

TRAFFIC IMPACT ANALYSIS  
**SUGARBUSH SUBDIVISION**

San Diego County, California  
June 1, 2007

TM5295rpl<sup>5</sup>, R04-008, SP03-003, S04-015  
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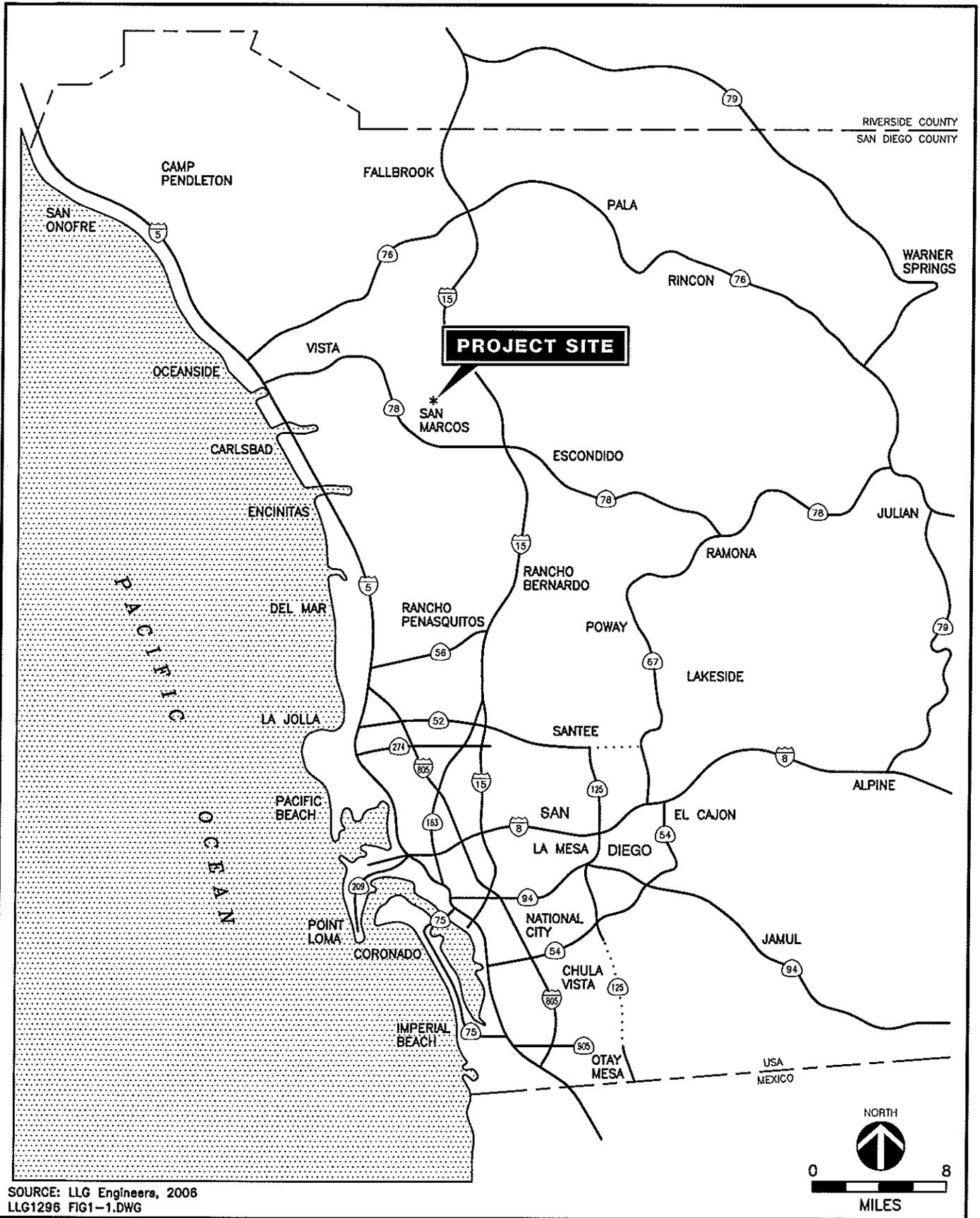
## 1.0 INTRODUCTION

The following traffic study has been prepared to determine and evaluate the traffic impacts on the surrounding circulation system due to the proposed development of a 45-unit single-family home subdivision. The proposed site is situated south of Buena Creek Road at the terminus of Sugarbush Drive. The project site is currently vacant.

Included in this traffic study are the following:

- Project description;
- Existing conditions description;
- Project trip generation/distribution/assignment;
- Cumulative projects discussion;
- Significance criteria;
- Traffic Analysis Methodology;
- Intersection and street segment capacity analyses;
- Sight Distance Assessment/Access;
- Access / On-Site Circulation;
- Plan-to-Plan Analysis; and
- Significance of impacts/Mitigation measures.

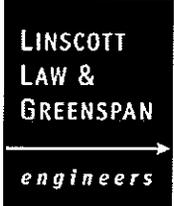
*Figure 1-1* shows the general location of the project, while *Figure 1-2* shows a more detailed project area map.

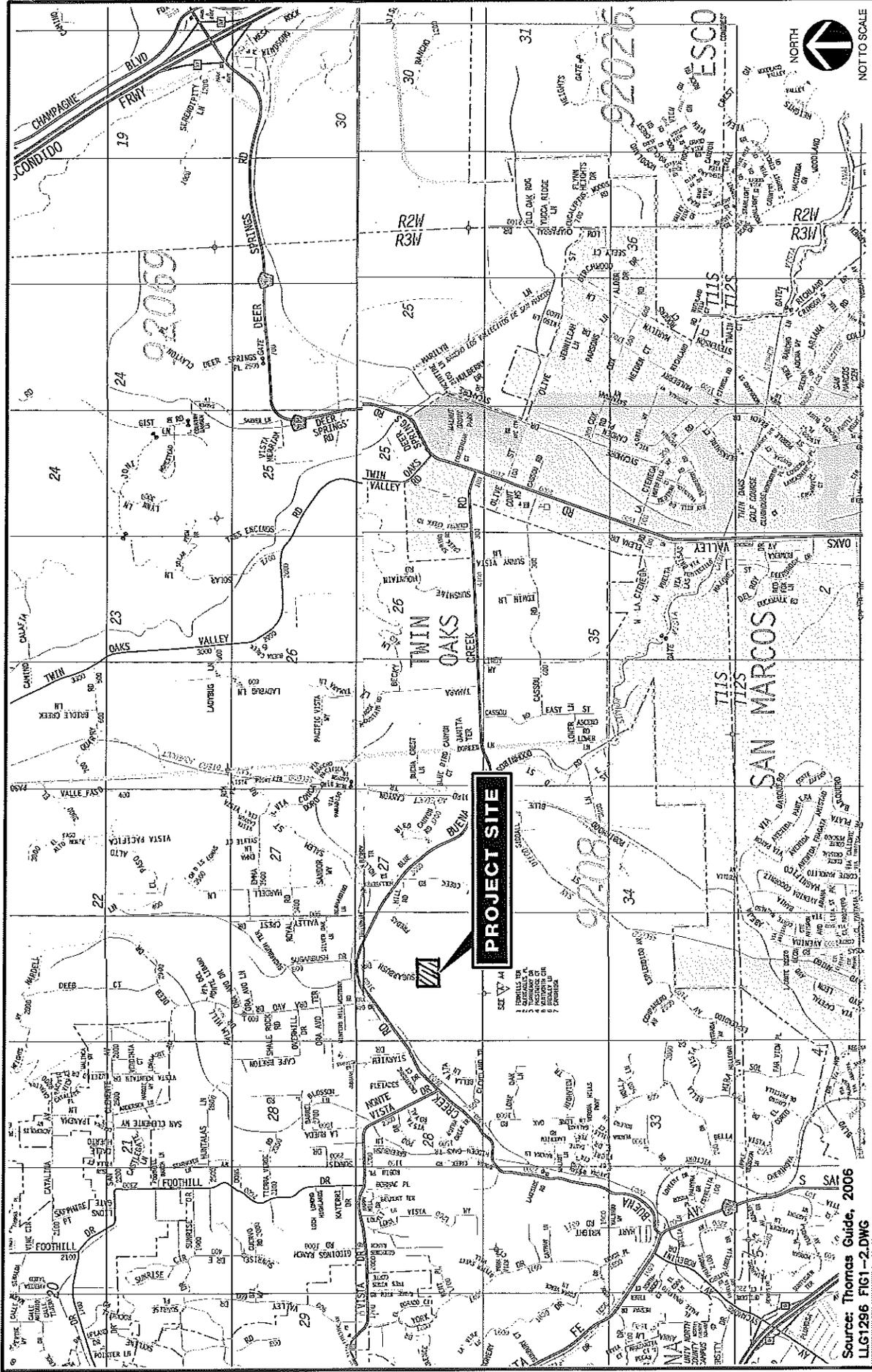


SOURCE: LLG Engineers, 2006  
 LLG1296 FIG1-1.DWG

**Figure 1-1**  
**Vicinity Map**

SUGARBUSH SUBDIVISION





**Figure 1-2**  
**Project Area Map**

SUGARBUSH SUBDIVISION

Source: Thomas Guide, 2006  
 LLG1296 FIG1-2.DWG

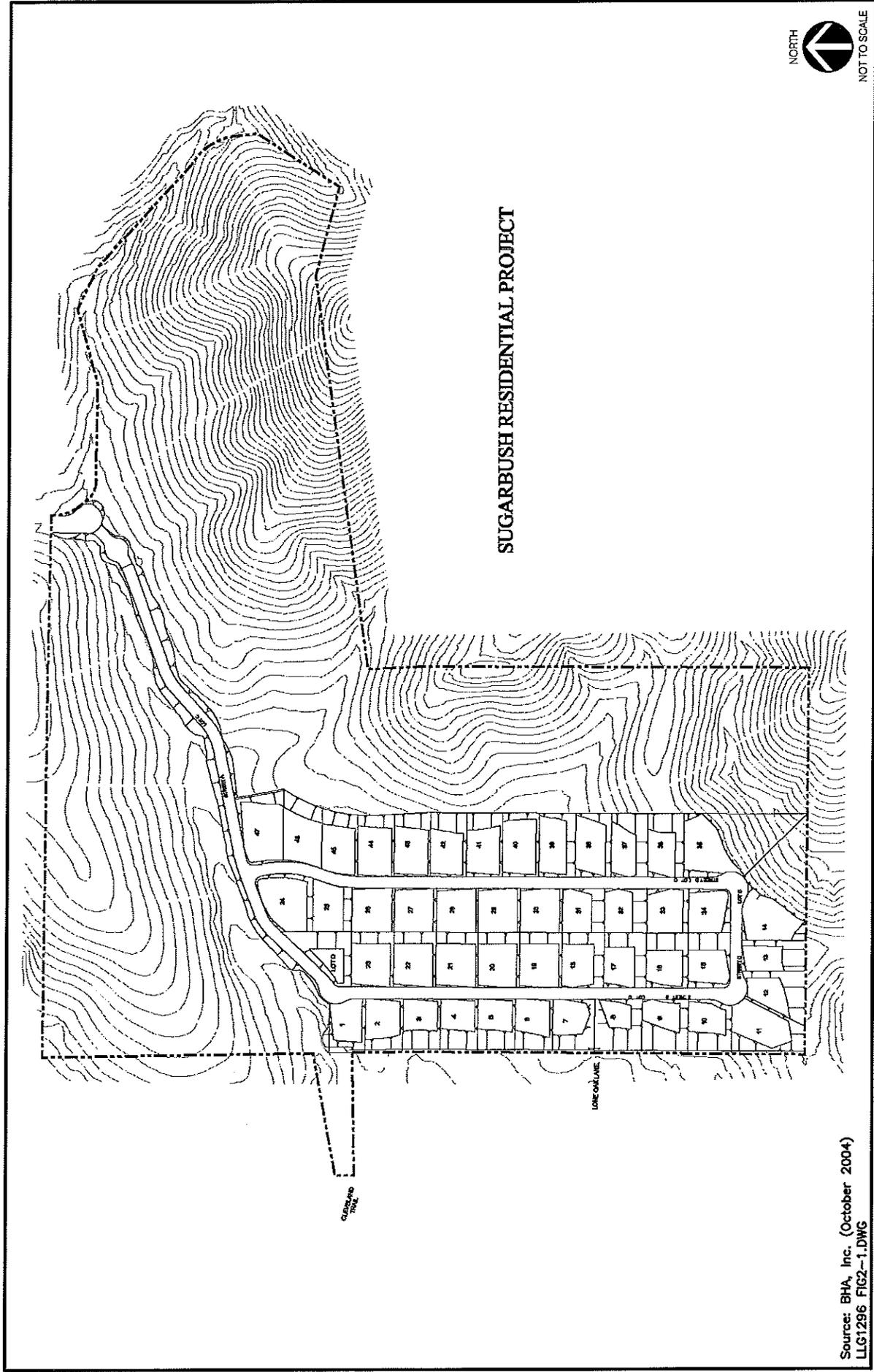
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## 2.0 PROJECT DESCRIPTION

The proposed subdivision consists of constructing 45 single-family estate homes on 115.5 acres within the County of San Diego. The project site is situated at the terminus of Sugarbush Drive, south of Buena Creek Road. This existing site is currently undeveloped and access to and from the project site is proposed via Sugarbush Drive only. One day-to-day access point is sufficient to serve a project, which generates 540 ADT. However, emergency access should also be provided. It is planned to provide emergency access via Cleveland Trail.

A review of the Tentative Map indicates that the on-site roads and Sugarbush Drive are built to the County's public road design standards.

*Figure 2-1* shows the site plan.



Source: BHA, Inc. (October 2004)  
 LLG1296 FIG2-1.DWG

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**Figure 2-1**  
**Site Plan**

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## 3.0 EXISTING CONDITIONS

### 3.1 Existing Street Network

According to the County of San Diego Public Road Standards, Prime Arterials should be 102 feet wide in 122 feet of Right-of-Way (R/W), providing six thru lanes, a raised median and curbside parking. Major Roads should be 78 feet wide in 98 feet of R/W, providing four thru lanes, a raised median and curbside parking. Collectors should be 64 feet wide in 84 feet of R/W providing four thru lanes with curbside parking or four thru lanes with a left-turn lane. Light Collectors should be 40 feet wide in 72 feet of R/W, providing two thru lanes with a left-turn lane. Bike lanes add 10 feet to both the road width and the R/W.

The following is a brief description of the existing street system in the project area. *Figure 3-1* shows an existing conditions diagram.

**Buena Creek Road** is a winding two-lane roadway from South Santa Fe Avenue in the County of San Diego to North Twin Oaks Valley Road in the City of San Marcos. Buena Creek Road currently does not provide shoulders and has a general cross-section width of 26 feet. Curbside parking is generally not allowed, and the posted speed limit ranges from 40 to 50 mph due to the winding nature of the roadway. Buena Creek Road is identified as a Major Road on the County Circulation Element.

The widening of Buena Creek Road between South Santa Fe Avenue and Twin Oaks Valley Road, a length of 4.3 miles is a County Capital Improvement Project (CIP). The construction of this improvement is not funded and there is no timeline.

**Sycamore Avenue/Robelini Drive** is a winding two-lane Collector Street from the SR 78 interchange to South Santa Fe Avenue within the County limits and a six-lane divided roadway within City of Vista limits. The northerly segment of Sycamore Avenue continues north from Lobelia Drive as a two-lane street named Robelini Drive. Curbside parking is generally not allowed, and the posted speed limit along Robelini Drive is 25 mph. Sycamore Avenue is identified as a Major Road on the County of San Diego Circulation Element. Robelini Drive is identified as a Collector Road.

It should be noted that the elimination of the South Santa Fe Avenue/Robelini Drive intersection, and the realignment of Robelini Drive and Sycamore Avenue are part of the South Santa Fe Avenue CIP.

**South Santa Fe Avenue** is classified as a Major Road on the County of San Diego's Circulation Element. S. Santa Fe Avenue is currently constructed as a two lane undivided roadway providing one lane of travel per direction. Curbside parking is prohibited and the posted speed limit is 45 mph. Plans to improve South Santa Fe Road by the County of San Diego is detailed below with the project divided into two segments. Two following two alternatives are being analyzed:

#### Alternative A

- South Santa Fe Avenue would be improved to a paved width of 76 feet within a 96-foot right-of-way (ROW). The typical cross-section would include two 12-foot inside traffic lanes and two 14-foot outside lanes; a 14-foot, striped, two-way left-turn median with left-turn pockets at public road intersections; two 5-foot bicycle lanes; and sidewalks.
- The proposed project would include a new traffic signal and lighting systems. The new traffic signal would be located at Buena Creek Road / Hart Wright Road. The existing signals at South Santa Fe Avenue/Palmyra Drive and South Santa Fe Avenue / Buena Creek Road would be replaced and modified. The existing signal at Robelini Drive would be removed.
- Sycamore Avenue would extend east from the Vista City limits to South Santa Fe Avenue and Robelini Drive would be no longer be connected to South Santa Fe Avenue. Sycamore Avenue would replace Robelini Drive as the route between State Route (SR) 78 and South Santa Fe Avenue and connect to South Santa Fe Avenue opposite Buena Creek Road to form a new 4-leg intersection with South Santa Fe Avenue.
- Robelini Drive would be partially reconfigured. The south end of Robelini Drive would remain a public road from Sycamore Avenue extending north and connecting with El Valle Opulento. The north end of Robelini Drive from El Valle Opulento would no longer be connected to South Santa Fe Avenue and Sycamore Avenue would replace Robelini Drive as the route between SR 78 and South Santa Fe Avenue. A driveway would be constructed from the intersection of Robelini Drive and El Valle Opulento to replace the removed section of Robelini Drive and provide access to the existing businesses previously utilizing Robelini Drive.
- Buena Creek Road would be widened to 90 feet at the intersection with South Santa Fe Avenue and at the railroad crossing. The new Buena Creek Road/South Santa Fe Avenue intersection would be approximately 130 feet west of the existing intersection.
- The South Santa Fe Avenue improvements would terminate at the San Marcos City limits, approximately 150 feet north of the Smilax Road intersection.

### Alternative B

- Under Alternative B, the project would not include modifications to the County's Major Road standards. South Santa Fe Avenue would be improved to a paved width of 78 feet within a 98-foot ROW width. The typical cross-section would include two 12-foot inside traffic lanes and two 14-foot outside lanes; a 14-foot striped two-way, left-turn median with left-turn pockets at public road intersections; two 6-foot bicycle lanes; and sidewalks. The width of the bike lanes in this alternative would meet the County's Major Road standards of 6 feet and result in a ROW two feet wider than Alternative A. As with Alternative A, variations of this typical section would be required on certain portions of the road due to NCTD ROW encroachment constraints. All other improvements included in Alternative A would also be components of Alternative B.

**Deer Springs Road** is classified as a Major Road on the County of San Diego's Circulation Element. Deer Springs Road is currently constructed as a two-lane roadway in the project area. Parking is prohibited within the project area. The shoulders are unimproved. Deer Springs Road has both horizontal and vertical curves, and rural characteristics. Within the project area, the posted speed limit is 45 mph with no bike lanes are present.

**Sugarbush Drive** is an unclassified two-lane roadway serving a few residential homes. Sugarbush Drive does not provide shoulders and has a cross-section width of 40 feet. Curbside parking is generally permitted and the prima facie speed is 25 mph.

**Monte Vista Drive** is classified as a Major Road on the County of San Diego's Circulation Element. Monte Vista Drive is currently constructed as a two-lane undivided roadway. Monte Vista Drive does not provide shoulders and has a cross-section width of 26 feet. Curbside parking is prohibited and the posted speed is 45 mph.

**Twin Oaks Valley Road** is classified as a Major Road north of Borden Road, and as a Prime Arterial south of Borden Road on the County of San Diego's Circulation Element. Twin Oaks Valley Road is currently constructed as a two lane undivided roadway with a TWLTL and a 45 mph posted speed limit from Buena Creek Road to Cassou Road. From Cassou Road to La Cienega Road, the roadway is constructed as a four-lane divided roadway with a raised median and a 45 mph posted speed limit.

## **3.2 Existing Traffic Volumes**

### **3.2.1 Peak Hour Intersection Turning Movement Volumes**

*Figure 3-2* depicts the ADT and AM/PM peak hour turning movement volumes at the key study area intersections.

### **3.2.2 Segment Volumes**

Existing 24-hour segment volume counts were conducted in November 2006. *Table 3-1* summarizes the daily traffic volumes (ADT).

*Appendix A* contains the manual and street segment count sheets.

**TABLE 3-1  
EXISTING TRAFFIC VOLUMES**

Street Segment	ADT <sup>a</sup>	Date	Source
<b>Buena Creek Road</b>			
S. Santa Fe Avenue to Sugarbush Drive	10,500	2006	LLG Engineers
Sugarbush Drive to N. Twin Oaks Valley Road	7,500	2006	LLG Engineers
<b>S. Santa Fe Avenue</b>			
Robelini Drive to Buena Creek Road	18,900	2006	LLG Engineers
Buena Creek Road to Smilax Road	14,100	2006	LLG Engineers
<b>Monte Vista Drive</b>			
Robin Place to Buena Creek Road	8,200	2006	LLG Engineers
<b>Sugarbush Drive</b>			
South of Buena Creek Road	100	2006	LLG Engineers
<b>N. Twin Oaks Valley Road</b>			
Deer Springs Road to La Cienega Road	17,500	2006	LLG Engineers
<b>Robelini Drive</b>			
S. Santa Fe Avenue to University Drive	16,400	2006	LLG Engineers
<b>Deer Springs Road</b>			
N. Twin Oaks Valley Road to I-15	18,000	2006	LLG Engineers

*Footnotes:*

- a. Average Daily Traffic Volumes.

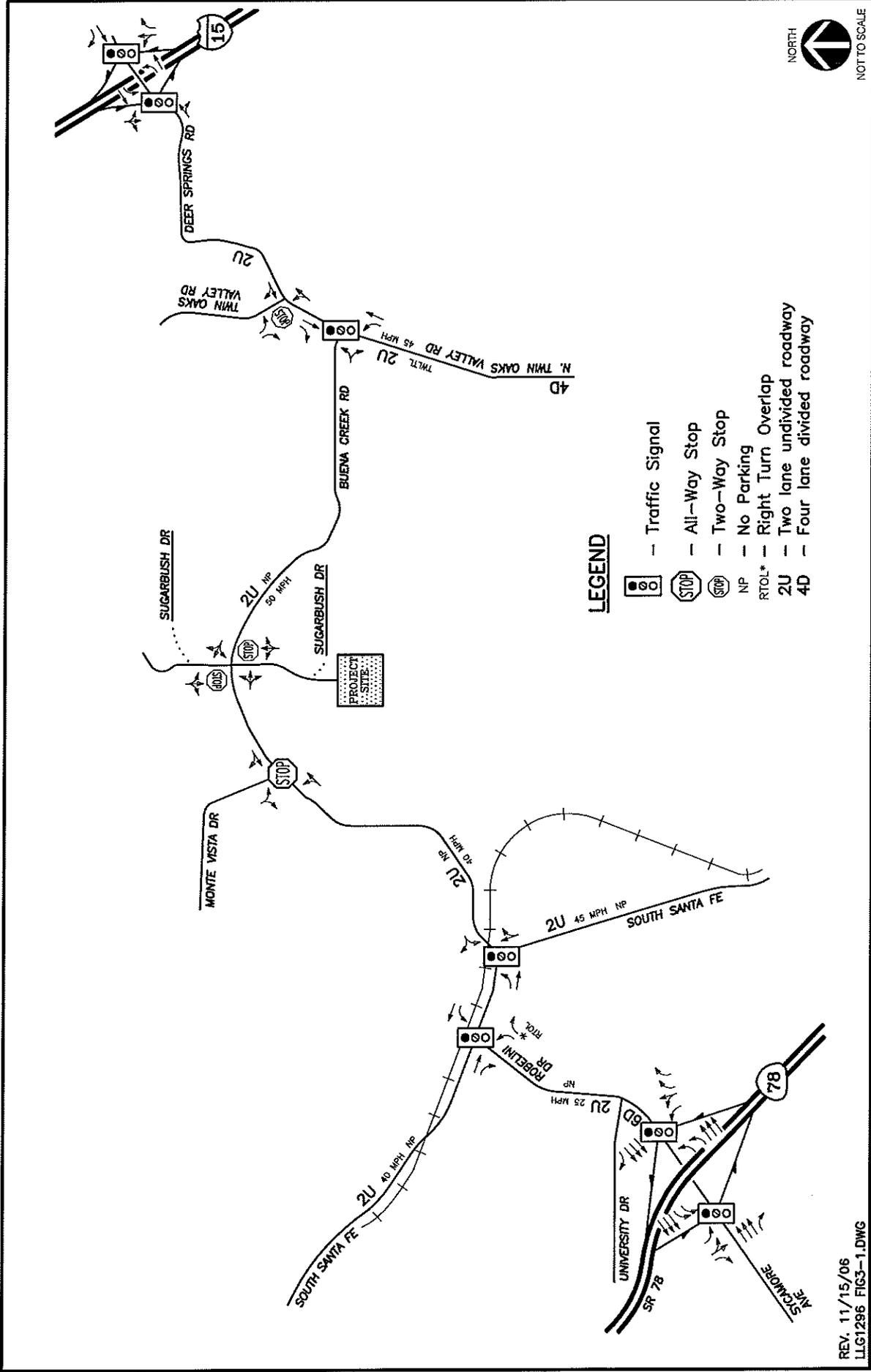
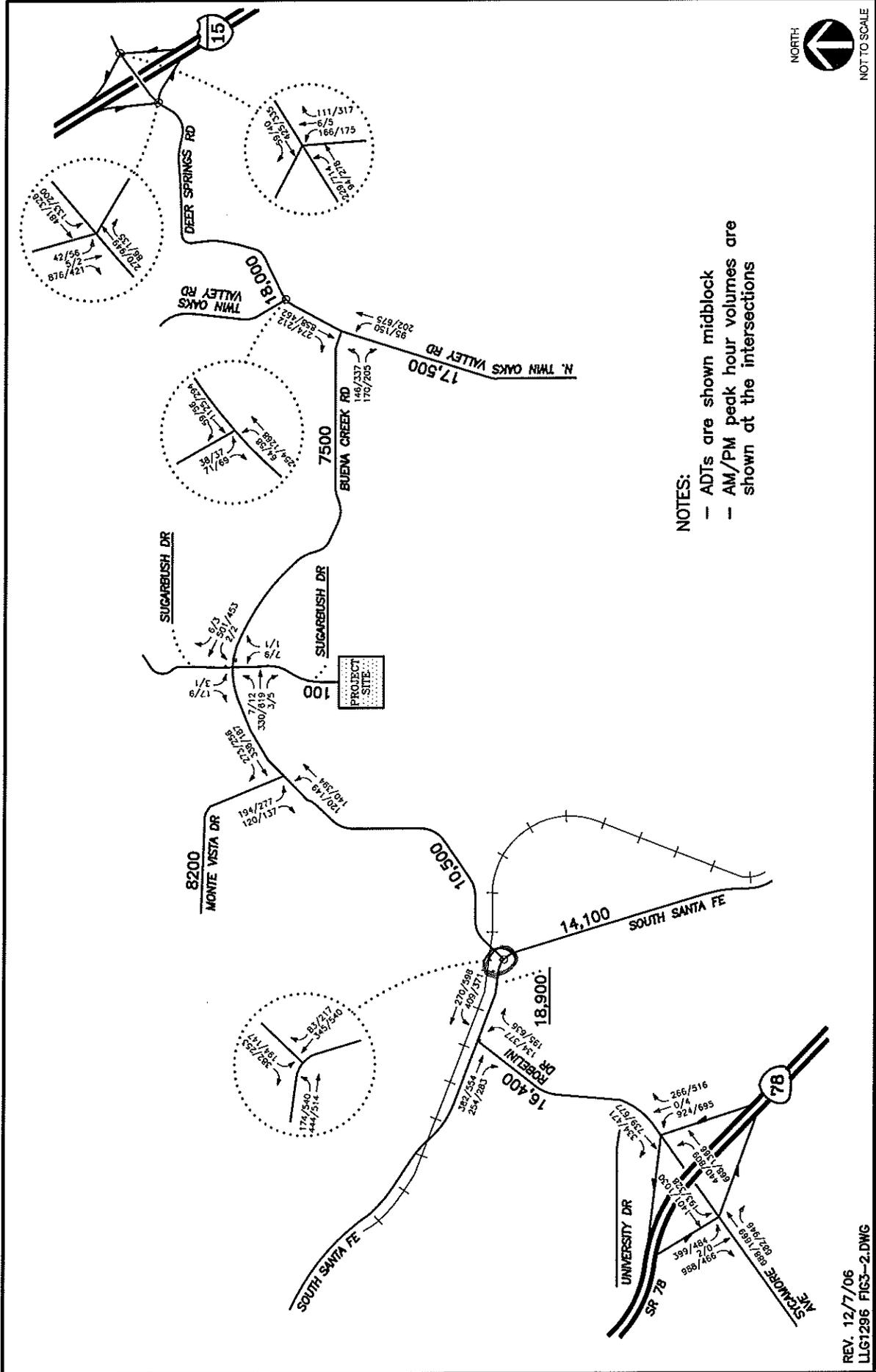


Figure 3-1

Existing Conditions Diagram

REV. 11/15/06  
 LLG1296 FIG3-1.DWG

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- NOTES:
- ADTs are shown midblock
  - AM/PM peak hour volumes are shown at the intersections

**Figure 3-2**  
**Existing Traffic Volumes**  
**AM/PM Peak Hours & ADT**

## 4.0 ANALYSIS APPROACH AND METHODOLOGY

### 4.1 Analysis Approach

This traffic analysis assesses the key intersections, street segments, freeways, and Traffic Monitoring Program arterials in the project area. All of these facilities are analyzed under several future analysis timeframes to determine the project impacts on the prevailing street network during each timeframe.

### 4.2 Analysis Methodology

There are different methodologies used to analyze signalized intersections, unsignalized intersections, street segments, freeways, and arterials, as described below.

The measure of effectiveness for intersection operations is level of service. In the 2000 Highway Capacity Manual (HCM), Level of Service for signalized intersections is defined in terms of delay. The level of service analysis results in seconds of delay expressed in terms of letters A through F. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time. The descriptions of the levels of service are summarized in *Table 4-1*.

TABLE 4-1  
INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

Level of Service	Description
A	Occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
C	Generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.
F	Considered to be unacceptable to most drivers. This condition often occurs with over saturation i.e. when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume-to-capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

#### 4.2.1 Signalized Intersections

For signalized intersections, level of service criteria are stated in terms of the average control delay per vehicle for a 15-minute analysis period. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. *Table 4-2* summarizes the delay thresholds for signalized intersections, while *Table 6* summarizes the signalized intersections levels of service descriptions.

Level of service A describes operations with very low delay, (i.e. less than 10.0 seconds per vehicle). This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level of service B describes operations with delay in the range 10.1 seconds and 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of Average delay.

Level of service C describes operations with delay in the range 20.1 seconds and 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level of service D describes operations with delay in the range 35.1 seconds and 55.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or higher v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are more frequent.

**TABLE 4-2  
LEVEL OF SERVICE THRESHOLDS FOR SIGNALIZED INTERSECTIONS**

Average Control Delay Per Vehicle (Seconds/Vehicle)	Level of Service
0.0    ≤    10.0	A
10.1   to   20.0	B
21.1   to   35.0	C
35.1   to   55.0	D
55.1   to   80.0	E
≥    80.0	F

Level of service E describes operations with delay in the range of 55.1 seconds to 80.0 seconds per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

Level of service F describes operations with delay in excess of over 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation (i.e., when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

### Additional Intersection Delay

It is important to account for the fact that the Sprinter will cause an increase in delay at the South Santa Fe Avenue and Buena Creek Road intersection. For the purpose of another traffic analysis LLG was preparing for a project in the City of Chula Vista, data regarding frequency of trolley passes and the average time of gate closure for passing trolleys was recorded at three trolley crossings was collected. This data was used to calculate the average delay due to trains on the SDNR railroad passing through the Buena Creek Road / South Santa Fe Avenue intersection. The method by which this delay was determined is explained below:

The trolley line (Blue Line) connecting Mission San Diego to San Ysidro runs parallel to I-5 at “E” Street, “H” Street and “J” Street with an “at grade” crossing immediately east of the I-5 northbound ramps. It is planned to have four train crossings each in the AM and PM peak hours (in each direction) at the York Drive / Woodland Drive / South Santa Fe Avenue intersection.

- The duration of gate closures was observed in the field at each trolley crossing
- The assumed number of trolley passes at the intersection is  $N_t$ .
- The average of observed time of gate closure was calculated ( $G_c$ ).
- The total time for which the gate is closed due to the trolley crossing ( $L_{gc}$ ) per hour was calculated by multiplying the average gate closure with the number of trolley passes per hour ( $N_t \times G_c$ ).
- The average weighted delay/cycle was then calculated by dividing the total time of gate closure by the number of cycles per hour ( $N_c$ ) at that interchange ( $L_{gc} / N_c$ ).

*Appendix A-1* includes Tables A-1, the observed closures in the AM and PM peak hours due to the trolley at three crossings in Chula Vista and A-2, the Average crossing closure length calculations.

At the subject intersection, an average delay of approximately 5.0 seconds due to the Sprinter crossing was calculated as follows:

- **Average weighted delay/cycle for the AM and PM peak hours:** 54 seconds (see *Appendix A-1*)
- **Number of passes of the Sprinter:** 8 passes
- **Signal cycle length:** 100 seconds

Average Delay = (54 seconds x 8 passes) / 100 seconds

The calculated average delay of 5.0 seconds was rounded up to 7.0 seconds for the analysis. This delay was added to the “typical non-railroad crossing” AM and PM peak hour delays calculated at the Sycamore Avenue / Buena Creek Road / South Santa Fe Avenue intersection to determine the forecasted delay at the intersection.

#### 4.2.2 Unsignalized Intersections

For unsignalized intersections, level of service is determined by the computed or measured control delay and is defined for each minor movement. Level of service is not defined for the intersection as a whole. *Table 4-3* depicts the criteria, which are based on the Average control delay for any particular minor movement.

**TABLE 4-3  
LEVEL OF SERVICE THRESHOLDS FOR UNSIGNALIZED INTERSECTIONS**

Average Control Delay Per Vehicle (Seconds/Vehicle)	Level of Service	Expected Delay to Minor Street Traffic
0.0 ≤ 10.0	A	Little or no delay
10.1 to 15.0	B	Short traffic delays
15.1 to 25.0	C	Average traffic delays
25.1 to 35.0	D	Long traffic delays
35.1 to 50.0	E	Very long traffic delays
≥ 50.0	F	Severe congestion

Level of Service F exists when there are insufficient gaps of suitable size to allow a side street demand to safely cross through a major street traffic stream. This level of service is generally evident from extremely long control delays experienced by side-street traffic and by queuing on the minor-street approaches. The method, however, is based on a constant critical gap size; that is, the critical gap remains constant no matter how long the side-street motorist waits.

LOS F may also appear in the form of side-street vehicles selecting smaller-than-usual gaps. In such cases, safety may be a problem, and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior, which are more difficult to observe in the field than queuing.

#### 4.2.3 Street Segments

The street segments were analyzed on a daily basis by comparing the daily traffic volume (ADT) to the County of San Diego Average Daily Vehicle Trips Table and City of San Marcos Roadway Classification Table. These tables are included in *Appendix B* and provide Levels of Service estimates based on traffic volumes and roadway characteristics.

## 5.0 SIGNIFICANCE CRITERIA

The following criterion was utilized to evaluate potential significant impacts, based on the County's adopted criteria outlined in the document *Guidelines for Determining Significance*, dated September 26, 2006.

### Road Segments

Pursuant to the County's General Plan Public Facilities Element (PFE), new development must provide improvements or other measures to mitigate traffic impacts to avoid:

- Reduction in Level of Service (LOS) below "C" for on-site Circulation Element roads;
- Reduction in LOS below "D" for off-site and on-site abutting Circulation Element roads; and
- "Significantly impacting congestion" on roads that operate at LOS "E" or "F". If impacts cannot be mitigated, the project will be denied unless a statement of overriding findings is made pursuant to the State CEQA Guidelines. The PFE, however, does not include specific guidelines/thresholds for determining the amount of additional traffic that would "significantly impact congestion" on such roads, as that phrase is used in item (c) above.

The County has created the following guidelines to evaluate likely traffic impacts of a proposed project for road segments and intersections serving that project site, for purposes of determining whether the development would "significantly impact congestion" on the referenced LOS E and F roads. The guidelines are summarized in Table 1 (hereinafter, referred to as *Table 5-1* in this report). The thresholds in *Table 5-1* are based upon average operating conditions on County roadways. It should be noted that these thresholds only establish general guidelines, and that the specific project location must be taken into account in conducting an analysis of traffic impact from new development.

#### 5.1.1 On-site Circulation Element Roads

PFE, Transportation, Policy 1.1 states that "new development shall provide needed roadway expansion and improvements on-site to meet demand created by the development, and to maintain a Level of Service C on Circulation Element Roads during peak traffic hours". Pursuant to this policy, a significant traffic impact would result if:

- The additional or redistributed ADT generated by the proposed land development project will cause on-site Circulation Element Roads to operate below LOS C during peak traffic hours except within the Otay Ranch project as defined in the Otay Subregional Plan Text, Volume 2. PFE, Implementation Measure 1.1.2.

#### 5.1.2 Off-site Circulation Element Roads

PFE, Transportation, Policy 1.1 also states that "new development shall provide needed roadway expansion and improvements off-site to meet demand created by the development, and to maintain a Level of Service D on Circulation Element Roads." "New development that would significantly impact congestion on roads operating at LOS E or F, either currently or as a result of the project, will

be denied unless improvements are scheduled to improve the LOS to D or better or appropriate mitigation is provided.” The PFE, however, does not specify what would significantly impact congestion or establish criteria for evaluating when increased traffic volumes would significantly impact congestion. The following significance guidelines provided are the County’s preferred method for evaluating whether or not increased traffic volumes generated or redistributed from a proposed project will “significantly impact congestion” on County roads, operating at LOS E or F, either currently or as a result of the project.

Traffic volume increases from projects that result in one or more of the following criteria will have a significant traffic impact on a road segment, unless specific facts show that there are other circumstances that mitigate or avoid such impacts:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a Circulation Element Road or State Highway currently operating at LOS E or LOS F, or will cause a Circulation Element Road or State Highway to operate at a LOS E or LOS F as a result of the proposed project as identified in *Table 5-1*, or
- The additional or redistributed ADT generated by the proposed project will cause a residential street to exceed its design capacity.

**TABLE 5-1  
MEASURES OF SIGNIFICANT PROJECT IMPACTS TO CONGESTION ON ROAD SEGMENTS  
ALLOWABLE INCREASES ON CONGESTED ROAD SEGMENTS**

Level of Service	Two-Lane Road	Four-Lane Road	Six-Lane Road
LOS E	200 ADT	400 ADT	600 ADT
LOS F	100 ADT	200 ADT	300 ADT

*Footnotes:*

- a. By adding proposed project trips to all other trips from a list of projects, this same table must be used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes any trips must mitigate a share of the cumulative impacts.
- b. The County may also determine impacts have occurred on roads even when a project’s traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.

## 5.2 Intersections

This section provides guidance for evaluating adverse environmental effects a project may have on signalized and unsignalized intersections.

### 5.2.1 Signalized

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or level of service traffic impact on a road segment:

- The additional or redistributed ADT generated by the proposed project will significantly increase congestion on a signalized intersection currently operating at LOS E or LOS F, or will cause a signalized intersection to operate at a LOS E or LOS F as identified in *Table 2* (hereinafter, referred to as *Table 5-2* in this report).

**TABLE 5-2  
MEASURES OF SIGNIFICANT PROJECT IMPACTS TO CONGESTION ON INTERSECTIONS  
ALLOWABLE INCREASES ON CONGESTED INTERSECTIONS**

Level of service	Signalized Intersections	Unsignalized Intersections
LOS E	Delay of 2 seconds	20 peak hour trips on a critical movement
LOS F	Delay of 1 second, or 5 peak hour trips on a critical movement	5 peak hour trips on a critical movement

*Footnotes:*

- a. A critical movement is one that is experiencing excessive queues.
- b. By adding proposed project trips to all other trips from a list of projects, these same tables are used to determine if total cumulative impacts are significant. If cumulative impacts are found to be significant, each project that contributes any trips must mitigate a share of the cumulative impacts.
- c. The County may also determine impacts have occurred on roads even when a project's traffic or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.

**5.2.2 Unsignalized**

The operating parameters and conditions for unsignalized intersections differ dramatically from those for signalized intersections. Very small volume increases on one leg or turn and/or through movement of an unsignalized intersection can substantially affect the calculated delay for the entire intersection. Significance criteria for unsignalized intersections are based upon a minimum number of trips added to a critical movement at an unsignalized intersection.

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant traffic volume or level of service traffic impact on a road segment:

- The additional or redistributed ADT generated by the proposed project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection, and cause an unsignalized intersection to operate below LOS D, or
- The additional or redistributed ADT generated by the proposed project will add 20 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS E, or
- The additional or redistributed ADT generated by the proposed project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection, and cause the unsignalized intersection to operate at LOS F, or
- The additional or redistributed ADT generated by the proposed project will add 5 or more peak hour trips to a critical movement of an unsignalized intersection currently operating at LOS F, or
- Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, it is found that the generation rate is less than those specified above, and would significantly impact the operations of the intersection.

## 6.0 ANALYSIS OF EXISTING CONDITIONS

### 6.1 Peak Hour Intersection Levels of Service

*Table 6-1* summarizes the existing operations at the key study area intersections. As seen in *Table 6-1*, the majority of the key intersections are currently operating at LOS D or better during both the AM and PM peak hours with the exception of the following intersections which are calculated to currently operate at LOS E or F.

- SR 78 / Sycamore Avenue Eastbound Ramps (LOS F during the AM peak hour);
- Buena Creek Road / S. Santa Fe Avenue (LOS E during the AM peak hour and LOS F during the PM peak hour);
- Buena Creek Road / Monte Vista Drive (LOS E during the PM peak hour);
- Deer Springs Road / I-15 Southbound Ramps (LOS F during the PM peak hours); and

*Table 6-1* shows under existing conditions, the SR 78/Sycamore Avenue WB Ramps are calculated to operate at under capacity during both the AM and PM peak hours. The SR 78/Sycamore Avenue EB Ramps are calculated to operate at over capacity for both the AM and PM peak hours. In addition, the Deer Springs Road interchange is calculated to operate at over capacity during the PM peak hour only.

*Appendix C* contains the existing intersection analysis worksheets.

### 6.2 Daily Street Segment Levels of Service

*Table 6-2* shows that the following segments are calculated to currently operate at LOS E or worse conditions:

- South Santa Fe Avenue from Robelini Drive to Buena Creek Road (LOS F)
- South Santa Fe Avenue from Buena Creek Road to Smilax Road (LOS E)
- North Twin Oaks Valley Road from Buena Creek Road to La Cienega Road (LOS F)
- Robelini Drive from S. Santa Fe Avenue to University Drive (LOS F)
- Deer Springs Road from N. Twin Oaks Valley Road to I-15 (LOS F)

**TABLE 6-1  
EXISTING INTERSECTION OPERATIONS**

Intersection	Control Type	Peak Hour	Existing	
			Delay <sup>a</sup>	LOS <sup>b</sup>
1. SR 78 / Sycamore Avenue EB Ramps	Signal	AM	89.7	F
		PM	52.6	D
2. SR 78 / Sycamore Avenue WB Ramps	Signal	AM	26.5	C
		PM	29.3	C
3. Robelini Drive / S. Santa Fe Avenue	Signal	AM	23.4	C
		PM	30.1	C
4. Buena Creek Road / S. Santa Fe Avenue	Signal	AM	65.9	E
		PM	>100.0	F
5. Buena Creek Road / Monte Vista Drive	AWSC <sup>c</sup>	AM	14.6	B
		PM	39.7	E
6. Buena Creek Road / Sugarbush Drive	TWSC <sup>d</sup>	AM	19.4	C
		PM	27.8	D
7. Buena Creek Road / N. Twin Oaks Valley Road	Signal	AM	12.6	B
		PM	19.0	B
8. Deer Springs Road / N. Twin Oaks Valley Road	Signal	AM	14.7	B
		PM	13.3	B
9. Deer Springs Road / Interstate 15 SB Ramps	Signal	AM	46.5	D
		PM	91.9	F
10. Deer Springs Road / Interstate 15 NB Ramps	Signal	AM	25.6	C
		PM	38.0	D

**Footnotes:**

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. TWSC – Two-Way Stop Controlled intersection. Minor street left turn delay is reported.

Signalized		Unsignalized	
Thresholds		Thresholds	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

**TABLE 6-2  
EXISTING SEGMENT OPERATIONS**

Segment	Existing Roadway Class <sup>a</sup>	LOS E Capacity <sup>b</sup>	Existing		
			Volume	LOS	V/C
<b>Buena Creek Road</b> S. Santa Fe Ave to Sugarbush Dr Sugarbush Dr to N. Twin Oaks Valley Rd	Rural Collector	16,200	10,500	D	0.65
	Rural Collector	16,200	7,500	D	0.46
<b>S. Santa Fe Avenue</b> Robelini Dr to Buena Creek Rd Buena Creek Rd to Smilax Rd	Rural Collector	16,200	<b>18,900</b>	<b>F</b>	<b>1.17</b>
	Rural Collector	16,200	<b>14,100</b>	<b>E</b>	<b>0.87</b>
<b>Monte Vista Drive</b> Robin Pl to Buena Creek Rd	Rural Collector	16,200	8,200	D	0.51
<b>Sugarbush Drive</b> S. of Buena Creek Rd	Residential Street <sup>c</sup>	1,500	100	C	0.07
<b>N. Twin Oaks Valley Road <sup>d</sup></b> Buena Creek Rd to La Cienega Rd	Rural Collector	15,000	<b>17,500</b>	<b>F</b>	<b>1.17</b>
<b>Robelini Drive</b> S. Santa Fe Ave to University Dr	Rural Collector	16,200	<b>16,400</b>	<b>F</b>	<b>1.01</b>
<b>Deer Springs Road</b> N. Twin Oaks Valley Rd to I-15	Rural Collector	16,200	<b>18,000</b>	<b>F</b>	<b>1.11</b>

*Footnotes:*

- a. Existing Roadway Classification.
- b. County of San Diego, Average Daily Vehicle Trips.
- c. Level of service does not apply to residential streets since their primary purpose is to serve abutting lots and not serve as through streets.
- d. Located within the City of San Marcos. Hence, City of San Marcos Average Roadway Levels of Service Table utilized.
- e. **Bold** indicates LOS E or worse operations

### 6.3 Intersection Lane Vehicle (ILV) Analysis

*Table 6-3* summarizes the Intersection Lane Volume (ILV) analysis for the SR 78 / Sycamore Avenue and the I-15 / Deer Springs Road interchanges, per Caltrans methodologies. As seen in *Table 6-3*, the SR 78/Sycamore Avenue EB Ramps is calculated to operate at over capacity during the AM and PM peak hours and the I-15 / Deer Springs SB Ramps intersection is calculated to operate at over capacity during the PM peak hour. The remaining intersections are calculated to operate at near or under capacity.

*Appendix C* also contains the ILV analysis worksheets.

**TABLE 6-3  
EXISTING ILV OPERATIONS**

Intersection	Peak Hour	Total Operating Level (ILV / Hour)	Capacity
SR 78/Sycamore Avenue WB Ramps	AM PM	< 1200 < 1200	Under Under
SR 78/Sycamore Avenue EB Ramps	AM PM	>1500 >1500	Over Over
I-15 / Deer Springs SB Ramps	AM PM	>1200 & <1500 >1500	Near Over
I-15 / Deer Springs NB Ramps	AM PM	< 1200 >1200 & <1500	Under Near

## 7.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

### 7.1 Trip Generation

*Table 8-1* summarizes the total project traffic generation. The project is calculated to generate approximately 540 ADT with 43 trips (13 inbound / 30 outbound) during the AM peak hour and 54 trips (38 inbound / 16 outbound) during the PM peak hour.

### 7.2 Trip Distribution/Assignment

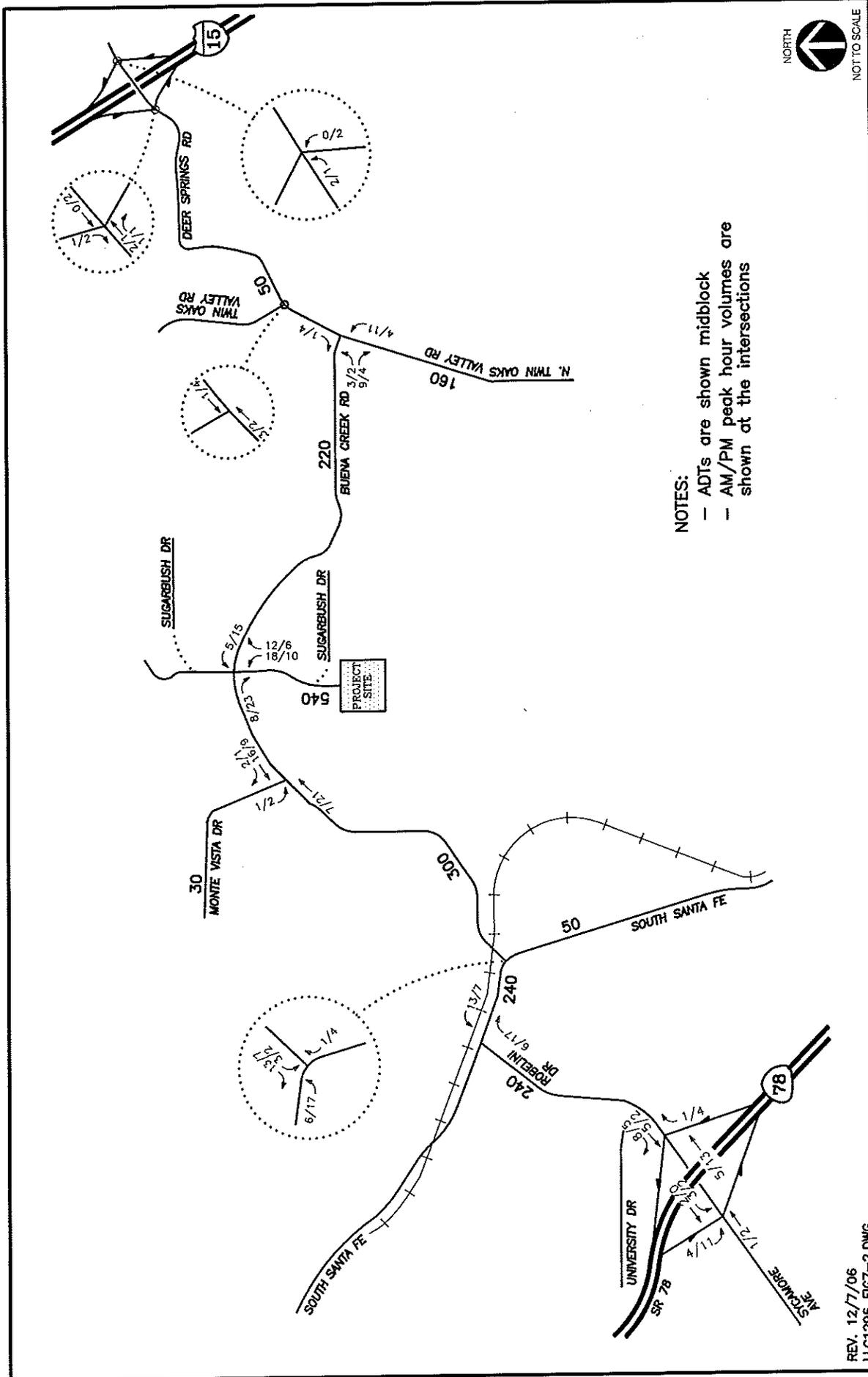
The generated project traffic was distributed and assigned to the street system based on project access, the characteristics of the roadway system, the proximity of the project to SR 78, and potential employment, retail, and educational opportunities. Slightly more than half of the trips are expected to utilize Buena Creek Road to the west since that route is the most direct to SR 78 and I-15. It also provides access to retail opportunities. *Figure 7-1* depicts the estimated project traffic distribution in the site environs.

The assignment of project traffic to the surrounding circulation system was based on the estimated distribution and is shown in *Figure 7-2*, while *Figure 7-3* depicts the existing + project traffic volumes.

**TABLE 7-1  
PROJECT TRIP GENERATION**

Land Use	Size	Daily Trip Ends		AM Peak Hour					PM Peak Hour				
		Rate <sup>a</sup>	ADT	% of ADT	In:Out Split	Volume			% of ADT	In:Out Split	Volume		
						In	Out	Total			In	Out	Total
Estate Homes	45 DU	12 /DU <sup>b</sup>	540	8%	30 : 70	13	30	43	10%	70 : 30	38	16	54



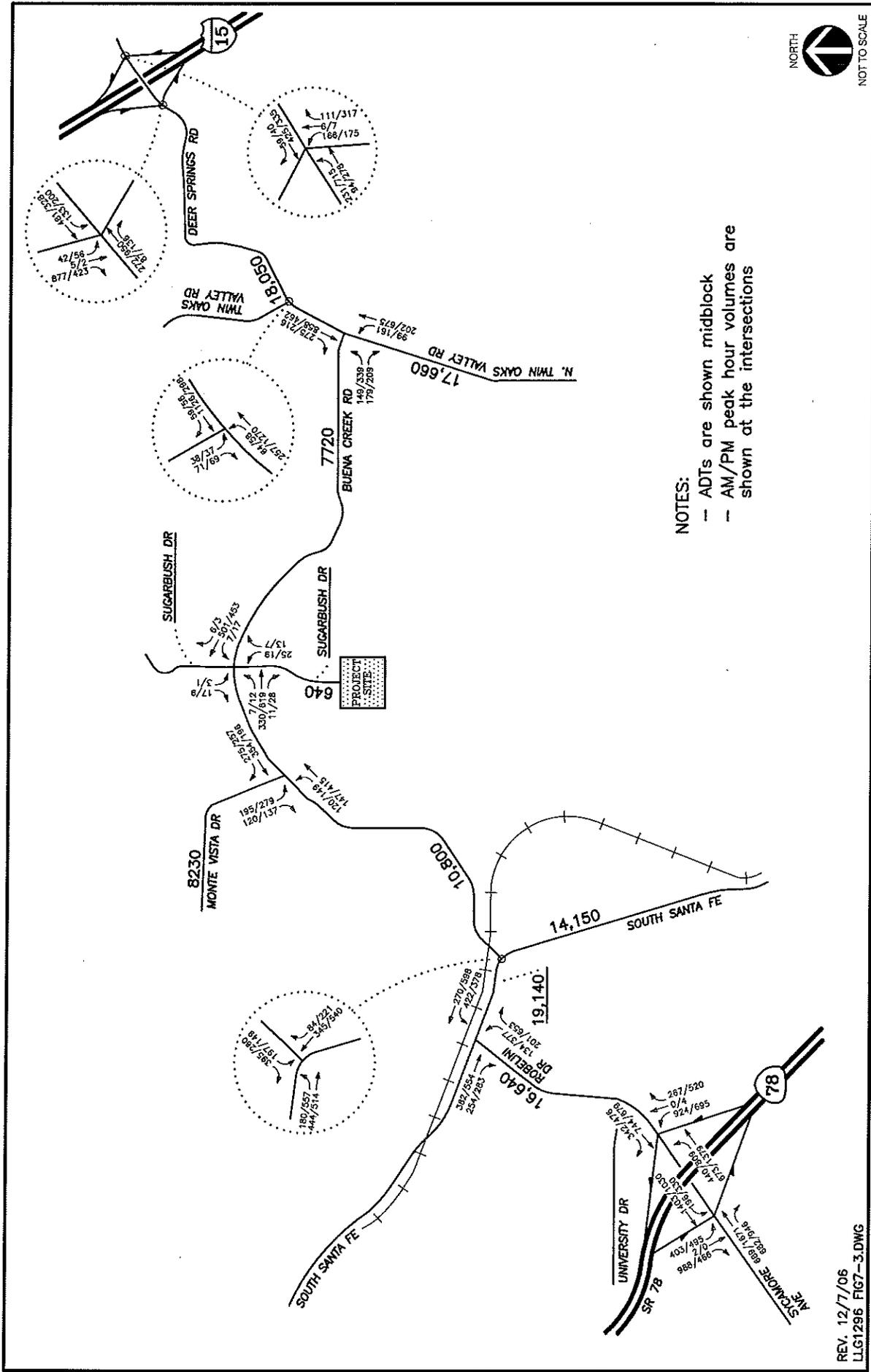


**Figure 7-2**  
**Project Traffic Volumes**  
**AM/PM Peak Hours & ADT**

SUGARBUSH SUBDIVISION

REV. 12/7/06  
 LLG1296 FIG7-2.DWG

**LINSCOTT  
 LAW &  
 GREENSPAN**  
*engineers*



**Figure 7-3**  
**Existing + Project Traffic Volumes**  
**AM/PM Peak Hours & ADT**



## 8.0 CUMULATIVE PROJECTS

### 8.1 Description of Projects

LLG conducted a thorough research at the County to determine the cumulative projects in the project vicinity contributing traffic to the study area intersections and segments. Information obtained from various sources including several visits to the County of San Diego and the City of Marcos indicates a total of 72 cumulative projects in the project vicinity.

*Table 8-1* summarizes the trip generation for all the cumulative projects. As seen in Table 8-1, following is a summary of the cumulative projects trip generation:

- **City of San Marcos** - 19 cumulative projects were identified in the City of San Marcos with a total trip generation of 10,789 ADT with 985 trips in the AM peak hour (417 inbound and 568 outbound) and 1,357 trips in the PM peak hour (736 inbound and 621 outbound).
- **San Diego County** - 35 cumulative projects were identified in the San Diego County with a total trip generation of 62,908 ADT with 4,376 trips in the AM peak hour (1,460 inbound and 2,916 outbound) and 6,265 trips in the PM peak hour (3,960 inbound and 2,575 outbound).
- **City of Vista** - 6 cumulative projects were identified in the City of Vista with a total trip generation of 1,672 ADT with 127 trips in the AM peak hour (38 inbound and 89 outbound) and 439 trips in the PM peak hour (107 inbound and 332 outbound).
- **City of Escondido** - 5 cumulative projects were identified in the City of Escondido with a total trip generation of 1,440 ADT with 95 trips in the AM peak hour (35 inbound and 60 outbound) and 133 trips in the PM peak hour (85 inbound and 48 outbound).
- **Escondido Union School District** - 1 cumulative project was identified in Escondido Union School District with a total trip generation of 1,360 ADT with 436 trips in the AM peak hour (218 inbound and 218 outbound) and 122 trips in the PM peak hour (61 inbound and 61 outbound).
- **San Marcos School District** - 1 cumulative project was identified in San Marcos School District with a total trip generation of 1,217 ADT with 243 trips in the AM peak hour (170 inbound and 73 outbound) and 122 trips in the PM peak hour (49 inbound and 73 outbound).
- **Vista Unified School District** - 3 cumulative projects were identified in Vista Unified School District with a total trip generation of 1,920 ADT with 614 trips in the AM peak hour (307 inbound and 307 outbound) and 172 trips in the PM peak hour (86 inbound and 86 outbound).

**TABLE 8-1  
CUMULATIVE PROJECTS TRIP GENERATION SUMMARY**

Project Number	Project ID	Cumulative Project	Rate	Unit	Daily	AM Peak Hour		PM Peak Hour			
						In:Out	In	Out	In:Out	In	Out
<b>City of San Marcos</b>											
TSM 401	1	Rose Ranch	10 /DU	83 DU	830	3 :7	20	46	7 :3	58	25
TSM 398	2	Del Roy Drive Res	10 /DU	36 DU	360	3 :7	9	20	7 :3	25	11
TSM 412	3	Malone Street Residential	10 /DU	14 DU	140	3 :7	3	8	7 :3	10	4
TSM 413	4	Vineyard Residential	10 /DU	7 DU	70	3 :7	2	4	7 :3	5	2
TSM 414/CUP 03-593	5	Mulberry Residential	10 /DU	33 DU	330	3 :7	8	18	7 :3	23	10
TSM 419	6	Liberty Ln Residential	10 /DU	39 DU	390	3 :7	9	22	7 :3	27	12
TSM 427	7	Glendale Residential	10 /DU	83 DU	830	3 :7	20	46	7 :3	58	25
TSM 428	8	Mulberry/Rose Ranch	10 /DU	96 DU	960	3 :7	23	54	7 :3	67	29
TSM 429	9	Windy Way Residential	10 /DU	39 DU	390	3 :7	9	22	7 :3	27	12
TSM 430	10	Sycamore/Cox Res	10 /DU	18 DU	180	3 :7	4	10	7 :3	13	5
TSM 432	11	Mission Road Residential	10 /DU	119 DU	1,190	3 :7	29	67	7 :3	83	36
TSM 434	12	Vineyard/Shirley Res	10 /DU	190 DU	190	3 :7	5	11	7 :3	13	6
TSM 440	13	Woodward/Borden	8 /DU	56 DU	448	3 :7	9	22	6 :4	24	150
SDP 02-0236	14	Richmar Ave Retail	40 /KSF	26,553 SF	1,062	6 :4	51	34	5 :5	53	53
SP 81-04	15	Windy Way Industrial	80 /KSF	11,233 SF	899	9 :1	89	10	2 :8	22	86
Neg. Dec. 03-676; PZ 03-16;	28	Discovery Valley Equestrian.					64	35		53	78
CUP03-585	29	Walnut Grove Park	5 /Acre	26 Acres	130	5 :5	5	5	5 :5	7	7
F 1251; CUP 02-550	49	San Marcos Highlands	10 /DU	230 DU	2,300	3 :7	55	129	7 :3	161	69
TSM 408					90	3 :7	2	5	7 :3	6	3
TSM 459	50	TSM 459	10 /DU	9 DU	90	3 :7	2	5	7 :3	6	3
<b>Subtotal City of San Marcos</b>						<b>10,789</b>	<b>417</b>	<b>568</b>		<b>736</b>	<b>621</b>
<b>San Diego County</b>											
TM 5283	16	Merriam West Ranch	12 /DU	33 DU	396	3 :7	10	22	7 :3	28	12
AD 01-021	17	Twin Oaks Farm									
TM 5132	18	Via Conca D'Oro Res	10 /DU	6 DU	60	3 :7	1	3	7 :3	4	2
SPA 99-002; TM 5175 RPL	19	Hidden Meadows II	10 /DU	854 DU	8,540	3 :7	205	478	7 :3	598	256
SPA 86-001; TM 4605	20	Rim Rock	10 /DU	172 DU	1,720	3 :7	41	96	7 :3	120	52
SP 94-002	21	Champagne Gardens			8,360		54	333		637	501
-001; TM 5193	22	Mountain Gate	10 /DU	138 DU	1,380	3 :7	33	77	7 :3	97	41
TM 5134	23	Garden Villas	8 /DU	148 DU	1,184	3 :7	25	58	6 :4	64	150
TPM 20469	24	Plamondon TPM/Emma	12 /DU	3 DU	36	3 :7	1	2	7 :3	3	1
TPM 20558; 20556	25	Piro/Ciba TMs	12 /DU	6 DU	72	3 :7	2	4	7 :3	5	2
TPM 20660	27	Rimsa TM	12 /DU	2 DU	24	3 :7	1	1	7 :3	1	1

**TABLE 8-1 (CONTINUED)  
CUMULATIVE PROJECTS TRIP GENERATION SUMMARY**

Project Number	Project ID	Cumulative Project	Rate	Unit	Daily	AM Peak Hour		PM Peak Hour	
						In	Out	In	Out
<b>San Diego County (Continued)</b>									
P 03-004	30	Casa de Amparo Facility	a	a	416	29	26	28	30
TPM 20846	31	Pizzuto	/DU	3 DU	36	3 :7	2	7 :3	1
ER 04-02-014	32	Brooks & Kiersey Dwy	/DU	12 DU	144	3 :7	8	10 :3	4
TPM 20327 RPL 1	33	Arend Brouwer	/DU	4 DU	48	3 :7	3	7 :3	1
TM 5335	34	Washington Meadows	/DU	12 DU	144	3 :7	8	10 :3	4
TPM 20290	35	Raisigel/Fejeran	/DU	4 DU	48	3 :7	3	7 :3	1
TM 4967	36	Heritage Valley Estates	/DU	10 DU	120	3 :7	7	7 :3	4
TM 5295RP3	37	Sugarbush	/DU	59 DU	590	3 :7	33	7 :3	18
TM 5308	38	DKST	/DU	16 DU	160	3 :7	9	7 :3	5
TM 5326	39	Villas on the Green	/DU	210 DU	2,100	5 :5	84	5 :5	14
TPM 20398RA	40	Meadows 35	/DU	4 DU	48	3 :7	3	7 :3	1
TM 5174; TPM 20452 RPL	41	The Oaks	/DU	11 DU	132	3 :7	7	7 :3	3
TPM 20409	42	Odell	/DU	2 DU	24	3 :7	1	7 :3	1
TPM 20226 TE	43	Hidden Meadows	/DU	4 DU	48	3 :7	3	7 :3	1
TPM 20541	44	Woodhead Minor Res	/DU	4 DU	48	3 :7	3	7 :3	1
TM 5264 RPL	45	Choi TM	/DU	8 DU	96	3 :7	5	7 :3	3
TPM 20441	46	Welcome View	/DU	2 DU	24	3 :7	1	7 :3	1
TM 5313	47	Canyon Villas	a	a	334	a	1	1	0
P02-019	48	Teri	b	b	596	a	154	a	122
RP79-05	68	National Quarries	b	b	596	b	32	b	b
RP79-05	69	Paradigm Development	/DU	125 DU	250	3 :7	6	7 :3	17
RP79-05	70	Merriam Mountains	b	b	35,526	b	767	b	1,318
RP79-05	71	South Santa Fe Avenue Widening	b	b	35,526	b	1,574	b	1,318
TM 5295	72	Tai Estates	/DU	6 DU	72	3 :7	2	7 :3	2
<b>Subtotal San Diego County</b>					<b>62,908</b>		<b>1,460</b>	<b>3,960</b>	<b>2,575</b>
<b>City of Vista</b>									
PC2-072	51	Monte Vista Dr.	/DU	8 DU	80	3 :7	2	7 :3	2
PC 19-055	52	San Clemente Av TSM	/DU	5 DU	50	3 :7	1	7 :3	2
PC 12-038	53	Vineyards Specific Plan	/DU	59 DU	590	3 :7	14	7 :3	18
PC24-017	54	Grand View Road TSM	/DU	46 DU	276	3 :7	6	7 :3	150
PC2-090	55	Craftsman Condo	/DU	13 DU	130	3 :7	3	7 :3	4
PC2-090	56	Monte Vista Dr.	/DU	42 DU	336	3 :7	7	7 :3	150
<b>Subtotal City of Vista</b>					<b>1,672</b>		<b>38</b>	<b>107</b>	<b>332</b>

**TABLE 8-1 (CONTINUED)  
CUMULATIVE PROJECTS TRIP GENERATION SUMMARY**

Project Number	Project ID	Cumulative Project	Rate	Unit	Daily	AM Peak Hour		PM Peak Hour			
						In:Out	In	Out	In:Out	In	Out
<b>City of Escondido</b>											
TR 864; ER 2002-25; 2002-69CUP; 2003-43-DP/DA; PM 203-20	57	Meadowbrook Village	<sup>a</sup>	225 DU	690	<sup>a</sup>	17	18	<sup>a</sup>	33	26
TR 868	58	Tract 868	6 /DU	5 DU	30	3 :7	1	2	7 :3	2	1
TR 892	59	Tract 892	10 /DU	38 DU	380	3 :7	9	21	7 :3	27	11
TR 916	60	Tract 916	10 /DU	34 DU	340	3 :7	8	19	7 :3	24	10
ER 2005-26	61	Fire Station #3	/Location	1 Station	-	3 :7	-	-	7 :3	-	-
<b>Subtotal City of Escondido</b>					<b>1,440</b>		<b>35</b>	<b>60</b>		<b>85</b>	<b>48</b>
<b>Escondido Union School District</b>											
	62	Reidy Creek Elementary	1.6 /Student	850 Students	1,360	5 :5	218	218	5 :5	61	61
<b>San Marcos School District</b>											
	63	Hollandia High School	1.3 /Student	936 Students	1,217	7 :3	170	73	4 :6	49	73
<b>Vista Unified School District</b>											
	64	Foothill Oak Elementary	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
	65	Hannalei Elementary	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
	66	Rancho Minerva	1.6 /Student	1200 Students	1,920	5 :5	307	307	5 :5	86	86
<b>Subtotal Vista Unified School District</b>					<b>1,920</b>		<b>307</b>	<b>307</b>		<b>86</b>	<b>86</b>
<b>Vista Irrigation District</b>											
	67	Vista Irrigation Pipeline	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
<b>NCTD</b>											
	72	Sprinter	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
<b>Total All Cumulative Projects</b>					<b>81,306</b>		<b>2,644</b>	<b>4,230</b>		<b>5,085</b>	<b>3,797</b>

**Footnotes:**

- a. Information not available.
- b. Project does not generate any additional regional trips. Local trips are accounted for.

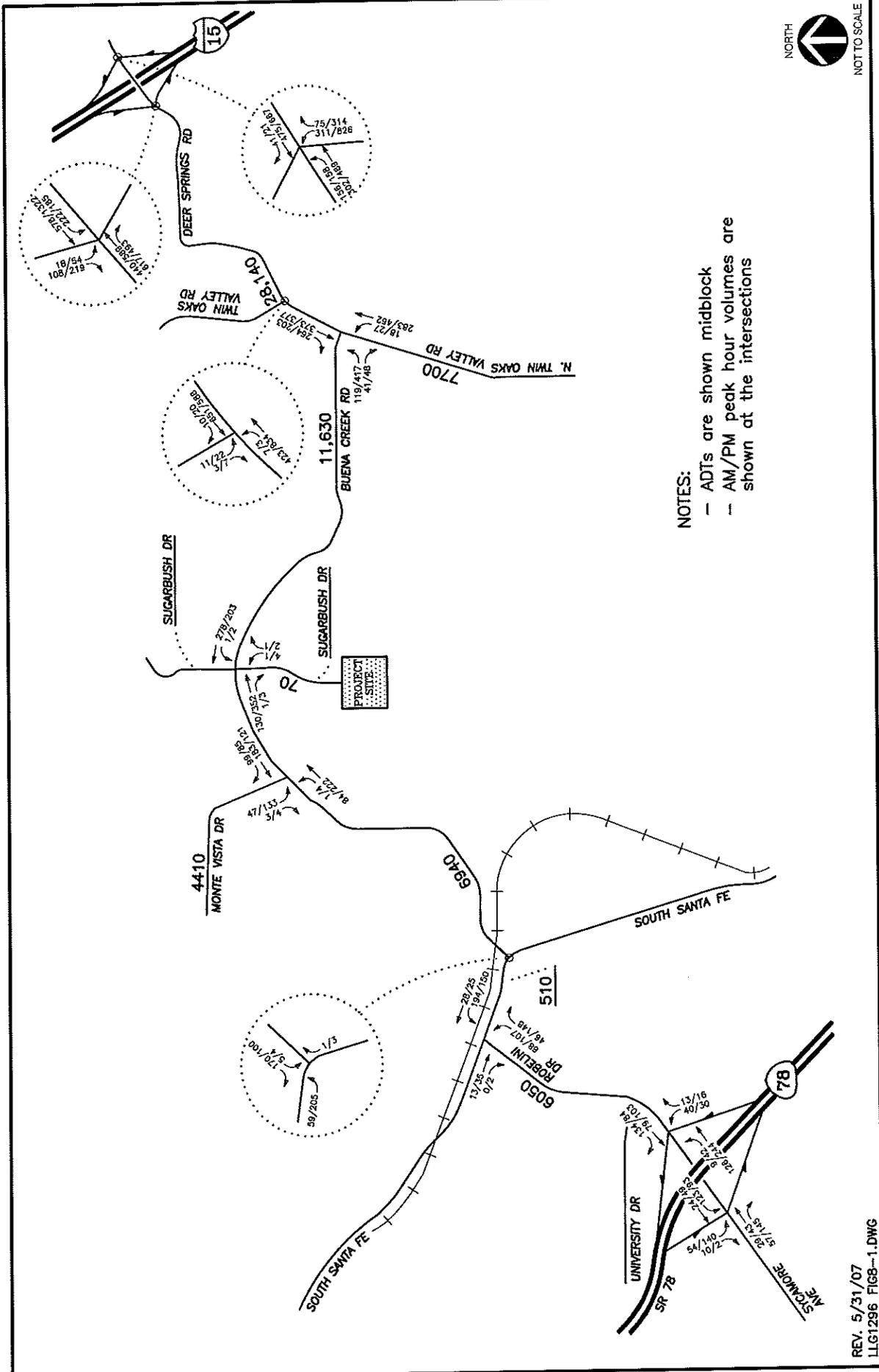
- **North County Transit District** – The Sprinter rail line which will extend from Escondido to Oceanside is planned to be completed by 2009. This project will not add any traffic on a regional basis but will add some traffic immediately adjacent to transit stations, which was accounted for in this traffic study. The South Santa Fe Avenue Capital Improvement Project (CIP) involves widening the South Santa Fe Avenue and Buena Creek Road through the intersection. In addition, it should be stated that this traffic study does not assume a reduction in traffic as a result of potential driving movements shifting to the sprinter.
- **Vista Irrigation District** - 1 cumulative project was identified in the Vista Irrigation District. This project consists of installing an irrigation pipeline. The project is not expected to generate any traffic except during construction.

## 8.2 Summary of Cumulative Projects Trips

The cumulative projects are calculated to generate a total of 81,306 ADT with 6,875 trips in the AM peak hour (2,644 inbound and 4,231 outbound) and 8,882 trips in the PM peak hour (5,085 inbound and 3,797 outbound)

The cumulative project volumes are shown in *Figure 8-1*, while *Figure 8-2* depicts the existing + project + cumulative projects traffic.

*Appendix D* contains the cumulative projects data.

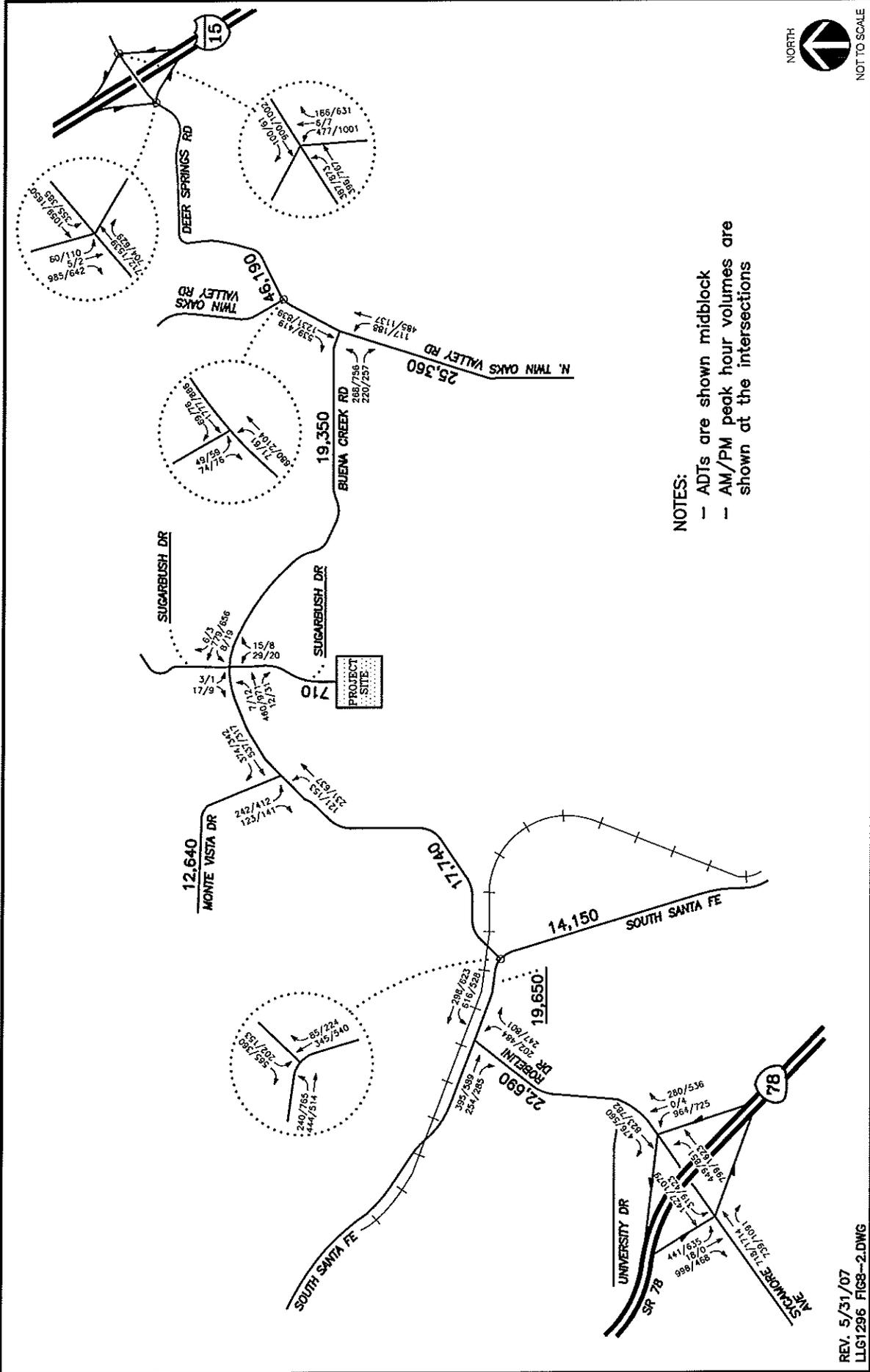


NOTES:  
 - ADTs are shown midblock  
 - AM/PM peak hour volumes are shown at the intersections

**Figure 8-1**  
**Total Cumulative Traffic Volumes**  
**AM/PM Peak Hours & ADT**

REV. 5/31/07  
 ILLG1296 FIG8-1.DWG

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- NOTES:
- ADTs are shown midblock
  - AM/PM peak hour volumes are shown at the intersections

**Figure 8-2**  
**Existing + Project + Cumulative (With Merriam) Traffic Volumes**  
**AM/PM Peak Hours & ADT**

REV. 5/31/07  
 LLGT296 FIG8--2.DWG

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## 9.0 ANALYSIS OF FUTURE SCENARIOS

### 9.1 Existing + Project

#### 9.1.1 Intersection Analysis

*Table 9-1* shows that with the addition of project traffic, the majority of the key intersections in the project area are calculated to continue to operate at LOS D or better during both the AM and PM peak hours with the exception of the following intersections which are calculated to continue to operate at LOS E or F.

- SR 78 / Sycamore Avenue Eastbound Ramps (LOS F during the AM peak hour);
- Buena Creek Road / S. Santa Fe Avenue (LOS E during the AM peak hour and LOS F during the PM peak hour);
- Buena Creek Road / Monte Vista Drive (LOS E during the PM peak hour);
- Deer Springs Road / I-15 Southbound Ramps (LOS F during the PM peak hour);

*Appendix E* contains the existing + project peak hour intersection analysis worksheets.

#### 9.1.2 Segment Operations

*Table 9-2* shows that with the addition of project traffic, the majority of the key street segments in the project area are calculated to continue to operate at LOS E or F on a daily basis.

*Table 6-2* shows that with the addition of project traffic, the following segments are calculated to continue to operate at LOS E or worse conditions:

- South Santa Fe Avenue from Robelini Drive to Buena Creek Road (LOS F)
- South Santa Fe Avenue from Buena Creek Road to Smilax Road (LOS E)
- North Twin Oaks Valley Road from Buena Creek Road to La Cienega Road (LOS F)
- Robelini Drive from S. Santa Fe Avenue to University Drive (LOS F)
- Deer Springs Road from N. Twin Oaks Valley Road to I-15 (LOS F)

#### 9.1.3 Intersection Lane Vehicles Analysis

*Table 6-3* summarizes the Intersection Lane Volume (ILV) analysis for the SR 78 / Sycamore Avenue and the I-15 / Deer Springs Road interchanges, per Caltrans methodologies. As seen in *Table 6-3*, with the addition of project traffic, the SR 78/Sycamore Avenue EB Ramps is calculated to continue to operate at over capacity during the AM and PM peak hours and the I-15 / Deer Springs SB Ramps intersection is calculated to continue to operate at over capacity during the PM peak hour. The remaining intersections are calculated to operate at near or under capacity.

*Appendix E* also contains the ILV analysis worksheets for the existing + project condition.

TABLE 9-1  
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Project		Δ Delay / Project Volume	Existing + Project + Cumulative Projects (With Merriam)		Impact Type
			Delay <sup>a</sup>	LOS <sup>b</sup>	Delay <sup>a</sup>	LOS <sup>b</sup>		Delay <sup>a</sup>	LOS <sup>b</sup>	
1. SR 78 / Sycamore Ave EB Ramps	Signal	AM PM	89.7	F	89.7	F	0.0	>100.0	F	Cumulative Cumulative
			52.6	D	52.7	D	NA	67.4	E	
2. SR 78 / Sycamore Ave WB Ramps	Signal	AM PM	26.5	C	26.5	C	NA	28.3	C	None None
			29.3	C	29.5	C	NA	34.7	C	
3. Robelini Dr / S. Santa Fe Ave	Signal	AM PM	23.4	C	23.6	C	NA	29.5	C	None None
			30.1	C	30.6	C	NA	53.0	D	
4. Buena Creek Rd / S. Santa Fe Ave	Signal	AM PM	65.9	E	70.1	E	4.2	>100.0	F	Direct Direct
			>100.0	F	>100.0	F	>100.0	>100.0	F	
5. Buena Creek Rd / Monte Vista Dr	AWSC <sup>c</sup>	AM PM	14.6	B	15.2	C	0.6	38.2	E	None Direct
			39.7	E	45.1	E	5.4	>100.0	F	

Footnotes:

- a. Average delay expressed in seconds per vehicle.
- b. Level of Service.
- c. AWSC – All-Way-Stop-Controlled intersection.  
**Bold** indicates significant impact

Signalized		Unsignalized	
Thresholds		Thresholds	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

TABLE 9-1  
NEAR-TERM INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Existing + Project		$\Delta$ Delay / Project Volume	Existing + Project + Cumulative Projects				Impact Type
			Delay <sup>a</sup>	LOS <sup>b</sup>	Delay <sup>a</sup>	LOS <sup>b</sup>		With Merriam		Without Merriam		
								Delay <sup>a</sup>	LOS <sup>b</sup>	Delay <sup>a</sup>	LOS <sup>b</sup>	
6. Buena Creek Rd / Sugarbush Dr	TWSC <sup>d</sup>	AM PM	19.4	C	19.6	C	NA	38.6	E	22.2	C	Cumulative <sup>e</sup> Cumulative <sup>e</sup>
			27.8	D	29.1	D	NA	92.2	F	35.7	E	
7. Buena Creek Rd / N. Twin Oaks Valley Rd	Signal	AM PM	12.6	B	13.0	B	NA	39.7	D	15.5	B	None <sup>f</sup> None <sup>f</sup>
			19.0	B	19.1	B	NA	>100.0	F	24.0	C	
8. Deer Springs Rd / N. Twin Oaks Valley Rd	Signal	AM PM	14.7	B	19.3	B	NA	>100.0	F	33.9	C	None <sup>f</sup> None <sup>f</sup>
			13.3	B	19.2	B	NA	>100.0	F	44.5	D	
9. Deer Springs Rd / I-15 SB Ramps	Signal	AM PM	46.5	D	46.7	D	NA	>100.0	F	NA	NA	Cumulative Cumulative
			91.9	F	92.6	F	0.7	>100.0	F	NA	NA	
10. Deer Springs Rd / I-15 NB Ramps	Signal	AM PM	25.6	C	25.7	C	NA	95.3	F	NA	NA	Cumulative Cumulative
			38.0	D	38.1	D	NA	>100.0	F	NA	NA	

**Footnotes:**

- a. Average delay expressed in seconds per vehicle.
  - b. Level of Service.
  - c. AWSC - All-Way-Stop-Controlled intersection.
  - d. TWSC - Two-Way Stop Controlled intersection. Minor street left turn delay is reported.
  - e. Considered a significant impact since this intersection is the main project driveway.
  - f. Not significant since impact would not occur unless the Merriam Mountains project is built. The Merriam Mountains project will be required to mitigate the impact.
- Bold** indicates significant impact

Signalized		Unsignalized	
Thresholds		Thresholds	
Delay	LOS	Delay	LOS
0.0 < 10.0	A	0.0 < 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
> 80.1	F	> 50.1	F

**TABLE 9-2  
NEAR TERM SEGMENT OPERATIONS**

Segment	Existing Roadway Class <sup>a</sup>	LOS E Cap <sup>b</sup>	Existing			Existing + Project			Project Traffic	Existing + Project + Cumulative Projects			Impact Type
			Vol	LOS	V/C	Vol	LOS	V/C		Vol	LOS	V/C	
<b>Buena Creek Road</b> S. Santa Fe Ave to Sugarbush Dr Sugarbush Dr to N. Twin Oaks Val Rd	Rural Col	16,200	10,500	D	0.65	10,800	D	0.67	300	17,740	F	1.10	Cumulative
	Rural Col	16,200	7,500	D	0.46	7,720	D	0.48	220	19,350	F	1.19	Cumulative
<b>S. Santa Fe Avenue</b> Robelini Dr to Buena Creek Rd Buena Creek Rd to Smilax Rd	Rural Col	16,200	18,900	F	1.17	19,140	F	1.18	240	19,650	F	1.21	Direct
	Rural Col	16,200	14,100	E	0.87	14,150	E	0.87	50	14,150	E	0.87	Cumulative
<b>Monte Vista Drive</b> Robin Pl to Buena Creek Rd	Rural Col	16,200	8,200	D	0.51	8,230	D	0.51	30	12,640	E	0.78	None <sup>d</sup>
	Res Street <sup>e</sup>	1,500	100	C	<sup>e</sup>	640	C	<sup>e</sup>	540	710	C	<sup>c</sup>	None
<b>Sugarbush Drive</b> S. of Buena Creek Rd	Rural Col	15,000	17,500	F	1.17	17,660	F	1.18	0.01	25,360	F	1.69	Cumulative
	Rural Col	16,200	16,400	F	1.01	16,640	F	1.03	240	22,690	F	1.40	Direct
<b>Deer Springs Road</b> N. Twin Oaks Valley Rd to I-15	Rural Col	16,200	18,000	F	1.11	18,050	F	1.11	50	46,190	F	2.85	Cumulative

**Footnotes:**

- Existing Roadway Classification.
- County of San Diego, Average Daily Vehicle Trips.
- Level of service does not apply to residential streets since their primary purpose is to serve abutting lots and not serve as through streets. Level of service normally applies to roads carrying through traffic between major trip generators and attractors.
- Not significant since impact would not occur unless the Merriam Mountains project is built. The Merriam Mountains project will be required to mitigate the impact. The total volume without the Merriam Mountains project is 10,740 with LOS D.
- This portion of Twin Oaks Valley Road is in the City of San Marcos and impact is considered cumulative based on City criteria since v/c ratio increase is less than 0.02.

**TABLE 9-3  
NEAR-TERM ILV OPERATIONS**

Intersection	Peak Hour	Existing		Existing + Project		Existing + Project + Cumulative Projects	
		ILV / Hour	Capacity	ILV / Hour	Capacity	ILV / Hour	Capacity
SR 78/Sycamore Ave WB Ramps	AM PM	< 1200 < 1200	Under Under	< 1200 < 1200	Under Under	< 1200 < 1200	Under Under
SR 78/Sycamore Ave EB Ramps	AM PM	> 1500 > 1500	Over Over	> 1500 > 1500	Over Over	> 1500 > 1500	Over Over
I-15 / Deer Springs SB Ramps	AM PM	> 1200 & < 1500 > 1500	Near Over	> 1200 & < 1500 > 1500	Near Over	> 1500 > 1500	Over Over
I-15 / Deer Springs NB Ramps	AM PM	< 1200 > 1200 & < 1500	Under Near	< 1200 > 1200 & < 1500	Under Near	> 1500 > 1500	Over Over

## 9.2 Existing + Cumulative Projects + Project

### 9.2.1 Intersection Analysis

*Table 9-1* shows that with the addition of project traffic, the SR 78/Sycamore Avenue WB Ramps are calculated to continue to operate at under capacity during both the AM and PM peak hours. The remaining intersections are calculated to operate at LOS E or worse conditions as summarized below:

- SR 78 / Sycamore Avenue Eastbound Ramps (LOS F during the AM peak hour and LOS E during the PM peak hour);
- Buena Creek Road / S. Santa Fe Avenue (LOS F during the AM peak hour PM peak hours);
- Buena Creek Road / Monte Vista Drive (LOS E during the AM peak hour and LOS F during the PM peak hour);
- Buena Creek Road / Sugarbush Drive (LOS E during the AM peak hour and LOS F during the PM peak hour);
- Buena Creek Road / Twin Oaks Valley Road (LOS F during the PM peak hour);
- Deer Springs Road / Twin Oaks Valley Road (LOS F during the AM and PM peak hours);
- Deer Springs Road / I-15 Southbound Ramps (LOS F during the AM and PM peak hours);
- Deer Springs Road / I-15 Northbound Ramps (LOS F during the AM and PM peak hours);

The cumulative projects traffic included in the above analysis includes the planned Merriam Mountains project. In order to compare and identify the impact of the Merriam Mountains project, an additional analysis was conducted at several intersections, excluding the Merriam Mountains project traffic. *Table 9-1* includes the results of this analysis. As seen in *Table 9-1*, three intersections are calculated to operate at LOS D or better without Merriam Mountains project traffic (but with all other cumulative projects traffic).

*Appendix F* contains the existing + project + cumulative projects peak hour intersection analysis worksheets, while *Appendix F-1* contains the existing + project + cumulative projects without Merriam Project peak hour intersection analysis worksheets.

### 9.2.2 Segment Operations

*Table 9-2* shows that with the addition of cumulative projects traffic, the following segments are calculated to continue to operate at LOS E or worse conditions:

- Buena Creek Road from South Santa Fe Avenue to Sugarbush Drive (LOS E)
- Buena Creek Road from Sugarbush Drive to N. Twin Oaks Valley Road (LOS E)
- South Santa Fe Avenue from Robilini Drive to Buena Creek Road (LOS F)
- South Santa Fe Avenue from Buena Creek Road to Smilax Road (LOS E)
- North Twin Oaks Valley Road from Buena Creek Road to La Cienega Road (LOS F)

- Robelini Drive from S. Santa Fe Avenue to University Drive (LOS F)
- Deer Springs Road from N. Twin Oaks Valley Road to I-15 (LOS F)

### 9.2.3 *Intersection Lane Vehicles Analysis*

*Table 9-3* summarizes the Intersection Lane Volume (ILV) analysis for the SR 78 / Sycamore Avenue and the I-15 / Deer Springs Road interchanges, per Caltrans methodologies. As seen in *Table 9-3*, with the addition of cumulative projects traffic, the SR 78 / Sycamore Avenue EB Ramps intersection is calculated to continue to operate at under capacity during the AM and PM peak hours, while the remaining freeway interchange intersections are calculated to operate at over capacity.

*Appendix F* also contains the ILV analysis worksheets for the existing + project + cumulative projects condition.

### 9.2.4 *Buena Creek Road / Sugarbush Drive Intersection Traffic Signal*

The forecasted traffic volume on Sugarbush Drive is a maximum of 38 trips during the peak hour, of which 13 trips are right-turns and will generally not need a traffic signal to enter Buena Creek Road. The minimum peak hour traffic volume that would warrant a traffic signal based on the Manual of Uniform Traffic Control Devices (MUTCD) Warrant 3, is 75 trips. Therefore, the volumes are well below the amount that would warrant a traffic signal.

## 10.0 CONGESTION MANAGEMENT PROGRAM COMPLIANCE

The Congestion Management Program (CMP), adopted on November 22, 1991, is intended to link land use, transportation and air quality through level of service performance. The CMP requires an Enhanced CEQA Review for projects that are expected to generate more than 2,400 ADT or more than 200 peak hour trips. As the project trip generation exceeds the CMP thresholds a CMP analysis is triggered.

The *SANDAG Congestion Management Program, January 2003* report contains a list of “CMP Arterials” that are to be analyzed if the project exceeds the above mentioned trip generation thresholds. None of the arterials listed in the report are CMP facilities. Therefore, no CMP analysis is required.

## **11.0 SIGHT DISTANCE ASSESSMENT AND PLAN-TO-PLAN ANALYSIS**

### **11.1 Sight Distance Assessment**

A sight distance analysis was conducted at the project access point to Buena Creek Road by the project's Civil Engineer. The plan is shown in *Figure 11-1*. The plan shows that 480 feet is available when looking east and 480 feet when looking to the west from Sugarbush Drive assuming the vegetation is cut back. This distance exceeds the minimum needed for a 45 mph design speed.

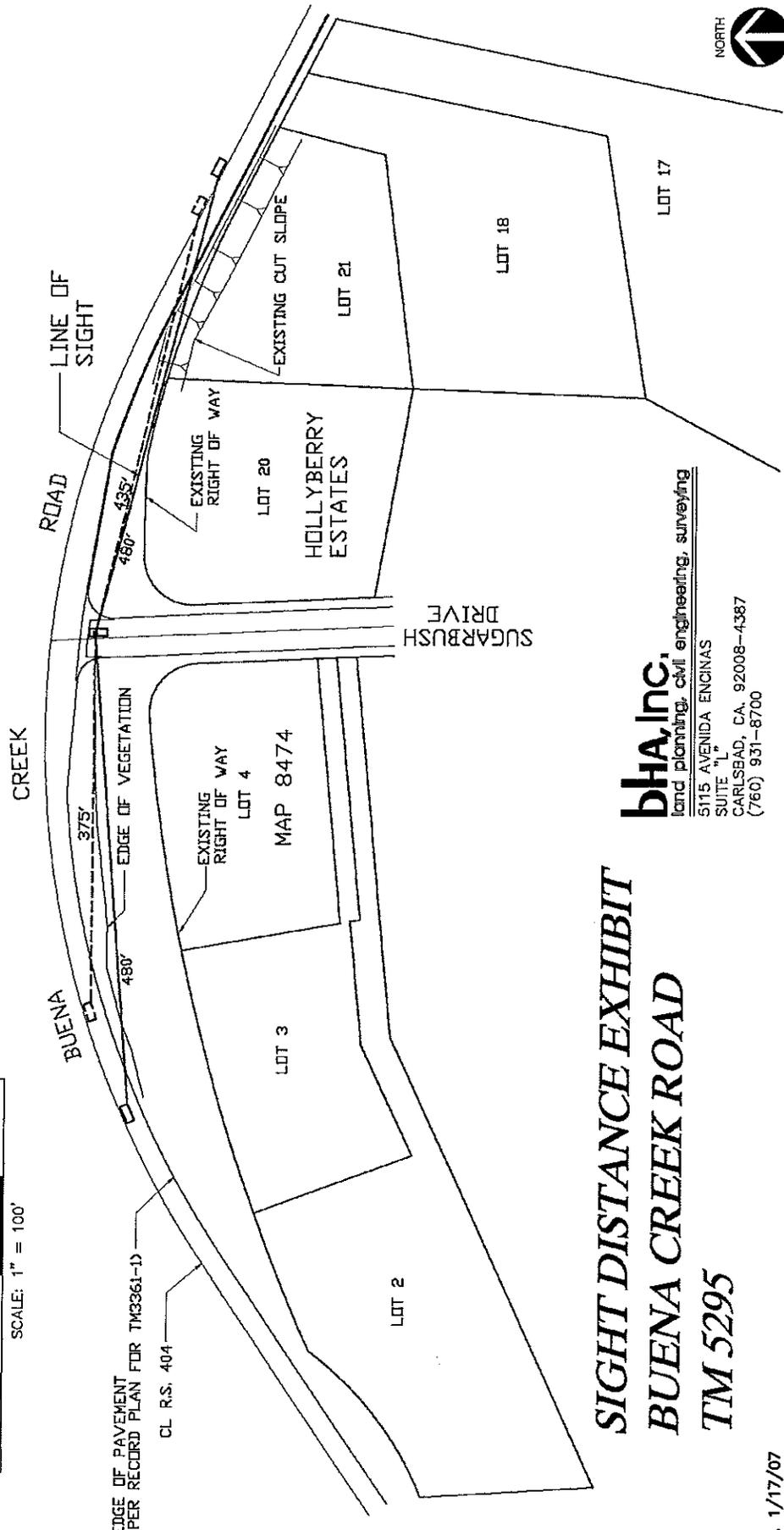
The 375 feet and 435 feet lines show that the sight distance if the vegetation is not trimmed. A clear space easement should be obtained since vegetation along Buena Creek Road will be required to be removed to maintain sight distance in the future. The vegetation is located in public right-of-way according to the civil engineer for the project (BHA, Inc.)

### **11.2 Plan-To-Plan Analysis**

The current general plan designation for this site is Estate 17, 2, or 4, which means that lots have to be a minimum of 2 or 4 acre depending on slope. If the average slope is 25% or less 2-acre lots are permitted. If greater than 25%, 4-acre lots are required.

The slope map prepared by the project's Civil Engineer indicates that a total of 47 lots would be allowed under the current land use regulations, which is more than the number of lots being proposed (45) under the current specific plan. Therefore, there is no net increase in traffic associated with the General Plan Amendment for the project.

--- 375' SIGHT DISTANCE WITHOUT VEGETATION REMOVAL  
 --- 480' SIGHT DISTANCE WITH VEGETATION REMOVAL



EDGE OF PAVEMENT  
 (PER RECORD PLAN FOR TM3361-1)

CL R.S. 404

EXISTING  
 RIGHT OF WAY  
 LOT 4

MAP 8474

LOT 3

LOT 2

HOLLYBERRY  
 ESTATES

LOT 20

LOT 21

LOT 18

LOT 17

SUGARBUSH  
 DRIVE

CREEK

BUENA  
 CREEK  
 ROAD

EDGE OF VEGETATION

LINE OF  
 SIGHT

**SIGHT DISTANCE EXHIBIT**  
**BUENA CREEK ROAD**  
**TM 5295**

**bha, inc.**  
 land planning, civil engineering, surveying  
 5115 AVENIDA ENCINAS  
 SUITE 110  
 CARLSBAD, CA. 92008-4387  
 (760) 931-8700



NOT TO SCALE

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 LLG1296 FIG11-1.DWG

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**Figure 11-1**

**Buena Creek Road - Site Distance**

## 12.0 SIGNIFICANCE OF IMPACTS AND MITIGATION MEASURES

Following is a description of the calculated significant impacts for the project based on the established Significance Criteria along with recommendations for mitigation measures at the impacted locations.

### 12.1 Significance of Impacts

The following key intersections and street segments were determined to be directly or cumulatively impacted by the project using established significance criteria and based on the results of *Tables 4a and 5*.

#### 12.1.1 Direct ( and Cumulative) Impacts

##### Intersections

- a. Buena Creek Road / S. Santa Fe Avenue intersection
- b. Buena Creek Road / Monte Vista Drive intersection

##### Segments

- c. S. Santa Fe Avenue from Robelini Drive to Buena Creek Road
- d. Robelini Drive from S. Santa Fe Avenue to University Drive

#### 12.1.2 Cumulative Impacts

##### Intersections

- e. SR 78 / Sycamore Avenue EB Ramps intersection
- f. Buena Creek Road / Sugarbush Drive intersection
- g. I-15 / Deer Springs interchange

##### Segments

- h. Buena Creek Road from S. Santa Fe Avenue to N. Twin Oaks Valley Road
- i. S. Santa Fe Avenue From Buena Creek Road to Smilax Road
- j. Twin Oaks Valley Road from Buena Creek Road to La Cienega Road
- k. Deer Springs Road from N. Twin Oaks Valley Road to I-15

#### 12.1.3 Access

- l. Significant access related impacts would occur if adequate access is not provided.

## 12.2 Mitigation

### 12.2.1 Direct (and Cumulative) Impacts

Note that the measures outlined below would mitigate both the direct and cumulative impacts at each location listed below.

#### Intersections

**a. Buena Creek Road / S. Santa Fe Avenue intersection**

Part of the South Santa Fe Avenue CIP project includes widening the South Santa Fe Avenue/Buena Creek Road intersection. The project should contribute a fair share towards the improvement of this intersection, assuming construction has begun on the CIP project before the project is constructed. However, if the project desires to proceed prior to the CIP project, the project should provide a dedicated northbound right-turn lane at the South Santa Fe Avenue/Buena Creek Road intersection. *Appendix G* contains a conceptual Striping Plan of the improvement and a preliminary cost estimate towards the improvements.

**b. Buena Creek Road / Monte Vista Drive intersection**

Provide a dedicated right-turn lane on Buena Creek Road at Monte Vista Drive to the satisfaction of the County of San Diego. *Appendix G* contains the road widening and Striping Plan.

#### Segments

**c. S. Santa Fe Avenue from Robelini Drive to Buena Creek Road**

Part of the South Santa Fe Avenue CIP project includes widening the South Santa Fe Avenue/Buena Creek Road intersection. The project should contribute a fair share towards the improvement of this intersection, assuming construction has begun on the CIP project before the project is constructed. However, if the project desires to proceed prior to the CIP project, the project should provide a dedicated northbound right-turn lane at the South Santa Fe Avenue/Buena Creek Road intersection. *Appendix G* contains a conceptual Striping Plan of the improvement and a preliminary cost estimate towards the improvements. The intersection improvements would mitigate the impact to the segment.

**d. Robelini Drive from S. Santa Fe Avenue to University Drive**

The impact to Robelini Drive will be mitigated through several measures. The South Santa Fe Avenue intersections at Robelini Drive and Buena Creek Road are in very close proximity and their signals are coordinated. Therefore mitigation “a” will improve not only the South Santa Fe Avenue/Buena Creek Road intersection but also the South Santa Fe Avenue/Robelini Drive intersection since the increased capacity will allow both intersections to be retimed to allow more efficient flow between the intersections.

In addition, it is recommended that the northbound right-turn lane on Robelini Drive be extended from the current 130 foot length to 260 feet in length. This doubling of the right-turn lane length will enable 10-12 vehicles to queue before the adjacent left-turn lane is

negatively impacted, twice the current queue length. The capacity of Robelini Drive will therefore be improved at the S. Santa Fe Avenue intersection. Figure 12 shows a conceptual plan of the improvement.

## 12.2.2 Cumulative Impacts

### Intersections

**e. SR 78 / Sycamore Avenue EB Ramps intersection**

Contribute a fair share towards the City of Vista's planned restriping of the SR 78 / Sycamore Avenue EB Ramps intersection to change the middle lane to a shared thru/right/left-turn lane. *Appendix G* contains a letter from the City of Vista detailing expected fair share contributions.

**f. Buena Creek Road / Sugarbush Drive intersection**

Construct a 150 foot long westbound left-turn lane (with a 120-foot bay taper) on Buena Creek Road at Sugarbush Drive. *Appendix G* contains the conceptual site plan.

**g. I-15 / Deer Springs Road interchange**

The project shall improve or assure the improvement of I-15 / Deer Springs Southbound Ramps intersection to provide the following geometry. *Appendix G* shows the conceptual improvements.

Southbound off-Ramp – One shared through / left lane and two right-turn lanes.

Eastbound – One right-turn lane and one through lane.

Westbound – An additional through lane on Deer Springs Road between I-15 Southbound Ramps and Mesa Rock Road.

As an alternative to this mitigation, once this improvement becomes a “bonded” project, the contribution of a fair share towards the improvement project would be an appropriate mitigation measure for this cumulative compact.

### Segments

**h. Buena Creek Road from S. Santa Fe Avenue to Twin Oaks Valley Road**

The project's Traffic Impact Fee (TIF) payment or contribution to the South Santa Fe Avenue CIP will mitigate the impact.

**i. S. Santa Fe Avenue from Buena Creek Road to Smilax Road**

The project's Traffic Impact Fee (TIF) payment or contribution to the South Santa Fe Avenue CIP will mitigate the impact.

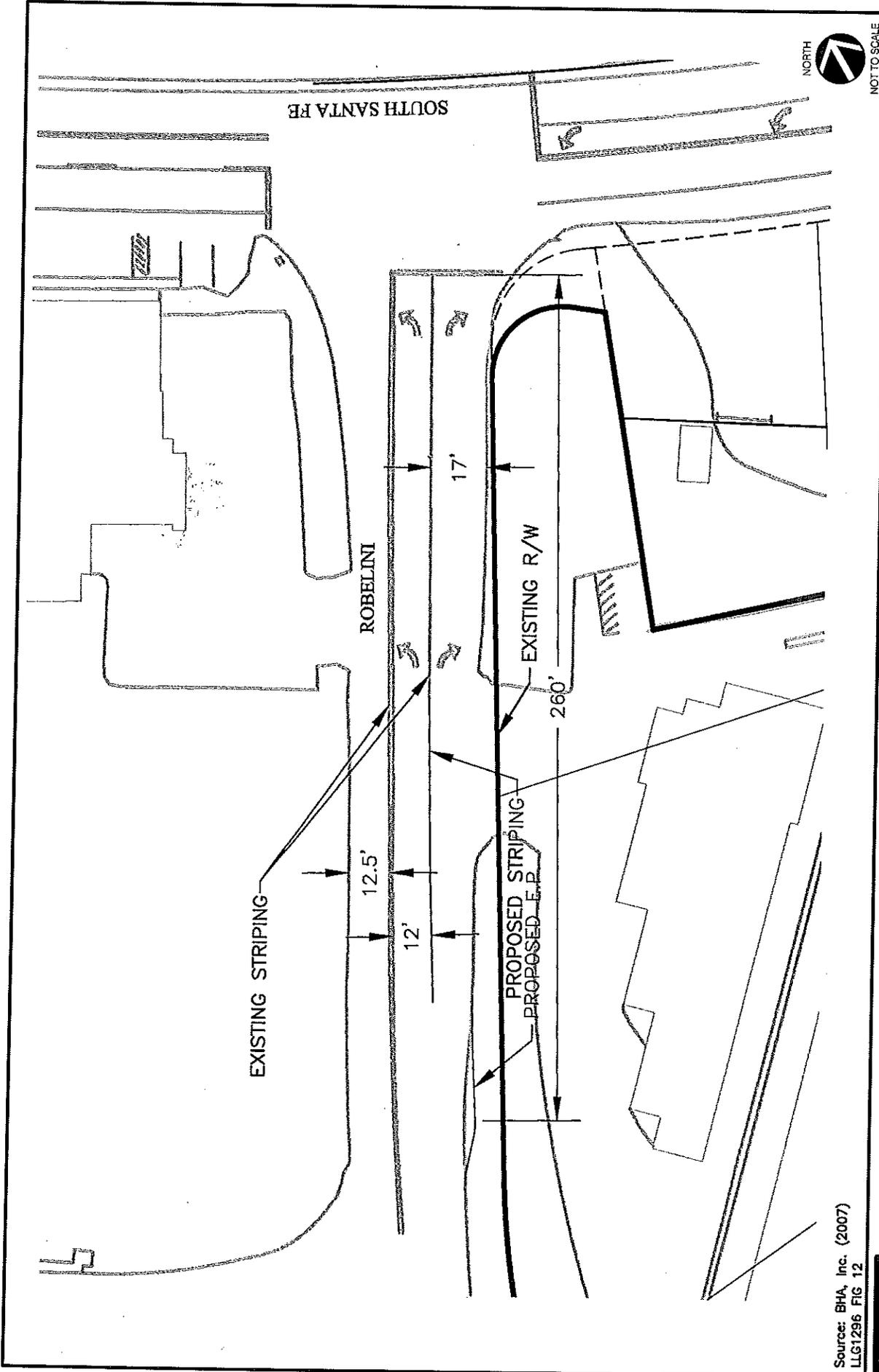
**j. Twin Oaks Valley Road from Buena Creek Road to La Cienega Road**

Contribute a fair share towards the planned signalization and improvements at the N. Twin Oaks Valley Road/Deer Springs Road intersection, as planned by the City of San Marcos. *Appendix G* contains a letter from the City of San Marcos detailing expected fair share contributions.

- k. Deer Springs Road from N. Twin Oaks Valley Road to I-15**  
The project's Traffic Impact Fee (TIF) payment will mitigate the impact.

**Access**

- l. The project should also provide the following mitigation measure:**  
The project should provide sight distance at the project driveway, which meets County standards.



**Figure 12**  
**Conceptual Improvement of**  
**South Santa Fe/Robelini Drive Intersection**