Appendix B –
Sanctuary Residential 9 Homes Local Transportation Analysis

Sanctuary Residential 9 Homes (MULTI-002610-2018, DR-002611-2018, SUB-002612-2018, ITRP-004018-2020, USE-003068-2019)

CITY OF ENCINITAS
Ranch View Terrace
December 9, 2021

Local Transportation Analysis

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Job #1903

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Executive Summary
Sanctuary Residential Project (9 Residential Lots)

This Local Transportation Analysis determines if the proposed project is calculated to create any traffic effects on the study area roadways in the vicinity of the project. The proposed project includes nine (9) residential lots located on Ranch View Terrace west of Rancho Santa Fe Road in Encinitas, California. The site is currently vacant. Project access is from Ranch View Terrace.

This analysis is based on traffic analysis criteria outlined in the local San Diego Institute of Transportation Engineers (ITE) *Guidelines for Traffic Impact Studies in the San Diego Region*, May 2019. Project traffic generation was calculated using the San Diego Association of Governments (SANDAG) trip rates from the *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002. The project is calculated to generate 90 ADT, 7 AM peak hour trips and 9 PM peak hour trips. Based on a review of City of Encinitas on-line cumulative projects and coordination with City staff, cumulative projects anticipated to add traffic to the study area were included for analysis. The following scenarios were analyzed: Existing, Existing + Project, Existing + Cumulative, and Existing + Cumulative + Project conditions. The operational findings are summarized below by scenario:

1) Under existing conditions, the study intersection and the street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E).

2) Under existing plus project conditions, the study intersection and street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E). <u>The addition of project traffic does not create a traffic effect.</u>

3) Under existing plus cumulative conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS C or better under existing conditions and LOS D or better under cumulative conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would fall from LOS D under existing conditions to LOS E under cumulative conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would fall from LOS E under existing conditions to LOS F under cumulative conditions.

4) Under existing plus cumulative plus project conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS D or better under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would operate at LOS E under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would operate at LOS

F under cumulative and cumulative plus project conditions. The addition of project traffic does not create a traffic effect.

No traffic effects were calculated; therefore, off-site roadway improvements are not required.

1.0 Introduction

This Local Transportation Analysis (LTA) determines if the proposed project is calculated to create any traffic effects on the study area roadways in the vicinity of the project. The proposed project includes nine (9) residential lots located on Ranch View Terrace west of Rancho Santa Fe Road in Encinitas, California. The site is currently vacant. Project access is from Ranch View Terrace. The regional location of the project is shown in **Figure 1**. A site plan is shown in **Figure 2.**

This report describes the existing roadway network in the vicinity of the project site and includes a review of the existing and proposed activities for weekday peak AM and PM periods, and daily traffic conditions when the project is completed. The format of this study includes the following chapters:

1.0 Introduction
2.0 Study Methodology
3.0 Existing Conditions
4.0 Project Description
5.0 Existing + Project Conditions
6.0 Cumulative Projects
7.0 Existing + Cumulative Conditions
8.0 Existing + Cumulative + Project Conditions
9.0 Conclusion
10.0 References

Figure 1: Project Location

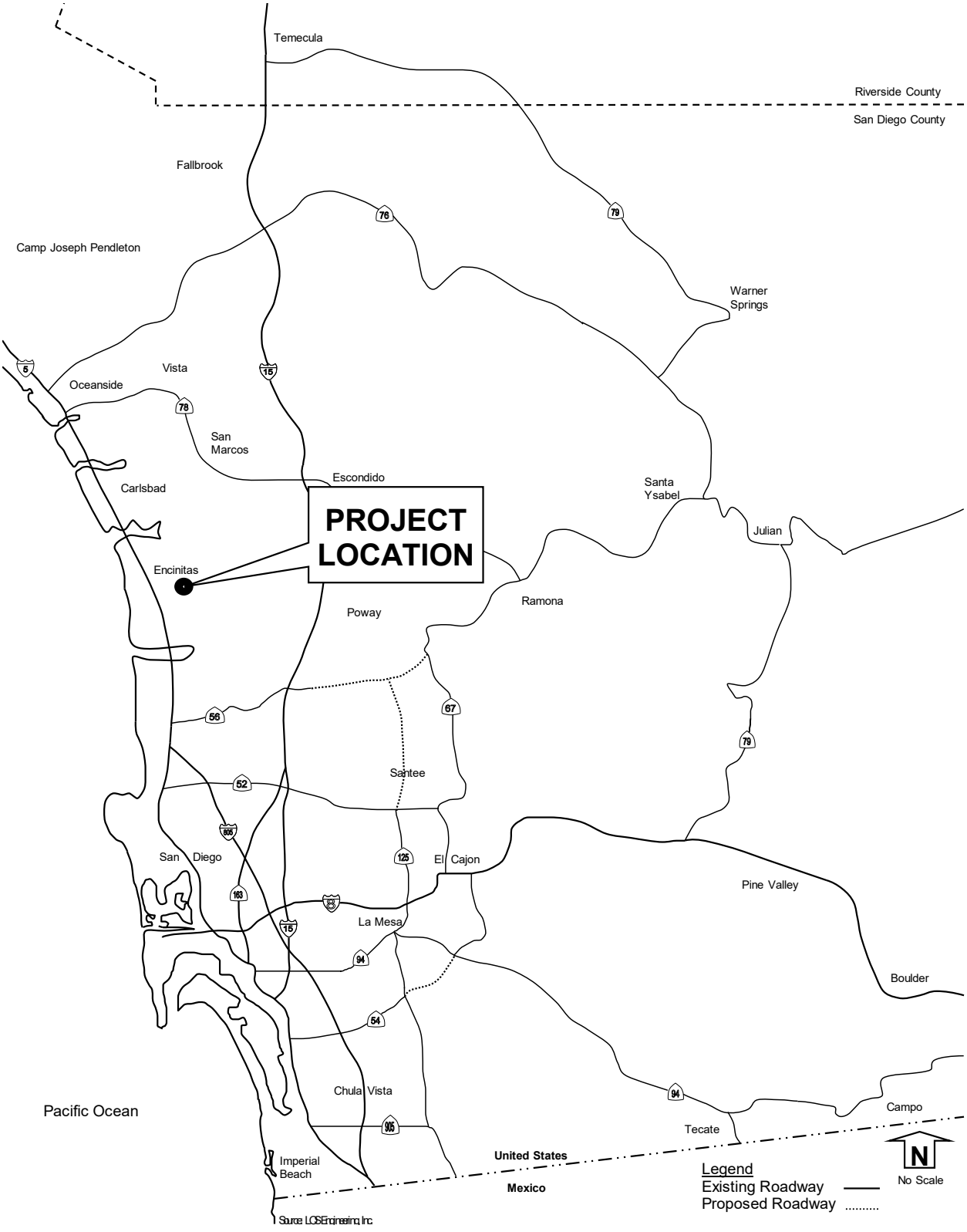
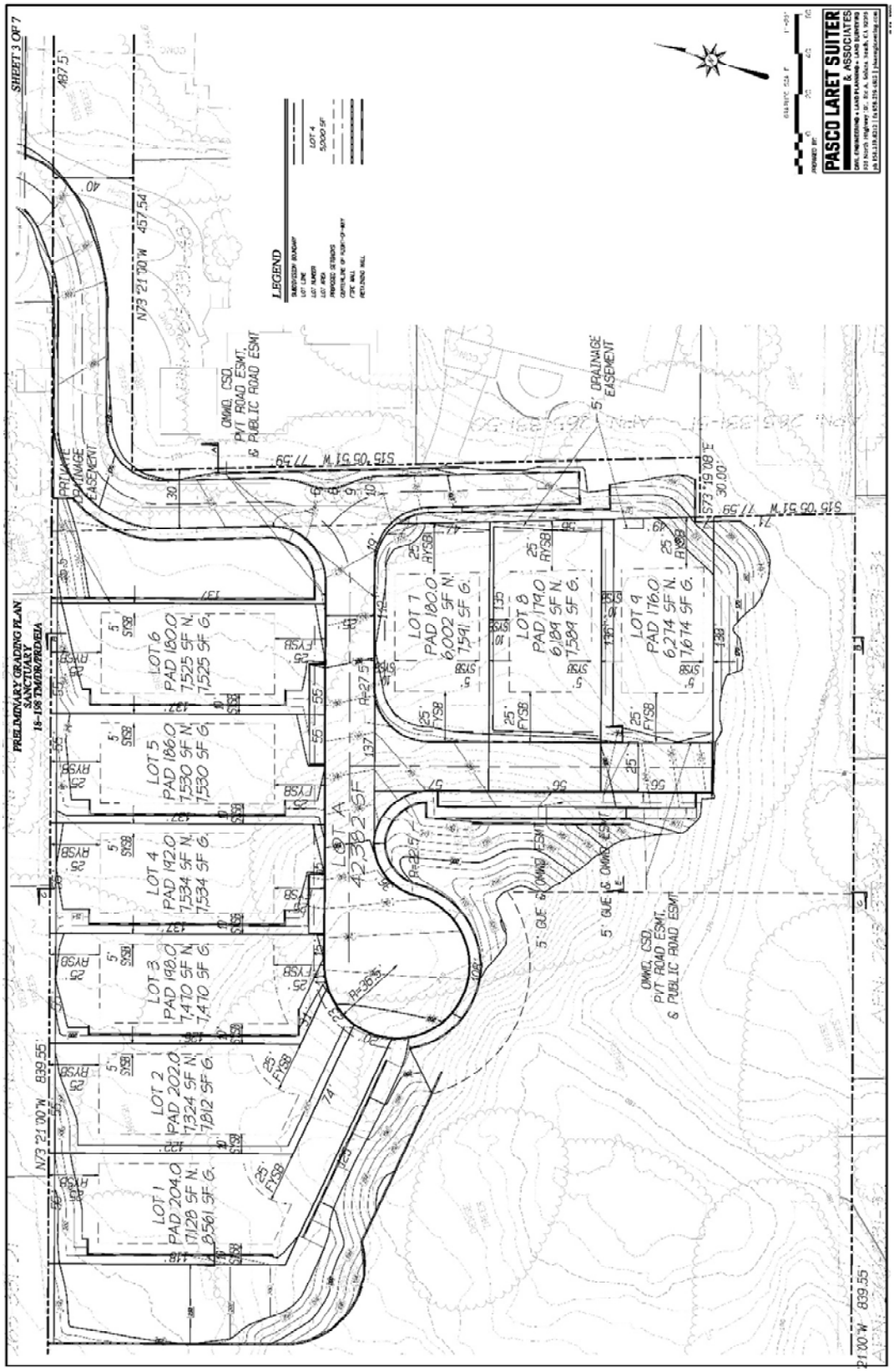


Figure 2: Site Plan



Source: Pasco Laret Suiter

2.0 Traffic Analysis Methodology and Significance Criteria

The parameters by which this traffic study was prepared included the determination of what intersection and roadways are to be analyzed, the scenarios to be analyzed and the methods required for analysis. The criteria for each of these parameters are included herein.

2.1 Study Area Criteria

The following intersection was analyzed as part of this study:

1) Rancho Santa Fe Road at Ranch View Terrace (un-signalized)

The following street segments were also analyzed as part of this study:

1) Rancho Santa Fe Road between Whisper Wind Dr and Ranch View Terrace, and
2) Rancho Santa Fe Road between Ranch View Terrace and Woodwind Dr

2.2 Scenario Criteria

The number of scenarios to be analyzed is typically based on the size of the project. For this project, the following scenarios were included:

1) Existing Conditions
2) Existing + Project Conditions
3) Existing + Cumulative Conditions
4) Existing + Cumulative + Project Conditions

2.3 Traffic Analysis Criteria

The traffic analyses prepared for this study were based on the *6th Edition Highway Capacity Manual* (HCM) operations analysis using Level of Service (LOS) evaluation criteria. The operating conditions of the study intersection and street segments were measured using the HCM LOS designations, which ranges from A through F. LOS A represents the best operating condition and LOS F denotes the worst operating condition.

2.3.1 Intersection

The study intersection was analyzed based on the **operational analysis** outlined in the 6th Ed HCM. This process defines LOS in terms of **average control delay** per vehicle, which is measured in seconds. LOS at the intersection were calculated using the computer software program Synchro 10 (Trafficware Corporation). The 6th Ed HCM LOS for the range of delay by seconds for un-signalized and signalized intersection is described in **Table 1**.

TABLE 1: INTERSECTION LEVEL OF SERVICE DEFINITIONS (6TH EDITION HCM)

Level of Service	Un-Signalized (TWSC and AWSC) Control Delay (sec/veh where v/c ≤ 1)	Signalized Control Delay (sec/veh where v/c ≤ 1)
A	0-10	≤ 10
B	> 10-15	> 10-20
C	> 15-25	> 20-35
D	> 25-35	> 35-55
E	> 35-50	> 55-80
F	> 50	> 80

TWSC: Two Way Stop Control. AWSC: All Way Stop Control. Source: 6th Edition HCM (exhibit 20-2 for two way stop control, exhibit 21-8 for all way stop control, and exhibit 19-8 for signalized intersection). For unsignalized intersection, the control delay is the worst movement delay in seconds/vehicle.

2.3.2 Street Segments

The street segments were analyzed based on the functional classification of the roadway using the City of Encinitas *Public Road Standards* General Plan Circulation Element Roadway Capacity Standards (excerpts included in **Appendix A**). The roadway segment capacity and LOS standards used to analyze street segments are summarized in **Table 2**.

TABLE 2: STREET SEGMENT DAILY CAPACITY AND LOS (CITY OF ENCINITAS)

Facility Type	Number of Lanes	LOS C	LOS D	LOS E
Prime Arterial	6	<46,000	<51,200	<57,000
Prime Arterial – Augmented	6	<53,000	<60,000	<66,000
Major Roadway	4	<28,200	<31,600	<35,200
Major Roadway - Augmented	4+	<36,300	<41,000	<45,400
Collector Roadway	4	<26,000	<29,200	<32,400
Local Roadway - Augmented	2+	<16,000	<18,000	<20,000
Local Roadway	2	<11,200	<12,600	<14,000

Source: City of Encinitas *Public Road Standards* April 1991.

2.4 Project's Transportation Effect

If a proposed project's traffic causes the values shown in the **Table 3** to be exceeded, the effects of the project are determined to justify improvements (ITE excerpts included in **Appendix B**).

TABLE 3: CITY OF ENCINITAS DETERMINATION FOR POTENTIAL ROADWAY IMPROVEMENTS

Level of Service with Project*	Allowable Change Due to Project Effect**				
	Freeways	Roadway Segments		Intersections	Ramp Metering
	V/C	V/C	Speed (mph)	Delay (sec.)	Delay (min.)
E & F	0.01	0.02	1	2	2*

Source: San Diego ITE Guidelines for Transportation Impact Studies in the San Diego Region, 2019.

* All level of service measurements are based upon Highway Capacity Manual (HCM) procedures for peak-hour conditions. The target LOS for freeways, roadways, and intersections is generally "D". For metered freeway ramps, LOS does not apply; however, ramp meter delays above 15 minutes are considered excessive.

** If a proposed project's traffic causes the values shown in the table to be exceeded, the effects of the project are determined to justify improvements. These changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible improvements within the LTA report that will maintain the traffic facility at the target LOS or restore to pre-project conditions. If the LOS with the proposed project becomes worse than the target (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, roadway improvements should be considered.

*** See Attachment B for ramp metering analysis.

Key: V/C = Volume to Capacity
Speed = Speed measured in miles per hour
Delay = Average stopped delay per vehicle measures in seconds for intersection, or minutes for ramp meters
LOS = Level of Service

3.0 Existing Conditions

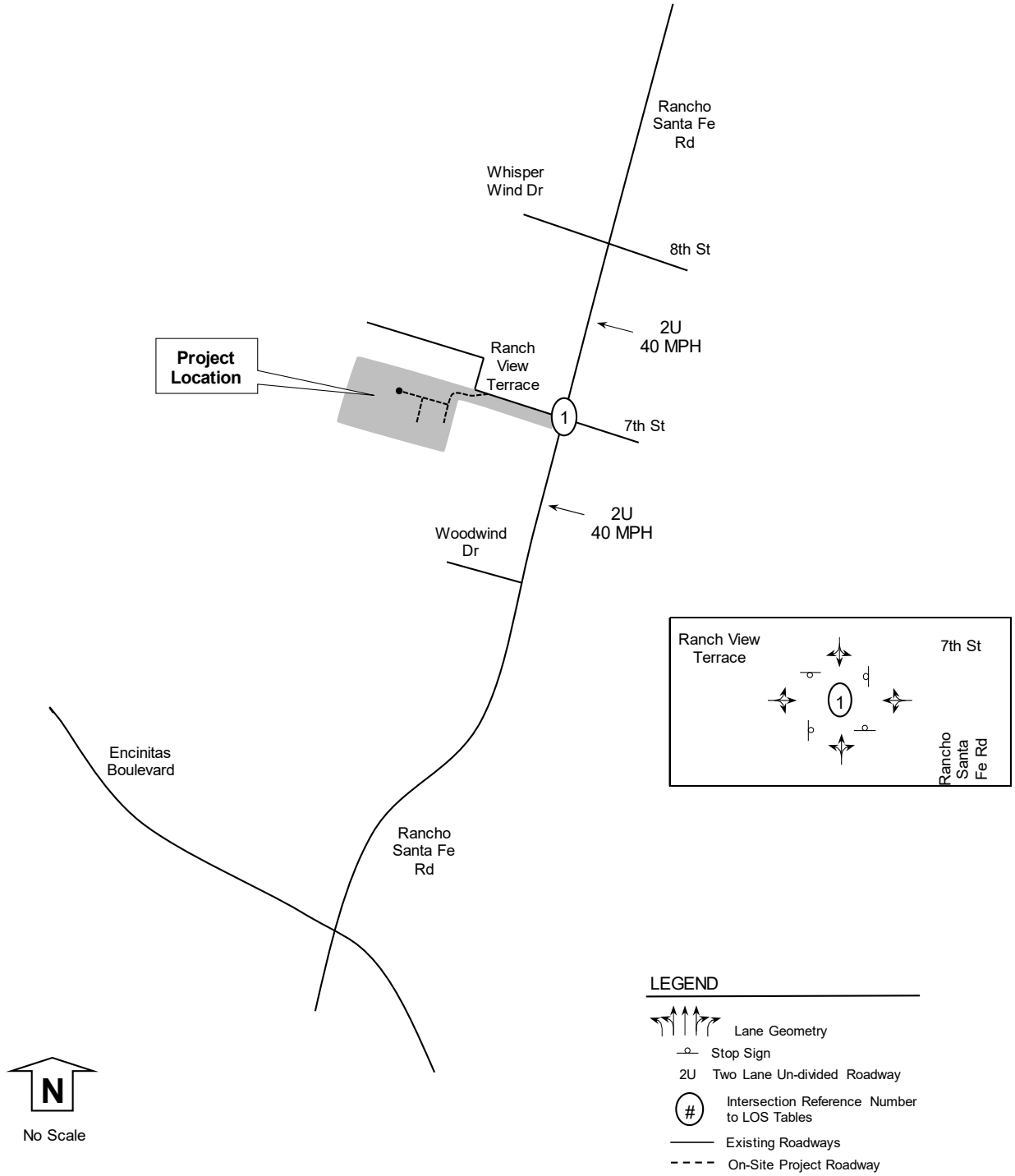
This section describes the study area street system, peak hour intersection volumes, daily roadway volumes, and existing LOS.

3.1 Existing Street System

In the vicinity of the project, the following circulation element roadway was analyzed as part of this study and is described below. The existing roadway conditions are shown in **Figure 3**.

Rancho Santa Fe Road from Whisper Wind Drive to Woodwind Drive is a two (2) lane un-divided roadway. On-street parking is prohibited on both sides of the roadway. The posted speed limit is 40 Miles Per Hour (MPH). This segment of Rancho Santa Fe Road is classified as a two lane *Local Road - Augmented Facility* on the City of Encinitas Circulation Plan (Appendix A); however, a functional capacity of a 2 lane local road was applied to represent actual conditions.

Figure 3: Existing Roadway Conditions



3.2 Existing Traffic Volumes

Existing peak hour traffic volumes were collected from 7:00 to 9:00 AM and from 4:00 to 6:00 PM when nearby schools were in session for the following intersection with counts dates in parentheses:

1) Rancho Santa Fe Road at Ranch View Terrace (Tuesday, February 12, 2019)

The following street segments were also analyzed as part of this study:

1) Rancho Santa Fe Road between Whisper Wind Dr and Ranch View Terrace (Tuesday, February 12, 2019)
2) Rancho Santa Fe Road between Ranch View Terrace and Woodwind Dr (Tuesday, February 12, 2019)

The existing AM, PM, and daily volumes are shown on **Figure 4**, with count data included in **Appendix C**. The LOS calculated for the intersection and street segments under existing conditions are shown in **Tables 4 and 5**, respectively.

TABLE 4: EXISTING INTERSECTION OPERATIONS

Intersection and (Analysis)[1]	Movement	Peak Hour	Existing Delay[2]	Existing LOS[3]
1) Rancho Santa Fe	All	AM	24.9	C
at Ranch View Terrace (U)	All	PM	15.0	B

Notes: 1) Intersection Analysis - (S) Signalized, (U) Unsignalized. 2) Delay - HCM Average Control Delay in seconds.
3) LOS: Level of Service.

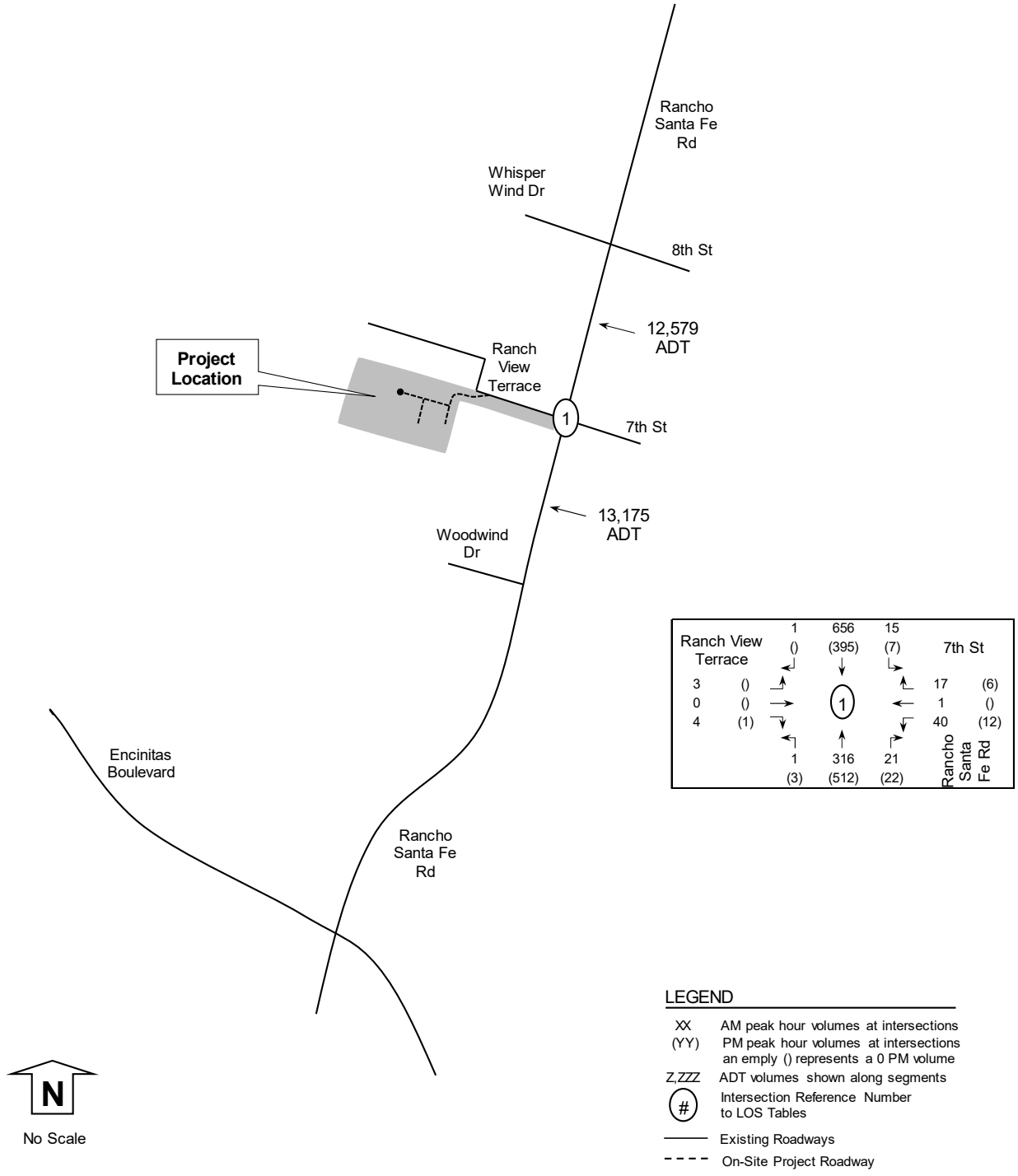
TABLE 5: EXISTING SEGMENT VOLUMES AND OPERATIONS

Segment	Functional Classification*	Existing # of lanes	Daily Volume	LOS E Capacity	V/C	LOS
Rancho Santa Fe Road						
Whisper Wind to Ranch View Terrace	Local Road	2	12,579	14,000	0.90	D
Ranch View Terrace to Woodwind	Local Road	2	13,175	14,000	0.94	**E**

Notes: Daily volume is an average 24 hour volume. LOS: Level of Service. V/C: Volume to Capacity ratio.
*Functional Classification represents existing segment functionality and not the ultimate classification.

Under existing conditions, the study intersection and the street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E). Intersection LOS calculations are included in **Appendix D**.

Figure 4: Existing Volumes



4.0 Project Description

The proposed project includes nine (9) residential lots located on Ranch View Terrace west of Rancho Santa Fe Road in Encinitas, California. The site is currently vacant. Project access is from Ranch View Terrace.

4.1 Project Traffic Generation

Project traffic generation was calculated using the San Diego Association of Governments (SANDAG) trip rates from the *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002. The project is calculated to generate 90 ADT, 7 AM peak hour trips (2 inbound and 5 outbound), and 9 PM peak hour trips (6 inbound and 3 outbound) as shown in **Table 6**.

TABLE 6: PROJECT TRAFFIC GENERATION

Proposed Project						AM				PM	
	Rate	Size & Units	ADT	%	Split	IN	OUT	%	Split	IN	OUT
10 Single Family Homes	10 /DU	9 DU	**90**	8%	0.3 0.7	**2**	**5**	10%	0.7 0.3	**6**	**3**

Source: SANDAG *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region,* April 2002. DU: Dwelling Unit.

ADT-Average Daily Traffic; Split-percent inbound and outbound.

4.2 Project Distribution and Assignment

Project trips were distributed to the adjacent roadway network based on background traffic patterns, commuter patterns, trips attractors, and schools. The project distribution is shown in **Figure 5** with assignment of the project volumes shown in **Figure 6.**

4.3 Project Access

Project access is from Ranch View Terrace.

4.4 Project On-Site Parking

Each residential dwelling unit is planned with a garage.

Figure 5: Project Distribution

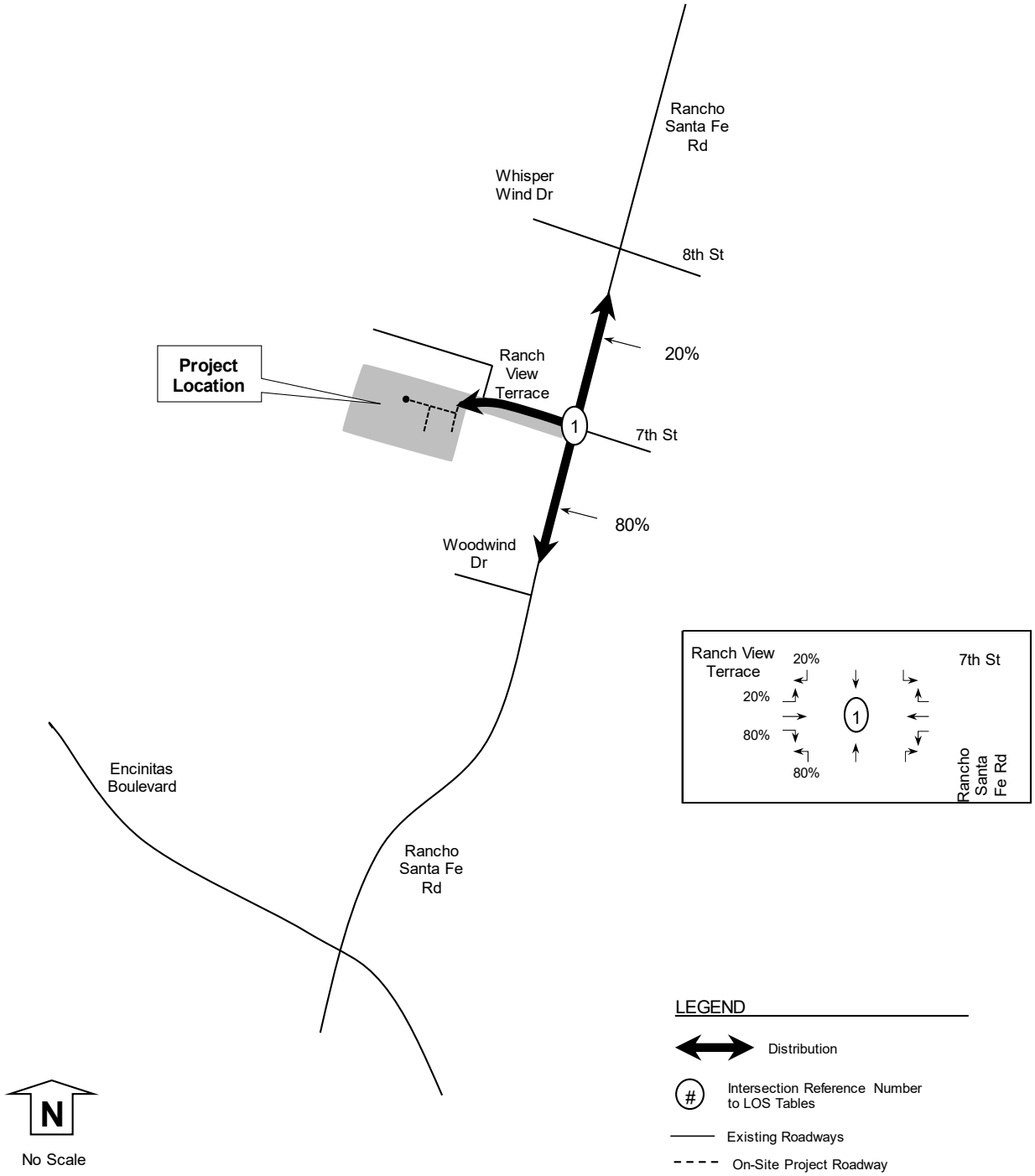
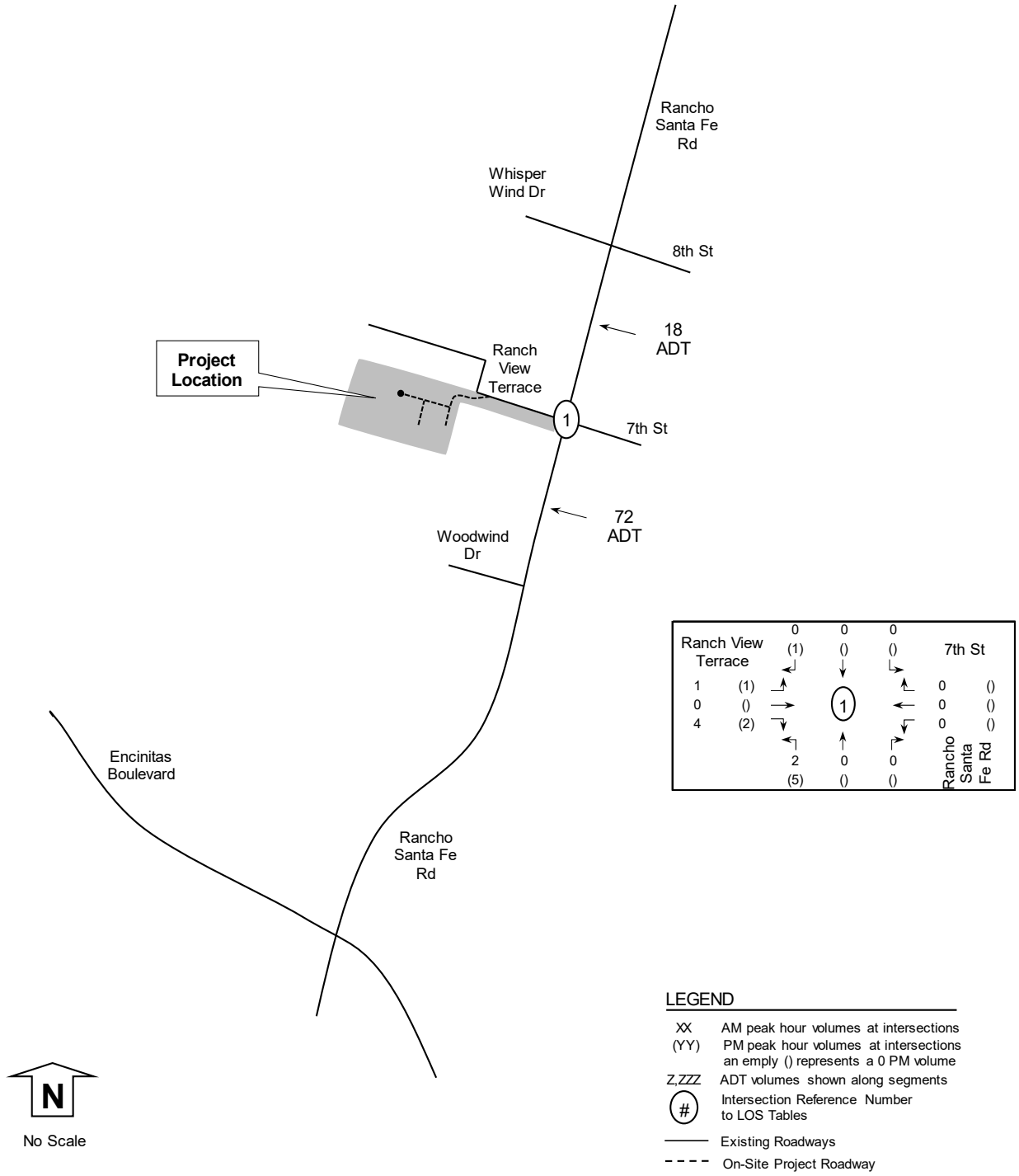


Figure 6: Project Volumes



5.0 Existing + Project Conditions

This scenario accounts for the addition of project traffic onto existing traffic for AM, PM and daily conditions. The peak hour intersection volumes and daily traffic volumes are shown in **Figure 7**. The LOS calculated for the intersection and street segments under existing plus project conditions are shown in **Tables 7 and 8**.

TABLE 7: EXISTING + PROJECT INTERSECTION OPERATIONS

Intersection and	Movement	Peak	Existing		Existing + Project			
(Analysis)[1]		Hour	Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delta[4]	Effect[5]
1) Rancho Santa Fe	All	AM	24.9	C	25.3	D	0.4	No
at Ranch View Terrace (U)	All	PM	15.0	B	15.2	C	0.2	No

Notes: 1) Intersection Analysis - (S) Signalized, (U) Unsignalized. 2) Delay - HCM Average Control Delay in seconds.
3) LOS: Level of Service. 4) Delta is the increase in delay from project. 5) Project effect if threshold is exceeded.

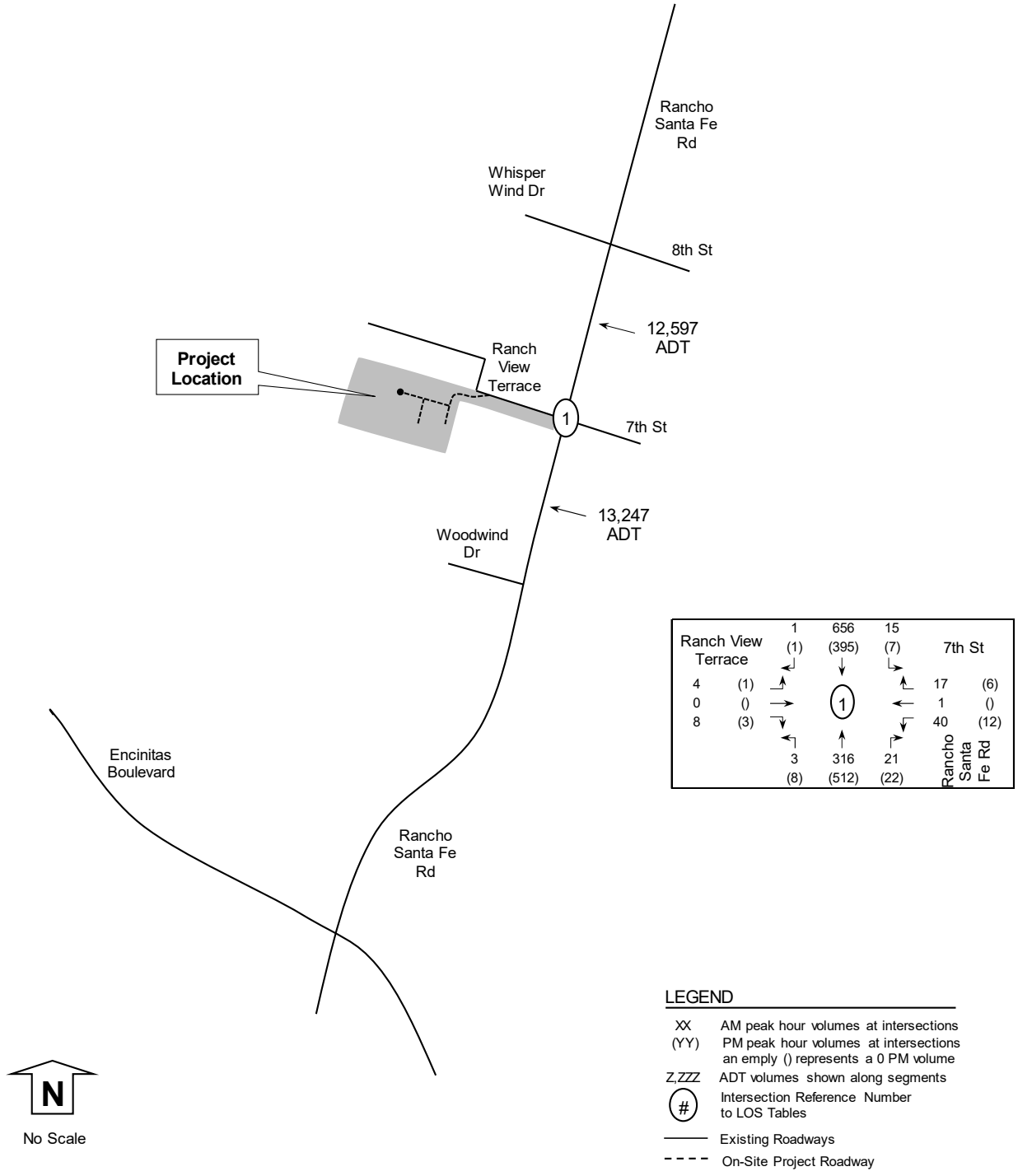
TABLE 8: EXISTING + PROJECT SEGMENT VOLUMES AND OPERATIONS

Segment	Functional Classification*	Existing				Project	Existing + Project				
		Daily Volume	LOS E Capacity	V/C	LOS	Daily Volume	Daily Volume	V/C	LOS	Change in V/C	Project Effect?
Rancho Santa Fe Road											
Whisper Wind to Ranch View Terrace	Local Road	12,579	14,000	0.899	D	18	12,597	0.900	D	0.001	No
Ranch View Terrace to Woodwind	Local Road	13,175	14,000	0.941	**E**	72	13,247	0.946	**E**	0.005	No

Notes: Daily volume is an average 24 hour volume. LOS: Level of Service. V/C: Volume to Capacity ratio.
*Functional Classification represents existing segment functionality and not the ultimate classification.

Under existing plus project conditions, the study intersection and street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E). The addition of project traffic does not create a traffic effect. Intersection LOS calculations are included in **Appendix E**.

Figure 7: Existing + Project Volumes



6.0 Cumulative Projects

Based on a review of City of Encinitas on-line cumulative projects and coordination with City staff, the following cumulative projects were determined to potentially add traffic to the study area. The following list describes the cumulative projects.

1) #17-206 (2218 13th Street). A residential project with 2 dwelling units calculated to generate 20 ADT with 1 AM and 2 PM peak hour trip.

2) #18-121 (1335 Desert Rose Way). A residential project with 16 dwelling units calculated to generate 160 ADT with 13 AM and 16 PM peak hour trip.

3) #18-266 (2223 El Camino Del Norte). A residential project with 2 dwelling units calculated to generate 20 ADT with 1 AM and 2 PM peak hour trip.

4) Candidate Housing Site #8 (2230 Encinitas Blvd). A residential project with 283 apartments calculated to generate 1,698 ADT with 136 AM and 153 PM peak hour trip.

5) Candidate Housing Site #12 (630 Encinitas Blvd). A residential project with 140 apartments calculated to generate 840 ADT with 67 AM and 76 PM peak hour trip.

6) Unforeseen/Distant Cumulative Projects. Addition of 200 ADT and 10 peak hour directional trips were added along Rancho Santa Fe Road in the study area.

A summary of cumulative traffic generation is included in **Table 9.**

TABLE 9: CUMULATIVE TRAFFIC GENERATION

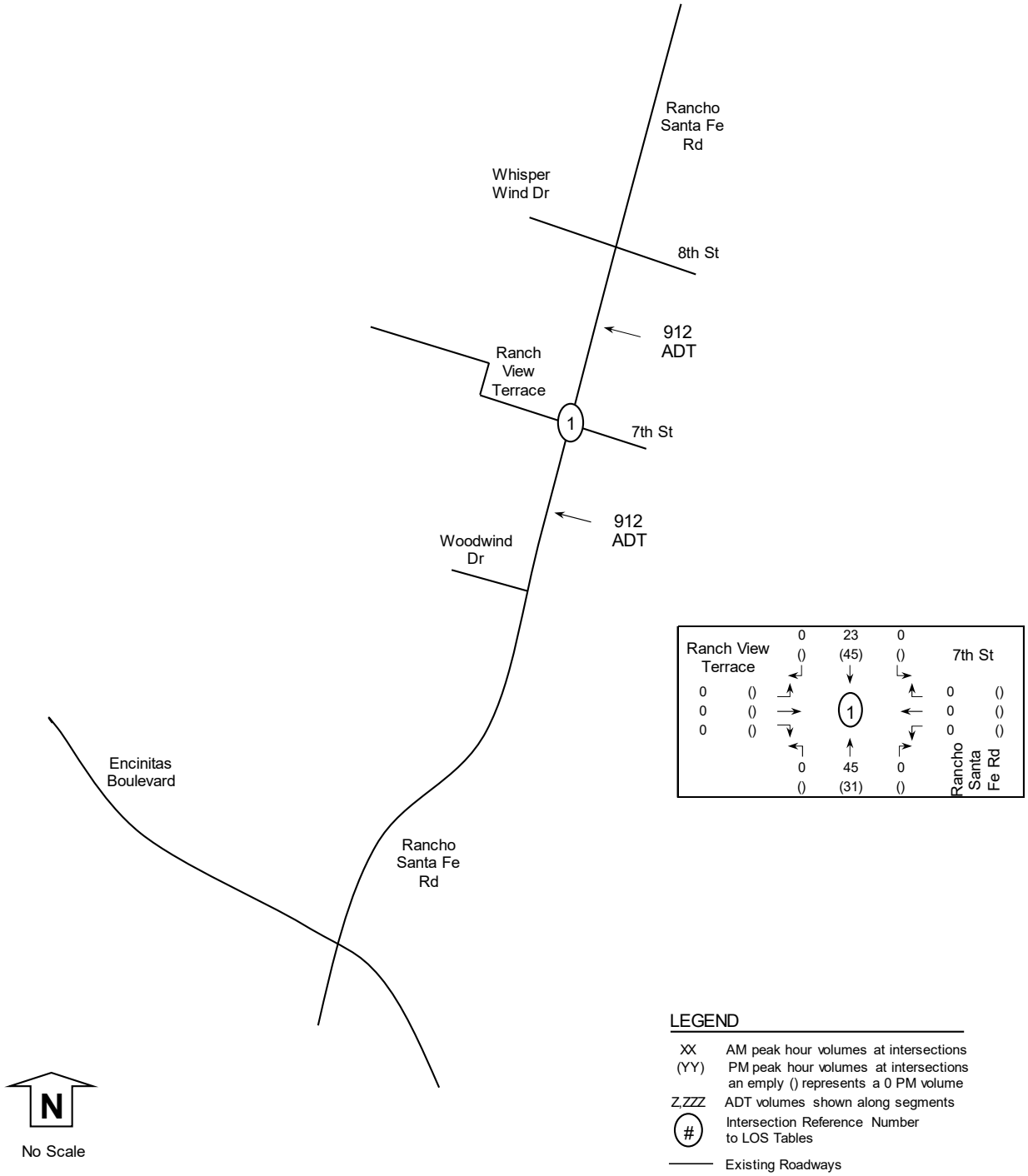
								AM					PM	
Cumualtive Project	**Rate**	**Size & Units**		**ADT**	**%**	**Split**		**IN**	**OUT**	**%**	**Split**		**IN**	**OUT**
1) #17-206: Residential Single Family	10 /DU	2	DU	**20**	8%	0.3	0.7	**0**	**1**	10%	0.7	0.3	**1**	**1**
2) #18-121: Residential Single Family	10 /DU	16	DU	**160**	8%	0.3	0.7	**4**	**9**	10%	0.7	0.3	**11**	**5**
3) #18-266: Residential Single Family	10 /DU	2	DU	**20**	8%	0.3	0.7	**0**	**1**	10%	0.7	0.3	**1**	**1**
4) Housing Site #8 2230 Encinitas Blvd	6 /DU	283	DU	**1,698**	8%	0.2	0.8	**27**	**109**	9%	0.7	0.3	**107**	**46**
5) Housing Site #12 630 Encinitas Blvd	6 /DU	140	DU	**840**	8%	0.2	0.8	**13**	**54**	9%	0.7	0.3	**53**	**23**
6) Unknown/Distant				**200**				**10**	**10**				**10**	**10**
Totals				**2,938**				**55**	**184**				**183**	**85**

Source: SANDAG *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region,* April 2002. DU: Dwelling Unit.

Split: % inbound and outbound. Excel rounding may result in ±1 to the numbers above.

The cumulative project traffic volumes are shown in **Figure 8**. Cumulative project traffic information is included in **Appendix F**.

Figure 8: Cumulative Project Volumes



7.0 Existing + Cumulative Conditions

This scenario accounts for the addition of cumulative traffic onto the existing traffic for AM, PM and daily conditions. The peak hour intersection volumes and daily traffic volumes are shown in **Figure 9**. The LOS calculated for the intersection and street segment are shown in **Tables 10 and 11**, respectively. Intersection LOS calculations are included in **Appendix G**.

TABLE 10: EXISTING + CUMULATIVE INTERSECTION OPERATIONS

Intersection and (Analysis)[1]	Movement	Peak Hour	Existing		Existing + Cumulative		
			Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delta[4]
1) Rancho Santa Fe	All	AM	24.9	C	29.3	D	4.4
at Ranch View Terrace (U)	All	PM	15.0	B	16.9	C	1.9

Notes: 1) Intersection Analysis - (S) Signalized, (U) Unsignalized. 2) Delay - HCM Average Control Delay in seconds.
3) LOS: Level of Service. 4) Delta is the increase in delay from cumulative projects.

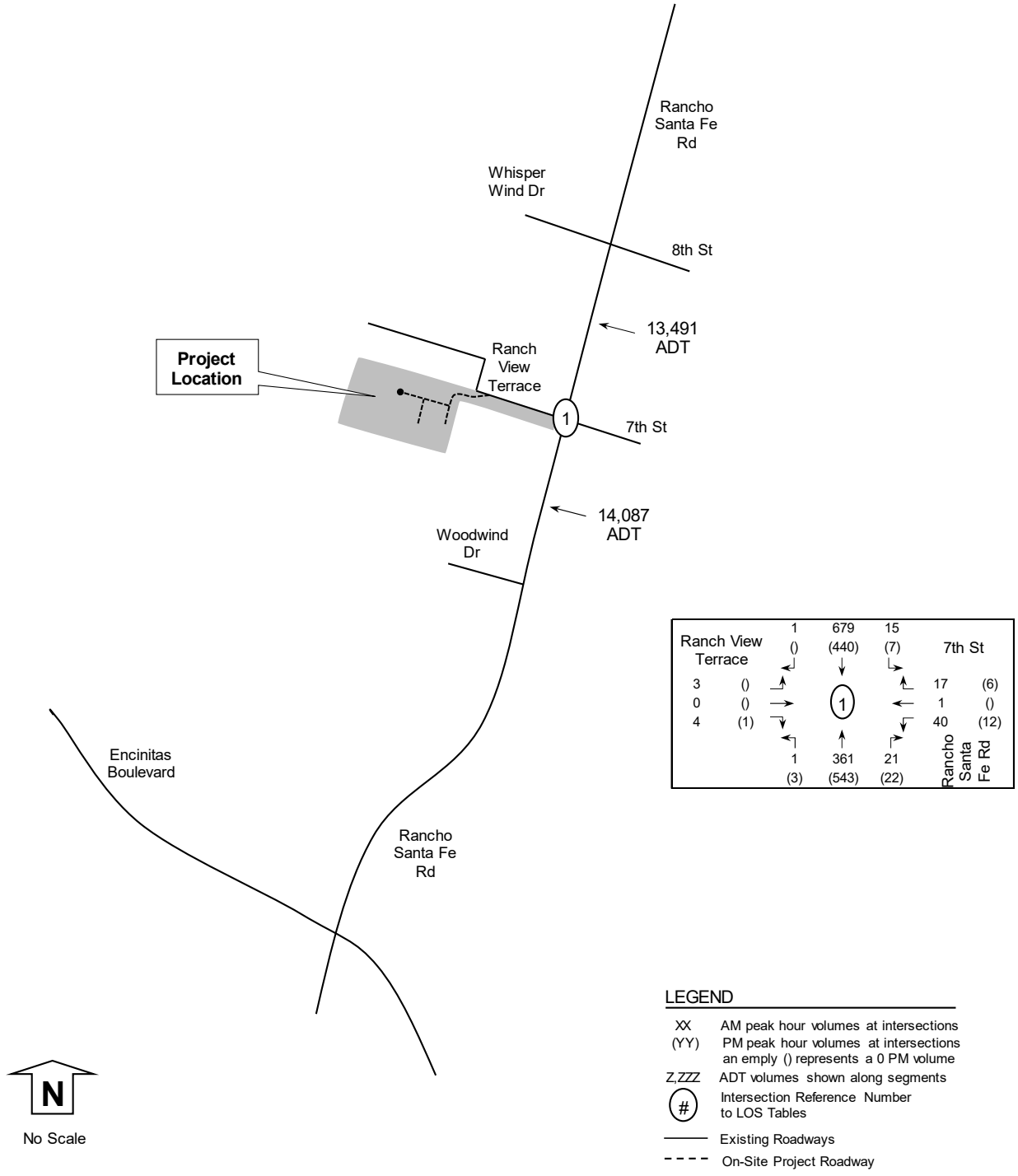
TABLE 11: EXISTING + CUMULATIVE SEGMENT VOLUMES AND OPERATIONS

Segment	Functional Classification*	Existing				Cumulative	Existing + Cumulative			
		Daily Volume	LOS E Capacity	V/C	LOS	Daily Volume	Daily Volume	LOS E Capacity	V/C	LOS
Rancho Santa Fe Road										
Whisper Wind to Ranch View Terrace	Local Road	12,579	14,000	0.899	D	912	13,491	14,000	0.964	**E**
Ranch View Terrace to Woodwind	Local Road	13,175	14,000	0.941	**E**	912	14,087	14,000	1.006	**F**

Notes: Daily volume is an average 24 hour volume. LOS: Level of Service. V/C: Volume to Capacity ratio.
*Functional Classification represents existing segment functionality and not the ultimate classification.

Under existing plus cumulative conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS C or better under existing conditions and LOS D or better under cumulative conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would fall from LOS D under existing conditions to LOS E under cumulative conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would fall from LOS E under existing conditions to LOS F under cumulative conditions.

Figure 9: Existing + Cumulative Volumes



8.0 Existing + Cumulative + Project Conditions

This scenario accounts for the addition of project traffic onto existing plus cumulative traffic for AM, PM, and daily conditions. The peak hour intersection volumes and daily traffic volumes are shown in **Figure 10**. The LOS calculated for the intersection and street segment are shown in **Tables 12 and 13**, respectively. Intersection LOS calculations are included in **Appendix H**.

TABLE 12: EXISTING + CUMULATIVE + PROJECT INTERSECTION OPERATIONS

Intersection and (Analysis)[1]	Movement	Peak Hour	Existing + Cumulative Delay[2]	Existing + Cumulative LOS[3]	Existing + Cumulative + Project Delay[2]	Existing + Cumulative + Project LOS[3]	Delta[4]	Effect[5]
1) Rancho Santa Fe	All	AM	29.3	D	29.8	D	0.5	No
at Ranch View Terrace (U)	All	PM	16.9	C	17.2	C	0.3	No

Notes: 1) Intersection Analysis - (S) Signalized, (U) Unsignalized. 2) Delay - HCM Average Control Delay in seconds.
3) LOS: Level of Service. 4) Delta is the increase in delay from project. 5) Project effect if threshold is exceeded.

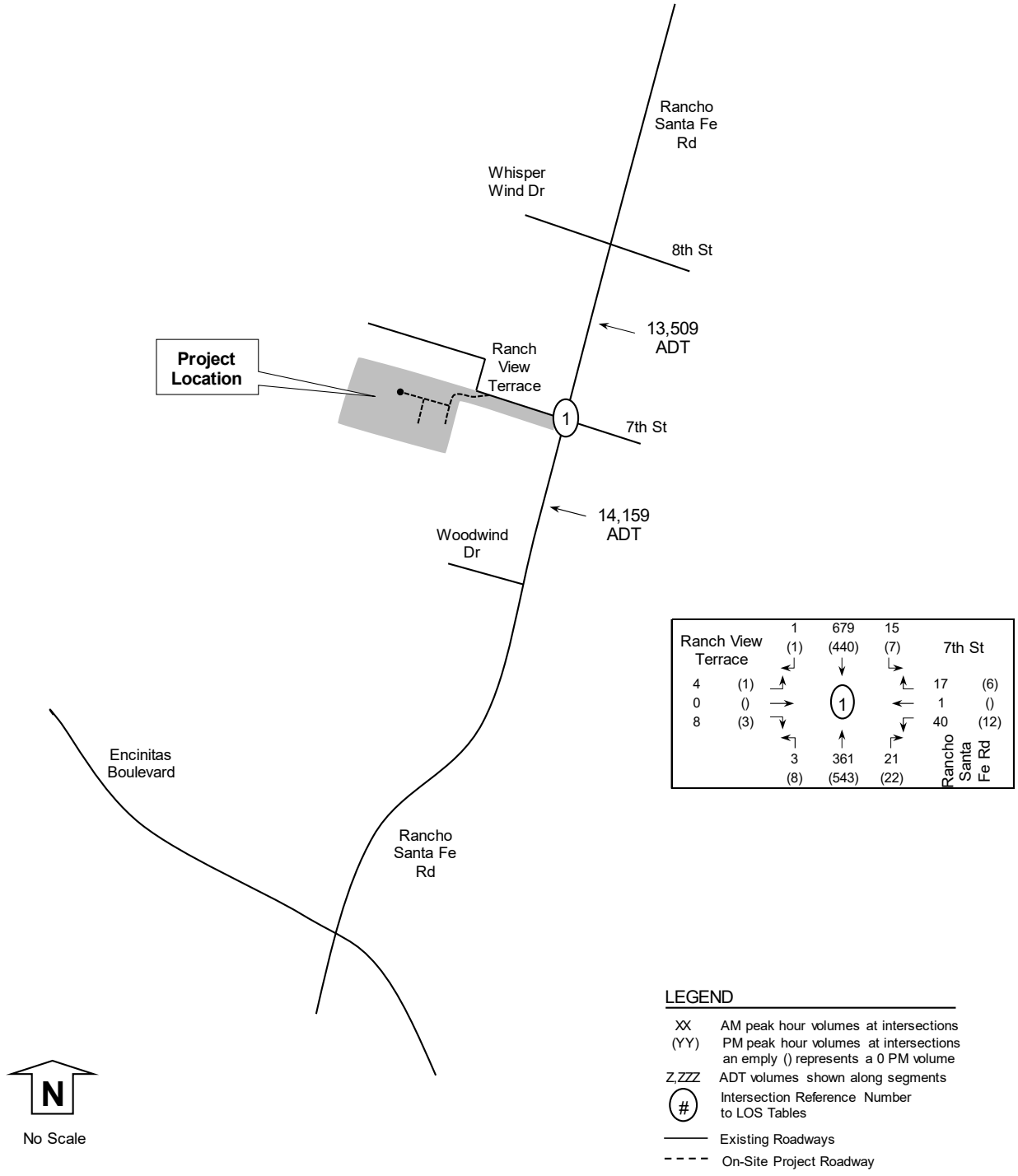
TABLE 13: EXISTING + CUMULATIVE + PROJECT SEGMENT VOLUMES AND OPERATIONS

Segment	Functional Classification*	Existing + Cumulative Daily Volume	LOS E Capacity	V/C	LOS	Project Daily Volumes	Existing + Cumulative + Project Daily Volume	V/C	LOS	Delta	Project Effect?
Rancho Santa Fe Road											
Whisper Wind to Ranch View Terrace	Local Road	13,491	14,000	0.964	E	18	13,509	0.965	E	0.001	No
Ranch View Terrace to Woodwind	Local Road	14,087	14,000	1.006	F	72	14,159	1.011	F	0.005	No

Notes: Daily volume is an average 24 hour volume. LOS: Level of Service. V/C: Volume to Capacity ratio.
*Functional Classification represents existing segment functionality and not the ultimate classification.

Under existing plus cumulative plus project conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS D or better under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would operate at LOS E under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would operate at LOS F under cumulative and cumulative plus project conditions. The addition of project traffic does not create a traffic effect.

Figure 10: Existing + Cumulative + Project Volumes



9.0 Conclusion

This Local Transportation Analysis determined if the proposed project was calculated to create any traffic effects on the study area roadways in the vicinity of the project. The proposed project includes nine (9) residential lots located on Ranch View Terrace west of Rancho Santa Fe Road in Encinitas, California. The site is currently vacant. Project access is from Ranch View Terrace.

This analysis was based on traffic analysis criteria outlined in the local San Diego Institute of Transportation Engineers (ITE) *Guidelines for Traffic Impact Studies in the San Diego Region*, May 2019. Project traffic generation was calculated using the San Diego Association of Governments (SANDAG) trip rates from the *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002. The project is calculated to generate 90 ADT, 7 AM peak hour trips and 9 PM peak hour trips. Based on a review of City of Encinitas on-line cumulative projects and coordination with City staff, cumulative projects anticipated to add traffic to the study area were included for analysis. The following scenarios were analyzed: Existing, Existing + Project, Existing + Cumulative, and Existing + Cumulative + Project conditions. The operational findings are summarized below by scenario:

1) Under existing conditions, the study intersection and the street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E).

2) Under existing plus project conditions, the study intersection and street segments were calculated to operate at LOS D or better except for the segment of Rancho Santa Fe Road from Ranch View Terrace to Woodwind Dr (LOS E). The addition of project traffic does not create a traffic effect.

3) Under existing plus cumulative conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS C or better under existing conditions and LOS D or better under cumulative conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would fall from LOS D under existing conditions to LOS E under cumulative conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would fall from LOS E under existing conditions to LOS F under cumulative conditions.

4) Under existing plus cumulative plus project conditions, the roadway operations were calculated as follows. The study intersection of Rancho Santa Fe Road at Ranch View Terrace is calculated to operate at LOS D or better under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Whisper Wind Dr and Ranch View Terrace would operate at LOS E under cumulative and cumulative plus project conditions. The study segment of Rancho Santa Fe Rd between Ranch View Terrace and Woodwind Dr would operate at LOS F under cumulative and cumulative plus project conditions. The addition of project traffic does not create a traffic effect.

No traffic effects were calculated; therefore, off-site roadway improvements are not required.

10.0 References

City of Encinitas *Circulation Element* May 11, 1995.

Highway Capacity Manual (6th Edition).

San Diego Institute of Transportation Engineers. May 2019. *Guidelines for Transportation Impact Studies in the San Diego Region*.

San Diego Association of Governments (SANDAG). April 2002. *Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*.

Trafficware Corporation. Synchro 10.0 computer software.

Appendix A

Excerpts from City of Encinitas General Plan

THE CITY OF ENCINITAS
CALIFORNIA

PUBLIC ROAD STANDARDS

April, 1991

TABLE 2
GENERAL PLAN CIRCULATION ELEMENT
ROADWAY CAPACITY STANDARDS *

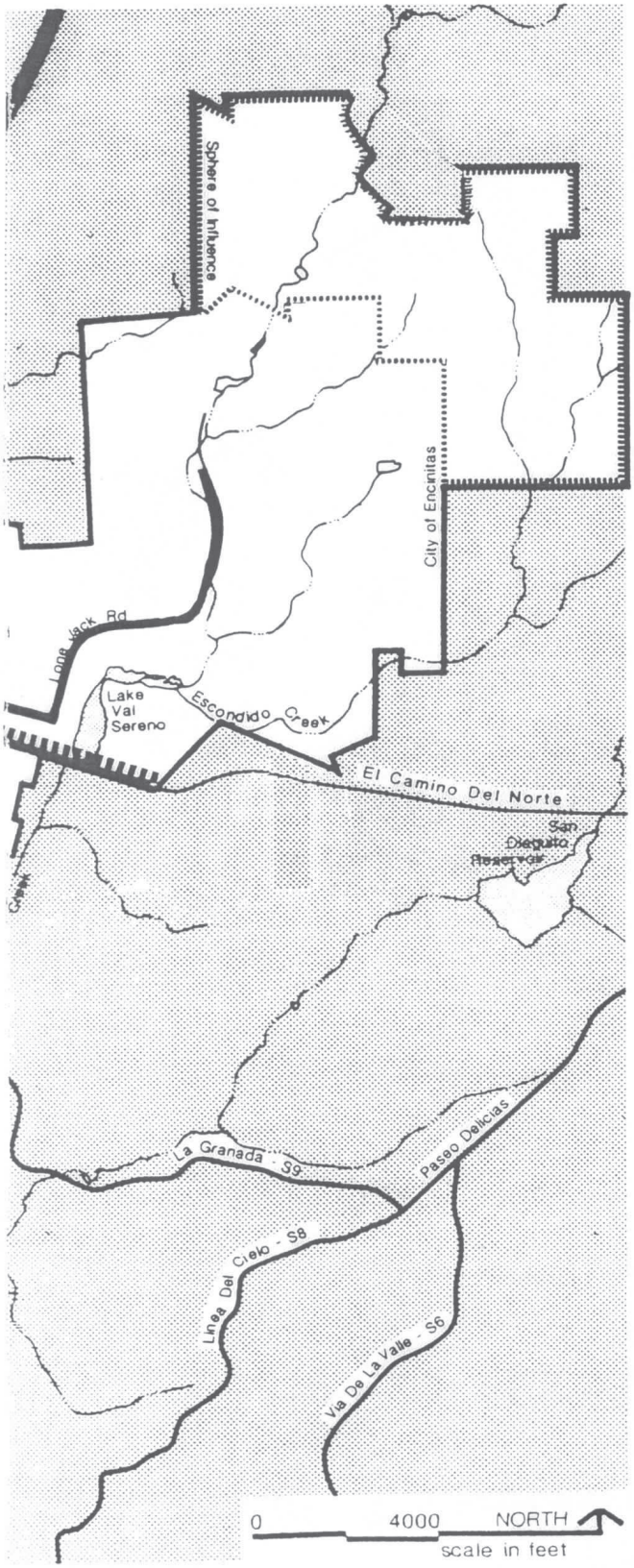
Facility Type	# of Lanes	ADT Capacity LOS C	LOS D	LOS E
FREEWAY	6	108,00	120,000	135,000
	8	145,000	160,000	175,000
	10	175,000	195,000	215,000
Prime Arterial	6	46,000	51,200	57,000
Prime Arterial-Augmented	6	53,000	60,000	66,000
Major Roadway	4	28,200	31,600	35,200
Major Roadway-Augmented	4+	36,300	41,000	45,400
Collector Roadway	4	26,000	29,200	32,400
Local Roadway-Augmented	2+	16,000	18,000	20,000
Local Roadway	2	11,200	12,600	14,000

NOTE: 1. Capacity means the maximum volume for the stated level of service.

2. The above Standards are not applicable to non-circulation element roadways.

* From City of Encinitas General Plan Circulation Element.

SOURCE: Austin-Foust Associates, Inc.



Freeway

Prime Arterial (6 Lanes)

Major (4 Lanes)

Collector (4 Lanes)

Local Street (2 Lanes)

Augmented Facility

Limited Facility

Interchange Reconstruction

NOTE: Leucadia Blvd. between Interstate 5 and El Camino Real designated as "Scenic Roadway" with 85 foot right-of-way (ROW)

Figure 2
Circulation Plan

Encinitas
General Plan
3/29/89

Appendix B

Excerpts from ITE Guidelines

GUIDELINES FOR TRANSPORTATION IMPACT STUDIES IN THE SAN DIEGO REGION

May 2019

7.0 ROADWAY

It is recommended that consideration be given to preparation of a local transportation analysis (LTA) for all land development and transportation projects. This section describes the recommended methodology for analysis of local roadway conditions.

The purpose of the roadway analysis portion of an LTA is to forecast, describe, and analyze how a development will affect existing and future circulation infrastructure for users of the roadway system, including vehicles, bicycles, pedestrians, and transit. The LTA assists transportation engineers and planners in both the development community and public agencies when making land use, mobility infrastructure, and other development decisions. An LTA quantifies the expected changes in transportation conditions and translates these changes into transportation system effects in the vicinity of a project.

The roadway transportation analysis included in an LTA is separate from the transportation impact analysis conducted as part of the environmental (CEQA) project review process, as described in Part I. The purpose of the roadway transportation analysis is to ensure that all projects provide a fair share of roadway infrastructure improvements in order to accommodate their multimodal transportation demands.

The following guidelines were prepared to assist local agencies throughout the San Diego Region in promoting consistency and uniformity in local transportation studies. These guidelines do not establish a legal standard for these functions but are intended to supplement any individual manuals or level of service objectives for the various jurisdictions. These guidelines attempt to consolidate regional efforts to identify when an LTA is needed, what professional procedures should be followed, and what constitutes a significant traffic effect that should be dealt with.

The instructions outlined in these guidelines are subject to update as future conditions and experience become available. Special situations may call for variation from these guidelines. It is recommended that consultants who prepare an LTA submit a scoping letter (methodology memo) for review by the lead agency to verify the application of these guidelines and to identify any analysis needed to address special circumstances. The scoping letter in this context is used for transportation analysis only and is not related to a formal scoping process that occurs with preparation of a CEQA study. Caltrans and lead agencies should agree on the specific methods used in local transportation analysis studies involving any State Route facilities, including metered and unmetered freeway ramps.

NEED FOR A STUDY

Figure 7-1 shows the flow chart for determination of when a roadway analysis should be conducted. A roadway analysis should be prepared for all projects which generate traffic greater than 1,000 total average daily driveway trips (ADT) or 100 peak-hour trips. If a proposed project is not in conformance with the land use and/or transportation element of the general or community plan, use threshold rates of 500 ADT or 50 peak-hour trips.

Early consultation with any affected jurisdictions is strongly encouraged since a “focused” or “abbreviated” roadway analysis may still be required – even if the above threshold rates are not met. An understanding of the level of detail and the assumptions required for the analysis should be reached. A pre-submittal in-person conference may not be required. However, the applicant should prepare a scoping letter for the agency’s review and approval prior to preparation of the analysis.

Table 7-1

DETERMINATION OF THE NEED FOR ROADWAY IMPROVEMENTS

LEVEL OF SERVICE WITH PROJECT*	ALLOWABLE CHANGE DUE TO PROJECT EFFECT**					
	FREEWAYS		ROADWAY SEGMENTS		INTERSECTIONS	RAMP*** METERING
	V/C	SPEED (MPH)	V/C	SPEED (MPH)	DELAY (SEC.)	DELAY(MIN.)
E, & F (OR RAMP METER DELAYS ABOVE 15 MIN.)	0.01	1	0.02	1	2	2

NOTES:

* All level of service measurements are based upon Highway Capacity Manual (HCM) procedures for peak-hour conditions. However, V/C ratios for Roadway Segments may be estimated on an ADT/24-hour traffic volume basis (using Table 7-2 or a similar LOS chart for each jurisdiction). The target LOS for freeways, roadways, and intersections is generally "D." For metered freeway ramps, LOS does not apply; however, ramp meter delays above 15 minutes are considered excessive.

** If a proposed project's traffic causes the values shown in the table to be exceeded, the effects of the project are determined to justify improvements. These changes may be measured from appropriate computer programs or expanded manual spreadsheets. The project applicant shall then identify feasible improvements within the LTA report that will maintain the traffic facility at the target LOS or restore to pre-project conditions. If the LOS with the proposed project becomes worse than the target (see above * note), or if the project adds a significant amount of peak-hour trips to cause any traffic queues to exceed on- or off-ramp storage capacities, roadway improvements should be considered.

*** See Attachment B for ramp metering analysis.

KEY: V/C = Volume to Capacity ratio
Speed = Speed measured in miles per hour
Delay = Average stopped delay per vehicle measured in seconds for intersections, or minutes for ramp meters
LOS = Level of Service

Appendix C

Count Data

PO Box 1178
Corona, CA 92880
951-268-6268

Location: Encinitas
N/S: Rancho Santa Fe Road
E/W: Ranch View Terrace

Date: 2/12/2019
Day: TUESDAY
Project # 143-19082

TURNING MOVEMENT COUNT

Count Period: **7:00 AM to 9:00 AM**
Peak Hour: **7:15 AM to 8:15 AM**

Vehicle Counts

	Rancho Santa Fe Road Northbound			Rancho Santa Fe Road Southbound			Ranch View Terrace Eastbound			Ranch View Terrace Westbound			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
7:00 AM	0	62	4	2	171	0	1	0	0	8	0	1	249
7:15 AM	0	66	2	3	182	0	2	0	0	14	0	4	273
7:30 AM	1	68	5	3	146	0	1	0	2	4	0	9	239
7:45 AM	0	89	6	5	167	0	0	0	2	7	0	4	280
8:00 AM	0	93	8	4	161	1	0	0	0	15	1	0	283
8:15 AM	0	90	7	2	151	0	1	0	3	2	0	1	257
8:30 AM	1	76	1	4	143	1	1	0	1	5	0	2	235
8:45 AM	1	85	6	0	166	0	0	0	2	6	0	2	268
TOTAL VOLUMES:	3	629	39	23	1287	2	6	0	10	61	1	23	2084

AM Peak Hr Begins at: 715 AM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	1	316	21	15	656	1	3	0	4	40	1	17	1075

PEAK HR FACTOR:	0.837	0.908	0.583	0.806	0.950

Bicycle Counts

	Rancho Santa Fe Road Northbound			Rancho Santa Fe Road Southbound			Ranch View Terrace Eastbound			Ranch View Terrace Westbound			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	1	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	1
8:30 AM	0	1	0	0	0	0	0	0	0	2	0	0	3
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	1	0	0	1	0	0	0	0	3	0	0	5

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	0	0	0	1	0	0	0	0	0	0	0	1

Pedestrian Counts

	Rancho Santa Fe Road North Leg	Rancho Santa Fe Road South Leg	Ranch View Terrace East Leg	Ranch View Terrace West Leg	TOTAL
7:00 AM	0	0	0	0	0
7:15 AM	4	0	0	0	4
7:30 AM	3	0	0	0	3
7:45 AM	0	0	1	0	1
8:00 AM	0	0	1	0	1
8:15 AM	0	0	0	0	0
8:30 AM	0	0	0	0	0
8:45 AM	0	0	0	0	0
TOTAL VOLUMES:	7	0	2	0	9

	North Leg	South Leg	East Leg	West Leg	TOTAL
PEAK VOLUMES:	7	0	2	0	9

PO Box 1178
Corona, CA 92880
951-268-6268

Location: Encinitas
N/S: Rancho Santa Fe Road
E/W: Ranch View Terrace

Date: 2/12/2019
Day: TUESDAY
Project # 143-19082

TURNING MOVEMENT COUNT

Count Period: **4:00 PM to 6:00 PM**
Peak Hour: **5:00 PM to 6:00 PM**

Vehicle Counts

	Rancho Santa Fe Road Northbound			Rancho Santa Fe Road Southbound			Ranch View Terrace Eastbound			Ranch View Terrace Westbound			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
4:00 PM	3	110	8	3	105	0	0	0	0	12	0	1	242
4:15 PM	2	93	5	4	93	1	0	0	1	10	0	1	210
4:30 PM	0	100	10	0	123	0	0	0	0	5	0	3	241
4:45 PM	1	101	11	1	98	0	0	0	1	3	0	4	220
5:00 PM	2	139	5	3	99	0	0	0	0	2	0	3	253
5:15 PM	0	120	6	2	108	0	0	0	1	3	0	0	240
5:30 PM	1	111	6	1	104	0	0	0	0	5	0	0	228
5:45 PM	0	142	5	1	84	0	0	0	0	2	0	3	237
TOTAL VOLUMES:	9	916	56	15	814	1	0	0	3	42	0	15	1871

PM Peak Hr Begins at: 500 PM

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	3	512	22	7	395	0	0	0	1	12	0	6	958

PEAK HR FACTOR:	0.913	0.914	0.250	0.900	0.947

Bicycle Counts

	Rancho Santa Fe Road Northbound			Rancho Santa Fe Road Southbound			Ranch View Terrace Eastbound			Ranch View Terrace Westbound			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	2	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL VOLUMES:	0	1	0	0	3	0	0	0	0	0	0	0	4

	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
PEAK VOLUMES:	0	1	0	0	3	0	0	0	0	0	0	0	4

Pedestrian Counts

	Rancho Santa Fe Road North Leg	Rancho Santa Fe Road South Leg	Ranch View Terrace East Leg	Ranch View Terrace West Leg	TOTAL
4:00 PM	2	0	1	0	3
4:15 PM	0	0	0	0	0
4:30 PM	0	2	0	0	2
4:45 PM	0	1	0	0	1
5:00 PM	0	0	1	0	1
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
TOTAL VOLUMES:	2	3	2	0	7

	North Leg	South Leg	East Leg	West Leg	TOTAL
PEAK VOLUMES:	0	0	1	0	1

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Encinitas
Rancho Santa Fe Road
B/ Whisper Drive - Ranch View Terrace
24 Hour Directional Speed Survey

ECN001
Site Code: 143-19082

Northbound, Souuthbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
02/12/19	0	0	1	3	10	4	0	0	0	0	0	0	0	0	18
01:00	0	0	1	1	3	0	1	0	0	0	0	0	0	0	6
02:00	0	0	0	1	2	2	0	0	0	0	0	0	0	0	5
03:00	0	0	1	1	1	0	2	1	0	0	0	0	0	0	6
04:00	0	0	0	3	16	6	3	1	0	0	0	0	0	0	29
05:00	0	0	1	17	58	27	4	2	0	0	0	0	0	0	109
06:00	18	3	25	176	172	51	3	0	0	0	0	0	0	0	448
07:00	230	47	87	329	223	34	3	0	0	0	0	0	0	0	953
08:00	70	41	135	412	307	42	3	0	0	0	0	0	0	0	1010
09:00	65	23	95	385	360	63	1	0	0	0	0	0	0	0	992
10:00	74	25	61	270	320	62	6	0	0	0	0	0	0	0	818
11:00	55	10	60	286	324	50	1	0	0	0	0	0	0	0	786
12 PM	36	4	58	352	311	49	4	0	0	0	1	0	0	0	815
13:00	49	22	95	310	327	68	6	0	0	0	0	0	0	0	877
14:00	57	11	90	364	297	62	3	0	0	0	0	0	0	0	884
15:00	241	47	102	299	242	37	5	0	0	0	0	0	0	0	973
16:00	263	14	52	210	225	58	0	0	0	0	0	0	0	0	822
17:00	53	18	104	365	318	56	4	1	0	0	0	0	0	0	919
18:00	46	19	139	318	247	58	12	0	1	0	0	0	0	0	840
19:00	24	6	55	189	197	64	5	0	0	0	0	0	0	0	540
20:00	3	1	26	123	123	50	4	1	0	0	0	0	0	0	331
21:00	3	0	17	74	101	38	5	0	0	0	0	0	0	0	238
22:00	0	0	6	30	53	16	6	2	0	0	0	0	0	0	113
23:00	2	0	0	14	19	11	1	0	0	0	0	0	0	0	47
Total	1289	291	1211	4532	4256	908	82	8	1	0	1	0	0	0	12579

Daily

15th Percentile :	21 MPH
50th Percentile :	28 MPH
85th Percentile :	33 MPH
95th Percentile :	37 MPH

Statistics

Mean Speed(Average) :	28 MPH
10 MPH Pace Speed :	26-35 MPH
Number in Pace :	8788
Percent in Pace :	69.9%
Number of Vehicles > 55 MPH :	1
Percent of Vehicles > 55 MPH :	0.0%

Counts Unlimited, Inc.

PO Box 1178
Corona, CA 92878
Phone: (951) 268-6268
email: counts@countsunlimited.com

City of Encinitas
Rancho Santa Fe Road
B/ Ranch View Terrace - Woodwind Drive
24 Hour Directional Speed Survey

ECN002
Site Code: 143-19082

Northbound, Southbound

Start Time	1 15	16 20	21 25	26 30	31 35	36 40	41 45	46 50	51 55	56 60	61 65	66 70	71 75	76 999	Total
02/12/19	0	0	1	1	5	4	5	0	2	0	0	0	0	0	18
01:00	0	0	0	0	2	1	2	0	0	0	0	0	0	0	5
02:00	0	0	0	1	1	2	3	1	0	0	0	0	0	0	8
03:00	0	0	0	0	0	3	1	1	1	0	0	0	0	0	6
04:00	0	0	0	1	5	9	9	7	3	0	0	0	0	0	34
05:00	0	0	0	6	14	40	47	16	5	0	0	0	0	0	128
06:00	21	1	3	7	59	201	157	43	5	0	0	0	0	0	497
07:00	60	12	17	41	204	416	229	51	6	0	0	0	0	0	1036
08:00	77	8	24	86	310	373	167	27	3	0	0	0	0	0	1075
09:00	38	0	8	45	192	417	245	37	4	0	0	0	0	0	986
10:00	49	12	13	51	227	306	177	20	2	0	0	0	0	0	857
11:00	29	0	10	70	198	330	166	25	2	0	0	0	0	0	830
12 PM	51	4	26	77	214	307	153	22	3	0	0	0	0	0	857
13:00	72	7	41	102	233	281	122	32	5	2	0	0	0	0	897
14:00	50	4	17	74	241	360	166	27	1	0	0	0	0	0	940
15:00	197	5	28	106	245	313	141	29	4	0	2	0	0	0	1070
16:00	52	0	9	72	190	306	200	25	3	0	0	0	0	0	857
17:00	59	32	68	112	241	299	127	24	1	0	0	0	0	0	963
18:00	85	19	47	128	240	208	99	18	5	4	0	0	0	0	853
19:00	28	3	10	48	162	175	77	12	1	0	0	0	0	0	516
20:00	3	0	13	13	90	140	66	17	5	0	0	0	0	0	347
21:00	4	0	0	24	66	82	47	8	1	1	0	0	0	0	233
22:00	0	0	0	8	28	39	28	9	3	0	0	0	0	0	115
23:00	0	0	0	0	7	16	15	6	0	3	0	0	0	0	47
Total	875	107	335	1073	3174	4628	2449	457	65	10	2	0	0	0	13175

Daily

15th Percentile :	28 MPH
50th Percentile :	36 MPH
85th Percentile :	42 MPH
95th Percentile :	44 MPH

Statistics

Mean Speed(Average) :	35 MPH
10 MPH Pace Speed :	31-40 MPH
Number in Pace :	7802
Percent in Pace :	59.2%
Number of Vehicles > 55 MPH :	12
Percent of Vehicles > 55 MPH :	0.1%

Appendix D

Existing Intersection LOS Calculations

Intersection	
Intersection Delay, s/veh	24.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	4	40	1	17	1	316	21	15	656	1
Future Vol, veh/h	3	0	4	40	1	17	1	316	21	15	656	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	4	42	1	18	1	333	22	16	691	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.1	12.4	32.7
HCM LOS	A	B	B	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	43%	69%	2%
Vol Thru, %	93%	0%	2%	98%
Vol Right, %	6%	57%	29%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	338	7	58	672
LT Vol	1	3	40	15
Through Vol	316	0	1	656
RT Vol	21	4	17	1
Lane Flow Rate	356	7	61	707
Geometry Grp	1	1	1	1
Degree of Util (X)	0.48	0.013	0.107	0.892
Departure Headway (Hd)	4.853	6.258	6.314	4.541
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	736	575	571	792
Service Time	2.922	4.262	4.314	2.597
HCM Lane V/C Ratio	0.484	0.012	0.107	0.893
HCM Control Delay	12.4	9.3	10.1	32.7
HCM Lane LOS	B	A	B	D
HCM 95th-tile Q	2.6	0	0.4	11.7

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	12	0	6	3	512	22	7	395	0
Future Vol, veh/h	0	0	1	12	0	6	3	512	22	7	395	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	13	0	6	3	539	23	7	416	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	9.2	16.8	12.8
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	0%	67%	2%
Vol Thru, %	95%	0%	0%	98%
Vol Right, %	4%	100%	33%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	537	1	18	402
LT Vol	3	0	12	7
Through Vol	512	0	0	395
RT Vol	22	1	6	0
Lane Flow Rate	565	1	19	423
Geometry Grp	1	1	1	1
Degree of Util (X)	0.692	0.002	0.031	0.536
Departure Headway (Hd)	4.406	5.457	5.954	4.562
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	820	651	598	791
Service Time	2.429	3.526	4.021	2.588
HCM Lane V/C Ratio	0.689	0.002	0.032	0.535
HCM Control Delay	16.8	8.5	9.2	12.8
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	5.7	0	0.1	3.2

Appendix E

Existing + Project Intersection LOS Calculations

Intersection	
Intersection Delay, s/veh	25.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	8	40	1	17	3	316	21	15	656	1
Future Vol, veh/h	4	0	8	40	1	17	3	316	21	15	656	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	8	42	1	18	3	333	22	16	691	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.3	10.1	12.5	33.3
HCM LOS	A	B	B	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	33%	69%	2%
Vol Thru, %	93%	0%	2%	98%
Vol Right, %	6%	67%	29%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	340	12	58	672
LT Vol	3	4	40	15
Through Vol	316	0	1	656
RT Vol	21	8	17	1
Lane Flow Rate	358	13	61	707
Geometry Grp	1	1	1	1
Degree of Util (X)	0.485	0.022	0.108	0.896
Departure Headway (Hd)	4.875	6.196	6.342	4.561
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	734	581	568	792
Service Time	2.951	4.2	4.344	2.623
HCM Lane V/C Ratio	0.488	0.022	0.107	0.893
HCM Control Delay	12.5	9.3	10.1	33.3
HCM Lane LOS	B	A	B	D
HCM 95th-tile Q	2.7	0.1	0.4	11.9

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	3	12	0	6	8	512	22	7	395	1
Future Vol, veh/h	1	0	3	12	0	6	8	512	22	7	395	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	3	13	0	6	8	539	23	7	416	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

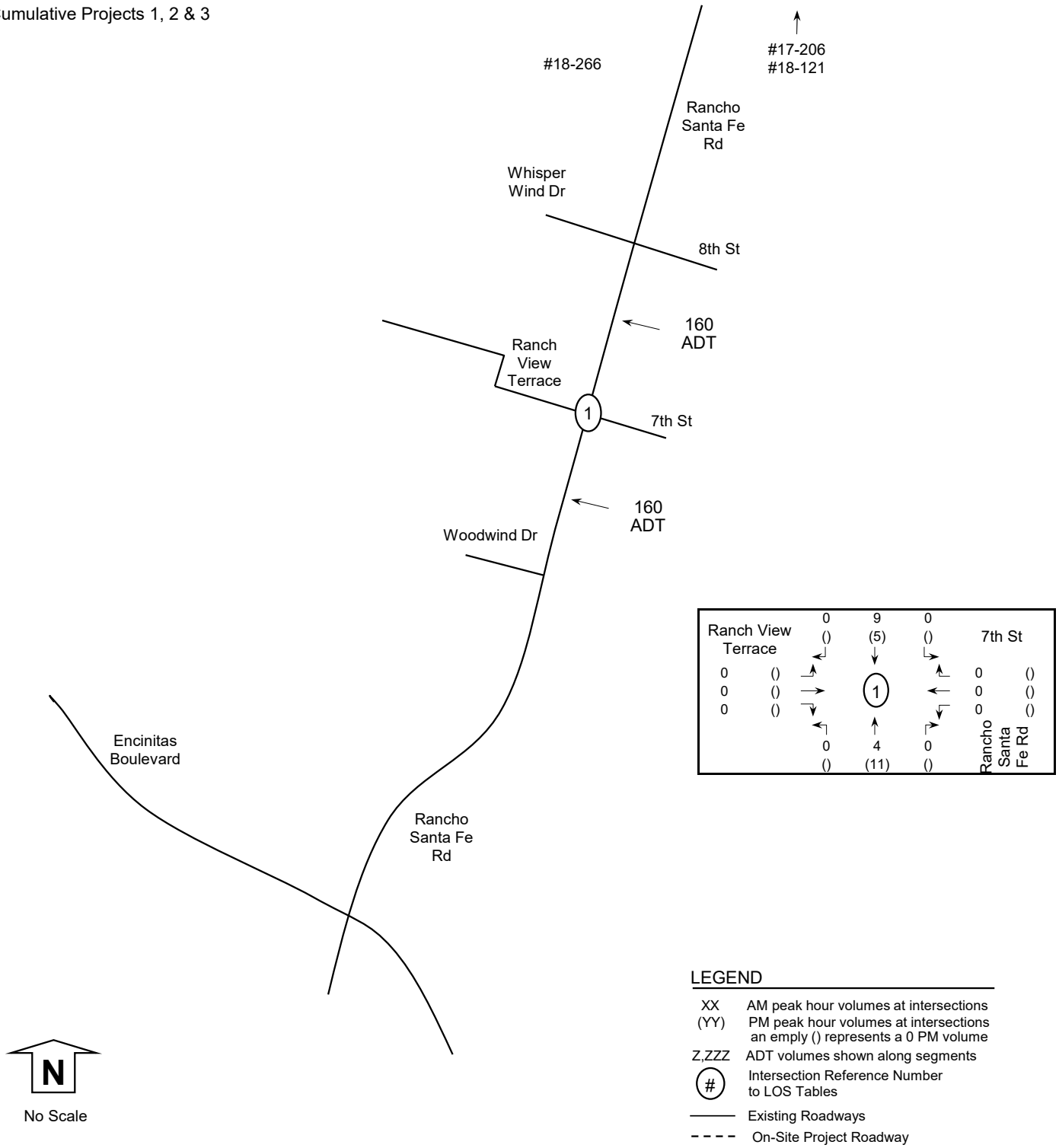
Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.8	9.2	17.2	12.9
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	25%	67%	2%
Vol Thru, %	94%	0%	0%	98%
Vol Right, %	4%	75%	33%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	542	4	18	403
LT Vol	8	1	12	7
Through Vol	512	0	0	395
RT Vol	22	3	6	1
Lane Flow Rate	571	4	19	424
Geometry Grp	1	1	1	1
Degree of Util (X)	0.701	0.007	0.031	0.54
Departure Headway (Hd)	4.421	5.677	5.979	4.579
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	816	626	595	789
Service Time	2.446	3.751	4.05	2.606
HCM Lane V/C Ratio	0.7	0.006	0.032	0.537
HCM Control Delay	17.2	8.8	9.2	12.9
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	5.9	0	0.1	3.3

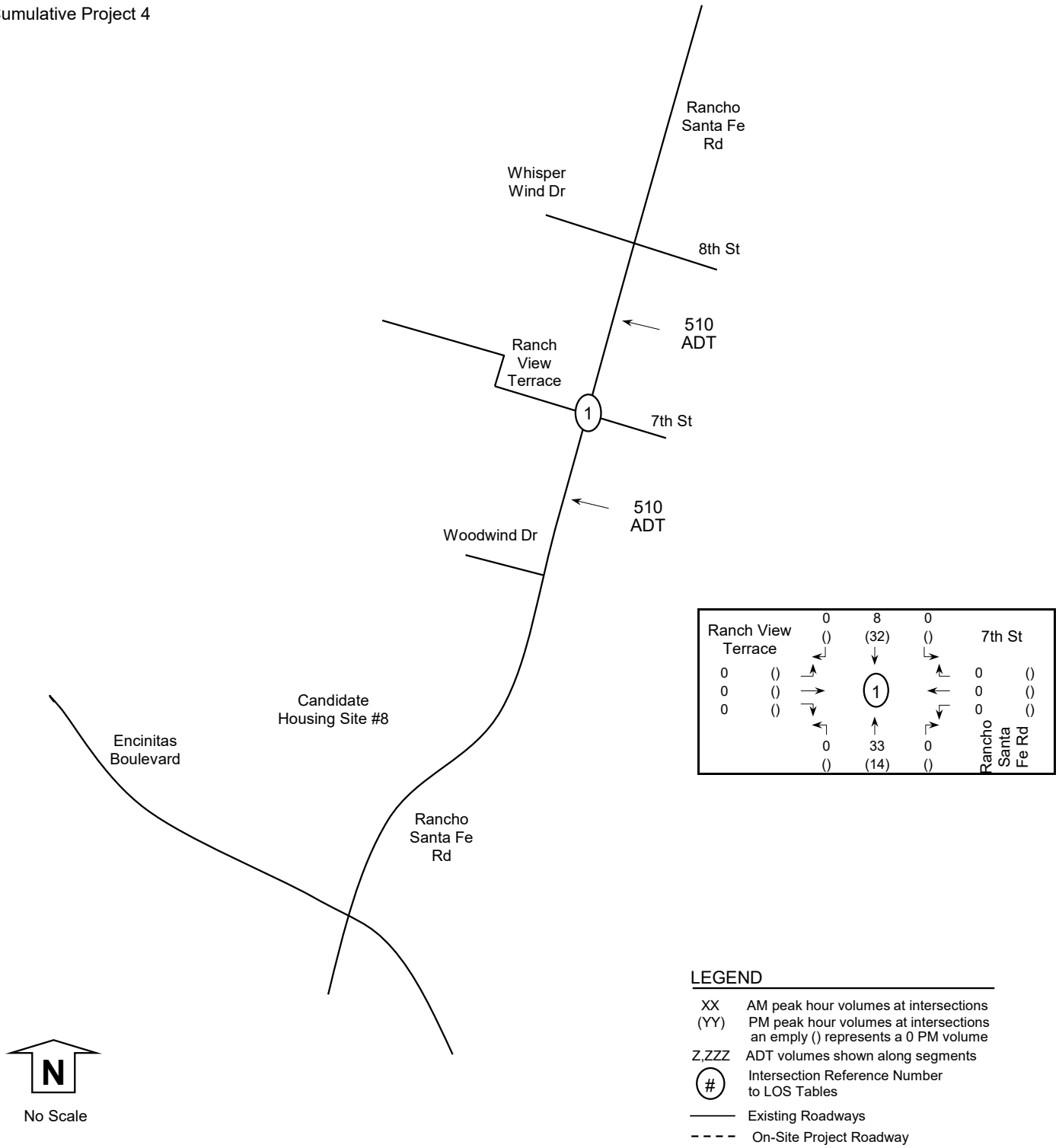
Appendix F

Cumulative Project Information

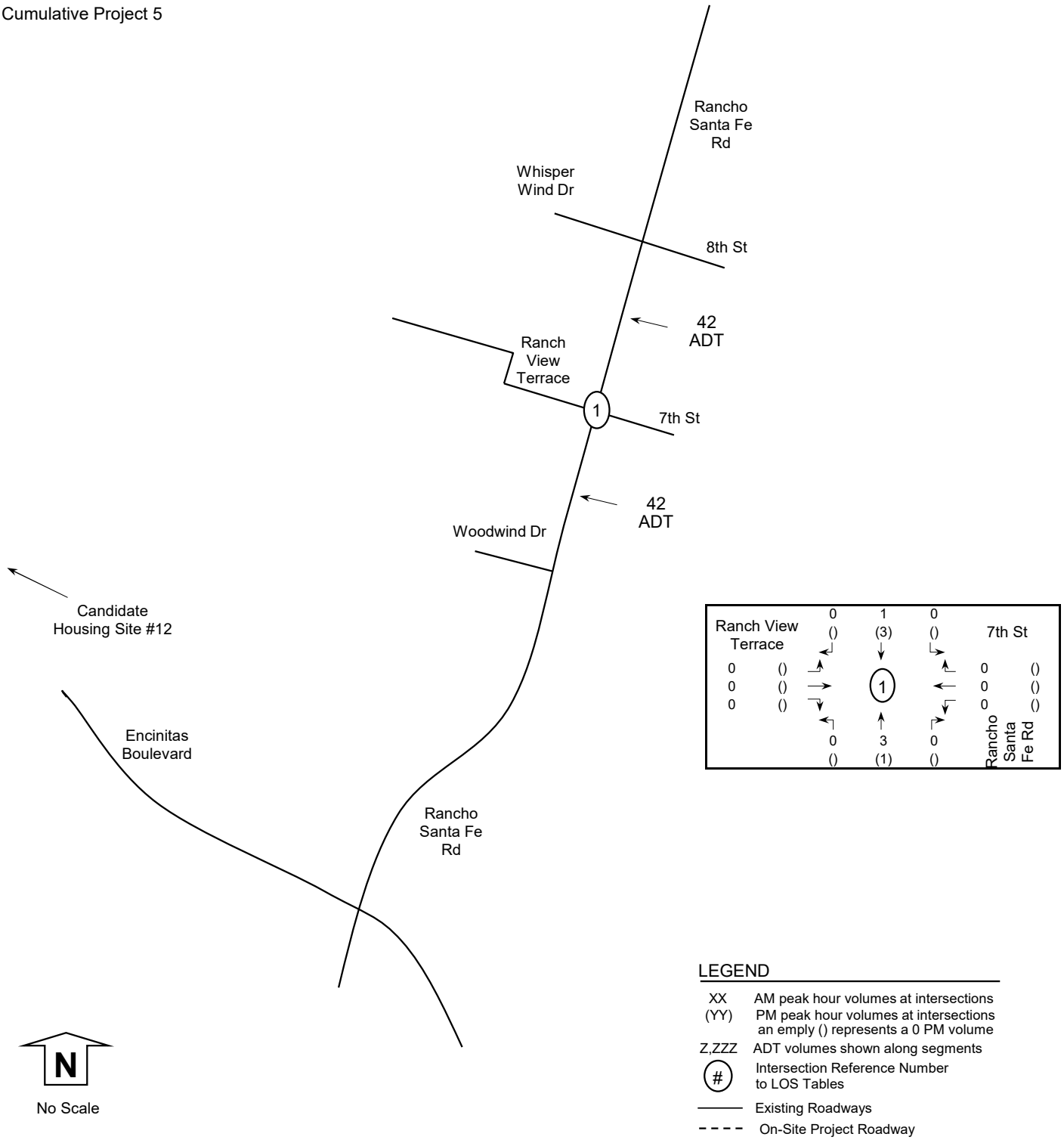
Cumulative Projects 1, 2 & 3



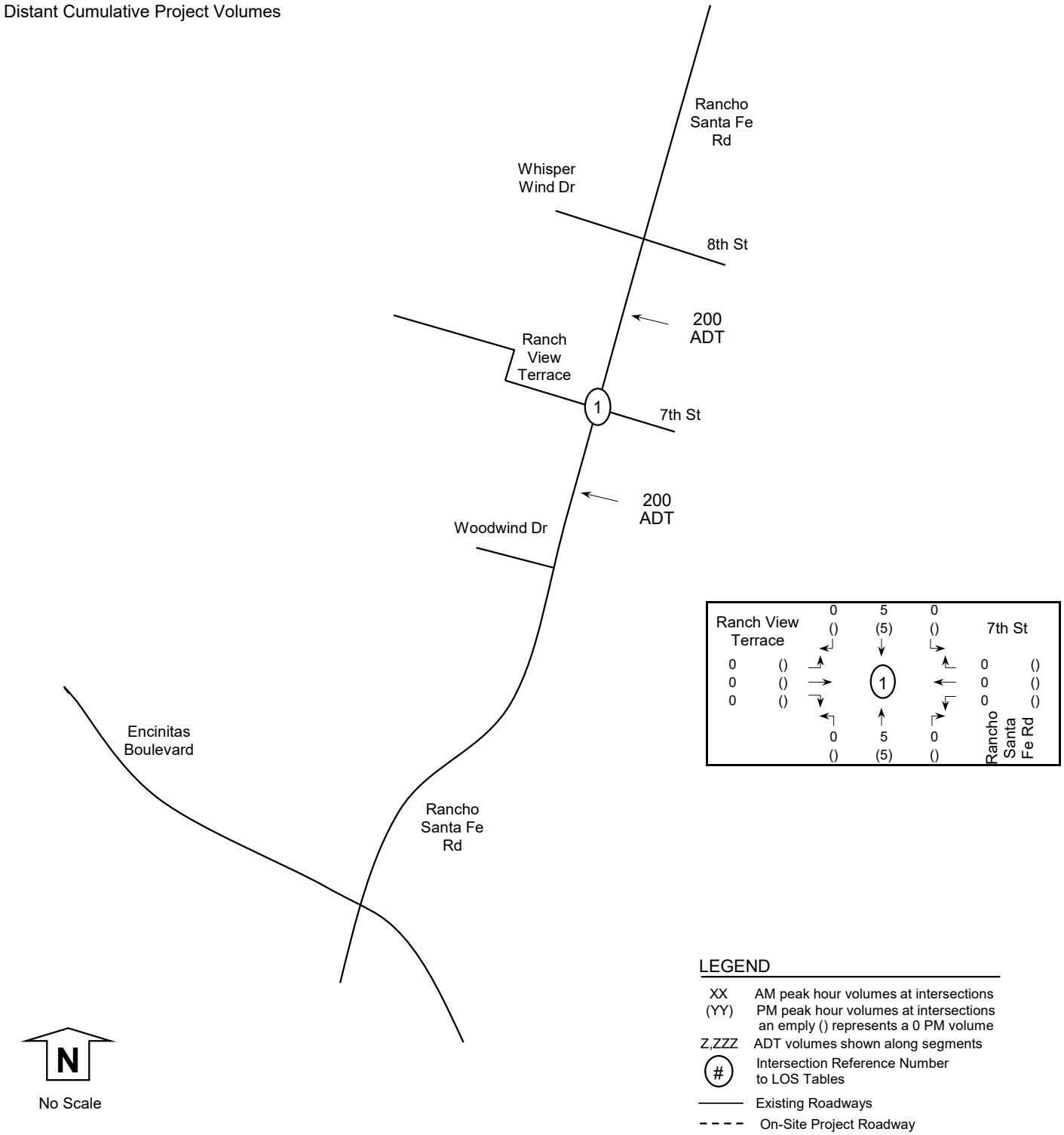
Cumulative Project 4



Cumulative Project 5



Distant Cumulative Project Volumes



Appendix G

Existing + Cumulative Intersection LOS Calculations

Intersection	
Intersection Delay, s/veh	29.3
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	4	40	1	17	1	361	21	15	679	1
Future Vol, veh/h	3	0	4	40	1	17	1	361	21	15	679	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	4	42	1	18	1	380	22	16	715	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	10.3	13.8	39.7
HCM LOS	A	B	B	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	43%	69%	2%
Vol Thru, %	94%	0%	2%	98%
Vol Right, %	5%	57%	29%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	383	7	58	695
LT Vol	1	3	40	15
Through Vol	361	0	1	679
RT Vol	21	4	17	1
Lane Flow Rate	403	7	61	732
Geometry Grp	1	1	1	1
Degree of Util (X)	0.548	0.013	0.11	0.935
Departure Headway (Hd)	4.894	6.437	6.475	4.6
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	730	559	557	783
Service Time	2.972	4.441	4.475	2.664
HCM Lane V/C Ratio	0.552	0.013	0.11	0.935
HCM Control Delay	13.8	9.5	10.3	39.7
HCM Lane LOS	B	A	B	E
HCM 95th-tile Q	3.4	0	0.4	13.6

Intersection	
Intersection Delay, s/veh	16.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	12	0	6	3	543	22	7	440	0
Future Vol, veh/h	0	0	1	12	0	6	3	543	22	7	440	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	1	13	0	6	3	572	23	7	463	0
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.7	9.4	19.2	14.4
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	0%	67%	2%
Vol Thru, %	96%	0%	0%	98%
Vol Right, %	4%	100%	33%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	568	1	18	447
LT Vol	3	0	12	7
Through Vol	543	0	0	440
RT Vol	22	1	6	0
Lane Flow Rate	598	1	19	471
Geometry Grp	1	1	1	1
Degree of Util (X)	0.741	0.002	0.032	0.601
Departure Headway (Hd)	4.459	5.621	6.116	4.6
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	631	581	786
Service Time	2.488	3.703	4.193	2.632
HCM Lane V/C Ratio	0.736	0.002	0.033	0.599
HCM Control Delay	19.2	8.7	9.4	14.4
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	6.8	0	0.1	4.1

Appendix H

Existing + Cumulative + Project Intersection LOS Calculations

Intersection	
Intersection Delay, s/veh	29.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	0	8	40	1	17	3	361	21	15	679	1
Future Vol, veh/h	4	0	8	40	1	17	3	361	21	15	679	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	8	42	1	18	3	380	22	16	715	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.5	10.3	14	40.5
HCM LOS	A	B	B	E

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	33%	69%	2%
Vol Thru, %	94%	0%	2%	98%
Vol Right, %	5%	67%	29%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	385	12	58	695
LT Vol	3	4	40	15
Through Vol	361	0	1	679
RT Vol	21	8	17	1
Lane Flow Rate	405	13	61	732
Geometry Grp	1	1	1	1
Degree of Util (X)	0.553	0.022	0.11	0.939
Departure Headway (Hd)	4.916	6.373	6.506	4.621
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	725	565	554	775
Service Time	2.998	4.377	4.506	2.688
HCM Lane V/C Ratio	0.559	0.023	0.11	0.945
HCM Control Delay	14	9.5	10.3	40.5
HCM Lane LOS	B	A	B	E
HCM 95th-tile Q	3.4	0.1	0.4	13.8

Intersection	
Intersection Delay, s/veh	17.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	0	3	12	0	6	8	543	22	7	440	1
Future Vol, veh/h	1	0	3	12	0	6	8	543	22	7	440	1
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	0	3	13	0	6	8	572	23	7	463	1
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9	9.4	19.7	14.5
HCM LOS	A	A	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	1%	25%	67%	2%
Vol Thru, %	95%	0%	0%	98%
Vol Right, %	4%	75%	33%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	573	4	18	448
LT Vol	8	1	12	7
Through Vol	543	0	0	440
RT Vol	22	3	6	1
Lane Flow Rate	603	4	19	472
Geometry Grp	1	1	1	1
Degree of Util (X)	0.75	0.007	0.032	0.605
Departure Headway (Hd)	4.474	5.841	6.14	4.617
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	808	607	579	783
Service Time	2.504	3.928	4.222	2.65
HCM Lane V/C Ratio	0.746	0.007	0.033	0.603
HCM Control Delay	19.7	9	9.4	14.5
HCM Lane LOS	C	A	A	B
HCM 95th-tile Q	7	0	0.1	4.1