

TRAFFIC IMPACT STUDY

For

Shady Oak
Valley Center, CA.

(PDS2016-REZ-16-005, PDS2016-TM-5614, PDS2016-STP-16-019)

Prepared For: The County of San Diego

Submitted To:

Touchstone Development Inc.
9909 Mira Mesa Blvd, Suite 150
San Diego, CA 92131

Prepared By:

Darnell & Associates, Inc.
4411 Mercury Street, Suite 207A
San Diego, CA 92111



Signature: _____

Bill E. Darnell

Date Signed: 04/06/2017

Revised April 6, 2017

Revised December 15, 2016

Original: August 15, 2016

Darnell & ASSOCIATES, INC.

TRANSPORTATION PLANNING & TRAFFIC ENGINEERING

April 6, 2017

Mr. Kerry Garza
Touchstone Development, Inc.
9909 Mira Mesa Blvd, Suite 150
San Diego, CA 92131

D&A Ref. No: 160701

Subject: Traffic Impact Study for the Proposed Shady Oak 47 Unit Residential Project on the southside of Mirar de Valle west of Valley Center Road in the Valley Center Community of the County of San Diego. (PDS2016-REZ-16-005, PDS2016-TM-5614, PDS2016-STP-16-019)

Dear Mr. Garza;

In accordance with your authorization, Darnell & Associates, Inc. (D&A) has prepared this traffic impact study to assess the impacts associated with the proposed Shady Oak 47 Unit Residential Project located on the southside of Mirar De Valle Road in the Valley Center Community of the County of San Diego.

The traffic study analyzes the traffic impacts related to the proposed project on the surrounding roadways and intersections under existing and existing plus project conditions. The report has been revised to respond to County of San Diego comments dated December 5, 2016 and March 23, 2017.

If you have any questions, please feel free to contact this office.

Sincerely,

DARNELL & ASSOCIATES, INC.

Sincerely,

Darnell & Associates, Inc.



Bill E Darnell, P.E.
Firm Principal

RCE 22338, Expires 9/30/2017

Date Signed: 04/06/2017



BED/jam
160701 - Shady Oak - April - 2017

TRAFFIC IMPACT STUDY

FOR

SHADY OAK PROJECT
VALLEY CENTER
(PDS2016-REZ-16-005, PDS2016-TM-5614, PDS2016-STP-16-019)

IN THE COUNTY OF SAN DIEGO

Submitted To:

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9909 Mira Mesa Blvd, Suite 150
San Diego, CA 92131

Prepared by:

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April 6, 2017
160701 - Shady Oak - April - 2017

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SECTION I - INTRODUCTION

PROJECT DESCRIPTION

The applicant proposes to develop the Shady Oak Project, which includes 47 cottage residential units located on the southside of Mirar de Valle Road within the Valley Center Community of San Diego County. The project is generally located to the west of Valley Center Road and Mirar de Valle to the north. A vicinity map showing the project location is provided on Figure 1.

The project proposes 47 cottage residential units. The Shady Oak Illustrative Master Plan is provided on Figure 2. Figure 3 presents a copy of the Shady Oak Tentative Map

As detailed in this report, development of the proposed Shady Oak property is estimated to generate a total of 376 average daily driveway trips, 30 AM peak hour driveway trips, and 38 PM peak hour driveway trips.

SCENARIOS STUDIED

For purposes of this analysis, the following scenarios are included:

Existing (2016) Conditions refers to that condition which exists on the ground today (2016), including existing traffic and existing lane configurations at roadway segments.

Existing (Year 2016) Plus Project Conditions refers to those conditions which includes the existing traffic volumes and lane configurations plus the traffic generated by the proposed project.

LEVEL OF SERVICE

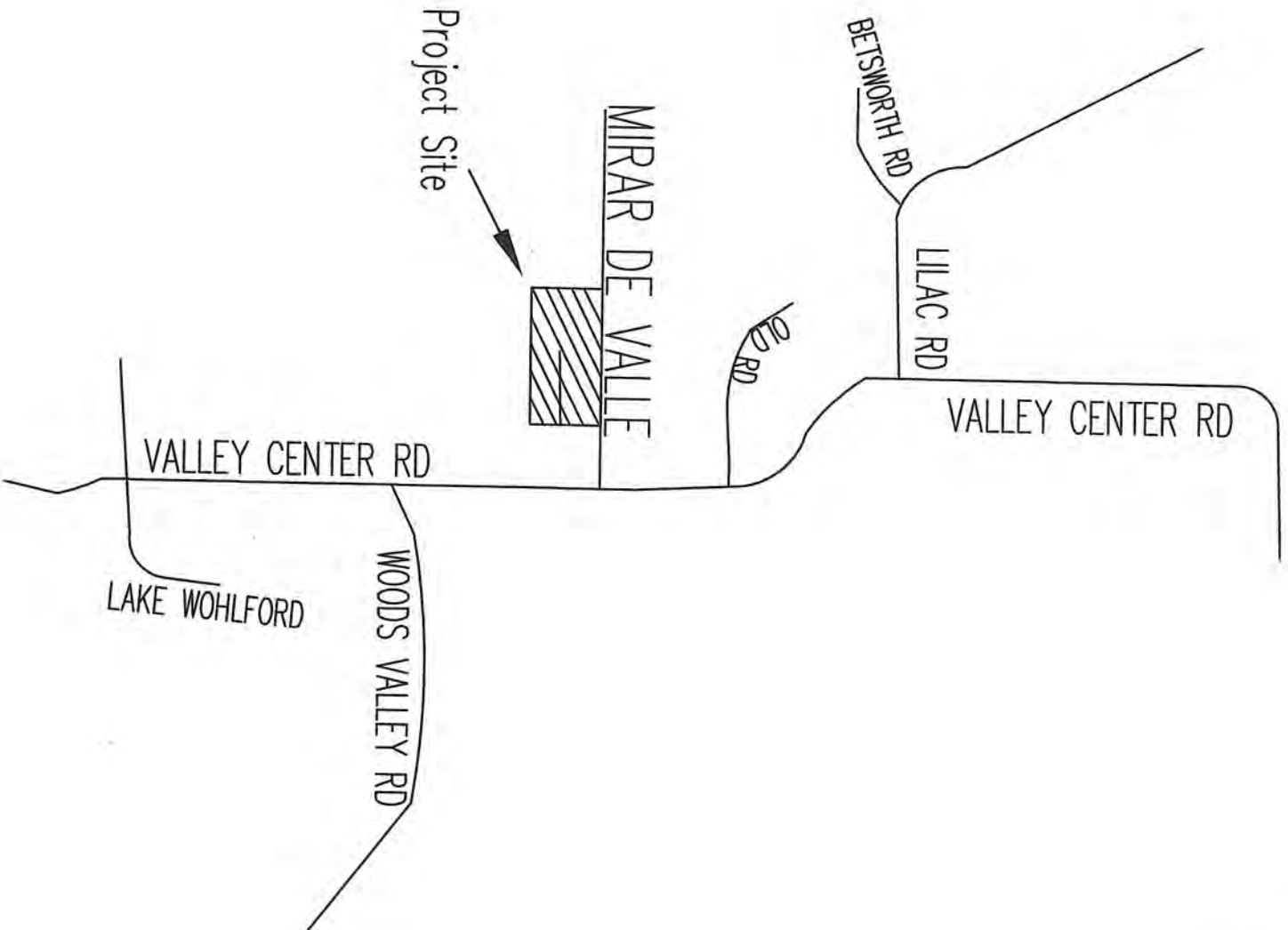
Level of Service (LOS) is a professional industry standard by which the operating conditions of a given roadway segment or intersection is measured. Level of Service is defined on a scale of A to F; where LOS A represents the best operating conditions and LOS F represents the worst operating conditions. LOS A facilities are characterized as having free flowing traffic conditions with no restrictions on maneuvering or operating speeds; traffic volumes are low and travel speeds are high. LOS F facilities are characterized as having forced flow with many stoppages and low operating speeds. Table 1 shows the delay and ADT ranges that are equivalent to each Level of Service.

In general, the region-wide goal for an acceptable Level of Service on all roadway segments and intersections is "D."

Table 1 - Level of Service Ranges			
Level of Service	Roadway Segments – Average Daily Traffic (ADT) Volume ¹	Signalized Intersections – Delay (Seconds/Vehicle) ²	Unsignalized Intersections – Delay (Seconds/Vehicle) ²
A	Less Than 1,900	Less Than or Equal to 10.0	Less Than or Equal to 10.0
B	1,901 to 4,100	10.1 to 20.0	10.1 to 15.0
C	4,101 to 7,100	20.1 to 35.0	15.1 to 25.0
D	7,101 to 10,900	35.1 to 55.0	25.1 to 35.0
E	10,901 to 16,200	55.1 to 80.0	35.1 to 50.0
F	Greater Than 16,200	Greater than 80.0	Greater than 50.0

¹ The volume ranges are based on the County of San Diego Circulation Element of a Light Collector, the average daily volume ranges for the other roadway classifications has been provided on Table 1 of the County of San Diego Public Road Standards in Appendix A.

² The delay ranges shown are based on the 2000 Highway Capacity Manual (HCM).





SHADY OAK VALLEY CENTER, CA

TOUCHSTONE
COMMUNITIES

SUMMA
ARCHITECTURE

TSAC
ENGINEERING

IN-SITE
LANDSCAPE ARCHITECTURE, INC.

Darnell & ASSOCIATES, INC.

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FIGURE 2
The Shady Oak Illustrative Master Plan

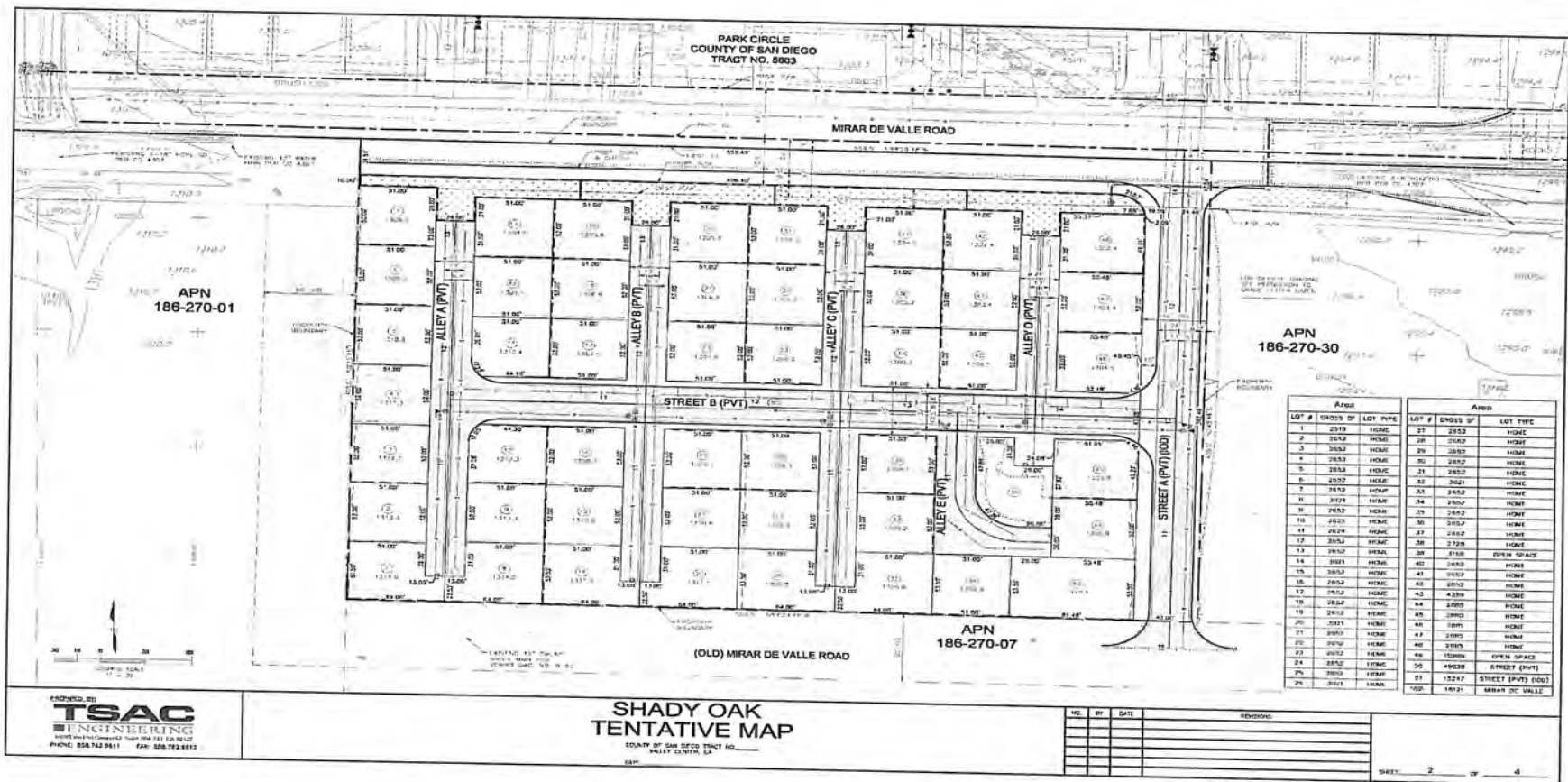


FIGURE 3
Shady Oak Tentative Map

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ANALYSIS METHODOLOGY

The roadway segment daily LOS was determined by comparing the average daily traffic (ADT) volumes under all traffic conditions to the capacity of the roadway according to its roadway cross-section and classification. For the purpose of this report, the daily traffic volumes of the roadway segments in the vicinity of the project were compared to the County of San Diego Level of Service classification thresholds. The daily (24 hour) traffic count sheets and a copy of the “Summary of County of San Diego Public Road Standards” are included in Appendix A.

Synchro, Version 8, was utilized to analyze the morning and afternoon peak hour conditions of the intersections in the project vicinity. The signalized intersection methodology defines LOS based on delay using variables such as lane configuration, traffic volumes, and signal timings. The unsignalized intersection methodology defines LOS based on the longest delay experienced by any single movement. Since the Synchro program calculates the average delay per vehicle, there may be instances where the Synchro analysis will show a reduction in delay with the addition of more traffic. This phenomenon occurs when the additional traffic is added to a movement that experiences a shorter amount of delay, thereby decreasing the intersection’s average delay per vehicle (i.e. a larger amount of vehicles will have to wait a shorter time while only a few vehicles have to wait an extended period of time). It should be noted that the Synchro program is based on the 2000 Highway Capacity Manual (HCM).

REPORT ORGANIZATION

Following this introduction, Section II discusses existing conditions. Section III discusses trip generation and trip distribution associated with the proposed project. Analysis of project’s traffic impacts under existing plus project conditions is discussed in Section IV. Section V addresses project access, corner sight distance and Mirar De Valle roadway channelization. Section VI summarizes the direct and cumulative impacts, and identification of recommended mitigation measures. Section VII provides a summary of Findings and Conclusions.

SECTION II - EXISTING CONDITIONS

This section of the traffic study is intended to assess the existing conditions of the roadways and intersections within the vicinity of the project to determine travel flow and/or delay difficulties, if any, that exist prior to adding the traffic generated by the proposed project. The existing conditions analysis establishes a base condition which is used to assess the other scenarios discussed in this report. Darnell & Associates, Inc. conducted a field review of the area surrounding the project in June 2016. Figure 4 depicts the existing roadway and intersection geometrics in the project vicinity, respectively.

KEY ROADWAY SEGMENTS

The key segments analyzed in the study area are identified below:

Valley Center Road (SF 639) is constructed south of Woods Valley Road to provide two (2) travel lanes in each direction with a painted median and a posted speed limit of 60 mph. Between Woods Valley Road and Cole Grade Road, Valley Center Road is currently constructed to provide two (2) travel lanes in each direction with a raised painted and/or median and a posted speed limit of 45 mph. From Woods Valley Road to Cole Grade Road the roadway has been constructed equivalent to a 4.1A Major Road with a LOS "E" capacity of 37,000.

Lilac Road (SF 1415) is generally constructed as a two (2)-lane undivided east-west circulation element roadway with turn lanes at intersections with a posted speed limit of 55 miles per hour (mph). Between Valley Center Road and Betsworth Road, Lilac Road widens to provide a westbound left turn lane at Betsworth Road and provides eastbound left, left thru and right-turn lanes at Valley Center Road. The existing capacity of Lilac Road west of Valley Center Road is estimated to be equivalent to that of a 2.2 C Light Collector with intermittent turn lanes, capacity of 16,200 at LOS "E".

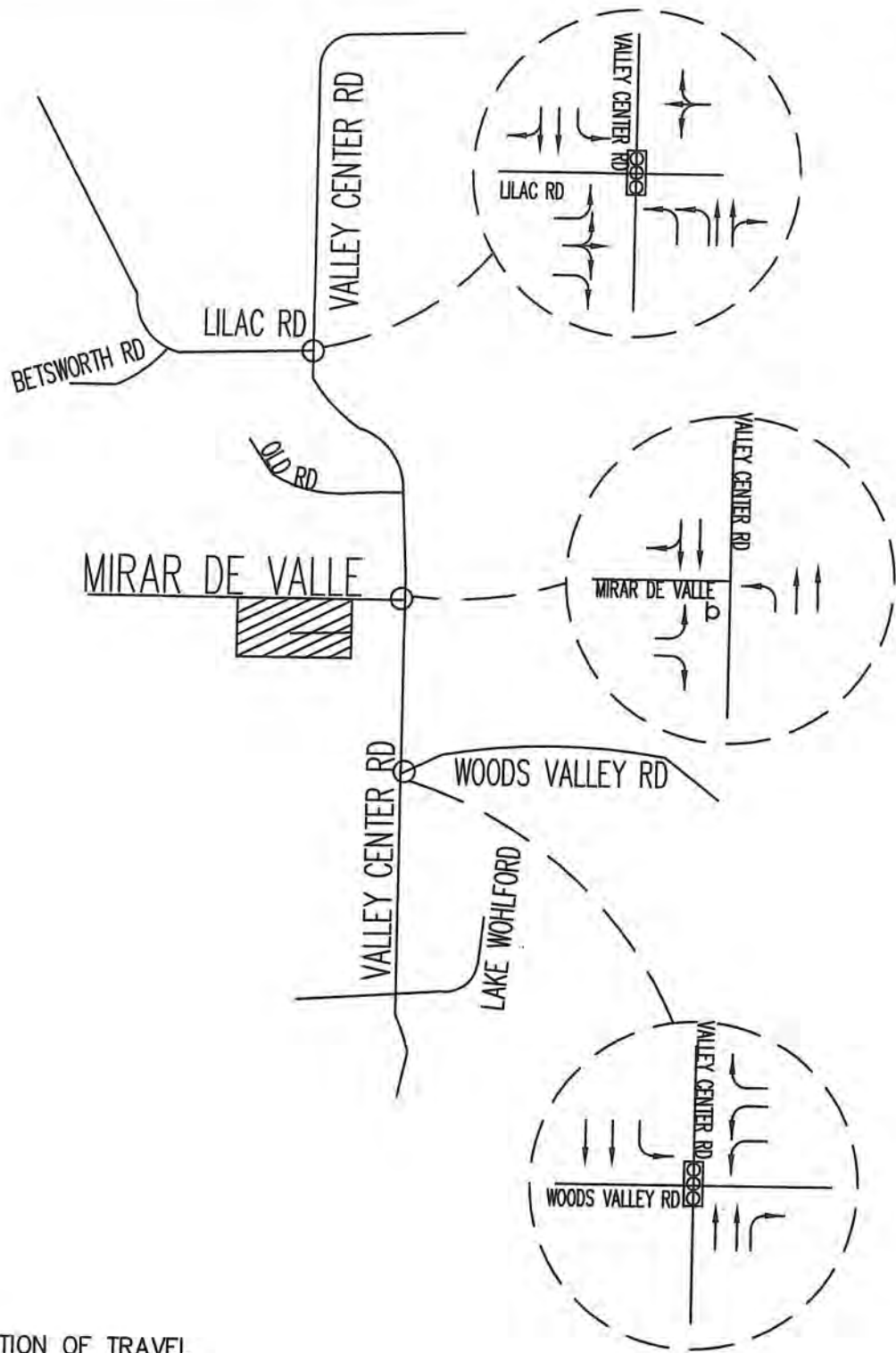
Per the General Plan Update, the ultimate classification of Lilac Road between Betsworth Road and Valley Center Road is classified as a 4.2B Boulevard (a four-lane roadway with intermittent turn lanes, 92 to 106 feet of ROW, and a capacity of 28,000 ADT at LOS "E").

Mirar de Valle is generally constructed as a 2-lane undivided east-west circulation element roadway west of Valley Center Road with a capacity of 9,000 at LOS "E". The Mobility Element of the General Plan designates Mirar de Valle as a 2.1D Community Collector Road west of Future Road 19 and was accepted at LOS "F" from New Road 19 to the Hidden Meadows Community boundary. Along the projects Mirar De Valle frontage between New Road 19 and Valley Center Road the roadway is classified as a non-Mobility Element Local Public Road.

Woods Valley Road is an east-west circulation element roadway. The posted speed limit is 45 MPH. Currently Woods Valley Road roadway capacity is equivalent to that of a 2.2 B Light Collector, 13,500 ADT at LOS "E".

ROADWAY SEGMENT DAILY TRAFFIC

Twenty-four (24) hour count data were collected on typical weekdays (Tuesday, Wednesday, or Thursday) in late March 2015 when school was in session. Count summary sheets can be found in Appendix A. The existing daily traffic volumes are illustrated on Figure 5.



LEGEND

- - DIRECTION OF TRAVEL
-  - TRAFFIC SIGNAL
- ◻ - STOP SIGN
-  - PROJECT SITE

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FIGURE 4
EXISTING CONDITIONS

KEY INTERSECTIONS

Intersection configurations and traffic control for the key intersections was previously shown on Figures 4. The key intersections to be analyzed in the study are identified below:

- Valley Center Road/Lilac Road – Signalized;
- Valley Center Road / Mirar De Valle – One-Way Stop-Controlled; and
- Valley Center Road/Woods Valley Road – Signalized.

INTERSECTION TRAFFIC COUNTS

Morning and afternoon peak hour turn counts were collected at all key intersections, on a typical weekday (Tuesday, Wednesday, or Thursday) in late March 2015 when school was in session. The existing peak hour traffic counts are depicted on Figure 5. A copy of the traffic count sheets are provided in Appendix A.

EXISTING LEVEL OF SERVICE CONDITIONS

Existing – Roadway Segments

Table 2 summarizes the daily segment analysis for the existing conditions. As shown in Table 2, based on average daily conditions all of the roadway segments currently operate at an acceptable LOS “D” or better.

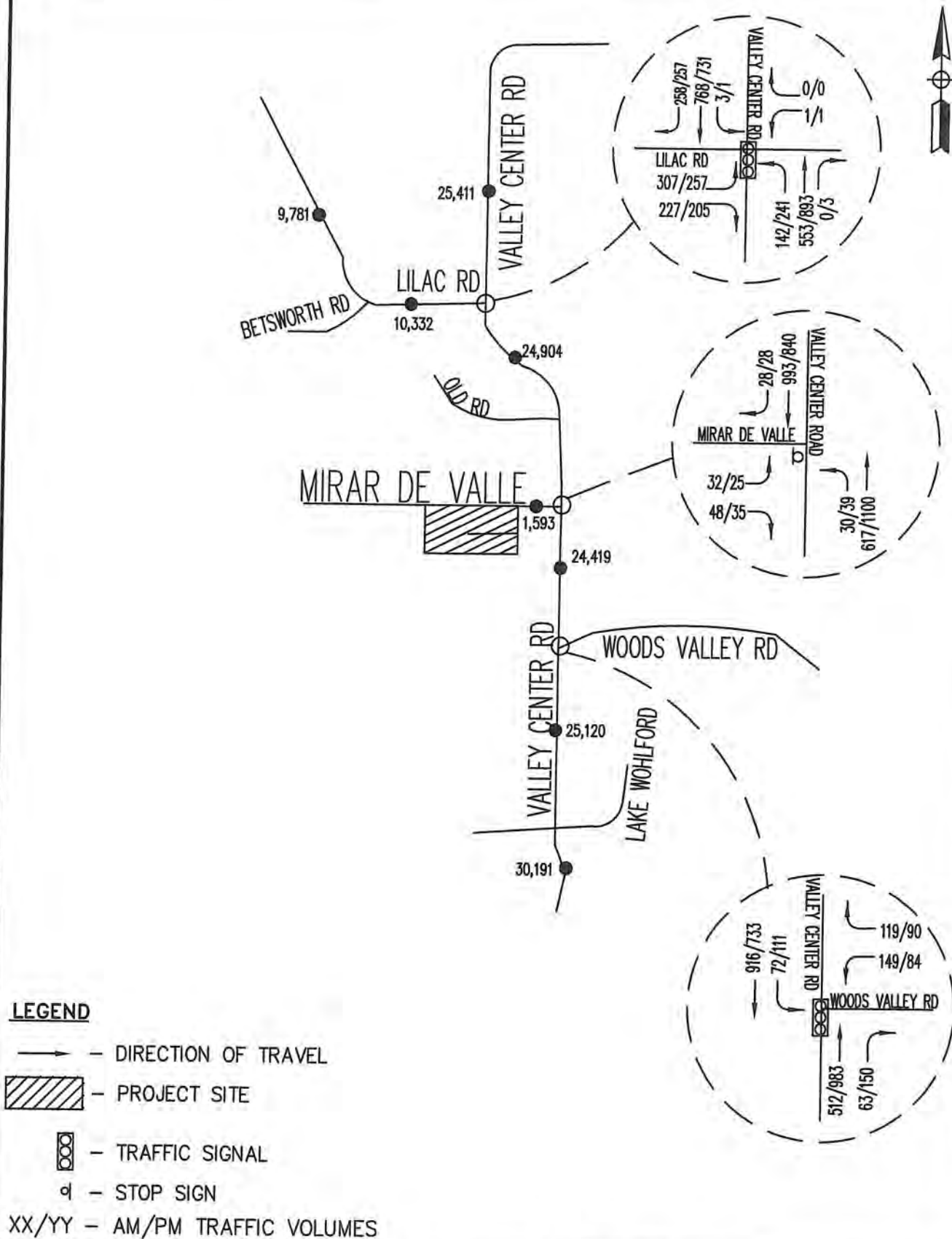
Table 2 - Existing Roadway Segment Level of Service Summary				
Segment	Jurisdiction	LOS E Capacity	Existing	
			ADT	LOS
Valley Center Road				
Between Miller Rd and Lilac Rd	County	37,000	25,411	C
Between Lilac Rd and Mirar De Valle Rd	County	37,000	24,904	C
Between Mirar De Valle Rd and Woods Valley Rd	County	37,000	24,419	B
Between Woods Valley Rd and Lake Wohlford Rd	County	37,000	25,120	C
Lilac Road				
Between Betsworth Rd and Valley Center Rd	County	16,200	10,332	D
Mirar De Valle Rd				
West of Valley Center Rd	County	9,000	1,593	A
(a) Volume on this segment was estimated. Capacity is based on the upper limits of LOS E per the County of San Diego; <D = Operates at LOS D or better, ADT= Average Daily Traffic; LOS= Level of Service;				

Existing – Intersections

Table 3 illustrates the existing intersection levels of service for existing conditions. A copy of the Synchro worksheets for the existing conditions can be found in Appendix B.

Table 3 - Existing Conditions Intersection LOS Summary							
Intersection	Jurisdiction	Traffic Control	Critical Move	AM Peak		PM Peak	
				Delay	LOS	Delay	LOS
Valley Center Road (N-S) @ Lilac Road (E-W)	County	Sig	Int.	22.8	C	22.2	C
Valley Center Road (N-S) @ Mirar De Valle (E-W)	County	OWSC	Int.	16.4	C	15.2	C
Valley Center Rd (N-S) @Woods Valley Rd (E-W)	County	Sig	Int.	9.1	A	11.2	B
Delay is measured in seconds/vehicle; LOS=Level of Service; sig=signalized; TWSC = Two-Way Stop-Controlled; OWSC=One Way Stop Controlled; sig – Signalized; Int = Intersection; NB = Northbound Approach; SB = Southbound Approach; EB = Eastbound Approach; WB = Westbound Approach; EBL = Eastbound Left; WBL = Westbound Left E-W = East-West Roadway; N-S = North-South Roadway							

As can be seen from Table 3, each of the intersections currently operate at LOS ‘C’ or better during both peak hours under existing conditions.



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FIGURE 5
EXISTING (2015) TRAFFIC VOLUMES

SECTION III — PROJECT RELATED CONDITIONS

TRIP GENERATION

Trip generation for the proposed project was estimated using the San Diego Association of Governments (SANDAG) *(Not So) Brief Guide of Vehicular Traffic Generation Rates for the San Diego Region*, April 2002.

Table 4 presents the trip generation rates for each land use component and Table 5 summarizes the trip generation calculations for the proposed project using the full driveway rates and with pass-by reductions. As shown on Table 4, the driveway trips (those trips that enter the project site) for the entire project is estimated to generate 376 daily trips with 30 in the morning peak hour and 38 in the evening peak hour at project build-out.

Table 4 - Trip Generation Rates								
Land Use	Rate	AM		PM PEAK				
		% of	In:Out	% of	In:Out Ratio			
High Density Single Family	8 trips / du	8%	0.20 : 0.80	9%	0.70 : 0.30			
Table 5 - Trip Generation Summary								
Land Use	Amount	ADT	AM			PM		
			In	Out	Total	In	Out	Total
High Density Single Family Detached	47 du	376	6	24	30	27	11	38

TRIP DISTRIBUTION

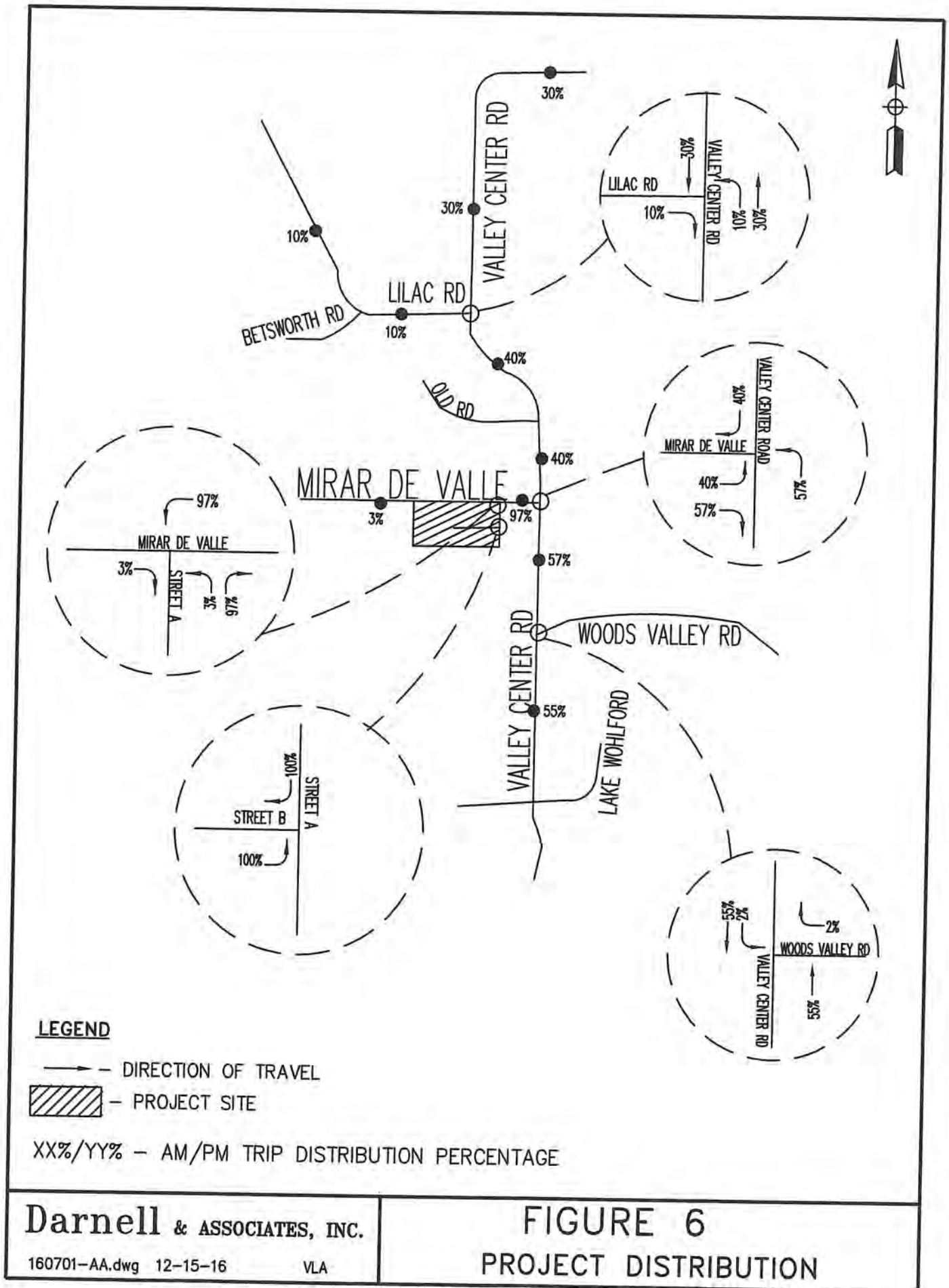
Trip distribution patterns for project traffic were estimated based on previous studies for projects in Valley Center.

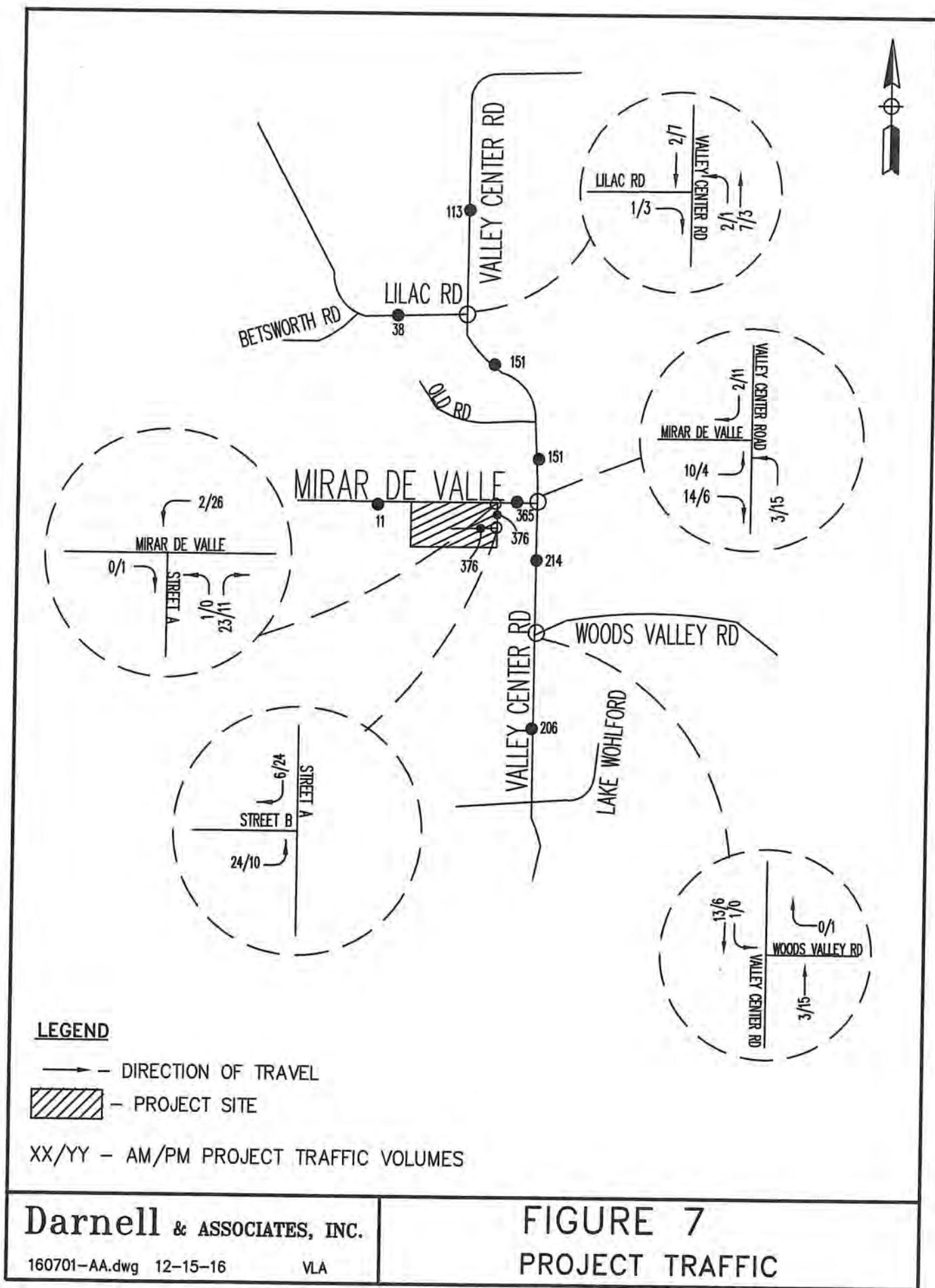
Figure 6 illustrates the trip distribution percentages for the proposed project. Figure 7 presents the projects daily and peak hourly traffic volumes.

STUDY AREA

To determine the study area for the project D&A utilized the County of San Diego's criteria which recommends the inclusion of all transportation facilities that receive 25 or more peak hour trips from the proposed project. Based on the County's criteria and review of the project traffic presented on Figure 7, the study area for each scenario was determined to include:

- Valley Center Road from South of Woods Valley Road to North of Lilac Road;
- Mirar De Valle Road west of Valley Center Road; and
- Lilac Road West of Valley Center Road to Betsworth Road.





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FIGURE 7
PROJECT TRAFFIC

SECTION IV - EXISTING PLUS PROJECT IMPACTS

POLICIES AND SIGNIFICANCE STANDARDS

The County of San Diego General Plan Mobility Element Policy M-2.1 requires development projects to provide associated road improvements necessary to achieve a level of service of “D” or higher on all Mobility Element roads except for those where a failing level of service has been accepted by the County pursuant to the criteria specifically identified in the accompany text box (Criteria for Accepting a Road Classification with Level of Service “E”/”F”). When development is proposed on roads where a failing level of service has been accepted the policy requires feasible mitigation in the form of road improvements or a fair share contribution to a road improvement program, consistent with the Mobility Element road network.

To address project impacts the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements for Transportation and Traffic dated August 24, 2011 identifies criteria, guidelines and standards to determine if, a discretionary project which has a significant impact on roadways will be required, as a condition of approval, to make “improvements or other measures necessary to mitigate traffic impacts to avoid reduction in the existing Level of Service below ‘D’ on off-site and on-site abutting County of San Diego’s Circulation Element roads. New development that would significantly impact congestion on roads at LOS ‘E’ or ‘F’, either currently or as a result of the project, will be denied unless improvements are scheduled to increase the LOS to ‘D’ or better or appropriate mitigation is provided. Appropriate mitigation would include a fair share contribution in the form of road improvements or a fair share contribution to an established program or project. If impacts cannot be mitigated, the project will be denied unless a specific statement of overriding findings is made pursuant to Section 15091(b) and 15093 of the State CEQA Guidelines.”

LEVELS OF SIGNIFICANCE STANDARDS

The *County of San Diego Guidelines for Determining Significance Transportation and Traffic, Second Modification August 24, 2011* was developed to evaluate the significance of traffic impacts on roadways and intersections which are currently operating at LOS E or F. A summary of the County’s Guidelines is provided in Table 6.

Table 6 - Measures of Significant Project Impacts					
LOS	Allowable Increase on Congested Roads and Intersections				
	Intersections		Road Segments		
	Signalized	Unsignalized	2-Lane Road	4-Lane Road	6-Lane Road
LOS E	Delay of 2 seconds or less	20 or less peak hour trips on a critical movement	200 ADT	400 ADT	600 ADT
LOS F	Either a Delay of 1 second, or 5 peak hour trips or less on a critical movement	5 or less peak hour trips on a critical movement	100 ADT	200 ADT	300 ADT
County Notes: – A critical movement is an intersection movement (right turn, left turn, and through-movement) that experiences excessive queues, which typically operate at LOS F. Also if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway. – 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 additional trips must mitigate a share of the cumulative impacts. – 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. – For determining significance at signalized intersection with LOS F conditions, the analysis must evaluate both the delay <u>and</u> the number of trips on a critical movement, exceedance of either criteria result in a significant impact.					
ADT = Average Daily Traffic; LOS = Level of Service, sec = Seconds of Delay per Vehicle					

Roadway Segments

As shown in Table 6, per the County's Guidelines, "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 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 6, or
- The additional or redistributed ADT generated by the proposed project will cause a residential street to exceed its design capacity."

As discussed on pages 13 and 14 of the *County of San Diego Guidelines for Determining Significance, Second Modification August 24, 2011*, an increase of the daily thresholds established for roadway segments operating at LOS E would result in only one additional car every 2.4 minutes per lane while the thresholds established for roadway segments operating at LOS F would result in only one additional car every 4.8 minutes. Therefore, the thresholds identified in Table 6, in most cases, would result in changes to traffic flow that would not be noticeable to the average driver and would thus not constitute a significant impact on the roadway.

Two-Lane Highways

Intersection Spacing Over One (1) Mile

In the *County of San Diego Guidelines for Determining Significance Transportation and Traffic, Second Modification August 24, 2011* the County of San Diego established a higher capacity and a higher impact significance level for two-lane highways (such as State Route 76) with signalized intersection spacing over one mile. Table 7 provides a summary of the level of service criteria and guidelines for significance for two-lane highways with intersection spacing over one-mile.

Table 7 - Measures of Significance on 2-Ln Hwys		
Level of Service	LOS Criteria	Impact Significance Level
E	> 16,200 ADT	>325 ADT
F	> 22,900 ADT	>225 ADT
Note: Where detailed data is available, the Director of Public Works may also accept a detailed level of service analysis based upon the two-lane highway analysis procedures provided in the Chapter 20 Highway Capacity Manual		

Intersection Spacing Less Than One (1) Mile

"Similar to the experience of drivers in urban areas with closely spaced intersections, the functionality of two-lane highway conditions with signalized intersection spacing under one-mile becomes constrained not due to the segment capacity but the intersection operations. Therefore the assessment of operates of intersection on two-lane highways shall be guided by a Level of Service standard. Level of Service for purposes of this significance guideline is based upon the overall intersection operations similar - to Urban Street analysis in Chapter 15 Highway Capacity Manual." Impacts for the two-lane highways with signalized intersection under one mile spacing will be determined by evaluating the intersection impact criteria identified in Table 8.

Table 8 - Measures of Significance on 2-Ln Hwys w/ Signalized Intersection Spacing < 1 Mile	
Level of Service	Adjacent Signalized Intersection
E	Delay of 2 seconds
F	Delay of 1 second, or 5 peak hour trips on a critical movement
Notes: – A critical movement is an intersection movement (right turn, left turn, through-movement) that experiences excessive queues which typically operate at LOS F. – 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 is responsible for mitigating its share of the cumulative impact. – 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.	

It should be noted that per the *County of San Diego Guidelines for Determining Significance Transportation and Traffic, Second Modification August 24, 2011*, “impacts related to operational features on two-lane highways will be evaluated on a case-by-case basis based upon traffic flow patterns, geometrics, available sight distance, accident histories, and other factors.”

Signalized Intersections

“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 signalized intersection”:

- “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 8.”
- Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.”

As discussed on page 16 of the *County of San Diego Guidelines for Determining Significance Transportation and Traffic, Second Modification August 24, 2011*, an increase in delay of two seconds or less, the threshold established for signalized intersections operating at LOS E, “...is a small fraction of the typical cycle length for a signalized intersection that ranges between 60 and 120 seconds. The likelihood of increased queues forming due to the additional two seconds of delay is low.” Thus, the increase in delay of two (2) seconds or less, on average, would result in changes to traffic flow that would not be noticeable to the average driver and would thus not constitute a significant impact. Since small changes and disruptions to the traffic flow at a signalized intersection can have a greater effect on the overall intersection operation when the intersection is operating at LOS F, versus LOS E, a more stringent guideline of one (1) second of delay was established for intersections operating at LOS F.

The five (5)-peak hour trip threshold, established for the critical movement of a signalized intersection operating at LOS F, when spread out over the peak hour, results in an increase of one (1) vehicle every 12 minutes or 720 seconds. This increase would not be noticeable to the average driver because one additional vehicle during a 12-minute interval on average would clear the traffic signal cycles well within the 12-minute period. Further, even if all five (5) additional peak hour vehicles arrived at the same time, these trips would also, on average, clear the traffic cycle and the existing queue lengths would be re-established. Thus, the increase of five (5) peak hour trips to a critical movement at a signalized intersection, on average, would result in changes to traffic flow that would not be noticeable to the average driver and would thus not constitute a significant impact.

Unsignalized Intersections

“Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant impact at an unsignalized intersection as listed in Table [9] and described as text below:”

- “The additional or redistributed ADT generated by the proposed project will add 21 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 21 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 6 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 6 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, the project would significantly impact the operations of the intersection.”

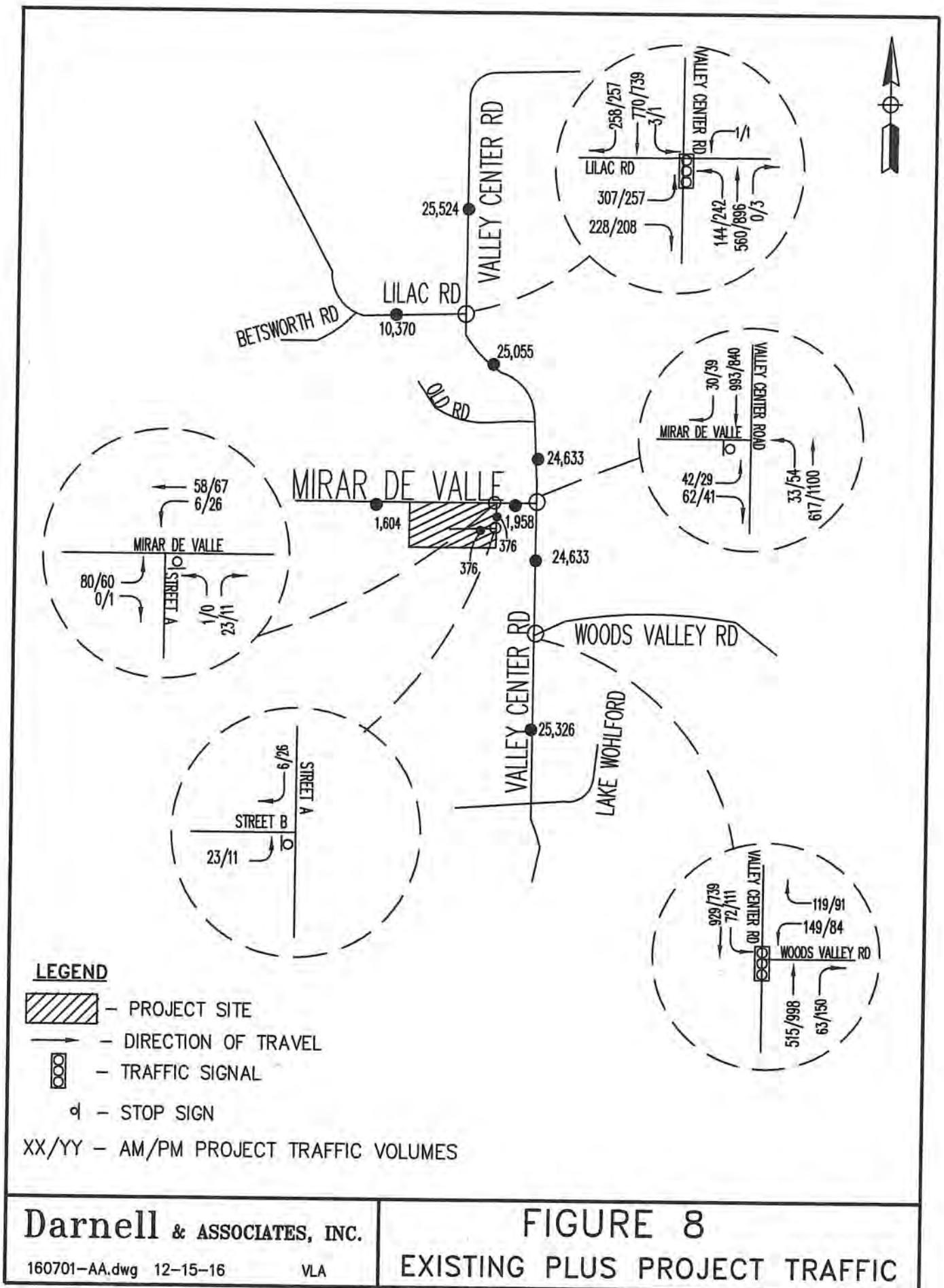
As discussed on page 18 of the *County of San Diego Guidelines for Determining Significance Transportation and Traffic, Second Modification August 24, 2011*, the addition of 20 peak hour trips to a critical movement, would result in an increase of one (1) vehicle every 3.0 minutes or 180 seconds. “Assuming the average wait time for a vehicle in the critical movement queue is less than 3.0 minutes, which is typical for LOS E conditions; this would not be noticeable to the average driver and would not be considered a significant impact.” Five (5) – trips spread out over an hour would result in an increase of one (1) vehicle every 12.0 minutes or 720 seconds. “This typically exceeds the average wait time in the queue and would not be noticeable to the average driver.” (See page 18 of the County’s *Guidelines for Determining Significance Transportation and Traffic* provided in Appendix A.)

EXISTING PLUS PROJECT LEVEL OF SERVICE CONDITIONS

This scenario analyzes the traffic impacts of the proposed project under existing plus project conditions. Figure 8 illustrates the existing plus project traffic volumes.

Existing Plus Project – Roadway Segments

Table 9 summarizes the daily roadway segment level of service analysis under the existing without and with project conditions. As shown in Table 9, based on average daily conditions all of the roadway segments analyzed operate at LOS “D” or better under existing plus project conditions.



Darnell & ASSOCIATES, INC.

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FIGURE 8
EXISTING PLUS PROJECT TRAFFIC

Table 9 - Existing Plus Project Roadway Segment Level of Service Summary

Segment	Jurisdiction	Class	LOS E Capacity	Existing		Existing Plus Project			
				ADT	LOS	Prj.	ADT	LOS	Sig.
Valley Center Road									
Between Lilac Rd and Miller Rd	County	4.1A MR	37,000	25,411	C	113	25,524	C	No
Between Lilac Rd and Mirar De Valle Rd	County	4.1A MR	37,000	24,904	C	151	25,055	C	No
Between Woods Valley Rd and Mirar De Valle Rd	County	4.1A MR	37,000	24,419	B	214	24,633	C	No
Between Lake Wohlford Rd and Woods Valley Rd	County	4.1A MR	37,000	25,120	C	206	25,326	C	No
Lilac Road									
Between Betsworth Rd and Valley Center Rd	County	2.2B LC	16,200	10,332	D	38	10,370	D	No
Mirar De Valle Rd									
West of Valley Center Rd to the Project Access	County	2.3 MC	8,000	1,593	A	365	1,958	A	No
West of the Project Access	County	2.3 MC	8,000	1,593	A	11	1,604	A	No
Street A									
South of Mirar De Valle Rd	County	PVT	750 (C)	DNE		376	376	A	No
Street B									
West of Street A	County	PVT	750 (C)	DNE		376	376	A	No
(a) Volume on this segment was estimated. Capacity is based on the upper limits of LOS E per the County of San Diego; <D = Operates at LOS D or better, Class = Roadway Classification; ADT= Average Daily Traffic; LOS= Level of Service; 4.1A MR = 4.1A Major Road; 2.2B LC = 2.2 B Light Collector; 2.3MC = Minor Collector, Sign? = Project Significance based on the County Guidelines per Significance and the General Plan Mobility Element, PVT = Private Road, (b) Significance based on Table 8 Criteria, (c0) ADI Limit on Page 8 of 20 of the Private Road Standards									

Existing Plus Project – Intersections

The traffic volumes on Figure 5 and 8 were analyzed using Synchro 8 software for existing and existing plus project conditions. (A copy of the Synchro worksheets for existing plus project conditions can be found in Appendix B). Table 10 summarizes the AM/PM peak hour intersection level of service. Review of Table 10 shows that each intersection operates at LOS “C” or better.

Table 10 - Summary of Intersection Operation for Existing and Existing Plus Project														
Intersection	Traffic Control	Crit Mvmt	Existing				Existing + Project							
			AM Peak		PM Peak		AM Peak				PM Peak			
			Delay	LOS	Delay	LOS	Delay	LOS	Δ Delay	Type of Impact	Delay	LOS	Δ Delay	Type of Impact
Valley Center Rd (N-S) @ Lilac Rd (E-W)	Sig	Int.	22.8	C	22.2	C	22.8	C	0.0	None	22.3	C	0.1	None
Valley Center Rd (N-S) @ Mirar de Valle (E-W)	OWSC	Int.	16.4	C	15.2	C	17.1	C	0.7	None	15.6	C	0.4	None
Valley Center Rd (N-S) @Woods Valley Road (EW)	Sig	Int.	9.1	A	11.2	B	9.1	A	0.0	None	11.2	B	0.0	None
Mirar de Valle (E-W)@ Project Access Street	OWSC	Int.	DNE				8.8	A	8.8	None	8.7	A	8.7	None
LOS Capacity is based on the methodology outlined in the 2000 Highway Capacity Manual (HCM) and preformed using Synchro 8, Int. = Intersection, , Sig = Signal, OWSC = One way stop control, ADT= Average Daily Traffic; LOS= Level of Service; DNE = Does Not Exist, Crit Mvmt = Critical Movement														

SECTION V - PROJECT ACCESS, CORNER SIGHT DISTANCE AND PROJECT ROADWAYS

Project Access

Access to/from the project site is proposed via Street A and Street B connecting to Mirar De Valle Road. Analysis of short term conditions at the Mirar de Valle /Street A intersection was conducted and it was concluded that the access road need to be improved to provide the following improvements and Traffic Control:

Mirar de Valle at Street A:

- Stop sign control on Street A;
- One (1) westbound lane on Mirar de Valle;
- One (1) center turn lane;
- One (1) eastbound lane on Mirar de Valle;
- One (1) northbound left and right turning lane.

Street A at Street B:

- One (1) lane in each direction on Street A; and
- One (1) lane in each direction on Street B.

Corner Sight Distance

The project has two (2) intersections that require certification of Corner Sight Distance for conformance to Section 6.1E of the County of San Diego Public Works Standards.

- Mirar De Valle:
Looking east and west from Street A.
- Street A:
Looking north and south from Street B.

The County of San Diego Public Works Standards identifies the Classification and Design Speed for each roadway as follows:

- Mirar De Valle:
2.1D Community Collector – 45 MPH
- Street A (New Road 19):
2.3A Minor Collector – 35MPH

Prevailing Speeds

The traffic volume on existing Mirar de Valle is 1,593 daily vehicles and is not sufficient to identify a prevailing speed. Similarly the existing Street A does not have sufficient traffic volumes to establish a prevailing speed. Therefore the certification of corner sight distance will be based on the design speed of each roadway.

The required corner sight distance is based on the design speed times 10 feet per mile per hour of the design speed.

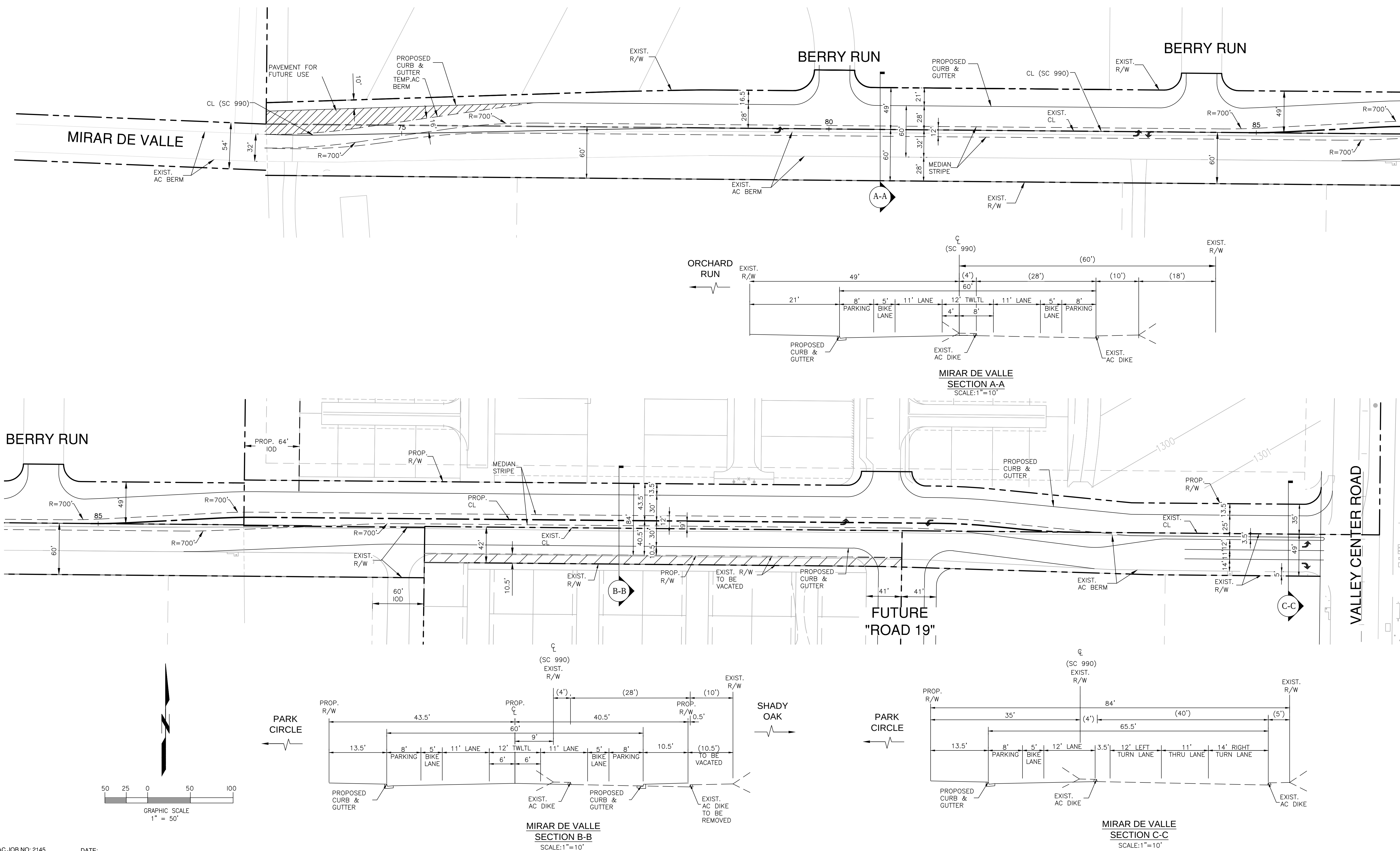


FIGURE 9 MIRAR DE VALLE STRIPING PLAN

Based on County Standards the following Corner Sight Distance is required:

- Mirar De Valle:
Looking west 450 feet (45 mph x 10ft/mph) at eastbound traffic and looking east 450 feet (45 mph x 10ft/mph) at westbound traffic on Mirar De Valle.
- Street A (New Road 19):
Looking north 350 feet (35 mph x 10ft/mph) at southbound traffic from Street B and looking south 350 feet (35 mph x 10ft/mph) at northbound traffic from Street B.

Figure 10 presents the required corner sight distance of 450 feet looking east and west on Mirar de Valle from Street A and 350 feet looking north and south on Street A from Street B. Looking north on Street A from Street B the 350 feet of corner sight distance is based on the development of the Park Circle project.

Preliminary analysis of the required Corner Sight Distance found the Corner Sight Distance can be provided and certified at:

- Mirar De Valle at Street A; and
- Street B at Street A.

A separate stand alone report will be provided by the applicant to be used to certify corner sight distance at these two (2) locations.

Project Roadways

Street A and Street B:

The internal roadways within the project site were analyzed for conformance to the County of San Diego Private Road Standards. The project traffic volumes within the project were previously estimated and are presented on Figure 8. Each of the roadways was found to satisfy the County's Private Road Standards for 2-Lane roadways ADT Limit of 750 vehicles per day as follows:

- Street A is to be constructed to provide 28 feet of pavement within 41 feet of the right-of-way.
- Street B is to be constructed to provide 32 feet of pavement within 42 feet of the right-of-way.

Mirar De Valle:

The Projects Mirar De Valle frontage west of Valley Center Road is designated a Local Public Street. To accommodate the future extension of Mirar De Valle west of New Road 19 to Mountain Meadow Road as a 2.1D Community Collector. For roadway continuity it is recommended Mirar De Valle between New Road 19 and Valley Center Road be constructed equivalent to a 2.1 D Community Collector to provide one (1) lane in each direction plus a center turn lane. Figure 9 depicts the channelization concept previously submitted and approved by the County of San Diego. The project will construct the frontage to conform to the Figure 9 Channelization concept.

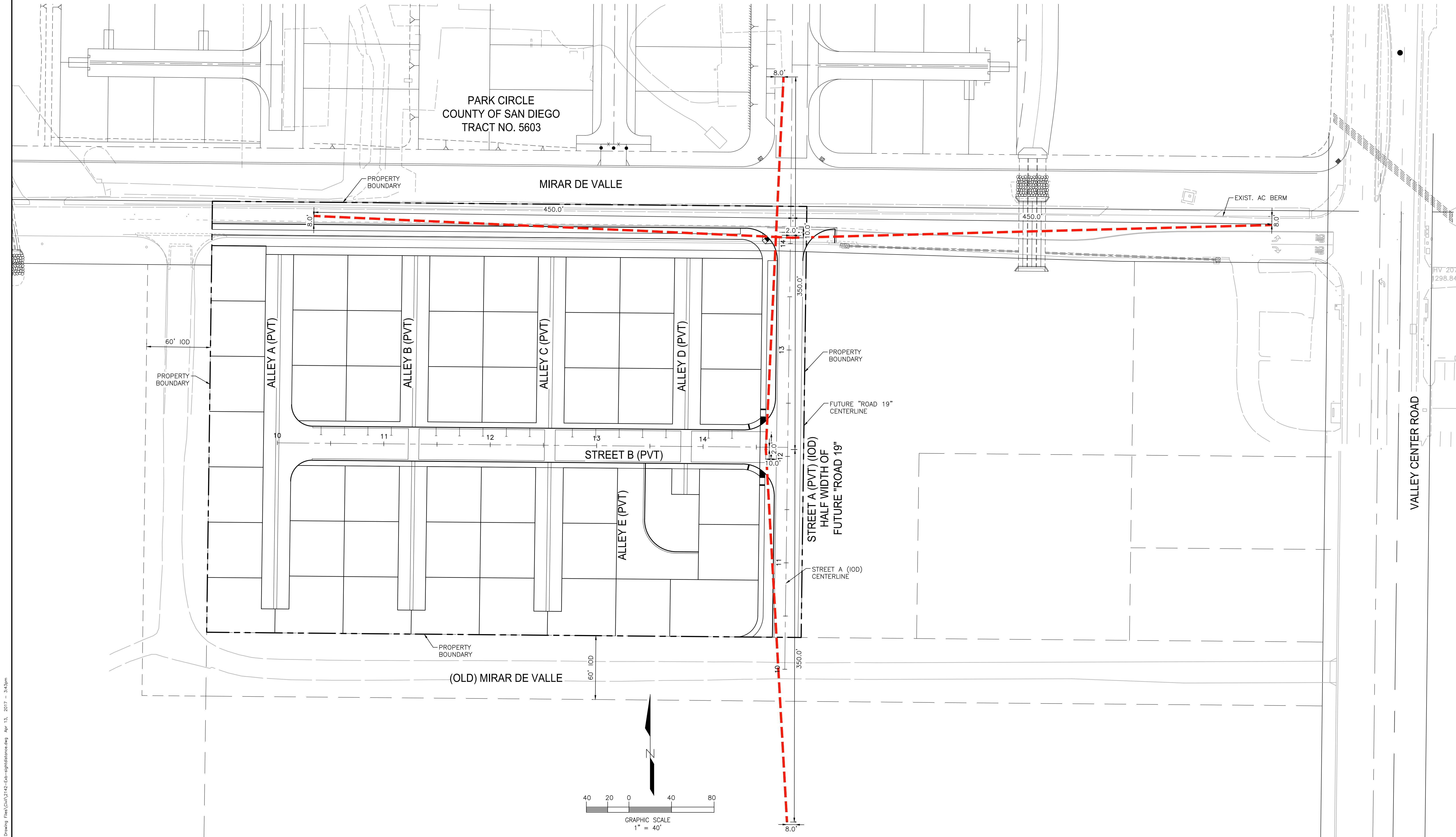


FIGURE 10
CORNER SIGHT DISTANCE FOR SHADY OAK TM 5614

SECTION VI – IMPACTS / MITIGATION MEASURES

TRANSPORTATION IMPACT FEE (TIF)

The County of San Diego has developed an overall programmatic solution that addresses existing and projected future road deficiencies in the unincorporated portions of San Diego County. This program includes the adoption of a Transportation Impact Fee (TIF) program to fund improvements to roadways necessary to mitigate potential cumulative impacts caused by traffic from future development. Based on SANDAG regional growth and land use forecasts, the SANDAG Regional Transportation Model was utilized to analyze projected build-out (year 2050) development conditions on the existing circulation element roadway throughout the unincorporated area of the County. Based on the results of the traffic modeling, funding necessary to construct transportation facilities that will mitigate cumulative impacts from new development was identified. Existing roadway deficiencies will be corrected through improvement projects funded by other public funding sources, such as TransNet, gas tax and grants. Potential cumulative impacts to the region's freeways have been addressed in SANDAG's Regional Transportation Plan (RTP). This plan, which considers freeway build out over the next 40 years, will use funds from TransNet, state and federal funding to improve freeways to projected level of service objectives in the RTP.

Full build out of the project is estimated to generate a total of 376 average daily driveway trips. These trips will be distributed on circulation element roadways in the County that were analyzed by the TIF program, some of which currently or are projected to operate at inadequate levels of service. The potential growth represented by the proposed project was included in the growth projections upon which the TIF program is based. Therefore, compliance with the County TIF ordinance, which will be required at issuance of building permits, in combination with other components of the program described above, will mitigate potential cumulative traffic impacts to County Circulation Element Roadways to less than significant. The TIF program provides a mechanism for developers to mitigate their cumulative impacts by paying a specified fee for the use that is being proposed.

The County Board of Supervisors adopted the County of San Diego Traffic Impact Fee (TIF) program in April 2005. The latest TIF Ordinance Update was adopted by the Board of Supervisors effective on December 31, 2012. It should be noted that the actual traffic impact fees are subject to change as the TIF ordinance is updated annually as the fees are adjusted to reflect the engineering cost index. Compliance with the County TIF ordinance will mitigate any cumulative impact that the project has on the County roadway facilities located within the Valley Center Community Sub-region and the North TIF region. The project proposes to comply with the County's TIF to mitigate the project's local and regional cumulative impacts within the unincorporated area.

DIRECT IMPACTS

Direct Impacts – Roadway Segments

The project does not have any direct roadway impacts. Therefore no mitigation is required.

Direct Impacts – Intersections

The project does not have any direct intersection impacts. Therefore no mitigation is required.

CUMULATIVE IMPACTS

The project is considered to be part of cumulative impacts. To mitigate projects cumulative impacts the Applicant agrees to participate in the County of San Diego Traffic Impact Fees (TIF) Program and will pay the current County TIF Fees at the time building permits are issued.

SECTION VII - SUMMARY OF FINDINGS & CONCLUSIONS

- The applicant proposes to develop the Shady Oak 47 Unit Single Family project located on the southside of Mirar de Valle west of Valley Center Road in the Valley Center Community of San Diego County.
- The project proposes 47 higher density cluster, alley and cottage residential units.
- As detailed in this report, build out of the proposed Shady Oak Project is estimated to generate a total of 376 average daily driveway trips, 30 AM peak hour driveway trips, and 38 PM peak hour driveway trips.
- The analysis of the study area roadway segments found each roadway segment to operate at LOS “D” or better for existing and existing plus project conditions. Therefore the project does not have any direct impacts that require mitigation.
- The project will be a part of the cumulative impacts within the study area. Mitigation of Cumulative Impacts will be accommodated by paying the County’s Traffic Impact fees.
- In accordance with the County’s Centerline Ordinance the project will be responsible for improving its frontage along Mirar de Valle, Street A and Street B.
- Improvements to Mirar de Valle along the projects frontage are proposed to be consistent with the County of San Diego Classification of Mirar de Valle west of Road 19. Figure 9 presents the proposed improvements to construct the projects Mirar de Valle frontage to be consistent with the County’s 2.1 D Classification and the following:

Mirar de Valle at Street A:

- Stop sign control on Street A;
 - One (1) westbound lane on Mirar de Valle;
 - One (1) eastbound lane on Mirar de Valle;
 - One (1) northbound left and right turning lane.
- Improvements to Street A along the projects frontage are proposed to be constructed to provide the following improvements and Traffic Control:
 - One (1) lane in each direction on Street A;
 - Street A is to be constructed to provide 28 feet of pavement within 41 feet of the right-of-way for the westerly half of New Road 19.
 - Improvements to Street B are proposed to be constructed to provide the following:
 - One (1) lane in each direction plus parking on the northside;
 - Street B is to be constructed to provide 32 feet of pavement within 42 feet of the right-of-way.
 - Corner Sight Distance at the two (2) project intersections was analyzed and recommended of the report. The corner sight distance is based on the following:
 - Mirar de Valle design speed of 45 MPH;
 - Street A design speed of 35 MPH.
- Certification will be provided by the projects Civil Engineer.

APPENDIX A

- Existing AM/PM Peak Hour Traffic Counts
 - Existing 24 Hour Machine Counts
- County of San Diego Level of Service Worksheets
- Excerpts from the County's Significance Thresholds

Existing AM/PM Peak Hour Traffic Counts

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

MIRA DE VALLE W-O VALLEY CENTER

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00			0	0	12:00			14	17
00:15			0	1	12:15			19	8
00:30			0	0	12:30			11	10
00:45			0	0	12:45			9	53
01:00			1	1	13:00			12	8
01:15			0	0	13:15			11	8
01:30			0	2	13:30			6	13
01:45			0	1	13:45			10	39
02:00			0	0	14:00			12	14
02:15			0	1	14:15			11	13
02:30			1	0	14:30			15	8
02:45			0	1	14:45			9	47
03:00			0	0	15:00			7	19
03:15			0	0	15:15			9	16
03:30			0	0	15:30			23	9
03:45			0	0	15:45			17	56
04:00			2	1	16:00			22	21
04:15			1	0	16:15			14	14
04:30			3	0	16:30			20	19
04:45			2	8	16:45			14	70
05:00			4	0	17:00			8	17
05:15			1	2	17:15			7	18
05:30			5	0	17:30			7	25
05:45			9	19	17:45			18	40
06:00			10	2	18:00			14	13
06:15			9	8	18:15			12	12
06:30			18	13	18:30			9	14
06:45			17	54	18:45			14	49
07:00			15	14	19:00			4	11
07:15			36	10	19:15			6	10
07:30			20	26	19:30			12	7
07:45			15	86	19:45			6	28
08:00			27	8	20:00			8	8
08:15			19	15	20:15			3	21
08:30			12	10	20:30			3	8
08:45			11	69	20:45			1	15
09:00			14	8	21:00			0	8
09:15			8	7	21:15			0	5
09:30			15	9	21:30			3	2
09:45			5	42	21:45			0	3
10:00			15	10	22:00			1	10
10:15			14	15	22:15			3	7
10:30			11	11	22:30			1	1
10:45			21	61	22:45			1	6
11:00			11	12	23:00			0	1
11:15			12	10	23:15			0	4
11:30			11	7	23:30			2	0
11:45			10	44	23:45			1	3

Total Vol.	385	271	656	409	528	937
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Split %	AM			PM		
	58.7%	41.3%	41.2%	43.6%	56.4%	58.8%
Peak Hour	07:15	06:45	06:45	15:30	16:45	16:00
Volume	98	68	156	76	77	141
P.H.F.	0.68	0.65	0.85	0.83	0.77	0.82

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

VALLEY CENTER N-O LILAC

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	19	27			12:00	163	173		
00:15	23	32			12:15	184	171		
00:30	22	26			12:30	166	139		
00:45	17	81	32	117	12:45	155	668	168	651
01:00	12	23			13:00	187	165		
01:15	16	31			13:15	182	171		
01:30	12	19			13:30	181	177		
01:45	6	46	19	92	13:45	217	767	194	707
02:00	5	26			14:00	179	215		
02:15	9	24			14:15	204	192		
02:30	10	27			14:30	234	199		
02:45	4	28	14	91	14:45	209	826	256	862
03:00	11	21			15:00	204	254		
03:15	9	14			15:15	217	217		
03:30	10	19			15:30	282	228		
03:45	10	40	26	80	15:45	268	971	200	899
04:00	9	28			16:00	243	214		
04:15	12	27			16:15	283	215		
04:30	16	45			16:30	306	262		
04:45	21	58	52	152	16:45	295	1127	268	959
05:00	24	70			17:00	288	215		
05:15	43	93			17:15	272	268		
05:30	65	122			17:30	284	205		
05:45	80	212	128	413	17:45	277	1121	181	869
06:00	93	176			18:00	236	153		
06:15	136	199			18:15	260	172		
06:30	132	209			18:30	235	159		
06:45	125	486	184	768	18:45	222	953	149	633
07:00	188	215			19:00	203	127		
07:15	232	262			19:15	190	93		
07:30	215	288			19:30	163	92		
07:45	195	830	215	980	19:45	152	708	63	375
08:00	216	268			20:00	144	106		
08:15	184	277			20:15	152	101		
08:30	170	235			20:30	108	70		
08:45	161	731	181	961	20:45	131	535	107	384
09:00	142	172			21:00	90	96		
09:15	134	221			21:15	91	67		
09:30	153	199			21:30	87	55		
09:45	162	591	141	733	21:45	83	351	52	270
10:00	150	167			22:00	63	79		
10:15	128	170			22:15	67	71		
10:30	124	156			22:30	55	48		
10:45	157	559	142	635	22:45	46	231	50	248
11:00	141	187			23:00	37	52		
11:15	155	184			23:15	37	42		
11:30	168	162			23:30	22	31		
11:45	170	634	173	706	23:45	18	114	33	158
Total Vol.									
	4296	5728			10024	8372	7015		15387
					Daily Totals				
					NB	SB	EB	WB	Combined
					12668	12743			25411
					PM				
Split %	42.9%	57.1%		39.4%	54.4%	45.6%			60.6%
Peak Hour	07:15	07:30		07:15	16:15	16:30			16:30
Volume	858	1048		1891	1172	1013			2174
P.H.F.	0.92	0.91		0.94	0.96	0.94			0.96

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

LILAC W-O BETSWORTH

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	5	9			12:00	66	49		
00:15	5	1			12:15	69	68		
00:30	7	5			12:30	60	53		
00:45	7	24	4	19	12:45	68	263	61	231
01:00	2	2			13:00	62	81		
01:15	7	6			13:15	66	76		
01:30	3	5			13:30	63	62		
01:45	5	17	1	14	13:45	89	280	96	315
02:00	3	3			14:00	78	102		
02:15	6	1			14:15	80	132		
02:30	8	2			14:30	66	100		
02:45	6	23	0	6	14:45	103	327	81	415
03:00	6	5			15:00	106	83		
03:15	5	0			15:15	96	88		
03:30	1	11			15:30	102	98		
03:45	3	15	3	19	15:45	82	386	86	355
04:00	4	5			16:00	85	108		
04:15	4	5			16:15	86	98		
04:30	13	7			16:30	109	109		
04:45	5	26	18	35	16:45	119	399	115	430
05:00	13	21			17:00	99	107		
05:15	17	19			17:15	105	87		
05:30	26	36			17:30	97	92		
05:45	33	89	38	114	17:45	99	400	100	386
06:00	40	38			18:00	83	81		
06:15	58	68			18:15	96	69		
06:30	79	64			18:30	81	67		
06:45	64	241	73	243	18:45	88	348	57	274
07:00	67	98			19:00	67	41		
07:15	91	113			19:15	60	49		
07:30	75	126			19:30	52	51		
07:45	97	330	89	426	19:45	46	225	36	177
08:00	106	129			20:00	60	39		
08:15	86	118			20:15	55	21		
08:30	84	80			20:30	42	37		
08:45	61	337	82	409	20:45	35	192	30	127
09:00	52	61			21:00	33	21		
09:15	59	61			21:15	35	31		
09:30	49	74			21:30	23	22		
09:45	50	210	76	272	21:45	19	110	17	91
10:00	49	69			22:00	36	15		
10:15	48	68			22:15	28	13		
10:30	46	55			22:30	15	20		
10:45	53	196	59	251	22:45	11	90	9	57
11:00	77	59			23:00	14	5		
11:15	66	61			23:15	11	9		
11:30	57	70			23:30	11	5		
11:45	55	255	79	269	23:45	3	39	5	24
Total Vol.	1763	2077		3840		3059	2882		5941
					Daily Totals				
					NB	SB	EB	WB	Combined
					4822	4959			9781
Split %	45.9%	54.1%	AM		51.5%	48.5%	PM		60.7%
Peak Hour	07:45	07:30	07:15		16:30	13:45	16:30		
Volume	373	462	826		432	430	850		
P.H.F.	0.88	0.90	0.88		0.89	0.81	0.91		

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

LILAC W-O VALLEY CENTER

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00			9	5	12:00			51	80
00:15			2	4	12:15			71	69
00:30			3	7	12:30			45	61
00:45			1	15	12:45			68	235
01:00			1	3	13:00			76	67
01:15			5	6	13:15			59	82
01:30			5	3	13:30			38	72
01:45			1	12	13:45			67	240
02:00			3	3	14:00			53	93
02:15			1	7	14:15			78	104
02:30			3	9	14:30			66	74
02:45			0	7	14:45			66	263
03:00			2	8	15:00			79	114
03:15			0	4	15:15			54	106
03:30			10	1	15:30			103	107
03:45			5	17	15:45			87	323
04:00			5	4	16:00			105	102
04:15			5	5	16:15			116	102
04:30			8	11	16:30			111	132
04:45			16	34	16:45			128	460
05:00			25	12	17:00			121	121
05:15			19	16	17:15			105	119
05:30			41	30	17:30			95	121
05:45			45	130	17:45			108	429
06:00			43	41	18:00			74	101
06:15			49	59	18:15			79	115
06:30			66	86	18:30			67	92
06:45			83	241	18:45			52	272
07:00			103	78	19:00			53	72
07:15			134	91	19:15			51	74
07:30			126	83	19:30			45	56
07:45			118	481	19:45			35	184
08:00			148	119	20:00			44	57
08:15			131	88	20:15			44	47
08:30			111	88	20:30			29	43
08:45			90	480	20:45			33	150
09:00			72	54	21:00			22	57
09:15			45	60	21:15			18	44
09:30			77	57	21:30			21	25
09:45			75	269	21:45			18	79
10:00			66	52	22:00			3	27
10:15			50	57	22:15			13	39
10:30			34	54	22:30			5	8
10:45			57	207	22:45			4	25
11:00			58	79	23:00			6	19
11:15			64	73	23:15			5	19
11:30			71	73	23:30			6	10
11:45			80	273	23:45			8	25

Total Vol.	2166	1925	4091	2685	3556	6241
-------------------	------	------	-------------	------	------	-------------

NB	SB	EB	WB	Combined
		4851	5481	10332

Split %	AM	PM
	52.9%	43.0%
	47.1%	57.0%
	39.6%	60.4%

Peak Hour	07:15	07:45	07:15	16:15	16:30	16:30
Volume	526	400	924	476	504	969
P.H.F.	0.89	0.84	0.87	0.93	0.95	0.93

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

VALLEY CENTER S-O LILAC

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	18	20			12:00	175	168		
00:15	20	28			12:15	184	170		
00:30	16	33			12:30	160	151		
00:45	19	73	26	107	12:45	158	677	165	654
01:00	15	20			13:00	177	170		1331
01:15	11	31			13:15	184	158		
01:30	10	22			13:30	168	168		
01:45	9	45	18	91	13:45	191	720	177	673
02:00	11	21			14:00	188	181		1393
02:15	8	24			14:15	175	219		
02:30	9	26			14:30	195	205		
02:45	10	38	15	86	14:45	212	770	218	823
03:00	5	11			15:00	206	216		1593
03:15	4	16			15:15	218	205		
03:30	6	21			15:30	268	226		
03:45	7	22	23	71	15:45	252	944	205	852
04:00	9	29			16:00	266	215		1796
04:15	11	33			16:15	288	235		
04:30	18	40			16:30	315	218		
04:45	26	64	58	160	16:45	281	1150	242	910
05:00	21	81			17:00	295	244		2060
05:15	38	105			17:15	260	233		
05:30	51	126			17:30	284	195		
05:45	66	176	168	480	17:45	277	1116	150	822
06:00	95	184			18:00	242	141		1938
06:15	121	195			18:15	251	135		
06:30	135	213			18:30	235	141		
06:45	144	495	208	800	18:45	226	954	121	538
07:00	159	215			19:00	219	118		1492
07:15	161	268			19:15	205	105		
07:30	184	277			19:30	181	88		
07:45	177	681	212	972	19:45	170	775	90	401
08:00	185	252			20:00	142	105		1176
08:15	162	318			20:15	165	98		
08:30	144	230			20:30	122	88		
08:45	141	632	166	966	20:45	131	560	70	361
09:00	144	184			21:00	105	65		921
09:15	121	212			21:15	111	51		
09:30	135	189			21:30	89	66		
09:45	145	545	177	762	21:45	89	394	54	236
10:00	151	181			22:00	88	50		630
10:15	128	212			22:15	70	68		
10:30	122	184			22:30	65	51		
10:45	168	569	142	719	22:45	55	278	40	209
11:00	132	155			23:00	40	35		487
11:15	151	168			23:15	35	44		
11:30	168	174			23:30	22	28		
11:45	151	602	180	677	23:45	20	117	30	137
Total Vol.									
	3942	5891		9833		8455	6616		15071
					Daily Totals				
					NB	SB	EB	WB	Combined
					12397	12507			24904
Split %					PM				
	40.1%	59.9%		39.5%		56.1%	43.9%		60.5%
Peak Hour	07:30	07:30		07:30		16:15	16:15		16:15
Volume	708	1059		1767		1179	939		2118
P.H.F.	0.96	0.83		0.92		0.92	0.96		0.98

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

VALLEY CENTER N-O WOODS VALLEY

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	15	26			12:00	186	153		
00:15	23	31			12:15	177	178		
00:30	22	24			12:30	167	141		
00:45	16	76	24	105	12:45	147	677	164	636
01:00	11	16							1313
01:15	15	37			13:00	184	180		
01:30	11	18			13:15	165	164		
01:45	6	43	15	86	13:30	190	157		
02:00	5	24			13:45	195	734	163	664
02:15	11	21							1398
02:30	11	23			14:00	184	185		
02:45	4	31	11	79	14:15	186	202		
03:00	7	14			14:30	204	196		
03:15	10	14			14:45	202	776	209	792
03:30	8	24							1568
03:45	8	33	26	78	15:00	200	223		
04:00	9	28			15:15	225	199		
04:15	10	30			15:30	280	246		
04:30	14	45			15:45	240	945	192	860
04:45	18	51	55	158					1805
05:00	23	87			16:00	281	191		
05:15	48	92			16:15	277	198		
05:30	52	129			16:30	265	215		
05:45	71	194	164	472	16:45	275	1098	205	809
06:00	96	175							1907
06:15	118	198			17:00	255	216		
06:30	136	205			17:15	268	213		
06:45	156	506	204	782	17:30	284	166		
07:00	144	222			17:45	281	1088	175	770
07:15	131	235							1858
07:30	168	267			18:00	234	128		
07:45	184	627	225	949	18:15	261	150		
08:00	166	218			18:30	223	136		
08:15	141	268			18:45	249	967	137	551
08:30	144	215							1518
08:45	121	572	188	889	19:00	209	109		
09:00	134	191			19:15	221	98		
09:15	125	220			19:30	164	101		
09:30	122	204			19:45	178	772	82	390
09:45	137	518	166	781					1162
10:00	139	173			20:00	135	100		
10:15	133	208			20:15	161	109		
10:30	119	165			20:30	114	74		
10:45	160	551	150	696	20:45	139	549	85	368
11:00	116	148							917
11:15	160	188			21:00	102	74		
11:30	160	161			21:15	104	58		
11:45	162	598	184	681	21:30	90	55		
					21:45	97	393	58	245
									638
					22:00	79	68		
					22:15	84	72		
					22:30	54	54		
					22:45	58	275	45	239
									514
					23:00	40	46		
					23:15	44	33		
					23:30	22	29		
					23:45	18	124	33	141
									265
Total Vol.	3800	5756		9556		8398	6465		14863
					Daily Totals				
					NB	SB	EB	WB	Combined
					12198	12221			24419
Split %	39.8%	60.2%		39.1%	56.5%	43.5%			60.9%
Peak Hour	11:45	07:30		07:30	16:00	14:45			16:30
Volume	692	978		1637	1098	877			1912
P.H.F.	0.93	0.91		0.94	0.97	0.89			0.99

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

VALLEY CENTER S-O WOODS VALLEY

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	18	24			12:00	177	150		
00:15	21	38			12:15	183	177		
00:30	27	24			12:30	183	151		
00:45	13	79	25	111	12:45	156	699	150	628
									1327
01:00	15	21			13:00	184	175		
01:15	12	39			13:15	166	163		
01:30	14	19			13:30	194	140		
01:45	7	48	16	95	13:45	185	729	168	646
									1375
02:00	4	21			14:00	189	174		
02:15	14	23			14:15	165	187		
02:30	12	26			14:30	209	191		
02:45	6	36	16	86	14:45	193	756	202	754
									1510
03:00	8	14			15:00	202	197		
03:15	10	19			15:15	250	199		
03:30	10	22			15:30	276	220		
03:45	7	35	28	83	15:45	250	978	195	811
									1789
04:00	6	32			16:00	275	188		
04:15	14	32			16:15	297	196		
04:30	18	55			16:30	288	215		
04:45	11	49	54	173	16:45	278	1138	213	812
									1950
05:00	23	99			17:00	281	196		
05:15	46	107			17:15	299	225		
05:30	49	155			17:30	325	170		
05:45	69	187	181	542	17:45	321	1226	159	750
									1976
06:00	93	191			18:00	239	117		
06:15	113	230			18:15	277	157		
06:30	120	243			18:30	236	124		
06:45	139	465	224	888	18:45	264	1016	137	535
									1551
07:00	121	246			19:00	238	112		
07:15	141	267			19:15	228	99		
07:30	146	316			19:30	187	88		
07:45	157	565	255	1084	19:45	191	844	85	384
									1228
08:00	141	245			20:00	161	88		
08:15	126	287			20:15	166	92		
08:30	156	240			20:30	135	73		
08:45	123	546	193	965	20:45	157	619	84	337
									956
09:00	133	196			21:00	111	71		
09:15	125	238			21:15	126	55		
09:30	130	225			21:30	103	58		
09:45	147	535	167	826	21:45	106	446	50	234
									680
10:00	137	177			22:00	95	69		
10:15	130	204			22:15	94	63		
10:30	110	190			22:30	56	50		
10:45	148	525	157	728	22:45	64	309	50	232
									541
11:00	118	156			23:00	39	51		
11:15	160	183			23:15	46	38		
11:30	167	166			23:30	30	34		
11:45	153	598	190	695	23:45	20	135	35	158
									293
Total Vol.	3668	6276		9944		8895	6281		15176
					Daily Totals				
					NB	SB	EB	WB	Combined
					12563	12557			25120
Split %	36.9%	63.1%		39.6%	58.6%	41.4%			60.4%
Peak Hour	11:45	07:30		07:30	17:00	16:30			16:30
Volume	696	1103		1673	1226	849			1995
P.H.F.	0.95	0.87		0.91	0.95	0.94			0.95

TUESDAY, MARCH 24TH, 2015

CITY: VALLEY CENTER

PROJECT: PTD15-0327-01

VALLEY CENTER S-O LAKE WOHLFORD

AM Period	NB	SB	EB	WB	PM Period	NB	SB	EB	WB
00:00	23	38			12:00	186	231		
00:15	27	45			12:15	215	210		
00:30	29	27			12:30	197	229		
00:45	14	93	34	144	12:45	193	791	192	862
01:00	19	29			13:00	202	219		
01:15	14	41			13:15	207	216		
01:30	18	29			13:30	213	197		
01:45	8	59	26	125	13:45	197	819	203	835
02:00	14	19			14:00	224	217		
02:15	13	33			14:15	175	249		
02:30	8	27			14:30	257	237		
02:45	8	43	22	101	14:45	203	859	253	956
03:00	9	18			15:00	249	249		
03:15	17	22			15:15	297	250		
03:30	11	24			15:30	315	265		
03:45	9	46	36	100	15:45	280	1141	252	1016
04:00	9	33			16:00	318	239		
04:15	15	46			16:15	368	236		
04:30	23	53			16:30	335	240		
04:45	15	62	64	196	16:45	368	1389	244	959
05:00	37	116			17:00	350	248		
05:15	44	126			17:15	368	226		
05:30	66	170			17:30	353	208		
05:45	88	235	220	632	17:45	337	1408	198	880
06:00	109	207			18:00	299	164		
06:15	116	278			18:15	295	171		
06:30	147	300			18:30	266	178		
06:45	136	508	292	1077	18:45	307	1167	160	673
07:00	154	294			19:00	260	144		
07:15	141	313			19:15	269	141		
07:30	168	342			19:30	217	115		
07:45	170	633	319	1268	19:45	198	944	96	496
08:00	177	305			20:00	208	106		
08:15	161	331			20:15	197	113		
08:30	155	308			20:30	151	95		
08:45	150	643	277	1221	20:45	157	713	101	415
09:00	159	257			21:00	133	91		
09:15	161	272			21:15	145	76		
09:30	152	279			21:30	117	75		
09:45	167	639	231	1039	21:45	126	521	57	299
10:00	169	213			22:00	114	85		
10:15	146	243			22:15	88	84		
10:30	150	260			22:30	71	65		
10:45	155	620	228	944	22:45	71	344	64	298
11:00	165	202			23:00	49	62		
11:15	170	239			23:15	50	53		
11:30	195	240			23:30	43	44		
11:45	187	717	215	896	23:45	18	160	46	205
Total Vol.	4298	7743		12041		10256	7894		18150

Daily Totals				Combined
NB	SB	EB	WB	
14554	15637			30191

AM				PM			
Split %	35.7%	64.3%	39.9%	56.5%	43.5%		60.1%
Peak Hour	11:45	07:30	07:30	16:45	14:45		16:15
Volume	785	1297	1973	1439	1017		2389
P.H.F.	0.91	0.95	0.97	0.99	0.96		0.98

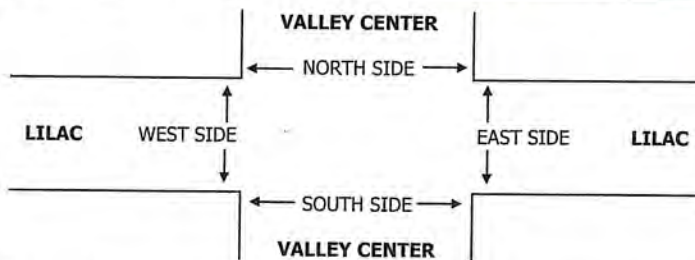
Existing 24 Hour Machine Counts

PREPARED BY: PACIFIC TECHNICAL DATA

PROJECT #: PTD15-0327-01
LOCATION #: 5
CONTROL: SIGNAL

W		▲	
DN		N	
ND	◀ W		E ▶
OTHER		S	
OTHER		▼	

U-TURNS				
NB X	SB X	EB X	WB X	TTL
				0
				0
				0
	1			1
	1			1
				0
				0
				0
0	2	0	0	2
			1	1
	1			1
				0
				0
				0
1				1
1				1
2	1	0	1	4



BICYCLE CROSSINGS				
NS	SS	ES	WS	TOTAL
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

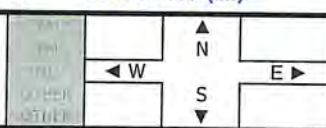
DATE:
3/24/15
TUESDAY

LOCATION:
NORTH & SOUTH:
EAST & WEST:

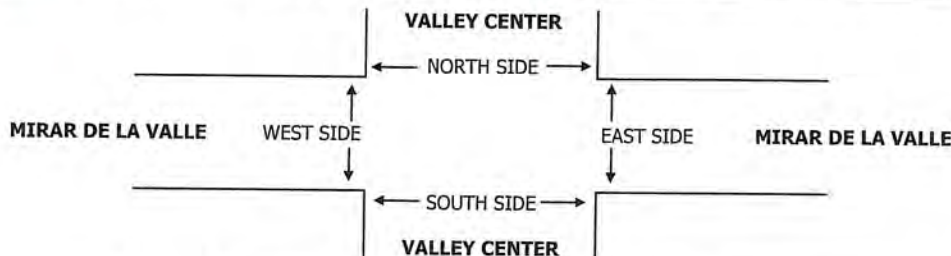
VALLEY CENTER
VALLEY CENTER
MIRAR DE LA VALLE

PROJECT #: PTD15-0327-01
LOCATION #: 6
CONTROL: 1-WAY STOP (EB)

NOTES:



	NORTHBOUND VALLEY CENTER			SOUTHBOUND VALLEY CENTER			EASTBOUND MIRAR DE LA VALLE			WESTBOUND MIRAR DE LA VALLE			TOTAL	U-TURNS				
	NL 1	NT 2	NR X	SL X	ST 2	SR 0	EL 1	ET X	ER 1	WL X	WT X	WR X		NB X	SB X	EB X	WB X	TTL
7:00 AM	7	147			204	6	5		11				380					0
7:15 AM	6	154			222	5	13		26				426					0
7:30 AM	10	156			275	12	5		17				475					0
7:45 AM	9	167			222	3	6		7				414					0
8:00 AM	3	161			226	4	17		11				422					0
8:15 AM	8	133			270	9	4		13				437					0
8:30 AM	5	148			218	5	5		5				386					0
8:45 AM	3	130			169	1	6		8				317					0
VOLUMES	51	1,196	0	0	1,806	45	61	0	98	0	0	0	3,257	0	0	0	0	0
APPROACH %	4%	96%	0%	0%	98%	2%	38%	0%	62%	0%	0%	0%						
APP/DEPART	1,247		1,257	1,851		1,904	159		0	0		96	0					
BEGIN PEAK HR	7:30 AM												0					
VOLUMES	30	617	0	0	993	28	32	0	48	0	0	0	1,748					
APPROACH %	5%	95%	0%	0%	97%	3%	40%	0%	60%	0%	0%	0%						
PEAK HR FACTOR		0.919			0.889			0.714			0.000		0.920					
APP/DEPART	647		649	1,021		1,041	80		0	0		58	0					
4:00 PM	17	246			203	3	7		16				492					0
4:15 PM	7	287			199	6	8		7				514					0
4:30 PM	12	271			212	7	6		14				522					0
4:45 PM	8	265			209	9	7		5				503					0
5:00 PM	12	277			220	6	4		9				528					0
5:15 PM	18	254			224	3	5		4				508					0
5:30 PM	21	285			165	5	0		9				485					0
5:45 PM	11	271			155	3	4		13				457					0
VOLUMES	106	2,156	0	0	1,587	42	41	0	77	0	0	0	4,009	0	0	0	0	0
APPROACH %	5%	95%	0%	0%	97%	3%	35%	0%	65%	0%	0%	0%						
APP/DEPART	2,262		2,197	1,629		1,664	118		0	0		148	0					
BEGIN PEAK HR	4:15 PM																	
VOLUMES	39	1,100	0	0	840	28	25	0	35	0	0	0	2,067					
APPROACH %	3%	97%	0%	0%	97%	3%	42%	0%	58%	0%	0%	0%						
PEAK HR FACTOR		0.969			0.960			0.750			0.000		0.979					
APP/DEPART	1,139		1,125	868		875	60		0	0		67	0					



		PEDESTRIAN CROSSINGS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM	7:00 AM					0
	7:15 AM					0
	7:30 AM					0
	7:45 AM					0
	8:00 AM					0
	8:15 AM					0
	8:30 AM					0
	8:45 AM					0
	TOTAL	0	0	0	0	0
PM	4:00 PM					0
	4:15 PM					0
	4:30 PM					0
	4:45 PM					0
	5:00 PM					0
	5:15 PM					0
	5:30 PM					0
	5:45 PM					0
	TOTAL	0	0	0	0	0

		PEDESTRIAN ACTIVATIONS				
		N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
AM	7:00 AM					0
	7:15 AM					0
	7:30 AM					0
	7:45 AM					0
	8:00 AM					0
	8:15 AM					0
	8:30 AM					0
	8:45 AM					0
	TOTAL	0	0	0	0	0
PM	4:00 PM					0
	4:15 PM					0
	4:30 PM					0
	4:45 PM					0
	5:00 PM					0
	5:15 PM					0
	5:30 PM					0
	5:45 PM					0
	TOTAL	0	0	0	0	0

		BICYCLE CROSSINGS				
		NS	SS	ES	WS	TOTAL
AM	7:00 AM					0
	7:15 AM					0
	7:30 AM					0
	7:45 AM					0
	8:00 AM					0
	8:15 AM					0
	8:30 AM					0
	8:45 AM					0
	TOTAL	0	0	0	0	0
PM	4:00 PM					0
	4:15 PM					0
	4:30 PM					0
	4:45 PM					0
	5:00 PM					0
	5:15 PM					0
	5:30 PM					0
	5:45 PM					0
	TOTAL	0	0	0	0	0

		BICYCLE ACTIVATIONS				
		NS	SS	ES	WS	TOTAL
AM	7:00 AM					0
	7:15 AM					0
	7:30 AM					0
	7:45 AM					0
	8:00 AM					0
	8:15 AM					0
	8:30 AM					0
	8:45 AM					0
	TOTAL	0	0	0	0	0
PM	4:00 PM					0
	4:15 PM					0
	4:30 PM					0
	4:45 PM					0
	5:00 PM					0
	5:15 PM					0
	5:30 PM					0
	5:45 PM					0
	TOTAL	0	0	0	0	0

INTERSECTION TURNING MOVEMENT COUNTS

PREPARED BY: PACIFIC TECHNICAL DATA

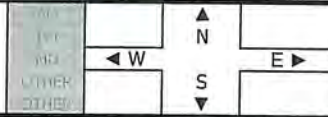
DATE:
3/24/15
TUESDAY

LOCATION:
NORTH & SOUTH:
EAST & WEST:

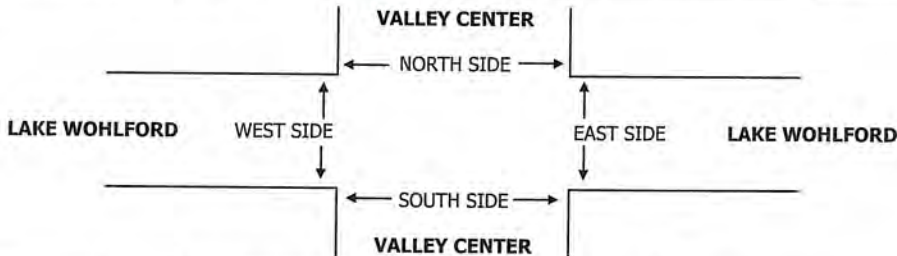
VALLEY CENTER
VALLEY CENTER
LAKE WOHLFORD

PROJECT #: PTD13-0329-01
LOCATION #: 7
CONTROL: SIGNAL

NOTES:



	NORTHBOUND VALLEY CENTER			SOUTHBOUND VALLEY CENTER			EASTBOUND LAKE WOHLFORD			WESTBOUND LAKE WOHLFORD			TOTAL	U-TURNS				
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR		NB	SB	EB	WB	TTL
LANES:	X	2	1	1	1	X	X	X	X	1	X	1		X	X	X	X	
7:00 AM		118	26	2	238					55		3	442					0
7:15 AM		121	21	3	252					50		3	450					0
7:30 AM		148	18	3	269					68		4	510					0
7:45 AM		139	26	2	255					70		2	494					0
8:00 AM		142	33	4	241					54		1	475					0
8:15 AM		138	31	2	256					77		4	508					0
8:30 AM		131	27	6	218					84		2	468					0
8:45 AM		121	20	2	202					60		1	406					0
VOLUMES	0	1,058	202	24	1,931	0	0	0	0	518	0	20	3,753	0	0	0	0	0
APPROACH %	0%	84%	16%	1%	99%	0%	0%	0%	0%	96%	0%	4%						
APP/DEPART	1,260	/	1,078	1,955	/	2,449	0	/	226	538	/	0	0					
BEGIN PEAK HR	7:30 AM																	
VOLUMES	0	567	108	11	1,021	0	0	0	0	269	0	11	1,987					
APPROACH %	0%	84%	16%	1%	99%	0%	0%	0%	0%	96%	0%	4%						
PEAK HR FACTOR		0.964			0.949			0.000			0.864		0.974					
APP/DEPART	675	/	578	1,032	/	1,290	0	/	119	280	/	0	0					
4:00 PM		268	65	9	181					42		9	574					0
4:15 PM		284	84	5	200					35		12	620					0
4:30 PM		251	81	4	202					33		18	589					0
4:45 PM		268	95	6	195					40		15	619					0
5:00 PM		278	77	8	199					44		11	617					0
5:15 PM		288	65	12	184					51		6	606					0
5:30 PM		291	54	11	161					40		9	566					0
5:45 PM		277	55	10	155					38		12	547					0
VOLUMES	0	2,205	576	65	1,477	0	0	0	0	323	0	92	4,738	0	0	0	0	0
APPROACH %	0%	79%	21%	4%	96%	0%	0%	0%	0%	78%	0%	22%						
APP/DEPART	2,781	/	2,297	1,542	/	1,800	0	/	641	415	/	0	0					
BEGIN PEAK HR	4:15 PM																	
VOLUMES	0	1,081	337	23	796	0	0	0	0	152	0	56	2,445					
APPROACH %	0%	76%	24%	3%	97%	0%	0%	0%	0%	73%	0%	27%						
PEAK HR FACTOR		0.963			0.989			0.000			0.945		0.986					
APP/DEPART	1,418	/	1,137	819	/	948	0	/	360	208	/	0	0					



AM	7:00 AM	
	7:15 AM	
	7:30 AM	
	7:45 AM	
	8:00 AM	
	8:15 AM	
	8:30 AM	
	8:45 AM	
PM	4:00 PM	
	4:15 PM	
	4:30 PM	
	4:45 PM	
	5:00 PM	
	5:15 PM	
	5:30 PM	
	5:45 PM	
TOTAL		

PEDESTRIAN CROSSINGS				
N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0

PEDESTRIAN ACTIVATIONS				
N SIDE	S SIDE	E SIDE	W SIDE	TOTAL
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0

BICYCLE CROSSINGS				
NS	SS	ES	WS	TOTAL
				0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0
				0
				0
				0
				0
				0
				0
				0
0	0	0	0	0

County of San Diego Level of Service Worksheets

**TABLE 1
AVERAGE DAILY VEHICLE TRIPS***

CIRCULATION ELEMENT ROADS		LEVELS OF SERVICE				
Road Classification	# of Travel Lanes	A	B	C	D	E
Expressway (6.1)	6	<36,000	<54,000	<70,000	<86,000	<108,000
Prime Arterial (6.2)	6	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road (4.1A)	4	<14,800	<24,700	<29,600	<33,400	<37,000
Major Road w/ Intermittent Turn Lanes (4.1B)	4	<13,700	<22,800	<27,400	<30,800	<34,200
Collector	4	<13,700	<22,800	<27,400	<30,800	<34,200
Boulevard w/ Raised Median (4.2A)	4	<18,000	<21,000	<24,000	<27,000	<30,000
Boulevard w/ Intermittent Turn Lanes (4.2B)	4	<16,800	<19,600	<22,500	<25,000	<28,000
Town Collector	2	<3,000	<6,000	<9,500	<13,500	<19,000
Community Collector	w/ Raised Median (2.1A)	<10,000	<11,700	<13,400	<15,000	<19,000
	w/ Continuous Left Turn Lane (2.1B)	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.1C)	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.1D)	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.1E)	<1,900	<4,100	<7,100	<10,900	<16,200
Light Collector	w/ Raised Median (2.2A)	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Continuous Left Turn Lane (2.2B)	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.2C)	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.2D)	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.2E)	<1,900	<4,100	<7,100	<10,900	<16,200
		<1,900	<4,100	<7,100	<10,900	<16,200
	w/ Reduced Shoulder (2.2F)	<5,800	<6,800	<7,800	<8,700	<9,700
Rural Collector	2	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Light Collector	2	<1,900	<4,100	<7,100	<10,900	<16,200
Rural Mountain	2	<1,900	<4,100	<7,100	<10,900	<16,200
Recreational Parkway	2	<1,900	<4,100	<7,100	<10,900	<16,200
Minor Collector	w/ Raised Median (2.3A)	<3,000	<6,000	<7,000	<8,000	<9,000
	w/ Intermittent Turn Lane (2.3B)	<3,000	<6,000	<7,000	<8,000	<9,000
	No Median (2.3C)	<1,900	<4,100	<6,000	<7,000	<8,000
NON-CIRCULATION ELEMENT ROADS**		LEVELS OF SERVICE				
Residential Collector	2	-	-	<4,500	-	-
Rural Residential Collector***	2	-	-	<4,500	-	-
Residential Road	2	-	-	<1,500	-	-
Rural Residential Road***	2	-	-	<1,500	-	-
Residential Cul-de-Sac or Loop Road	2	-	-	<200	-	-

* The values shown are subject to adjustment based on the geometry of the roadway, side frictions, and other relevant factors as determined by the Director, Department of Public Works.

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

*** Rural Residential Collectors and Rural Residential Roads are intended to serve areas with lot sizes of 2 acres or more which do not have a demand for on-street parking. On-street parking is not assured for these cross sections. Additional right-of-way is needed if on-street parking is in paved area.

**** See Tables 2A and 2B for roadway surfacing and right-of-way widths.

Excerpts from the County's Significance Thresholds

COUNTY OF SAN DIEGO
GUIDELINES FOR DETERMINING SIGNIFICANCE
AND
REPORT FORMAT AND CONTENT REQUIREMENTS
TRANSPORTATION AND TRAFFIC



LAND USE AND ENVIRONMENT GROUP

Department of Planning and Land Use
Department of Public Works

Second Revision
June 30, 2009

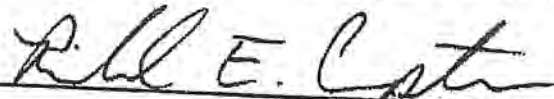
Second Modification
August 24, 2011

APPROVAL

I hereby certify that these **Guidelines for Determining Significance and Report Format and Content Requirements for Transportation and Traffic** are a part of the County of San Diego, Land Use and Environment Group's Guidelines for Determining Significance and Technical Report Format and Content Requirements and were considered by the Director of Planning and Land Use, in coordination with the Director of Public Works on the 24th day of August, 2011.



ERIC GIBSON
Director of Planning and Land Use



RICHARD E. CROMPTON
Director of Public Works

I hereby certify that these **Guidelines for Determining Significance and Report Format and Content Requirements for Transportation and Traffic** are a part of the County of San Diego, Land Use and Environment Group's Guidelines for Determining Significance and Technical Report Format and Content Requirements and have hereby been approved by the Deputy Chief Administrative Officer (DCAO) of the Land Use and Environment Group on the 24th day of August, 2011. The Director of Planning and Land Use is authorized to approve revisions to these Guidelines for Determining Significance and Report Format and Content Requirements for Transportation and Traffic, except any revisions to Section 4.0 of the Guidelines for Determining Significance for Transportation and Traffic must be approved by the Deputy CAO.

Second Modification
August 24, 2011

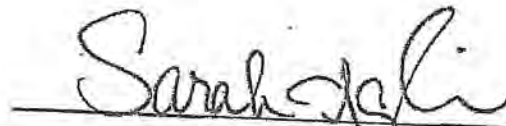
Approved: August 24, 2011

First Modification
February 19, 2010

Second Revision
June 30, 2009

First Revision
December 5, 2007

Approved
September 26, 2006



SARAH AGHASSI
Deputy CAO

EXPLANATION

These Guidelines for Determining Significance for Transportation and Traffic and information presented herein shall be used by County staff in their review of discretionary projects and environmental documents pursuant to the California Environmental Quality Act (CEQA). These Guidelines present a range of quantitative, qualitative, and performance levels for particular environmental effects. Normally, (in the absence of substantial evidence to the contrary), non-compliance with a particular standard stated in these Guidelines will usually mean the project will result in a significant effect, whereas compliance will normally mean the effect will be determined to be "less than significant." Section 15064(b) of the State CEQA Guidelines states:

"The determination whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on factual and scientific data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

These Guidelines assist in providing a consistent, objective and predictable evaluation of significant effects. These Guidelines are not binding on any decision-maker and should not be substituted for the use of independent judgment to determine significance or the evaluation of evidence in the record. The County reserves the right to request further, project specific, information in its evaluation of a project's environmental effects and to modify these Guidelines in the event a scientific discovery or factual data alters the common application of a Guideline. In addition, evaluations to verify the applicability of the significance guidelines for individual project conditions may be necessary. Additional evaluations may include analysis of vehicle headways, speeds, average gaps, queues, delay, or other factors.

4.0 GUIDELINES FOR DETERMINING SIGNIFICANCE

The following significance guidelines should guide the evaluation of whether a significant impact to transportation and traffic will occur as a result of project implementation. A project will generally be considered to have a significant effect if it proposes any of the following, absent specific evidence to the contrary. Conversely, if a project does not propose any of the following, it will generally not be considered to have a significant effect on transportation and traffic, absent specific evidence of such an effect.

This section provides guidance for evaluating adverse environmental effects a project may have in relation to traffic and transportation. The guidelines for determining significance are organized into eight categories: road segments, intersections, two-lane highways, ramps, congestion management plan, hazards due to an existing transportation design feature, hazards to pedestrians or bicyclists, and public transportation.

Land Development Projects

Land Development projects are projects that may result in an increase in the density or intensity or use on a parcel or parcels of land. These projects include, but are not limited to subdivisions, use permits, rezones and general plan amendments. Land development projects, typically, require discretionary approval. Due to the increased intensity of uses, land development projects generate additional traffic onto the County's road network and can contribute towards traffic congestion. A traffic impact study is often required to fully assess potential traffic impacts that may result from implementation of the proposed project.

Road Improvement Projects

Road improvement projects are projects that can affect transportation system operations; including level of service and other performance measures. Projects may consist of increasing road capacity or improving the traffic operations on the County's road network. This section refers to stand alone road improvement projects that are not improvements associated with a proposed development. These projects are typically publicly initiated. Road improvement projects do not generate additional trips but, in some cases, may cause a redistribution of trips on the County's road network. Road improvement projects are typically one or more of the following; road widening, construction of new road, intersection improvements and operational improvements/road maintenance. Additional guidance on how to evaluate Publicly Initiated Road Improvement Projects is included as Attachment B of the Report Format and Content Requirements.

4.1 Road Segments

Pursuant to the County's General Plan Public Facilities Element (PFE Pg. XII-4-18), new development must provide improvements or other measures to mitigate traffic impacts to avoid:

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

The County has created the following guidelines to evaluate likely motor vehicle 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. The levels in Table 1 are based upon average operating conditions on County roadways. It should be noted that these levels 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.

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 and Harmony Grove Village plans as specified in the PFE, Implementation Measure 1.1.2.***

Off-site Circulation Element Roads

PFE, Transportation, Policy 1.1 also addresses offsite Circulation Element roads. It states, "new development shall provide off-site improvements designed to contribute to the overall achievement of a Level of Service D on Circulation Element Roads". Implementation Measure 1.1.3 addresses projects that would significantly impact

congestion on roads at LOS E or F. It states that 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 attain a LOS to D or better or appropriate mitigation is provided. The following significance guidelines define a 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 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 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 1, or*
- *The additional or redistributed ADT generated by the proposed project will cause a residential street to exceed its design capacity,*

Table 1
Measures of Significant Project Impacts to Congestion on Circulation Element Road Segments:
Allowable Increases on Congested Road Segments

Level of service	Two-lane road	Four-lane road	Six-lane road
LOSE	200 ADT	400 ADT	600 ADT
LOSF	100 ADT	200 ADT	300 ADT

Notes:

1. 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 additional trips must mitigate a share of the cumulative impacts.
2. 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.

LOS E

The first significance criterion listed in Table 1 addresses roadways presently operating at LOS E. Based on these criteria, an impact from new development on an LOS E road would be reached when the increase in average daily trips (ADT) on a two-lane road exceeds 200 ADT. Using SANDAG's "Brief Guide for Vehicular Traffic Generation Rates for the San Diego Region" for most discretionary projects this would generate less than 25 peak hour trips. On average, during peak hour conditions, this would be only one additional car every 2.4 minutes.

Therefore, the addition of 200 ADT, in most cases, would result in changes to traffic flow that would not be noticeable to the average driver and therefore would not constitute a significant impact on the roadway. Significance criteria were also established for 4-lane and 6-lane roads operating at LOS E and are based upon the above 24 hour ADT significance criterion established for two-lane roads. The two-lane road criterion was doubled to determine impacts to four-lane roads and tripled to determine impacts to six-lane roads. This was considered to be conservative since the 24 hour per lane road capacity for a 4-lane road is more than double that of a two-lane road and the per lane capacity of a six-lane road is more than triple that of the two-lane road. For LOS E roads, the additional significance criteria are 400 ADT for a 4-lane road and 600 ADT for a 6-lane road.

Similar to the criteria for two-lane roads, 400 ADT for a 4-lane road and 600 ADT for a 6-lane road criteria would generate less than 25 per lane peak hour trips for most discretionary projects. On average, during peak hour conditions, this would be only one additional car per lane every 2.4 minutes. The addition of 200 ADT per lane (400 ADT for a 4 lane road or 600 ADT for a 6 lane road), in most cases, would result in changes to traffic flow that would not be noticeable to the average driver and therefore would not constitute a significant impact on the roadway. Road capacities based upon level of service for County roads can be found in the County's Public Road Standards, available online at <http://www.sdcounty.ca.gov/dpw/land/rtelocs.html>.

LOS F

The second significance criteria listed in Table 1 addresses roadways presently operating at LOS F. Under LOS F congested conditions, small changes and disruptions to the traffic flow on County Circulation Element Roads can have a greater effect on traffic operations when compared to other LOS conditions. In order to better account for potential effects of increased traffic on LOS F roads more stringent significance criteria was established when compared to that for LOS E. Based on this guidance, an impact from new development on an LOS F road would be reached when the increase in average daily trips (ADT) on a two-lane road exceeds 100. Again, using SANDAG's "Brief Guide for Vehicular Traffic Generation Rates for the San Diego Region" for most discretionary projects this would generate less than 12.5 peak hour trips. On average, during peak hour conditions, this would be only one additional car every 4.8 minutes.

The addition of 100 ADT, in most cases, would not be noticeable to the average driver and therefore would not constitute a significant impact on the roadway. The same approach used to determine significance criteria for 4-lane and 6-lane roads operating at LOS E was used to determine appropriate significance criteria for four-lane and six-lane roads operating at LOS F. Based on this approach, the significance criteria for a four-lane road (200 ADT) and for a six-lane road (300 ADT) would generate less than 12.5 per lane peak hour trips for most discretionary projects. On average, during peak hour conditions, this would be only one additional car per lane every 4.8 minutes. The addition of 100 per lane ADT (200 ADT for a 4-lane road and 300 ADT for a 6-lane road) would, in most cases, not be noticeable to the average driver and therefore would not constitute a significant impact on the roadway.

In summary, under extremely congested LOS F conditions, small changes and disruptions to the traffic flow can significantly affect traffic operations and additional project traffic can increase the likelihood or frequency of these events. Therefore, the LOS F ADT significance criteria was set at 100 ADT (50% of the LOS E criterion) to provide a higher level of assurance that the traffic allowed under the criterion would not significantly impact traffic operation on the road segment.

Non-Circulation Element Residential Streets

Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots and not to carry through traffic, however, for projects that will substantially increase traffic volumes on residential streets, a comparison of the traffic volumes on the residential streets with the recommended design capacity must be provided. Recommended design capacities for residential non-Circulation Element streets are provided in the San Diego County Public and Private Road Standards. Traffic volume that exceeds the design capacity on residential streets may impact residences and should be analyzed on a case-by-case basis.

4.2 Intersections

This section provides guidance for evaluating adverse environmental effects a project may have on signalized and unsignalized intersections. Table 2 summarizes significant project impacts for signalized and unsignalized intersections.

Table 2
Measures of Significant Project Impacts to Congestion on Intersections:
Allowable Increases on Congested Intersections

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

Notes:

1. A critical movement is an intersection movement (right turn, left turn, through-movement) that experiences excessive queues, which typically operate at LOS F. Also if a project adds significant volume to a minor roadway approach, a gap study should be provided that details the headways between vehicles on the major roadway.
2. 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 is responsible for mitigating its share of the cumulative impact.
3. The County may also determine impacts have occurred on roads even when a project's direct or cumulative impacts do not trigger an unacceptable level of service, when such traffic uses a significant amount of remaining road capacity.
4. For determining significance at signalized intersections with LOS F conditions, the analysis must evaluate both the delay and the number of trips on a critical movement, exceedance of either criteria result in a significant impact.

4.2.1 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 signalized intersection:

- *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.*
- *Based upon an evaluation of existing accident rates, the signal priority list, intersection geometrics, proximity of adjacent driveways, sight distance or other factors, the project would significantly impact the operations of the intersection.*

LOS E

The significance criterion for signalized intersections identified in Table 2 allows an increase in the overall delay at an intersection operating at LOS E of two seconds. This is consistent with the capacity limit contained in the SANDAG's CMP and guidelines established by the City of San Diego. A delay of two seconds is a small fraction of the typical cycle length for a signalized intersection that ranges between 60 and 120 seconds. The likelihood of increased queues forming due to the additional two seconds of delay is low. Therefore, an increased wait time of two seconds, on average, would result in changes to traffic flow that would not be noticeable to the average driver. Therefore the significance guideline for intersections operating at LOS E is 2 seconds.

LOS F

The primary significance criterion for signalized intersections operating at LOS F conditions was based upon increased delay at the intersection. Under LOS F congested conditions, small changes and disruptions to the traffic flow to signalized intersections can have a greater effect on overall intersection operations when compared to other LOS conditions. In order to better account for potential effects of increased traffic at signalized intersections operating at LOS F, a more stringent guideline was established when compared to signalized intersection operating at LOS E. A significance guideline of an increased delay of 1 second was established for signalized intersections operating at LOS F. An increase in the overall delay at an intersection of one second, on average, would result in changes to traffic flow that would not be noticeable to the average driver. Therefore the significance guideline for intersections operating at LOS F is 1 second.

Signalized intersections operating at LOS F also have the potential for substantial queuing at specific turning movements that may detrimentally effect overall intersection and/or road segment operations. Thus, an increase of peak hour trips to a critical move was also established as a secondary significance criterion for signalized intersections. A critical movement would be a movement or a lane at an intersection that is experiencing queuing or substantial delay and is affecting the overall operation of the

intersection. The increase in peak hour trips to a critical move is a measurement of how many cars can be added to an existing queue. The addition of more than five trips (peak hour) per critical movement will normally be considered a significant impact. This significance criterion was selected because the five or less additional trips spread out over the peak hour would not significantly increase the length of an existing queue and would not be noticeable to the average driver (5 peak hour trips equals one trip every 12 minutes or 720 seconds).

For LOS F intersections, the 5 peak hour trips to a critical movement would not be noticeable to the average driver since the one additional trip during the 12 minute interval on average would clear the traffic signal cycles well within the 12 minute period. It should also be noted that if the 5 additional peak hour trips arrived at the same time these trips would also clear the traffic cycle and existing queue lengths would be re-established.

4.2.2 Unsignalized

Traffic volume increases from public or private projects that result in one or more of the following criteria will have a significant impact to an unsignalized intersection as listed in Table 2 and described as text below:

- *The additional or redistributed ADT generated by the proposed project will add 21 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 21 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 6 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 6 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, the project would significantly impact the operations of the intersection.*

The operating parameters and conditions for unsignalized intersections differ dramatically from those of 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. As noted in Table 2 on page 15, significance criteria for unsignalized intersections are based upon a minimum number of trips added to a critical movement at an unsignalized intersection.

LOS E

The significance guidelines for unsignalized intersections identify a minimum number of trips added to a critical movement at an unsignalized intersection. Since the operations of unsignalized intersections under congested conditions are heavily influenced by traffic volume increases on critical moves, the significance guidelines for unsignalized intersections were based upon the number of trips added to a critical movement. This guideline directly relates to the number of vehicles that can be added to an existing queue that forms at the intersection. A significance criteria of (21) twenty-one or more trips (peak hour) per critical movement was used for LOS E conditions. Although delays drivers experience under LOS E condition may be noticeable, they are not yet considered unacceptable. Twenty trips spread out over the peak hour would not likely cause the intersection delay or existing queue lengths to become unacceptable. The twenty trips (peak hour) would not be noticeable to the average driver.

The operations of unsignalized intersections under congested conditions are heavily influenced by traffic volume increases on critical moves. Therefore, the significance guidelines for unsignalized intersections are based upon the number of peak hour trips added to a critical movement at that intersection. This guideline examines the number of vehicles that may be added to an existing queue that forms at the intersection by the additional traffic generated by a project. In LOS E situations, the delays that drivers experience are noticeable, but are not considered excessive. A peak hour increase of twenty trips to the critical movement of an unsignalized intersection would be, on average, one additional car every 3.0 minutes or 180 seconds. Assuming the average wait time for a vehicle in the critical movement queue is less than 3.0 minutes, which is typical for LOS E condition, this would not be noticeable to the average driver and would not be considered a significant impact.

LOS F

For LOS F conditions, a significance level of 6 or more trips (peak hour) per critical movement was used. Five trips or less spread out over the peak hour would not significantly increase the length of an existing queue and would not be noticeable to the average driver. For example, 5 trips spread out over an hour would be one car every 12 minutes. This typically exceeds the average wait time in the queue and would not be noticeable to the average driver.

4.3 Two-Lane Highways

This section provides level of service impact guidelines for State highways and County arterials operating as two-lane highways.

Several designated County Circulation Element Roads are State highways that are managed and maintained by Caltrans. These highways include State Route 67, State Route 76, State Route 78, State Route 79 and State Route 94 and within the unincorporated area of the County most of these routes operate as two-lane highways. Caltrans has prepared a "Guide for the Preparation of Traffic Impact Studies" that should also be referenced when evaluating traffic impacts to the above Circulation Element Roads that are under the jurisdiction of Caltrans. Also, Caltrans District 11 local office should be consulted early to adequately scope the traffic study and ensure potential local district issues in the traffic impact study are addressed. While the "Guide for the Preparation of Traffic Impact Studies" provides guidance for scoping a traffic study to assess impacts on Caltrans facilities, it does not provide specific guidelines for determining when a significant traffic impact occurs; hence, the development of the following significance guidelines for two-lane highways.

In addition to the State Routes identified above, several County Circulation Element Roads, although designated as arterials, operate as two-lane highways. These include roadways that have passing opportunities for 40% or more along the length of the roadway and/or have few/limited access points and intersections along the length of the roadway. Examples would include sections of Old Highway 80, Old Highway 395 and Del Dios Highway. The Highway Capacity Manual (HCM) includes analysis criteria for assessment of LOS for two-lane highways. Section 2.2 of the County of San Diego's "Transportation and Traffic Report Format and Content Requirements" states that "The Director of Public Works may, based upon a review of the operational characteristics of the roadway, designate that a HCM analysis be used to determine the LOS for a two-lane County arterial in lieu of the LOS table provided in the County of San Diego Public Road Standards." Level of service tables for two-lane highways have also been established by the County of Riverside and the County of Sacramento.

4.3.1 Signalized Intersection Spacing Over One Mile

This section provides LOS impact significance levels for State highways and County arterials operating as two-lane highways with signalized intersection spacing over one mile. County arterials were addressed in section 4.1 and Table 1, however, those that operate as two-lane highways would have higher project contribution amounts and different LOS E and LOS F levels and are treated in this section.

Table 3
Measures of Significant Project Impacts to Congestion: Allowable Increases
on Two-lane Highways with Signalized Intersection Spacing Over One Mile

Level of Service	LOS Criteria	Impact Significance Level
LOS E	> 16,200 ADT	>325 ADT
LOS F	> 22,900 ADT	>225 ADT
Note: Where detailed data are available, the Director of Public Works may also accept a detailed level of service analysis based upon the two-lane highway analysis procedures provided in the Chapter 20 Highway Capacity Manual.		

Two-lane highways with intersection spacing over one mile have minimal side friction and conform to the HCM assumptions for two-lane highways. Level of service criteria for LOS E and LOS F are provided in Table 3 based upon criteria established with the Counties of Riverside and Sacramento and concurred upon by Caltrans-District 11. These criteria are appropriate for use for most projects with the potential to affect two-lane highways, as road conditions for two-lane highways in these Counties are similar to those in the County of San Diego. The ADT based guidelines should be the first applied method of analysis, however, County staff may allow the use of HCM Chapter 20 methodology (average travel speed and/or percent time spent following) to provide a more detailed evaluation and to determine the overall level of service in certain cases, with the approval of the Director of Public Works. Where impacts to State Highways are involved, consultation with Caltrans is recommended.

LOS E

Impact significance levels are provided in Table 3 for two-lane highways with signalized intersection spacing over one mile. The first impact significance level addresses impacts from new development (both direct and cumulative impacts) on an LOS E road. In this scenario a significant impact would be reached when the increase in average daily trips (ADT) on a two-lane road exceeds 325. For most discretionary projects, the 325 ADT level would generate less than 35 peak hour trips. On average, during peak hour conditions, this would be only one additional car every 1.7 minutes. The addition of 325 ADT would, in most cases, not be noticeable to the average driver on a two-lane highway which has higher speeds and reduced side friction compared to a typical arterial. The additional 325 ADT, therefore, would not constitute a significant impact on a two-lane highway operating at LOS E; however, the addition of more than 325 ADT would generally result in a significant impact.

LOS F

The second impact significance guideline concerns roadways presently operating at LOS F (for a 2-lane highway LOS F would not occur until ADT exceeds 22,900 trips per day. Under LOS F congested conditions, small changes and disruptions to the traffic flow on County Circulation Element Roads can have a greater affect on traffic operations when compared to other LOS conditions. In order to better account for potential effects of increased traffic on LOS F roads, a more stringent guideline was established when compared to that for LOS E. The guideline for determining significance from new development (both direct and cumulative impacts) on a LOS F

road would be reached when the increase in average daily trips (ADT) on a two-lane road exceeds 225. For most discretionary projects, the 225 ADT level would generate less than 25 peak hour trips. On average, during peak hour conditions, this would be only one additional car every 2.4 minutes. The addition of 225 ADT would, in most cases, not be noticeable to the average driver on a two-lane highway which has higher speeds and reduced side friction compared to a typical arterial. The addition 225 ADT or less would therefore not constitute a significant impact on a two-lane highway operating at LOS F. However, the addition of more than 225 ADT would be considered a significant impact.

4.3.2 Signalized Intersection Spacing Under One Mile

This section provides level of service impact guidelines for State highway segments and County arterials operating as two-lane highways with signalized intersection spacing under one mile. Typical examples of this type of roadway are those segments of two lane highways that traverse town centers. Similar to the experience of drivers in urban areas with closely spaced intersections, the functionality of two-lane highway conditions with signalized intersections spacing under one mile becomes constrained not due to the segment capacity but the intersection operations. Therefore the assessment of operations of intersections on two-lane highways shall be guided by a Level of Service standard. Level of Service for purposes of this significance guideline is based upon the overall intersection operations – similar to Urban Street analysis in Chapter 15 Highway Capacity Manual. For determining impact significance at the signalized intersection, Table 4 “Measures of Significant Project Impacts to Congestion on Intersections Allowable Increases on Congested Intersections” may be used as summarized below:

Table 4
Measures of Significant Project Impacts to Congestion; Allowable Increases on Two-lane Highways with Signalized Intersection Spacing Under One Mile

Level of Service	Signalized
LOS E	Delay of 2 seconds or less
LOS F	Delay of 1 second, or 5 peak hour trips or less on a critical movement
Notes: 1. A critical movement is an intersection movement (right turn, left turn, through-movement) that experiences excessive queues which typically operate at LOS F. 2. 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 is responsible for mitigating its share of the cumulative impact. 3. 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.	

The second impact significance guideline (Table 4) concerns two-lane highways with signalized intersection spacing less than 1 mile. Two-lane highways with intersection spacing less than 1 mile operate similar to urban streets as identified in the HCM. Per the HCM, level Urban Streets have lower speeds with levels of service most

APPENDIX B

- Existing Conditions Synchro and HCM Worksheets
- Existing Plus Project Conditions Synchro and HCM Worksheets

➤Existing Synchro and HCM Work Sheets

Shady Oak
1: Valley Center Rd & Lilac Rd

Existing
Timing Plan: AM Peak

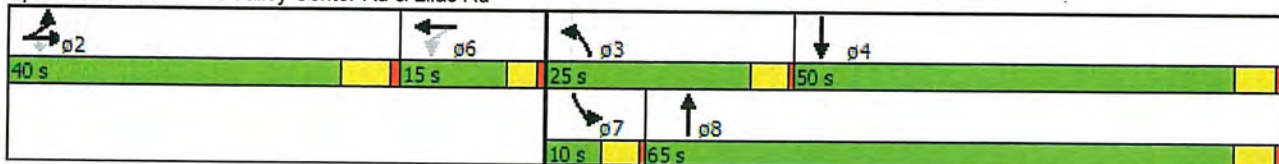
									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	307	0	227	1	0	142	553	3	768
Turn Type	Split	NA	Perm	Perm	NA	Prot	NA	Prot	NA
Protected Phases	2	2			6	3	8	7	4
Permitted Phases			2	6					
Detector Phase	2	2	2	6	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	50.0	10.0	50.0
Total Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	65.0	10.0	50.0
Total Split (%)	30.8%	30.8%	30.8%	11.5%	11.5%	19.2%	50.0%	7.7%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.2	3.2	3.9	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		4.2	4.4	5.3	4.4	5.3
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	16.4	16.4	16.4		9.6	9.2	46.9	5.3	34.0
Actuated g/C Ratio	0.20	0.20	0.20		0.12	0.11	0.58	0.07	0.42
v/c Ratio	0.59	0.48	0.41		0.00	0.40	0.29	0.03	0.77
Control Delay	41.1	17.9	8.9		39.0	42.9	13.5	51.3	26.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	17.9	8.9		39.0	42.9	13.5	51.3	26.7
LOS	D	B	A		D	D	B	D	C
Approach Delay		23.0			39.0		19.5		26.8
Approach LOS		C			D		B		C

Intersection Summary

Cycle Length: 130
 Actuated Cycle Length: 81.2
 Natural Cycle: 130
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 23.7
 Intersection Capacity Utilization 56.8%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 1: Valley Center Rd & Lilac Rd



Shady Oak
1: Valley Center Rd & Lilac Rd

Existing
Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	307	0	227	1	0	0	142	553	0	3	768	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Lane Util. Factor	0.95	0.91	0.95		1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.95	0.85		1.00		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1560	1504		1770		3433	3539		1770	3406	
Flt Permitted	0.95	0.97	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1560	1504		1863		3433	3539		1770	3406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	334	0	247	1	0	0	154	601	0	3	835	280
RTOR Reduction (vph)	0	104	149	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	200	94	34	0	1	0	154	601	0	3	1094	0
Turn Type	Split	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	2	2			6		3	8		7	4	
Permitted Phases			2	6								
Actuated Green, G (s)	16.4	16.4	16.4		3.6		9.2	46.9		0.7	38.4	
Effective Green, g (s)	16.4	16.4	16.4		3.6		9.2	46.9		0.7	38.4	
Actuated g/C Ratio	0.19	0.19	0.19		0.04		0.11	0.54		0.01	0.44	
Clearance Time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Vehicle Extension (s)	2.0	2.0	2.0		2.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	315	292	281		76		360	1896		14	1494	
v/s Ratio Prot	c0.12	0.06					c0.04	0.17		0.00	c0.32	
v/s Ratio Perm			0.02		c0.00							
v/c Ratio	0.63	0.32	0.12		0.01		0.43	0.32		0.21	0.73	
Uniform Delay, d1	32.8	30.7	29.6		40.2		36.7	11.3		43.1	20.3	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	0.2	0.1		0.1		0.3	0.0		2.8	1.6	
Delay (s)	35.9	31.0	29.6		40.3		37.0	11.4		45.9	21.9	
Level of Service	D	C	C		D		D	B		D	C	
Approach Delay (s)		32.2			40.3			16.6			22.0	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			22.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			87.5				Sum of lost time (s)		19.9			
Intersection Capacity Utilization			56.8%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Shady Oak
1: Valley Center Rd & Lilac Rd

Existing
Timing Plan: PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	257	0	205	1	0	241	893	1	731
Turn Type	Split	NA	Perm	Perm	NA	Prot	NA	Prot	NA
Protected Phases	2	2			6	3	8	7	4
Permitted Phases			2	6					
Detector Phase	2	2	2	6	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	50.0	10.0	50.0
Total Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	65.0	10.0	50.0
Total Split (%)	30.8%	30.8%	30.8%	11.5%	11.5%	19.2%	50.0%	7.7%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.2	3.2	3.9	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		4.2	4.4	5.3	4.4	5.3
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	15.2	15.2	15.2		9.6	12.2	48.7	5.2	32.6
Actuated g/C Ratio	0.19	0.19	0.19		0.12	0.15	0.60	0.06	0.40
v/c Ratio	0.55	0.44	0.39		0.00	0.51	0.46	0.01	0.78
Control Delay	42.1	15.9	9.7		41.0	40.7	14.5	54.0	28.2
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	15.9	9.7		41.0	40.7	14.5	54.0	28.2
LOS	D	B	A		D	D	B	D	C
Approach Delay		23.0			41.0		20.1		28.3
Approach LOS		C			D		C		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 81.8

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 23.7

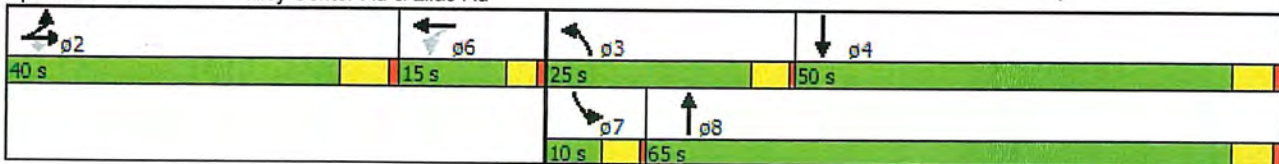
Intersection LOS: C

Intersection Capacity Utilization 56.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Valley Center Rd & Lilac Rd



Shady Oak
1: Valley Center Rd & Lilac Rd

Existing
Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	257	0	205	1	0	0	241	893	3	1	731	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Lane Util. Factor	0.95	0.91	0.95		1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.94	0.85		1.00		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1550	1504		1770		3433	3538		1770	3401	
Flt Permitted	0.95	0.97	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1550	1504		1863		3433	3538		1770	3401	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	279	0	223	1	0	0	262	971	3	1	795	279
RTOR Reduction (vph)	0	106	131	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	173	65	27	0	1	0	262	974	0	1	1050	0
Turn Type	Split	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	2	2			6		3	8		7	4	
Permitted Phases			2	6								
Actuated Green, G (s)	15.2	15.2	15.2		3.5		12.3	48.8		0.6	37.1	
Effective Green, g (s)	15.2	15.2	15.2		3.5		12.3	48.8		0.6	37.1	
Actuated g/C Ratio	0.17	0.17	0.17		0.04		0.14	0.55		0.01	0.42	
Clearance Time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Vehicle Extension (s)	2.0	2.0	2.0		2.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	290	267	259		74		479	1961		12	1433	
v/s Ratio Prot	c0.10	0.04					c0.08	0.28		0.00	c0.31	
v/s Ratio Perm			0.02		c0.00							
v/c Ratio	0.60	0.24	0.11		0.01		0.55	0.50		0.08	0.73	
Uniform Delay, d1	33.6	31.4	30.7		40.6		35.3	12.0		43.4	21.3	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.2	0.1		0.1		0.7	0.1		1.1	1.7	
Delay (s)	35.8	31.6	30.7		40.6		35.9	12.1		44.5	23.0	
Level of Service	D	C	C		D		D	B		D	C	
Approach Delay (s)		32.8			40.6			17.2			23.0	
Approach LOS		C			D			B			C	

Intersection Summary

HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	19.9
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Shady Oak
2: Valley Center Rd & Mirar De Valle

Existing
Timing Plan: AM Peak

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (veh/h)	32	48	30	617	993	28	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	35	52	33	671	1079	30	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				TWLT	None		
Median storage veh)				2			
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1495	555	1110				
vC1, stage 1 conf vol	1095						
vC2, stage 2 conf vol	401						
vCu, unblocked vol	1495	555	1110				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3	2.2				
p0 queue free %	87	89	95				
cM capacity (veh/h)	262	475	625				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	35	52	33	335	335	720	390
Volume Left	35	0	33	0	0	0	0
Volume Right	0	52	0	0	0	0	30
cSH	262	475	625	1700	1700	1700	1700
Volume to Capacity	0.13	0.11	0.05	0.20	0.20	0.42	0.23
Queue Length 95th (ft)	11	9	4	0	0	0	0
Control Delay (s)	20.9	13.5	11.1	0.0	0.0	0.0	0.0
Lane LOS	C	B	B				
Approach Delay (s)	16.4		0.5			0.0	
Approach LOS	C						
Intersection Summary							
Average Delay			0.9				
Intersection Capacity Utilization			38.3%		ICU Level of Service		A
Analysis Period (min)			15				

Shady Oak
2: Valley Center Rd & Mirar De Valle

Existing
Timing Plan: PM Peak



Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (veh/h)	25	35	39	1100	840	28	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	27	38	42	1196	913	30	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				TWLT	None		
Median storage (veh)				2			
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1611	472	943				
vC1, stage 1 conf vol	928						
vC2, stage 2 conf vol	683						
vCu, unblocked vol	1611	472	943				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3	2.2				
p0 queue free %	90	93	94				
cM capacity (veh/h)	277	539	723				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	27	38	42	598	598	609	335
Volume Left	27	0	42	0	0	0	0
Volume Right	0	38	0	0	0	0	30
cSH	277	539	723	1700	1700	1700	1700
Volume to Capacity	0.10	0.07	0.06	0.35	0.35	0.36	0.20
Queue Length 95th (ft)	8	6	5	0	0	0	0
Control Delay (s)	19.4	12.2	10.3	0.0	0.0	0.0	0.0
Lane LOS	C	B	B				
Approach Delay (s)	15.2		0.4			0.0	
Approach LOS	C						
Intersection Summary							
Average Delay			0.6				
Intersection Capacity Utilization			40.8%		ICU Level of Service		A
Analysis Period (min)			15				

Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing
Timing Plan: AM Peak

	↙	↖	↑	↗	↘	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙↙	↖	↑↑	↗	↘	↑↑
Volume (vph)	149	119	512	63	72	916
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Detector Phase	6	6	8	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	7.0	4.0	4.0	1.0
Minimum Split (s)	30.0	30.0	100.0	30.0	20.0	100.0
Total Split (s)	30.0	30.0	100.0	30.0	20.0	120.0
Total Split (%)	20.0%	20.0%	66.7%	20.0%	13.3%	80.0%
Yellow Time (s)	4.3	4.3	4.3	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min	None	None	Min
Act Effct Green (s)	9.1	9.1	16.0	33.9	7.0	22.3
Actuated g/C Ratio	0.21	0.21	0.37	0.79	0.16	0.52
v/c Ratio	0.22	0.30	0.42	0.05	0.27	0.54
Control Delay	15.7	5.8	14.1	1.1	22.9	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	5.8	14.1	1.1	22.9	8.8
LOS	B	A	B	A	C	A
Approach Delay	11.3		12.7			9.8
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 43.1

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 10.9

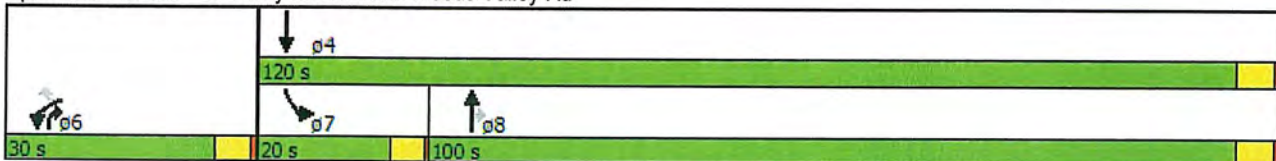
Intersection LOS: B

Intersection Capacity Utilization 38.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Valley Center Rd & Woods Valley Rd



Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing
Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	LT	LT	TH	TH	TH	TH
Volume (vph)	149	119	512	63	72	916
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	162	129	557	68	78	996
RTOR Reduction (vph)	0	102	0	29	0	0
Lane Group Flow (vph)	162	27	557	39	78	996
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Actuated Green, G (s)	9.1	9.1	16.0	25.1	4.0	24.4
Effective Green, g (s)	9.1	9.1	16.0	25.1	4.0	24.4
Actuated g/C Ratio	0.21	0.21	0.36	0.57	0.09	0.55
Clearance Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	708	326	1283	1091	160	1958
v/s Ratio Prot	c0.05		0.16	0.01	0.04	c0.28
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.23	0.08	0.43	0.04	0.49	0.51
Uniform Delay, d1	14.6	14.1	10.6	4.2	19.1	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.1	0.0	0.9	0.1
Delay (s)	14.6	14.2	10.7	4.2	19.9	6.2
Level of Service	B	B	B	A	B	A
Approach Delay (s)	14.4		10.0			7.2
Approach LOS	B		B			A

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing
Timing Plan: PM Peak

	↖	↗	↑	↘	↙	↓
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖↖	↗	↑↑	↘	↙	↑↑
Volume (vph)	84	90	983	150	111	733
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Detector Phase	6	6	8	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	7.0	4.0	4.0	7.0
Minimum Split (s)	30.0	30.0	100.0	30.0	20.0	100.0
Total Split (s)	30.0	30.0	100.0	30.0	20.0	120.0
Total Split (%)	20.0%	20.0%	66.7%	20.0%	13.3%	80.0%
Yellow Time (s)	4.3	4.3	4.3	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min	None	None	Min
Act Effct Green (s)	8.7	8.7	26.6	41.1	9.5	40.9
Actuated g/C Ratio	0.14	0.14	0.44	0.67	0.16	0.67
v/c Ratio	0.19	0.32	0.69	0.15	0.44	0.34
Control Delay	25.8	9.4	17.4	0.9	33.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	9.4	17.4	0.9	33.1	5.2
LOS	C	A	B	A	C	A
Approach Delay	17.3		15.2			8.9
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 61

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 12.9

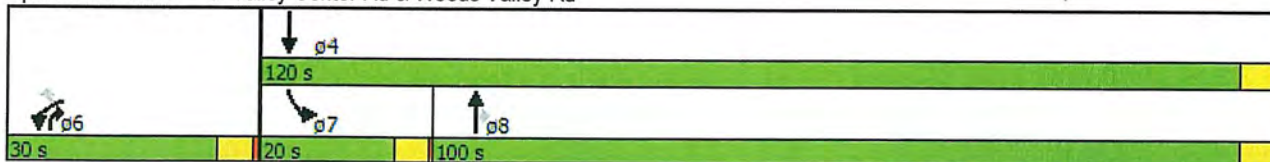
Intersection LOS: B

Intersection Capacity Utilization 49.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Valley Center Rd & Woods Valley Rd



Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing
Timing Plan: PM Peak

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↱	↰↱	↰	↰	↰↱
Volume (vph)	84	90	983	150	111	733
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	98	1068	163	121	797
RTOR Reduction (vph)	0	84	0	66	0	0
Lane Group Flow (vph)	91	14	1068	97	121	797
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Actuated Green, G (s)	8.7	8.7	26.9	35.6	9.5	40.8
Effective Green, g (s)	8.7	8.7	26.9	35.6	9.5	40.8
Actuated g/C Ratio	0.14	0.14	0.45	0.59	0.16	0.68
Clearance Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	496	229	1584	1077	279	2402
v/s Ratio Prot	c0.03		c0.30	0.01	c0.07	0.23
v/s Ratio Perm		0.01		0.05		
v/c Ratio	0.18	0.06	0.67	0.09	0.43	0.33
Uniform Delay, d1	22.6	22.2	13.1	5.3	22.9	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.9	0.0	0.4	0.0
Delay (s)	22.6	22.2	14.0	5.3	23.3	4.0
Level of Service	C	C	B	A	C	A
Approach Delay (s)	22.4		12.9			6.6
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay		11.2		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.53				
Actuated Cycle Length (s)		60.1		Sum of lost time (s)		15.0
Intersection Capacity Utilization		49.2%		ICU Level of Service		A
Analysis Period (min)		15				
c Critical Lane Group						

➤Existing Plus Project Synchro and HCM Work Sheets

Shady Oak
1: Valley Center Rd & Lilac Rd

Existing Plus Project
Timing Plan: AM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	307	0	228	1	0	144	560	3	770
Turn Type	Split	NA	Perm	Perm	NA	Prot	NA	Prot	NA
Protected Phases	2	2			6	3	8	7	4
Permitted Phases			2	6					
Detector Phase	2	2	2	6	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	50.0	10.0	50.0
Total Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	65.0	10.0	50.0
Total Split (%)	30.8%	30.8%	30.8%	11.5%	11.5%	19.2%	50.0%	7.7%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.2	3.2	3.9	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		4.2	4.4	5.3	4.4	5.3
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	16.4	16.4	16.4		9.6	9.2	47.1	5.3	34.2
Actuated g/C Ratio	0.20	0.20	0.20		0.12	0.11	0.58	0.07	0.42
v/c Ratio	0.59	0.48	0.41		0.00	0.40	0.30	0.03	0.77
Control Delay	41.3	17.9	8.9		39.0	43.0	13.5	51.3	26.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	41.3	17.9	8.9		39.0	43.0	13.5	51.3	26.8
LOS	D	B	A		D	D	B	D	C
Approach Delay		23.1			39.0		19.5		26.8
Approach LOS		C			D		B		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 81.4

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 23.7

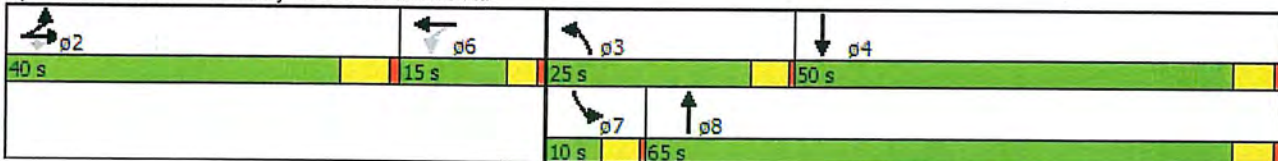
Intersection LOS: C

Intersection Capacity Utilization 56.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Valley Center Rd & Lilac Rd



Shady Oak
1: Valley Center Rd & Lilac Rd

Existing Plus Project
Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	307	0	228	1	0	0	144	560	0	3	770	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Lane Util. Factor	0.95	0.91	0.95		1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.95	0.85		1.00		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1560	1504		1770		3433	3539		1770	3406	
Flt Permitted	0.95	0.97	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1560	1504		1863		3433	3539		1770	3406	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	334	0	248	1	0	0	157	609	0	3	837	280
RTOR Reduction (vph)	0	104	150	0	0	0	0	0	0	0	21	0
Lane Group Flow (vph)	200	94	34	0	1	0	157	609	0	3	1096	0
Turn Type	Split	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	2	2			6		3	8		7	4	
Permitted Phases			2	6								
Actuated Green, G (s)	16.4	16.4	16.4		3.6		9.2	47.2		0.7	38.7	
Effective Green, g (s)	16.4	16.4	16.4		3.6		9.2	47.2		0.7	38.7	
Actuated g/C Ratio	0.19	0.19	0.19		0.04		0.10	0.54		0.01	0.44	
Clearance Time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Vehicle Extension (s)	2.0	2.0	2.0		2.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	313	291	280		76		359	1902		14	1501	
v/s Ratio Prot	c0.12	0.06					c0.05	0.17		0.00	c0.32	
v/s Ratio Perm			0.02		c0.00							
v/c Ratio	0.64	0.32	0.12		0.01		0.44	0.32		0.21	0.73	
Uniform Delay, d1	33.0	30.9	29.7		40.4		36.9	11.3		43.3	20.2	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	0.2	0.1		0.1		0.3	0.0		2.8	1.6	
Delay (s)	36.1	31.1	29.8		40.4		37.2	11.4		46.1	21.8	
Level of Service	D	C	C		D		D	B		D	C	
Approach Delay (s)		32.4			40.4			16.7			21.9	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			22.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			87.8				Sum of lost time (s)		19.9			
Intersection Capacity Utilization			56.9%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Shady Oak
1: Valley Center Rd & Lilac Rd

Existing Plus Project
Timing Plan: PM Peak

									
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	257	0	208	1	0	242	896	1	739
Turn Type	Split	NA	Perm	Perm	NA	Prot	NA	Prot	NA
Protected Phases	2	2			6	3	8	7	4
Permitted Phases			2	6					
Detector Phase	2	2	2	6	6	3	8	7	4
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	6.0	6.0	4.0	6.0	4.0	6.0
Minimum Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	50.0	10.0	50.0
Total Split (s)	40.0	40.0	40.0	15.0	15.0	25.0	65.0	10.0	50.0
Total Split (%)	30.8%	30.8%	30.8%	11.5%	11.5%	19.2%	50.0%	7.7%	38.5%
Yellow Time (s)	5.0	5.0	5.0	3.2	3.2	3.9	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	0.5	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0		4.2	4.4	5.3	4.4	5.3
Lead/Lag						Lead	Lag	Lead	Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	15.4	15.4	15.4		9.6	12.3	49.2	5.2	33.0
Actuated g/C Ratio	0.19	0.19	0.19		0.12	0.15	0.60	0.06	0.40
v/c Ratio	0.56	0.44	0.39		0.00	0.51	0.46	0.01	0.78
Control Delay	42.4	15.9	9.7		41.0	41.0	14.5	55.0	28.3
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	15.9	9.7		41.0	41.0	14.5	55.0	28.3
LOS	D	B	A		D	D	B	D	C
Approach Delay		23.2			41.0		20.2		28.3
Approach LOS		C			D		C		C

Intersection Summary

Cycle Length: 130

Actuated Cycle Length: 82.4

Natural Cycle: 130

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 23.8

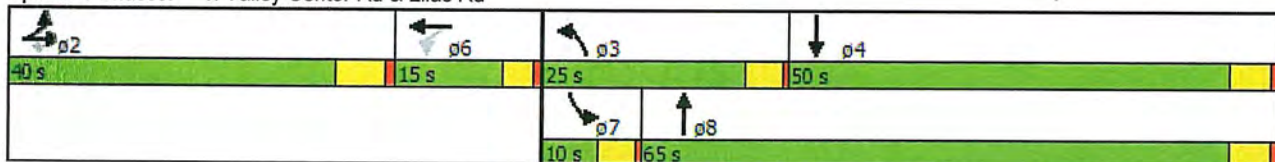
Intersection LOS: C

Intersection Capacity Utilization 57.1%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Valley Center Rd & Lilac Rd



Shady Oak
1: Valley Center Rd & Lilac Rd

Existing Plus Project
Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	257	0	208	1	0	0	242	896	3	1	739	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Lane Util. Factor	0.95	0.91	0.95		1.00		0.97	0.95		1.00	0.95	
Frt	1.00	0.94	0.85		1.00		1.00	1.00		1.00	0.96	
Flt Protected	0.95	0.97	1.00		0.95		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1681	1547	1504		1770		3433	3538		1770	3402	
Flt Permitted	0.95	0.97	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1681	1547	1504		1863		3433	3538		1770	3402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	279	0	226	1	0	0	263	974	3	1	803	279
RTOR Reduction (vph)	0	106	131	0	0	0	0	0	0	0	24	0
Lane Group Flow (vph)	176	65	27	0	1	0	263	977	0	1	1058	0
Turn Type	Split	NA	Perm	Perm	NA		Prot	NA		Prot	NA	
Protected Phases	2	2			6		3	8		7	4	
Permitted Phases			2	6								
Actuated Green, G (s)	15.4	15.4	15.4		3.5		12.3	49.2		0.6	37.5	
Effective Green, g (s)	15.4	15.4	15.4		3.5		12.3	49.2		0.6	37.5	
Actuated g/C Ratio	0.17	0.17	0.17		0.04		0.14	0.56		0.01	0.42	
Clearance Time (s)	6.0	6.0	6.0		4.2		4.4	5.3		4.4	5.3	
Vehicle Extension (s)	2.0	2.0	2.0		2.5		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	292	268	261		73		476	1964		11	1439	
v/s Ratio Prot	c0.10	0.04					c0.08	0.28		0.00	c0.31	
v/s Ratio Perm			0.02		c0.00							
v/c Ratio	0.60	0.24	0.11		0.01		0.55	0.50		0.09	0.74	
Uniform Delay, d1	33.8	31.6	30.8		40.9		35.6	12.1		43.7	21.4	
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.2	0.1		0.1		0.8	0.1		1.3	1.7	
Delay (s)	36.2	31.7	30.9		40.9		36.4	12.2		45.0	23.1	
Level of Service	D	C	C		D		D	B		D	C	
Approach Delay (s)		33.0			40.9			17.3			23.1	
Approach LOS		C			D			B			C	
Intersection Summary												
HCM 2000 Control Delay			22.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			88.6				Sum of lost time (s)		19.9			
Intersection Capacity Utilization			57.1%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

Shady Oak
2: Valley Center Rd & Mirar De Valle

Existing Plus Project
Timing Plan: AM Peak

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (veh/h)	42	62	33	617	993	30	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	46	67	36	671	1079	33	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				TWLT	None		
Median storage (veh)				2			
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1503	556	1112				
vC1, stage 1 conf vol	1096						
vC2, stage 2 conf vol	407						
vCu, unblocked vol	1503	556	1112				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3	2.2				
p0 queue free %	82	86	94				
cM capacity (veh/h)	261	475	624				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	46	67	36	335	335	720	392
Volume Left	46	0	36	0	0	0	0
Volume Right	0	67	0	0	0	0	33
cSH	261	475	624	1700	1700	1700	1700
Volume to Capacity	0.18	0.14	0.06	0.20	0.20	0.42	0.23
Queue Length 95th (ft)	16	12	5	0	0	0	0
Control Delay (s)	21.7	13.8	11.1	0.0	0.0	0.0	0.0
Lane LOS	C	B	B				
Approach Delay (s)	17.0		0.6			0.0	
Approach LOS	C						
Intersection Summary							
Average Delay			1.2				
Intersection Capacity Utilization			38.9%		ICU Level of Service		A
Analysis Period (min)			15				

Shady Oak
2: Valley Center Rd & Mirar De Valle

Existing Plus Project
Timing Plan: PM Peak

							
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations							
Volume (veh/h)	29	41	54	1100	840	39	
Sign Control	Stop			Free	Free		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	32	45	59	1196	913	42	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type				TWLTL	None		
Median storage veh)				2			
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	1649	478	955				
vC1, stage 1 conf vol	934						
vC2, stage 2 conf vol	715						
vCu, unblocked vol	1649	478	955				
tC, single (s)	6.8	6.9	4.1				
tC, 2 stage (s)	5.8						
tF (s)	3.5	3.3	2.2				
p0 queue free %	88	92	92				
cM capacity (veh/h)	268	534	715				
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	32	45	59	598	598	609	347
Volume Left	32	0	59	0	0	0	0
Volume Right	0	45	0	0	0	0	42
cSH	268	534	715	1700	1700	1700	1700
Volume to Capacity	0.12	0.08	0.08	0.35	0.35	0.36	0.20
Queue Length 95th (ft)	10	7	7	0	0	0	0
Control Delay (s)	20.2	12.4	10.5	0.0	0.0	0.0	0.0
Lane LOS	C	B	B				
Approach Delay (s)	15.6		0.5			0.0	
Approach LOS	C						
Intersection Summary							
Average Delay			0.8				
Intersection Capacity Utilization			41.1%		ICU Level of Service		A
Analysis Period (min)			15				

Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing Plus Project
Timing Plan: AM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←	←	↑↑	↑	←	↑↑
Volume (vph)	149	119	515	63	72	929
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Detector Phase	6	6	8	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	7.0	4.0	4.0	1.0
Minimum Split (s)	30.0	30.0	100.0	30.0	20.0	100.0
Total Split (s)	30.0	30.0	100.0	30.0	20.0	120.0
Total Split (%)	20.0%	20.0%	66.7%	20.0%	13.3%	80.0%
Yellow Time (s)	4.3	4.3	4.3	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min	None	None	Min
Act Effct Green (s)	9.1	9.1	16.1	34.0	7.0	22.4
Actuated g/C Ratio	0.21	0.21	0.37	0.79	0.16	0.52
v/c Ratio	0.22	0.30	0.43	0.05	0.27	0.55
Control Delay	15.8	5.8	14.1	1.1	22.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.8	5.8	14.1	1.1	22.9	8.9
LOS	B	A	B	A	C	A
Approach Delay	11.3		12.7			9.9
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 43.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 11.0

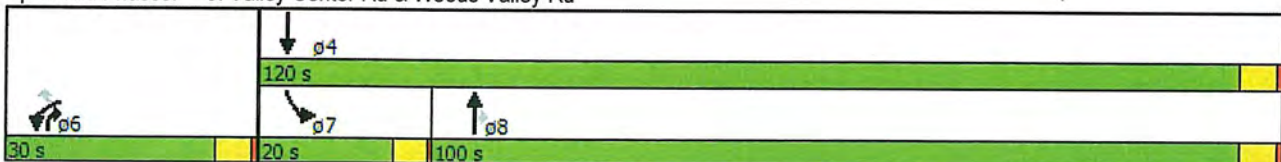
Intersection LOS: B

Intersection Capacity Utilization 38.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Valley Center Rd & Woods Valley Rd



Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing Plus Project
Timing Plan: AM Peak



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←	→	↑↑	→	←	↑↑
Volume (vph)	149	119	515	63	72	929
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	162	129	560	68	78	1010
RTOR Reduction (vph)	0	102	0	29	0	0
Lane Group Flow (vph)	162	27	560	39	78	1010
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Actuated Green, G (s)	9.1	9.1	16.1	25.2	4.0	24.5
Effective Green, g (s)	9.1	9.1	16.1	25.2	4.0	24.5
Actuated g/C Ratio	0.21	0.21	0.36	0.57	0.09	0.55
Clearance Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	706	325	1289	1092	160	1961
v/s Ratio Prot	c0.05		0.16	0.01	0.04	c0.29
v/s Ratio Perm		0.02		0.02		
v/c Ratio	0.23	0.08	0.43	0.04	0.49	0.52
Uniform Delay, d1	14.6	14.2	10.6	4.2	19.1	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.1	0.0	0.9	0.1
Delay (s)	14.7	14.2	10.7	4.2	20.0	6.2
Level of Service	B	B	B	A	B	A
Approach Delay (s)	14.5		10.0			7.2
Approach LOS	B		A			A

Intersection Summary

HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	44.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing Plus Project
Timing Plan: PM Peak

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	←←	→	←←	→	←	→→
Volume (vph)	84	91	998	150	111	739
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Detector Phase	6	6	8	6	7	4
Switch Phase						
Minimum Initial (s)	4.0	4.0	7.0	4.0	4.0	7.0
Minimum Split (s)	30.0	30.0	100.0	30.0	20.0	100.0
Total Split (s)	30.0	30.0	100.0	30.0	20.0	120.0
Total Split (%)	20.0%	20.0%	66.7%	20.0%	13.3%	80.0%
Yellow Time (s)	4.3	4.3	4.3	4.3	3.9	4.3
All-Red Time (s)	1.0	1.0	1.0	1.0	0.5	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lead/Lag			Lag		Lead	
Lead-Lag Optimize?			Yes		Yes	
Recall Mode	None	None	Min	None	None	Min
Act Effect Green (s)	8.7	8.7	27.1	41.5	9.5	41.3
Actuated g/C Ratio	0.14	0.14	0.44	0.67	0.15	0.67
v/c Ratio	0.19	0.32	0.70	0.15	0.44	0.34
Control Delay	26.1	9.5	17.5	0.9	33.4	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	9.5	17.5	0.9	33.4	5.2
LOS	C	A	B	A	C	A
Approach Delay	17.5		15.3			8.9
Approach LOS	B		B			A

Intersection Summary

Cycle Length: 150

Actuated Cycle Length: 61.5

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 13.0

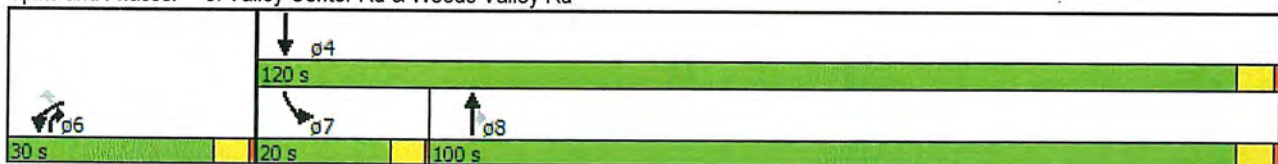
Intersection LOS: B

Intersection Capacity Utilization 49.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Valley Center Rd & Woods Valley Rd



Shady Oak
3: Valley Center Rd & Woods Valley Rd

Existing Plus Project
Timing Plan: PM Peak

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↰	↱↱	↰	↰	↱↱
Volume (vph)	84	91	998	150	111	739
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Lane Util. Factor	0.97	1.00	0.95	1.00	1.00	0.95
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3433	1583	3539	1583	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1770	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	99	1085	163	121	803
RTOR Reduction (vph)	0	85	0	66	0	0
Lane Group Flow (vph)	91	14	1085	97	121	803
Turn Type	Prot	Perm	NA	pm+ov	Prot	NA
Protected Phases	6		8	6	7	4
Permitted Phases		6		8		
Actuated Green, G (s)	8.7	8.7	27.4	36.1	9.5	41.3
Effective Green, g (s)	8.7	8.7	27.4	36.1	9.5	41.3
Actuated g/C Ratio	0.14	0.14	0.45	0.60	0.16	0.68
Clearance Time (s)	5.3	5.3	5.3	5.3	4.4	5.3
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	492	227	1600	1081	277	2411
v/s Ratio Prot	c0.03		c0.31	0.01	c0.07	0.23
v/s Ratio Perm		0.01		0.05		
v/c Ratio	0.18	0.06	0.68	0.09	0.44	0.33
Uniform Delay, d1	22.8	22.4	13.1	5.2	23.1	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.9	0.0	0.4	0.0
Delay (s)	22.9	22.5	14.0	5.2	23.5	4.0
Level of Service	C	C	B	A	C	A
Approach Delay (s)	22.7		12.9			6.6
Approach LOS	C		B			A
Intersection Summary						
HCM 2000 Control Delay		11.2		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.53				
Actuated Cycle Length (s)		60.6		Sum of lost time (s)	15.0	
Intersection Capacity Utilization		49.6%		ICU Level of Service	A	
Analysis Period (min)		15				
c Critical Lane Group						

Shady Oak
4: Proj Dwy & Mirar De Valle

Existing Plus Project
Timing Plan: AM Peak

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕		↕	↕	↕	
Volume (veh/h)	80	0	6	58	1	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	87	0	7	63	1	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			87		163	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			87		163	87
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1509		824	972
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	87	7	63	26		
Volume Left	0	7	0	1		
Volume Right	0	0	0	25		
cSH	1700	1509	1700	964		
Volume to Capacity	0.05	0.00	0.04	0.03		
Queue Length 95th (ft)	0	0	0	2		
Control Delay (s)	0.0	7.4	0.0	8.8		
Lane LOS		A		A		
Approach Delay (s)	0.0	0.7		8.8		
Approach LOS				A		
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			15.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Shady Oak
4: Proj Dwy & Mirar De Valle

Existing Plus Project
Timing Plan: PM Peak

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	60	1	26	67	0	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	1	28	73	0	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			66		195	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			66		195	66
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	99
cM capacity (veh/h)			1535		779	998
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total	66	28	73	12		
Volume Left	0	28	0	0		
Volume Right	1	0	0	12		
cSH	1700	1535	1700	998		
Volume to Capacity	0.04	0.02	0.04	0.01		
Queue Length 95th (ft)	0	1	0	1		
Control Delay (s)	0.0	7.4	0.0	8.7		
Lane LOS		A		A		
Approach Delay (s)	0.0	2.1		8.7		
Approach LOS				A		

APPENDIX C

- Valley Center Mobility Element
- Corner Sight Distance Certification Letter

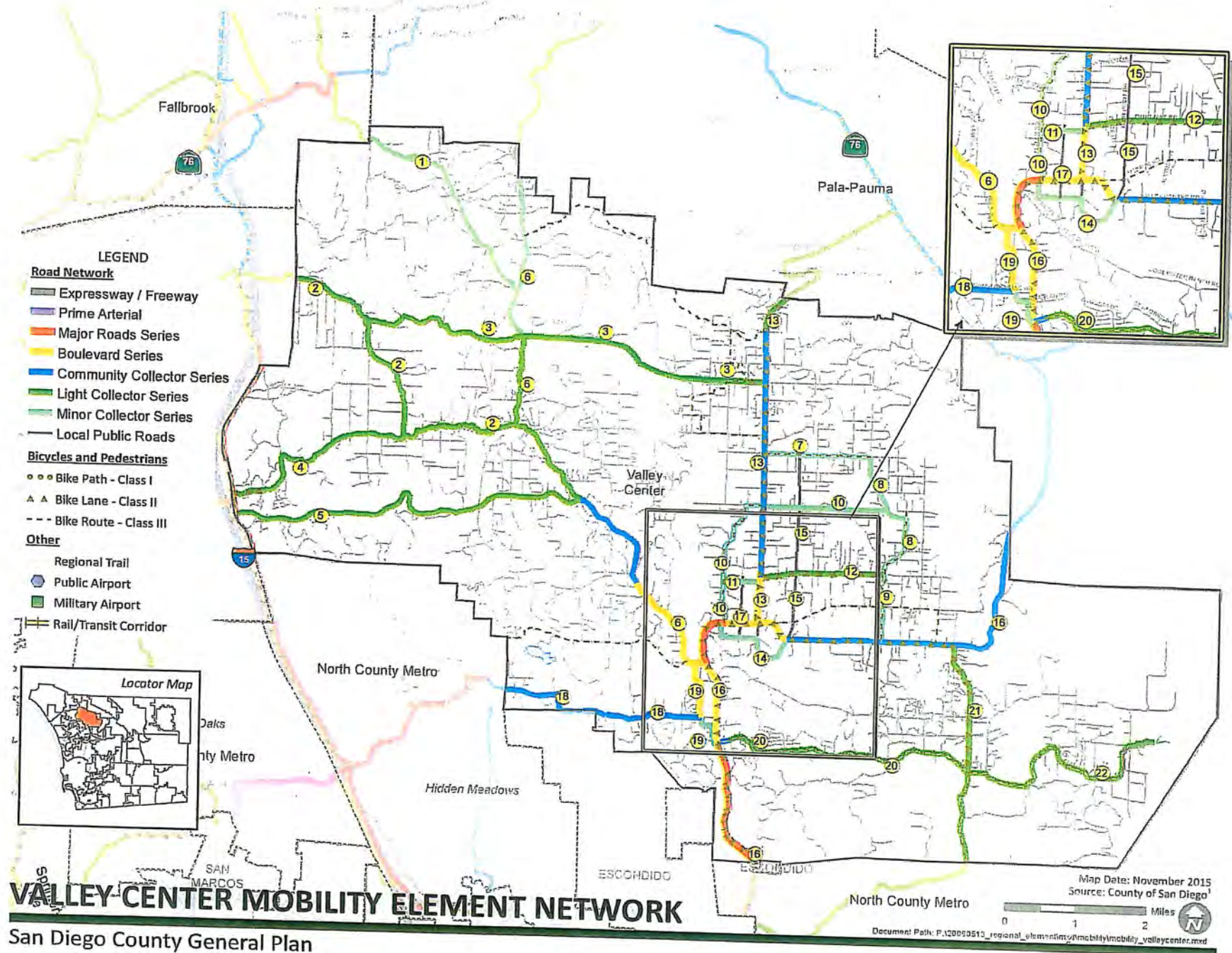


Figure M-A-23



MOBILITY ELEMENT NETWORK APPENDIX

Mobility Element Network—Valley Center Community Planning Area Matrix

ID ^a	Road Segment	Designation/Improvement #.#X = [# of lanes].[roadway classification][improvement]	Special Circumstances
1	Couser Canyon Road (SC 240) <u>Segment:</u> Fallbrook CPA boundary to Lilac Road	2.3C Light Collector Reduced Shoulder — two feet; Reduced Parkway to ten feet	Improvement Option Reduce shoulder width to six feet for use as a bike lane (requires parking prohibition)
2	West Lilac Road (SC 270.1 / 280.2) <u>Segment:</u> Bonsall CPA boundary to Lilac Road	2.2F Light Collector Reduced Shoulder—New Road 3 to Lilac Road 2.2C Light Collector Intermittent Turn Lanes—New Road 3 to Bonsall CPA boundary	None
3	New Road 3 <u>Segment:</u> West Lilac Road to West Oak Glen Road / Cole Grade Road	2.2C Light Collector Intermittent Turn Lanes	None
4	Circle R Road (SC 280.1) <u>Segment:</u> Old Highway 395 to West Lilac Road	2.2E Light Collector	None
5	Old Castle Road (SF 1415) <u>Segment:</u> Old Highway 395 to Lilac Road	2.2D Light Collector Improvement Options [Passing Lanes]	None
6	Lilac Road (SA 110/ SF 1415) <u>Segment:</u> Pala/Pauma Subregion boundary to Valley Center Road	2.3C Minor Collector Reduced Shoulder to two feet / Reduced Parkway to ten feet — Pala/Pauma Subregion boundary to New Road 3 2.2E Light Collector New Road 3 to Old Castle Road 2.1C Community Collector Intermittent Turn Lanes—Old Castle Road to Anthony Road 4.2B Boulevard Intermittent Turn Lanes—Anthony Road to Valley Center Rd.	Accepted at LOS F <u>Segment:</u> New Road 19 to Valley Center Road
7	Cool Valley Road (SC 300) <u>Segment:</u> Cole Grade Road to Villa Sierra Road	2.3C Minor Collector Reduced Shoulder to two feet / Reduced Parkway to ten feet	None
8	Villa Sierra Road (SC 300) <u>Segment:</u> Cool Valley Road to Mac Tan Road	2.3C Minor Collector Reduced Shoulder to two feet / Reduced Parkway to ten feet	None

C-2

Mobility Element Network—Valley Center Community Planning Area Matrix			
ID ^a	Road Segment	Designation/Improvement #. #X = [# of lanes].[roadway classification][improvement]	Special Circumstances
9	Mac Tan Road (SC 300) <u>Segment:</u> Villa Sierra Road to Valley Center Road	2.3C Minor Collector Reduced Shoulder to two feet / Reduced Parkway to ten feet	None
10	Miller Road <u>Segment:</u> Valley Center Road to Villa Sierra Road	2.3B Minor Collector Intermittent Turn Lanes—Valley Center to new local public road (south of Misty Oak) 2.3C Minor Collector Reduced Shoulder to two feet; Reduced Parkway to ten feet— New Road 11 (south of Misty Oak) to Villa Sierra Road	None
11	New Road 11 (south of Misty Oak Road) <u>Segment:</u> Miller Road to Cole Grade Road	2.3A Minor Collector Raised Median	None
12	Fruitvale Road (SC 310) <u>Segment:</u> Cole Grade Road to Villa Sierra Road	2.2C Light Collector Intermittent Turn Lanes—Cole Grade Road to Villa Sierra Road	None
13	Cole Grade Road (SA 110) <u>Segment:</u> New Road 14 to Pala/Pauma Subregion boundary	Industrial / Commercial Local Public Road New Road 14 to Valley Center Road 4.2A Boulevard Raised Median—Valley Center Road to Fruitvale Road 2.1D Community Collector Improvement Options (left / right turn lanes)—Fruitvale Road to Pauma Heights Road 2.1C Community Collector Intermittent Turn Lanes—Pauma Heights Road to McNally Road 2.2E Light Collector McNally Road to Pala/Pauma Subregion boundary	None
14	New Road 14 <u>Segment:</u> Valley Center (at Miller Road) to Valley Center Road (at New Road 15)	2.3B Minor Collector Intermittent Turn Lanes	Road Alignment North of floodplain whenever feasible



MOBILITY ELEMENT NETWORK APPENDIX

Mobility Element Network—Valley Center Community Planning Area Matrix

ID ^a	Road Segment	Designation/Improvement #. #X = [# of lanes].[roadway classification][improvement]	Special Circumstances
15	New Road 15 / High Point Drive <u>Segment:</u> Valley Center (at New Road 14) to Cool Valley Road	Local Public Road	None
16	Valley Center Road (SF 639) <u>Segment:</u> North County Metro Subregion boundary to Pala/Pauma Subregion boundary	4.1A Major Road Raised Median—North County Metro Subregion boundary to Woods Valley Road 4.2A Boulevard Raised Median—Woods Valley Road to Lilac Road 4.1A Major Road Raised Median—Lilac Road to Miller Road 4.2A Boulevard Raised Median—Miller Road to New Roads 14/15 2.1D Community Collector Improvement Options [Passing Lanes]—New Roads 14/15 to Pala/Pauma Subregion boundary	Accepted at LOS F <u>Segment:</u> Miller Road to Indian Creek Road
17	New Road 17 <u>Segment:</u> New Road 14 to Misty Oak Road	Rural Residential Collector Local Public Road	None
18	Mirar de Valle Road (SC 990.2) <u>Segment:</u> North County Metro Subregion boundary to New Road 19	2.1D Community Collector Improvement Options [Unspecified]	Accepted at LOS F <u>Segment:</u> New Road 19 to Hidden Meadows community boundary
19	New Road 19 <u>Segment:</u> Lilac Road to Valley Center Road (at Woods Valley Road)	4.2B Boulevard Intermittent Turn Lanes—Lilac Road to Mirar de Valle Road 2.3A Minor Collector Raised Median—Mirar de Valle Road to Woods Valley Road	Accepted at LOS E <u>Segment:</u> Mirar de Valle Road to Lilac Road
20	Woods Valley Road (SC 1010) <u>Segment:</u> Valley Center Road to Lake Wohlford Road	2.1D Community Collector Improvement Options [Raised Median and Right-Turn Lanes]—Valley Center Road to Oakmont Rd. 2.2C Light Collector Intermittent Turn Lanes—Oakmont Rd. to Lake Wohlford Road	Accepted at LOS E <u>Segment:</u> Oakmont Road to Karibu Lane

Mobility Element Network—Valley Center Community Planning Area Matrix			
ID ^a	Road Segment	Designation/Improvement #.#X = [# of lanes].[roadway classification][improvement]	Special Circumstances
21	Lake Wohlford Road (SA 130) Segment: North County Metro Subregion boundary to Valley Center Road	2.2D Light Collector Improvement Options [Unspecified]	None
22	Paradise Mountain Rd. (SC 1010.1) Segment: Lake Wohlford Road to Hell Hole Canyon Open Space Preserve entrance	2.2E Light Collector	None

a. ID = Roadway segment on Figure M-A-23



Date: April 13, 2017

Richard E. Crompton, Director
Department of Public Works
County of San Diego
Traffic Engineering
5510 Overland Ave., Suite 410
San Diego, CA 92123

Subject: Sight Distance Certification for the Street A at Mirar De Valle and Street B at Street A intersections in conjunction with the TM 5614 Development in Valley Center. (PDS 2016-REZ-16-005, PDS2016-TM5614, PDS2016-STP-16-019). Based on the current circumstances.

Dear Mr. Crompton:

I, Stephen J. McPartland (RCE 35109) certify the following:

- That there is 450 feet of unobstructed intersectional Sight Distance in the eastbound and westbound direction from Street A along Mirar De Valle measured in accordance with the methodology described in Table 5 of the March 2012 County of San Diego Public Road Standards. This sight distance satisfies the required intersectional Sight Distance requirements of 450 feet as described in Table 5 based on a design speed of 45 mph, which I have verified to be the higher of the prevailing speed or the minimum design speed of the road classification.
- That there is 350 feet of unobstructed intersectional Sight Distance in the northbound and southbound direction from Street B along Street A measured in accordance with the methodology described in Table 5 of the March 2012 County of San Diego Public Road Standards. This sight distance satisfies the required intersectional Sight Distance requirements of 350 feet as described in Table 5 based on a speed of 35 mph, which I have verified to be the higher of the prevailing speed or the minimum design speed of the road classification.

This certification is based on the proposed project roadway improvements for TM 5614.
I have exercised responsible charge for the certification as defined in Section 6703 of the Professional Engineers Act of the California Business and Professions Code.

Sincerely,


Stephen J. McPartland RCE 35109
Senior Vice President
TSAC Engineering
16885 Via Del Campo Court, Suite 304
San Diego, Ca 92127



Date Signed: 4/13/17

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