FOCUSED TRAFFIC IMPACT ANALYSIS REPORT

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PALMDALE ROAD RETAIL DEVELOPMENT

VICTORVILLE, CALIFORNIA

Prepared by:

DAVID EVANS AND ASSOCIATES INC.

FINAL REPORT
January 20, 2023

DAVID EVANS AND ASSOCIATES INC.

January 20, 2023 Job No. RDEV0000-0005

Mr. Tab Johnson
Rich Development, LLC
600 N. Tustin Avenue
Santa Ana, CA 02705

RE: FINAL FOCUSED TRAFFIC IMPACT ANALYSIS – PALMDALE ROAD RETAIL DEVELOPMENT – VICTORVILLE, CALIFORNIA

Dear Mr. Johnson,

David Evans and Associates, Inc. is pleased to submit this Final Focused Traffic Impact Analysis Report (TIA) for your proposed Palmdale Road Retail Development Project in the City of Victorville, California. The proposed project consists of an automated car wash and a fast-food restaurant with drive-through. The project is located at the northeast corner of Palmdale Road and Cantina Street.

The final version of the report incorporates response to the City of Victorville's comments on the draft version of the study dated April 25, 2022. The report has been prepared in coordination with the City of Victorville Engineering Department requirements and scope of work approved prior to this report.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 909-912-7304.

Respectfully submitted,

DAVID EVANS AND ASSOCIATES, INC.

James M. Daisa, P.E.
Senior Project Manager

DAVID EVANS AND ASSOCIATES INC.

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DAVID EVANS AND ASSOCIATES INC.

1 EXECUTIVE SUMMARY

This executive summary presents the findings and recommendations of this study.

1.1 Project Description

The project site is located on the northeast corner of Palmdale Road and Cantina Street in the City of Victorville, California. The proposed project consists of an automated car wash and a fast-food restaurant with drive-through window.

The project site is currently vacant and undeveloped property. It is bounded to the north by vacant/undeveloped properties, to the south by Palmdale Road and vacant/undeveloped properties, to the west by Cantina Street and the Crossroads Shopping Center, and to the east by the Victorville Village Retail Center.

Access to the site is proposed from Palmdale Road (Highway 18) and Cantina Street.

1.2 City of Victorville Level of Service Standard

The City's peak hour level of service standard is LOS D. An intersection found to operate at a LOS E with an Intersection Capacity Utilization (ICU) value greater than 0.95 or Highway Capacity Manual (HCM) delay worse than LOS D (i.e., LOS E or F) is considered deficient.

If a development project would worsen the peak hour level of service to a LOS E or LOS F, it is considered an impact that requires improvement to return the level of service to pre-project conditions. If a development project would worsen the level of service at an already deficient intersection by two percent or more, it is considered a significant impact that requires improvement to return the level of service to pre-project conditions.

1.3 Proposed Project-Specific Access, Roadway, and Off-Site Intersection Improvements

The project proposes to construct several roadway /intersection improvements on Palmdale Road (Highway 18) and Cantina Street concurrent with the construction of the project site. These improvements include right-of-way dedication and widening of Palmdale Road (Highway 18) and Cantina Street frontages to meet City cross-section standards for each road's functional classification and access driveways including turning lanes as needed to safely accommodate entering traffic.

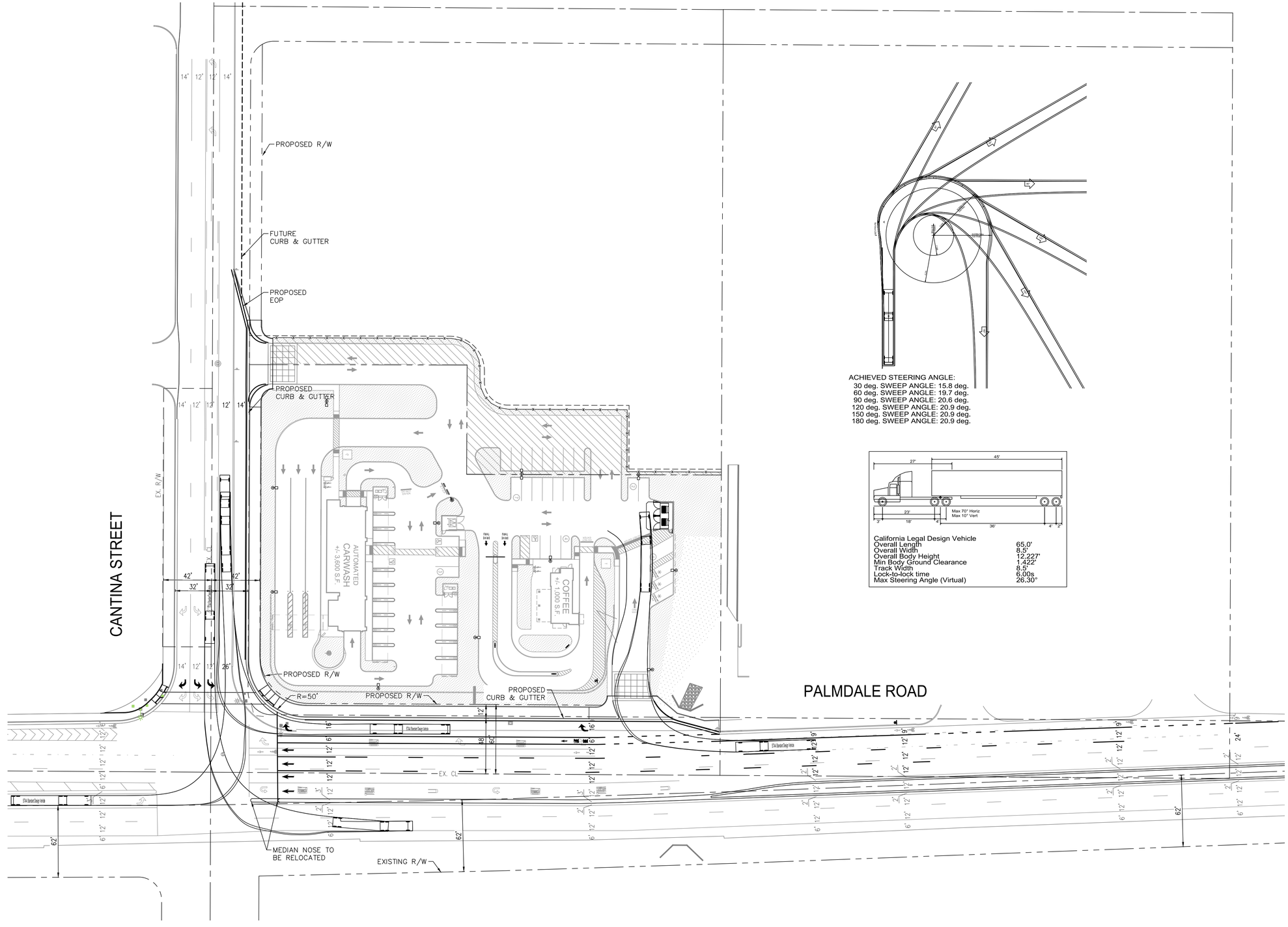
The dedication of right-of-way and widening of Palmdale Road (Highway 18) and Cantina Street along the project's frontages allows for additional lane addition improvements at the off-site intersection of these two roads. Because the project would not be constructed without these proposed improvements, the analysis of project conditions includes the proposed improvements at off-site intersections and site access driveways.

The proposed project-specific access, roadway, and off-site intersection improvements are shown in the **Figure ES-1** and are described in detail in Chapter 4, Section 4.1.

1.4 Level of Service Comparison With and Without the Proposed Project

1.4.1 Determination of Project-Specific Impacts

A comparison of level of service between existing and existing plus project conditions is used to identify impacts that are solely caused by the project and for which the project is responsible for mitigating. These two scenarios exclude any estimated traffic from planned and approved, but not yet built, developments allowing for an unadulterated assessment of project impacts.



ACHIEVED STEERING ANGLE:
30 deg. SWEEP ANGLE: 15.8 deg.
60 deg. SWEEP ANGLE: 19.7 deg.
90 deg. SWEEP ANGLE: 20.6 deg.
120 deg. SWEEP ANGLE: 20.9 deg.
150 deg. SWEEP ANGLE: 20.9 deg.
180 deg. SWEEP ANGLE: 20.9 deg.

California Legal Design Vehicle	
Overall Length	65.0'
Overall Width	8.5'
Overall Body Height	12.227'
Min Body Ground Clearance	1.422'
Track Width	8.5'
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	26.30°

N

40 0 40 80
scale 1"= 40' feet

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DAVID EVANS AND ASSOCIATES INC.
18484 Outer Highway 18 North Suite 225
Apple Valley California 92307
Phone: 760.524.9100

CITY OF VICTORVILLE

PROPOSED TRUCK TURNING TEMPLATE PLAN

CANTINA STREET AT
PALMDALE ROAD

PALMDALE ROAD RETAIL DEVELOPMENT

DRAWN BY:
DESIGNED BY:
CHECKED BY:

DATE: 01/15/2023

SHT NO.: 1 OF 1

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Last Opened: Jan 23, 2023 - 3:59pm By: Smac

Table 1-1 compares the Existing and Existing Plus Project Conditions (see Chapters 3 and 4) weekday peak hour LOS at the study intersections.

Under Existing Plus Project Conditions, the level of service of the intersection of Palmdale Road (SR 18) / Cantina Street is anticipated to operate at LOS C in the AM and PM peak hours with the proposed project-specific improvements.

Table 1-1:Comparison of Existing and Existing + Project Intersection Levels of Service

Intersection	Intersection Control Type	Existing Condition				Existing + Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.1	B	17.4	B	13.3	B	17.0	C
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.3	B	12.0	B

Notes:
[1] The Existing Plus Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

1.4.2 Determination of Cumulative Impacts

A comparison of level of service between Background and Project conditions (opening day scenario) is used to identify impacts that are cumulative in nature due to the contribution of traffic from planned and approved, but not yet built, developments (see Chapters 5 through 8). A cumulative impact is typically mitigated by developments sharing in the cost of the mitigation measure.

Table 1-2 compares the background and project conditions weekday peak hour level of service at the study intersections. Background conditions represent the project's opening year of 2024 and includes growth in ambient traffic from regional and local development equaling 3.5 percent annually. In the year 2024 scenario, the study intersections operate at a LOS B or better during the peak hours with implementation of the proposed [project-specific improvements.

Table 1-2:Comparison of Background and Project Intersection Levels of Service

Intersection	Intersection Control Type	Background Condition				Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.7	B	19.4	B	13.9	B	18.1	B
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.3	B	12.2	B

Notes:
[1] The Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

The comparison of Future and Future Plus Project Conditions results in identifying the intersection of Palmdale Road (SR 18) / Cantina Street operating below the City's peak hour level of service standard during the PM peak hour. Future conditions represent the horizon year of 2034 and includes growth in ambient traffic from regional and local development equaling 3.5 percent annually. The increase in delay anticipated at the intersection of Palmdale Road (SR 18) / Cantina Street is above the City's peak hour level of service standard creates a cumulative impact at the intersection.

Table 1-3 compares the future and future plus project conditions weekday peak hour level of service at the study intersections. Under Future Plus Project Conditions, the level of service of the intersection of Palmdale Road (SR 18) / Cantina Street is anticipated to operate at LOS B in the AM and LOS D in the PM peak hours with the proposed project-specific improvements.

Table 1-3:Comparison of Future and Future + Project Intersection Levels of Service

Intersection	Intersection Control Type	Future Condition				Future + Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	14.2	B	66.2	E	16.8	B	35.7	D
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.6	B	13.7	B

Notes:
[1] The Future Plus Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

2 INTRODUCTION

This report identifies traffic impacts and recommends traffic mitigation for the proposed development project located at the northeast corner of Palmdale Road (Highway 18) and Cantina Street in the City of Victorville, California. The project consists of an automated car wash and a fast-food restaurant with drive-through window, located in the City of Victorville.

The intent of this report is to evaluate potentially significant traffic impacts caused by the proposed development in accordance with the City of Victorville's traffic impact study requirements and under the following scenarios as outlined in the traffic scope approved by the City's Department of Public Works:

- Existing Conditions - **Chapter 3**
- Existing plus Project Conditions - **Chapter 4**
- Background Conditions (Year 2024) - **Chapter 5**
- Background plus Project Conditions- **Chapter 6**
- Future Conditions (Year 2034) – **Chapter 7**
- Future plus Project Conditions (Year 2034) - **Chapter 8**

2.1 Scenario Definitions

Existing Conditions. This scenario represents existing transportation conditions at the time this report was prepared. Data includes traffic counts collected in February 2022. This scenario is used as the baseline condition from which to measure project-specific impacts.

Existing Plus Project Conditions. This scenario represents transportation conditions as if the project were built and occupied today. This scenario is intended to identify potentially significant impact (requiring mitigation) when compared to existing conditions without any unrelated transportation system improvements or other development. Impacts identified in this scenario are considered "project-specific"—impacts that are the sole responsibility of the project to mitigate.

Background Conditions (Year 2024). This scenario represents conditions at the time the project is anticipated to be fully constructed and occupied (known as buildout Year 2024) but without traffic generated by the project. This scenario is comprised of an ambient growth, a general rate of growth in traffic from overall regional growth but not specific to any nearby development (assumed to be 3.5% annually for this study).

Project Conditions (Year 2024). This scenario adds the project's estimated traffic generation at buildout (2024) to the Background Conditions scenario described above. Impacts identified in this near-term scenario are considered "cumulative" impacts—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

Future Conditions (Year 2034). This scenario represents conditions at the horizon Year 2034 but without traffic generated by the project. This scenario is comprised of an ambient growth, a general rate of growth in traffic from overall regional growth but not specific to any nearby development (assumed to be 3.5% annually for this study).

Future with Project Conditions (Year 2034). This scenario adds the project's estimated traffic generation to the Future Conditions scenario described above. Impacts identified in this scenario are considered "cumulative" impacts—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

Selection of 2034 Future Conditions Versus 2044 Future Conditions

The cumulative analysis scenario in the City of Victorville's traffic study guidelines is defined as 10-years from a project's opening year. The guidelines allow growth factors to develop opening year and cumulative traffic forecasts, specifically, a 2.5% rate of growth reflecting ambient traffic growth, and a 1.5% rate of growth reflecting nearby cumulative development compounded annually for the next three to ten years result in reasonable traffic forecasts.

A 10-year planning horizon is more consistent with the city's five-year capital improvement program (CIP) and knowledge of the transportation infrastructure that known planned development will be required to build or help fund. Further, from the city's perspective, improvements resulting from a 10-year planning horizon can usually be conditioned in full, or in part, to new development.

The 20-year planning horizon requested by Caltrans to determine level of service deficiencies is challenging to demonstrate a nexus, and to collect funds from developers for improvements that may not be implemented for many years or even decades. Further, accurate traffic projects within a focused study area are not practical to achieve.

For this study, the two options for developing 20-year traffic forecasts are continued use of compounded annual growth rates or deriving forecasts from the San Bernardino Transportation Analysis Model (SBTAM). Use of growth rates for a 20-year period is not a preferred option because it is highly speculative and lacks evidence required to establish a nexus. Deriving forecasts from the SBTAM would be the preferred option, however, the countywide model has a very coarse Traffic Analysis Zone (TAZ) system and network in the vicinity of the proposed project and does not accurately represent development of the surrounding vacant land and/or street system serving this land which is currently not included in the 2040 version of the SBTAM. Modifying the model's TAZs and network system to reflect the focused analysis area is outside of the scope of this study. For these reasons, a 20-year planning scenario was not included in this focused traffic impact analysis.

Figure 1 illustrates the vicinity map, and **Figure 2** illustrates the proposed project site plan.

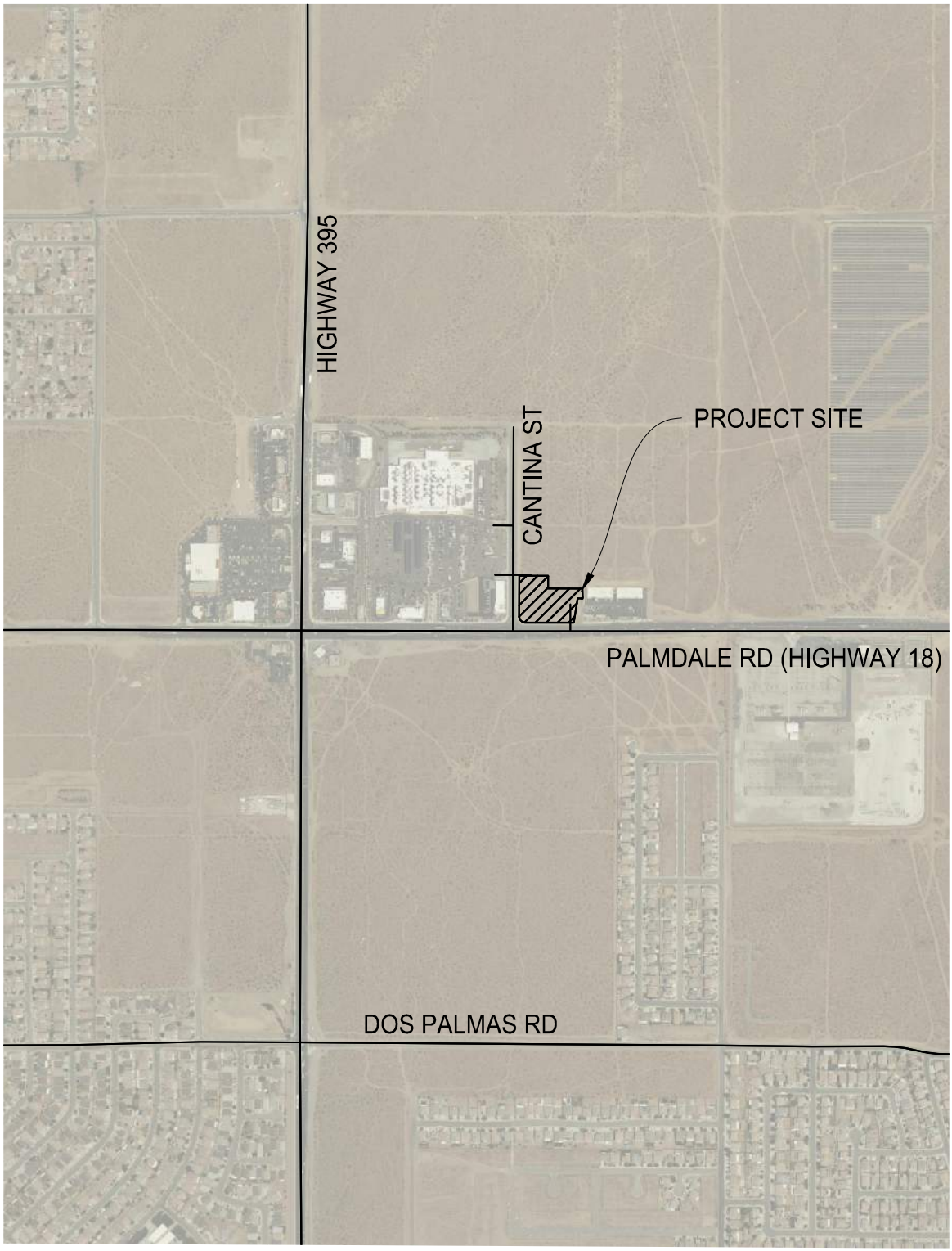

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FIGURE 1: VICINITY MAP

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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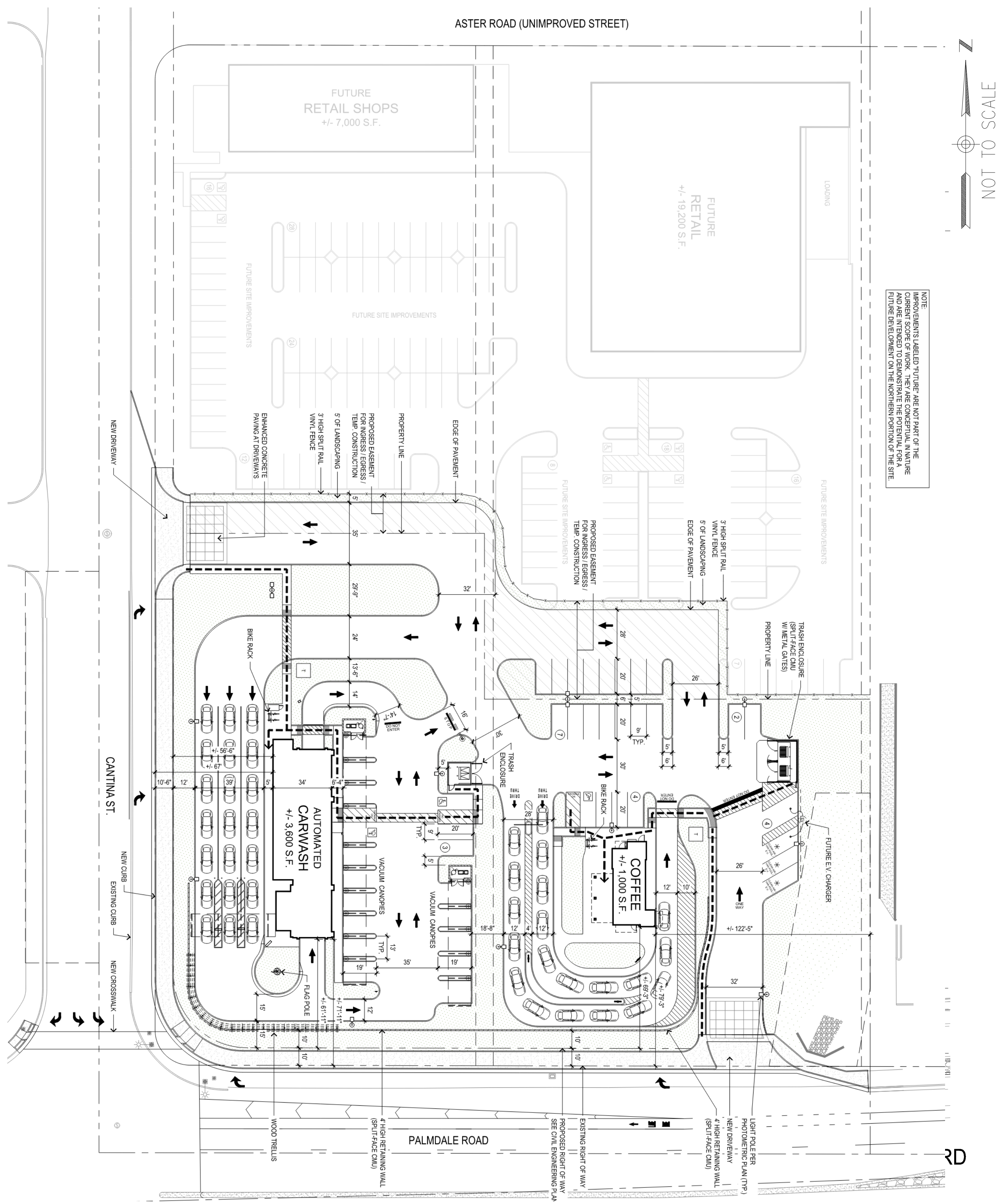

FIGURE 2: SITE PLAN

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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3 EXISTING CONDITIONS

The project site is currently vacant and undeveloped property. It is bounded to the north by vacant/undeveloped properties, to the south by Palmdale Road and vacant/undeveloped properties, to the west by Cantina Street and the Crossroads Shopping Center, and to the east by the Victorville Village Retail Center.

3.1 Existing Street System

The following roadways provide local and regional access to the project within the study area:

Palmdale Road (Highway 18) is a major east-west primarily four-lane road (two lanes in each direction with a with turn pockets at key intersections) and with a raised curbed median, in the project area. Palmdale Road (Highway 18) is identified as a super arterial on the City of Victorville Circulation Plan. The posted speed limit within the project area is 55 mph.

Cantina Street is a north-south four-lane roadway, two lanes southbound, one lane northbound and a two-way-left-turn lane. It currently ends approximately 1,200 feet north of Palmdale Road (Highway 18). Cantina Street is identified as an arterial street, in the project area, on the City of Victorville circulation map. It will provide direct access to the project site.

3.2 Study Intersections

The study area for determining level of service impacts includes one existing intersection and two future project driveway intersections:

1. Palmdale Road (SR 18) and Cantina Street

2. Palmdale Road (SR 18) and Project Driveway “A” (future intersection)

3. Cantina Street and Project Driveway “B” (future intersection

The intersection of Palmdale Road (SR 18) and Cantina Street is a signalized intersection.

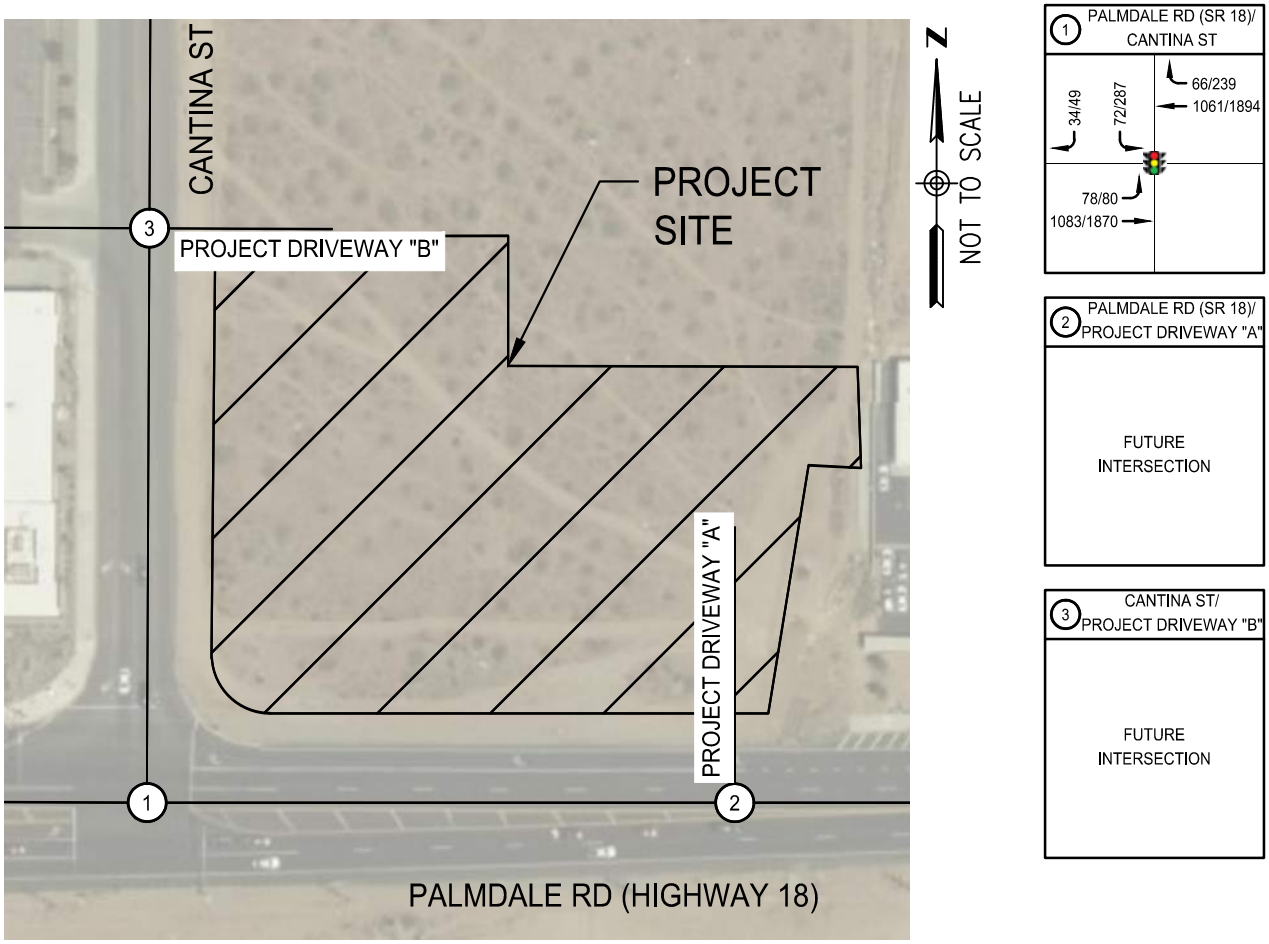
3.3 Existing Traffic Volumes

Turn movement counts were conducted in February 2022 by Newport Traffic Studies, an independent traffic data collection company. These counts were collected during the AM (7:00-9:00 AM) and PM (4:00-6:00 PM) peak periods. The raw turning movement counts are included in **Appendix B** of this study. **Figure 3** illustrates the existing peak hour traffic volumes in the study area.

3.1 Capacity Analysis Methodology

Intersection capacity analyses were conducted using Synchro software[1], which implements the methods of the Highway Capacity Manual, 6th Edition (HCM 6)[2] used in this report. The intersection capacity analyses utilize existing intersection geometrics and existing and forecasted traffic volumes in analyzing AM and PM peak hour intersection operating conditions. The traffic analysis methodology concepts presented in Chapters 19 and 20 of the Highway Capacity Manual (HCM 6) were utilized to calculate intersection Level of Service (LOS) based on the average control delay (in seconds per vehicle) of vehicles utilizing the intersections.

1 Trafficware Ltd, Version 10.
2 Transportation Research Board, Washington D.C., 2010.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

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FIGURE 3: EXISTING TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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The analysis determines a LOS that quantitatively describes the operating characteristics of signalized intersections. **Table 3-1** provides LOS thresholds for signalized intersections as provided in the HCM 6 Chapter 19.

Table 3-1: HCM 6 – LOS Criteria for Signalized Intersections

Control Delay (seconds /veh)	**LOS by Volume-to-Capacity Ratio [a]**	
	≤1.0	**>1.0**
≤ 10	A	F
> 10 - 20	B	F
> 20 - 35	C	F
> 35 - 55	D	F
> 55 - 80	E	F
> 80	F	F
Note: [a] For approach-based and intersection-wide assessments, LOS is defined solely by control delay. Source: Highway Capacity Manual 6th Edition, Exhibit 19-8.		

The LOS for a Two-Way Stop Controlled (TWSC) intersection is determined by the computed or measured control delay. The LOS is determined for each minor street movement (or shared movement) by using the criteria provided in **Table 3-2** referenced from HCM 6 Chapter 20.

Table 3-2: HCM 6 – LOS Criteria for TWSC

Control Delay (seconds/vehicle)	LOS by Volume-to-Capacity Ratio	
	Volume / Capacity Ratio ≤ 0.99	Volume / Capacity Ratio < 1.0
0 - 10	A	F
> 10 -15	B	F
> 15 - 25	C	F
> 25 - 35	D	F
> 35 - 50	E	F
> 50	F	F
Note: The LOS criteria apply to each lane on each approach of the stop-controlled minor street. LOS is not calculated for major-street approaches or for the intersection as a whole. Source: Highway Capacity Manual 6th Edition, Exhibit 20-2.		

Current City Policy on Intersection Performance

The City's peak hour level of service standard is LOS D. An intersection found to operate at a LOS E with an Intersection Capacity Utilization (ICU) value greater than 0.95 or Highway Capacity Manual (HCM) delay worse than LOS D (i.e., LOS E or F) is considered deficient.

If a development project would worsen an intersection peak hour LOS to E or worse, it is considered a significant impact that must be mitigated. If a development project would worsen an already deficient intersection by two percent or more, it is considered a significant impact that must be mitigated.

3.2 Existing Traffic Analysis

Existing intersection capacity and LOS analyses are based on the existing intersection geometrics and the AM and PM peak hour traffic volumes discussed earlier. The results of the analysis are shown in **Table 3-3** and provided in **Appendix C**. As shown in **Table 3-3** under Existing Conditions, the study intersection operate at LOS B during the AM and PM peak hours. The existing geometrics are illustrated in **Figure 4**.

Table 3-3: Intersection Capacity Analysis – Existing Conditions

Intersection	Intersection Control Type	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.1	B	17.4	B
Abbreviations: TS – Traffic Signal Controlled Intersection SSSC – Side Street Stop Controlled Intersection Delay – seconds per vehicle LOS – Level of Service					

4 EXISTING PLUS PROJECT CONDITIONS

Existing Plus Project Conditions identifies impacts to the City's level of service standards when compared to Existing Conditions without any unrelated transportation system improvements or other development. Impacts identified in this scenario are considered "project-specific"—impacts that are the sole responsibility of the project to mitigate.

4.1 Site Access and Project-Specific Roadway Frontage Improvements

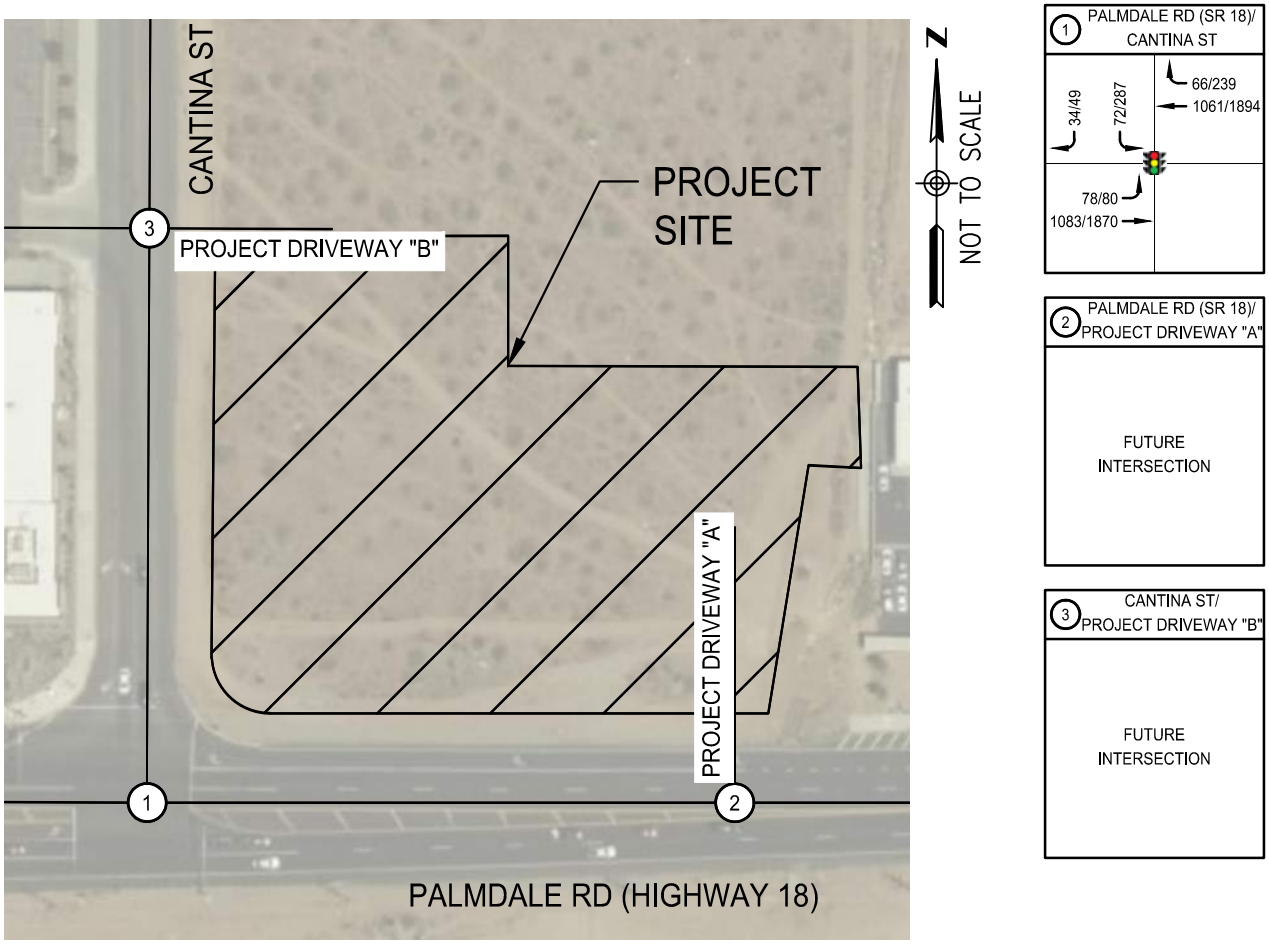
Access to the site is proposed via driveways along Palmdale Road (Highway 18) and Cantina Street.

The proposed Palmdale Road (Highway 18) driveway includes the following improvements (refer to conceptual geometric plan Figure ES-1):

- A right turn in only access driveway is proposed at Project Driveway "A" on Palmdale Road (Highway 18) located about 367-feet east of Cantina Street (measured from centerline to centerline). Proposed improvements to Palmdale Road (Highway 18) include widening the northside of the road along the project frontage and restriping to provide a third westbound through lane, a westbound right turn lane into Cantina Street, and a 6-foot-wide westbound bicycle lane between the outside through lane and the right turn lane.

The proposed Cantina Street driveway includes the following improvements (refer to conceptual geometric plan Figure ES-1):

- A full access driveway about 36-feet wide is proposed at Project Driveway "B" on Cantina Street located about 355-feet north of Palmdale Road (measured from centerline to centerline) and aligned with an existing driveway on the west side of Cantina Street. Proposed improvements to Cantina Street include dedication of land to accommodate half of Cantina Street's ultimate 84-foot right of way (42-feet) and widening the east side of the road to provide 32-feet of pavement, and curb, gutter, and sidewalk to the City's standards. Pavement transition would be provided north of Project Driveway "B" to transition the widening of Cantina Street to its existing width.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

DAVID EVANS AND ASSOCIATES INC.

FIGURE 3: EXISTING TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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Project-Specific Off-Site Intersection Improvements

The dedication of right-of-way and widening of Cantina Street and Palmdale Road (Highway 18) along the project's frontage allows for improvements at the off-site intersection of these two roads. **Table 4-1** describes the widening, lane geometry and traffic control improvements as used in the capacity analyses of Project Conditions.

Table 4-1: Proposed Project-Specific Off-Site Intersection Improvements

Intersection	Proposed Improvements
Palmdale Road (Highway 18) / Cantina Street	North Leg of Cantina Street • Proposed improvements to Cantina Street include dedication of land to accommodate half of Cantina Street's ultimate 84-foot right of way (42-feet) and widening the east side of the road to provide 32-feet of pavement, and curb, gutter, and sidewalk to the City's standards. Pavement transition would be provided north of Project Driveway "B" to transition the widening of Cantina Street to its existing width. East Leg of Palmdale Road (Highway 18) • Dedication of right-of-way to accommodate the widening of Palmdale Road (Highway 18) to its ultimate 122-foot right of way. • Widening the north side of Palmdale Road to accommodate the following: o On 12-foot-wide westbound U-turn Lane o Three 12-foot wide westbound through lanes o A 6-foot-wide westbound bike lane o A 12-foot-wide westbound right turn lane beginning immediately west of Project Driveway "A" and terminating at Cantina Street o Reconstruction of the curb return on the northeast corner of Palmdale Road (Highway 18) / Cantina Street including relocation / replacement of traffic signal equipment to accommodate proposed widening of both Cantina Street and Palmdale Road

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4.2 Project Trip Generation

The trip generation rates for the site were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. Opening year of the project is 2024.

Land use categories for estimating trips include **Automated Car Wash (ITE Land Use 948)** and **Fast-Food Restaurant with Drive-Through Window (ITE Land Use 934)** and were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

Pass-by factors for the fast-food restaurant with drive-through window were provided by the City of Victorville staff. A reduction in trips of 10% for internal capture is assumed for the development.

Table 4-2 summarizes the estimated trip generation on an average weekday, and during the AM (7-9 AM) and PM (4-6 PM) peak hours.

Table 4-2:Project Trip Generation

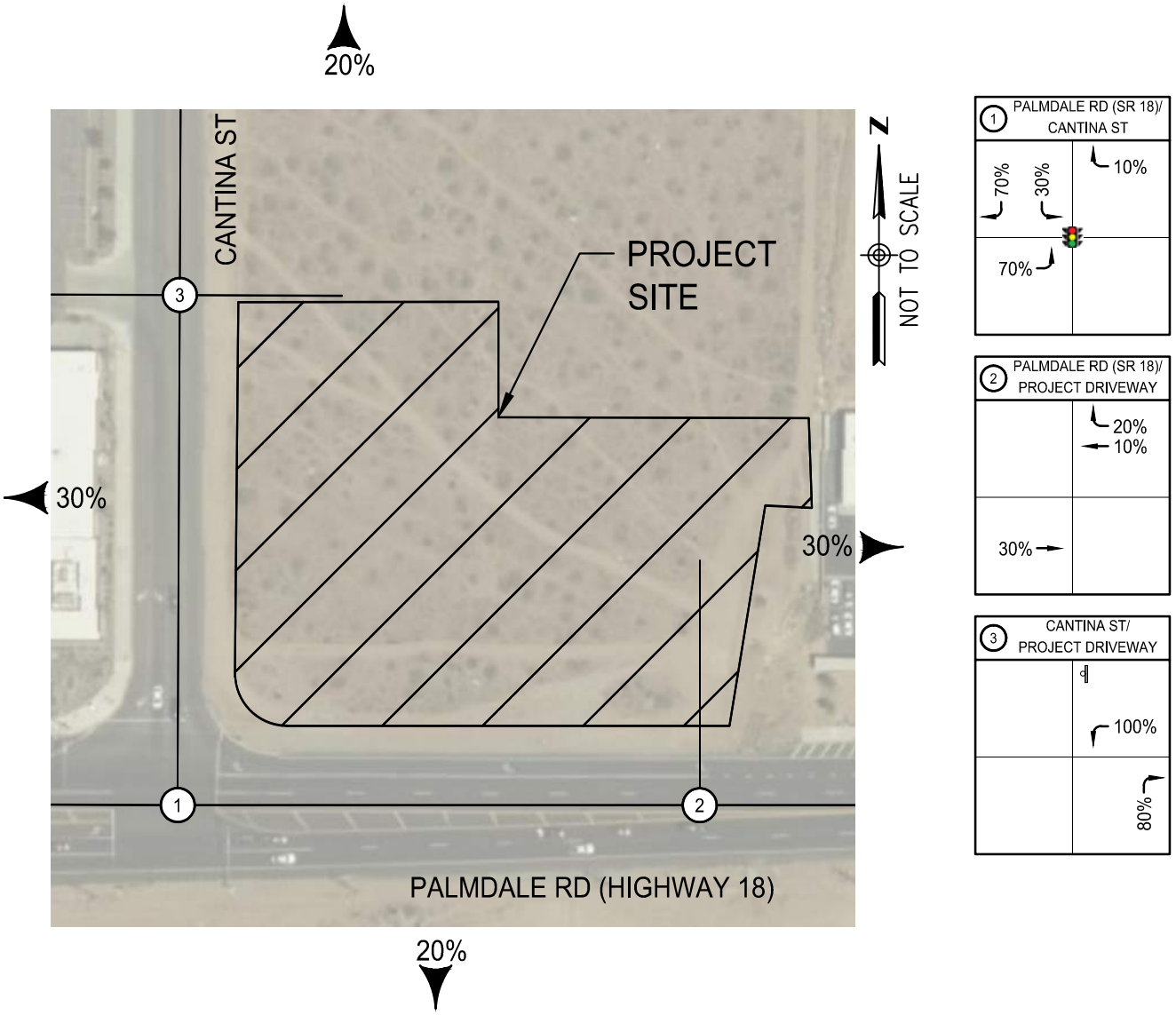
	Use	Size/ Quantity	Daily	AM Peak Hour			PM Peak Hour		
1	**Automated Car Wash Land Use Category (ITE 948)**								
	Per 1,000 Sq. Ft. GLA	3,600	275.26 [1]	0	0	0	7.10	7.10	14.20
	Trips		991	0	0	0	26	26	52
	Internal Trips (10%)		99	0	0	0	3	3	6
	Subtotal Trips		892	0	0	0	23	23	46
2	**Fast Food Restaurant Land Use Category (ITE 934)**								
	Per 1,000 Sq. Ft. GLA	3,000	470.95	20.50	19.69	40.19	16.99	15.68	32.67
	Trips		1,413	62	59	121	51	47	98
	Internal Trips (10%)		142	6	6	12	5	5	10
	Subtotal Trips		1,271	56	53	109	46	42	88
	Pass-By Trips (35%, 35%)		0	19	19	38	16	15	31
	Primary Trips (65%, 65%)		1,271	37	34	71	30	27	57
	Subtotal Project Trips		2,163	56	53	109	69	65	134
	Pass-By Trips		0	19	19	38	16	15	31
	Primary Trips		2,163	37	34	**71**	53	50	**103**

Source: "Trip Generation Manual, Institute of Transportation Engineers", 10th Edition
[1] ITE Trip Generation (10th Edition) does not provide a daily rate for the automated carwash land use category. The daily rate used in Table 4-2 is from the 9th Edition of Trip Generation.

As presented in **Table 4-2** proposed project is estimated to generate 2,163 primary daily trips, 71 primary AM peak hour and 103 primary PM peak hour trips.

4.3 Project Trip Distribution and Assignment

The estimated project trips are distributed by direction and assigned to the local network of streets **Figure 5** distribution of the project trips. **Figure 6** illustrates the assignment of primary project trips to study intersections. **Figure 7** illustrates the assignment of pass-by project trips to study intersections. **Figure 8** illustrates the assignment of total project trips to study intersections.



LEGEND

XX% - GENERAL PROJECT TRIP DISTRIBUTION

XX% - SPECIFIC PROJECT TRIP PERCENTAGE

(#) - STUDY INTERSECTIONS

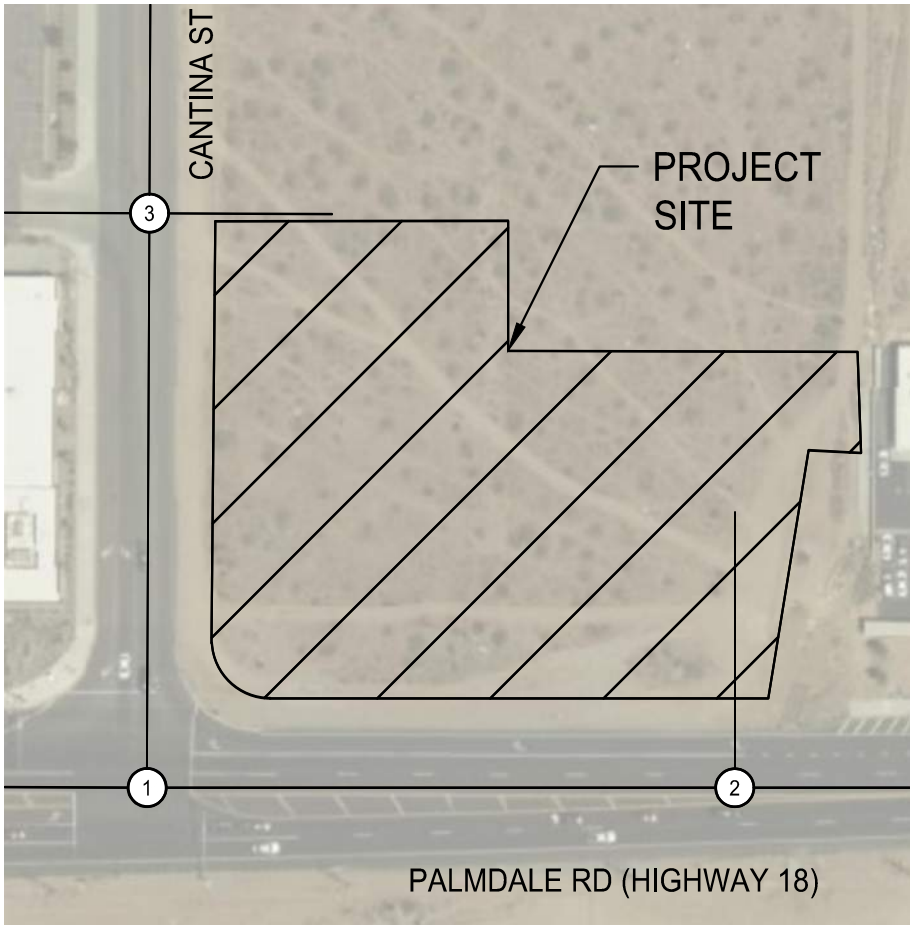
- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

FIGURE 5: PROJECT TRIP DISTRIBUTION

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.



PRIMARY PROJECT TRIPS

AM PEAK PERIOD - 37 IN / 34 OUT
PM PEAK PERIOD - 53 IN / 50 OUT

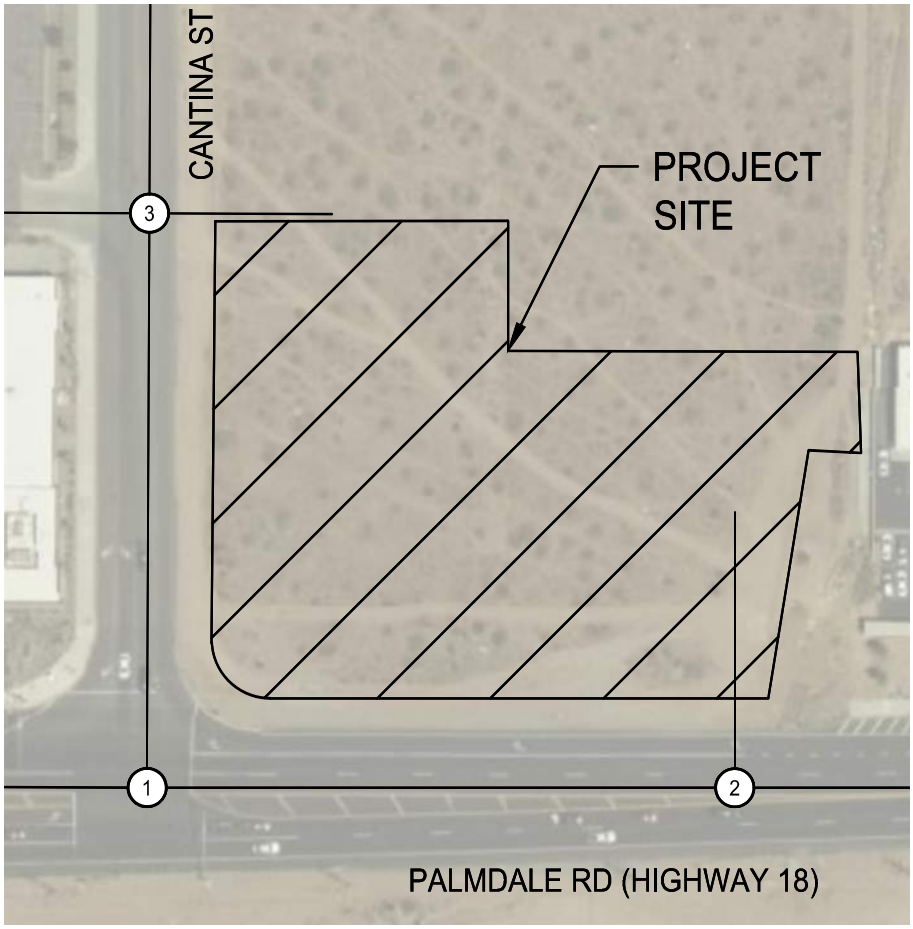
LEGEND

XX/XX - AM/PM PROJECT TRIP
- STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

FIGURE 6: PRIMARY PROJECT TRIPS

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.



PASS-BY PROJECT TRIPS

AM PEAK PERIOD - 19 IN / 19 OUT
PM PEAK PERIOD - 16 IN / 15 OUT

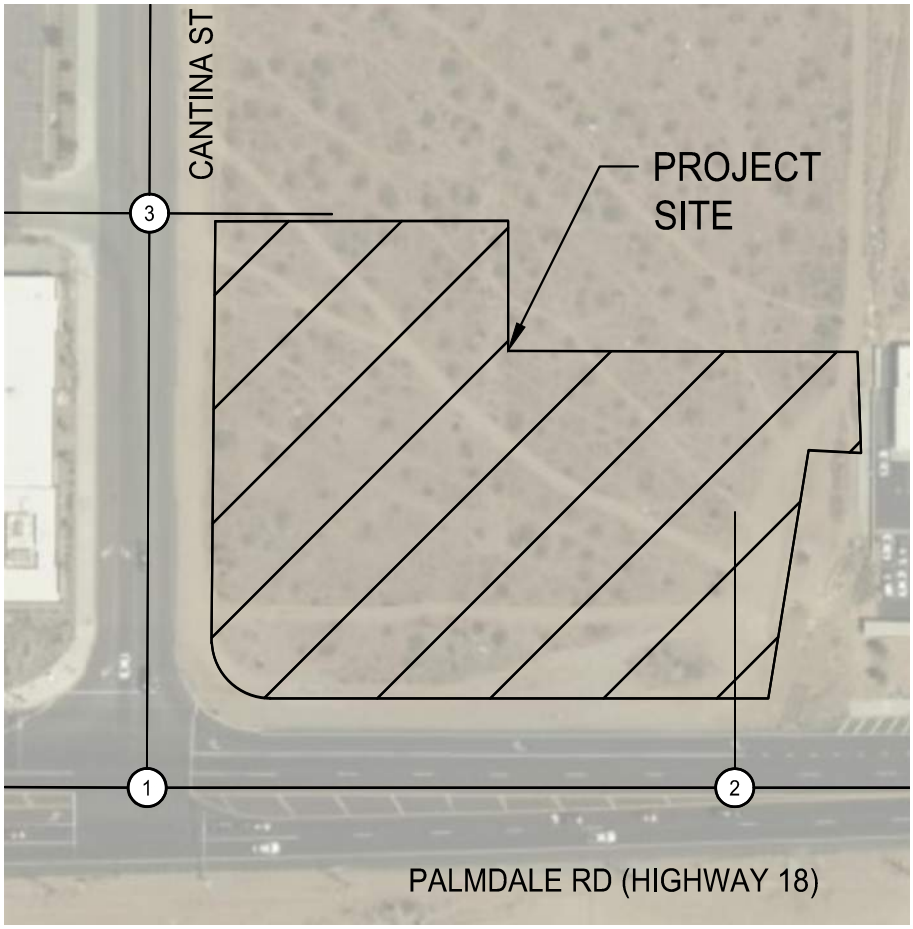
LEGEND

XX/XX - AM/PM PROJECT TRIP
(#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

FIGURE 7: PASS-BY PROJECT TRIPS

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.



PROJECT TRIPS

AM PEAK PERIOD - 53 IN / 53 OUT
PM PEAK PERIOD - 69 IN / 65 OUT

LEGEND

XX/XX - AM/PM PROJECT TRIP
(#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

FIGURE 8: TOTAL PROJECT TRIPS

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

DAVID EVANS AND ASSOCIATES INC.

4.4 Existing Plus Project Traffic Analysis

The project trip generation, traffic distribution and assignment patterns were used in the intersection capacity analyses to assess potential project impacts to level of service. The project trips were added to existing traffic volumes to derive Existing Plus Project Conditions. This scenario's traffic volumes are illustrated in **Figure 9**. Intersection capacity analysis for the study intersections uses the existing lanes geometries and project access driveway improvements. The results of the analysis are shown in **Table 4 3** and provided in **Appendix C**.

Table 4-3: Intersection Capacity Analysis – Existing Plus Project Conditions

Intersection	Intersection Control Type	Existing Condition				Existing + Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.1	B	17.4	B	13.3	B	17.0	C
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.3	B	12.0	B

Notes:
[1] The Existing Plus Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

As presented in **Table 4-3**, under Existing Plus Project Conditions, the study intersections would operate at LOS D or better with the proposed project-specific improvements. The existing and proposed project geometrics are illustrated in **Figure 10**.

4.5 Existing Plus Project Traffic Queuing Analysis

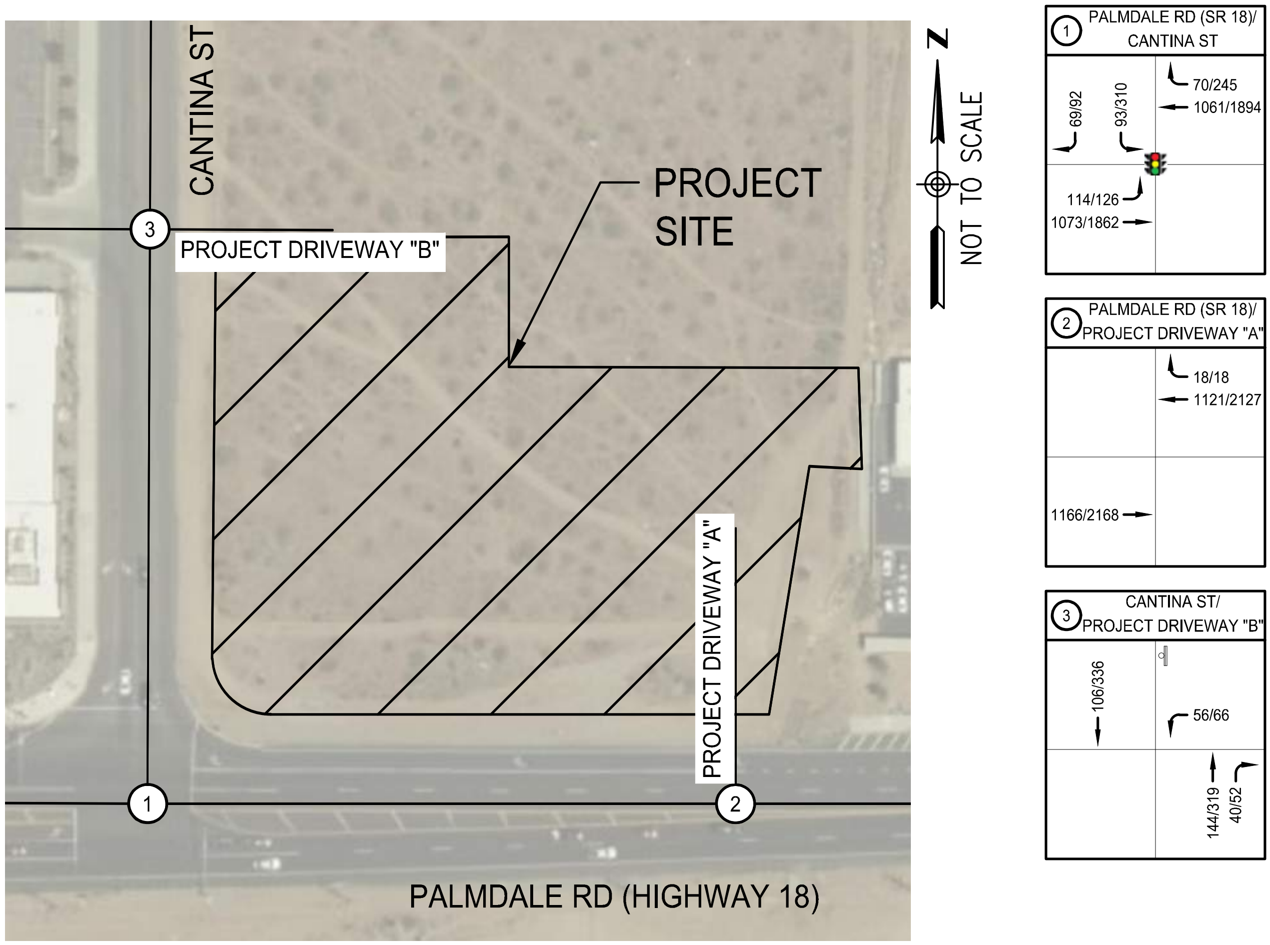
A queuing analysis for the existing plus project conditions was performed for the westbound right turn from Palmdale Road (SR 18) to Cantina Street. The queuing analysis was performed utilizing the Trafficware SimTraffic Version 11 software package. The 95th percentile maximum queue length results for the Existing Plus Project Conditions are shown in **Table 4 3** and **Appendix D**.

Table 4-4: Queuing Analysis – Existing Plus Project Conditions

Intersection	Movement	Storage Length (Feet)	AM	PM
1. Palmdale Road (SR 18) / Cantina Street	WBT		197	329
	WBT		162	316
	WBT		87	232
	WBR	300	44	88

Queue – In Feet
95% - 95 Percentile Queue Length

As presented in **Table 4-4**, under Existing Plus Project Conditions the proposed turn bay lengths will accommodate the AM or PM peak 95th percentile traffic flows.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

\# - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

FIGURE 9: EXISTING PLUS PROJECT TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

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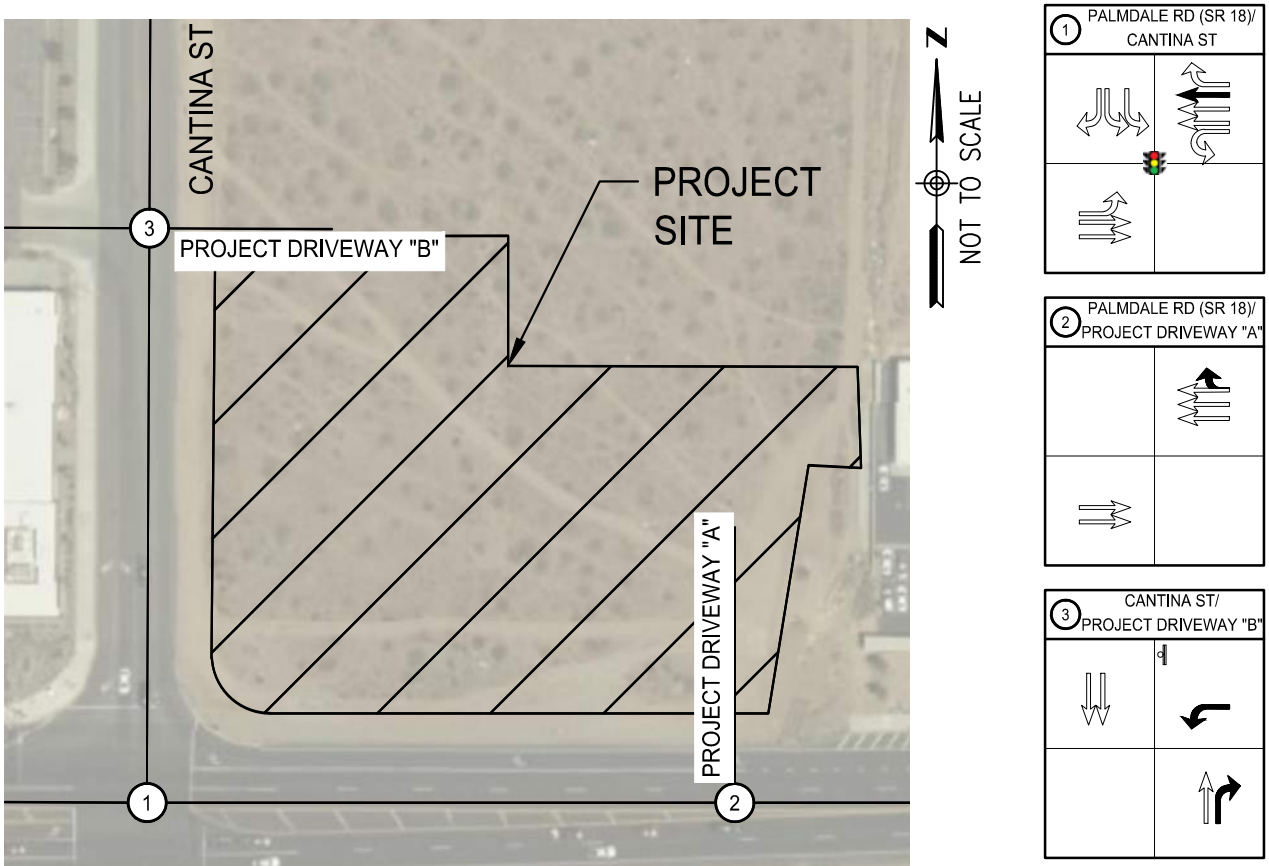


LEGEND

- EXISTING GEOMETRICS
- PROPOSED GEOMETRICS
- (#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

FIGURE 10: EXISTING PLUS PROJECT INTERSECTION GEOMETRICS
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

5 BACKGROUND CONDITIONS (YEAR 2024)

This scenario represents conditions at the time the Proposed Project is anticipated to be fully constructed and occupied (known as buildout which is the Year 2024 for this project) but without traffic generated by the project. This scenario is comprised of Ambient growth—a general rate of growth in traffic from overall regional growth but not specific to any nearby development.

5.1 Ambient Growth Projections

The Proposed Project is anticipated to be constructed and occupied in the Year 2024. As stated earlier in this report near-term growth in traffic is comprised of regional ambient growth and other area projects expected to be completed within the same timeframe. Ambient growth is estimated as a 3.5% annual increase.

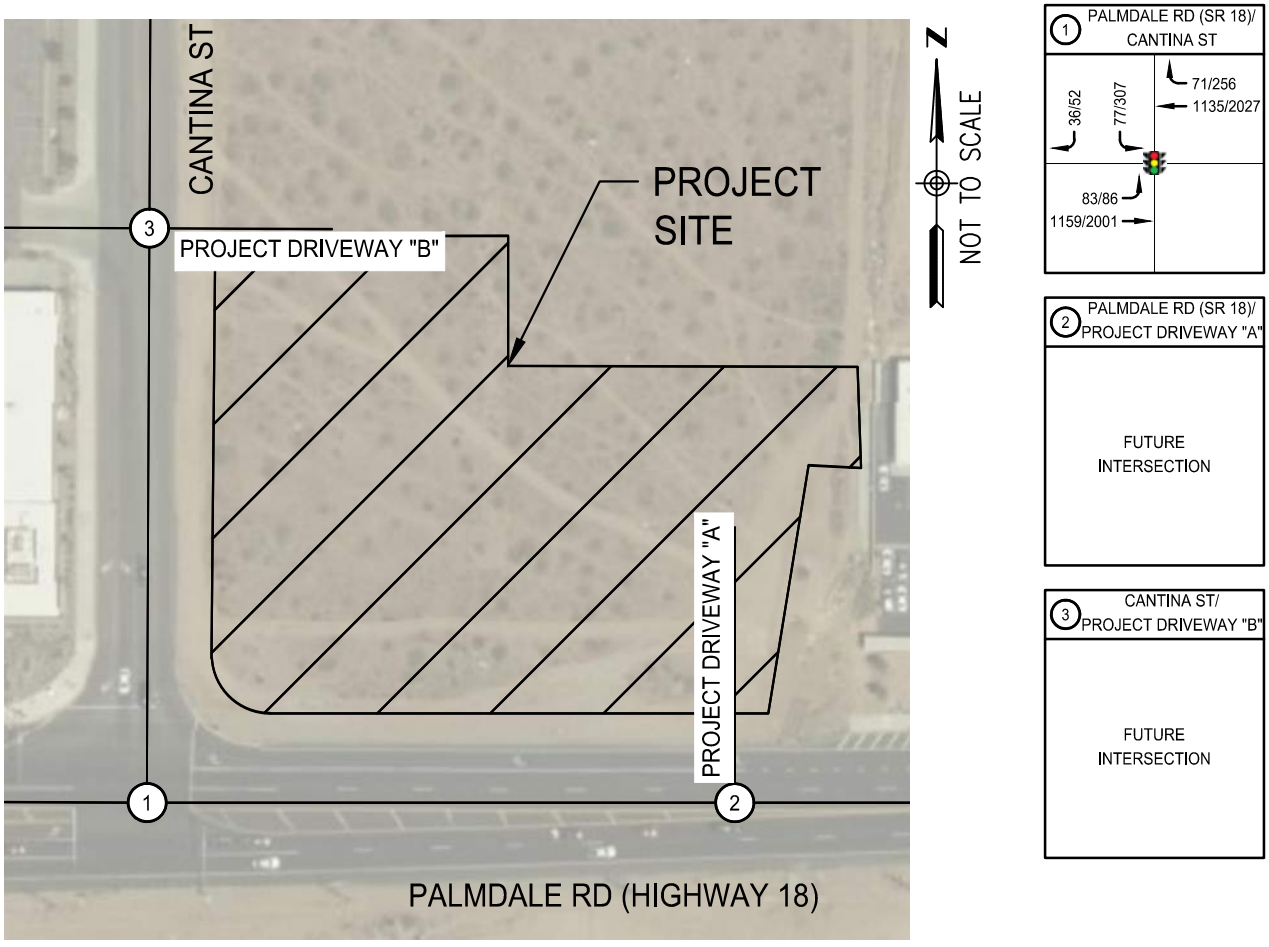
5.2 Background Conditions (Year 2024) Traffic Analysis

The Background Conditions traffic volumes are illustrated in **Figure 11**. Intersection capacity analysis for this scenario uses existing lanes geometries. The results of the analysis are shown in **Table 5-1** and provided in **Appendix C.**

Table 5-1: Intersection Capacity Analysis – Background Conditions

Intersection	Intersection Control Type	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.7	B	19.4	B
Abbreviations: TS – Traffic Signal Controlled Intersection SSSC – Side Street Stop Controlled Intersection Delay – seconds per vehicle LOS – Level of Service					

As presented in **Table 5-1**, under the background conditions, the study intersection is anticipated to operate at LOS C or better.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

DAVID EVANS AND ASSOCIATES INC.

FIGURE 11: BACKGROUND TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

6 PROJECT TRAFFIC CONDITIONS

This scenario adds the project's estimated traffic generation at buildout (2024) to the Background Conditions scenario described above. Level of service impacts identified in this scenario are considered "cumulative" impacts—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

6.1 Project Traffic Analysis

The traffic volumes under this scenario are illustrated in **Figure 12**. Intersection capacity analysis for the study intersections uses existing lanes geometries and the proposed project-specific access, roadway, and off-site intersection improvements described earlier. The results of the analysis are shown in **Table 6-1** and provided in **Appendix C.**

Table 6-1: Intersection Capacity Analysis – Project Conditions

Intersection	Intersection Control Type	Background Condition				Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	11.7	B	19.4	B	13.9	B	18.1	B
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.3	B	12.2	B

Notes:
[1] The Existing Plus Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

As presented in **Table 6-1**, under Project Conditions, the study intersections would operate at LOS D or better with the proposed project-specific improvements.

6.2 Project Traffic Queuing Analysis

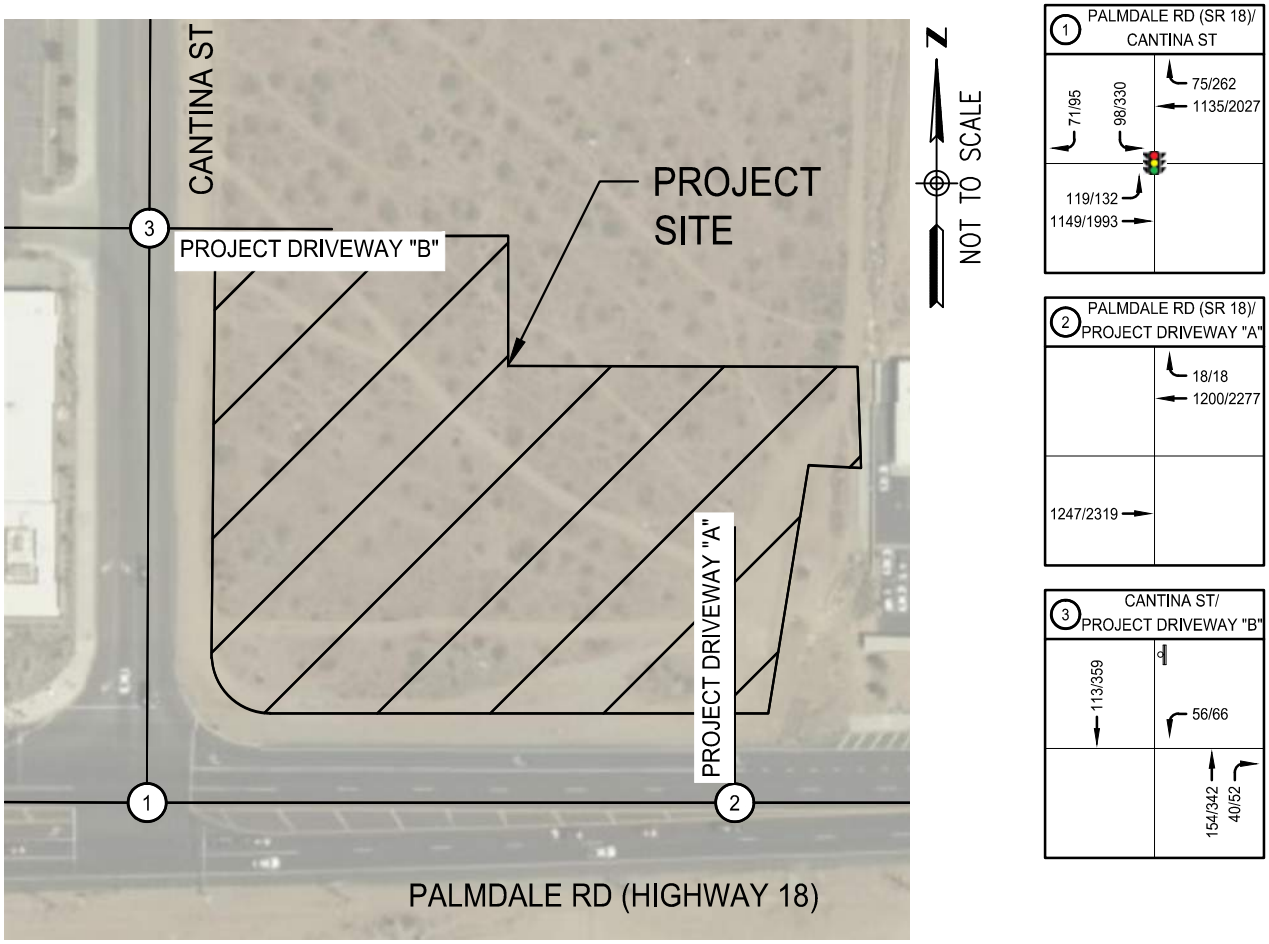
A queuing analysis for the Project Conditions was performed for the westbound right turn from Palmdale Road (SR 18) to Cantina Street. The queuing analysis was performed utilizing the Trafficware SimTraffic Version 11 software package. The 95th percentile maximum queue length results for the Project Conditions are shown in **Table 6-2** and **Appendix D**.

Table 6-2: Queuing Analysis –Project Conditions

Intersection	Movement	Storage Length (Feet)	AM	PM
1. Palmdale Road (SR 18) / Cantina Street	WBT		192	314
	WBT		160	268
	WBT		85	198
	WBR	300	54	109

Queue – In Feet
95% - 95 Percentile Queue Length

As presented in **Table 6 2**, under Project Conditions the proposed turn bay lengths will accommodate the AM or PM peak 95th percentile traffic flows.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

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FIGURE 12: PROJECT TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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7 FUTURE CONDITIONS (YEAR 2034)

The Future Conditions scenario represents conditions at the planning horizon Year 2034 without traffic generated by the project. This scenario is comprised of an ambient growth—a rate of growth in traffic reflecting regional growth but not specific to any nearby development (assumed to be 3.5% annually for this study).

7.1 Future Traffic Analysis

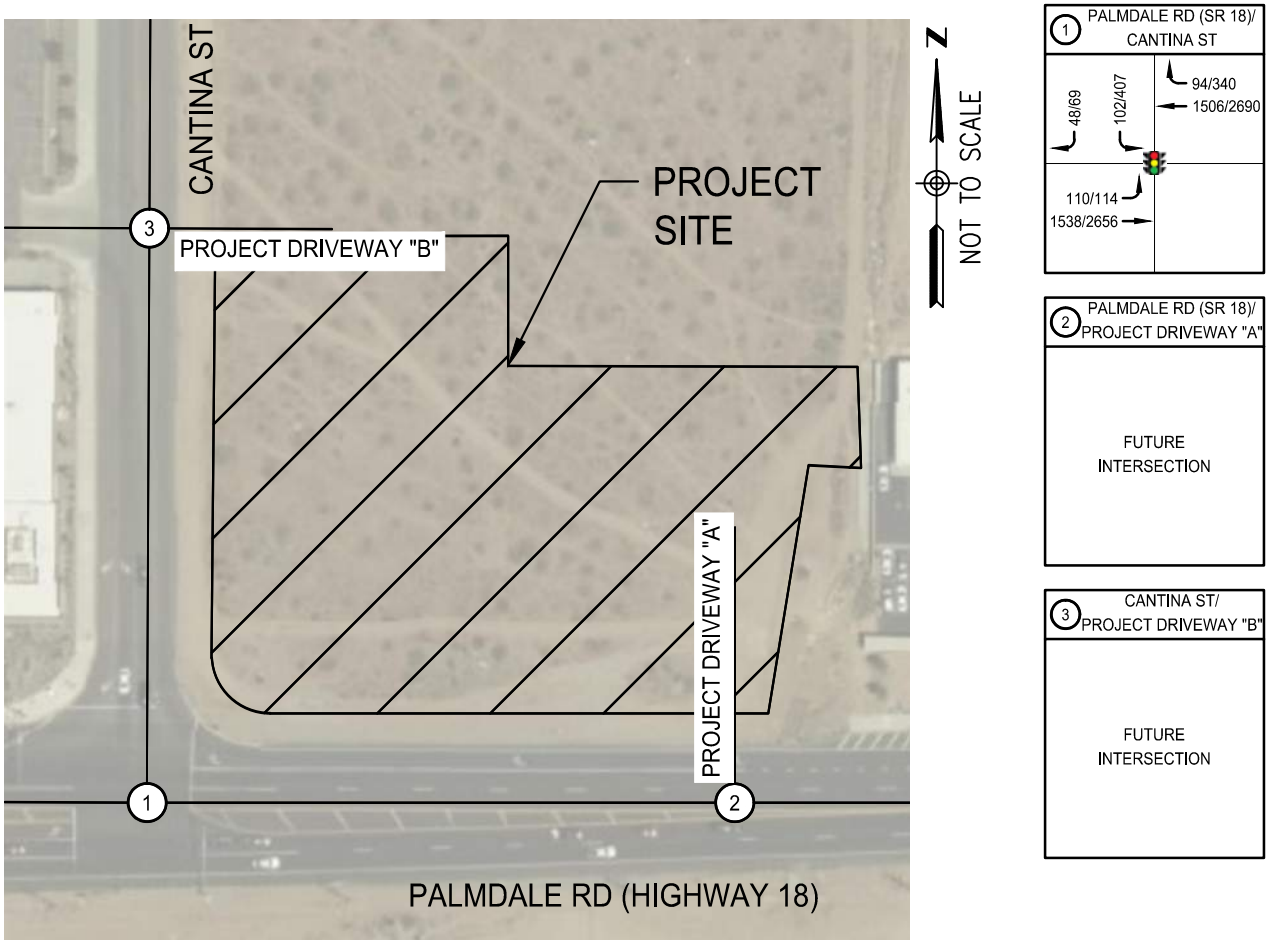
The Future Conditions (Year 2034) forecasted traffic volumes are illustrated in **Figure 13**.Intersection capacity analysis for the study intersections uses existing lanes geometries. To account for forecasted traffic volumes the analysis utilized a PHF of 0.95 for all intersections, as specified in the city's guidelines for forecasted traffic volumes. The results of the analysis are shown in **Table 7-1** and provided in **Appendix C**.

Table 7-1: Intersection Capacity Analysis – Future Conditions (Year 2034)

Intersection	Intersection Control Type	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	14.2	B	66.2	E
Abbreviations: TS – Traffic Signal Controlled Intersection SSSC – Side Street Stop Controlled Intersection Delay – seconds per vehicle LOS – Level of Service					

As presented in under the **Table 7-1**, under Future Conditions, the study intersection would operate at LOS C during the AM peak hour and at LOS F during the PM peak hour.

The intersection of Palmdale Road (SR 18) / Cantina Street is anticipated to operate below the city's peak hour level of service standard. As a result, the impacts to the intersection of Palmdale Road (SR 18) / Cantina Street are identified as a cumulative impact prior to the addition of project traffic.



LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

DAVID EVANS AND ASSOCIATES INC.

FIGURE 13: FUTURE TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

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8 FUTURE PLUS PROJECT CONDITIONS (YEAR 2034)

The Future Plus Project Conditions scenario adds the project's estimated traffic generation to the Future Condition scenario described in **Chapter 7**. Impacts identified in this scenario are considered "cumulative" impacts—impacts that the project contributes to, but does not solely cause, and may be responsible for a fair-share of the cost to implement any mitigation measures.

8.1 Future Plus Project Traffic Analysis

The traffic volumes under this scenario are illustrated in **Figure 14**. Intersection capacity analysis for the study intersections uses existing lanes geometries and the proposed project-specific access, roadway, and off-site intersection improvements described earlier. To account for forecasted traffic volumes the analysis utilized a PHF of 0.95 for all intersections, as specified in the city's guidelines for forecasted traffic volumes. The results of the analysis are shown in **Table 8-1** and provided in **Appendix C.**

Table 8-1: Intersection Capacity Analysis – Future Plus Project Conditions (Year 2034)

Intersection	Intersection Control Type	Future Condition				Future + Project Condition [1]			
		AM Peak		PM Peak		AM Peak		PM Peak	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Palmdale Road (SR 18) / Cantina Street	TS	14.2	B	66.2	E	16.8	B	35.7	D
2. Palmdale Road (SR 18) / Project Driveway [2]	RI	Not Applicable				Not Applicable			
3. Cantina Street / Project Driveway	SSSC					10.6	B	13.7	B

Notes:
[1] The Existing Plus Project Conditions scenario assumes the project-specific improvements to the intersection of Palmdale Road (SR 18) / Cantina Street. See Figure ES-1 proposed geometric plan.
[2] Project Driveway "A" is a right turn in only intersection. No level of service is reported for this type of intersection.
Abbreviations:
TS – Traffic Signal Controlled Intersection
SSSC – Side Street Stop Controlled Intersection
"RI" – Right-In Only Driveway
Delay – seconds per vehicle
LOS – Level of Service

As presented in **Table 8-1,** under Future Plus Project Conditions, the study intersections would operate at LOS D or better with the proposed project-specific improvements.

8.2 Future Plus Project Traffic Queuing Analysis

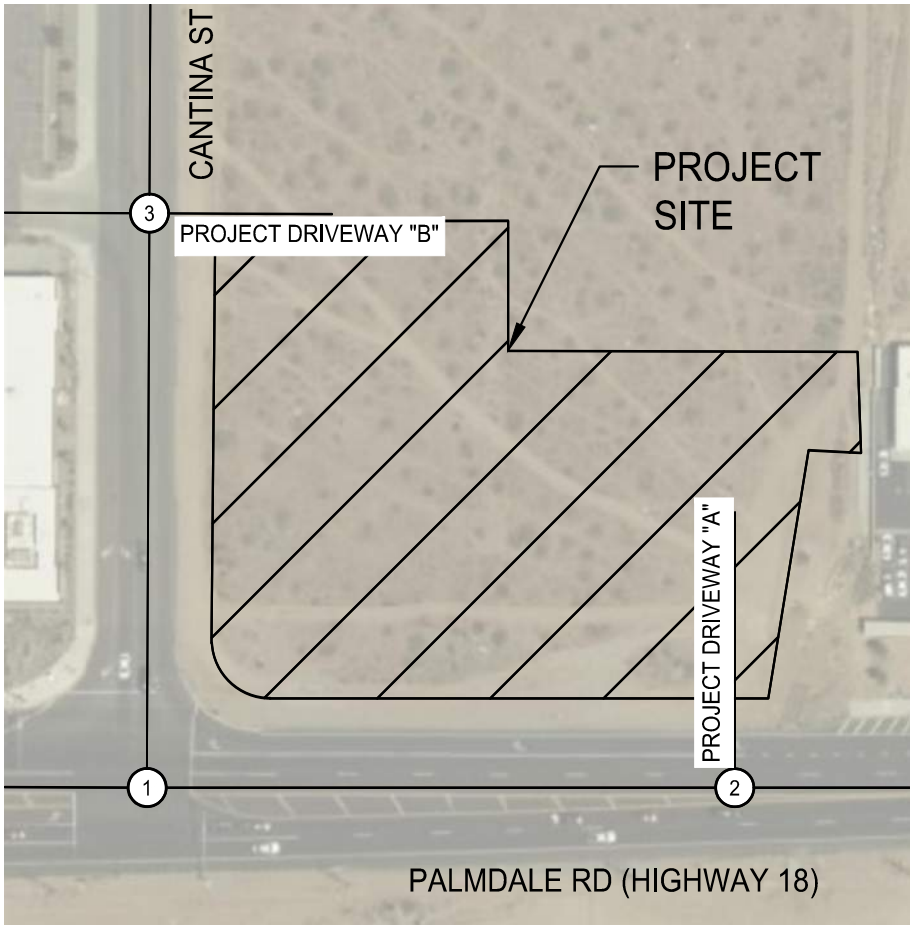
A queuing analysis for the Future Plus Project Conditions was performed for the westbound right turn from Palmdale Road (SR 18) to Cantina Street. The queuing analysis was performed utilizing the Trafficware SimTraffic Version 11 software package. The 95th percentile maximum queue length results for the Project Conditions are shown in **Table 6-2** and **Appendix D**.

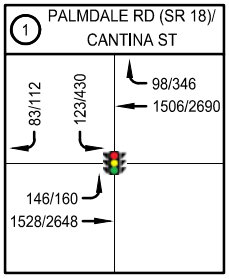
Table 8-2: Queuing Analysis – Future Plus Project Conditions

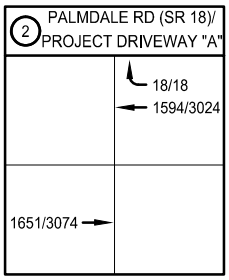
Intersection	Movement	Storage Length (Feet)	AM	PM
1. Palmdale Road (SR 18) / Cantina Street	WBT		307	362
	WBT		284	359
	WBT		204	306
	WBR	300	52	104

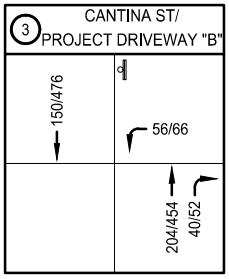
Queue – In Feet
95% - 95 Percentile Queue Length

As presented in **Table 8-2**, under Future Plus Project Conditions the proposed turn bay lengths will accommodate the AM or PM peak 95th percentile traffic flows.









LEGEND

XX/XX - AM/PM PEAK HOUR VOLUMES

(#) - STUDY INTERSECTIONS

- SIGNALIZED INTERSECTION

- STOP CONTROLLED APPROACH

FIGURE 14: FUTURE PLUS PROJECT
TRAFFIC VOLUMES
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

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9 APPENDICES

Appendix A: Approved City Scope Agreement
Appendix B: Turn Movement Count Volumes
Appendix C: Intersection Capacity Analysis Calculations
Appendix D: Queuing Analysis

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Appendix A: Approved City Scope Agreement

Trisha Munoz

From: Anwar Wagdy <awagdy@victorvilleca.gov>
Sent: Monday, January 24, 2022 9:16 AM
To: Trisha Munoz
Cc: Jim Daisa; Shane Schubert; Robert Kilpatrick; Fredy Bonilla
Subject: RE: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

Hi Trisha,

I am OK with the submitted scoping agreement, and apologize for the delayed response.
Thanks,

ANWAR WAGDY, P.E.
City Traffic Engineer
Public Works Dept. Engineering
(760) 955-5160

From: Trisha Munoz <TMunoz@deainc.com>
Sent: Thursday, November 18, 2021 4:22 PM
To: Fredy Bonilla <fbonilla@victorvilleca.gov>
Cc: Anwar Wagdy <awagdy@victorvilleca.gov>; Jim Daisa <Jim.Daisa@deainc.com>; Shane Schubert <SSchubert@deainc.com>; Robert Kilpatrick <RKilpatrick@deainc.com>
Subject: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

Freddy,

I trust this email finds you well.

Please see attached the Traffic Study Scope Memorandum and Proposed Conceptual Geometric Plans for the proposed Palmdale Road Retail Development located on the northeast corner of Palmdale Road and Cantina Street in the City of Victorville, California.
This memorandum provides our assumptions for completing the traffic impact study for review and approval (or commenting) by the affected jurisdictions including the City of Victorville and Caltrans District 8 IGR Planning.
The Memorandum is concurrently submitted to Caltrans District 8 IGR Planning.

If you have any questions, please do not hesitate to contact us.

Trisha Munoz, EIT | Engineering Designer II, Transportation
David Evans and Associates, Inc.
18484 Outer Highway 18 North, Suite 225 | Apple Valley, CA, 92307 | www.deainc.com
d: 760.524.9120 | c: 760.686.1215 | Cisco: 39120 | tnm@deainc.com

Trisha Munoz

From: MATHEW, JACOB K@DOT <Jacob.MATHEW@dot.ca.gov>
Sent: Monday, January 10, 2022 3:03 PM
To: Trisha Munoz
Cc: Clark, Rosa F@DOT; Jim Daisa; Shane Schubert; Robert Kilpatrick; Kristine Simmons; Fredy Bonilla
Subject: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

Hi,
Thank you for providing the California Department of Transportation (Caltrans) the opportunity to review and comment on the Scoping Agreement for Traffic Impact Analysis (TIA) regarding the Commercial Development project, proposed at the northeast corner of Palmdale Road (SR-18) and Cantina Street in the City of Victorville. The project proposes to construct and operate retail shops, a fast-food restaurant, and a car wash.

The presented scope appears to be appropriate and adequate, however we offer the following additional comments:

1) In your TIA, conduct a queue analysis to determine the storage length of the proposed right-turn pocket on SR-18 westbound.
2) The proposed driveway on SR-18 shall be INGRESS ONLY (no EGRESS) to minimize potential vehicular and pedestrian conflicts at this driveway location.
3) Re-evaluate the proposed stop-control and circulation at the driveway on Cantina Road as this will be the only FULL access driveway for the site and provide applicable recommendations.
4) Include a 20-year horizon year for "with" and "without" project analysis in your Traffic Impact Analysis (TIA) report.
5) There are several proposed or ongoing development projects in the vicinity of your proposed project site. Please consult with the City of Victorville for the status and information of these projects and incorporate combined potential traffic impacts resulted from these developments in your trip generation, trip projection, trip distribution, impact analysis, and mitigations or alternatives, if needed.
6) Provide traffic safety reviews as a stand-alone report for proposed land use projects and plans affecting the State Highway System.
7) Perform appropriate VMT focused Traffic Impact Study and submit for review. Identified VMT category will be evaluated based on the Traffic Impact Study. Project may not be categorized as less than significant VMT impact.
8) Provide truck turning template for your site at all access points.
9) Provide Hydrology report for our review.

Do not hesitate to contact me for any additional information regarding the review of Scoping Agreement for this project.

Thanks,
JACOB K MATHEW
D-8, IGR – Planning
464 W. 4TH Street
San Bernardino, CA 92401

Ph: 909-963-9255

From: Trisha Munoz <TMunoz@deainc.com>
Sent: Tuesday, January 4, 2022 10:55 AM
To: MATHEW, JACOB K@DOT <Jacob.MATHEW@dot.ca.gov>
Cc: Clark, Rosa F@DOT <rosa.f.clark@dot.ca.gov>; Jim Daisa <Jim.Daisa@deainc.com>; Shane Schubert <SSchubert@deainc.com>; Robert Kilpatrick <RKilpatrick@deainc.com>
Subject: RE: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

EXTERNAL EMAIL. Links/attachments may not be safe.

Jacob,

I trust this email finds you well and hope you had a wonderful Holiday.

We are reaching out for a status update on your review of the Traffic Study Scope Memorandum and Proposed Conceptual Geometric Plans for the proposed Palmdale Road Retail Development. Could you provide a timeline on when we could anticipate approval or comments?

Trisha Munoz, EIT | Engineering Designer II, Transportation
David Evans and Associates, Inc.
18484 Outer Highway 18 North, Suite 225 | Apple Valley, CA, 92307 | www.deainc.com
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ENERGY | LAND DEVELOPMENT | MARINE SERVICES | SURVEYING AND GEOMATICS | TRANSPORTATION | WATER AND ENVIRONMENT

From: MATHEW, JACOB K@DOT <Jacob.MATHEW@dot.ca.gov>
Sent: Monday, November 22, 2021 8:09 AM
To: Trisha Munoz <TMunoz@deainc.com>
Cc: Clark, Rosa F@DOT <rosa.f.clark@dot.ca.gov>; Jim Daisa <Jim.Daisa@deainc.com>; Shane Schubert <SSchubert@deainc.com>; Robert Kilpatrick <RKilpatrick@deainc.com>
Subject: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

Hi,
Thank you for providing us the Scoping Agreement for the Commercial Development project, proposed at the northeast corner of Palmdale Road (SR-18) and Cantina Street in the City of Victorville. We'll route the provided documents to our functional units and respond to you with comments as soon as we complete the review.

Thanks,

JACOB K MATHEW
D-8, IGR – Planning
464 W. 4TH Street
San Bernardino, CA 92401
Ph: 909-963-9255

From: Trisha Munoz <TMunoz@deainc.com>
Sent: Thursday, November 18, 2021 4:22 PM
To: MATHEW, JACOB K@DOT <Jacob.MATHEW@dot.ca.gov>
Cc: Clark, Rosa F@DOT <rosa.f.clark@dot.ca.gov>; Jim Daisa <Jim.Daisa@deainc.com>; Shane Schubert <SSchubert@deainc.com>; Robert Kilpatrick <RKilpatrick@deainc.com>
Subject: Project Scoping Memorandum for Proposed Palmdale Road Retail Development

I trust this email finds you well.

Please see attached the Traffic Study Scope Memorandum and Proposed Conceptual Geometric Plans for the proposed Palmdale Road Retail Development located on the northeast corner of Palmdale Road and Cantina Street in the City of Victorville, California.
This memorandum provides our assumptions for completing the traffic impact study for review and approval (or commenting) by the affected jurisdictions including the City of Victorville and Caltrans District 8 IGR Planning.
The Memorandum is concurrently submitted to City of Victorville.

If you have any questions, please do not hesitate to contact us.

Trisha Munoz, EIT | Engineering Designer II, Transportation
David Evans and Associates, Inc.
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d: 760.524.9120 | c: 760.686.1215 | Cisco: 39120 | tnm@deainc.com
ENERGY | LAND DEVELOPMENT | MARINE SERVICES | SURVEYING AND GEOMATICS | TRANSPORTATION | WATER AND ENVIRONMENT

DAVID EVANS AND ASSOCIATES INC.

October 18, 2021 Job No. RDEV0000-0005

MEMORANDUM

To: Mr. Tab Johnson
Rich Development, LLC
600 N. Tustin Avenue
Santa Ana, CA 02705

From: James M. Daisa, PE
Senior Transportation Project Manager

RE: Traffic Study Scope and Vehicle Miles Traveled (VMT) Screening for the Palmdale Road Retail Development, Victorville, California

This memorandum presents key elements of the proposed Focused Traffic Impact Analysis Report (TIA Report) scope of work for the above referenced development project. The purpose of this memorandum is to present our traffic study assumptions and methodologies to the City of Victorville for their review and approval.

A. Project Description

The proposed project consists of an automated car wash and a fast-food restaurant with drive-through window. The project site is located on the northeast corner of Palmdale Road and Cantina Street in the City of Victorville, California, as illustrated in **Exhibit A**.

The proposed project is bounded to the north by vacant/undeveloped properties, to the south by Palmdale Road and vacant/undeveloped properties, to the west by Cantina Street and the Crossroads Shopping Center, and to the east by the Victorville Village Retail Center. **Exhibit B** illustrates the proposed site plan. As shown in the plan, access to the site is proposed from Palmdale Road and Cantina Street.

B. Project Trip Generation

Table A summarizes the estimated trip generation for the proposed project for weekday AM (7-9 AM) and PM (4-6 PM) peak hours. The trip generation rates for the site include **Automated Car Wash (ITE Land Use 948)** and **Fast-Food Restaurant with Drive-Through Window (ITE Land Use 934)** and were obtained from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition.

Pass-by factors for the fast-food restaurant with drive-through window were provided by the City of Victorville staff. A reduction in trips of 10% for internal capture is assumed for the development.

The proposed project is estimated to generate 2,163 primary daily trips, 71 primary AM peak hour and 103 primary PM peak hour trips.

DAVID EVANS AND ASSOCIATES INC.

Table A: Project Trip Generation

	Use	Size/ Quantity	Daily	AM			PM		
1	**Automated Car Wash Land Use Category (ITE 948)**								
	Per 1,000 Sq. Ft. GLA	3,600	275.26 [1]	0	0	0	7.10	7.10	14.20
	Trips		991	0	0	0	26	26	52
	Internal Trips (10%)		99	0	0	0	3	3	6
	Subtotal Trips		892	0	0	0	23	23	46
2	**Fast Food Restaurant Land Use Category (ITE 934)**								
	Per 1,000 Sq. Ft. GLA	3,000	470.95	20.50	19.69	40.19	16.99	15.68	32.67
	Trips		1,413	62	59	121	51	47	98
	Internal Trips (10%)		142	6	6	12	5	5	10
	Subtotal Trips		1,271	56	53	109	46	42	88
	Pass-By Trips (35%, 35%)		0	19	19	38	16	15	31
	Primary Trips (65%, 65%)		1,271	37	34	71	30	27	57
	Subtotal Project Trips		2,163	56	53	109	69	65	134
	Pass-By Trips		0	19	19	38	16	15	31
	Primary Trips		**2,163**	37	34	**71**	53	50	**103**

Source: "Trip Generation Manual, Institute of Transportation Engineers", 10th Edition

[1] ITE Trip Generation (10th Edition) does not provide a daily rate for the automated carwash land use category. The daily rate used in Table A is from the 9th Edition of Trip Generation.

C. Project Trip Distribution and Assignment

To address the impacts of the estimated project traffic, the trips were distributed by direction towards major commute routes and concentrations of residential and commercial / employment centers. Once the distribution pattern was established, project trips were assigned to the area streets that serve the project.

The distribution of the project trips is illustrated in **Exhibit C**. The assignment of primary project trips to nearby intersections is illustrated in **Exhibit D1**. The assignment of pass-by project trips to nearby intersections is illustrated in **Exhibit D2**. The assignment of total project trips to nearby intersections is illustrated in **Exhibit E**.

D. Study Intersections

Since the proposed project is located at the southeast corner of Palmdale Road and Cantina Street, we identify a existing intersection and two proposed project driveways as study intersections:

1. Palmdale Road (SR 18) and Cantina Street
2. Palmdale Road (SR 18) and Project Driveway (future intersection)
3. Cantina Street and Project Driveway (future intersection)

The intersection of Palmdale Road (SR 18) and Cantina Street is a signalized intersection.

Site Access

Access to the site is proposed with a right turn in / right turn out driveway on Palmdale Road (SR 18) located about 355-feet east of Cantina Street (measured from centerline to centerline). A second, full access driveway, is proposed on Cantina Street about 235-feet north of Palmdale Road and aligned with an existing driveway on the west side of Cantina Street.

E. Methodology

Level of service will be calculated using the Highway Capacity Manual (HCM6) methodologies for signalized and non-signalized intersections. All study intersections will be analyzed to identify deficiencies in the City's Level of Service (LOS) policy. The capacity analysis will reflect trucks as a percentage of the total traffic volumes.

F. Traffic Study Scenarios

Scenarios analyzed in this study are consistent with San Bernardino County Congestion Management Program (CMP) requirements and include:

1. Existing Conditions (AM (7-9 AM) and PM (4-6 PM) peak)
2. Existing plus Project Conditions
3. Background Conditions (Year 2023)
    a. Existing + Ambient Growth (assuming a growth rate of 3.5% per year)
4. Project Conditions (Year 2023)
    a. Existing + Ambient Growth + Project Traffic
5. Future Horizon Year 2033 without project)
    a. Background + Ambient Growth (assuming a growth rate of 3.5% per year)
6. Future plus Project (Horizon Year 2033)
    a. Background + Ambient Growth + Project Traffic

G. Vehicle Miles Traveled (VMT) Screening

The City of Victorville Vehicle Miles Traveled (VMT) Analysis Guidelines were adopted in June of 2020 in conformance with SB 743.

Project Screening from Conducting VMT Analyses

Victorville uses screening criteria to determine if a development project is required to conduct a VMT analysis. If a project satisfies the criteria described below it is considered to have a less than significant impact on VMT and does not require an analysis.

Victorville has two criteria for screening projects from requiring a VMT analysis. The first criteria is based on the project's net daily increase in vehicle trips—if the project's net daily traffic generation is equal to or less than the City's threshold of 1,285 trips per day, it is exempt from a VMT analysis.

The second criteria is comprised of a list of specific land uses types and a maximum size threshold in terms of dwelling units for residential projects and floor area for non-residential projects. The listed types of land uses are deemed too small to cause a significant increase in VMT or they are considered "locally-serving" types of land uses that reduce VMT by providing nearby opportunities for employment, shopping and services. Proposed projects matching the "project type" and falling within the size thresholds are exempt from a VMT analysis.

1. Screening for Net Increase in Daily Vehicle Trips

As shown in Table A, the project's net increase in daily vehicle trips is 2,163 which exceeds the 1,285 daily trip threshold in the City's guidelines. Based on this criterion, the project is not screened from requiring a VMT.

2. Project Type Screening

According to the City of Victorville's VMT guidelines, the following types of land uses or development with the specified maximum size are exempt from having to conduct a VMT analysis:

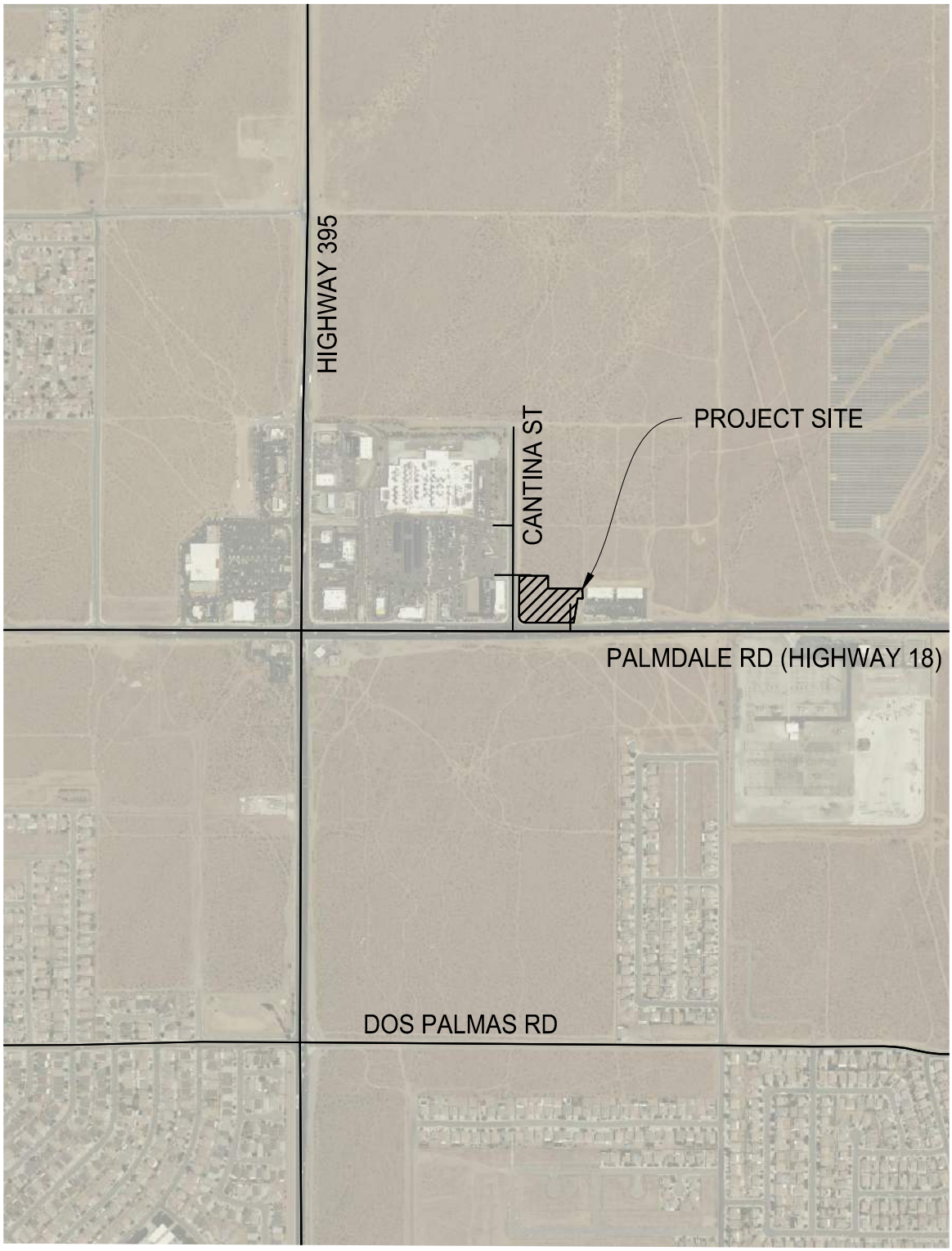
- Single Family or Multifamily Residential – 136 dwelling units or less
- Office — 227,000 square feet or less
- **Retail — 122,000 square feet or less**
- Warehousing — 829,000 square feet or less
- Light Industrial — 296,000 square feet or less
- K-12 Public School
- Daycare/Childcare/Pre-K
- Affordable Housing
- Student Housing
- Community Institutions, Social Services and Public Buildings

The proposed project is comprised of retail uses (a car wash and a fast-food restaurant with drive-through window). The combined building square footage (6,600 SF) of the proposed uses is below the City's retail size threshold of 122,000 square feet. Therefore, based on this criterion, the project is screened from conducting a VMT analysis.

If you have any questions or comments, please feel free to contact us.

Attachments

1. Exhibit A – Vicinity Map
2. Exhibit B – Site Plan
3. Exhibit C – Project Trip Distribution
4. Exhibit D1 – Primary Project Trips
5. Exhibit D2 – Pass-by Project Trips
6. Exhibit E – Total Project Trips



N

NOT TO SCALE

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT A: VICINITY MAP

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

Drawing Name: P:\RRDEV\00000005\04000CAD\EXHIBITS\SCOPE\Exhibit A.dwg
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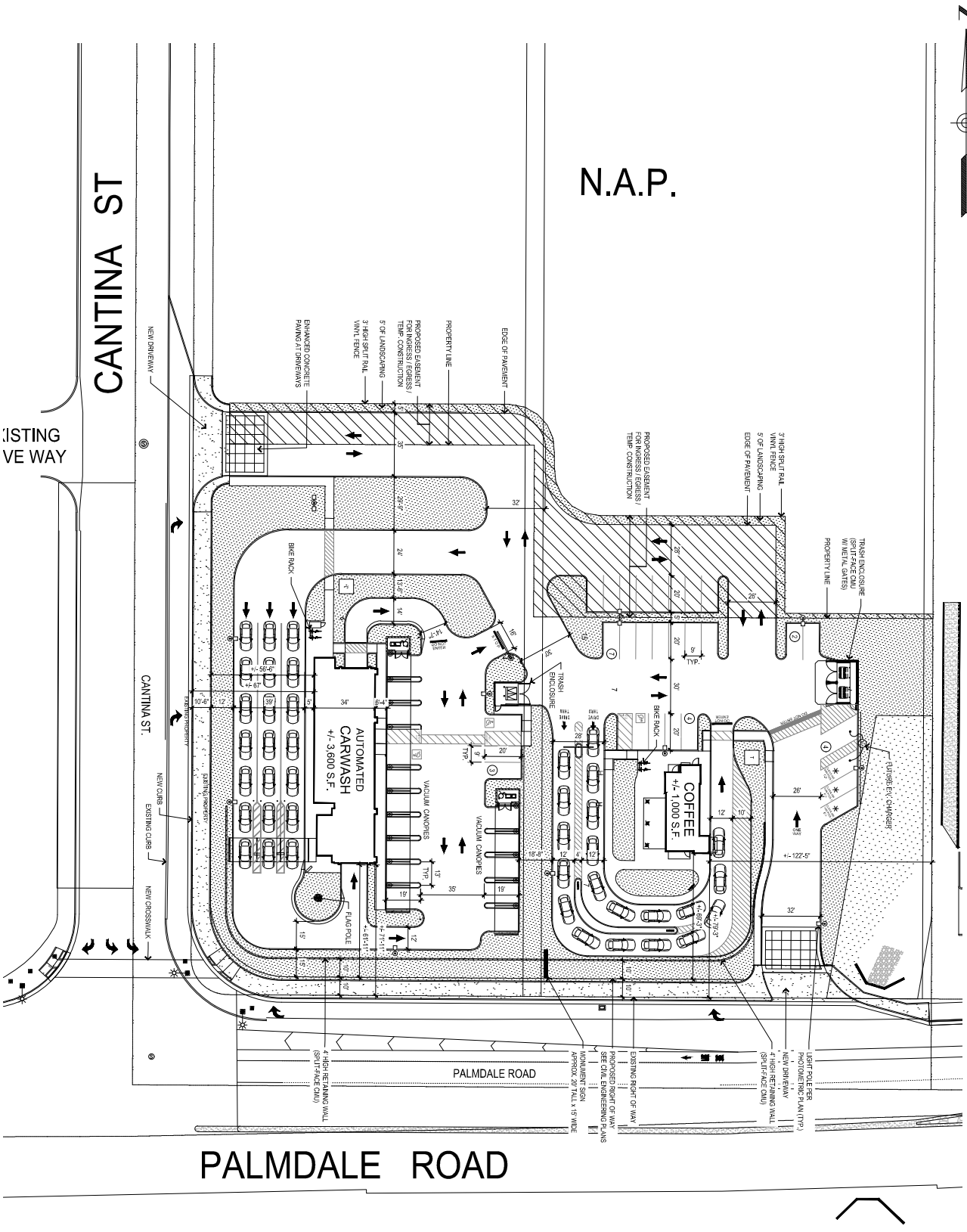
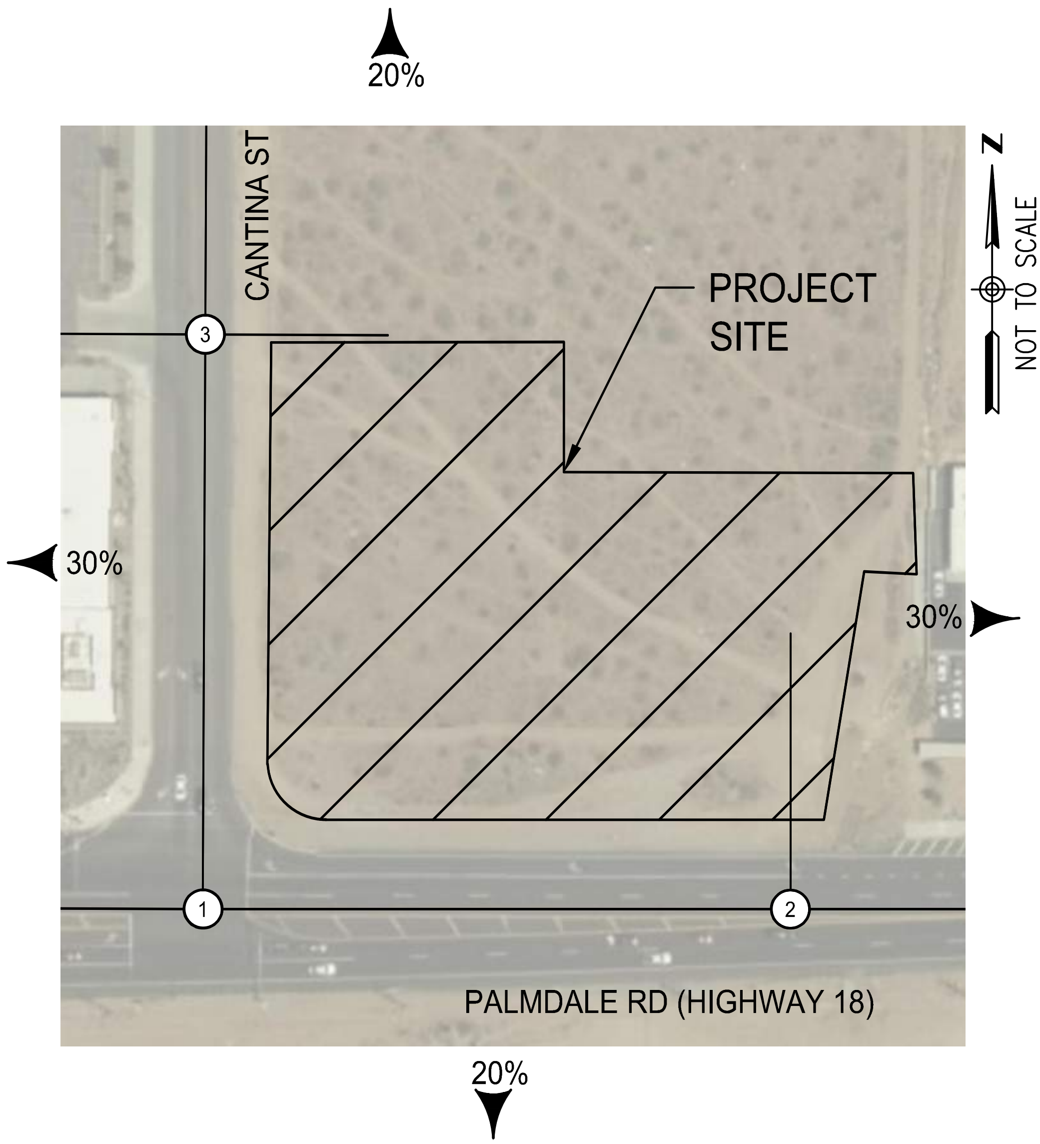
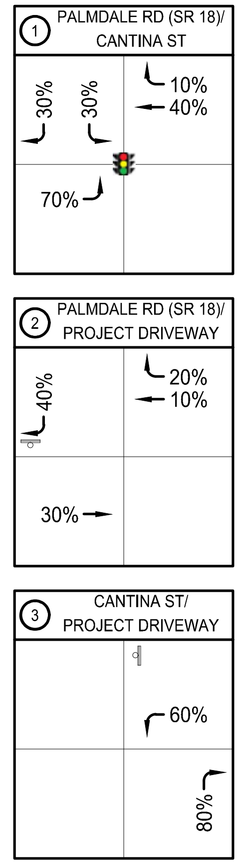


EXHIBIT B: SITE PLAN

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.





LEGEND

- XX% - GENERAL PROJECT TRIP DISTRIBUTION
- XX% - SPECIFIC PROJECT TRIP PERCENTAGE
- # - STUDY INTERSECTIONS
- - SIGNALIZED INTERSECTION
- - STOP CONTROLLED APPROACH

EXHIBIT C: PROJECT TRIP DISTRIBUTION

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

Drawing Name: P:\R\RDEV00000005\0400CAD\EXHIBITS\SCOPE\Exhibit C.dwg
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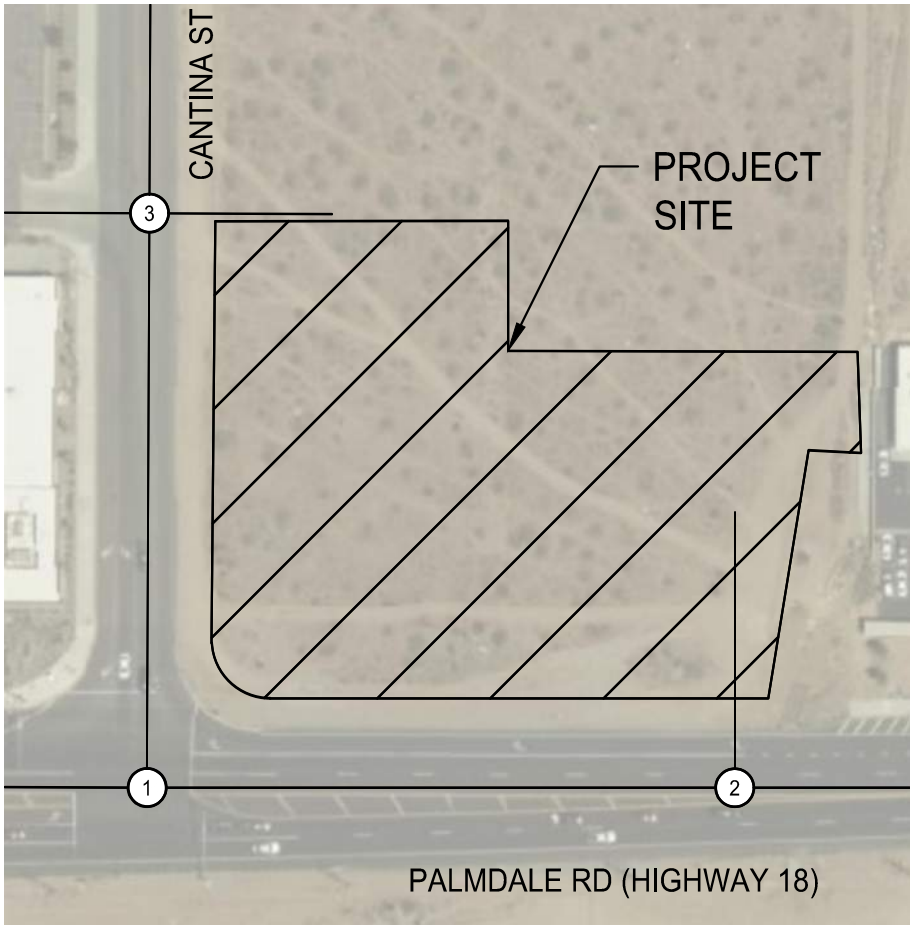
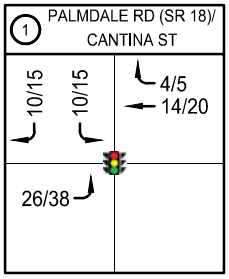
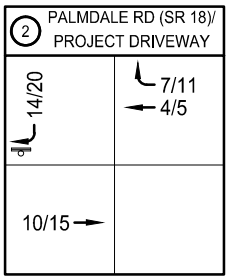
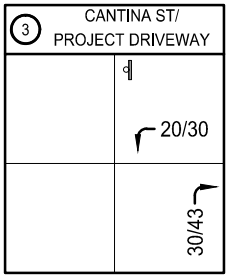








PRIMARY PROJECT TRIPS

AM PEAK PERIOD - 37 IN / 34 OUT
PM PEAK PERIOD - 53 IN / 50 OUT

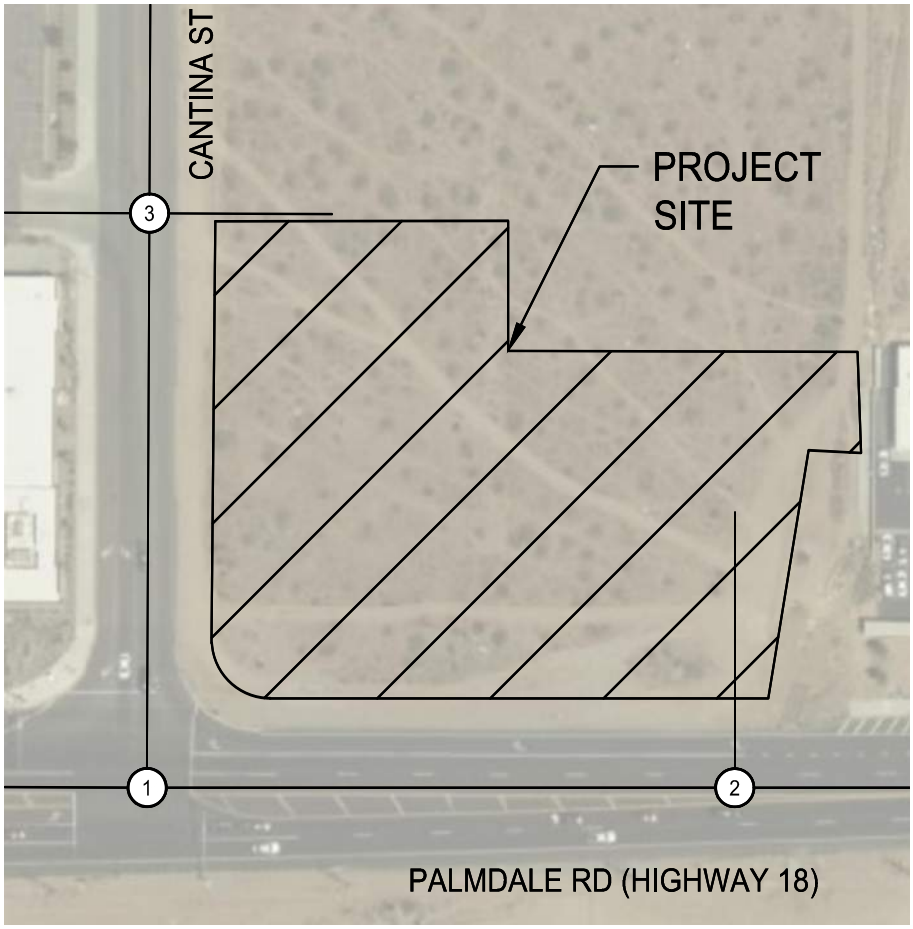
LEGEND

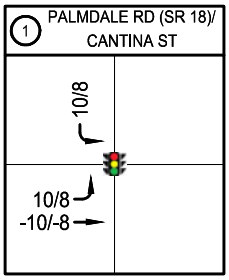
XX/XX - AM/PM PROJECT TRIP
- STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

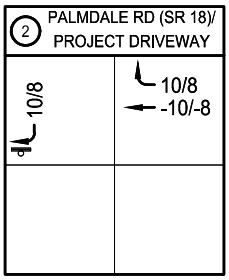
EXHIBIT D1: PRIMARY PROJECT TRIPS

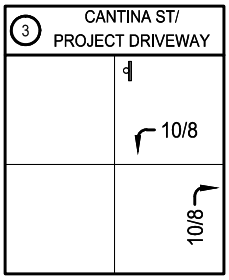
PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.









PASS-BY PROJECT TRIPS

AM PEAK PERIOD - 19 IN / 19 OUT
PM PEAK PERIOD - 16 IN / 15 OUT

LEGEND

XX/XX - AM/PM PROJECT TRIP
(#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

EXHIBIT D2: PASS-BY PROJECT TRIPS

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS AND ASSOCIATES INC.

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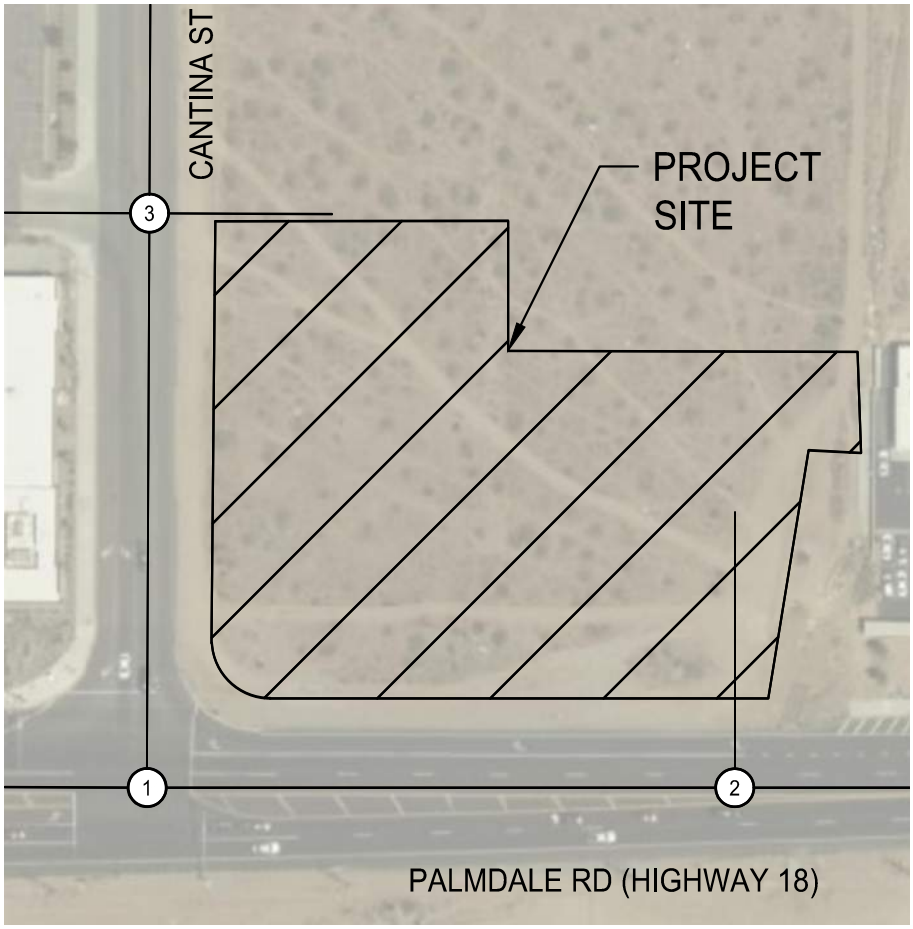
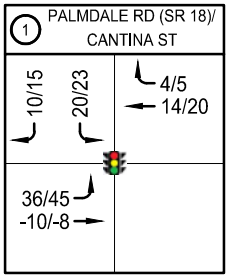
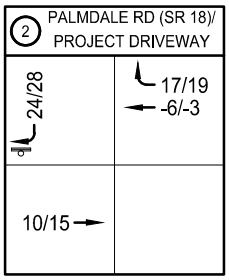
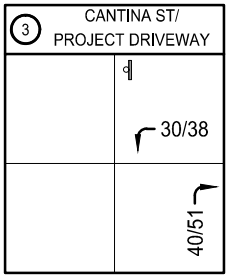








PROJECT TRIPS

AM PEAK PERIOD - 53 IN / 53 OUT
PM PEAK PERIOD - 69 IN / 65 OUT

LEGEND

XX/XX - AM/PM PROJECT TRIP
(#) - STUDY INTERSECTIONS
- SIGNALIZED INTERSECTION
- STOP CONTROLLED APPROACH

DAVID EVANS AND ASSOCIATES INC.

EXHIBIT E: TOTAL PROJECT TRIPS

PALMDALE ROAD RETAIL DEVELOPMENT
VICTORVILLE, CALIFORNIA

DAVID EVANS
AND ASSOCIATES INC.

Appendix B: Turn Movement Count Volumes

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CANTINA
EAST-WEST STREET: PALMDALE RD
JURISDICTION: VICTORVILLE

DATE: 02-17-22

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 106

Rt	Thru	Lt	
34		72	Total
2		10	1st
8		16	2nd
11		26	3rd
13		20	4th

EAST LEG TOTAL: 1,127

	1st	2nd	3rd	4th	Total
Rt	9	28	12	17	66
Thru	262	284	271	244	1061
Lt					

WEST LEG TOTAL: 1,161

Total	1st	2nd	3rd	4th	
78	17	14	19	28	Lt
1083	239	342	294	208	Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.72
SOUTH LEG =
EAST LEG = 0.90
WEST LEG = 0.82

ALL LEGS = 0.86

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 2,394

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CANTINA
EAST-WEST STREET : PALMDALE RD
BEGINNING TIME : 07:00AM

VICTORVILLE
02-17-22

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
NORTH LEG												
2	0	10	0	0	0	0	0	0	0	0	0	12
8	0	16	0	0	0	0	0	0	0	0	0	24
11	0	26	0	0	0	0	0	0	0	0	0	37
13	0	20	0	0	0	0	0	0	0	0	0	33
4	0	22	0	0	0	0	0	0	0	0	0	26
4	0	22	0	0	0	0	0	0	0	0	0	26
2	0	22	0	0	0	0	0	0	0	0	0	24
1	0	33	0	0	0	0	0	0	0	0	0	34
45	0	171	0	0	0	0	0	0	0	0	0	216
SOUTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
EAST LEG												
9	253	0	0	2	0	0	1	0	0	6	0	271
28	278	0	0	0	0	0	3	0	0	3	0	312
12	266	0	0	2	0	0	0	0	0	3	0	283
17	233	0	0	3	0	0	3	0	0	5	0	261
12	248	0	0	4	0	0	0	0	0	2	0	266
8	181	0	0	0	0	0	1	0	0	5	0	195
6	178	0	0	2	0	0	1	0	0	10	0	197
15	221	0	0	4	0	0	0	0	0	9	0	249
107	1858	0	0	17	0	0	9	0	0	43	0	2034
WEST LEG												
0	224	17	0	3	0	0	1	0	0	11	0	256
0	328	14	0	3	0	0	2	0	0	9	0	356
0	283	19	0	0	0	0	3	0	0	8	0	313
0	191	28	0	5	0	0	0	0	0	12	0	236
0	138	30	0	2	0	0	1	0	0	12	0	183
0	180	30	0	1	0	0	1	0	0	10	0	222
0	228	26	0	1	0	0	0	0	0	8	0	263
0	225	29	0	1	0	0	1	0	0	9	0	265
0	1797	193	0	16	0	0	9	0	0	79	0	2094

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CANTINA

EAST-WEST STREET: PALMDALE RD

TIME: 07:00AM-08:00AM DATE: 02-17-22

NORTH LEG

34		72	Total
2		10	1st
8		16	2nd
11		26	3rd
13		20	4th
Rt	Thru	Lt	

Rt	9	28	12	17	66
Thru	262	284	271	244	1061
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
78	17	14	19	28	Lt
1083	239	342	294	208	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CANTINA

EAST-WEST STREET: PALMDALE RD

TIME: 08:00AM-09:00AM DATE: 02-17-22

NORTH LEG

Rt	Thru	Lt	
11		99	Total
4		22	1st
4		22	2nd
2		22	3rd
1		33	4th

	1st	2nd	3rd	4th	Total
Rt	12	8	6	15	41
Thru	254	187	191	234	866
Lt					

Total	1st	2nd	3rd	4th	
115	30	30	26	29	Lt
818	153	192	237	236	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: CANTINA
EAST-WEST STREET: PALMDALE RD
JURISDICTION: VICTORVILLE

DATE: 02-17-22

PEAK HOUR: 04:00PM

NORTH LEG

TOTAL: 336

Rt	Thru	Lt	
49		287	Total
6		71	1st
16		81	2nd
9		77	3rd
18		58	4th

EAST LEG TOTAL: 2,133

	1st	2nd	3rd	4th	Total
Rt	49	62	74	54	239
Thru	452	492	452	498	1894
Lt					

WEST LEG TOTAL: 1,950

Total	1st	2nd	3rd	4th	
80	22	21	17	20	Lt
1870	503	483	441	443	Thru
					Rt

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG =
EAST LEG = 0.96
WEST LEG = 0.93

ALL LEGS = 0.96

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 4,419

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : CANTINA

EAST-WEST STREET : PALMDALE RD

VICTORVILLE

02-17-22

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
NORTH LEG												
4	0	71	1	0	0	0	0	0	1	0	0	77
16	0	81	0	0	0	0	0	0	0	0	0	97
9	0	77	0	0	0	0	0	0	0	0	0	86
18	0	58	0	0	0	0	0	0	0	0	0	76
18	0	59	0	0	0	0	0	0	0	0	0	77
18	0	46	0	0	0	0	0	0	0	0	0	64
13	0	53	0	0	0	0	0	0	0	0	1	67
8	0	67	0	0	0	0	0	0	0	0	0	75
104	0	512	1	0	0	0	0	0	1	0	1	619
SOUTH LEG												
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
EAST LEG												
49	440	0	0	3	0	0	4	0	0	5	0	501
62	487	0	0	0	0	0	0	0	0	5	0	554
74	447	0	0	1	0	0	1	0	0	3	0	526
54	495	0	0	0	0	0	1	0	0	2	0	552
46	471	0	0	2	0	0	2	0	0	3	0	524
52	393	0	0	1	0	0	1	0	0	3	0	450
48	438	0	0	3	0	0	2	0	0	8	0	499
24	316	0	0	0	0	0	0	0	0	3	0	343
409	3487	0	0	10	0	0	11	0	0	32	0	3949
WEST LEG												
0	491	22	0	2	0	0	2	0	0	8	0	525
0	476	21	0	0	0	0	2	0	0	5	0	504
0	433	17	0	2	0	0	0	0	0	6	0	458
0	434	20	0	0	0	0	1	0	0	8	0	463
0	411	21	0	0	0	0	0	2	0	5	0	439
0	393	11	0	2	0	0	1	1	0	9	0	417
0	279	15	0	1	0	0	1	0	0	2	0	298
0	304	13	0	2	0	0	0	0	0	1	0	320
0	3221	140	0	9	0	0	7	3	0	44	0	3424

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CANTINA

EAST-WEST STREET: PALMDALE RD

TIME: 04:00PM-05:00PM DATE: 02-17-22

NORTH LEG

Rt	Thru	Lt	
49		287	Total
6		71	1st
16		81	2nd
9		77	3rd
18		58	4th

	1st	2nd	3rd	4th	Total
Rt	49	62	74	54	239
Thru	452	492	452	498	1894
Lt					

Total	1st	2nd	3rd	4th	
80	22	21	17	20	Lt
1870	503	483	441	443	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: CANTINA

EAST-WEST STREET: PALMDALE RD

TIME: 05:00PM-06:00PM DATE: 02-17-22

NORTH LEG

57		226	Total
18		59	1st
18		46	2nd
13		54	3rd
8		67	4th
Rt	Thru	Lt	

Rt	46	52	48	24	170
Thru	478	398	451	319	1646
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
63	23	12	15	13	Lt
1411	416	405	283	307	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

DAVID EVANS
AND ASSOCIATES INC.

Appendix C: Intersection Capacity Analysis Calculations

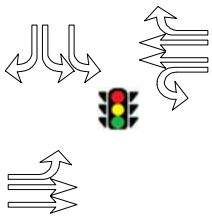
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	21-Mar-22	RDEV0000-0005	1 OF 2

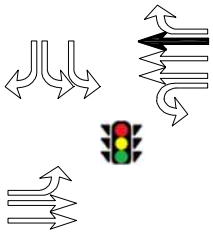
E/W STREET : PALMDALE RD (HWY 18)
N/S STREET : CANTINA ST
CONDITION : AM PEAK HOUR

INTERSECTION : 1
PROJECTED GROWTH PER YEAR : 3.5%

CONDITION DIAGRAMS



EXISTING GEOMETRICS



PROJECT GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	1		3		5	7		9	11
PALMDALE RD (HWY 18)									
EB LEFT	78	36	114	5	83	119	27	110	146
EB THRU	1083	-10	1073	76	1159	1149	379	1,538	1528
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0	0
WB THRU	1061	14	1075	74	1135	1149	371	1,506	1520
WB RIGHT	66	4	70	5	71	75	23	94	98
CANTINA ST									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0	0
SB LEFT	72	21	93	5	77	98	25	102	123
SB THRU	0	0	0	0	0	0	0	0	0
SB RIGHT	34	11	45	2	36	47	12	48	59
TOTALS	**2394**	**76**	**2470**	**167**	**2561**	**2637**	**837**	**3398**	**3474**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	21-Mar-22	RDEV0000-0005	2	OF 2

E/W STREET : PALMDALE RD (HWY 18) N/S STREET : CANTINA ST

CONDITION : AM PEAK HOUR PHF : 0.86

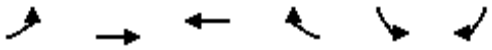
NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
2	0	10	0	0	0	0	0	0	0	0	0
8	0	16	0	0	0	0	0	0	0	0	0
11	0	26	0	0	0	0	0	0	0	0	0
13	0	20	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
9	253	0	0	2	0	0	1	0	0	6	0
28	278	0	0	0	0	0	3	0	0	3	0
12	266	0	0	2	0	0	0	0	0	3	0
17	233	0	0	3	0	0	3	0	0	5	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	224	17	0	3	0	0	1	0	0	11	0
0	328	14	0	3	0	0	2	0	0	9	0
0	283	19	0	0	0	0	3	0	0	8	0
0	191	28	0	5	0	0	0	0	0	12	0

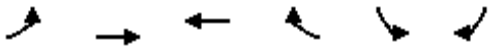
	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
PALMDALE RD (HWY 18)					
EB LEFT	0	78	**78**	**1%**	**78**
EB THRU	57	1026	**1,083**	**5%**	**1,083**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	31	1030	**1,061**	**3%**	**1,061**
WB RIGHT	0	66	**66**	**1%**	**66**
CANTINA ST					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	0	72	**72**	**1%**	**72**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	0	34	**34**	**1%**	**34**



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	78	1083	1061	66	72	34
Future Volume (veh/h)	78	1083	1061	66	72	34
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	91	1259	1234	77	84	40
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	115	1972	1556	705	880	404
Arrive On Green	0.07	0.60	0.47	0.47	0.27	0.27
Sat Flow, veh/h	1701	3373	3428	1514	3300	1514
Grp Volume(v), veh/h	91	1259	1234	77	84	40
Grp Sat Flow(s),veh/h/ln	1701	1643	1670	1514	1650	1514
Q Serve(g_s), s	3.2	14.9	18.8	1.7	1.1	1.2
Cycle Q Clear(g_c), s	3.2	14.9	18.8	1.7	1.1	1.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	115	1972	1556	705	880	404
V/C Ratio(X)	0.79	0.64	0.79	0.11	0.10	0.10
Avail Cap(c_a), veh/h	170	1972	1556	705	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.6	7.8	13.6	9.0	16.6	16.6
Incr Delay (d2), s/veh	14.3	1.6	4.2	0.3	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	3.1	5.7	0.5	0.4	1.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	41.8	9.4	17.8	9.3	16.8	17.1
LnGrp LOS	D	A	B	A	B	B
Approach Vol, veh/h		1350	1311		124	
Approach Delay, s/veh		11.6	17.3		16.9	
Approach LOS		B	B		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	8.0	32.0
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	6.0	26.0
Max Q Clear Time (g_c+I1), s		16.9		3.2	5.2	20.8
Green Ext Time (p_c), s		8.0		0.3	0.0	3.3

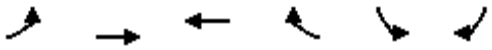
Intersection Summary		
HCM 6th Ctrl Delay		14.5
HCM 6th LOS		B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	1073	1061	70	93	69
Future Volume (veh/h)	114	1073	1061	70	93	69
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	133	1248	1234	81	108	80
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	167	1972	2087	658	880	404
Arrive On Green	0.10	0.60	0.43	0.43	0.27	0.27
Sat Flow, veh/h	1701	3373	4957	1514	3300	1514
Grp Volume(v), veh/h	133	1248	1234	81	108	80
Grp Sat Flow(s),veh/h/ln	1701	1643	1600	1514	1650	1514
Q Serve(g_s), s	4.6	14.7	11.7	1.9	1.5	2.5
Cycle Q Clear(g_c), s	4.6	14.7	11.7	1.9	1.5	2.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	167	1972	2087	658	880	404
V/C Ratio(X)	0.79	0.63	0.59	0.12	0.12	0.20
Avail Cap(c_a), veh/h	227	1972	2087	658	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.5	7.7	12.9	10.1	16.7	17.0
Incr Delay (d2), s/veh	12.8	1.6	1.2	0.4	0.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	3.1	3.2	0.5	0.5	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.3	9.3	14.1	10.5	17.0	18.1
LnGrp LOS	D	A	B	B	B	B
Approach Vol, veh/h		1381	1315		188	
Approach Delay, s/veh		12.2	13.9		17.5	
Approach LOS		B	B		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	9.9	30.1
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	8.0	24.0
Max Q Clear Time (g_c+I1), s		16.7		4.5	6.6	13.7
Green Ext Time (p_c), s		7.9		0.4	0.0	5.5

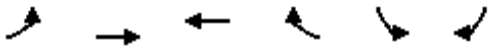
Intersection Summary	
HCM 6th Ctrl Delay	13.3
HCM 6th LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	83	1159	1135	71	77	36
Future Volume (veh/h)	83	1159	1135	71	77	36
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	97	1348	1320	83	90	42
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	122	1972	1541	698	880	404
Arrive On Green	0.07	0.60	0.46	0.46	0.27	0.27
Sat Flow, veh/h	1701	3373	3428	1514	3300	1514
Grp Volume(v), veh/h	97	1348	1320	83	90	42
Grp Sat Flow(s),veh/h/ln	1701	1643	1670	1514	1650	1514
Q Serve(g_s), s	3.4	16.7	21.1	1.9	1.2	1.3
Cycle Q Clear(g_c), s	3.4	16.7	21.1	1.9	1.2	1.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	122	1972	1541	698	880	404
V/C Ratio(X)	0.79	0.68	0.86	0.12	0.10	0.10
Avail Cap(c_a), veh/h	170	1972	1541	698	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.4	8.1	14.4	9.2	16.6	16.6
Incr Delay (d2), s/veh	15.8	1.9	6.3	0.3	0.2	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	3.6	6.8	0.5	0.4	1.3
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.2	10.1	20.7	9.6	16.8	17.1
LnGrp LOS	D	B	C	A	B	B
Approach Vol, veh/h		1445	1403		132	
Approach Delay, s/veh		12.3	20.1		16.9	
Approach LOS		B	C		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	8.3	31.7
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	6.0	26.0
Max Q Clear Time (g_c+I1), s		18.7		3.3	5.4	23.1
Green Ext Time (p_c), s		8.2		0.3	0.0	2.1

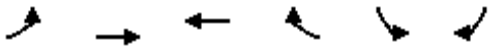
Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	119	1149	1135	75	98	71
Future Volume (veh/h)	119	1149	1135	75	98	71
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	138	1336	1320	87	114	83
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	173	1972	2071	653	880	404
Arrive On Green	0.10	0.60	0.43	0.43	0.27	0.27
Sat Flow, veh/h	1701	3373	4957	1514	3300	1514
Grp Volume(v), veh/h	138	1336	1320	87	114	83
Grp Sat Flow(s),veh/h/ln	1701	1643	1600	1514	1650	1514
Q Serve(g_s), s	4.8	16.4	12.9	2.1	1.6	2.6
Cycle Q Clear(g_c), s	4.8	16.4	12.9	2.1	1.6	2.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	173	1972	2071	653	880	404
V/C Ratio(X)	0.80	0.68	0.64	0.13	0.13	0.21
Avail Cap(c_a), veh/h	227	1972	2071	653	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.3	8.1	13.4	10.3	16.7	17.1
Incr Delay (d2), s/veh	13.6	1.9	1.5	0.4	0.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	3.5	3.6	0.6	0.6	2.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	40.0	10.0	14.9	10.7	17.0	18.2
LnGrp LOS	D	A	B	B	B	B
Approach Vol, veh/h		1474	1407		197	
Approach Delay, s/veh		12.8	14.6		17.5	
Approach LOS		B	B		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	10.1	29.9
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	8.0	24.0
Max Q Clear Time (g_c+I1), s		18.4		4.6	6.8	14.9
Green Ext Time (p_c), s		8.2		0.5	0.0	5.3

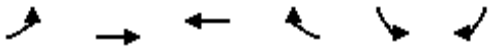
Intersection Summary	
HCM 6th Ctrl Delay	13.9
HCM 6th LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	110	1538	1506	94	102	48
Future Volume (veh/h)	110	1538	1506	94	102	48
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	116	1619	1585	99	107	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	146	1972	1495	677	880	404
Arrive On Green	0.09	0.60	0.45	0.45	0.27	0.27
Sat Flow, veh/h	1701	3373	3428	1514	3300	1514
Grp Volume(v), veh/h	116	1619	1585	99	107	51
Grp Sat Flow(s),veh/h/ln	1701	1643	1670	1514	1650	1514
Q Serve(g_s), s	4.0	23.3	26.9	2.3	1.5	1.5
Cycle Q Clear(g_c), s	4.0	23.3	26.9	2.3	1.5	1.5
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	146	1972	1495	677	880	404
V/C Ratio(X)	0.80	0.82	1.06	0.15	0.12	0.13
Avail Cap(c_a), veh/h	170	1972	1495	677	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.9	9.5	16.6	9.8	16.7	16.7
Incr Delay (d2), s/veh	19.8	4.0	41.1	0.5	0.3	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	5.3	15.6	0.6	0.5	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	46.7	13.4	57.7	10.2	17.0	17.3
LnGrp LOS	D	B	F	B	B	B
Approach Vol, veh/h		1735	1684		158	
Approach Delay, s/veh		15.7	54.9		17.1	
Approach LOS		B	D		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	9.1	30.9
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	6.0	26.0
Max Q Clear Time (g_c+I1), s		25.3		3.5	6.0	28.9
Green Ext Time (p_c), s		7.2		0.4	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	34.2
HCM 6th LOS	C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	1528	1506	98	123	83
Future Volume (veh/h)	146	1528	1506	98	123	83
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1730	1758	1786	1786	1786
Adj Flow Rate, veh/h	154	1608	1585	103	129	87
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	5	3	1	1	1
Cap, veh/h	192	1972	2019	637	880	404
Arrive On Green	0.11	0.60	0.42	0.42	0.27	0.27
Sat Flow, veh/h	1701	3373	4957	1514	3300	1514
Grp Volume(v), veh/h	154	1608	1585	103	129	87
Grp Sat Flow(s),veh/h/ln	1701	1643	1600	1514	1650	1514
Q Serve(g_s), s	5.3	23.0	17.1	2.5	1.8	2.7
Cycle Q Clear(g_c), s	5.3	23.0	17.1	2.5	1.8	2.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	192	1972	2019	637	880	404
V/C Ratio(X)	0.80	0.82	0.79	0.16	0.15	0.22
Avail Cap(c_a), veh/h	227	1972	2019	637	880	404
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.0	9.4	15.0	10.8	16.8	17.1
Incr Delay (d2), s/veh	16.1	3.9	3.2	0.5	0.4	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	5.2	5.1	0.7	0.7	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	42.1	13.3	18.2	11.4	17.1	18.3
LnGrp LOS	D	B	B	B	B	B
Approach Vol, veh/h		1762	1688		216	
Approach Delay, s/veh		15.8	17.8		17.6	
Approach LOS		B	B		B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		40.0		20.0	10.8	29.2
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		36.0		16.0	8.0	24.0
Max Q Clear Time (g_c+I1), s		25.0		4.7	7.3	19.1
Green Ext Time (p_c), s		7.3		0.5	0.0	3.7

Intersection Summary	
HCM 6th Ctrl Delay	16.8
HCM 6th LOS	B

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	21-Mar-22	RDEV0000-0005	1 OF 2

E/W STREET : PALMDALE RD (HWY 18)
N/S STREET : CANTINA ST
CONDITION : PM PEAK HOUR

INTERSECTION : 1
PROJECTED GROWTH PER YEAR : 3.5%

TURN MOVEMENTS

Condition	Existing Condition	Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	2		4		6	8		10	12
PALMDALE RD (HWY 18)									
EB LEFT	80	46	126	6	86	132	28	114	160
EB THRU	1870	-8	1862	131	2001	1993	655	2,656	2648
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0	0
WB THRU	1894	20	1914	133	2027	2047	663	2,690	2710
WB RIGHT	239	6	245	17	256	262	84	340	346
CANTINA ST									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0	0
SB LEFT	287	23	310	20	307	330	100	407	430
SB THRU	0	0	0	0	0	0	0	0	0
SB RIGHT	49	15	64	3	52	67	17	69	84
TOTALS	**4419**	**102**	**4521**	**310**	**4729**	**4831**	**1547**	**6276**	**6378**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET	OF
TURN VOLUME SUMMARY	TM	21-Mar-22	RDEV0000-0005	2	OF 2

E/W STREET : PALMDALE RD (HWY 18) N/S STREET : CANTINA ST
CONDITION : PM PEAK HOUR PHF : 0.96

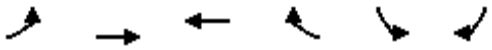
NORTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
4	0	71	1	0	0	0	0	0	1	0	0
16	0	81	0	0	0	0	0	0	0	0	0
9	0	77	0	0	0	0	0	0	0	0	0
18	0	58	0	0	0	0	0	0	0	0	0

SOUTH LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0

EAST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
49	440	0	0	3	0	0	4	0	0	5	0
62	487	0	0	0	0	0	0	0	0	5	0
74	447	0	0	1	0	0	1	0	0	3	0
54	495	0	0	0	0	0	1	0	0	2	0

WEST LEG											
AUTO			LARGE 2 AXLE			LARGE 3 AXLE			LARGE 4(+) AXLE		
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT
0	491	22	0	2	0	0	2	0	0	8	0
0	476	21	0	0	0	0	2	0	0	5	0
0	433	17	0	2	0	0	0	0	0	6	0
0	434	20	0	0	0	0	1	0	0	8	0

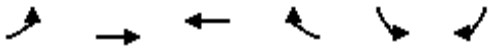
	Truck Volumes	Auto Volumes	Totals	Truck Percentage	Balanced Totals
PALMDALE RD (HWY 18)					
EB LEFT	0	80	**80**	**1%**	**80**
EB THRU	36	1834	**1,870**	**2%**	**1,870**
EB RIGHT	0	0	**0**	**0%**	**0**
WB LEFT	0	0	**0**	**0%**	**0**
WB THRU	25	1869	**1,894**	**1%**	**1,894**
WB RIGHT	0	239	**239**	**1%**	**239**
CANTINA ST					
NB LEFT	0	0	**0**	**0%**	**0**
NB THRU	0	0	**0**	**0%**	**0**
NB RIGHT	0	0	**0**	**0%**	**0**
SB LEFT	0	287	**287**	**1%**	**287**
SB THRU	0	0	**0**	**0%**	**0**
SB RIGHT	2	47	**49**	**4%**	**49**



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	80	1870	1894	239	287	49
Future Volume (veh/h)	80	1870	1894	239	287	49
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	83	1948	1973	249	299	51
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	105	2469	2129	950	587	263
Arrive On Green	0.06	0.73	0.63	0.63	0.18	0.18
Sat Flow, veh/h	1701	3455	3483	1514	3300	1478
Grp Volume(v), veh/h	83	1948	1973	249	299	51
Grp Sat Flow(s),veh/h/ln	1701	1683	1697	1514	1650	1478
Q Serve(g_s), s	4.3	33.0	46.6	6.6	7.4	2.6
Cycle Q Clear(g_c), s	4.3	33.0	46.6	6.6	7.4	2.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	105	2469	2129	950	587	263
V/C Ratio(X)	0.79	0.79	0.93	0.26	0.51	0.19
Avail Cap(c_a), veh/h	113	2469	2129	950	587	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.7	7.6	14.9	7.5	33.5	31.5
Incr Delay (d2), s/veh	29.1	2.7	8.5	0.7	3.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	7.1	15.1	1.8	3.1	2.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	70.8	10.2	23.4	8.2	36.6	33.2
LnGrp LOS	E	B	C	A	D	C
Approach Vol, veh/h		2031	2222		350	
Approach Delay, s/veh		12.7	21.7		36.1	
Approach LOS		B	C		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		70.0		20.0	9.5	60.5
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		66.0		16.0	6.0	56.0
Max Q Clear Time (g_c+I1), s		35.0		9.4	6.3	48.6
Green Ext Time (p_c), s		18.2		0.7	0.0	6.3

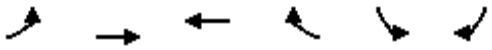
Intersection Summary						
HCM 6th Ctrl Delay			18.8			
HCM 6th LOS			B			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	126	1862	1894	245	310	92
Future Volume (veh/h)	126	1862	1894	245	310	92
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	131	1940	1973	255	323	96
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	154	2717	3355	1041	448	201
Arrive On Green	0.09	0.81	0.69	0.69	0.14	0.14
Sat Flow, veh/h	1701	3455	5036	1514	3300	1478
Grp Volume(v), veh/h	131	1940	1973	255	323	96
Grp Sat Flow(s),veh/h/ln	1701	1683	1625	1514	1650	1478
Q Serve(g_s), s	10.6	36.7	29.7	8.8	13.1	8.4
Cycle Q Clear(g_c), s	10.6	36.7	29.7	8.8	13.1	8.4
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	154	2717	3355	1041	448	201
V/C Ratio(X)	0.85	0.71	0.59	0.24	0.72	0.48
Avail Cap(c_a), veh/h	219	2717	3355	1041	448	201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.7	6.1	11.4	8.2	58.0	55.9
Incr Delay (d2), s/veh	19.3	1.6	0.8	0.6	9.7	8.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	8.6	9.2	2.6	6.1	7.4
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	82.0	7.8	12.2	8.8	67.6	63.9
LnGrp LOS	F	A	B	A	E	E
Approach Vol, veh/h		2071	2228		419	
Approach Delay, s/veh		12.5	11.8		66.8	
Approach LOS		B	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		117.0		23.0	16.7	100.3
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		113.0		19.0	18.0	91.0
Max Q Clear Time (g_c+I1), s		38.7		15.1	12.6	31.7
Green Ext Time (p_c), s		26.1		0.6	0.1	25.3

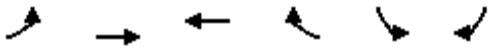
Intersection Summary	
HCM 6th Ctrl Delay	17.0
HCM 6th LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	2001	2027	256	307	52
Future Volume (veh/h)	86	2001	2027	256	307	52
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	90	2084	2111	267	320	54
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	113	2469	2112	942	587	263
Arrive On Green	0.07	0.73	0.62	0.62	0.18	0.18
Sat Flow, veh/h	1701	3455	3483	1514	3300	1478
Grp Volume(v), veh/h	90	2084	2111	267	320	54
Grp Sat Flow(s),veh/h/ln	1701	1683	1697	1514	1650	1478
Q Serve(g_s), s	4.7	39.0	56.0	7.3	7.9	2.8
Cycle Q Clear(g_c), s	4.7	39.0	56.0	7.3	7.9	2.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	113	2469	2112	942	587	263
V/C Ratio(X)	0.80	0.84	1.00	0.28	0.55	0.21
Avail Cap(c_a), veh/h	113	2469	2112	942	587	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.4	8.4	17.0	7.8	33.7	31.6
Incr Delay (d2), s/veh	31.2	3.7	19.5	0.8	3.6	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	8.5	20.9	2.0	3.4	2.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	72.6	12.1	36.5	8.5	37.3	33.3
LnGrp LOS	E	B	D	A	D	C
Approach Vol, veh/h		2174	2378		374	
Approach Delay, s/veh		14.7	33.3		36.7	
Approach LOS		B	C		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		70.0		20.0	10.0	60.0
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		66.0		16.0	6.0	56.0
Max Q Clear Time (g_c+I1), s		41.0		9.9	6.7	58.0
Green Ext Time (p_c), s		17.2		0.7	0.0	0.0

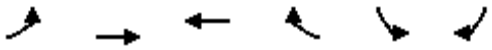
Intersection Summary		
HCM 6th Ctrl Delay		25.3
HCM 6th LOS		C



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	132	1993	2027	262	330	95
Future Volume (veh/h)	132	1993	2027	262	330	95
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	138	2076	2111	273	344	99
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	161	2717	3335	1035	448	201
Arrive On Green	0.09	0.81	0.68	0.68	0.14	0.14
Sat Flow, veh/h	1701	3455	5036	1514	3300	1478
Grp Volume(v), veh/h	138	2076	2111	273	344	99
Grp Sat Flow(s),veh/h/ln	1701	1683	1625	1514	1650	1478
Q Serve(g_s), s	11.2	43.4	33.8	9.7	14.1	8.7
Cycle Q Clear(g_c), s	11.2	43.4	33.8	9.7	14.1	8.7
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	161	2717	3335	1035	448	201
V/C Ratio(X)	0.86	0.76	0.63	0.26	0.77	0.49
Avail Cap(c_a), veh/h	219	2717	3335	1035	448	201
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.4	6.8	12.3	8.5	58.4	56.0
Incr Delay (d2), s/veh	21.2	2.1	0.9	0.6	11.9	8.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	10.2	10.6	2.9	6.6	7.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	83.7	8.9	13.3	9.2	70.3	64.5
LnGrp LOS	F	A	B	A	E	E
Approach Vol, veh/h		2214	2384		443	
Approach Delay, s/veh		13.6	12.8		69.0	
Approach LOS		B	B		E	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		117.0		23.0	17.3	99.7
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		113.0		19.0	18.0	91.0
Max Q Clear Time (g_c+I1), s		45.4		16.1	13.2	35.8
Green Ext Time (p_c), s		29.5		0.5	0.1	27.8

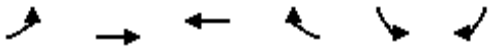
Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	114	2656	2690	340	407	69
Future Volume (veh/h)	114	2656	2690	340	407	69
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	120	2796	2832	358	428	73
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	113	2469	2111	942	587	263
Arrive On Green	0.07	0.73	0.62	0.62	0.18	0.18
Sat Flow, veh/h	1701	3455	3483	1514	3300	1478
Grp Volume(v), veh/h	120	2796	2832	358	428	73
Grp Sat Flow(s),veh/h/ln	1701	1683	1697	1514	1650	1478
Q Serve(g_s), s	6.0	66.0	56.0	10.5	11.0	3.8
Cycle Q Clear(g_c), s	6.0	66.0	56.0	10.5	11.0	3.8
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	113	2469	2111	942	587	263
V/C Ratio(X)	1.06	1.13	1.34	0.38	0.73	0.28
Avail Cap(c_a), veh/h	113	2469	2111	942	587	263
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	12.0	17.0	8.4	35.0	32.0
Incr Delay (d2), s/veh	101.0	65.3	156.9	1.2	7.8	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	34.7	61.2	2.9	4.9	3.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	143.0	77.3	173.9	9.6	42.7	34.6
LnGrp LOS	F	F	F	A	D	C
Approach Vol, veh/h		2916	3190		501	
Approach Delay, s/veh		80.0	155.4		41.6	
Approach LOS		F	F		D	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		70.0		20.0	10.0	60.0
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		66.0		16.0	6.0	56.0
Max Q Clear Time (g_c+I1), s		68.0		13.0	8.0	58.0
Green Ext Time (p_c), s		0.0		0.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	113.5
HCM 6th LOS	F



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	160	2648	2710	346	430	84
Future Volume (veh/h)	160	2648	2710	346	430	84
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No	No		No	
Adj Sat Flow, veh/h/ln	1786	1772	1786	1786	1786	1744
Adj Flow Rate, veh/h	168	2787	2853	364	453	88
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	1	1	1	4
Cap, veh/h	194	2693	3182	988	440	197
Arrive On Green	0.11	0.80	0.65	0.65	0.13	0.13
Sat Flow, veh/h	1701	3455	5036	1514	3300	1478
Grp Volume(v), veh/h	168	2787	2853	364	453	88
Grp Sat Flow(s),veh/h/ln	1701	1683	1625	1514	1650	1478
Q Serve(g_s), s	11.7	96.0	58.8	13.2	16.0	6.6
Cycle Q Clear(g_c), s	11.7	96.0	58.8	13.2	16.0	6.6
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	194	2693	3182	988	440	197
V/C Ratio(X)	0.87	1.03	0.90	0.37	1.03	0.45
Avail Cap(c_a), veh/h	227	2693	3182	988	440	197
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.3	12.0	17.5	9.5	52.0	47.9
Incr Delay (d2), s/veh	25.1	27.1	4.5	1.1	50.7	7.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	28.1	18.7	3.9	9.6	5.9
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	77.3	39.1	21.9	10.6	102.7	55.1
LnGrp LOS	E	F	C	B	F	E
Approach Vol, veh/h		2955	3217		541	
Approach Delay, s/veh		41.3	20.7		95.0	
Approach LOS		D	C		F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		100.0		20.0	17.7	82.3
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		96.0		16.0	16.0	76.0
Max Q Clear Time (g_c+I1), s		98.0		18.0	13.7	60.8
Green Ext Time (p_c), s		0.0		0.0	0.1	14.1

Intersection Summary	
HCM 6th Ctrl Delay	35.7
HCM 6th LOS	D

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	7-Apr-22	RDEV0000-0005	1 OF 2

E/W STREET : PALMDALE RD (HWY 18)
N/S STREET : PROJECT DRIVEWAY
CONDITION : AM PEAK HOUR

INTERSECTION : 2
PROJECTED GROWTH PER YEAR : 3.5%

CONDITION DIAGRAMS

PROJECT GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	1		3		5	7		9	11
PALMDALE RD (HWY 18)									
EB LEFT	0	0	0	0	0	0	0	0	0
EB THRU	1155	11	1166	81	1236	1247	404	1,640	1651
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0	0
WB THRU	1127	-6	1121	79	1206	1200	394	1,600	1594
WB RIGHT	0	18	18	0	0	18	0	0	18
PROJECT DRIVEWAY									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0	0
TOTALS	**2282**	**23**	**2305**	**160**	**2442**	**2465**	**798**	**3240**	**3263**

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	7-Apr-22	RDEV0000-0005	1 OF 2

E/W STREET : PALMDALE RD (HWY 18)
N/S STREET : PROJECT DRIVEWAY
CONDITION : PM PEAK HOUR

INTERSECTION : 2
PROJECTED GROWTH PER YEAR : 3.5%

TURN MOVEMENTS

Condition	Existing Condition	Phase I Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	2		4		6	8		10	12
PALMDALE RD (HWY 18)									
EB LEFT	0	0	0	0	0	0	0	0	0
EB THRU	2157	11	2168	151	2308	2319	755	3,063	3074
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0	0
WB THRU	2133	-6	2127	150	2283	2277	747	3,030	3024
WB RIGHT	0	18	18	0	0	18	0	0	18
PROJECT DRIVEWAY									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0	0
TOTALS	**4290**	**23**	**4313**	**301**	**4591**	**4614**	**1502**	**6093**	**6116**

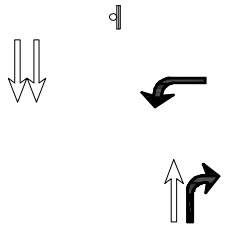
DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	21-Mar-22	RDEV0000-0005	1 OF 2

E/W STREET : PROJECT DRIVEWAY "B"
N/S STREET : CANTINA ST
CONDITION : AM PEAK HOUR

INTERSECTION : 3
PROJECTED GROWTH PER YEAR : 3.5%

CONDITION DIAGRAMS



PROJECT GEOMETRICS

TURN MOVEMENTS

Condition	Existing Condition	Phase I Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	1		3		5	7		9	11
PROJECT DRIVEWAY "B"									
EB LEFT	0	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	32	32	0	0	32	0	0	32
WB THRU	0	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0	0
CANTINA ST									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	144	0	144	10	154	154	50	204	204
NB RIGHT	0	40	40	0	0	40	0	0	40
SB LEFT	0	0	0	0	0	0	0	0	0
SB THRU	106	0	106	7	113	113	37	150	150
SB RIGHT	0	0	0	0	0	0	0	0	0
TOTALS	**250**	**72**	**322**	**17**	**267**	**339**	**87**	**354**	**426**

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	0	144	40	0	106
Future Vol, veh/h	32	0	144	40	0	106
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	0	167	47	0	123

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	229	167	0	0	-	-
Stage 1	167	-	-	-	-	-
Stage 2	62	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	749	877	-	-	0	-
Stage 1	862	-	-	-	0	-
Stage 2	954	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	749	877	-	-	-	-
Mov Cap-2 Maneuver	750	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	954	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	750	-
HCM Lane V/C Ratio	-	-	0.05	-
HCM Control Delay (s)	-	-	10.1	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	0	154	40	0	113
Future Vol, veh/h	32	0	154	40	0	113
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	37	0	179	47	0	131

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	245	179	0	0	-	-
Stage 1	179	-	-	-	-	-
Stage 2	66	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	733	863	-	-	0	-
Stage 1	851	-	-	-	0	-
Stage 2	949	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	733	863	-	-	-	-
Mov Cap-2 Maneuver	739	-	-	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	949	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	739	-
HCM Lane V/C Ratio	-	-	0.05	-
HCM Control Delay (s)	-	-	10.1	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	0	204	40	0	150
Future Vol, veh/h	32	0	204	40	0	150
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	34	0	215	42	0	158

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	294	215	0	0	-	-
Stage 1	215	-	-	-	-	-
Stage 2	79	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	685	824	-	-	0	-
Stage 1	820	-	-	-	0	-
Stage 2	935	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	685	824	-	-	-	-
Mov Cap-2 Maneuver	705	-	-	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	935	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	705	-
HCM Lane V/C Ratio	-	-	0.048	-
HCM Control Delay (s)	-	-	10.4	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.1	-

DAVID EVANS AND ASSOCIATES INC.

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENTS	TM	21-Mar-22	RDEV0000-0005	1 OF 2

E/W STREET : PROJECT DRIVEWAY "B"
N/S STREET : CANTINA ST
CONDITION : PM PEAK HOUR

INTERSECTION : 3
PROJECTED GROWTH PER YEAR : 3.5%

TURN MOVEMENTS

Condition	Existing Condition	Phase I Project Trips	Existing + Project Condition	Year 2024 Ambient Growth	Background Condition	Project Condition	Year 2034 Ambient Growth	Future Condition	Future + Project Condition
Scenario #	2		4		6	8		10	12
PROJECT DRIVEWAY "B"									
EB LEFT	0	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0	0
WB LEFT	0	38	38	0	0	38	0	0	38
WB THRU	0	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0	0
CANTINA ST									
NB LEFT	0	0	0	0	0	0	0	0	0
NB THRU	319	0	319	23	342	342	112	454	454
NB RIGHT	0	52	52	0	0	52	0	0	52
SB LEFT	0	0	0	0	0	0	0	0	0
SB THRU	336	0	336	23	359	359	117	476	476
SB RIGHT	0	0	0	0	0	0	0	0	0
TOTALS	**655**	**90**	**745**	**46**	**701**	**791**	**229**	**930**	**1020**

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	0	319	52	0	336
Future Vol, veh/h	38	0	319	52	0	336
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	0	332	54	0	350

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	507	332	0	0	-	-
Stage 1	332	-	-	-	-	-
Stage 2	175	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	510	709	-	-	0	-
Stage 1	726	-	-	-	0	-
Stage 2	838	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	510	709	-	-	-	-
Mov Cap-2 Maneuver	584	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	838	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	584	-
HCM Lane V/C Ratio	-	-	0.068	-
HCM Control Delay (s)	-	-	11.6	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	0	342	52	0	359
Future Vol, veh/h	38	0	342	52	0	359
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	0	356	54	0	374

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	543	356	0	0	-	-
Stage 1	356	-	-	-	-	-
Stage 2	187	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	485	687	-	-	0	-
Stage 1	708	-	-	-	0	-
Stage 2	827	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	485	687	-	-	-	-
Mov Cap-2 Maneuver	566	-	-	-	-	-
Stage 1	708	-	-	-	-	-
Stage 2	827	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	566	-
HCM Lane V/C Ratio	-	-	0.07	-
HCM Control Delay (s)	-	-	11.8	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.2	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	38	0	454	52	0	476
Future Vol, veh/h	38	0	454	52	0	476
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	130	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	40	0	478	55	0	501

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	729	478	0	0	-	-
Stage 1	478	-	-	-	-	-
Stage 2	251	-	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	-	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	-	-
Pot Cap-1 Maneuver	374	586	-	-	0	-
Stage 1	623	-	-	-	0	-
Stage 2	768	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	374	586	-	-	-	-
Mov Cap-2 Maneuver	481	-	-	-	-	-
Stage 1	623	-	-	-	-	-
Stage 2	768	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	481	-
HCM Lane V/C Ratio	-	-	0.083	-
HCM Control Delay (s)	-	-	13.2	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.3	-

DAVID EVANS
AND ASSOCIATES INC.

Appendix D: Queuing Analysis

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	95	138	114	176	140	84	37	15	58	34
Average Queue (ft)	66	97	64	135	99	35	18	5	39	22
95th Queue (ft)	107	149	121	197	162	87	44	22	69	46
Link Distance (ft)		729	729	314	314	314	314		237	237
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	119	113	86	181	144	61	43	35	78	37
Average Queue (ft)	79	82	56	132	97	30	19	10	51	25
95th Queue (ft)	133	135	104	192	160	85	54	44	92	45
Link Distance (ft)		729	729	314	314	314	314		237	237
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)								0	1	
Queuing Penalty (veh)								0	1	

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	116	204	180	281	263	176	44	20	76	50
Average Queue (ft)	82	143	119	223	189	107	27	6	45	31
95th Queue (ft)	133	211	194	307	284	204	52	31	81	58
Link Distance (ft)		729	729	314	314	314	314		237	237
Upstream Blk Time (%)				0	0					
Queuing Penalty (veh)				1	0					
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)								0	1	
Queuing Penalty (veh)								0	0	

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	102	292	257	286	264	197	77	80	141	61
Average Queue (ft)	69	228	193	250	214	137	48	39	100	37
95th Queue (ft)	125	328	306	329	316	232	88	100	150	71
Link Distance (ft)		729	729	315	315	315	315		238	238
Upstream Blk Time (%)				1	0					
Queuing Penalty (veh)				4	1					
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)								1	9	
Queuing Penalty (veh)								1	14	

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	160	213	181	286	239	174	86	183	225	64
Average Queue (ft)	111	140	108	236	189	120	51	144	189	40
95th Queue (ft)	180	248	216	314	268	198	109	204	254	76
Link Distance (ft)		729	729	315	315	315	315		238	238
Upstream Blk Time (%)				0					2	
Queuing Penalty (veh)				1					4	
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)								20	62	
Queuing Penalty (veh)								33	102	

Intersection: 1: Palmdale Rd (SR 18) & Cantina St

Movement	EB	EB	EB	WB	WB	WB	WB	SB	SB	SB
Directions Served	L	T	T	T	T	T	R	L	L	R
Maximum Queue (ft)	277	478	466	326	321	264	88	190	247	104
Average Queue (ft)	170	367	359	288	265	198	53	174	229	56
95th Queue (ft)	449	661	668	362	359	306	104	215	272	118
Link Distance (ft)		729	729	315	315	315	315		238	238
Upstream Blk Time (%)	0	3	3	4	2	0			16	0
Queuing Penalty (veh)	0	0	0	28	12	1			43	1
Storage Bay Dist (ft)	675							90		
Storage Blk Time (%)		3						47	76	
Queuing Penalty (veh)		5						100	164	