ACTON TACO BELL PROJECT
TRAFFIC IMPACT ANALYSIS
COUNTY OF LOS ANGELES, CALIFORNIA

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1.0 INTRODUCTION

The purpose of this traffic impact analysis (TIA) is to evaluate the potential traffic impacts of the proposed Acton Taco Bell project, and recommend improvements to mitigate identified significant transportation impacts (if any). The site is located north of Sierra Highway and east of Crown Valley Road in the unincorporated community of Acton (Los Angeles County).

The TIA study objectives for the following analysis scenarios include:

EXISTING TRAFFIC CONDITIONS

Traffic conditions in the vicinity of the project as they exist at the time the notice of preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced

EXISTING PLUS PROJECT TRAFFIC CONDITIONS

Traffic generated by the proposed project has been added to the Existing (2014) traffic conditions. Mitigation measures will be provided (if necessary).

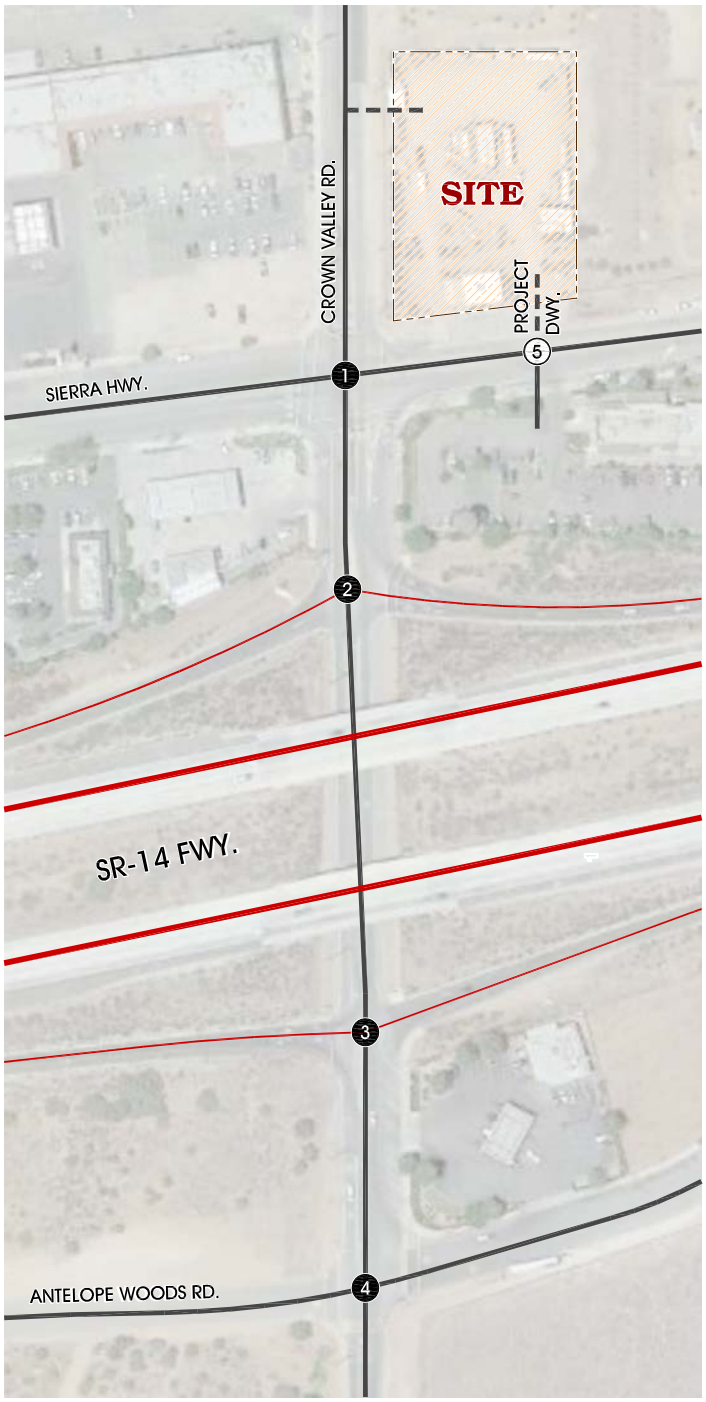
CUMULATIVE TRAFFIC CONDITIONS

Traffic generated from related projects in the study area is added to the Existing Plus Ambient Plus Project traffic conditions. This scenario is used in determining project's cumulative significant transportation impacts and mitigations.

1.1 SITE LOCATION AND STUDY AREA

The project site is located north of Sierra Highway and east of Crown Valley Road in the unincorporated community of Acton (Los Angeles County). Figure 1-A illustrates the traffic analysis study area. Pursuant to the attached scoping agreement (see Appendix "A") and discussions with County of Los Angeles staff, the study area include the following intersections:

FIGURE 1-A
STUDY AREA



LEGEND:

- ❹ = EXISTING INTERSECTION ANALYSIS LOCATION
- ② = FUTURE INTERSECTION ANALYSIS LOCATION
- = PROJECT DRIVEWAY

N

STUDY AREA INTERSECTIONS
1. Crown Valley Rd./Sierra Hwy.
2. Crown Valley Rd./SR-14 WB Ramps
3. Crown Valley Rd./SR-14 EB Ramps
4. Crown Valley Rd./Antelope Woods Rd.
5. Sierra Hwy./ Project Driveway

1.2 PROPOSED PROJECT DEVELOPMENT

The project site is proposed to be developed with a 2,029 sf Fast Food Restaurant with a Drive-Thru. It is anticipated that the project will be built by 2015.

Figure 1-B illustrates the preliminary site plan. A full- access driveway along Crown Valley Road and Sierra Highway is planned for the development.

1.3 FUTURE TRAFFIC VOLUMES

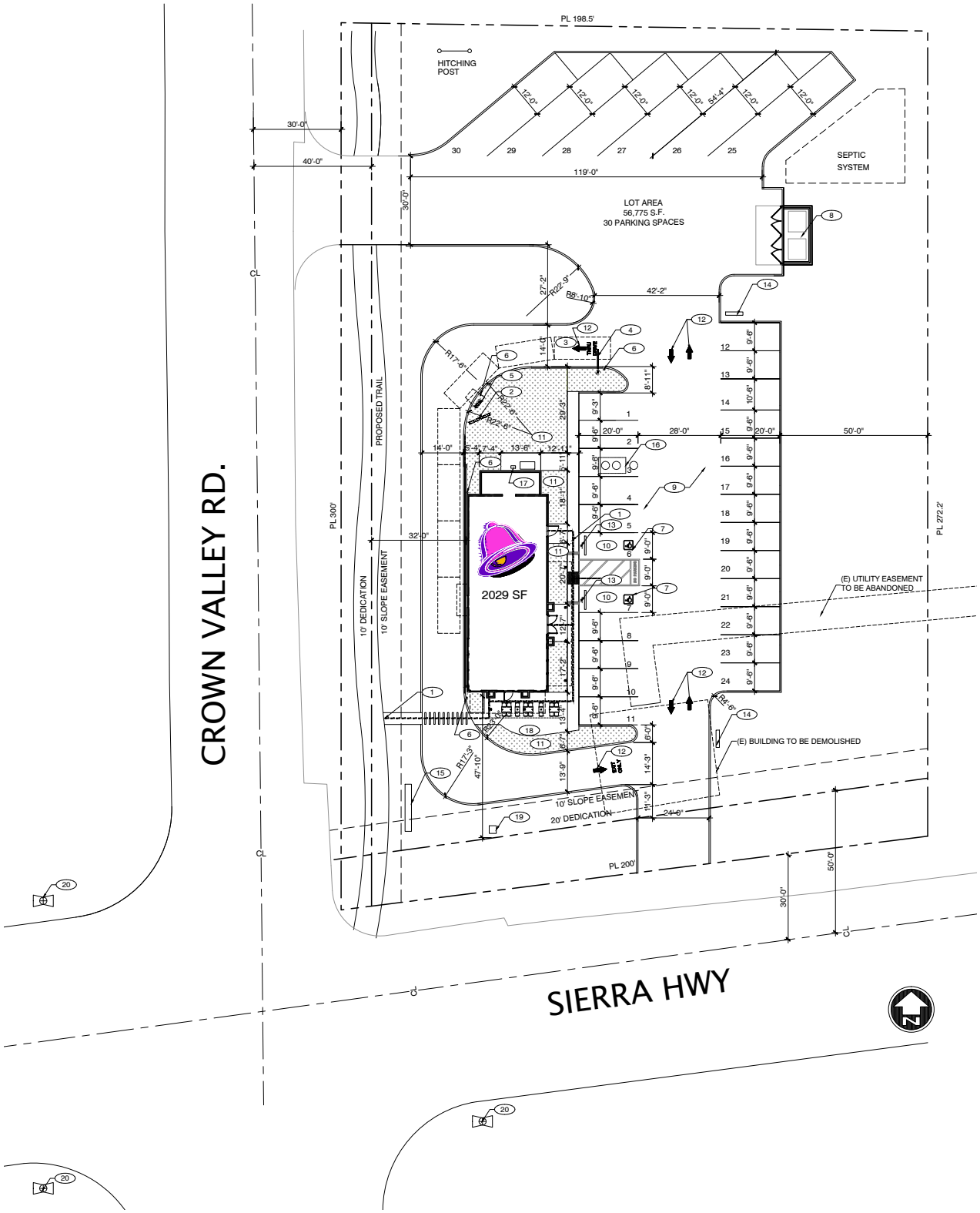
The opening year for the proposed project is anticipated to be year 2015. To account for ambient traffic volumes that may be added to the roadway system, a 2% annual growth rate for two years has been applied to the existing traffic volumes to reflect year 2015 conditions. Related projects provided by the County of Los Angeles have been added to the existing plus ambient growth to reflect future (2015) conditions (total buildout of the project).

1.4 ANALYSIS METHODOLOGY

1.4.1 INTERSECTION OPERATIONS ANALYSIS

The Intersection Capacity Utilization (ICU) methodology is utilized for all study area intersections. To calculate an ICU, the volume of traffic using the intersection is compared with the capacity of the intersection. ICU is usually expressed as a volume to capacity (V/C) ratio. The V/C represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. The ICU analysis has been performed using the Traffic 8.0 R1 software.

FIGURE 1-B
SITE PLAN



The relationship between Level of Service (LOS) and the overall intersection V/C ratio is indicated below.

LEVEL OF SERVICE	CRITICAL VOLUME-TO-CAPACITY (V/C) RATIO
A	0.0 – 0.60
B	0.61 – 0.70
C	0.71 – 0.80
D	0.81 – 0.90
E	0.91 – 1.00
F	>1.00

It should be noted that the study intersections at the SR-14 Freeway Ramps are within Caltrans jurisdiction and have been analyzed using both the ICU and HCM methodology. The HCM defines level of service as a qualitative measure, which describes operational conditions within a traffic stream, generally in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate Level of Service (LOS) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The HCM analysis has been performed using the Traffic 8.0 R1 software.

The study area intersections which are stop sign controlled with stop control on the minor street only have been analyzed using the unsignalized intersection methodology of the HCM. For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. Using data collected describing the intersection configuration and traffic volumes at the study area locations; the level of service has been calculated. The level of service criteria for this type of intersection analysis is based on average total delay per vehicle for the worst minor street movement(s).

The levels of service are defined for the unsignalized methodology as follows:

LEVEL OF SERVICE	AVERAGE TOTAL DELAY PER VEHICLE (SECONDS)
	UNSIGNALIZED
A	0 to 10.00
B	10.01 to 15.00
C	15.01 to 25.00
D	25.01 to 35.00
E	35.01 to 50.00
F	50.01 and up

1.4.2 BACKGROUND GROWTH

Ambient Growth

To account for ambient growth on roadways, future traffic volumes have been calculated based on a 2.0 percent growth rate of existing traffic volumes over a one year period (2015). The ambient growth rate has been developed in consultation with County of Los Angeles during the traffic study scoping process.

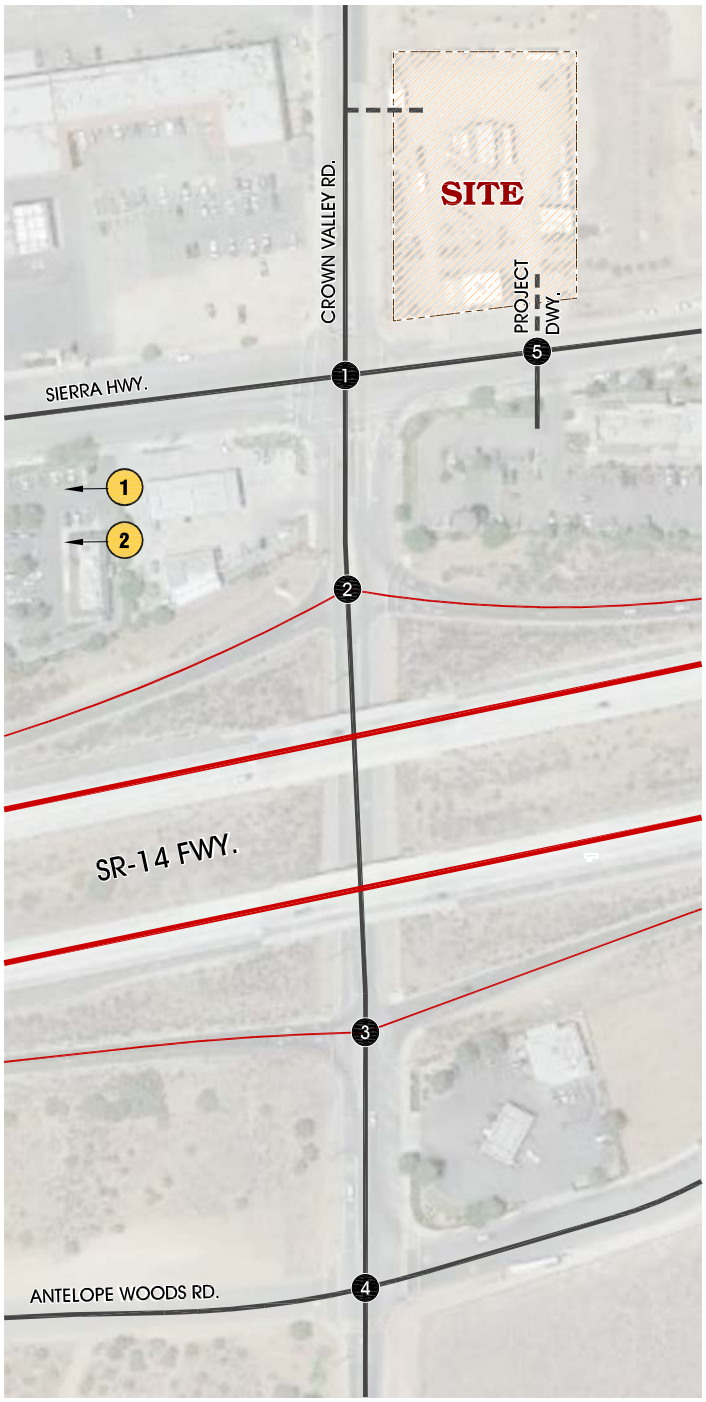
Cumulative Project

A list of cumulative projects that could potentially add traffic to the study area intersections were supplied by the County of Los Angeles. These include the following projects:

- Primo Burger (3,300 sf)
- Acton Feed Store (6,000 sf)

Figure 1-C illustrates the location of the cumulative projects within the study area. The peak hour trip generation rates and summary for the cumulative projects is presented in Table 1-1 and Table 1-2, respectively. The cumulative projects are projected to generate a total of approximately 2,564 trip-ends per day with 162 vehicles per hour during the AM peak hour and 188 vehicles per hour during the PM peak hour.

FIGURE 1-C
CUMULATIVE DEVELOPMENTS LOCATION MAP



LEGEND:

- 4 = INTERSECTION ID
- = PROJECT DRIVEWAY
- 2 = CUMULATIVE DEVELOPMENT TAZ ID (SEE CUMULATIVE DEVELOPMENT LIST TABLE FOR REFERENCE)

N

TABLE 1-1

CUMULATIVE TRIP GENERATION RATES[1]

LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR TRIP RATES						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
Fast Food w/ Drive Thru	934	3.3	TSF	23.16	22.26	45.42	16.98	15.67	32.65	496.12
Shopping Center	820	6.0	TSF	2.90	1.77	4.67	7.28	7.88	15.16	181.80

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 9th Edition, 2012.

[2] TSF = Thousand Square Feet

TABLE 1-2

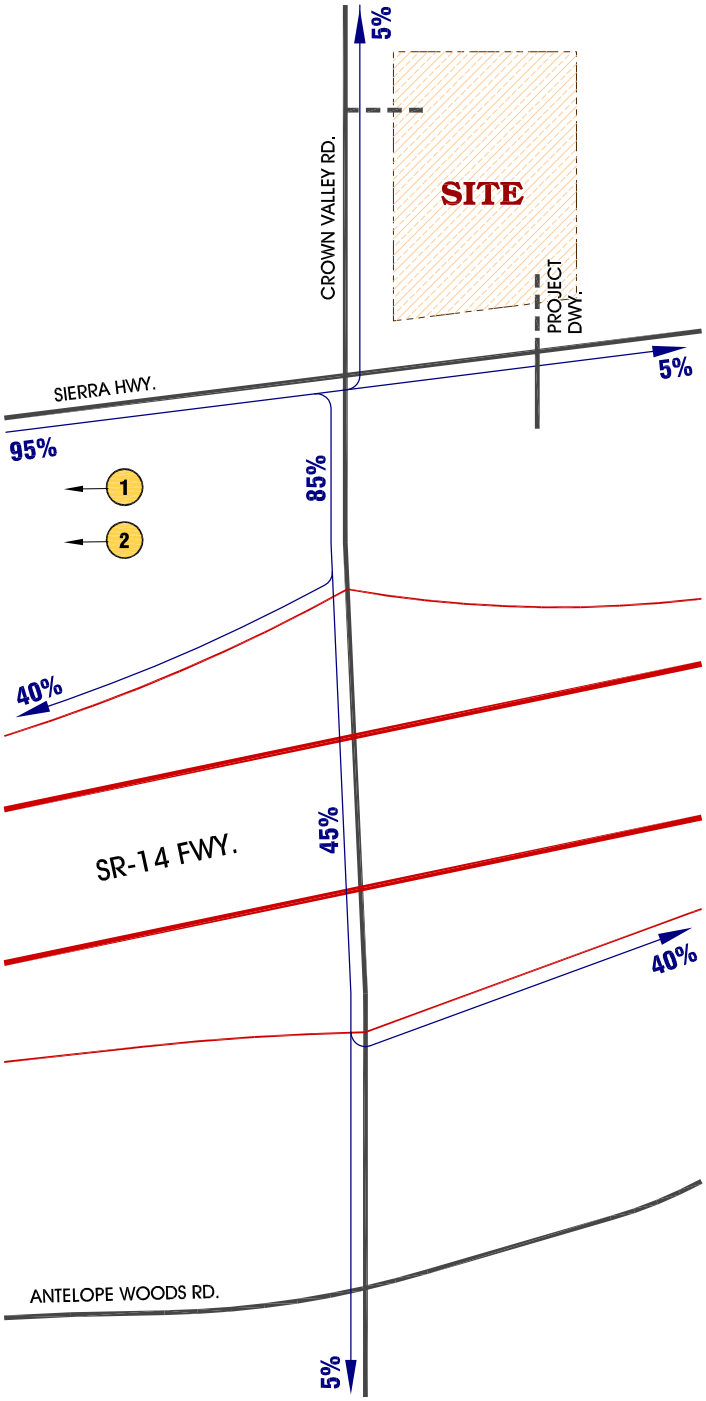
CUMULATIVE TRIP GENERATION SUMMARY

ID	PROJECT NAME	LAND USE	QUANTITY[1]		PEAK HOUR						DAILY
					AM			PM			
					IN	OUT	TOTAL	IN	OUT	TOTAL	
1	Primo Burgers	Fast Food w/ Drive Thru	3.3	TSF	76	73	149	56	52	108	1,637
	-Pass By Reduction (10%)				-8	-7	-15	-6	-5	-11	-164
2	Retail	Shopping Center	6.0	TSF	17	11	28	44	47	91	1,091
TOTAL CUMULATIVE TRIPS					85	77	162	94	94	188	2,564

[1] TSF = Thousand Square Feet

The trip distributions for the cumulative projects are graphically depicted on Figure 1-D". The AM and PM peak hour volumes and daily traffic volumes of the above mentioned cumulative projects are illustrated in Figure 1-E, Figure 1-F, and Figure 1-G, respectively.

FIGURE 1-D
CUMULATIVE DEVELOPMENTS TRIP DISTRIBUTION



LEGEND:

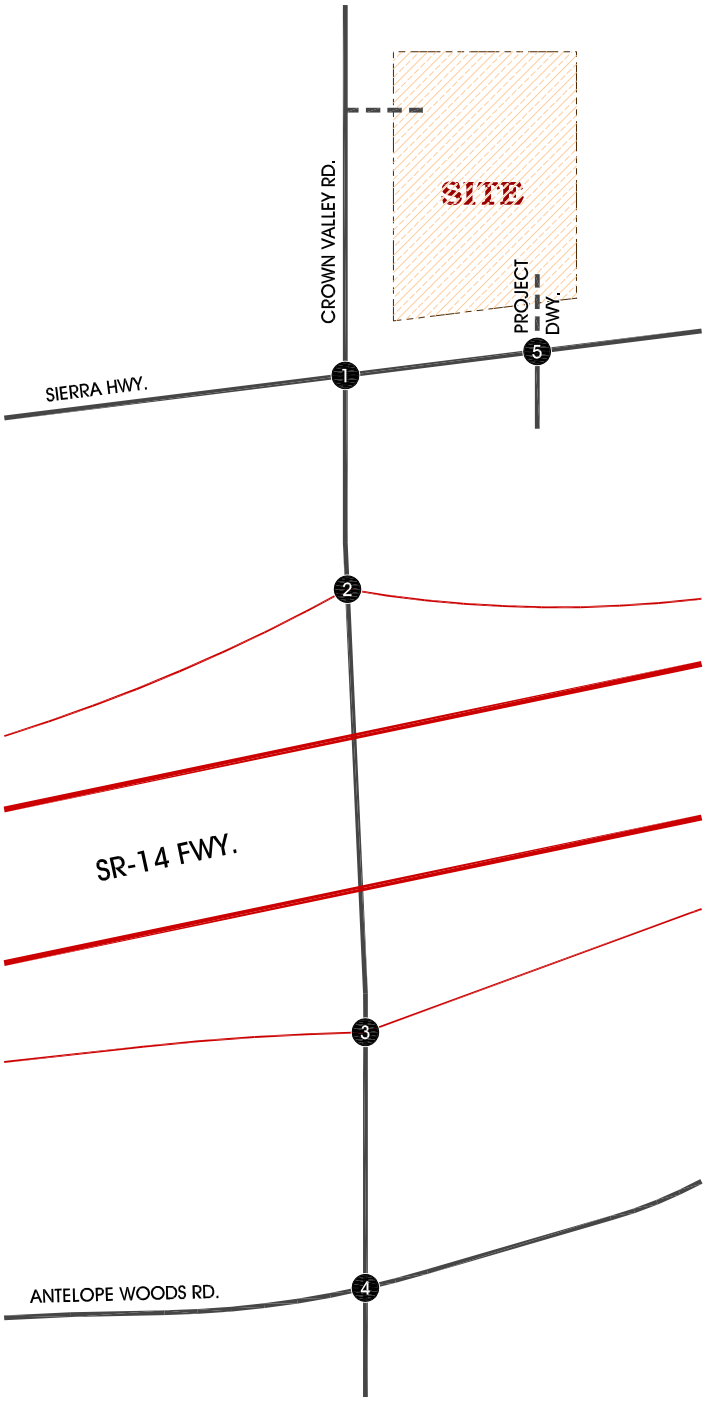
10% = PERCENT TO/FROM PROJECT

= FUTURE ROADWAY / PROJECT DRIVEWAY

(#) = CUMULATIVE DEVELOPMENT TAZ ID
(SEE CUMULATIVE DEVELOPMENT LIST TABLE FOR REFERENCE)

N

FIGURE 1-E
CUMULATIVE DEVELOPMENT PROJECTS ONLY AM PEAK HOUR INTERSECTION VOLUMES



1. Crown Valley Rd. / Sierra Hwy.		5. Project Dwy. / Sierra Hwy.	
4 0 0	0 4 0		4 0
4 4 65	72 0 0	4 0	0 0

2. Crown Valley Rd. / SR-14 WB Ramps	
31 35	34 0 0
	0 38

3. Crown Valley Rd. / SR-14 EB Ramps	
4 31	
34 0 0	4 0

4. Crown Valley Rd. / Antelope Woods Rd.	
0 4 0	0 0 0
0 0 0	0 4 0

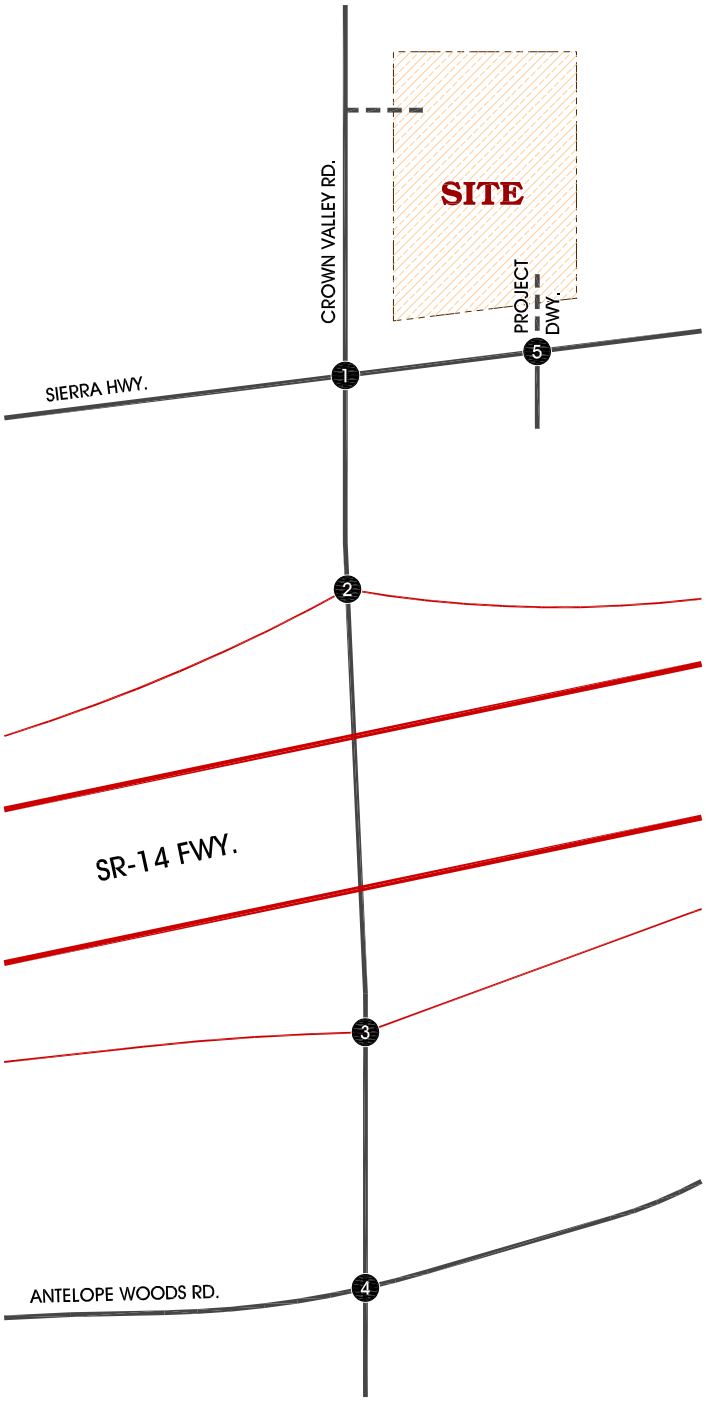
LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

N

FIGURE 1-F
CUMULATIVE DEVELOPMENT PROJECTS ONLY PM PEAK HOUR INTERSECTION VOLUMES



1. Crown Valley Rd. / Sierra Hwy.		5. Project Dwy. / Sierra Hwy.	
5 0 0	0 5 0		5 0
5 5 80	80 0 0	5 0	0 0
2. Crown Valley Rd. / SR-14 WB Ramps			
38 42	38 0 0		
	0 42		
3. Crown Valley Rd. / SR-14 EB Ramps			
5 38			
38 0 0	5 0		
4. Crown Valley Rd. / Antelope Woods Rd.			
0 5 0	0 0 0		
0 0 0	0 5 0		

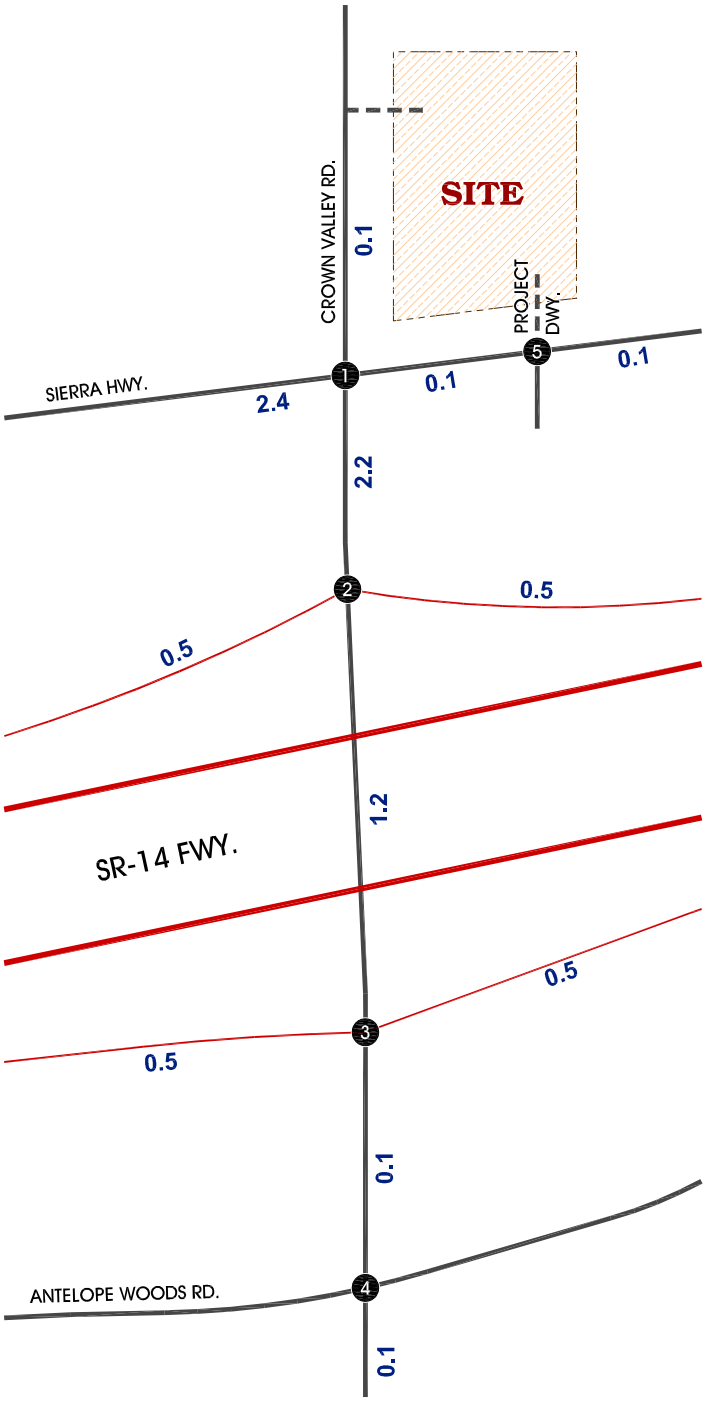
LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

N

FIGURE 1-G
CUMULATIVE DEVELOPMENT PROJECTS ONLY
AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

1.0 = VEHICLES PER DAY (1000's)

N

2.0 EXISTING (2014) CONDITIONS

This section of the report summarizes existing roadway and traffic conditions in the study area. The number of through travel lanes for existing roadways and intersection controls are presented, along with existing traffic operations in the study area.

2.1 STUDY AREA STREET SYSTEM

Figure 2-A identifies the existing roadway conditions for the study area roadways. The existing intersection traffic controls and geometrics are identified. The project will have direct access to both Sierra Highway and Crown Valley Road.

Sierra Highway – This roadway is currently one lane in each direction and parallels SR-14 in the vicinity of the project site. The speed limit in the vicinity of the site is 45 miles per hour. A two way left turn lane is currently provided adjacent to the project's proposed driveway location. On-street parking is currently allowed on the south side of Sierra Highway.

Crown Valley Road – This roadway is consists of one lane in each direction with a 45 mile per hour speed limit. Intersections along this roadway are stopped controlled in the vicinity of the project site. On-street parking is currently allowed on the west side of Crown Valley Road.

Figure 2-B illustrates the County of Los Angeles General Plan Proposed Arterial Highway Plan.

2.2 EXISTING (2014) TRAFFIC VOLUMES

Existing intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts made for Trames Solutions, Inc. in November 2014. Existing AM and PM peak hour intersection turning movements are shown on Figure 2-C and 2-D, respectively.

FIGURE 2-A

EXISTING TRAFFIC CONTROLS AND INTERSECTION GEOMETRICS

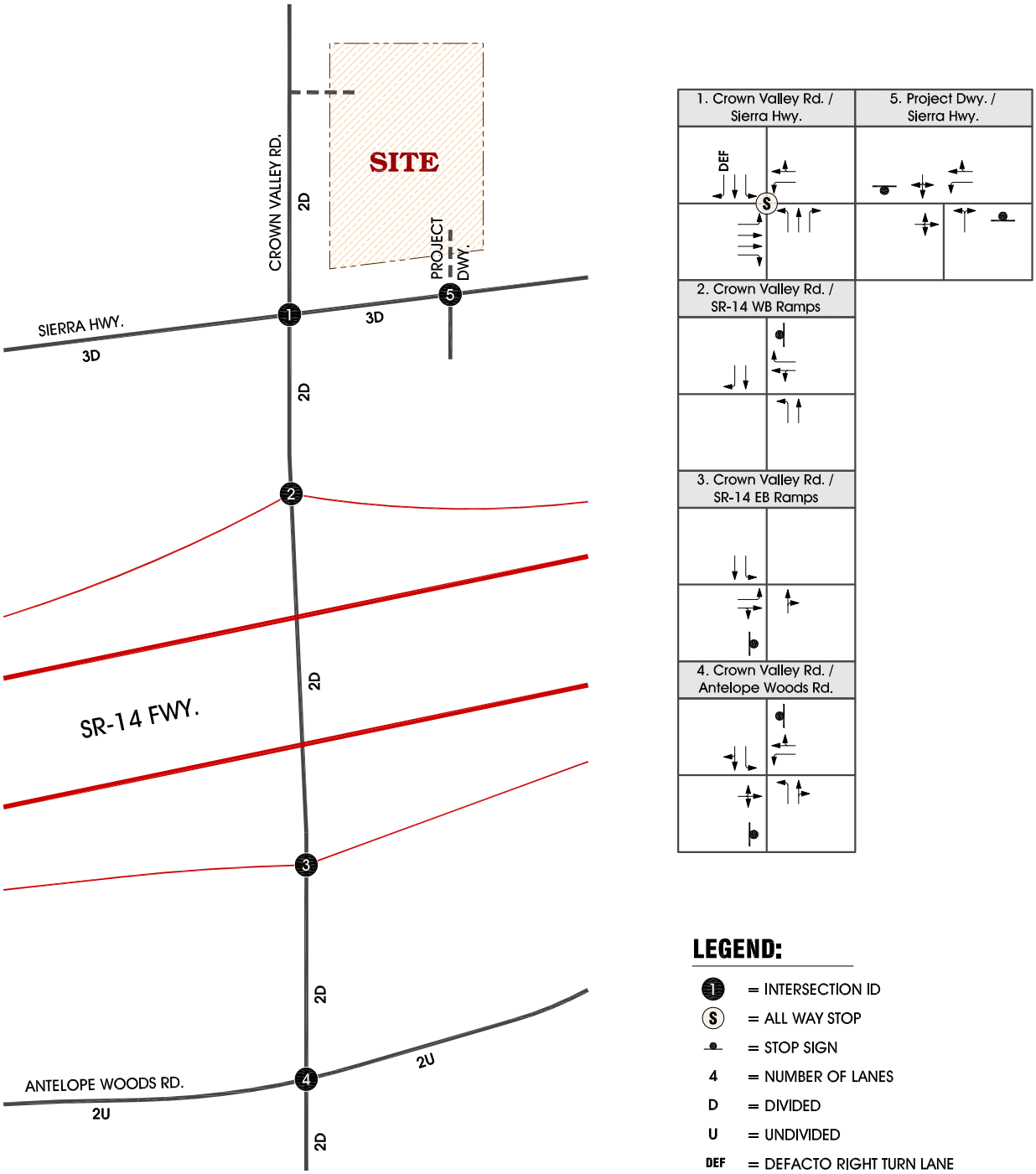
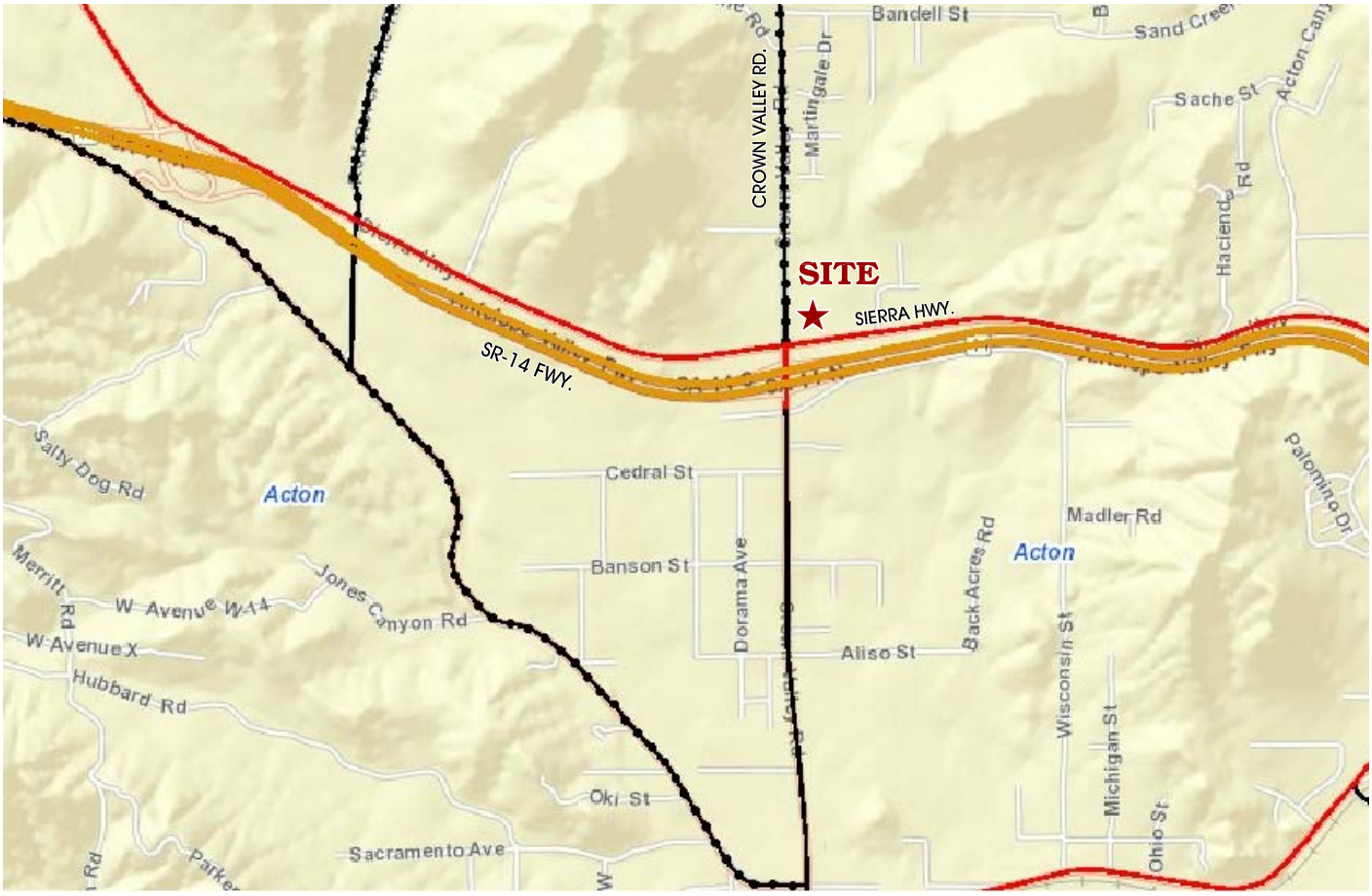


FIGURE 2-B

COUNTY OF LOS ANGELES GENERAL PLAN PROPOSED ARTERIAL HIGHWAY PLAN



LEGEND:

- MAJOR HIGHWAY - EXISTING
- MAJOR HIGHWAY - PROPOSED
- SECONDARY HIGHWAY - EXISTING
- SECONDARY HIGHWAY - PROPOSED
- LIMITED SECONDARY HIGHWAY - EXISTING
- LIMITED SECONDARY HIGHWAY - PROPOSED
- EXPRESSWAY - EXISTING
- EXPRESSWAY - PROPOSED
- PARKWAY - EXISTING
- PARKWAY - PROPOSED
- FREEWAY - EXISTING
- FREEWAY - PROPOSED

N

FIGURE 2-C

EXISTING (2014) AM PEAK HOUR INTERSECTION VOLUMES

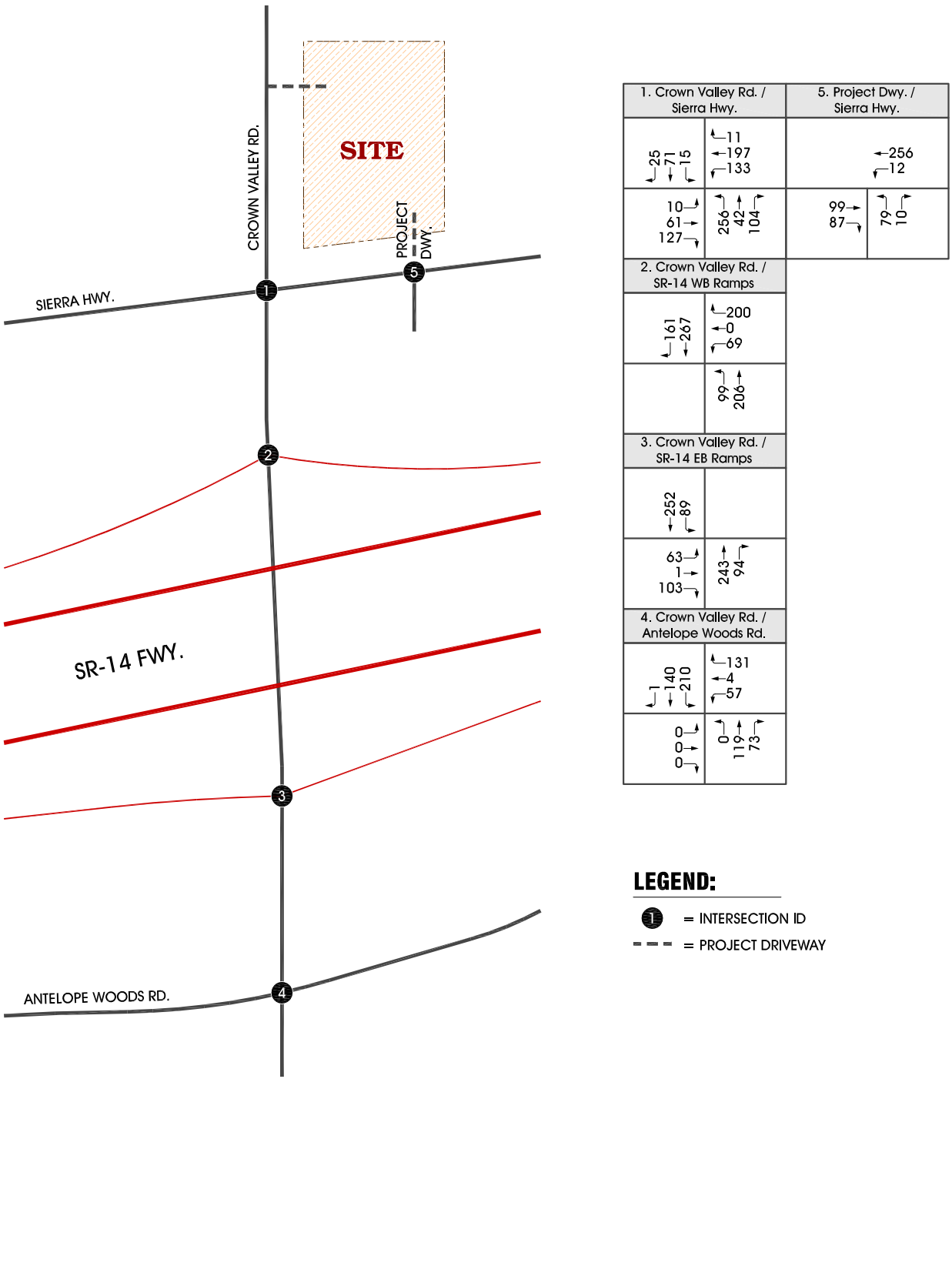
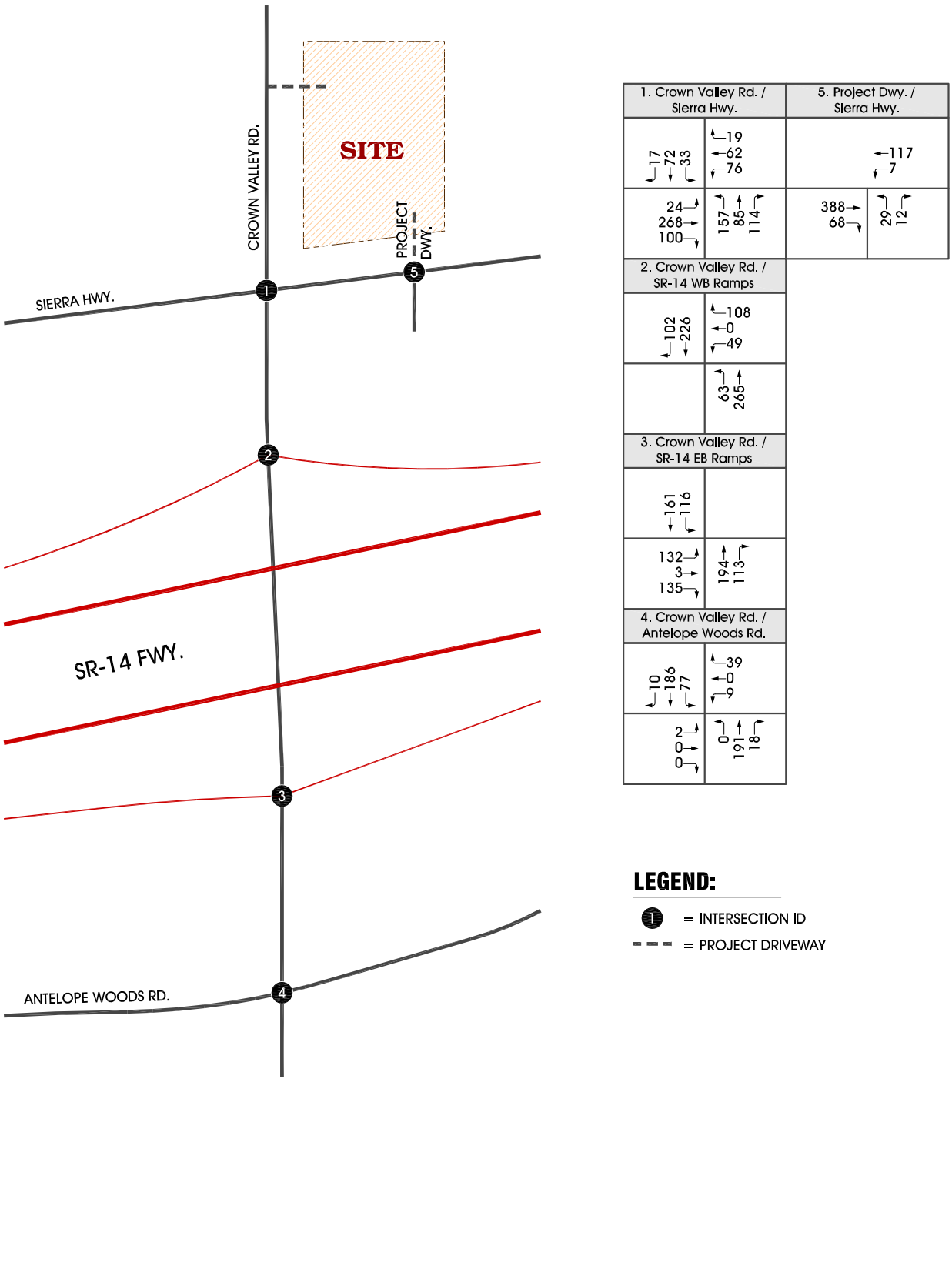


FIGURE 2-D

EXISTING (2014) PM PEAK HOUR INTERSECTION VOLUMES



Daily traffic counts were made for Trames Solutions, Inc. in November 2014. For roadway segments where data count is not available, the following formula is used to estimate the ADT volumes shown on Figure 2-E:

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

The traffic count worksheets are included in Appendix "B".

For the purpose of this report, weekday AM (7:00 to 9:00 AM) and PM (4:00 to 6:00 PM) peak periods are collected. The peak-hour is the highest one-hour period in the AM peak period, as determined by four consecutive 15-minute count periods are used in the analysis calculations. Variations in peak-hour volumes can affect Level of Service (LOS) calculations because they vary from day-to-day. To minimize these variations, no traffic counts are taken on Mondays, Fridays, holidays or weekends.

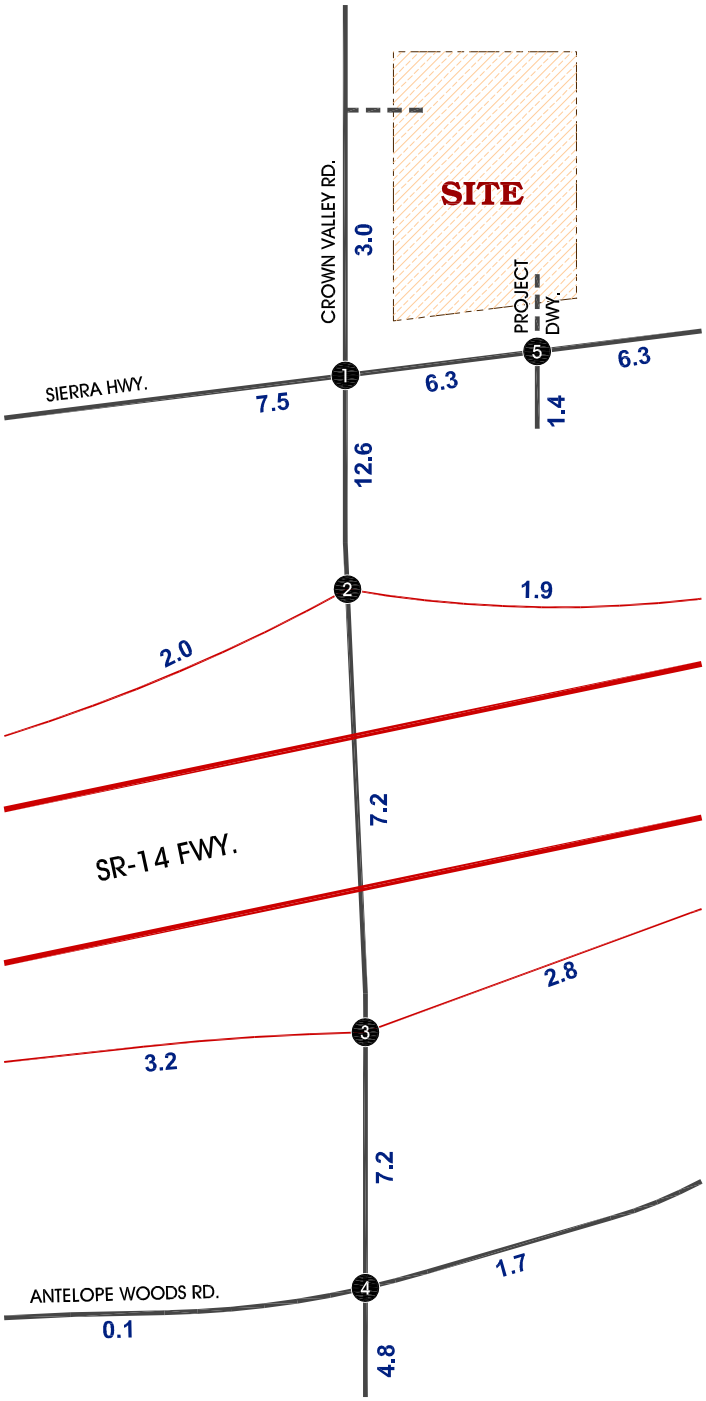
2.3 EXISTING (2014) INTERSECTION OPERATIONS ANALYSIS

Intersection levels of service for Existing (2014) traffic conditions are shown in Table 2-1. Table 2-1 shows the HCM calculations based on the current geometrics at the study area intersections. The operation analysis worksheets for the Existing (2014) traffic conditions are provided in Appendix “C”.

For Existing (2014) traffic conditions, the study area intersections are currently operating at acceptable levels of service during the peak hours with existing geometry.

FIGURE 2-E

EXISTING (2014) AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- ❶ = INTERSECTION ID
- = PROJECT DRIVEWAY
- 1.0 = VEHICLES PER DAY (1000's)

N

TABLE 2-1

INTERSECTION ANALYSIS FOR EXISTING (2014) CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes[2]												ICU [3] (secs.)		Level of Service		Delay [4] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound										
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	AM	PM	AM	PM
1	Crown Valley Rd./Sierra Hwy.	AWS	1	1	1	1	1	d	1	2	d	1	1	0	0.47	0.37	A	A	n/a[5]	n/a	n/a	n/a
2	Crown Valley Rd./SR-14 WB Ramps	CSS	1	1	0	0	1	1	0	0	0	0	1	1	0.454	0.35	A	A	17.5	15.0	C	B
3	Crown Valley Rd./SR-14 EB Ramps	CSS	0	1	0	1	1	0	1	1	0	0	0	0	0.43	0.45	A	A	12.7	13.9	B	B
4	Crown Valley Rd./Antelope Woods Rd.	CSS	1	1	0	1	0	1	0	1	0	0	1	d	0.43	0.30	A	A	n/a	n/a	n/a	n/a
5	Project Driveway/Sierra Hwy.	CSS	0	1	0	0	0	0	0	1	0	0	1	0	0.32	0.42	A	A	n/a	n/a	n/a	n/a

[1] AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; d =Defacto Right Turn Lane

[3] ICU = Intersection Capacity Utilization - Methodology required by Los Angeles County

[4] Delay = Highway Capacity Methodology (HCM) required by Caltrans

[5] n/a = Not Applicable

3.0 PROJECT DEVELOPMENT

This section describes the project land uses and traffic characteristics. The vehicular traffic due to the project will be quantified and form the basis in developing site-specific traffic circulation recommendations.

3.1 PROJECT DESCRIPTION

The project is proposed to be developed with a 2,029 sf Fast Food Restaurant with a Drive-Thru. A full- access driveway along Crown Valley Road and Sierra Highway is planned for the development. For the purpose of this TIA, the project is assumed to be built and fully operational by 2015.

3.2 PROJECT TRAFFIC

The traffic related to the project has been calculated in accordance with the following accepted procedural steps:

- Trip Generation
- Trip Distribution
- Traffic Assignment

These steps are described in detail below.

3.2.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic which is attracted and produced by a development. The traffic generation for this project is based upon the specific land use planned for this development.

Table 3-1 presents the rate which has been based on the 9th edition of the ITE Trip Generation manual.

Daily and peak hour trip generations for the proposed project are shown in Table 3-2. As illustrated in Table 3-2, the proposed project is anticipated to generate approximately 906 net trip ends per day, with 83 vehicles per hour during the AM peak hour and 59 vehicles per hour during the PM peak hour. It should be noted

TABLE 3-1

PROJECT TRIP GENERATION RATES[1]

LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR TRIP RATES						DAILY
				AM			PM			
				IN	OUT	TOTAL	IN	OUT	TOTAL	
Fast Food w/ Drive Thru	934	2.029	TSF	23.16	22.26	45.42	16.98	15.67	32.65	496.12

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 9th Edition, 2012.

[2] TSF = Thousand Square Feet

TABLE 3-2

PROJECT TRIP GENERATION SUMMARY

LAND USE	QUANTITY	UNITS[1]	PEAK HOUR						DAILY
			AM			PM			
			IN	OUT	TOTAL	IN	OUT	TOTAL	
Fast Food w/ Drive Thru	2.029	TSF	47	45	92	34	32	66	1,007
- Pass By Reduction (10%)			-5	-5	-9	-3	-3	-7	-101
TOTAL			**42**	**40**	**83**	**31**	**29**	**59**	**906**

[1] TSF = Thousand Square Feet

that a portion of the trips are anticipated to consist of pass-by traffic. Pass-by trips are not new trips but those that are already on the roadway system but are anticipated to "pass-by" the project on their way to a primary destination.

The ITE Manual indicates that up to 50% of fast food trips are comprised of pass-by trips, respectively. However, for the purposes of this study, a lower reduction (10%) in trips has been utilized to ensure a conservatively high estimate of project traffic.

3.2.2 Project Trip Distribution

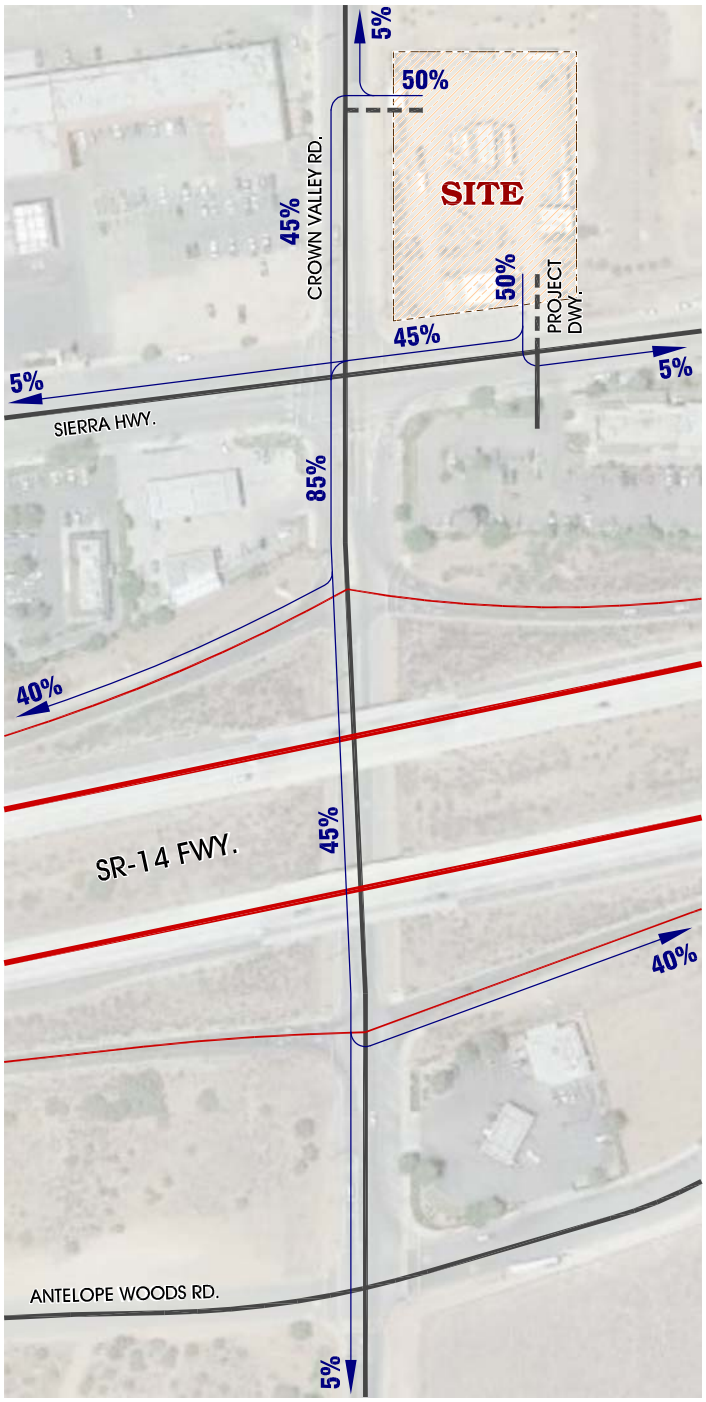
The trip distribution and assignment process represents the directional orientation of traffic to and from the project site. Trip distribution is heavily influenced by the geographical location of the site, the location of commercial and recreational opportunities and the proximity to the major roadways serving the site.

The directional orientation of traffic was determined by evaluating existing and proposed land uses and highways within the community. The project traffic distribution is shown on Figure 3-A.

3.2.3 Project Trip Assignment

The assignment of traffic from the site to the adjoining roadway system has been based upon the site's trip generation, trip distributions, and proposed street systems, which would be in place by the time of initial occupancy of the site. Based on the identified project traffic generation and distribution, Project AM and PM peak hour intersection turning movement volumes and Project Average Daily Traffic (ADT), volumes are shown on Figure 3-B, 3-C and 3-D, respectively.

FIGURE 3-A
PROJECT TRIP DISTRIBUTION



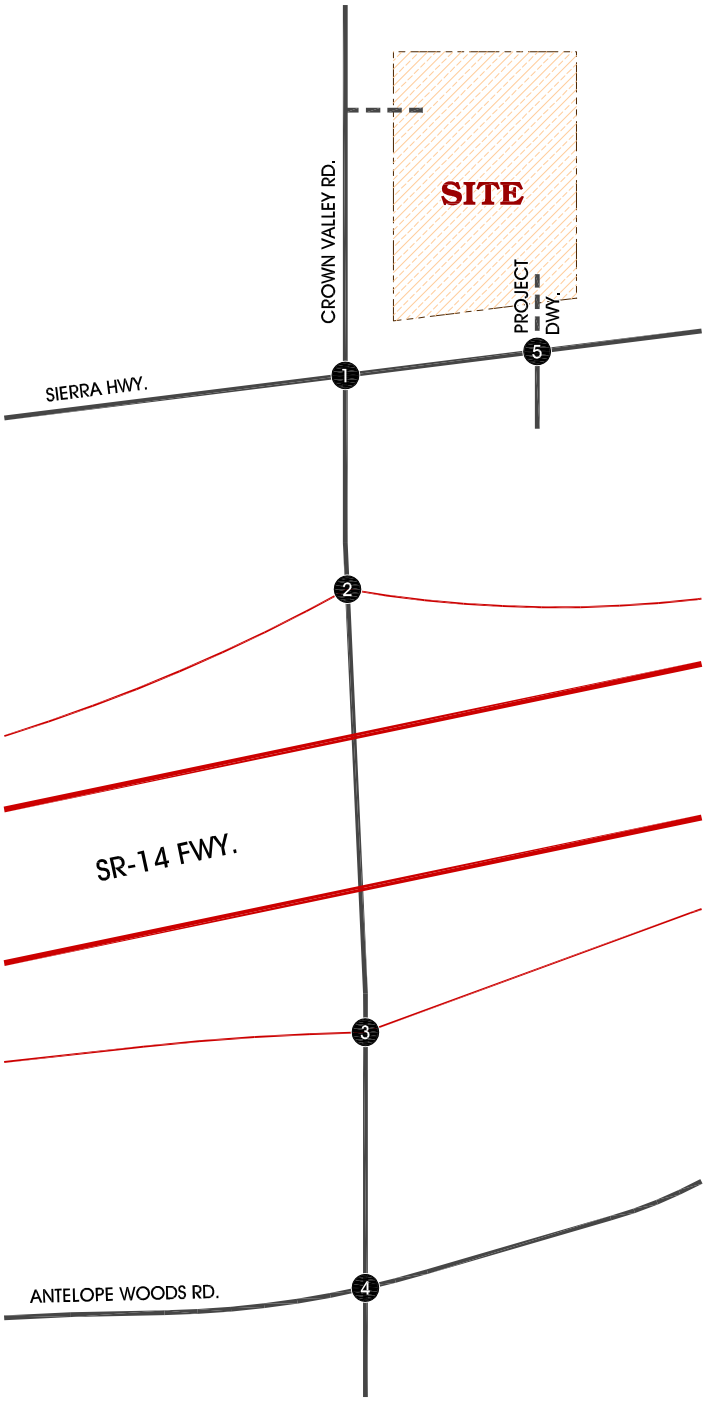
LEGEND:

10% = PERCENT TO/FROM PROJECT

= FUTURE ROADWAY / PROJECT DRIVEWAY

N

FIGURE 3-B
PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES



1. Crown Valley Rd. / Sierra Hwy.	
↓0 ↓2 ↓0	←0 ←2 ↰32
↱0 →2 ↳0	↰0 ↑2 ↱34

5. Project Dwy. / Sierra Hwy.	
↓34 ↓0 ↓2	←2 ←0 ↰0
↱36 →0 ↳0	↰0 ↑0 ↱0

2. Crown Valley Rd. / SR-14 WB Ramps	
↓16 ↓18	↰17 ←0 ↰0
	↰0 ↑19

3. Crown Valley Rd. / SR-14 EB Ramps	
↓2 ↓16	
↱17 →0 ↳0	↑2 ↱0

4. Crown Valley Rd. / Antelope Woods Rd.	
↓0 ↓2 ↓0	↰0 ←0 ↰0
↱0 →0 ↳0	↰0 ↑2 ↱0

LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

N

FIGURE 3-C

PROJECT ONLY PM PEAK HOUR INTERSECTION VOLUMES

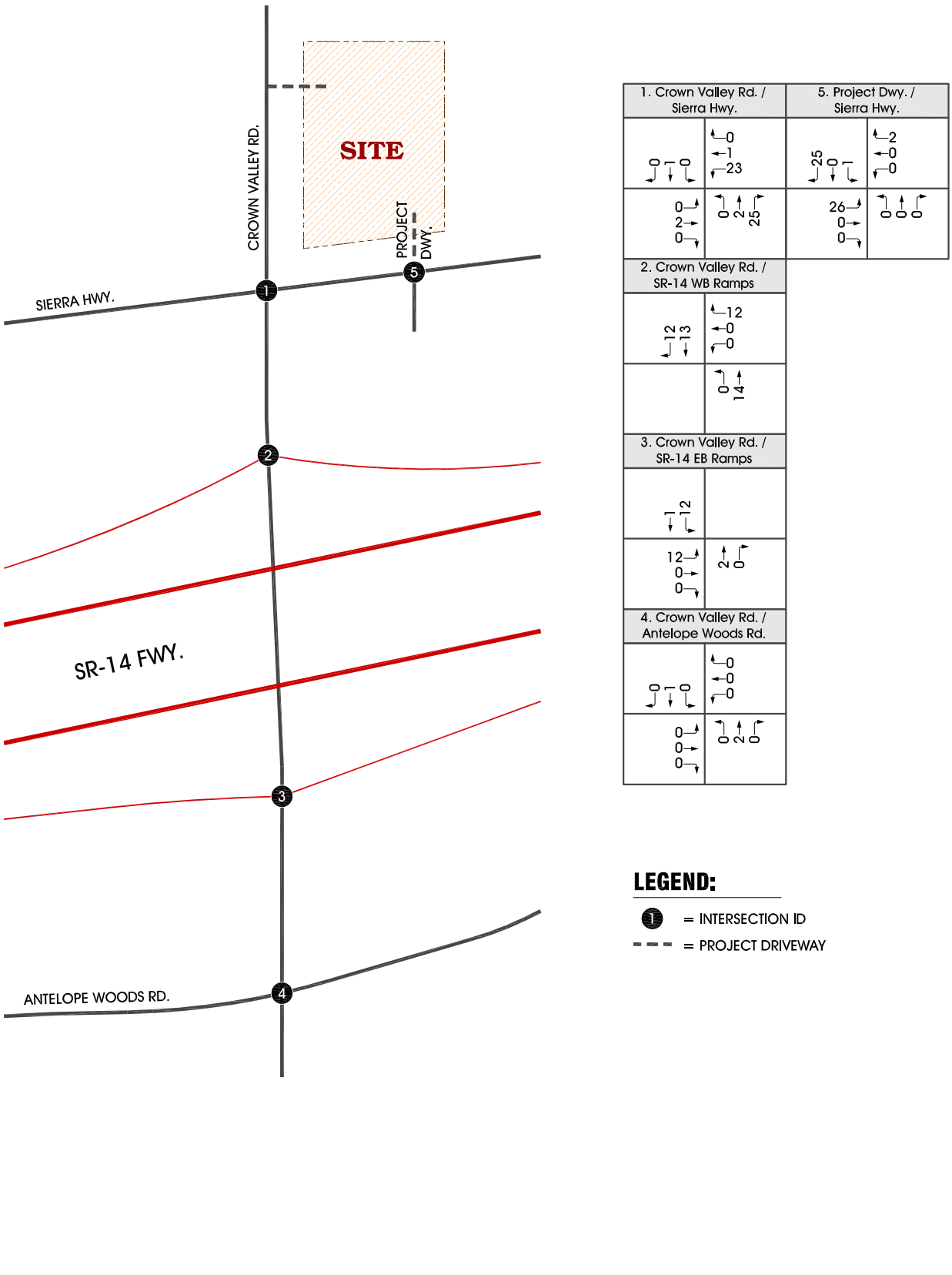
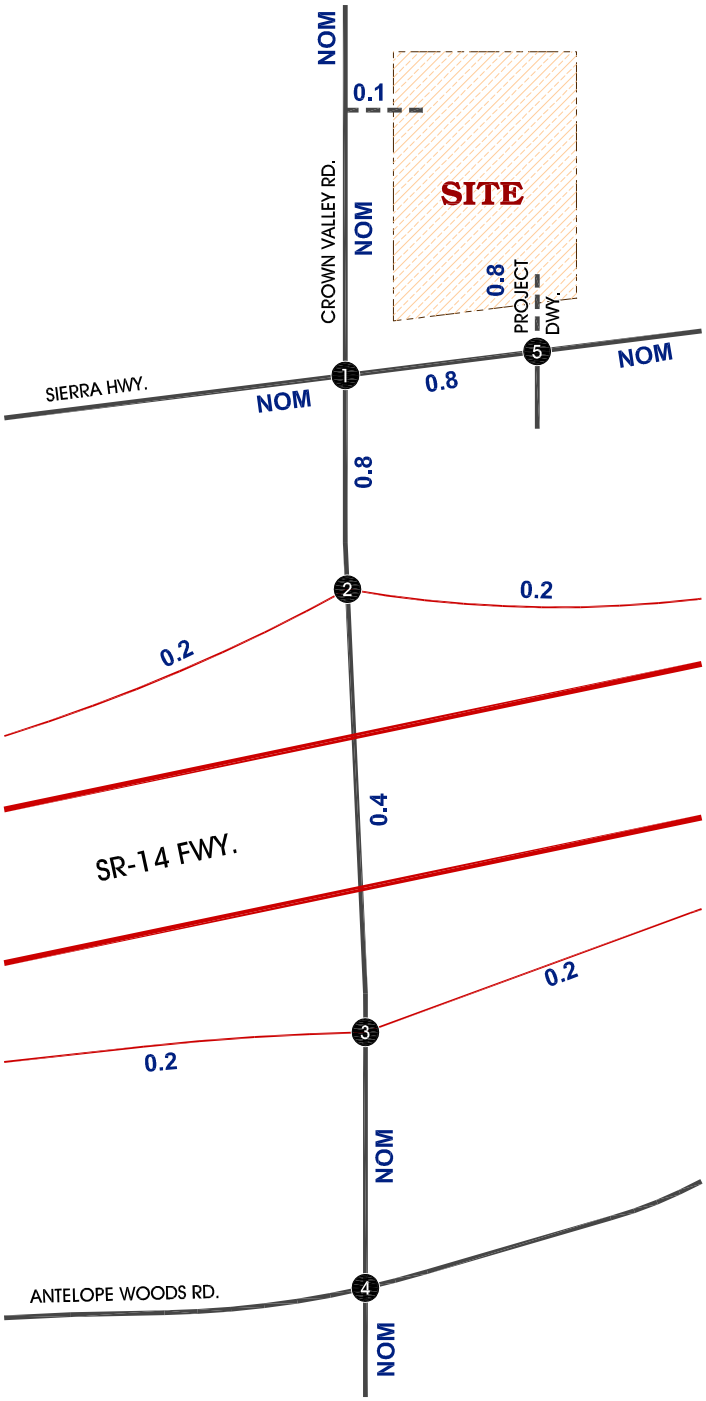


FIGURE 3-D
PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

- 1 = INTERSECTION ID
- = PROJECT DRIVEWAY
- 1.0 = VEHICLES PER DAY (1000's)
- NOM = NOMINAL (LESS THAN 50 VEHICLES PER DAY)

N

4.0 FUTURE (2015) TRAFFIC CONDITIONS

This section presents the peak hour intersection analysis results that have been performed at the study area intersections for Existing plus Project, and Existing plus Ambient plus Project plus Cumulative (2015) traffic conditions.

4.1 EXISTING PLUS PROJECT TRAFFIC CONDITIONS

Existing plus Project AM/PM peak hour intersection turning movement volumes and average daily traffic (ADT) volume are shown on Figures 4-A through 4-C.

Intersection levels of service for the Existing plus Project (2015) traffic conditions are shown in Table 4-1. Table 4-1 shows the ICU and HCM calculations based on the current geometrics at the study area intersections. As shown in Table 4-1, the study area intersections are projected to operate at acceptable levels of service during the peak hours with existing geometry.

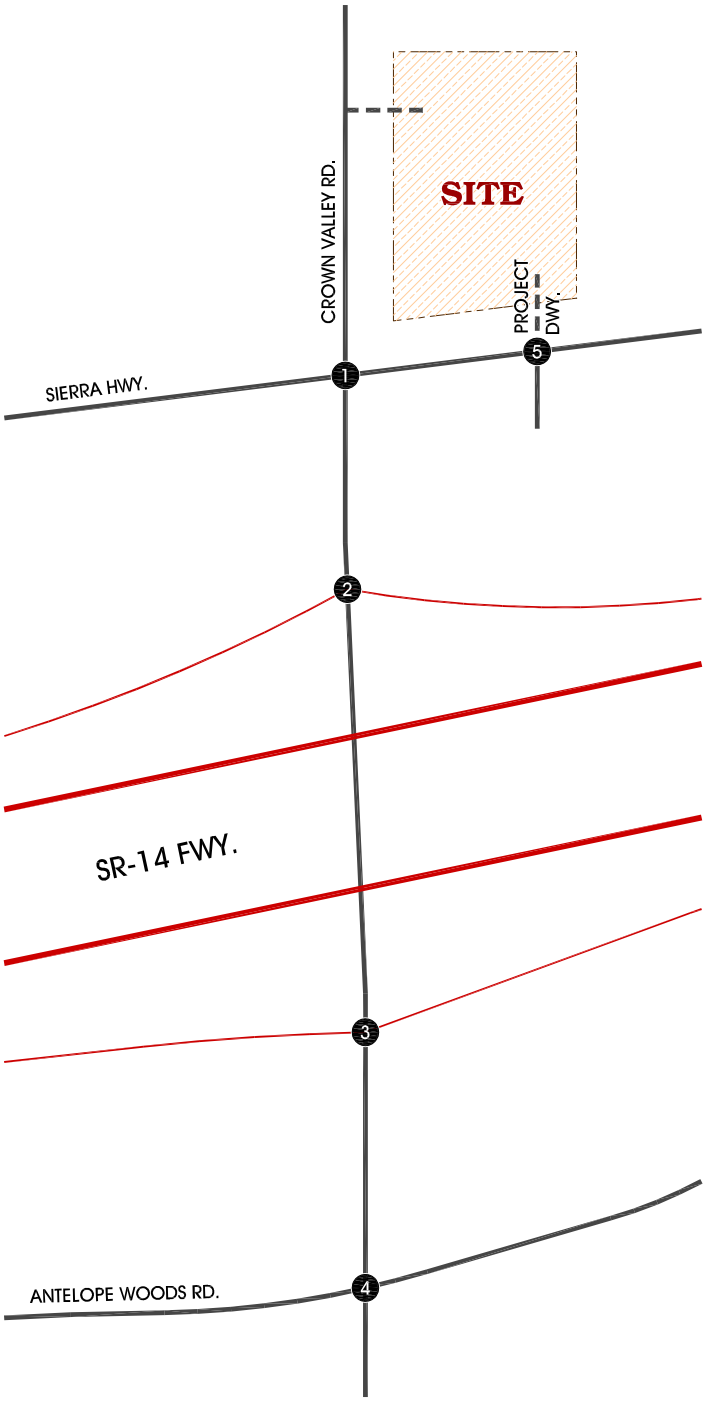
The operation analysis worksheets for the Existing plus Project traffic conditions are provided in Appendix “D”.

4.2 EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE (2015) TRAFFIC CONDITIONS

Existing plus Ambient Project plus Cumulative (2015) AM/PM peak hour intersection turning movement volumes and average daily traffic (ADT) volume are shown on Figures 4-D through 4-F.

Intersection levels of service for the Existing plus Ambient plus Project plus Cumulative (2015) traffic conditions are shown in Table 4-2. Table 4-2 shows the ICU and HCM calculations based on the current geometrics at the study area intersections. As shown in Table 4-2, the study area intersections are projected to operate at acceptable levels of service during the peak hours with existing geometry.

FIGURE 4-A
EXISTING PLUS PROJECT
AM PEAK HOUR INTERSECTION VOLUMES



1. Crown Valley Rd. / Sierra Hwy.		5. Project Dwy. / Sierra Hwy.	
↳25 ↓73 ↲15	↰11 ←199 ↱165	↳34 ↓0 ↲2	↰2 ←256 ↱12
10↱ 63→ 127↳	256↰ 44↑ 138↱	36↱ 99→ 87↳	79↰ 0↑ 10↱

2. Crown Valley Rd. / SR-14 WB Ramps	
↳177 ↓285	↰217 ←0 ↱69
	99↰ 225↑

3. Crown Valley Rd. / SR-14 EB Ramps	
↓254 ↲105	
80↱ 1→ 103↳	245↑ 94↱

4. Crown Valley Rd. / Antelope Woods Rd.	
↳1 ↓142 ↲210	↰131 ←4 ↱57
0↱ 0→ 0↳	0↰ 121↑ 73↱

LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

N

FIGURE 4-B
EXISTING PLUS PROJECT
PM PEAK HOUR INTERSECTION VOLUMES

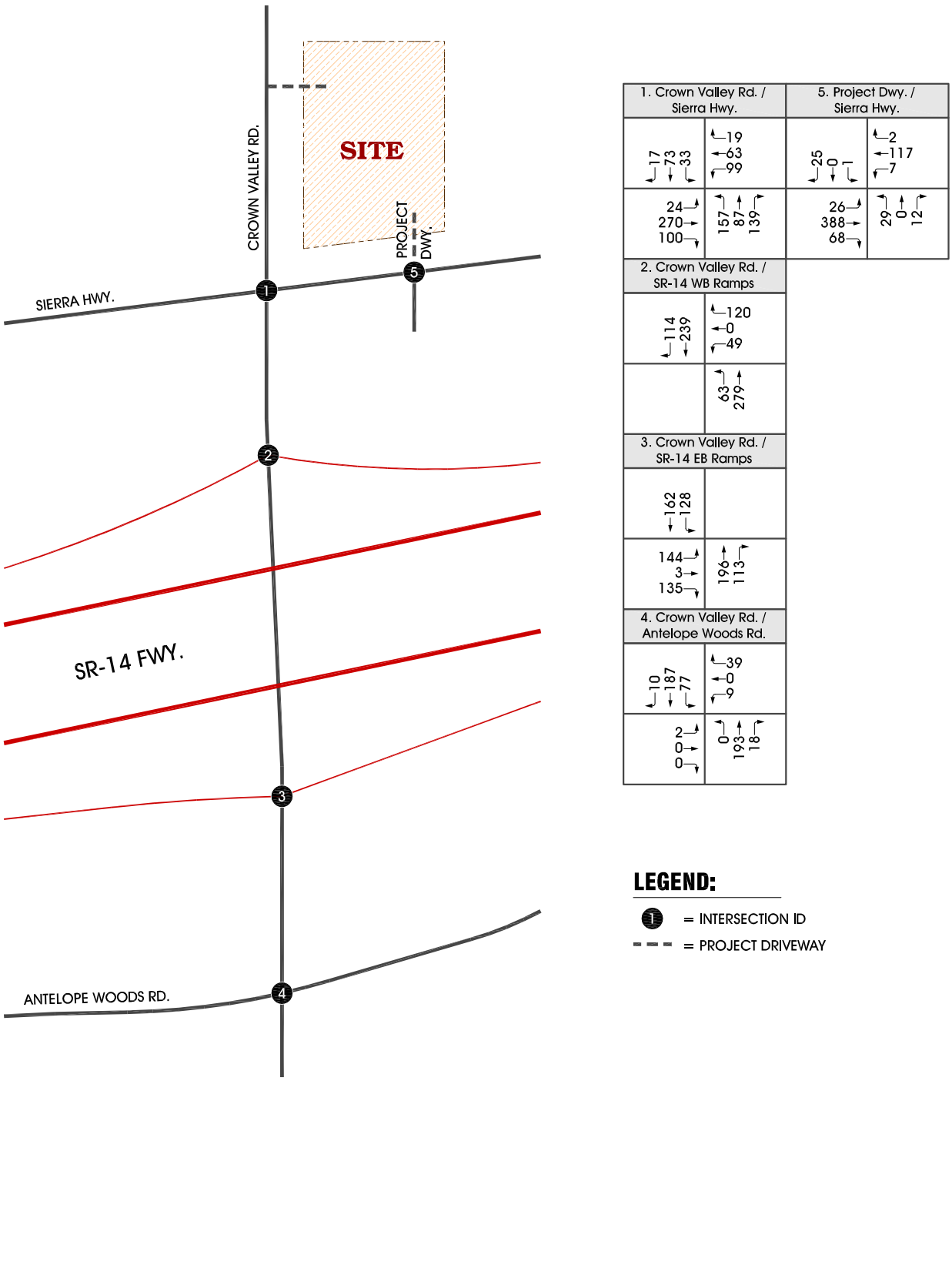
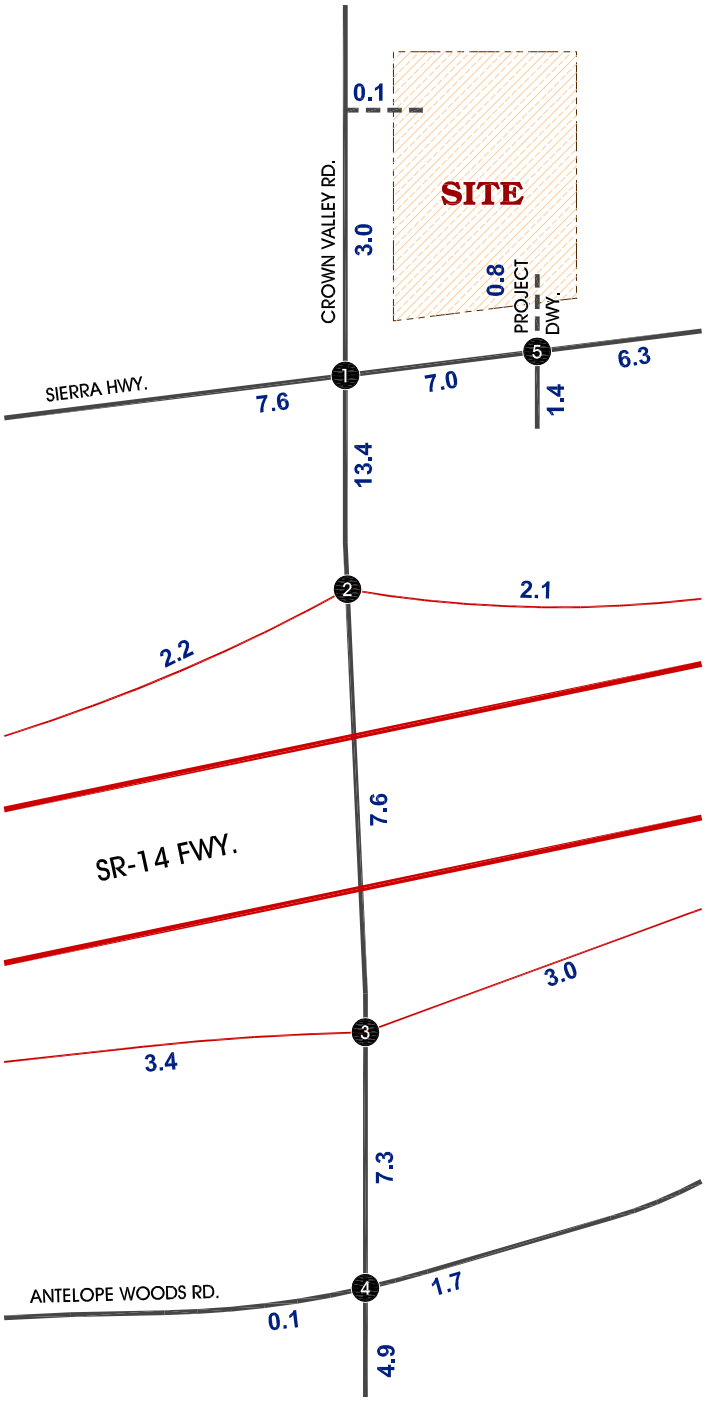


FIGURE 4-C
EXISTING PLUS PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

1 = INTERSECTION ID

= PROJECT DRIVEWAY

1.0 = VEHICLES PER DAY (1000's)

N

TABLE 4-1

INTERSECTION ANALYSIS FOR EXISTING (2014) PLUS PROJECT CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes[2]												ICU [3] (secs.)		Level of Service		Delay [4] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound										
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	AM	PM	AM	PM
1	Crown Valley Rd./Sierra Hwy.	AWS	1	1	1	1	1	d	1	2	d	1	1	0	0.49	0.39	A	A	n/a[5]	n/a	n/a	n/a
2	Crown Valley Rd./SR-14 WB Ramps	CSS	1	1	0	0	1	1	0	0	0	0	1	1	0.48	0.36	A	A	18.6	15.5	C	C
3	Crown Valley Rd./SR-14 EB Ramps	CSS	0	1	0	1	1	0	1	1	0	0	0	0	0.44	0.46	A	A	13.7	14.8	B	B
4	Crown Valley Rd./Antelope Woods Rd.	CSS	1	1	0	1	0	1	0	1	0	0	1	d	0.43	0.31	A	A	n/a	n/a	n/a	n/a
5	Project Driveway/Sierra Hwy.	CSS	0	1	0	0	0	0	0	1	0	0	1	0	0.36	0.44	A	A	n/a	n/a	n/a	n/a

[1] AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; d =Defacto Right Turn Lane; 1 = Lane Improvement (Project Driveway)

[3] ICU = Intersection Capacity Utilization - Methodology required by Los Angeles County

[4] Delay = Highway Capacity Methodology (HCM) required by Caltrans

[5] n/a = Not Applicable

FIGURE 4-D

EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE AM PEAK HOUR INTERSECTION VOLUMES

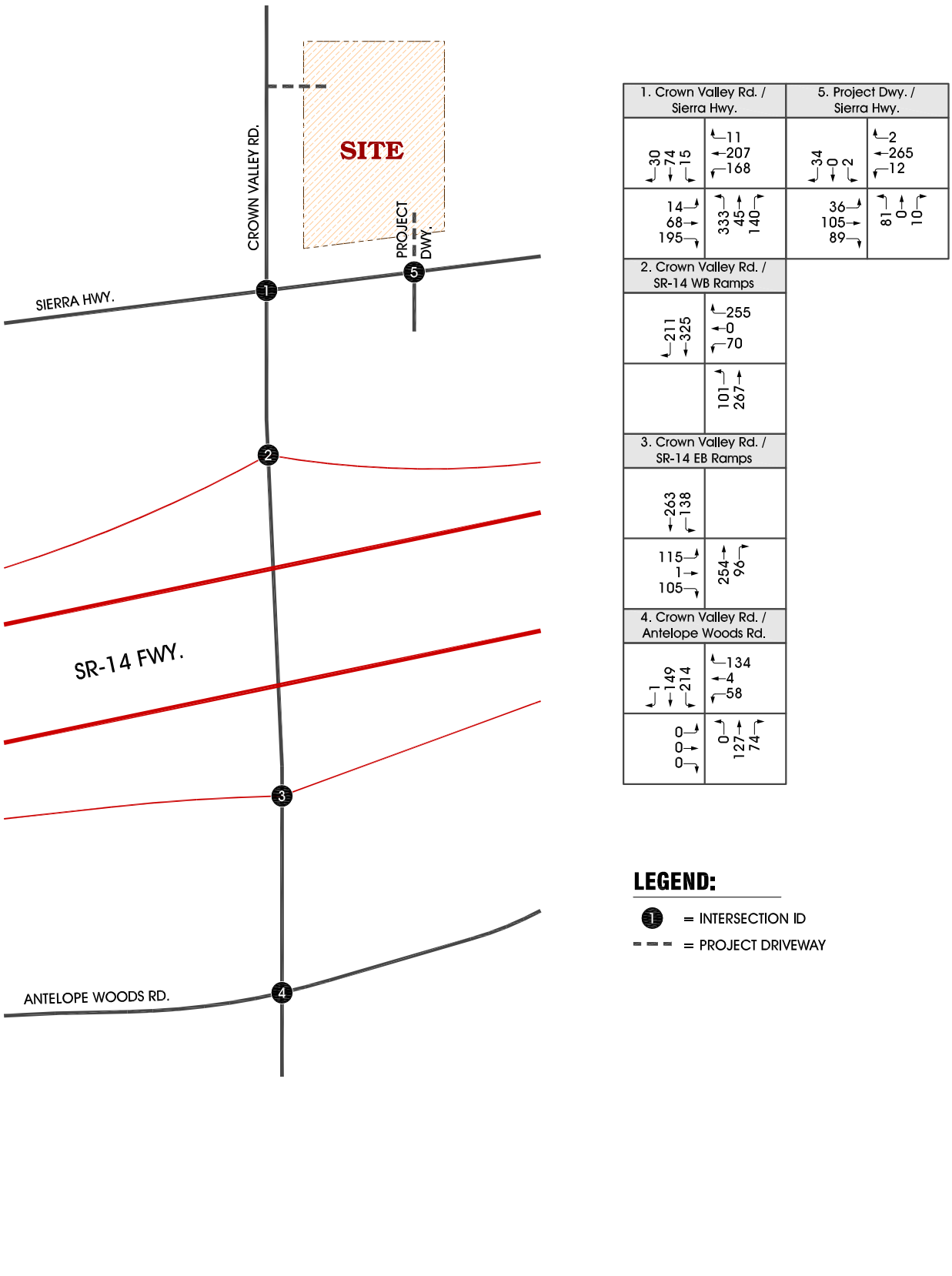


FIGURE 4-E
EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE PM PEAK HOUR INTERSECTION VOLUMES

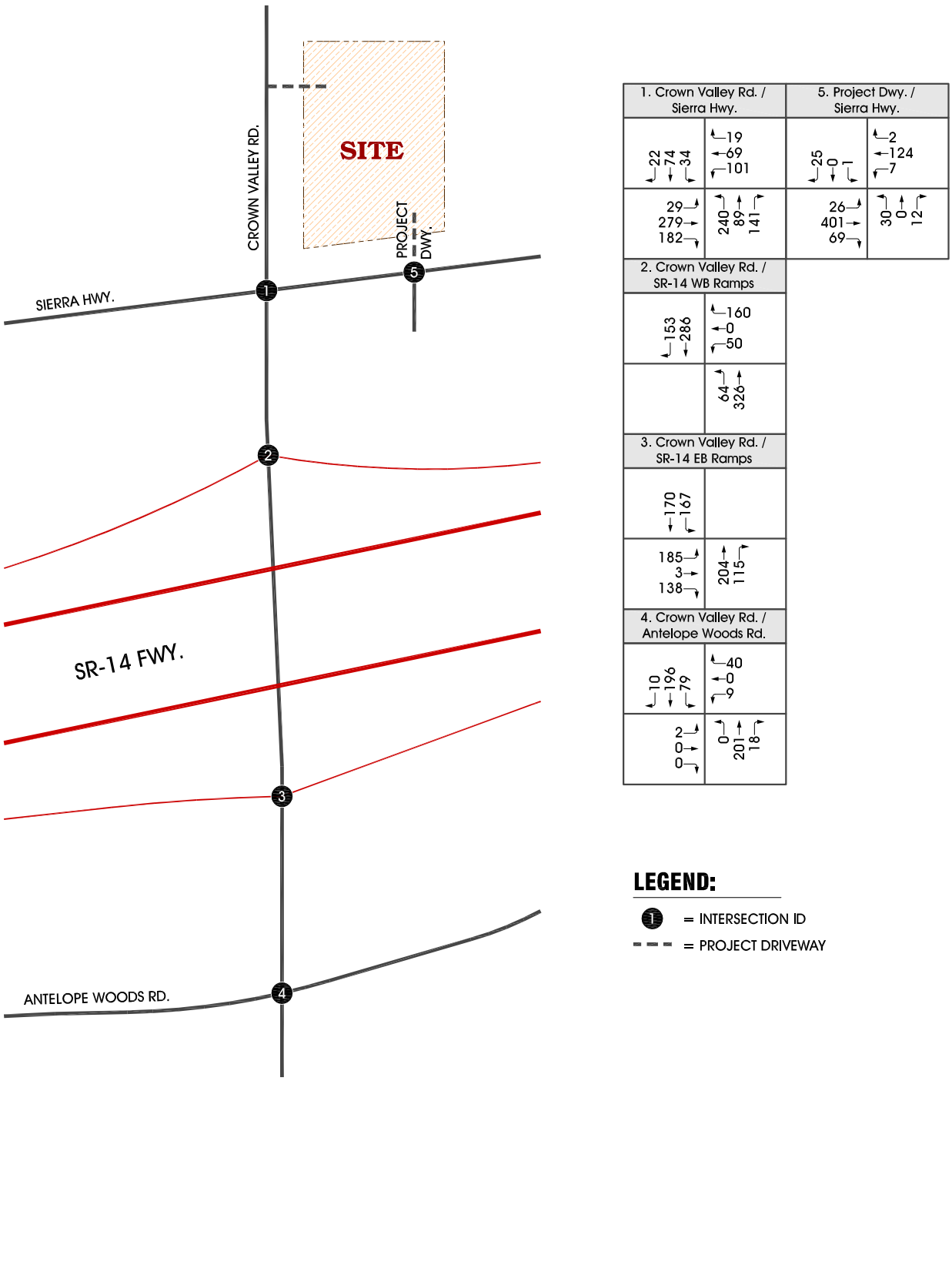


FIGURE 4-F

EXISTING PLUS AMBIENT PLUS PROJECT PLUS CUMULATIVE AVERAGE DAILY TRAFFIC (ADT)

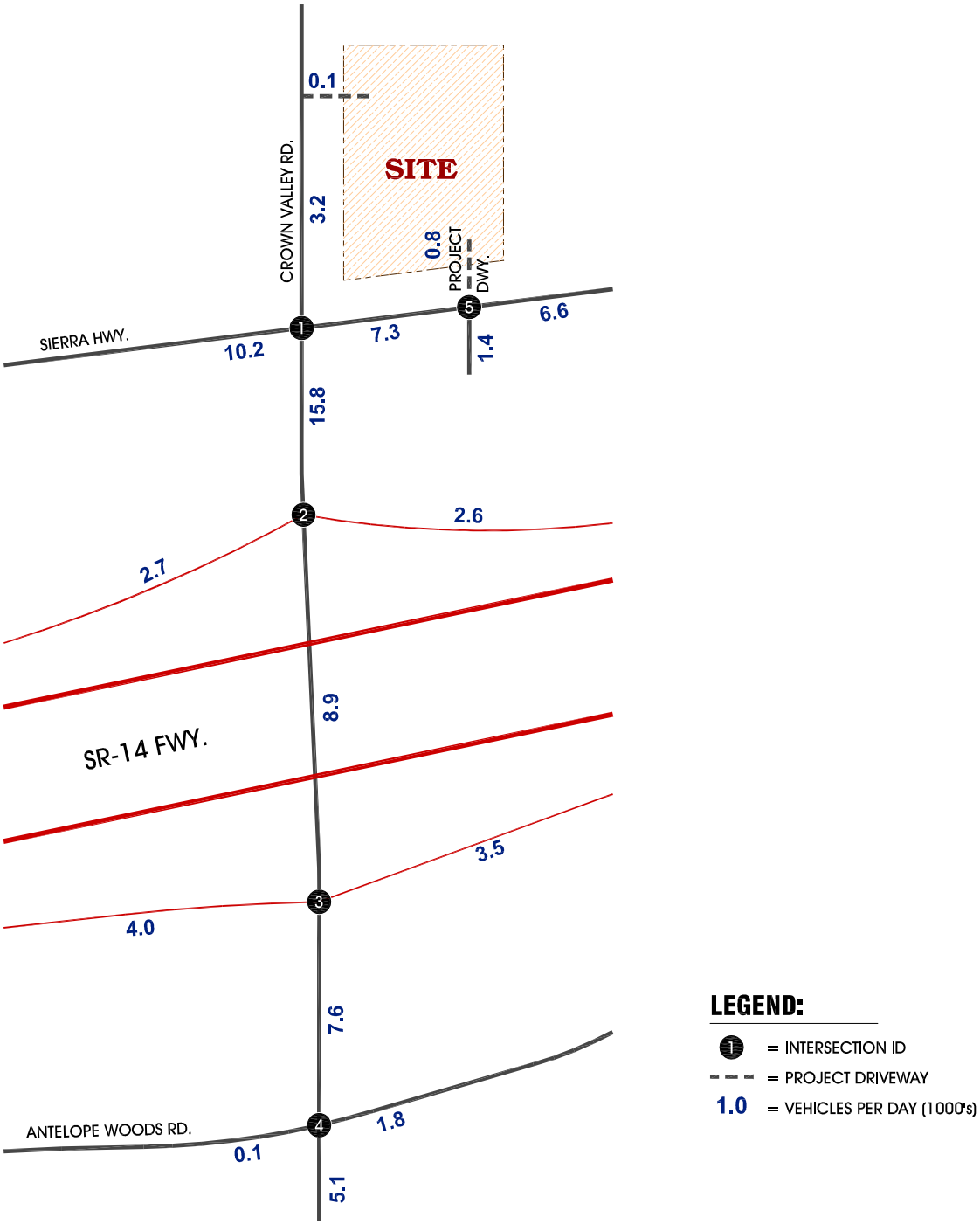


TABLE 4-2

INTERSECTION ANALYSIS FOR
EXISTING PLUS AMBIENT PLUS CUMULATIVE PLUS PROJECT (2015) CONDITIONS

ID	Intersection	Traffic Control [1]	Intersection Approach Lanes[2]												ICU [3] (secs.)		Level of Service		Delay [4] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound										
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM	AM	PM	AM	PM
1	Crown Valley Rd./Sierra Hwy.	AWS	1	1	1	1	1	d	1	2	d	1	1	0	0.58	0.47	A	A	n/a[5]	n/a	n/a	n/a
2	Crown Valley Rd./SR-14 WB Ramps	CSS	1	1	0	0	1	1	0	0	0	0	1	1	0.53	0.42	A	A	21.5	17.7	C	C
3	Crown Valley Rd./SR-14 EB Ramps	CSS	0	1	0	1	1	0	1	1	0	0	0	0	0.48	0.52	A	A	17.2	20.4	C	C
4	Crown Valley Rd./Antelope Woods Rd.	CSS	1	1	0	1	0	1	0	1	0	0	1	d	0.44	0.31	A	A	n/a	n/a	n/a	n/a
5	Project Driveway/Sierra Hwy.	CSS	0	1	0	0	0	0	0	1	0	0	1	0	0.36	0.45	A	A	n/a	n/a	n/a	n/a

[1] AWS = All Way Stop; CSS = Cross Street Stop

[2] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.
L = Left; T = Through; R = Right; 1! = Shared Left-Through-Right Lane; 0.5 = Shared Lane; d =Defacto Right Turn Lane; 1 = Lane Improvement (Project Driveway)

[3] ICU = Intersection Capacity Utilization - Methodology required by Los Angeles County

[4] Delay = Highway Capacity Methodology (HCM) required by Caltrans

[5] n/a = Not Applicable

The operation analysis worksheets for the Existing plus Ambient plus Cumulative plus Project traffic conditions are provided in Appendix “E”.

4.3 DRIVE-THRU STACKING ANALYSIS

The proposed fast-food restaurant will provide a drive-thru lane. Four vehicles can stack between the pick-up window and the order board. An additional 3 vehicles can stack between the order board and the drive-thru entrance. Behind the drive-thru entrance, another 6 vehicles can stack within the drive-aisle

Empirical Data Survey

In order to determine the appropriate drive-thru queuing distance of the proposed Taco Bell site, another Taco Bell restaurant has been surveyed. The restaurant located at 918 S. El Camino Real was selected due to its close proximity to the freeway. The restaurant was surveyed during the busiest time (midday peak (12:00-1:00 PM) to observe the highest drive-thru queue.

- Taco Bell at 918 S. El Camino Real, San Clemente (Approx. 3,150 sf)
    - Number of vehicles able to stack between the pick-up window and the order board = 3 vehicles
    - Number of vehicles able to stack at/between the order board and the drive-thru entrance = 2 vehicles
    - Number of vehicles able to stack between the drive-thru entrance and the public right-of-way = 3 vehicles

It should be noted that approximately 20 to 25 feet per vehicle is an industry standard used to estimate the length needed for a queued vehicle. However, since the drive-thru operations involve relatively slow speeds, a slightly shorter distance between vehicles is often observed. This can result in allowing more vehicles to queue in a given length.

The vehicular queues at the site was observed between; 1) the pick-up window and the order board; 2) at/behind the order board and the drive-thru entrance; and 3) the drive-thru entrance and the public right-of-way. The results of the survey are included in Appendix “A”.

Table 4-3 provides a summary of the maximum queues identified in the surveyed data. Based on the data collected, a maximum of 3 vehicles were observed between the pick-up window and the order board; 2 vehicles between the order board and the drive-thru entrance; and one vehicle behind the drive-thru entrance. The observed queues did not impede the movements of pedestrians or other vehicles on-site.

Stacking Evaluation

Based on the size of the surveyed site, a stacking rate has been calculated between the maximum queue and the restaurants square footage. A rate of 0.95 vehicles per square foot and 0.63 vehicles per square foot has been determined for the area between the order board and pickup window and between the order board and drive-thru entrance, respectively. These rates can be used to estimate the anticipated stacking distance of the proposed site. Based on the stacking rates, space for 2 vehicles would be required between the order board and pick up window and space for 1 vehicle between the order board and drive-thru entrance. It should be noted that the proposed site will provide space for 4 vehicles between the order board and pick up window and 3 vehicles between the order board and drive-thru entrance. In addition, another 6 vehicles can stack within the drive aisle if needed.

The queueing analysis indicates that the stacking distances provided at the proposed site should adequately accommodate the maximum queues. As a margin of safety, vehicles can also stack within the drive aisles, thereby minimizing the potential for vehicles to stack onto the public right-of-way.

TABLE 4-3

DRIVE THRU SURVEY SUMMARY

Empirical Data Summary

Location	Number of Vehicles Able to Stack[1]			Maximum Number of Vehicles Observed			Restaurant Size (sf)	Maximum Rate	
	Between the Order Board and the Pickup Window	Between the Drive-Thru Entrance and the Order Board	Behind the Drive-Thru Entrance	Between the Order Board and the Pickup Window	At and Behind the Order Board	Behind the Drive-Thru Entrance		Between the Order Board and the Pickup Window	At and Behind the Order Board
Taco Bell (918 S. El Camino Real, San Clemente)	3	2	3	3	2	1	3,150	0.95	0.63

Proposed Project Drive-Thru Recommendation

	Restaurant Size (sf)	Recommended Stacking		Proposed Stacking	
		Between the Order Board and the Pickup Window	At and Behind the Order Board	Between the Order Board and the Pickup Window	At and Behind the Order Board
PROPOSED PROJECT	2,029	**2**	**1**	**4**	**3**

[1] Based on 20-25' feet per vehicle

5.0 FINDINGS AND RECOMMENDATIONS

This chapter summarizes the findings of this traffic impact analysis, and provides recommendations related to project implementation.

5.1 TRAFFIC IMPACTS AND LEVEL OF SERVICE ANALYSIS

The proposed development is projected to generate approximately 906 net trip ends per day, with 83 vehicles per hour during the AM peak hour and 59 vehicles per hour during the PM peak hour.

For Existing (2014), Existing plus Project, and Existing plus Ambient plus Project plus Cumulative (2015) traffic conditions, the study area intersections are operating at an acceptable level of service during the peak hours with existing geometry. Therefore, no off-site mitigation measures are required

5.2 DRIVE-THRU STACKING ANALYSIS

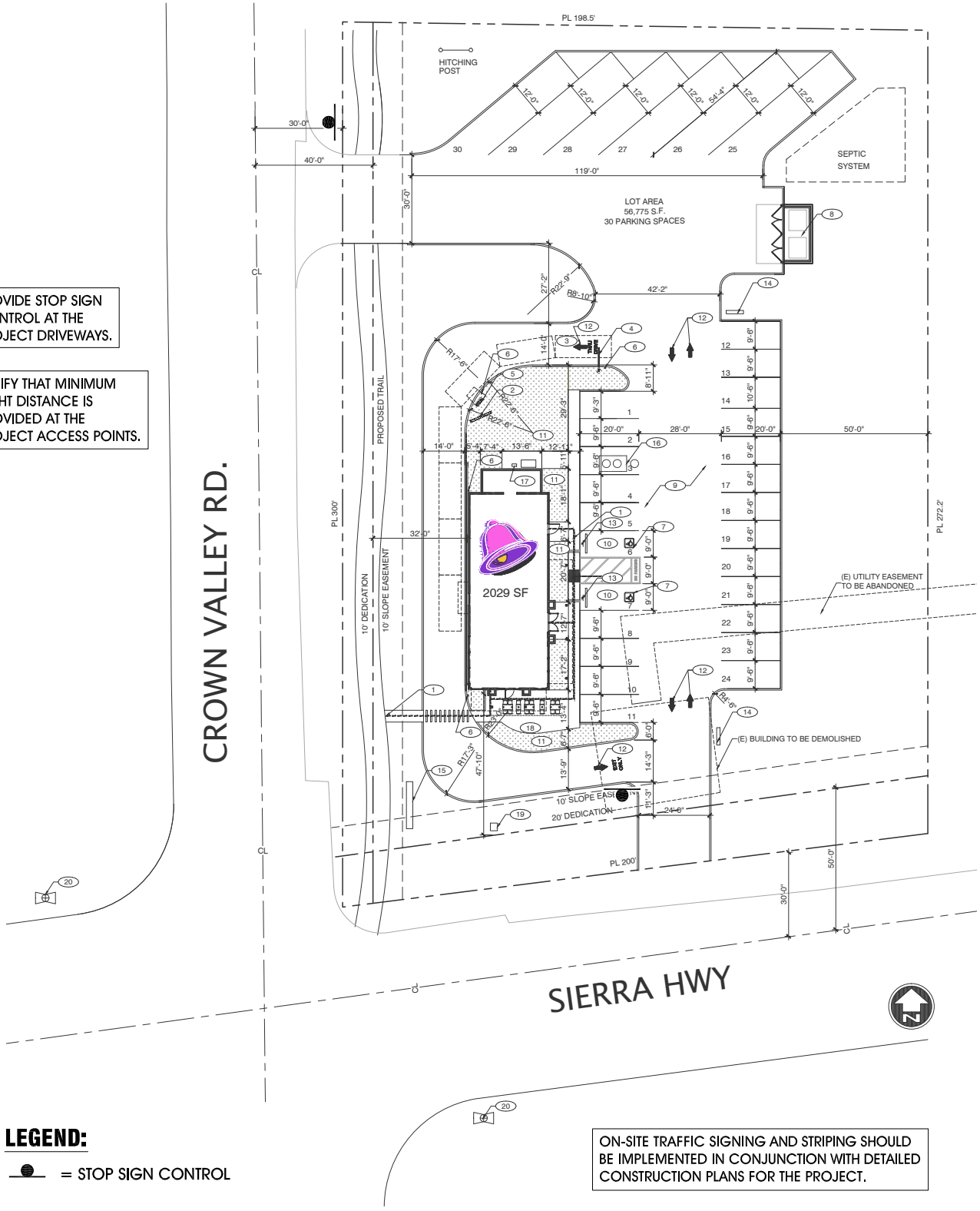
An empirical data survey was conducted at an existing Taco Bell to determine the number of vehicles stacked during a peak lunch period. Based on the data a queuing analysis was prepared. The results indicate that the stacking distances provided at the proposed site should adequately accommodate the maximum queues. As a margin of safety, vehicles can also stack within the drive aisles, thereby minimizing the potential for vehicles to stack onto the public right-of-way.

5.3 ON-SITE CIRCULATION RECOMMENDATIONS

On-site specific circulation and access recommendations are depicted on Figure 5-A and are described below:

- Provide stop sign control for vehicles exiting the site at the project driveway.
- On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.
- Verify that minimum sight distance is provided at the project driveway.

FIGURE 5-A
ON-SITE CIRCULATION RECOMMENDATIONS



LEGEND:

= STOP SIGN CONTROL

ON-SITE TRAFFIC SIGNING AND STRIPING SHOULD BE IMPLEMENTED IN CONJUNCTION WITH DETAILED CONSTRUCTION PLANS FOR THE PROJECT.