Traffic Impact Study

Vega SES LLC Solar Project

Technical Report

Prepared for:

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1.0 Introduction

1.1. Purpose of the Report

The purpose of this Traffic Impact Study (TIS) is to identify and document potential transportation related impacts associated with the development of the proposed Vega SES LLC Solar project (proposed project), as well as to recommend mitigation measures, as necessary, for any identified transportation related impacts.

1.2. Study Area and Project Background

The Vega SES Solar project is proposed to be located east of the Westside Main Canal, south of West Wixom Road, west of Drew Road, and north of Lyons Road in the County of Imperial. **Figure 1-1** displays the Proposed Project location. The project proposes to develop a 100-megawatt alternating current solar photovoltaic energy generation, with an integrated 100 MW battery storage project on approximately 574 acres of land. **Figure 1-2** displays the key project study area.

Four (4) scenarios were analyzed in this study, including:

- *Existing Conditions* – utilized to establish the existing baseline traffic operations within the study area.

- *Existing Plus Normal Background Growth (Near Term Base) Conditions* – establishes a baseline of existing conditions with normal background growth against which traffic generated by the Proposed Project can be compared.

- *Existing Plus Normal Background Growth (Near-Term Base Plus Project) Plus Project Conditions* – represents existing conditions with the addition of the normal background growth in the vicinity of the project location with the addition of traffic projected to be generated by the Proposed Project. As a worst-case scenario, project construction conditions were analyzed since this is the time in which the proposed project site will generate the most traffic.

- *Existing Plus Cumulative Projects (Build-Out) Plus Project Conditions* – represents near-term scenario the addition of cumulative projects located in the vicinity of the proposed project. As a worst-case scenario, project construction conditions were analyzed since this is the time in which the proposed project site will generate the most traffic.

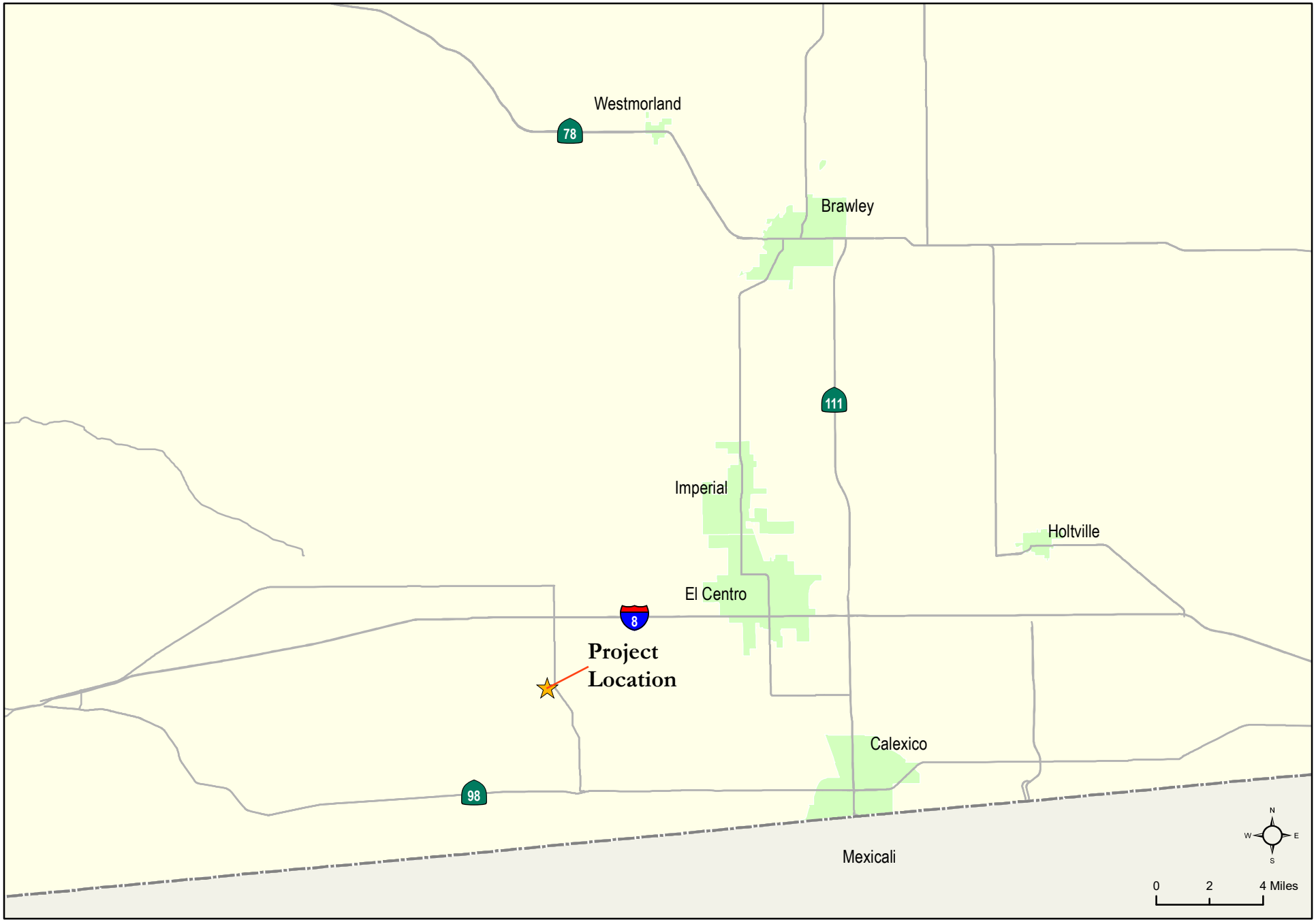

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Figure 1-1
Project Regional Area

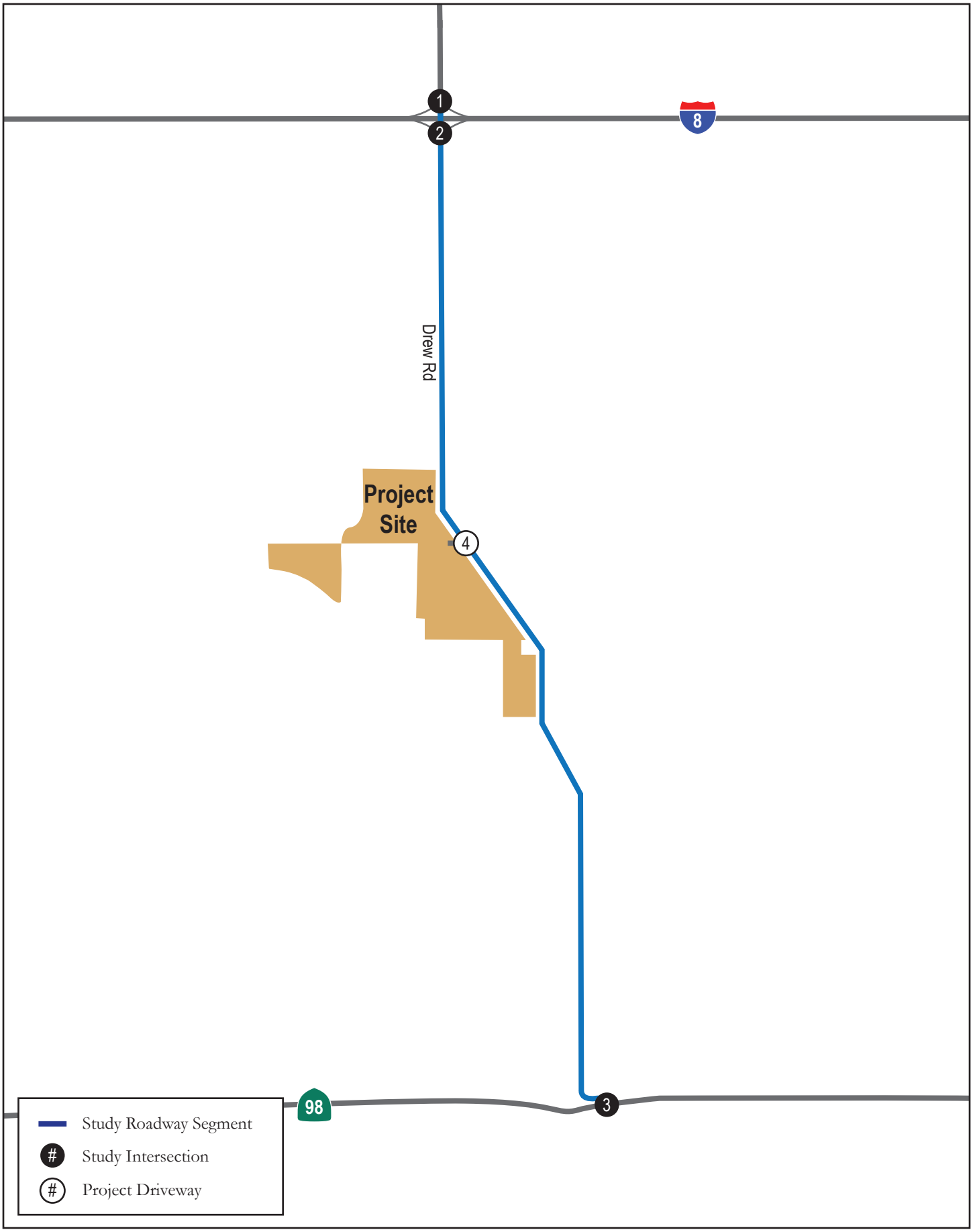

Figure 1-2
Project Study Area

1.3. Report Organization

Following this Introduction chapter, this report is organized into the following sections:

2.0 *Analysis Methodology* – This chapter describes the methodologies and standards utilized to analyze roadway and intersection facilities.

3.0 *Existing Conditions* – This chapter describes the existing traffic network within the study area and provides analysis results for existing traffic conditions.

4.0 *Existing Plus Normal Background Growth Conditions (Near-Term Base)* – This chapter identifies and describes traffic within the project study area with normal background traffic growth.

5.0 *Project Description* – This chapter describes the Proposed Project including its estimated trip generation, trip distribution patterns, and project trip assignment.

6.0 *Existing Plus Normal Background Growth Conditions* Plus Project (Near-Term Base Plus Project) – This chapter identifies and describes traffic within the project study area with normal background traffic growth and the Proposed Project's traffic. Based on the analysis, direct project related traffic impacts were identified with mitigation measures, if necessary.

7.0 *Near-Term Base Plus Cumulative Projects Plus Project Conditions (Buildout)* – This chapter identifies and describes the cumulative projects that are anticipated to contribute traffic within the project study area, and the Proposed Project's traffic. Analysis results are provided for Buildout conditions. Based on the analysis, cumulative project related traffic impacts were identified with mitigation measures, if necessary.

8.0 *Findings and Recommendations* – This chapter outlines overall study findings, identifies project-related impacts and recommended mitigation measures if any.

2.0 Analysis Methodology

This chapter describes the mobility network analysis methodologies employed throughout the report. This TIS was performed in accordance with the requirements of the County of Imperial Department of Public Works Traffic Study and Report Policy dated March 12, 2007, revised June 29, 2007 and approved by the Board of Supervisors of the County of Imperial on August 7, 2007. The Proposed Project study area is based on the extent of where in general 50 peak hour trips will travel.

2.1. Roadway Segment Level of Service (LOS) Standards and Thresholds

Roadway segment LOS standards and thresholds provide the basis for analysis of roadway segment performance. The analysis of roadway segment LOS is based on the functional classification of the roadway, the maximum capacity, roadway geometrics, and existing or forecast Average Daily Traffic (ADT) volumes.

The County of Imperial level of service analysis was performed by utilizing the *Circulation and Scenic Highways Element, January 2008*. The thresholds for each facility type are presented in **Table 2.1** below.

TABLE 2.1
ROADWAY SEGMENT DAILY CAPACITY AND LEVEL OF SERVICE THRESHOLDS

Road Class	LOS			
	X-Section	C or Better	D	E
Expressway	154/210	<60,000	<70,000	<80,000
Prime Arterial	106/136	<44,600	<50,000	<57,000
Minor Arterial	82/102	<29,600	<33,400	<37,000
Major Collector (Collector)	64/84	<27,400	<30,800	<34,200
Minor Collector (Local Collector)	40/70	<7,100	<10,900	<16,200
Local County (Residential)	40/60	<1,500	*	*
Local County (Residential Cul-de-Sac or Loop Street)	40/60	<200	*	*
Major Industrial Collector - (Industrial)	76/96	<14,000	<17,000	<20,000
Industrial Local	44/64	<7,000	<8,500	<10,000

Source: County of Imperial Circulation and Scenic Highways; January 2008

Note: *Levels of Service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

The standards shown in Table 2.1 are generally used as long-range planning guidelines to determine the functional classification of roadways. The actual capacity of a roadway facility varies according to its physical attributes. Typically, the performance and LOS of a roadway

segment is heavily influenced by the ability of the intersections to accommodate peak hour volumes. For the purposes of this traffic analysis, LOS C is considered acceptable for all street segment links and intersections.

2.2. Peak Hour Intersection Level of Service Standards and Thresholds

This section presents the methodologies used to perform peak hour intersection capacity analysis, including unsignalized intersections.

Unsignalized Intersection Analysis

Unsignalized intersections, including two-way and all-way stop controlled intersections were analyzed using the 2010 Highway Capacity Manual unsignalized intersection analysis methodology. The *Synchro 9.0* software supports this methodology and was utilized to produce LOS results. The LOS for a two-way stop controlled (TWSC) intersection is determined by the computed or measured control delay and is defined for each minor movement. **Table 2.2** summarizes the LOS criteria for unsignalized intersections.

The County of Imperial traffic impact study guidelines consider LOS C or better during the AM and PM peak hours to be the threshold of significance for intersection Level of Service.

TABLE 2.2
LEVEL OF SERVICE CRITERIA FOR
STOP CONTROLLED UNSIGNALIZED INTERSECTIONS

Average Control Delay (sec/veh)	Level of Service (LOS)
≤10	A
>10 to ≤15	B
>15 to ≤25	C
>25 to ≤35	D
>35 to ≤50	E
>50	F

Source: 2010 Highway Capacity Manual, TRB Special Report 209

2.3. Freeway Segment Analysis

Freeway level of service analysis is based upon procedures developed by Caltrans. The procedure for calculating freeway level of service involves estimating a peak hour volume to capacity (V/C) ratio. Peak hour volumes are estimated from the application of design hour ("K"), directional ("D") and truck ("T") factors to Average Daily Traffic (ADT) volumes. The base capacities for Interstate 8 were assumed to be 2,350 passenger-car per hour per main lane (pc/h/ln). A 0.95 peak-hour factor (PHF) is utilized for this analysis.

The resulting V/C ratio is then compared to acceptable ranges of V/C values corresponding to the various levels of service for each facility classification, as shown in **Table 2.3**. The corresponding level of service represents an approximation of existing or anticipated future freeway operating conditions in the peak direction of travel during the peak hour. LOS D or better is used in this study as the threshold for acceptable freeway operations based upon Caltrans requirements.

TABLE 2.3
CALTRANS FREEWAY SEGMENT LEVEL OF SERVICE DEFINITIONS

LOS	Maximum V/C	Congestion/Delay	Traffic Description
A	≤ 0.30	None	Free flow.
B	> 0.30 - 0.50	None	Free to stable flow, light to moderate volumes.
C	> 0.50 - 0.71	None to minimal	Stable flow, moderate volumes, freedom to maneuver noticeably restricted.
D	> 0.71 - 0.89	Minimal to substantial	Approaches unstable flow, heavy volumes, very limited freedom to maneuver.
E	> 0.89 - 1.00	Significant	Extremely unstable flow, maneuverability and psychological comfort extremely poor.
F	> 1.00	Considerable	Forced or breakdown flow. Delay measured in average travel speed (MPH). Signalized segments experience delays >60.0 seconds/vehicle.

Source: Caltrans Guide for the Preparation of Traffic Impact Studies, 2002.

2.4. Determination of Significant Impacts

This section outlines the thresholds for determination of significant project-related impacts on study area facilities.

The significance criteria for traffic impacts are based on the Imperial County Planning & Development Services Department level of service standard as outlined on page 55 of the Circulation and Scenic Highways Element dated January 29, 2008, which states "The County's goal for an acceptable traffic service standard on an ADT basis and during AM and PM peak periods for all County-Maintained Road shall be LOS C for all street segment links and intersections. The current practice of determining direct or cumulative impacts is defined by the significance criteria outlined below in **Table 2.4** summarizes the impact significance thresholds for facilities operating at substandard level of service with and without the project. These thresholds, as applied to roadway segments, are based upon an acceptable increase in the Volume / Capacity (V/C) ratio.

TABLE 2.4
SIGNIFICANCE CRITERIA

Existing	Existing + Project	Existing + Project + Cumulative Projects	Impact Type
Intersections			
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS D or worse	NA	Direct
LOS D	LOS D and adds 2.0 seconds or more of delay	LOS D or worse	Cumulative
LOS D	LOS E or F	NA	Direct
LOS E	LOS F	NA	Direct
LOS F	LOS F and delay increases by > 10.0 seconds	LOS F	Direct
Any LOS	Project does not degrade LOS and adds <2.0 seconds of delay	Any LOS	None
Any LOS	Project does not degrade LOS but adds 2.0 to 9.9 seconds of delay	LOS E or worse	Cumulative
Segments			
LOS C or better	LOS C or better	LOS C or better	None
LOS C or better	LOS C or better and v/c >0.02	LOS D or worse	Cumulative
LOS C or better	LOS D or worse	NA	Direct[1]
LOS D	LOS D and v/c >0.02	LOS D or worse	Cumulative
LOS D	LOS E or F	NA	Direct
LOS E	LOS F	NA	Direct
LOS F	LOS F and v/c increases by >0.09	LOS F	Direct
Any LOS	LOS E or worse & v/c 0.02 to 0.09	LOS E or worse	Cumulative

TABLE 2.4
SIGNIFICANCE CRITERIA

Existing	Existing + Project	Existing + Project + Cumulative Projects	Impact Type
Any LOS	LOS E or worse and v/c <0.02	Any LOS	None

Notes:
LOS: Level of Service
NA: Not Applicable
[1] Exception: post-project segment operation is LOS D and intersections along segment are LOS D or better resulting in no significant impact.

3.0 Existing Conditions

This section describes the key study area roadway segments and intersections, existing daily roadway and peak hour intersection traffic volume information, as well as the LOS analysis results under the Existing Conditions.

3.1. Existing Roadway Network

Each of the key roadways, as well as associated study intersections within the study area, are discussed below.

Roadway Facilities

North-South Roadways

Drew Road is a two-lane minor local collector roadway with no median and a posted speed limit of 55 mph. No sidewalks nor bicycle facilities are present on either side of the roadway. The width of the roadway is generally 24 feet.

Freeways and Highways

Interstate 8 (I-8) is a four-lane divided freeway with two (2) lanes in each direction with a posted speed limit of 70 mph between Dunaway Road and Forrester Road.

State Route 98 (SR-98) is a two-lane highway with no median and a posted speed limit of 65 mph between Interstate 8 and east of Drew Road.

Study Intersections

The following four (4) key study area intersections were analyzed:

1. Drew Road / I-8 WB Ramps (SSSC – side street stop controlled)
2. Drew Road / I-8 EB Ramps (SSSC – side street stop controlled)
3. Drew Road / SR-98 (SSSC – side street stop controlled)
4. Drew Road and Project Driveway (SSSC – side street stop controlled) ***Only under Plus Project scenarios***

Figure 3-1 displays the existing functional classifications and intersection geometrics for study area roadways and intersections.

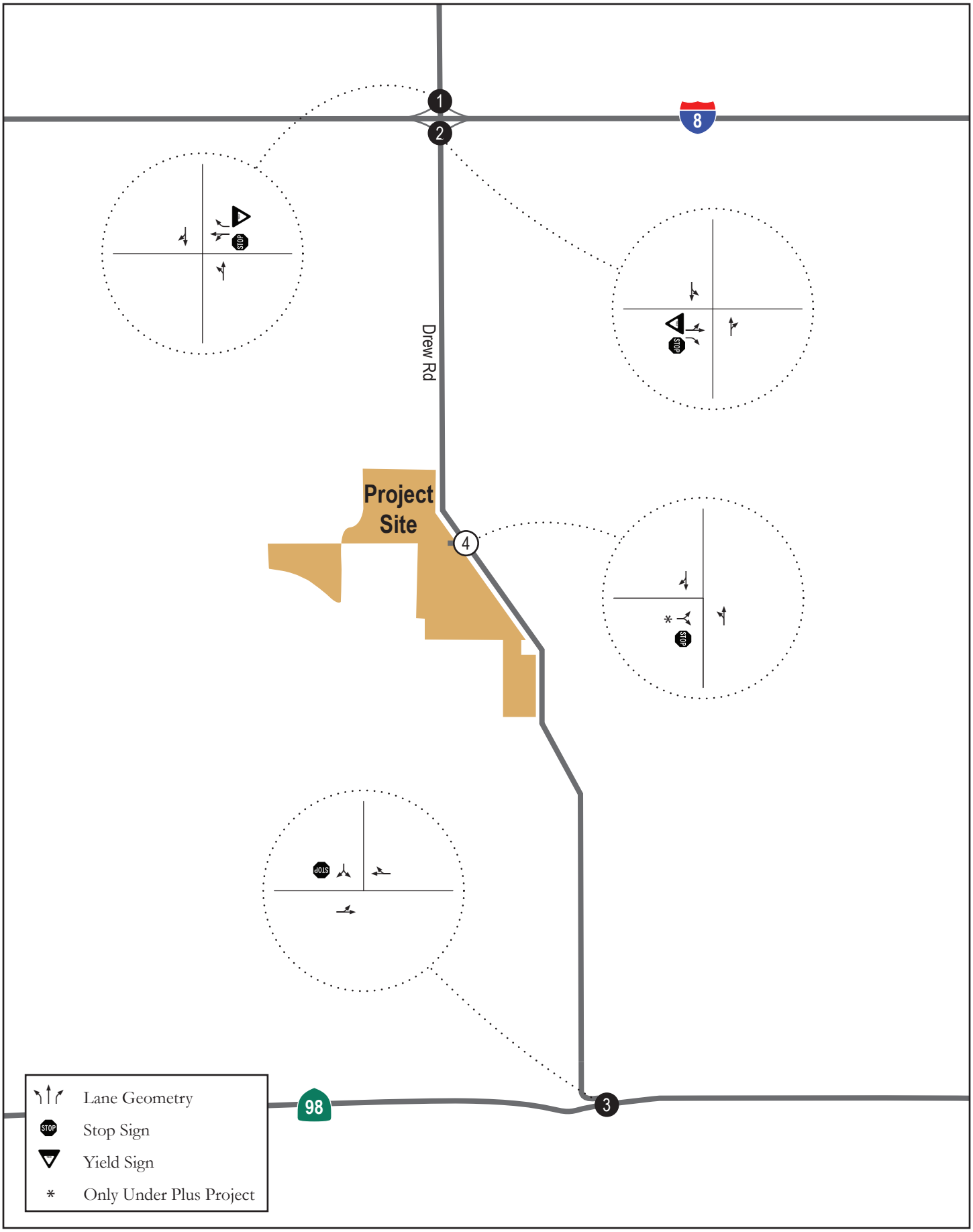

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Figure 3-1
Existing Roadway Network

3.2. Existing Intersection and Roadway Volumes

Figure 3-2 shows existing Average Daily Traffic (ADT) volumes for study area roadway segments and AM / PM peak hour traffic volumes for the key study area intersections. Roadway segment and study area intersection traffic counts were conducted in April 2017 and are provided in **Appendix A**.

3.3. Existing Level of Service Analysis

LOS analyses under Existing Conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment, intersection and freeway mainline LOS analysis results are discussed separately below.

Roadway Segment Analysis

Table 3.1 displays the LOS analysis results for key study area roadway segments under Existing Conditions.

TABLE 3.1
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS - EXISTING CONDITIONS

Roadway	Segment	Functional Classification	Average Daily Traffic (ADT)	Threshold (LOS E)	V/C	Level of Service (LOS)
Drew Road	Between I-8 Ramps	Minor Collector (Local Collector)	1,951	16,200	0.120	C or Better
	I-8 EB Ramps and Access Road	Minor Collector (Local Collector)	303	16,200	0.019	C or Better
	Access Road and SR-98	Minor Collector (Local Collector)	298	16,200	0.018	C or Better

Source: Chen Ryan Associates; June 2017.

Notes:
V/C = Volume / Capacity.

As shown in Table 3.1, all of the study area roadway segments currently operate at acceptable LOS C or better under Existing Conditions.

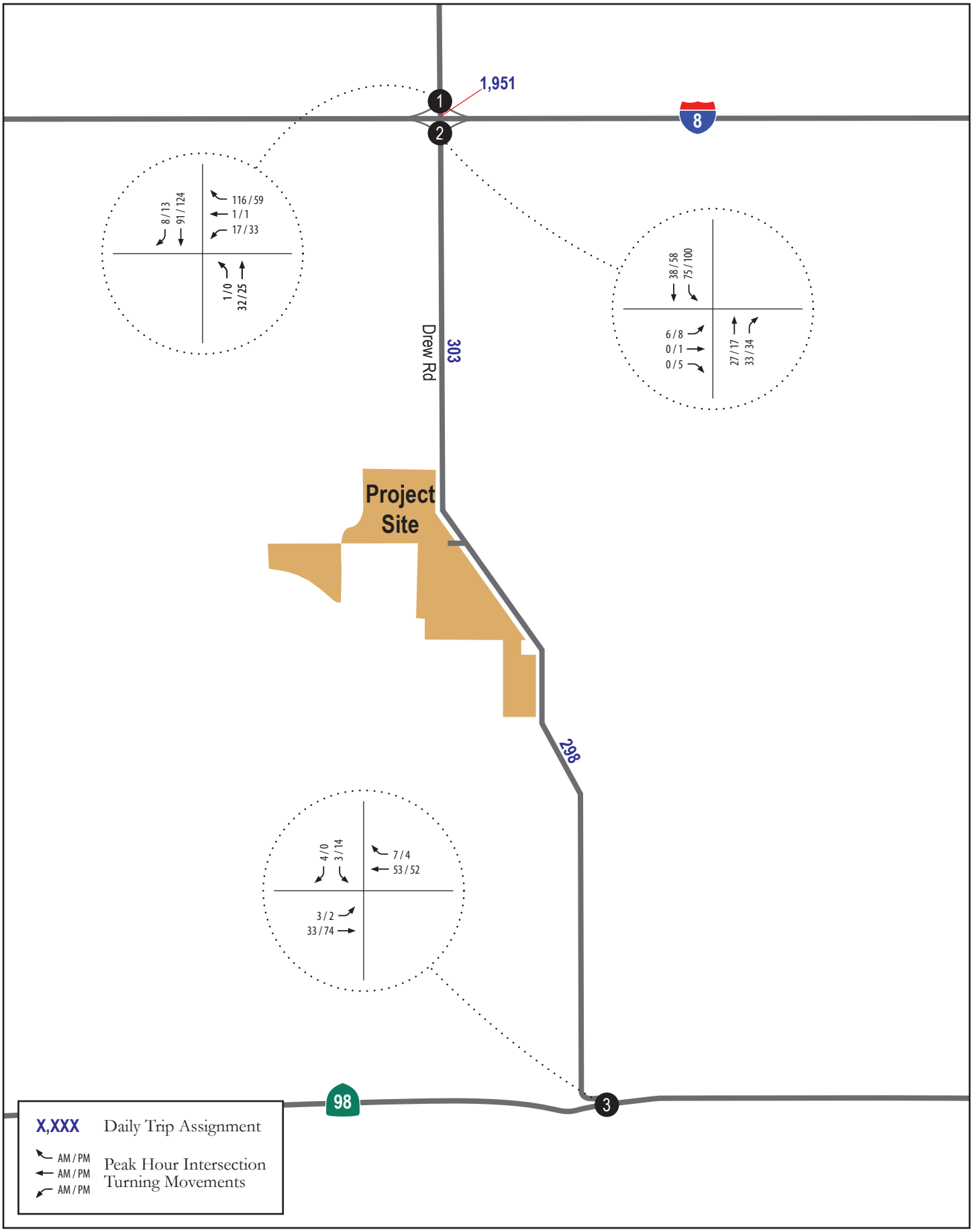

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Figure 3-2
Traffic Volumes - Existing Conditions

Intersection Analysis

Table 3.2 displays intersection LOS and average vehicle delay results for key study area intersections under Existing Conditions. LOS calculation worksheets for Existing Conditions are provided in **Appendix B**.

TABLE 3.2
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS - EXISTING CONDITIONS

		AM Peak Hour		PM Peak Hour	
Intersections	Traffic Control	Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS
1. Drew Road and I-8 WB Ramps	SSSC	9.5	A	9.7	A
2. Drew Road and I-8 EB Ramps	SSSC	10.5	B	11.2	B
3. Drew Road and SR-98	SSSC	8.9	A	9.5	A

Source: Chen Ryan Associates; June 2017.

Notes:
SSSC – side street stop controlled.
For SSSC intersections, the delay shown is the worst delay experienced by any of the approaches.

As shown in Table 3.2, all of the study area intersections currently operate at acceptable LOS B or better during the AM and PM peak hours under the Existing Conditions.

Freeway Segment Analysis

Table 3.3 displays the freeway segment level of service analysis results under Existing Conditions.

TABLE 3.3
FREEWAY SEGMENT LEVEL OF SERVICE RESULTS - EXISTING CONDITIONS

Freeway	Segment	ADT[a]	Direction	# of Lanes	Capacity[b]	D[c]	K[d]	HVF[e]	Peak Hour Volume	V/C	LOS
I-8	Dunaway Road to Drew Road	13,800	EB	2M	4,700	65.0%	11.4%	16.2%	1,070	0.228	A
			WB	2M	4,700	59.0%	14.5%	16.2%	1,240	0.264	A
	Drew Road to Forrester Road	15,600	EB	2M	4,700	54.8%	11.9%	10.7%	1,070	0.228	A
			WB	2M	4,700	64.2%	10.7%	10.7%	1,130	0.240	A

Source: Chen Ryan Associates; June 2017

Notes:
M = Mainline. A = Auxiliary Lane.
[a] Traffic volumes provided by Caltrans (2015).
[b] The capacity is calculated as 2,350 ADT per main lane.
[c] D = Directional split.| [d] K = Peak hour %. | e HV = Heavy vehicle %. These values were obtained from Caltrans peak hour volume data (2015).

As shown in Table 3.3, all of the study area freeway segments currently operate at acceptable LOS A in both directions under Existing Conditions.

4.0 Year 2018 Conditions (Near-Term Base)

This section documents year 2018 conditions, when the project is anticipated to be at the peak of construction activities. The year 2018 background volumes are based on increasing the existing year 2017 volumes by an annual growth rate. Determination of the annual growth rate was based on guidelines defined in *the County of Imperial Department of Public Works Traffic Study and Report Policy* dated March 12, 2007, revised June 29, 2007 and approved by the Board of Supervisors of the County of Imperial on August 7, 2007. This document indicates that traffic projections should be based on demonstrated growth as detailed in the general plan. Three growth rate options were reviewed:

1) The Land Use Element of the general plan indicates that the Population Research Unit of the California Department of Finance (DOF) estimates the annual change in population. Using the DOF revised July 1, 2015 population estimate of 185,328 and the projected population of Imperial County in 2035 of 232,298, an annual growth rate of 1.3 percent is calculated.

2) The Housing Element section of the general plan states that the total population of Imperial County in 2010 was 174,528, an increase of 23 percent since 2000. Based on this information, an annual growth rate of 2.3 percent is calculated.

3) The Southern California Association of Governments (SCAG) *Regional Transportation Plan 2012-2035 Sustainable Communities Strategy,* adopted in April 2012, states that the population of Imperial County is projected to grow at an annual rate of 2.6 percent.

For the purpose of this report, the most conservative growth rate of 2.6 percent per year was utilized to develop the traffic volumes to be analyzed in the "Normal background growth" scenarios. Also, as an effort to remain conservative, it was assumed that the peak of construction activities would take place towards the end of year 2018, therefore, the amount of years between existing conditions (April 2017) and Year 2018 was considered to be 2 years for a total traffic growth of 5.2%. Growth factor support data is provided in **Appendix C.**

4.1 Near-Term Base Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Base conditions were assumed to be identical to the existing geometrics, as shown previously in Figure 3-1.

The Near-Term Base scenario traffic volumes were derived by applying the growth rate obtained from the Southern California Association of Governments (SCAG) *Regional Transportation Plan 2012-2035 Sustainable Communities Strategy,* adopted in April 2012, to the existing traffic volumes, as seen in Figure 3-2. **Figure 4-1** displays the average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under Near-Term Base conditions.

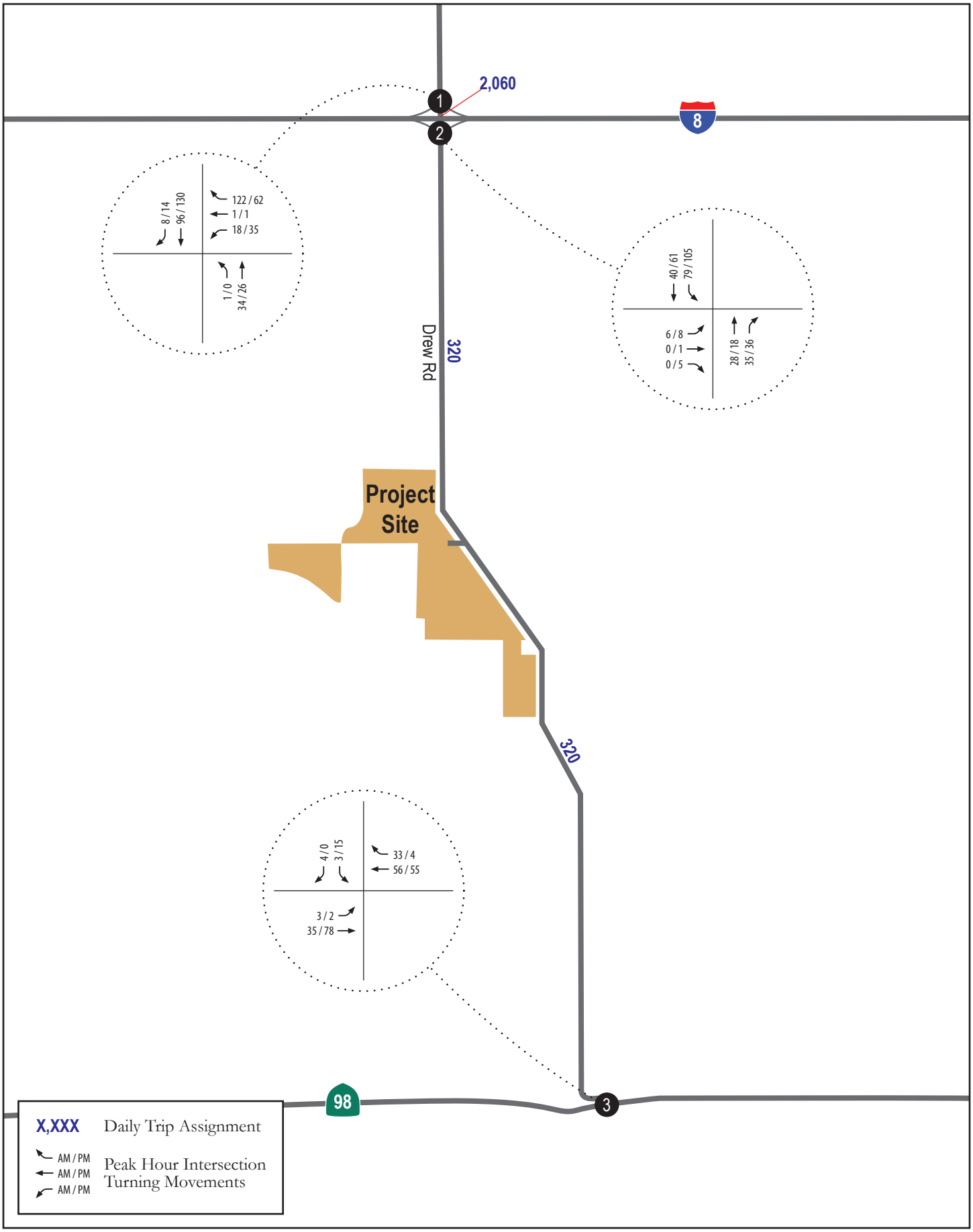

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Figure 4-1
Traffic Volumes
Near-Term Base Conditions

4.2 Near-Term Base Traffic Conditions

LOS analyses for Near-Term Base conditions were conducted using the methodologies described in Chapter 2.0. Roadway segment, intersection and freeway mainline LOS analysis results are discussed separately below.

Roadway Segment Analysis

Table 4.1 displays the LOS analysis results for key roadway segments under Near-Term Base conditions.

TABLE 4.1
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS - NEAR-TERM BASE CONDITIONS

Roadway	Segment	Functional Classification	Average Daily Traffic (ADT)	LOS Threshold (LOS E)	V/C	LOS
Drew Road	Between I-8 Ramps	Minor Collector (Local Collector)	2,060	16,200	0.127	C or Better
	I-8 EB Ramps and Access Road	Minor Collector (Local Collector)	320	16,200	0.020	C or Better
	Access Road and SR-98	Minor Collector (Local Collector)	320	16,200	0.020	C or Better

Source: Chen Ryan Associates; June 2017.

Notes:
V/C = Volume / Capacity.

As shown in Table 4.1, all key study area roadway segments are projected to operate at LOS C or better under Near-Term Base conditions.

Intersection Analysis

Table 4.2 displays intersection LOS and average vehicle delay results under Near-Term Base conditions. LOS calculation worksheets for Near-Term Base conditions are provided in **Appendix D**.

TABLE 4.2
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS - NEAR-TERM BASE CONDITIONS

Intersections	Traffic Control	AM Peak Hour		PM Peak Hour	
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS
1. Drew Road and I-8 WB Ramps	SSSC	9.5	A	9.8	A
2. Drew Road and I-8 EB Ramps	SSSC	10.6	B	11.5	B
3. Drew Road and SR-98	SSSC	9.0	A	9.7	A

Source: Chen Ryan Associates; June 2017.

Notes:
For SSSC intersections, the delay shown is the worst delay experienced by any of the approaches.

As shown in Table 4.2, all study area intersections are projected to operate at LOS B or better during the AM and PM peak hours under Near-Term Base conditions.

Freeway Segment Analysis

Table 4.3 displays the freeway segment level of service analysis results under Near-Term Base conditions.

TABLE 4.3
FREEWAY SEGMENT LEVEL OF SERVICE RESULTS – NEAR-TERM BASE CONDITIONS

Freeway	Segment	ADT	Direction	# of Lanes	Capacity[a]	D[b]	K[c]	HVF[d]	Peak Hour Volume	V/C	LOS
I-8	Dunaway Road to Drew Road	14,520	EB	2M	4,700	65.0%	11.4%	16.2%	1,130	0.240	A
			WB	2M	4,700	59.0%	14.5%	16.2%	1,310	0.279	A
	Drew Road to Forrester Road	16,420	EB	2M	4,700	54.8%	11.9%	10.7%	1,130	0.240	A
			WB	2M	4,700	64.2%	10.7%	10.7%	1,190	0.253	A

Source: Chen Ryan Associates; June 2017

Notes:
M = Mainline. A = Auxiliary Lane.
[a] The capacity is calculated as 2,350 ADT per main lane.
[b] D = Directional split.| [c] K = Peak hour %. | [d] HV = Heavy vehicle %.

As shown in Table 4.3, all of the study area freeway segments are projected to operate at acceptable LOS A in both directions under Near-Term Base conditions.

5.0 Project Description

This section describes the Proposed Project, including land uses, estimated trip generation, trip distribution, and trip assignment.

5.1. Project Description

The Vega SES LLC Solar Project is proposed to be located on approximately 574 acres of land currently used for agricultural purposes. The Proposed Project site is located east of the Westside Main Canal, South of West Wixom Road, west of Drew Road (S29), and north of Lyons Road in Sections 35 and 36 of Township 16 S., Range 12 E., SBB&M, and Section 1 of T. 16-1/2 S., R. 12 E., in the County of Imperial. The project proposes to develop a nominal 100-megawatt alternating current solar photovoltaic energy generation project with an integrated 100 MW battery storage project. **Figure 5-1** displays the proposed project site plan.

5.2. Project Trip Generation, Distribution, and Assignment

Project Trip Generation

The Proposed Project consists of two phases: construction phase and operations & maintenance phase. The construction phase will have the highest traffic intensity followed by an operations & maintenance phase with significantly less vehicular trips. Therefore, the higher and more conservative construction phase trip generation is used to determine potential project related impacts. Construction activities related to the proposed project consist of the following:

- Racking Installation
- Solar Panel Installation
- System Wiring and Trenching
- Substation Construction

Project trip generation estimates were derived based on information obtained from the project applicant. **Table 5.1** displays the Proposed Project's trip generation. Detailed information regarding construction scheduling and activities is provided in **Appendix E.**

TABLE 5.1
CONSTRUCTION TRIP GENERATION

Use	Units	Vehicle Conversion Rate	Rate	Daily Vehicle Trips	AM Peak Hour		PM Peak Hour	
					In	Out	In	Out
Construction Worker Traffic	136	1	2 / Worker	272	136	0	0	136
Haul Truck Traffic	17	3	2 / Truck	102	51	0	0	51
			Total	**374**	**187**	**0**	**0**	**187**

Source: Chen Ryan Associates, June 2017.

As shown in Table 5.1, construction of the Proposed Project is anticipated to generate 374 daily vehicle trips. During the AM peak hour, project construction is anticipated to generate 187 trips (187-in / 0-out) while during the PM peak hour, the project is anticipated to generate 187 peak hour trips (0-in / 187-out).

Once construction is completed the Project would be remotely controlled. No employees would be based at the Project site. Primary security-related monitoring would be done remotely. Security personnel may conduct unscheduled security rounds, and would be dispatched to the site in response to a fence breach or other alarm. Site maintenance workers may access the Project site periodically to clean the panels and maintain the equipment and Project area. The public would not have access to the facility and access to the Project site would be infrequent and limited to authorized personnel.

Project Trip Distribution

Trip distribution for the Proposed Project was determined based on adjacent land uses, population from the surrounding cities, and information from the project applicant. Based on this, it was assumed that 10% of the traffic comes from the City of Calexico, another 10% comes from the unincorporated areas of Ocotillo, Coyote Wells, and Edgar, and 80% comes from the Cities of El Centro, Imperial, Brawley, Holtville, etc. **Figure 5-2** displays the assumed trip distribution patterns associated with the Proposed Project.

Project Trip Assignment

Based upon the project trip distribution, daily and AM/PM peak hour project trips were assigned to the adjacent roadway network. **Figure 5-3** and **Figure 5-4** display the Proposed Project trip assignment for construction workers and haul trucks, respectively, while **Figure 5-5** displays the total project trip assignment.

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Figure 5-1
Project Site Plans

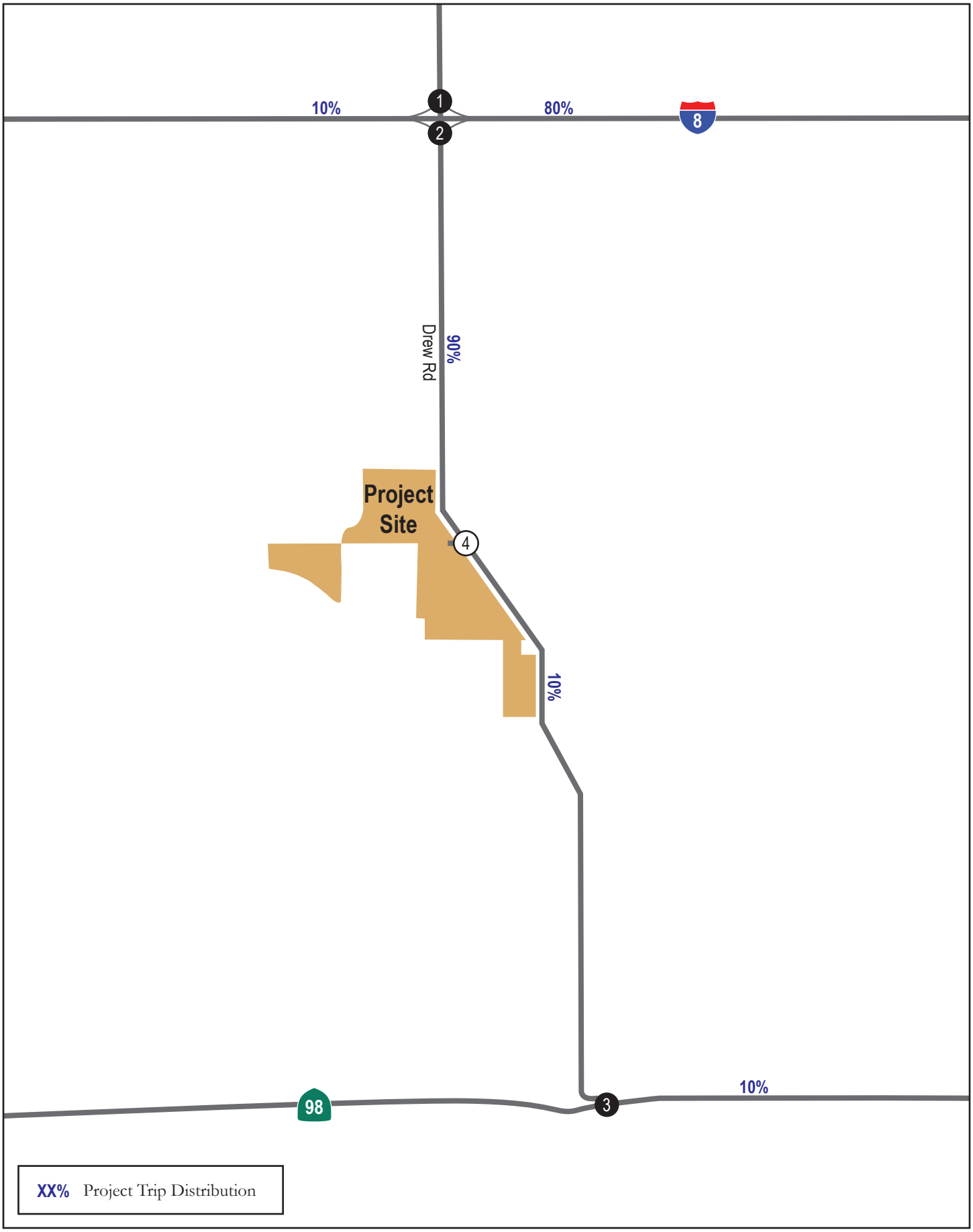

Figure 5-2
Project Trip Distribution

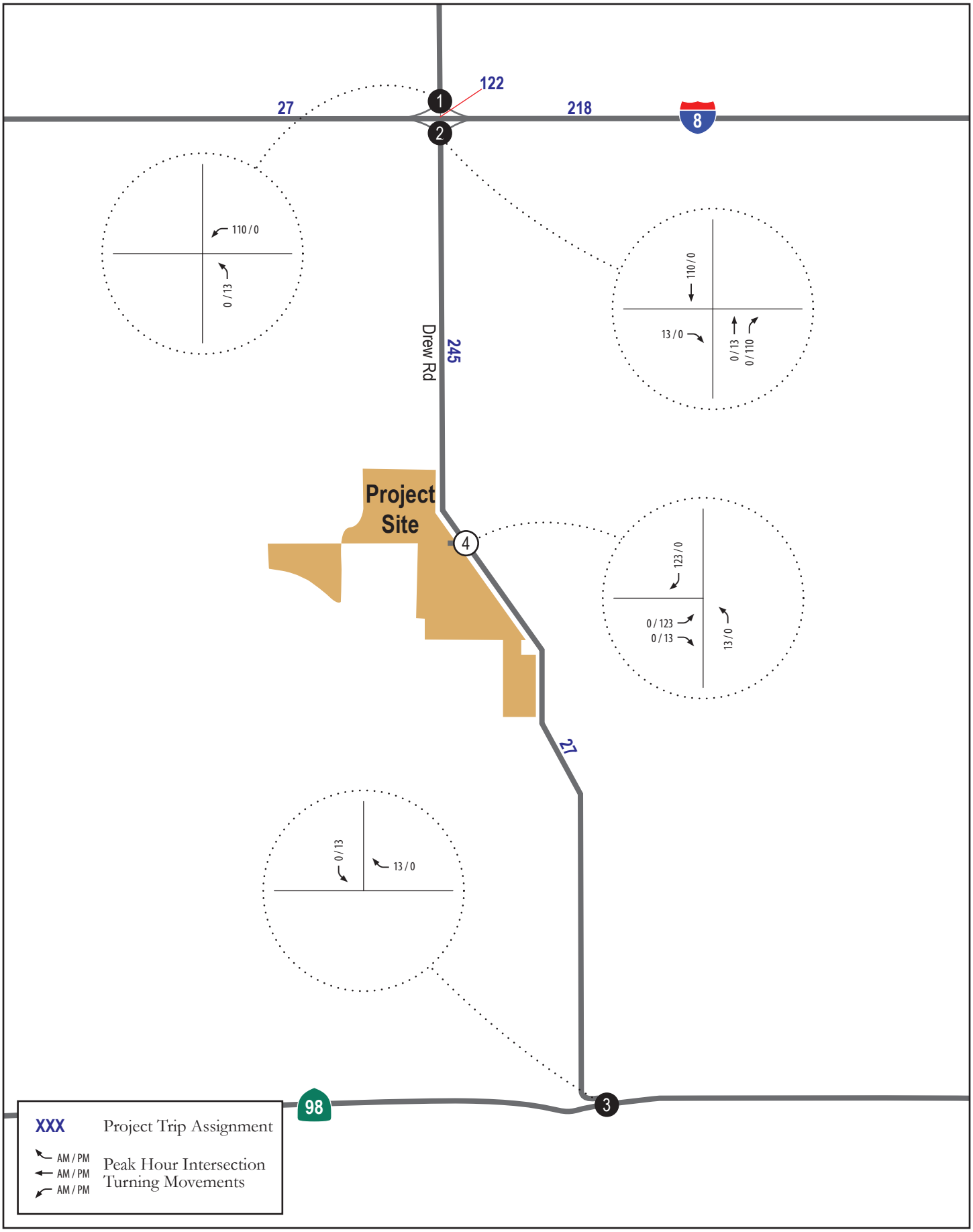

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Figure 5-3
Project Trip Assignment - Construction Workers

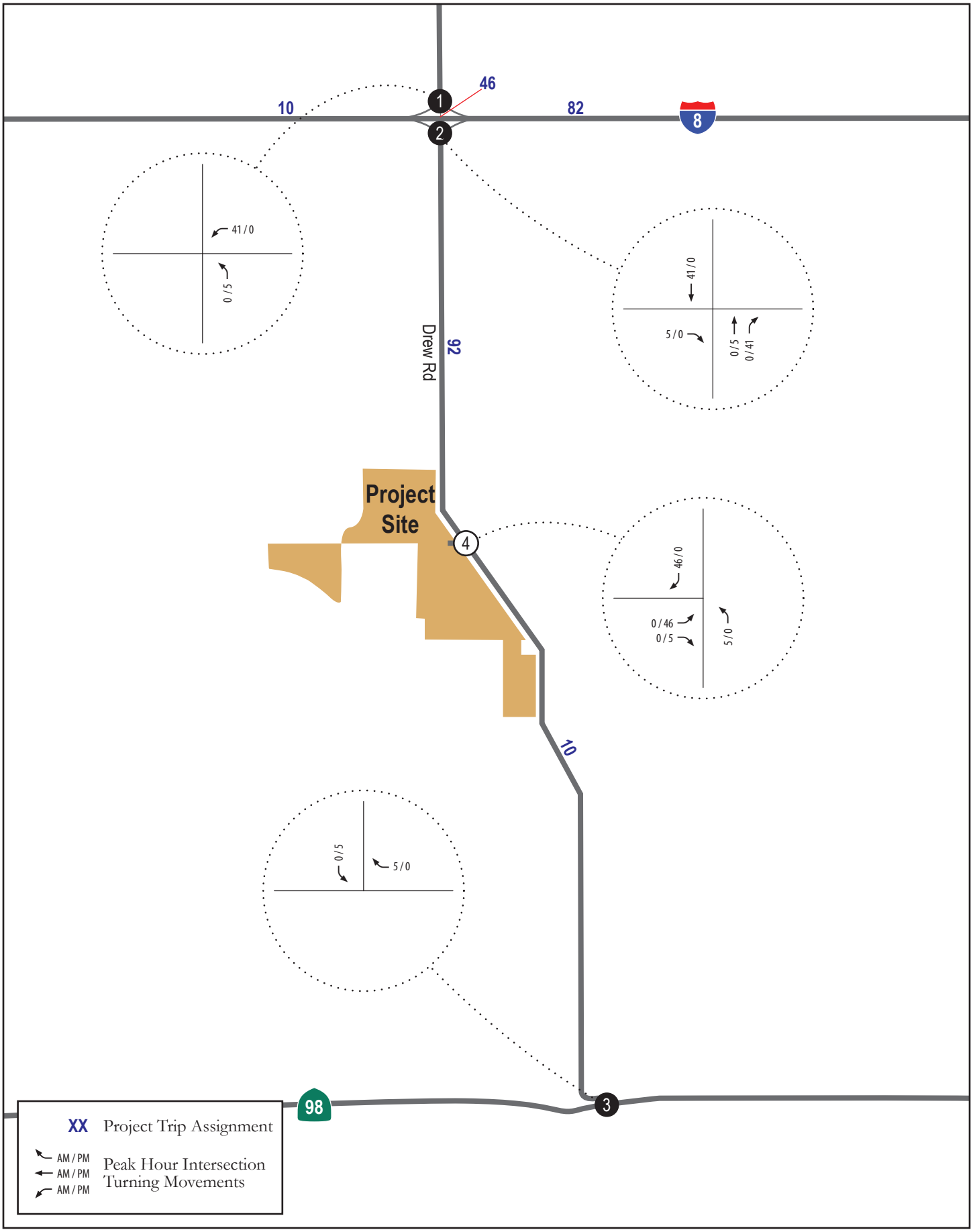

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Figure 5-4
Project Trip Assignment - Haul Trucks

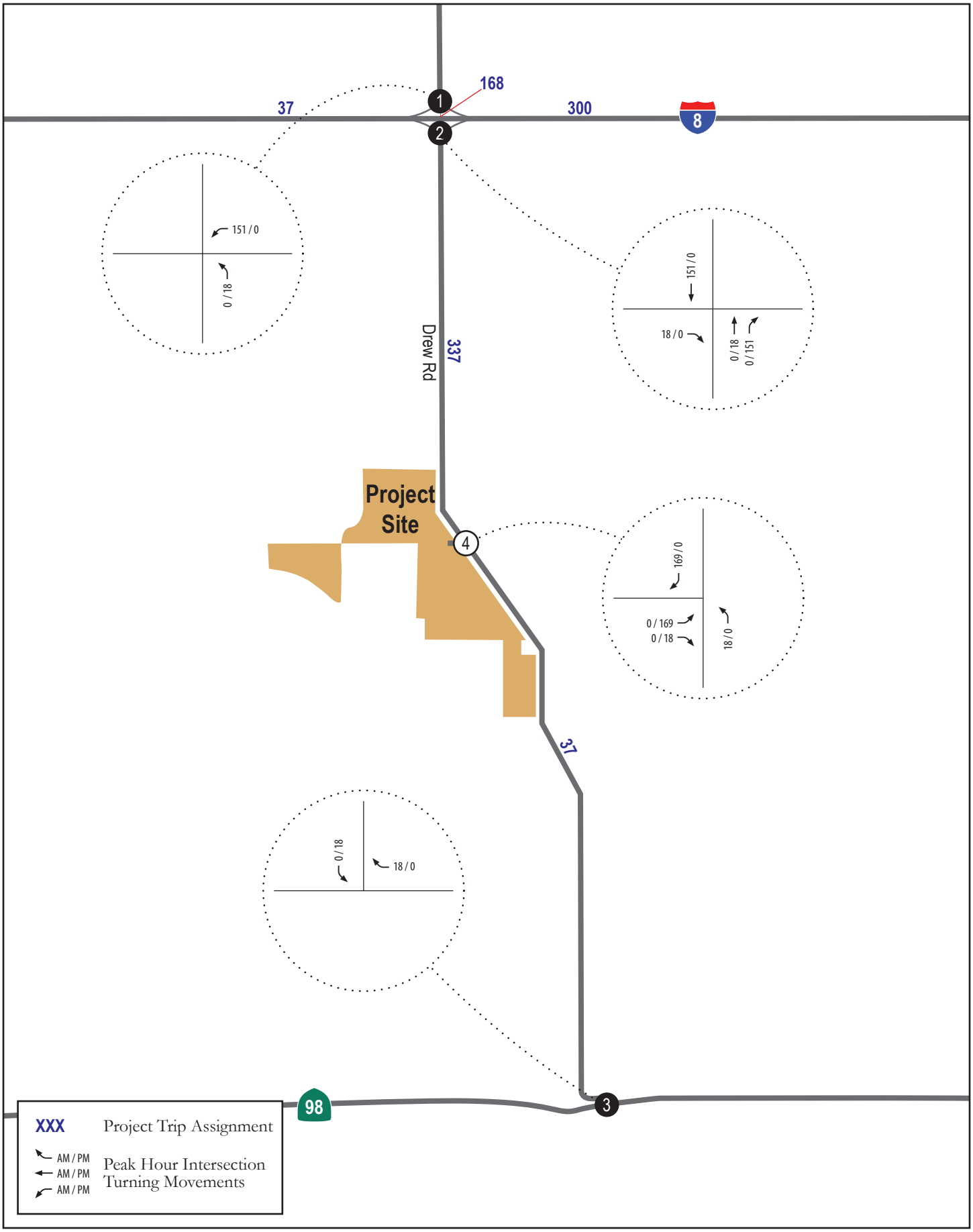


Figure 5-5
Project Trip Assignment - Construction Workers and Haul Trucks

6.0 Near-Term Base Plus Project

This section describes the key study area roadway segments and intersections, daily roadway and peak hour intersection traffic volume information, as well as the LOS analysis results under Near-Term Base Plus Project Conditions.

6.1. Roadway Network and Traffic Volumes

Roadway and intersection geometrics under Near-Term Base Plus Project conditions were assumed to be identical to the Near-Term Base conditions configurations. Near-Term Base Plus Project traffic volumes were derived by combining the Near-Term Base traffic volumes (displayed in Figure 4-1) and the project trip assignment volumes (displayed in Figure 5-3 and Figure 5-4). Daily and peak hour intersection volumes for this scenario are displayed in **Figure 6-1**.

6.2. Near-Term Base Plus Project Traffic Conditions

Analyses were conducted using the methodologies described in Chapter 2.0. Roadway segment, intersection and freeway mainline LOS analysis results are discussed separately in the following sections.

Roadway Segment Analysis

Table 6.1 displays the LOS analysis results for key roadway segments within the project study area, under Near-Term Base Plus Project conditions.

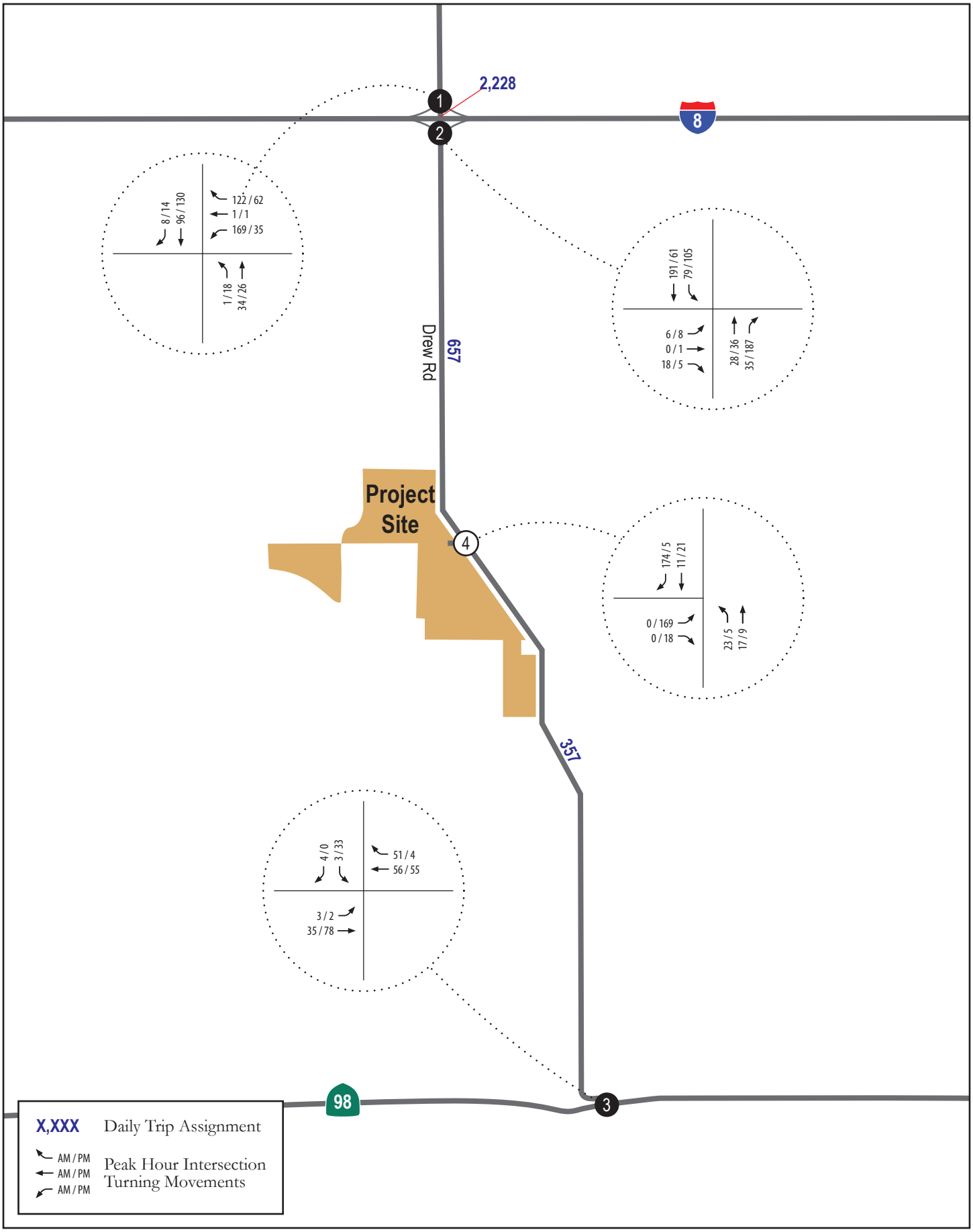
TABLE 6.1
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS - NEAR-TERM BASE PLUS PROJECT CONDITIONS

Roadway	Segment	Functional Classification	Average Daily Traffic (ADT)	LOS Threshold (LOS E)	V/C	LOS	LOS w/o Project	ΔV/C	SI?
Drew Road	Between I-8 Ramps	Minor Collector (Local Collector)	2,228	16,200	0.138	C or Better	C or Better	0.010	No
	I-8 EB Ramps and Access Road	Minor Collector (Local Collector)	657	16,200	0.041	C or Better	C or Better	0.021	No
	Access Road and SR-98	Minor Collector (Local Collector)	357	16,200	0.022	C or Better	C or Better	0.002	No

Source: Chen Ryan Associates; June 2017.

Notes:
V/C = Volume / Capacity.
SI? = Significant Impact?

As shown in Table 6.1 all study area roadway segments are projected to operate at LOS C or better under Near-Term Base Plus Project conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study roadway segments.



Vega SES LLC Solar Project
Transportation Impact Analysis
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Figure 6-1
Traffic Volumes
Near-Term Base Plus Project Conditions

Intersection Analysis

Table 6.2 displays intersection LOS and average vehicle delay results under Near-Term Base Plus Project conditions. LOS calculation worksheets for the Near-Term Base Plus Project conditions are provided in **Appendix F**.

TABLE 6.2
PEAK HOUR INTERSECTION LEVEL OF SERVICE
RESULTS – NEAR-TERM BASE PLUS PROJECT CONDITIONS

Intersections	Traffic Control	AM Peak Hour		PM Peak Hour		Delay w/o Project (sec) AM/PM	LOS w/o Project AM/PM	SI?
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS			
1. Drew Road and I-8 WB Ramps	SSSC	11.1	B	10.4	B	9.5 / 9.8	A / A	No
2. Drew Road and I-8 EB Ramps	SSSC	12.8	B	12.8	B	10.6 / 11.5	B / B	No
3. Drew Road and SR-98	SSSC	9.1	A	9.9	A	9.0 / 9.7	A / A	No
4. Drew Road and Project Driveway	SSSC	7.7	A	9.7	A	7.3 / 7.3	A / A	No

Source: Chen Ryan Associates; June 2017.

Notes:
For SSSC intersections, the delay shown is the worst delay experienced by any of the approaches.
SI? = Significant Impact?

As shown in Table 6.2, all study area intersections are projected to operate at LOS B or better during the AM and PM peak hours under Near-Term Base Plus Project conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study intersections.

Freeway Segment Analysis

Table 6.3 displays the freeway segment level of service analysis results under Near-Term Base Plus Project conditions.

TABLE 6.3
FREEWAY SEGMENT LEVEL OF SERVICE RESULTS – NEAR-TERM BASE PLUS PROJECT CONDITIONS

Freeway	Segment	ADT	Direction	# of Lanes	Capacity[a]	D[b]	K[c]	HVF[d]	Peak Hour Volume	V/C	LOS	ΔV/C	SI?
I-8	Dunaway Road to Drew Road	14,557	EB	2M	4,700	65.0%	11.4%	16.2%	1,130	0.240	A	0.000	N
			WB	2M	4,700	59.0%	14.5%	16.2%	1,310	0.279	A	0.000	N
	Drew Road to Forrester Road	16,720	EB	2M	4,700	54.8%	11.9%	10.7%	1,150	0.245	A	0.005	N
			WB	2M	4,700	64.2%	10.7%	10.7%	1,210	0.257	A	0.004	N

Source: Chen Ryan Associates; June 2017

Notes:
M = Mainline. A = Auxiliary Lane.
[a] The capacity is calculated as 2,350 ADT per main lane.
[b] D = Directional split.| [c] K = Peak hour %. | [d] HV = Heavy vehicle %.
SI? = Significant Impact?

As shown in Table 6.3, all of the study area freeway segments are projected to operate at acceptable LOS A in both directions under Near-Term conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study freeway mainline segments.

6.3 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.4 of this report, the addition of project traffic would not be associated with any identified significant traffic related impacts. Therefore, no traffic mitigation measures would be required under Near-Term Plus Project conditions.

7.0 Near-Term Base Plus Cumulative Project Plus Project (Buildout)

This section provides an analysis of Existing with Normal Background Growth (Near-Term Base) Plus Cumulative Project Plus Project (Buildout) conditions.

7.1 Cumulative Project Traffic

The Acorn Solar Project Transmission Line Right-of-Way was identified by County of Imperial staff as the sole cumulative project in the vicinity of the proposed project. Acorn Solar Project Transmission Line Right-of-Way is located south of Liebert Road, west of Mandrapa Road, and 5,400 feet north of SR-98, in the County of Imperial. The project proposes to build, operate, and maintain a single-circuit, 230 kilovolt (kV) aboveground generation-tie (gen-tie) line that will interconnect the Acorn Solar Project. The project is located on private land in western Imperial County, with the existing Imperial Valley Substation, located approximately 0.35 miles west of the Acorn Solar Project site on an existing approximately 1,300 acres of agricultural land.

The construction traffic generated from the project above was included in the Cumulative Project scenario. The cumulative project is divided into phases with the foundation installation and structure erection phase estimated to have the highest trip generation.

Table 7.1 displays trip generation for the cumulative project described above. Trip distribution and trip assignment for the cumulative project is derived from information in the Plan of Development document, which were provided by County of Imperial staff. Relevant excerpts from the different sources of information regarding cumulative projects are provided in **Appendix F.**

TABLE 7.1
CUMULATIVE PROJECT TRIP GENERATION – ACORN SOLAR PROJECT

Use	Units	Vehicle Conversion Rate	Rate	Daily Vehicle Trips	AM Peak Hour		PM Peak Hour	
					In	Out	In	Out
Construction Worker Traffic	50	1	2 / Worker	100	50	0	0	50
Construction Truck Traffic	49	3	2 / Truck	294	147	0	0	147
			Total	**394**	**197**	**0**	**0**	**197**

Source: Chen Ryan Associates, June 2017.

As shown, the cumulative project would generate a total of 394 average daily trips with 197 trips (197-in / 0-out) during the AM peak hour and 197 trips (0-in / 197-out) during the PM peak hour.

Figure 7-1 displays the location of the cumulative projects, and **Figure 7-2** displays the cumulative project trip assignment for construction workers and construction trucks.

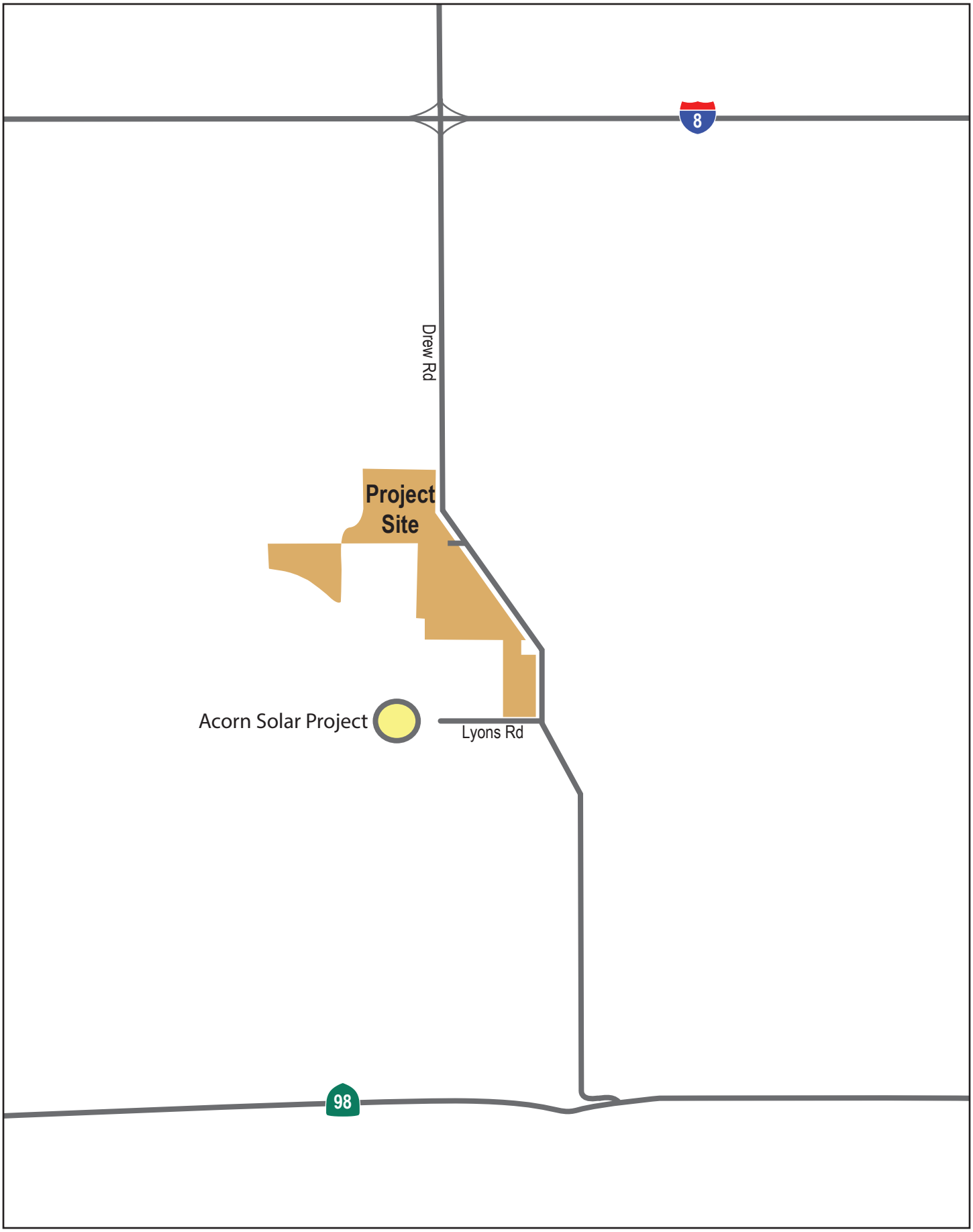

Figure 7-1
Cumulative Project Location

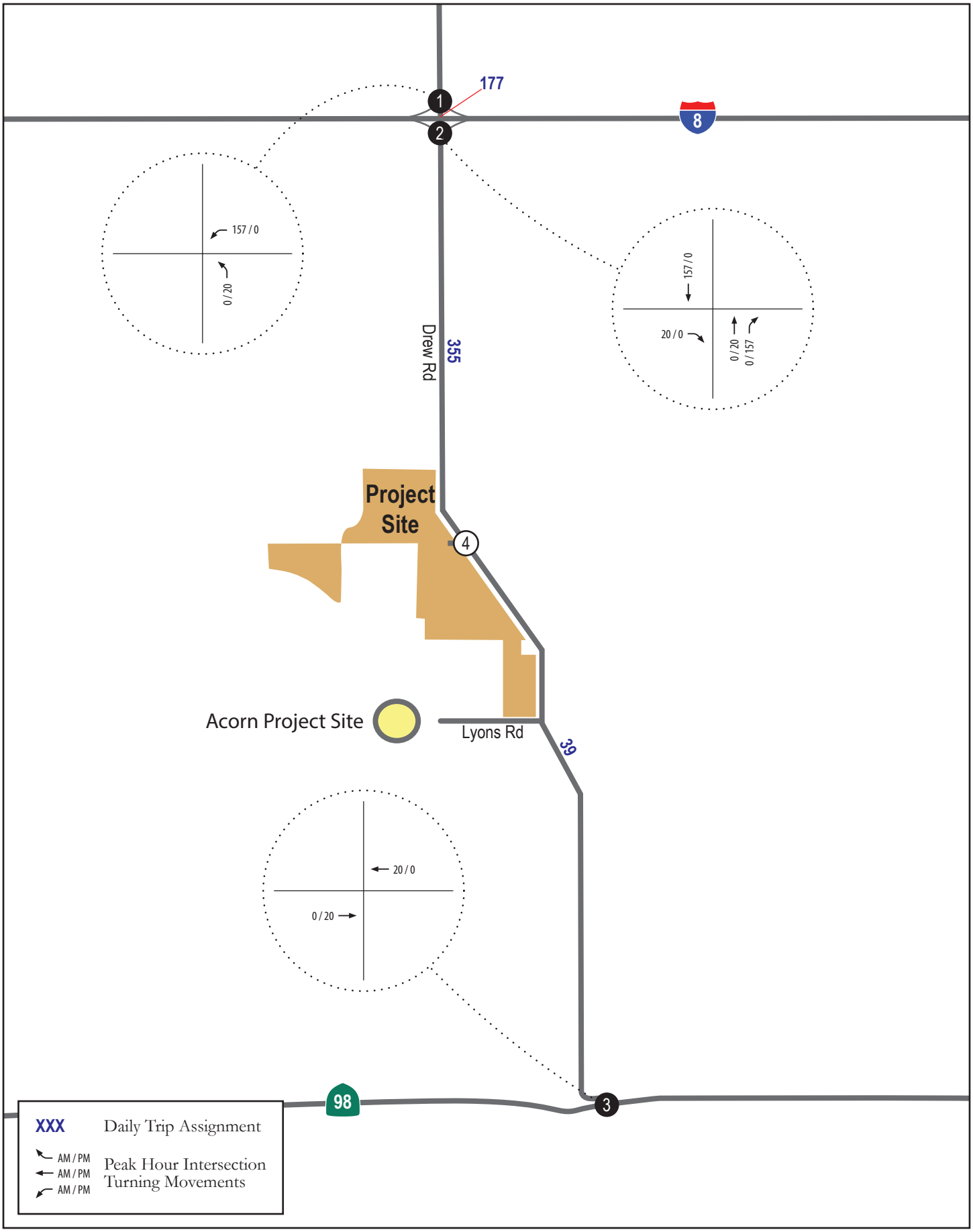

Figure 7-2
Traffic Volumes – Cumulative Projects Trip Assignment

7.2 Roadway Network and Traffic Volumes – Buildout

Roadway and intersection geometrics under Buildout conditions were assumed to be identical to the existing geometrics, as shown previously in Figure 3-1.

The Buildout conditions traffic volumes were derived by adding the additional trips generated by the cumulative project shown in Figure 7-1, to the Near-Term Base Plus Project (Figure 6-1). **Figure 7-3** displays the average daily roadway and peak hour intersection volumes for the study roadway segments and intersections under the Buildout conditions. Roadway segment, intersection and freeway mainline LOS analysis results are discussed separately below.

Roadway Segment Analysis

Table 7.2 displays the LOS analysis results for key roadway segments under Buildout conditions.

TABLE 7.2
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS – BUILDOUT CONDITIONS

Roadway	Segment	Functional Classification	Average Daily Traffic (ADT)	LOS Threshold (LOS E)	V/C	LOS	SI?
Drew Road	Between I-8 Ramps	Minor Collector (Local Collector)	2,405	16,200	0.148	C or Better	No
	I-8 EB Ramps and Access Road	Minor Collector (Local Collector)	1,012	16,200	0.062	C or Better	No
	Access Road and SR-98	Minor Collector (Local Collector)	396	16,200	0.024	C or Better	No

Source: Chen Ryan Associates, June 2017.

Notes:
V/C = Volume / Capacity.

As shown, all key study area roadway segments are projected to operate at LOS C or better under Buildout conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study roadway segments.

Intersection Analysis

Table 7.3 displays intersection LOS and average vehicle delay results under Buildout conditions. LOS calculation worksheets for the Buildout conditions are provided in **Appendix G**.

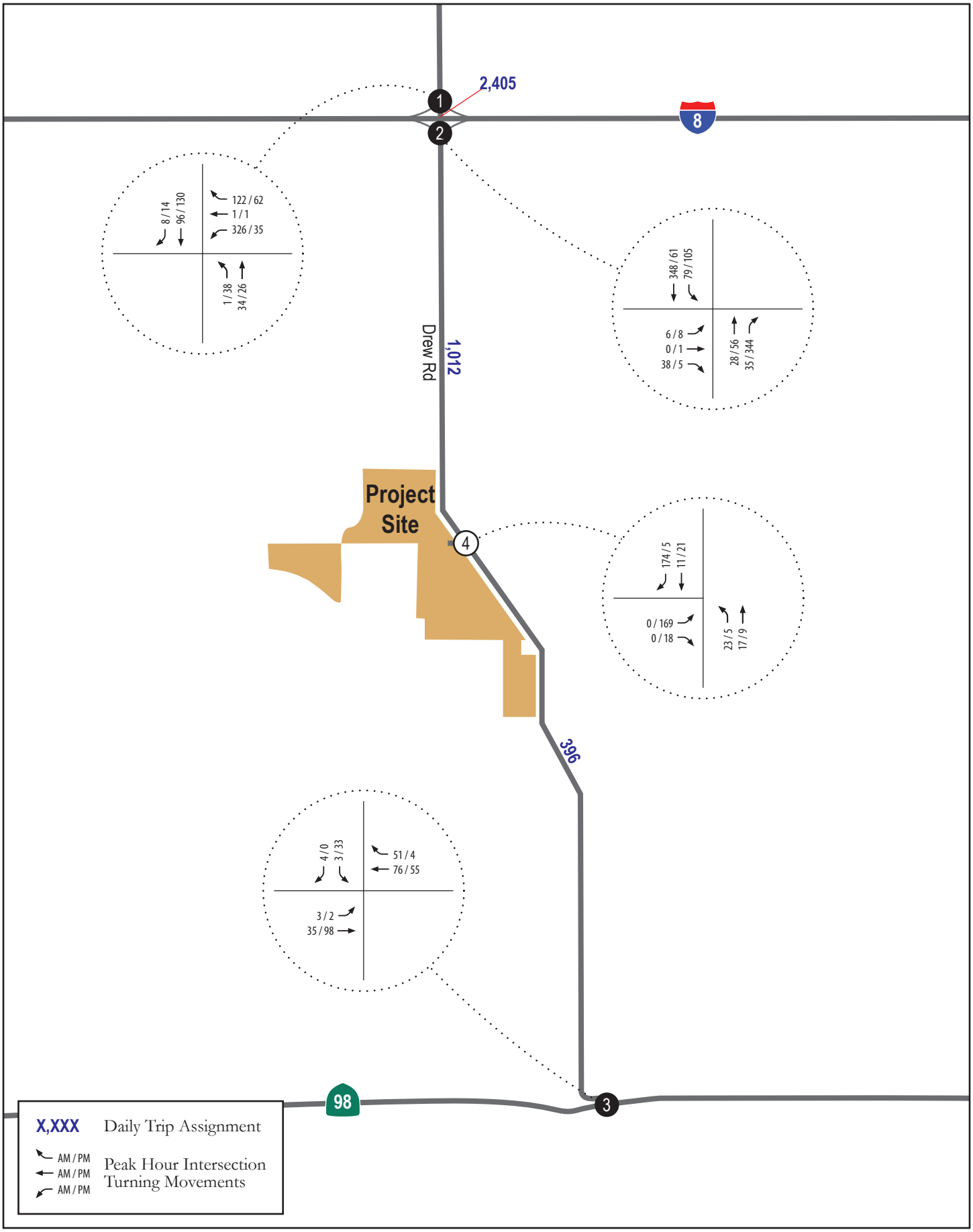

Figure 7-3
Traffic Volumes - Buildout Conditions

TABLE 7.3
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS - BUILDOUT CONDITIONS

Intersections	Traffic Control	AM Peak Hour		PM Peak Hour		SI?
		Avg. Delay (sec)	LOS	Avg. Delay (sec)	LOS	
1. Drew Road and I-8 WB Ramps	SSSC	14.4	B	11.1	B	No
2. Drew Road and I-8 EB Ramps	SSSC	14.6	B	14.5	B	No
3. Drew Road and SR-98	SSSC	9.2	A	10.1	B	No
4. Drew Road and Project Driveway	SSSC	7.7	A	9.7	A	No

Source: Chen Ryan Associates, June 2017.

Notes:
For SSSC intersections, the delay shown is the worst delay experienced by any of the approaches.

As shown in Table 7.3, all study area intersections are projected to operate at LOS B or better during the AM and PM peak hours under Buildout conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study intersections.

Freeway Segment Analysis

Table 7.4 displays the freeway segment level of service analysis results under Buildout conditions.

TABLE 7.4
FREEWAY SEGMENT LEVEL OF SERVICE RESULTS – BUILDOUT CONDITIONS

Freeway	Segment	ADT	Direction	# of Lanes	Capacity[a]	D[b]	K[c]	HVF[d]	Peak Hour Volume	V/C	LOS
I-8	Dunaway Road to Drew Road	14,557	EB	2M	4,700	65.0%	11.4%	16.2%	1,130	0.240	A
			WB	2M	4,700	59.0%	14.5%	16.2%	1,310	0.279	A
	Drew Road to Forrester Road	16,720	EB	2M	4,700	54.8%	11.9%	10.7%	1,150	0.245	A
			WB	2M	4,700	64.2%	10.7%	10.7%	1,210	0.257	A

Source: Chen Ryan Associates, June 2017.

Notes:
M = Mainline. A = Auxiliary Lane.
[a] The capacity is calculated as 2,350 ADT per main lane.
[b] D = Directional split.| [c] K = Peak hour %. | [d] HV = Heavy vehicle %.
SI? = Significant Impact?

As shown in Table 7.4, all of the study area freeway segments are projected to operate at acceptable LOS A in both directions under Buildout conditions. Therefore, based on the significance criteria outlined in Section 2.4, the Proposed Project would not be associated with a significant impact to any key study freeway mainline segments.

7.3 Impact Significance and Mitigation

Based upon the significance criteria presented in Section 2.4 of this report, the addition of project traffic would not be associated with any identified significant traffic related impacts. Therefore, no traffic mitigation measures would be required under Buildout conditions.

8.0 Findings and Recommendations

This chapter provides a summary of the key findings and study recommendations, including the LOS results for each scenario analyzed. Since the LOS of the studied roadways, intersections, and freeway segments are LOS C or better, no mitigation measures are required.

8.1 Summary of Roadway and Intersection Analyses

Summary of Roadway Segment Analyses

Table 8.1 displays roadway segment LOS results for each scenario analyzed.

TABLE 8.1
SUMMARY OF ROADWAY SEGMENT LEVEL OF SERVICE RESULTS

Roadway	Segment	Existing	Near-Term Base	Near-Term Base + Project	Buildout
Drew Road	Between I-8 Ramps	C or Better	C or Better	C or Better	C or Better
	I-8 EB Ramps and Access Road	C or Better	C or Better	C or Better	C or Better
	Access Road and SR-98	C or Better	C or Better	C or Better	C or Better

Source: Chen Ryan Associates, June 2017.

The following key points summarize the roadway segment analyses:

1. *Existing Conditions* – All key study area roadway segments within the project study area are projected to operate at acceptable LOS C or better under Existing Conditions.

2. *Near-Term Base Conditions* – All key study area roadway segments within the project study area are projected to operate at acceptable LOS C or better under both the Near-Term and Near-Term Plus Project conditions.

3. *Buildout Conditions* – All key study area roadway segments within the project study area are projected to operate at acceptable LOS C under Buildout conditions.

Summary of Intersection Analyses

Table 8.2 displays intersection LOS results for each of the analyzed scenarios.

TABLE 8.2
SUMMARY OF INTERSECTION PEAK HOUR LEVEL OF SERVICE RESULTS

Intersection	Existing		Near-Term Base		Near-Term Base + Project		Buildout	
	AM	PM	AM	PM	AM	PM	AM	PM
1. Drew Road and I-8 WB Ramps	A	A	A	A	B	B	B	B
2. Drew Road and I-8 EB Ramps	B	B	B	B	B	B	B	B
3. Drew Road and SR-98	A	A	A	A	A	A	A	B
4. Drew Road and Project Driveway	A	A	A	A	A	A	A	A

Source: Chen Ryan Associates, June 2017.

The following key points summarize the intersection analyses:

1. *Existing Conditions* – All key study area intersections within the project study area are projected to operate at acceptable LOS B or better under Existing Conditions.

2. *Near-Term Base Conditions* – All of the key study intersections are projected to operate at LOS B or better under both the Near-Term and Near-Term Plus Project conditions.

3. *Buildout Conditions* – All of the key study area intersections are projected to operate at LOS B or better under Buildout conditions.

Summary of Freeway Segment Analyses

Table 8.3 displays freeway segment LOS results for each of the analyzed scenarios.

TABLE 8.3
SUMMARY OF FREEWAY SEGMENT LEVEL OF SERVICE RESULTS

Freeway	Segment	Direction	Existing	Near-Term	Near-Term + Project	Buildout
I-8	Dunaway Road to Drew Road	EB	A	A	A	A
		WB	A	A	A	A
	Drew Road to Forrester Road	EB	A	A	A	A
		WB	A	A	A	A

Source: Chen Ryan Associates, June 2017.

The following key points summarize the intersection analyses:

1. *Existing Conditions* – All key study area freeway segments within the project study area are projected to operate at acceptable LOS A under Existing Conditions.

2. *Near-Term Conditions* – All of the key study freeway segments are projected to operate at LOS A under both the Near-Term and Near-Term Plus Project conditions.

3. *Buildout Conditions* – All of the key study area freeway segments are projected to operate at LOS A under Buildout conditions.

8.2 Summary of Mitigation Measures

This section summarizes project impacts and recommended mitigation measures (if any) at study area roadways and intersections under the various timeframes analyzed.

Near-Term Plus Project Conditions
Project Impact: None.

Buildout Conditions
Project Impact: None.