2 years or $1.02^{2\ years}$). 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.

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 City. The cumulative project list includes known and foreseeable projects that are anticipated to contribute traffic to the study area intersections. For the purposes of this analysis, the cumulative projects that were determined to affect one or more of the study area intersections are shown on Exhibit 4-4, listed in Table 4-6, and have been considered for inclusion. Any additional traffic generated by other projects not on the cumulative projects list is likely accounted for through background ambient growth factors that have been applied to the peak hour volumes at study area intersections as discussed in Section 4.5 Background Traffic. Cumulative development projects shown in Exhibit 4-4 and listed in Table 4-6. Cumulative Only ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-5.

EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES

1 Douglas Dr. & Katella Av.	2 Driveway 1 & Plaza Dr.	3 Driveway 2 & Plaza Dr.
200 / Nominal 2(8) ↲ ← 0(1) 7(3) ⮡ 1(0) → 200	100 / 150 0(4) ↲ 0(3) ↳ ↰ 3(1) ← 1(4) 4(1) ⮡ 3(2) → 200	300 / 250 1(4) ↲ 3(6) ↳ ↰ 5(4) ← 3(1) 3(2) ⮡ 0(3) → 150
4 Driveway 3/McDonnell Dr. & Plaza Dr.	**5 Driveway 4 & Plaza Dr.**	**6 Valley View St. & Plaza Dr.**
150 / 350 0(1) ↓ 1(7) ↳ ↰ 6(2) ← 7(4) 3(8) → ↑ 1(0) 250 / Nominal	100 / 500 1(7) ↳ ↰ 6(2) ← 13(6) 4(15) → 350	150 / 350 6(3) ↲ 2(6) ⮡ 3(15) ⮧ ↰ 14(6) 500

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

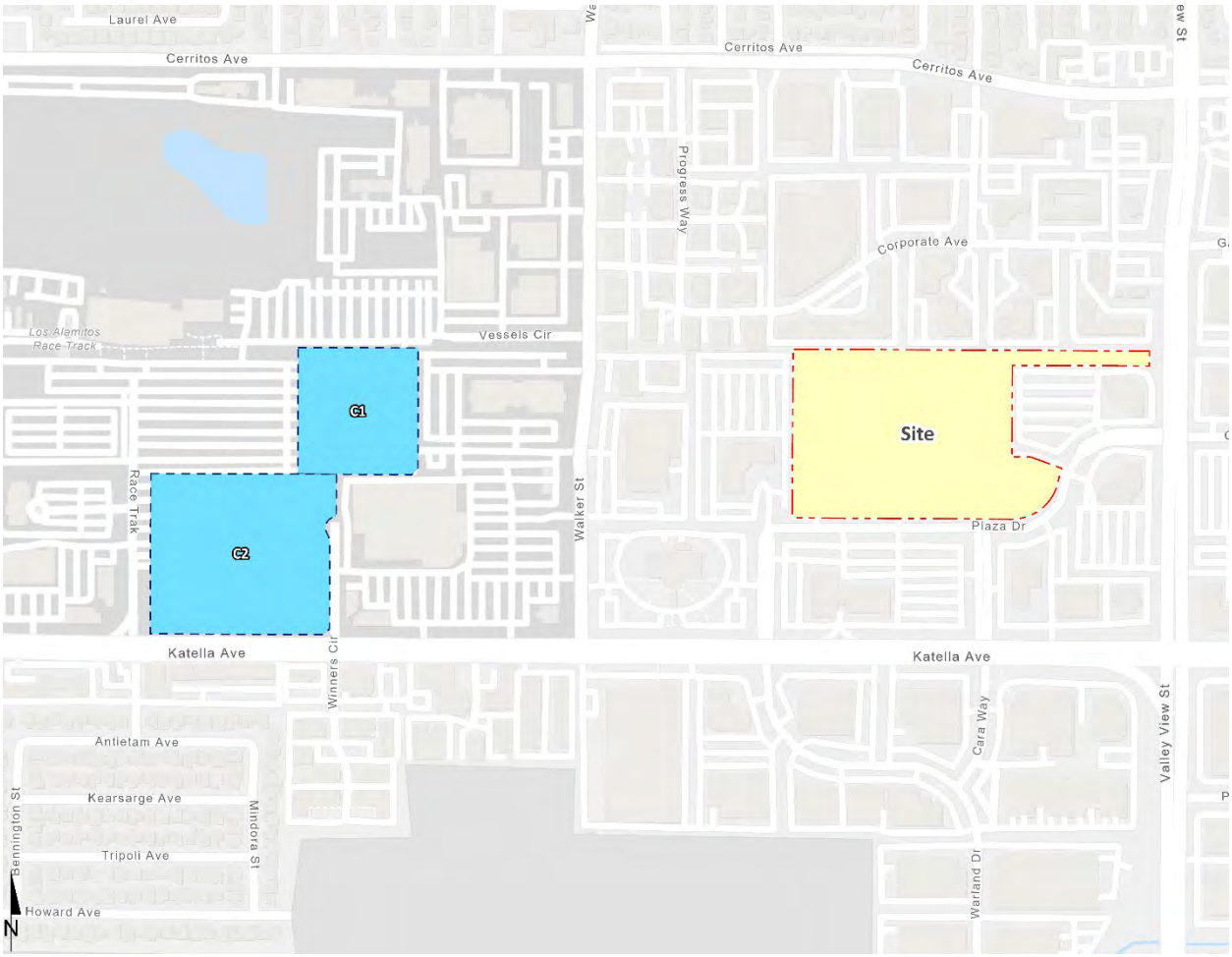
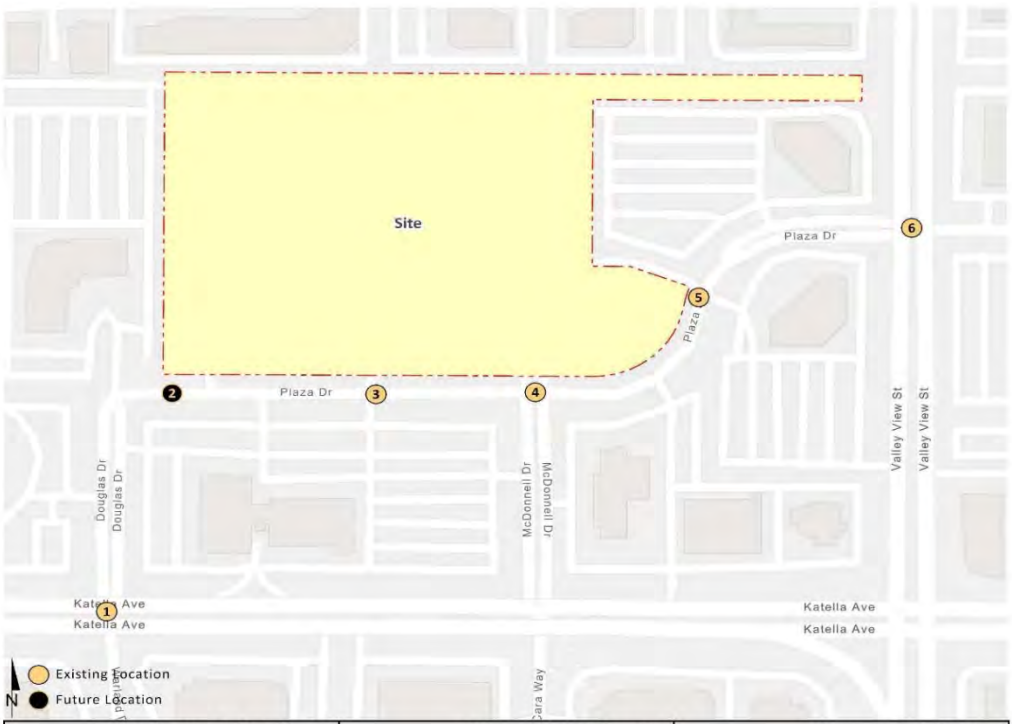


EXHIBIT 4-5: CUMULATIVE ONLY TRAFFIC VOLUMES



1 Douglas Dr. & Katella Av.	2 Driveway 1 & Plaza Dr.	3 Driveway 2 & Plaza Dr.
2,150 ← 32(82) 57(62) → *2,150*		
4 Driveway 3/McDonnell Dr. & Plaza Dr.	**5 Driveway 4 & Plaza Dr.**	**6 Valley View St. & Plaza Dr.**
		500 ← 7(18) 10(15) → *500*

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

TABLE 4-6: CUMULATIVE DEVELOPMENT LAND USE SUMMARY

No.	Project Name	Land Use[1]	Quantity	Units[2]
C1	Cypress Town Center 7-AC Residential	Multifamily (Low Rise) Housing	135	DU
C2	Cypress City Center	Shopping Center	20.800	TSF
		Multifamily (Mid-Rise) Housing	251	DU
		Hotel	120	Rooms
		Multiplex Movie Theater	10	Screens

[1] TSF = Thousand Square Feet; DU = Dwelling Units

4.7 NEAR-TERM TRAFFIC CONDITIONS

The "buildup" approach combines existing traffic counts with a background ambient growth factor to forecast Opening Year Cumulative (2024) traffic conditions. An ambient growth factor accounts for background (area-wide) traffic increases that occur over time up to the year 2024 from the year 2022. Traffic volumes generated by the Project are then added to assess the near-term traffic conditions. The 2024 roadway network is similar to the Existing conditions roadway network, with the exception of future driveways proposed to be developed by the Project. The near-term traffic analysis includes the following traffic conditions, with the various traffic components:

- Opening Year Cumulative (2024) Without Project
  - Existing 2022 counts
  - Ambient growth traffic (4.04%)
  - Cumulative Development traffic
- Opening Year Cumulative (2024) With Project
  - Existing 2022 counts
  - Ambient growth traffic (4.04%)
  - Cumulative Development traffic
  - Project traffic

5 OPENING YEAR CUMULATIVE (2024) TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Opening Year Cumulative (2024) conditions and the resulting intersection operations and traffic signal warrant analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2024) 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 (2024) conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative (2024) conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages).

5.2 WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2022) traffic volumes plus an ambient growth factor of 4.04% and traffic from pending and approved cumulative development projects (two major projects to the west on Katella Avenue). The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2024) Without Project traffic conditions are shown on Exhibit 5-1.

5.3 WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing (2022) traffic volumes plus an ambient growth factor of 4.04%, traffic from pending and approved cumulative development projects, and the addition of Project traffic. The weekday ADT volumes and peak hour volumes which can be expected for Opening Year Cumulative (2024) With Project traffic conditions are shown on Exhibit 5-2.

5.4 INTERSECTION OPERATIONS ANALYSIS

Opening Year Cumulative (2024) 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 Opening Year Cumulative traffic conditions, which indicate the study area intersections are anticipated to continue to operate at an acceptable LOS under Opening Year Cumulative (2024) Without and With Project traffic conditions. The intersection operations analysis worksheets for Opening Year Cumulative (2024) Without and With Project traffic conditions are included in Appendix 5.1 and Appendix 5.2 of this TA, respectively.

EXHIBIT 5-1: OPENING YEAR CUMULATIVE (2024) WITHOUT PROJECT TRAFFIC VOLUMES

1 Douglas Dr. & Katella Av.

1,050 | 12(47) ↲ 1(2) ↓ 2(25) ↳ | 42,900
27(11) → 1743(2026) → 62(28) ↴ | 18(82) ↰ 2(1) ↑ 5(7) ↱ | 1,450
46,850

2 Driveway 1 & Plaza Dr.

100 | 2(5) ↲ 0(1) ↳ | 500
2(0) → 3(24) → | 0(2) ↰ 32(18) ←
550

3 Driveway 2 & Plaza Dr.

750 | ← 40(19) ↰ 28(2)
3(26) → | 0(4) ↰ 2(21) ↱ | 300
550

4 Driveway 3/McDonnell Dr. & Plaza Dr.

0(1) ↓ | 850
5(45) → 0(2) ↴ | 20(5) ↰ 2(0) ↑ 33(9) ↱ | 350
750

5 Driveway 4 & Plaza Dr.

Nominal | 1(0) ↲ 0(4) ↳ | 1,700
15(63) → 27(2) ↴ | 0(16) ↰ 4(44) ↱ | 750
1,300

6 Valley View St. & Plaza Dr.

44,250 | 79(24) 1524(1532) ↓ 86(17) ↳ | 2,300
3(82) → 1(0) → 15(29) ↴ | 11(4) ↰ 1512(1986) ↑ 61(4) ↱ | 40,800
1,700

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

EXHIBIT 5-2: OPENING YEAR CUMULATIVE (2024) WITH PROJECT TRAFFIC VOLUMES

1 Douglas Dr. & Katella Av.

1,250 | 42,950
- ↲ 14(55) ↓ 1(2) ↳ 2(25)
- ↱ 34(6)
- ← 1750(1686)
- ↰ 9(8)

34(14) ↳
1744(2026) →
62(28) ↲

↰ 18(82) ↑ 2(1) ↱ 5(7)

47,050 | 1,450

2 Driveway 1 & Plaza Dr.

100 | 650
- ↲ 0(4) ↳ 0(3)
- ↱ 3(1)
- ← 33(22)

4(1) ↳
6(26) →

700

3 Driveway 2 & Plaza Dr.

300 | 1,000
- ↲ 1(4) ↳ 3(6)
- ↱ 5(4)
- ← 43(20)
- ↰ 28(2)

3(2) ↳
3(29) →

↰ 0(4) ↱ 2(21)

700 | 300

4 Driveway 3/McDonnell Dr. & Plaza Dr.

150 | 1,200
- ↓ 0(1) ↳ 1(7)
- ↱ 6(2)
- ← 55(20)
- ↰ 6(11)

8(53) →
0(2) ↲

↰ 20(5) ↑ 3(0) ↱ 33(9)

1,000 | 350

5 Driveway 4 & Plaza Dr.

100 | 2,150
- ↳ 1(7)
- ↱ 6(2)
- ← 73(39)
- ↰ 24(3)

19(78) →
27(2) ↲

↰ 0(16) ↱ 4(44)

1,650 | 750

6 Valley View St. & Plaza Dr.

44,400 | 2,300
- ↲ 85(27) ↓ 1524(1532) ↳ 86(17)
- ↱ 12(121)
- ← 0(9)
- ↰ 4(53)

5(88) ↳
1(0) →
18(44) ↲

↰ 25(10) ↑ 1512(1986) ↱ 61(4)

2,150 | 41,150

##(##) AM(PM) Peak Hour Intersection Volumes

Average Daily Trips

TABLE 5-1: INTERSECTION ANALYSIS FOR OPENING YEAR CUMULATIVE (2024) CONDITIONS

			2024 Without Project								2024 With Project							
			Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service		Delay[1] (secs.)		Level of Service		ICU[2] (V/C)		Level of Service	
#	Intersection	Traffic Control[3]	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
1	Douglas Dr. & Katella Av.	TS	6.9	9.9	A	A	0.45	0.54	A	A	7.1	10.1	A	B	0.46	0.54	A	A
2	Driveway 1 & Plaza Dr.	CSS	8.5	8.5	A	A	--	--			7.3	8.8	A	A	--	--		
3	Driveway 2 & Plaza Dr.	CSS	8.3	8.8	A	A	--	--			9.6	9.3	A	A	--	--		
4	Driveway 3/McDonnell Dr./Cara Wy. & Plaza Dr.	CSS	9.0	10.0	A	B	--	--			9.6	9.8	A	A	--	--		
5	Driveway 4 & Plaza Dr.	CSS	8.7	10.1	A	B	--	--			10.0	10.6	B	B	--	--		
6	Valley View St. & Plaza Dr.	TS	7.4	10.0	A	B	0.43	0.58	A	A	8.3	10.3	A	B	0.44	0.59	A	A

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. HCM delay reported in seconds.

2 ICU reported as a volume-to-capacity ratio and for signalized intersections only. ICU not applicable to unsignalized inspections.

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

5.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The traffic signal warrant analysis for Opening Year Cumulative (2024) traffic conditions are based on the peak hour volume-based traffic signal warrants. There are no study area intersections anticipated to meet traffic signal warrants for both Opening Year Cumulative (2024) Without and With Project traffic conditions (see Appendix 5.3 and Appendix 5.4, respectively).

5.6 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. There are no study area intersections anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2024) traffic conditions. As such, no intersection improvements have been recommended.

6 REFERENCES

1. **Orange County Transportation Authority.** 2021 Orange county Congestion Management Program Report. County of Orange : s.n., November 2021.
2. **Institute of Transportation Engineers.** Trip Generation Manual. 11th Edition. 2021.
3. **Transportation Research Board.** Highway Capacity Manual (HCM). 6th Edition. s.l. : National Academy of Sciences, 2016.
4. **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, Updated March 30, 2021 (Revision 6).

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