Final Transportation Impact Study for Vista Canyon Transit-Oriented Development (May 2010)

Final Report

Transportation Impact Study for Vista Canyon Transit-Oriented Development

Prepared for: Vista Canyon Ranch, LLC

Submitted by: FEHR & PEERS TRANSPORTATION CONSULTANTS

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EXECUTIVE SUMMARY

This report analyzes the transportation impacts of the proposed Vista Canyon Transit-Oriented Development (TOD) located in unincorporated Los Angeles County directly adjacent to the City of Santa Clarita, CA. The project is located south of State Route (SR) 14 between the Via Princessa and Sand Canyon Road interchanges. The project applicant is proposing to annex the project into the City of Santa Clarita. The following provides an overview of the project's expected impacts to the transportation system.

Project Description

The project includes the following mix of land uses plus a new Metrolink commuter rail station, a City bus transfer station, and a water reclamation plant (water factory):

- 1,021 attached, condominium units[1], and 96 single-family dwelling units
- 646,000 square-feet of office space,
- 164,000 square-feet of general retail space (including a ten-screen movie theater)
- 200-room hotel

The project also includes the annexation by the City of Santa Clarita of the project site. Vehicular access to the Vista Canyon project would be provided as follows:

- Lost Canyon Road (to Via Princessa)
- Jakes Way (to Canyon Park Boulevard)
- Vista Canyon Road (to Soledad Canyon Road)
- Lost Canyon Road (to Sand Canyon Road)

The first phase of the project (Phase 1) would consist of 680 attached, multi-family units, 25,000 square feet of retail space[2], and the water factory. The proposed Metrolink Station, the Vista Canyon Road Bridge over the Santa Clara River, and the easterly extension of Lost Canyon Road to La Veda Avenue would not be constructed or operational with Phase 1. However, the other street connections would be made.

Existing Conditions

Fehr & Peers conducted traffic counts at the 23 study intersections and various study segments of SR 14 in November 2008. The following study facilities currently operate unacceptably (based on the policies of the applicable agency):

- Soledad Canyon Road/Bouquet Canyon Road (LOS E during PM peak hour)
- Placerita Canyon Road/SR 14 SB Ramps (LOS F during both peak hours)
- SB SR 14 from Sand Canyon Road to Golden Valley Road (LOS F during AM peak hour)

1. For purposes of this traffic study, 579 of the attached, condominium units are assumed to be for-lease units
2. 430 of the 680 attached, condominium units are assumed to be for-lease units

The Sand Canyon Road/Lost Canyon Road intersection has been observed to operate in the LOS E/F range during the peak 15-minutes prior to classes starting at the Pinecrest and Sulphur Springs schools. However, when considering the entire peak hour, existing operations are at an acceptable LOS D.

Analysis Methods

The impacts of the proposed project were analyzed for the following scenarios:

- 2012 Plus Phase 1 Project Conditions
- Interim (Project Buildout) Conditions
- Cumulative (Project Buildout) Conditions

Background traffic forecasts for all scenarios were developed using a version of the Santa Clarita Valley Consolidated Travel Demand Model (SCVCTDM) enhanced by Fehr & Peers to provide improved forecasting accuracy in the study area. Figure 11 shows the assumed roadway improvements under interim conditions.

Project Travel Characteristics

Fehr & Peers coordinated with the City on the level of internal trip-capture (10 percent) and transit mode share (7 percent) to be assumed for analysis purposes. The resulting 17 percent internal/transit trip reduction is considered conservative given recent research and findings on TOD travel behavior characteristics. This assumption ensures that the analysis of potential off-site traffic impacts is not understated and rather is likely overstated. In fact, Fehr & Peers' analysis of the TOD travel research suggests that a greater level of internal trip-capture and transit mode share, perhaps in the range of 25 percent, could occur at Vista Canyon.

The analysis of project impacts on the surrounding roadway network considers both external vehicle (and bus) trips generated by the project as well as the trips entering/exiting the site to use the Metrolink station. The assumed level of auto travel to/from the rail station represents a substantial increase in park-and-ride ridership over the existing Via Princessa station, which the proposed station would replace.

Phase 1 Impacts under 2012 Conditions

Phase 1 of the project would cause significant impacts at the following five study intersections:

- Soledad Canyon Road/SR 14 SB Ramps
- Sand Canyon Road/Lost Canyon Road
- Via Princessa/SR 14 SB Ramps
- Via Princessa/SR 14 NB Ramps
- Via Princessa/Lost Canyon Road

Recommended mitigation at the Soledad Canyon Road/SR 14 SB Ramps intersection consists of converting the westbound left-turn lane onto the SB SR 14 on-ramp from a permitted to protected signal phase, and retiming this signal and the adjacent Sand Canyon Road/Soledad Canyon Road signal. Recommended improvements at the Via Princessa/SR 14 ramp intersections consist of traffic signal timing modifications. The recommended mitigation at the Via Princessa/Lost Canyon Road intersection consists of installing a right-turn overlap arrow on the westbound Lost Canyon Road approach.

Phase 1 of the project would further degrade LOS F operations at the Sand Canyon Road/Lost Canyon Road intersection even though Phase 1 does not include an easterly connection to Lost Canyon Road at La Veda Avenue. Phase 1 does include completion of the multi-use path along the Santa Clara River that would enable Vista Canyon residents to walk/bike to adjacent Sulphur Springs Elementary School. Phase 1 has a minimal contribution of traffic to the intersection (15 AM peak hour trips, which is a 1 percent increase) and therefore, the project does not include improvements to this intersection as part of Phase 1. The project would have a “temporary” significant unavoidable impact that would be mitigated upon completion of Intersection Design Option No. 2, 3 or 4 (see below) and the Lost Canyon Road improvements. From a traffic operational standpoint, Design Option No. 3 (Roundabout) is preferred.

Project Buildout Impacts under Interim Conditions

Project Buildout would cause significant impacts at the following study intersections:

2) Sand Canyon Road/Soledad Canyon Road
3) Soledad Canyon Road/SR 14 SB Ramps
5) Sand Canyon Road/Lost Canyon Road
7) Soledad Canyon Road/Lost Canyon Road
8) Sierra Highway/Soledad Canyon Road
14) Via Princessa/SR 14 SB Ramps
15) Via Princessa/SR 14 NB Ramps
16) Via Princessa/Lost Canyon Road

Figure ES-1 illustrates the physical improvements identified for these intersections. The identified mitigations are considered feasible and would reduce the impact to a less-than-significant level. Construction of the improvements illustrated in Figure ES-1 by the applicant would entitle the applicant to a credit under the Eastside Bridge and Major Thoroughfare (B&T) District in an amount equal to all costs expended to construct the improvements.

Project impacts were analyzed at the three Congestion Management Program (CMP) monitoring intersections and one freeway segment within the study area. An impact was identified at the Soledad Canyon Road/Sierra Highway intersection. A mitigation was identified, which would reduce the impact to less than significant. The project will be paying Eastside B&T fees or constructing eligible District improvements, and as such contributing its fair share to mitigate impacts within the District.

Project Impacts on Bicycle/Pedestrian Systems

The project would add a substantial amount of bicycle and pedestrian facilities within the project site. The project would not adversely affect an existing bicycle/pedestrian facility, nor cause an inconsistency with relevant policies in the City's *Non-Motorized Transportation Plan* (adopted in 2008). Therefore, impacts to the bicycle and pedestrian systems would be less-than-significant.

Project Impacts on Transit System

The proposed project would replace the existing Via Princessa Metrolink rail station with a new on-site rail station. The new station would help relieve parking shortages at other existing stations in the Valley and draw new riders to Metrolink commuter rail. The project also includes a bus transfer center that would connect with Metrolink service. The applicant would contribute funding toward the new Metrolink Station and Bus Transfer Station as required by the City's Transit Mitigation Fee. The project would not conflict with any transit policies in the City's *Transportation Development Plan* (adopted 2006). Therefore, project impacts to the transit system are considered less-than-significant.

Lost Canyon Road Improvements (Project Site Easterly to Sand Canyon Road)

Buildout of the proposed project would include improvements to the segment of Lost Canyon Road between the project site and Sand Canyon Road. This segment presently has one lane in each direction with a posted speed limit of 30 mph (25 mph when children are present). A continuous sidewalk is provided on the south side of the street, from the project site to Sand Canyon Road. Sulphur Springs Elementary School and Pinecrest School both take vehicular access from this segment of Lost Canyon Road. Presently, this segment of Lost Canyon Road is congested when school is in session during the morning when students are being dropped off and in the afternoon when students are being picked up. The proposed improvements include:

- Pavement widening and striping of this segment of Lost Canyon Road to accommodate one travel lane in each direction with a median turn lane, a trail along the north side of the roadway, a roundabout at the intersection of La Veda Avenue and Lost Canyon Road and on-street parallel parking on the south side of Lost Canyon Road. These improvements would be completed within the existing right-of-way.

- Restricting the outbound-only driveways at each school to right-turns to minimize conflicting turning movements, provided that a roundabout (versus a traffic signal) is constructed at the Lost Canyon Road/Sand Canyon Road intersection.

- Constructing a narrow raised median at the easterly Pinecrest School driveway and posting a sign that prohibits u-turns.

Sand Canyon Road/Lost Canyon Road Intersection Design Options

As part of buildout, the proposed project would implement one of the following four design options for the Sand Canyon Road/Lost Canyon Road intersection, all of which are analyzed in this study:

- Option 1 (Four-Way Stop) – this design option is presently in place at the intersection. Under this design option, the operation of this intersection in the future would worsen to LOS F with or without the Vista Canyon project. If this option is selected by the City, the project would result in a significant unavoidable impact at the intersection.

- Option 2 (Signalized Intersection with "Look Ahead Signal") – this design option would result in a signalized intersection, with a "look ahead" signal head at the southwest corner to address northbound "line of sight" requirements. Minimal widening of the intersection would occur with this design option, with right-of-way necessary at the northwest and southeast corners. Encroachment within the protected zone of the heritage oak tree located along the eastern edge of Sand Canyon Road would remain similar to the existing condition. A fence, located within the right-of-way, would have to be removed to adhere to "line of sight" requirements. Option 2 would result in the improved operation of the intersection in the future (LOS D) even with future growth (including Vista Canyon), as compared to the existing four-way stop design.

- Option 3 (Roundabout) – this design option would include the installation of a "roundabout" or traffic circle at the intersection. This option would involve the relocation of the intersection to the north and west to adhere to northbound "line of sight" requirements. Right-of-way acquisition would be necessary on all four corners; most of it would come from the northwest corner (which is presently vacant). Encroachment within the protected zone of the heritage oak tree located along the eastern edge of Sand Canyon Road would still occur, consistent with the existing condition. From a traffic operational standpoint, this design option would be the best of the four, improving the future LOS F under the existing design to an LOS C in the AM peak hour and LOS B in the PM peak hour even with future growth (including the Vista Canyon project).

- Option 4 (Signalized Intersection - Standard Configuration) – this design option improves the Lost Canyon Road/Sand Canyon Road intersection with a fully signalized intersection complying with all of the City's standard intersection design criteria. This option would require the acquisition of right-of-way on the northwest and southeast corner. A "line of sight" easement would be needed from three properties located east of Sand Canyon Road and south of the intersection. All vegetation and fencing within this easement would need to be removed, including the heritage oak tree located along the eastern edge of Sand Canyon Road. Similar to the "Look Ahead Signal" design option, this option would result in the improved operation of the intersection (LOS D), as compared to the existing design, even with future growth (including the Vista Canyon project).

Project Impacts Under Cumulative Conditions

The project would cause the following two significant impacts to roadways in the City under cumulative conditions:

- Soledad Canyon Road between Sierra Highway and Whites Canyon Road – LOS E to F (v/c ratio increases from 0.99 to 1.02)
- Soledad Canyon Road between Whites Canyon Road and Golden Valley Road – LOS E maintained (v/c ratio increases from 0.94 to 0.97)

No feasible improvements are available as this arterial is already constructed to its ultimate width of six lanes. The project would result in a net increase of 1,500 to 1,800 vehicles per day on these impacted segments, which are expected to carry between 52,000 and 55,000 vehicles per day under cumulative conditions (i.e., project trips would be about 3 percent of the total volume). Although these impacts are considered significant and unavoidable, it is worth noting that the project is a transit-oriented development, and as such, generates fewer vehicle trips and miles of travel than traditional developments. The project will also be paying B&T fees or constructing eligible improvements that serve to mitigate or minimize impacts within the District boundaries.

The City of Santa Clarita General Plan Circulation Element states, "Existing street improvements are in some cases, not able to be modified to accommodate additional traffic or circulation improvements due to right-of-way limitations and existing development." This language recognizes that in some cases it is not feasible to construct certain roadway improvements in light of potential time and cost of actions that may be necessary to acquire the property, the physical and economic costs to businesses and residents along the affected roadways, and the social costs that could occur if businesses or residents were forced to relocate. The draft One Valley-One Vision (OVOV) Plan also acknowledges the tradeoff between improving roadway operations in light of right-of-way constraints and pedestrian mobility.

Additionally, project buildout would increase traffic on SR 14 resulting in significant impacts on the segment between Sand Canyon Road and Soledad Canyon Road under interim and cumulative conditions. Project trips are estimated at 3.8 percent of future traffic growth for on this segment. The majority of the future traffic growth on SR 14 comes from areas east and north of the Santa Clarita Valley.

There presently are no improvements for SR 14 planned and programmed by Caltrans that would mitigate the identified project impacts under interim and cumulative conditions, nor is there an established funding program in place to collect developer fees to implement any such improvements. Notwithstanding, the project applicant and Caltrans have negotiated a Traffic Mitigation Agreement that requires the applicant to pay an in-lieu fee to Caltrans for future improvements to SR 14 based upon the project’s fair share. The Traffic Mitigation Agreement would be signed by both parties upon project approval. However, because there are presently no planned and programmed improvements for SR 14, nor is there an established funding program, the project's payment of an in-lieu fee would not fully mitigate the identified significant impacts. Therefore, mitigation is considered infeasible and the identified impacts would remain significant and unavoidable.

Impacts due to Modified Roadway System

The Vista Canyon project would result in a slightly different roadway system in the project vicinity than the circulation plan contemplated in the City's General Plan and Draft OVOV plan. The City's circulation plan would extend Lost Canyon Road northeasterly from Jakes Way as a major highway to Sand Canyon Road. The Vista Canyon project would construct Vista Canyon Road as a two-lane secondary highway across the Santa Clara River to Soledad Canyon Road. With the Vista Canyon project, Lost Canyon Road would be four lanes between Jakes Way and Vista Canyon Road, and two lanes between Vista Canyon Road and Sand Canyon Road.

Based on analysis using the Santa Clarita Valley Consolidated Travel Demand Model, the Vista Canyon street system would not cause any street segments to worsen from an acceptable to an unacceptable level. In fact, the Vista Canyon Road connection to Soledad Canyon Road would result in a net reduction in traffic at several intersections (Lost Canyon Road/Sand Canyon Road, Sand Canyon Road/Soledad Canyon Road, and Lost Canyon Road/Via Princessa) that were shown as operating unacceptably under interim (2015) conditions. Therefore, the proposed Vista Canyon circulation system would not cause any adverse circulatory impacts when compared to the City's Existing General Plan and the Draft OVOV circulation plan.

Vehicle Miles of Travel (VMT) Estimation

Chapter 10 of this report evaluates the project's estimated daily Vehicle Miles of Travel (VMT), which is an important input to the project's climate change and greenhouse gas emissions analysis. The analysis revealed the following conclusions:

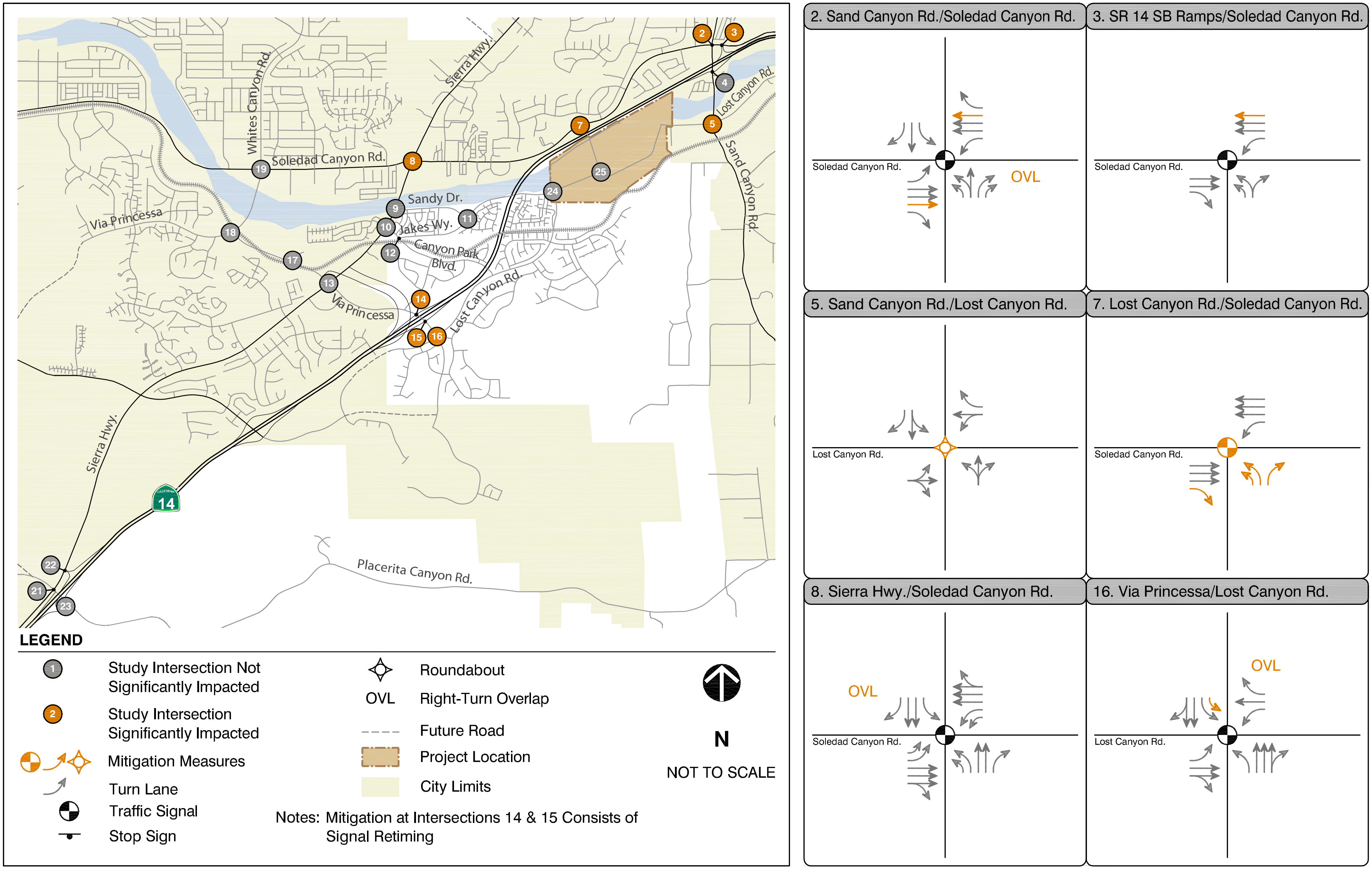
- The residential component of Vista Canyon is estimated to generate an average of 58 VMT per household per day, which is in the low-end of the estimated state-wide average of 55 to 65 daily VMT per household, and likely much less than the VMT for most households in the Santa Clarita Valley. Given that internal trip-capture and transit use will likely be greater than what was assumed in this study (based on academic research and findings), the residential component will likely generate less than 58 VMT per day. If the project site was developed under its draft One Valley One Vision residential land use designation (without immediate transit access or supporting non-residential), 71 VMT per household would be expected.
- The provision of on-site office, retail, and other supporting uses along with public transit provides Vista Canyon residents the option to bike or walk, make shorter trips within the site if necessary, and longer trips by transit instead of automobile.
- The project would provide a significant amount of professional office space, which provides opportunities for more residents to live and work within Santa Clarita Valley. Although the travel benefits of this are difficult to quantify, it is expected based on past

commute trends, some residents of the Santa Clarita and Antelope Valleys who currently commute into Burbank, Glendale, or Los Angeles, will instead work in Vista Canyon.

Evaluation of Local Circulation

Fehr & Peers assisted in refinements to the project site plan including layouts/lane markings for roundabouts, width/number of lanes on Vista Canyon Road, and permitted turning movements at project access intersections along Lost Canyon Road.

As indicated above, Fehr & Peers recommended improvements along Lost Canyon Road between the project site and Sand Canyon Road to improve access to Sulphur Springs Elementary School and Pinecrest School, while also providing additional capacity to accommodate project trips (refer to Figure 20 for illustration of recommended improvements).



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RECOMMENDED MITIGATION MEASURES FOR PROJECT IMPACTS UNDER INTERIM CONDITIONS

FIGURE ES-1

Jun 02, 2010 SRH
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1. INTRODUCTION

This report analyzes the transportation impacts associated with the proposed Vista Canyon Transit-Oriented Development (TOD) located in unincorporated Los Angeles County adjacent to the City of Santa Clarita, CA. The project proponent is proposing annexation of the project to the City of Santa Clarita. As shown on Figure 1a, the project is situated in the southeast area of Santa Clarita Valley directly south of State Route (SR) 14 between the Via Princessa and Sand Canyon Road interchanges. The project includes a mix of residential and non-residential land uses and a new Metrolink commuter rail station.

The analysis contained in this report will form the basis of the transportation chapter for the project Environmental Impact Report (EIR). Therefore, the assumptions and methodologies used in the study are intended to comply with applicable California Environmental Quality Act (CEQA) guidelines and requirements.

STUDY APPROACH

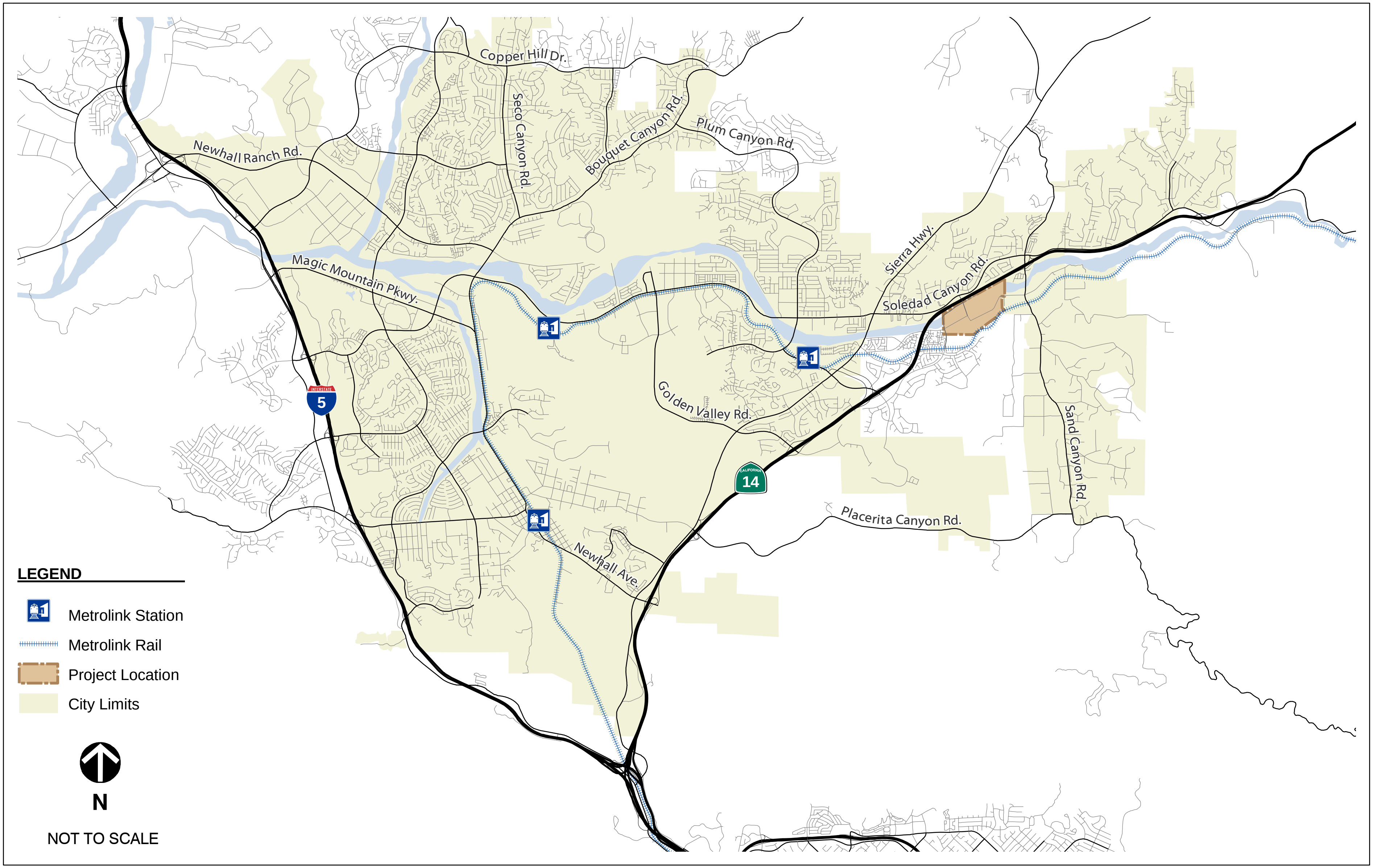
Fehr & Peers met with City of Santa Clarita staff in July 2008 to discuss the approach to this study. A detailed scope of work was developed by Fehr & Peers in October 2008. It was reviewed and approved by the City's Traffic Division. The scope of work was developed in consideration of the following important factors:

1. Operations should be analyzed at intersections using a methodology that produces results that match field observations.
2. The study should make appropriate assumptions regarding reductions in vehicle trips due to the mixed-use nature of the project and its immediate proximity to a new Metrolink station and bus transfer station.
3. Additional roadway and land use detail should be added to the Santa Clarita Valley Consolidated Travel Demand Model (SCVCTDM) to better predict traffic levels in the project vicinity.
4. Improvements to Lost Canyon Road west of Sand Canyon Road should be identified to improve access to the Sulphur Springs Elementary School and Pinecrest School, while also accommodating project traffic.

The following describes the study area, analysis scenarios, and analysis periods.

Study Area

The study area shown on Figure 1b was selected based on the project's expected travel characteristics (i.e., location and amount of project-added trips) as well as facilities susceptible to being impacted by the project. In addition, a project-only traffic assignment of the SCVCTDM was performed during the scoping phase to identify general directions of project-related travel and intersections that should be studied for potential impacts. The list of study facilities was reviewed by the City prior to beginning the impact analysis.



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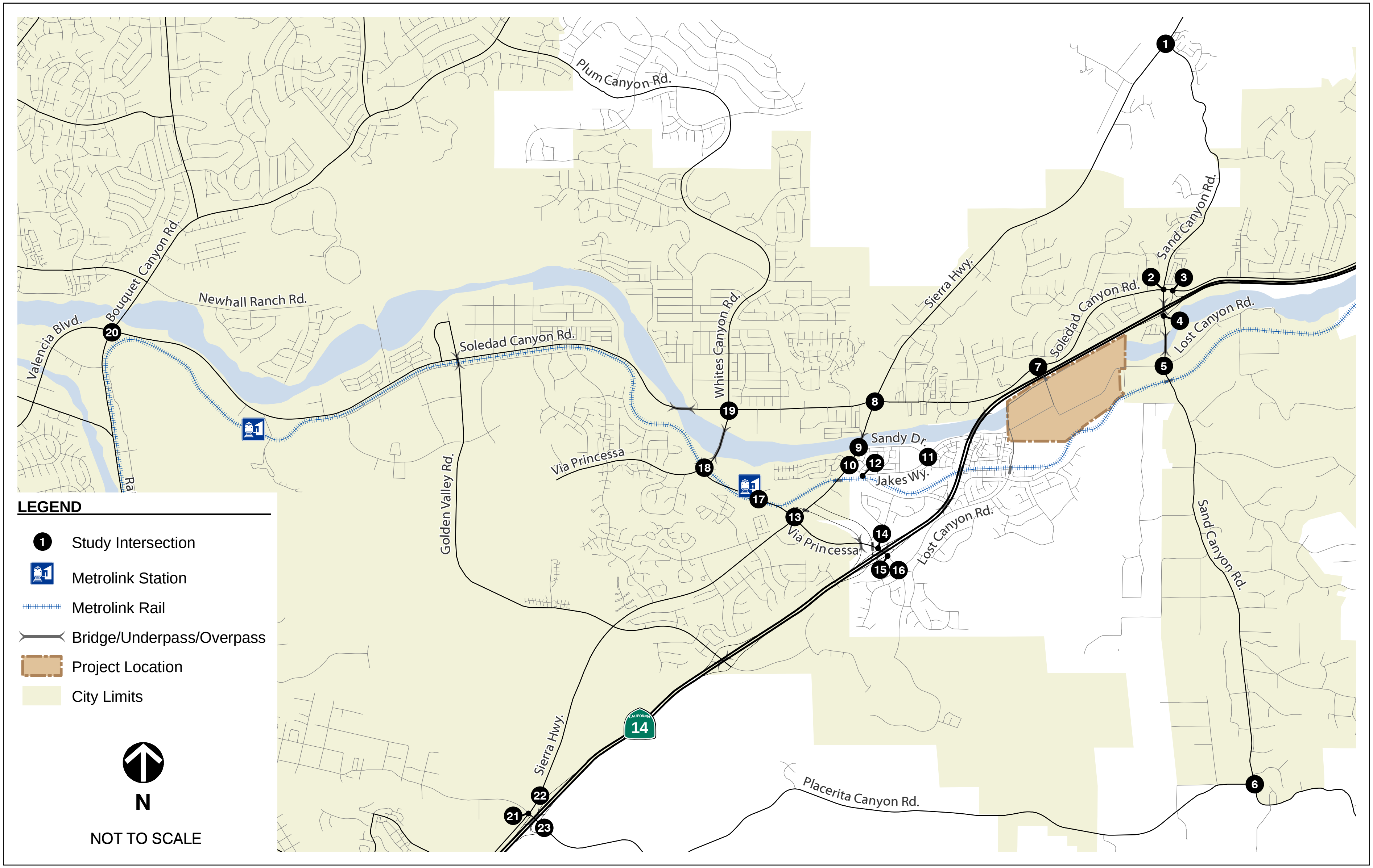
PROJECT LOCATION

FIGURE 1A



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STUDY AREA
FIGURE 1B

The study area is generally bounded by Sand Canyon Road on the east, Bouquet Canyon Road on the west, Sierra Highway on the north, and Placerita Canyon Road on the south. Three freeway interchanges on SR 14 are analyzed, as is SR 14 from Interstate 5 (I-5) to north of Sand Canyon Road. A total of 23 intersections were selected for analysis. These locations are shown on Figure 1.

Intersections 1, 11, 12, 15, 16, and 23 are located within unincorporated Los Angeles County. The remaining intersections are within the City of Santa Clarita. Intersections 3, 4, 14, 15, 22, and 23 are maintained by Caltrans.

Analysis Scenarios

The following scenarios are analyzed in this study:

1) Existing Conditions
2) 2012 No Project Conditions
3) 2012 Plus Phase 1 Project Conditions
4) Interim (2015) No Project Conditions
5) Interim (2015) Plus Project Buildout Conditions
6) Cumulative (2030) No Project Conditions
7) Cumulative (2030) Plus Project Buildout Conditions

The "2012 plus Phase 1 project" scenario evaluates the first phase of the project under assumptions that the Metrolink station is not built or operational, Vista Canyon Road is not extended across the Santa Clara River to Soledad Canyon Road and Lost Canyon Road is not extended easterly from the project to La Veda Avenue. The interim scenario is commonly analyzed for traffic studies in Santa Clarita. The cumulative scenario is required both by the City and CEQA.

Analysis Periods

The existing, 2012, and interim conditions scenarios focus on weekday AM and PM peak hour operations at intersections and freeways. The cumulative condition scenarios focus on average daily roadway operations on City streets.

This forecasting approach is reasonable given the difficulty of developing accurate peak hour turning movement projections at intersections 20 years in the future. Instead, daily traffic projections are developed for roadways to determine whether the proposed roadway right-of-way and cross-sections are adequate.

2. ANALYSIS METHODS

This chapter describes the analysis methodologies for intersections, freeway facilities, and arterial roads used in the following chapters.

INTERSECTIONS

For this study, the City of Santa Clarita Traffic Division required that signalized intersections in the City or directly adjacent to the City be analyzed using HCM procedures either through Synchro or SimTraffic (a micro-simulation component of the Synchro program). HCM procedures include: cycle length, green splits, pedestrian crossings, lane widths, grade, truck traffic, signal coordination, turn lane blockages, and effects caused by upstream or downstream intersections. These factors are considered in the Synchro/SimTraffic software program, which employs procedures described in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2000. Synchro or SimTraffic was also used to analyze ramp terminal intersections under the jurisdiction of Caltrans. The ICU method was selected for the other signalized intersections, all of which are located in Los Angeles County, consistent with their requirements. The ICU method is a planning-level tool that assigns a level of service (LOS) grade to an intersection based on its volume-to-capacity (v/c) ratio.

SimTraffic was selected in place of Synchro to analyze signalized intersections that are over-saturated or adversely affected by adjacent intersections. Per standard practice, 10 SimTraffic model runs are performed with the average results reported.

The ICU method assigns an overall LOS grade to the intersection. LOS by approach is not applicable. Conversely, Synchro and SimTraffic calculate the average control delay of all vehicles passing through an intersection, and assign the LOS based on the average delay. Table 1 shows the v/c ratio thresholds (for ICU) and average delay thresholds associated with each LOS grade.

TABLE 1:
INTERSECTION LOS CRITERIA

Level of Service	Signalized Intersections		Unsignalized Intersections
	ICU Method [1] (V/C Ratio)	Synchro/SimTraffic (HCM) Average Delay	Average Delay
A	≤ 0.60	≤ 10 sec/veh	≤ 10 sec/veh
B	0.61 to 0.70	> 10 to 20 sec/veh	> 10 to 15 sec/veh
C	0.71 to 0.80	> 20 to 35 sec/veh	> 15 to 25 sec/veh
D	0.81 to 0.90	> 35 to 55 sec/veh	> 25 to 35 sec/veh
E	0.91 to 1.00	> 55 to 80 sec/veh	> 35 to 50 sec/veh
F	> 1.00	> 80 sec/veh	> 50 sec/veh

Note: [1] Assumed to have a saturation flow rate of 1,600 vehicles per hour per lane with a 0.10 clearance interval.
Source: *Highway Capacity Manual* (Transportation Research Board, 2000), and ICU Methodology.

Unsignalized intersections were analyzed using the *HCM* methodology. The LOS at all-way stop intersections is based on the average delay of all vehicles. The LOS at side-street stop intersections is reported for the minor street movement with the greatest delay. Table 1 shows the average delay thresholds associated with each LOS grade for unsignalized intersections.

FREEWAYS

This study analyzes several mainline segments of SR 14 as well as ramp merge/diverge operations. These facilities are analyzed in accordance with procedures described in the *HCM*. The density in passenger cars per hour per lane is calculated for the mainline and ramp junctions and then compared to thresholds in the *HCM* to identify the corresponding LOS.

Because the observed traffic volumes for a given freeway segment reflect traffic that is able to be served (not the demand), additional descriptions of travel times and congestion are provided to ensure that reported operations match field conditions.

ARTERIAL ROADS

The *City of Santa Clarita Draft General Plan Circulation Element Update* (2008) contains average daily traffic (ADT) volume LOS ranges for various roadway types. Table 2 shows the ADT range for each LOS grade for various roadway cross-sections.

TABLE 2:
ARTERIAL ROADWAY LOS CRITERIA

Facility Type	Number of Through Lanes	Maximum Average Daily Traffic (ADT) at….				
		LOS A	LOS B	LOS C	LOS D	LOS E
Limited Secondary Highway	2 lanes	12,000	13,500	15,000	16,500	18,000
Secondary Highway	4 lanes	24,000	27,000	30,000	33,000	36,000
Secondary Highway (Limited Access)	4 lanes	28,000	32,000	36,000	40,000	44,000
Major Highway	6 lanes	36,000	40,400	45,000	49,500	54,000
Major Highway	8 lanes	48,000	54,000	60,000	66,000	72,000

Source: *City of Santa Clarita Draft General Plan Circulation Element Update* (2008).

CMP ANALYSIS

A Congestion Management Program (CMP) analysis was conducted in accordance with procedures described in Appendix B – Guidelines for CMP Transportation Impact Analyses presented in the *2004 Congestion Management Program for Los Angeles County*. Appendix B specifies the following analysis methods for qualifying intersections and freeways:

- Qualifying CMP arterial monitoring signalized intersections should be analyzed using the ICU methodology.
- Qualifying freeway mainline segments are to be analyzed using a simplified demand-to-capacity calculation, in which the freeway has a capacity of 2,000 vehicles per hour per lane.

The qualifying intersections are Sierra Highway/Sand Canyon Road, Sierra Highway/Soledad Canyon Road, and Sierra Highway/Placerita Canyon Road. The qualifying freeway segment is the segment of SR 14 north of I-5 to Newhall Avenue.

3. IMPACT SIGNIFICANCE CRITERIA

This chapter presents the thresholds of significance to be used in identifying project-specific and cumulative impacts. Separate criteria are identified for the roadway, bicycle, pedestrian, and transit systems using policies of the City of Santa Clarita (*Local CEQA Guidelines* adopted by City Council in April 2005) and other responsible agencies.

SIGNIFICANCE CRITERIA – ROADWAY SYSTEM

The project would cause a significant impact if it would:

- Worsen an intersection maintained by the City of Santa Clarita from LOS D or better to LOS E or F.
- Cause the following increase in delay at an intersection maintained by the City of Santa Clarita that operates (with the project) at LOS D or worse:[3]

  – LOS D with the project: more than 4-second increase in delay is significant.

  – LOS E or F with the project: more than 2-second increase in delay is significant.
- Cause the following increase in volume-to-capacity (v/c) ratio under cumulative conditions on a roadway in the City of Santa Clarita:

  – LOS D with the project: more than 0.02 increase in v/c ratio is significant.

  – LOS E or F with the project: more than 0.01 increase in v/c ratio is significant.
- Cause the following increase in volume-to-capacity (v/c) ratio at an intersection or two-lane roadway in unincorporated Los Angeles County:

  – LOS C pre-project: 0.04 or greater increase in v/c ratio is significant.

  – LOS D pre-project: 0.02 or greater increase in v/c ratio is significant.

  – LOS E or F pre-project: 0.01 or greater increase in v/c ratio is significant.
- Cause a facility maintained by Caltrans to worsen from LOS E or better to LOS F.
- Exacerbate LOS F operations on a facility maintained by Caltrans, causing the traffic demand to increase by 2 percent of capacity or more.

3. Delay threshold calculated by converting the City's v/c ratio threshold into a corresponding delay threshold based on HCM delay range for given LOS category.

- Cause an intersection or two-lane roadway maintained by Los Angeles County to be significantly impacted in accordance with analysis procedures and thresholds set forth by the County.

SIGNIFICANCE CRITERIA – TRANSIT SYSTEM

The project would cause a significant impact if it would:

- Interfere with existing or planned transit system service or facilities.
- Cause an inconsistency with a policy related to transit in the City's *Transportation Development Plan* (adopted in 2006).

SIGNIFICANCE CRITERIA – BICYCLE/PEDESTRIAN SYSTEM

The project would cause a significant impact if it would:

- Eliminate or adversely affect an existing bikeway or pedestrian facility in a way that would discourage its use.
- Cause an inconsistency with a relevant policy in the City's *Non-Motorized Transportation Plan* (adopted in 2008).

SIGNIFICANCE CRITERIA – CMP ANALYSIS

The project would cause a significant impact if it would increase the traffic demand by 2 percent of capacity at a CMP intersection or freeway facility, thereby resulting in or exacerbating LOS F conditions.

CMP transportation analysis also includes a review of transit impacts. This includes evidence that the transit operators received the Notice of Preparation (NOP) of an EIR, identification of existing transit services near the project, estimation of the number of project-related transit trips, information on facilities and/or programs that encourage public transit, and an analysis of project impacts on transit service.

4. EXISTING CONDITIONS

This chapter presents the existing condition of the roadway, transit, bicycle, and pedestrian circulation in the study area.

ROADWAY SYSTEM

This section describes the freeways, arterials, and local streets that would provide access to the proposed project. The existing roadway system including roadway designations and number of lanes is shown on Figure 2.

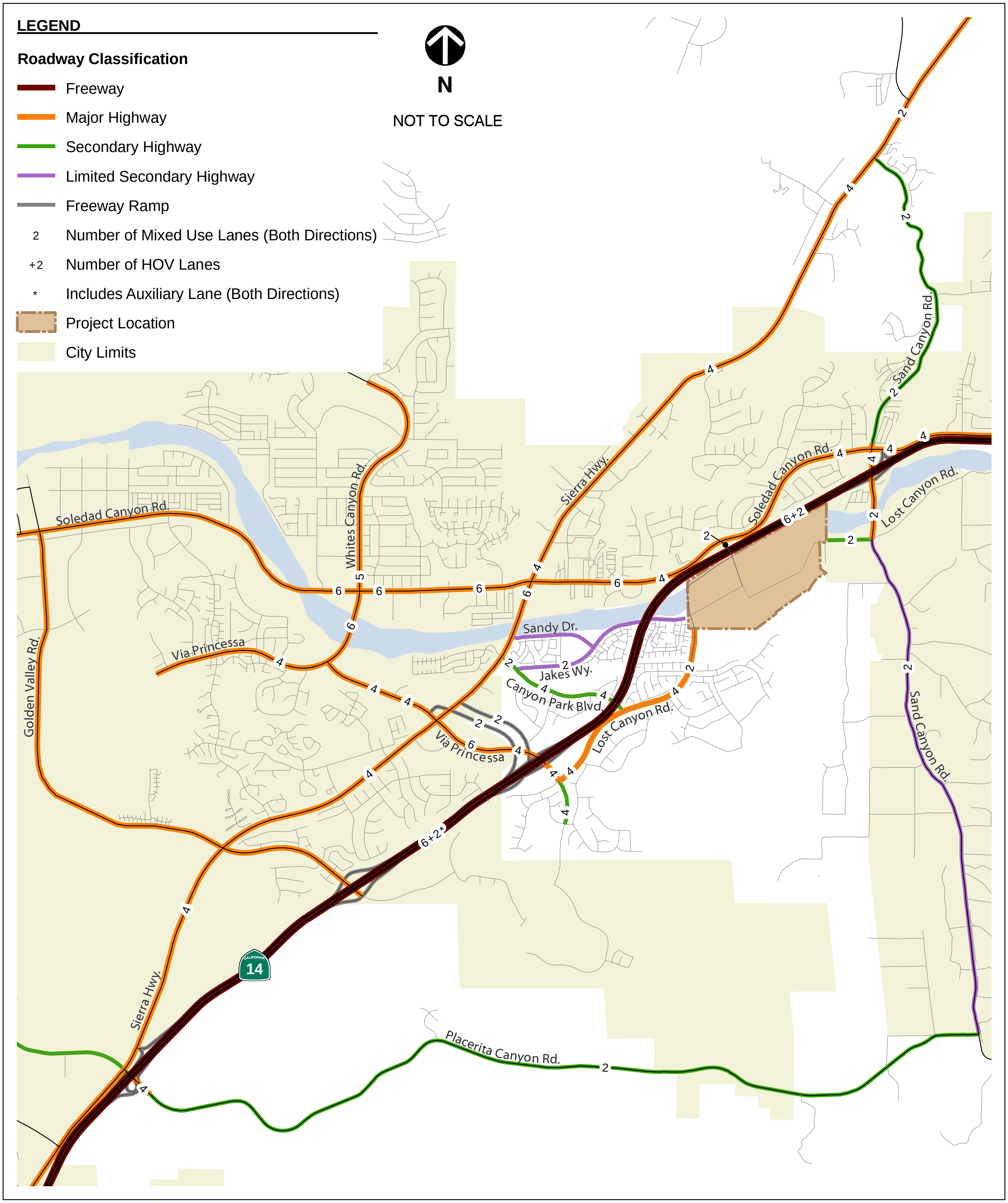
Freeways

SR 14 (Antelope Valley Freeway) – is a north-south freeway that extends from I-5 in northern Los Angeles County through Santa Clarita and into the Antelope Valley. It gradually narrows from 11 lanes just north of I-5 to six lanes north of Sand Canyon Road. It has a posted speed limit of 65 miles per hour (mph). SR 14 has a continuous High Occupancy Vehicle (HOV) lane in each direction throughout the study area. The HOV lane is 2+ and operates southbound from 5:00 to 9:00 a.m. and northbound from 3:00 to 7:00 p.m. Outside of those hours, it functions as a general purpose lane. The following describes the cross-sections of SR 14 in the study area.

- North of I-5 (PM[4]=24.8) – Northbound: 5 mixed-use and 1 HOV lane; Southbound: 4 mixed-use and 1 HOV lane. Average Annual Daily Traffic (AADT) is 169,000 vehicles.[5]
- North of Newhall Avenue (formerly San Fernando Road) (PM=27.0) – 3 mixed-use lanes and 1 HOV lane in each direction. AADT is 156,000 vehicles.
- Between Golden Valley Road (PM=29.7) and Via Princessa/Sierra Highway (PM=30.8) interchanges – 3 mixed-use lanes, 1 HOV lane, and 1 auxiliary lane in each direction. AADT is 148,000 vehicles.
- Between Via Princessa/Sierra Highway and Sand Canyon Road (PM=33.4) interchanges – 3 mixed-use lanes and 1 HOV lane in each direction. AADT is 118,000 vehicles.
- North of Sand Canyon Road interchange – 2 mixed-use lanes and 1 HOV lane in each direction. AADT is 107,000 vehicles.

The Caltrans' counts indicate that traffic levels on SR 14 diminish as the freeway extends to the north. Likewise, the number of travel lanes is also reduced.

4. PM = PostMile is a numerical value (in miles) assigned by Caltrans to a given point on a highway
5. Source: Caltrans 2007 traffic counts available at: http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/



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ROADWAY SYSTEM AND NUMBER OF LANES - EXISTING CONDITIONS

FIGURE 2

According to the *2007 Average Annual Daily Truck Traffic on California State Highways* (Caltrans, September 2008), trucks were estimated to represent about 5.5 percent of the daily traffic volume on SR 14 north of I-5. Truck percentages were not available at any other locations on SR 14 within the study area. Truck traffic during weekday peak hours is often lower due to the effects of commuting. Thus, for analysis purposes, a heavy vehicle percentage of four percent is used for SR 14 for peak hour analysis.

The Caltrans *2007 Highway Congestion Monitoring Program* (HICOMP) indicates that segments of SR 14 between I-5 and Via Princessa/Sierra Highway are congested (defined as travel speeds below 35 mph for at least 15 consecutive minutes) for multiple hours of the morning commute period in the southbound direction and for multiple hours of the evening commute period in the northbound direction.

SR 14 Travel Time Surveys

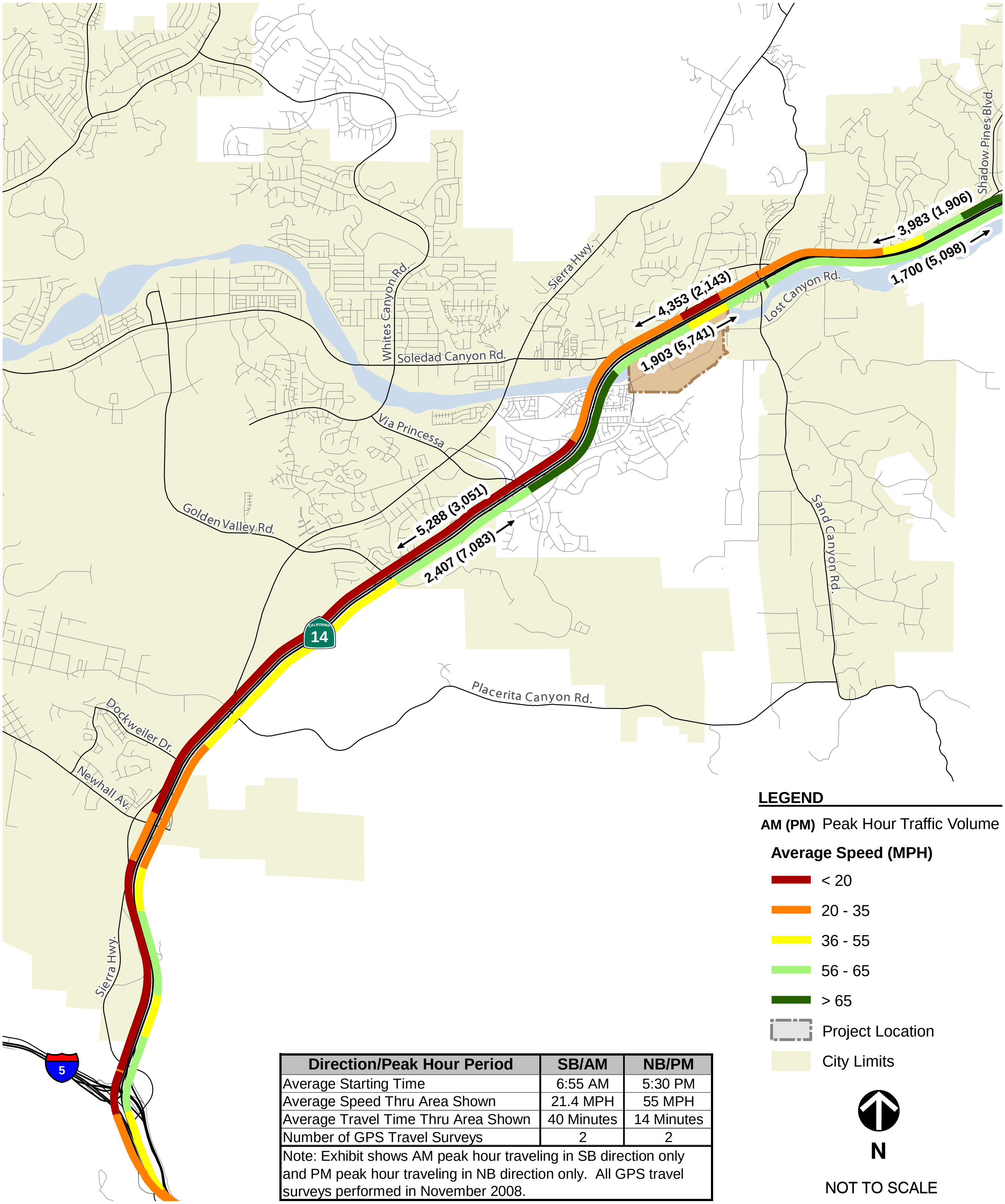
On November 16-18, 2008, Fehr & Peers performed vehicle travel time surveys in the peak direction of SR 14 using global positioning system (GPS) equipment. Two AM peak hour surveys were conducted on southbound SR 14 and two PM peak hour surveys were conducted on northbound SR 14. The GPS equipment calculates the location of the GPS transponder every second. Simple data manipulation can then be used to calculate average speed from the distance and time measurements.

Figure 3 displays the average travel speed on SR 14 in the peak direction based on the GPS travel survey. During the morning peak hour, the GPS equipment recorded congestion on southbound SR 14 beginning near the Sand Canyon Road interchange and extending southerly to I-5. The average travel speed through the corridor was 21 miles per hour (mph). The northbound SR 14 PM peak hour travel time runs revealed some minor slowing near the Newhall Avenue interchange, but an overall travel speed of 55 mph. These results generally match field observations by Fehr & Peers staff.

Major Highways

Major highways are six or more lane arterials designed for high mobility and limited vehicular access to driveways and cross streets. The following roadways within the study area are designated as major highways according to the *City of Santa Clarita General Plan Update Draft Circulation Element* (October, 2008):

Soledad Canyon Road – parallels SR 14 in the eastern area of Santa Clarita as a four-lane major highway with a posted speed limit of 50 mph. It continues in a westerly direction into central Santa Clarita, widening to six lanes at Galeton Road with a posted speed limit of 45 to 50 mph. It continues as a six-lane arterial to Bouquet Canyon Road where it becomes Valencia Boulevard. The posted speed limit west of Sierra Highway ranges from 35 to 50 mph. The segment east of Galeton Road, which is closest to the project site, carried 24,500 ADT in November 2008.



Direction/Peak Hour Period	SB/AM	NB/PM
Average Starting Time	6:55 AM	5:30 PM
Average Speed Thru Area Shown	21.4 MPH	55 MPH
Average Travel Time Thru Area Shown	40 Minutes	14 Minutes
Number of GPS Travel Surveys	2	2

Note: Exhibit shows AM peak hour traveling in SB direction only and PM peak hour traveling in NB direction only. All GPS travel surveys performed in November 2008.

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SR 14 TRAFFIC VOLUMES AND AVERAGE TRAVEL SPEEDS - EXISTING CONDITIONS

FIGURE 3

Lost Canyon Road (Via Princessa to Jakes Way) – is a four-lane divided major highway with a posted speed limit of 35 mph from Via Princessa to Medley Ridge Drive. East of this street, it has the same cross-section but is striped for only one lane in each direction. A bridge (of sufficient width to ultimately provide six lanes) across the Metrolink railroad tracks is constructed and provides a temporary access connection to the Colony Townhomes located on Jakes Way. West of Via Princessa, it has a posted speed limit of 35 mph and extends in a southwesterly direction to connect with Golden Valley Road. In November 2008, Lost Canyon Road carried 8,900 ADT east of Via Princessa and 6,300 ADT east of Canyon Park Boulevard.

Sand Canyon Road (Soledad Canyon Road to Lost Canyon Road) – is a north-south major highway featuring two continuous travel lanes (plus turn lanes) in each direction south of Soledad Canyon Road and on the SR 14 overcrossing. South of the NB SR 14 ramp intersection, it gradually narrows to two lanes and is a two-lane bridge over the Santa Clara River. It has a posted speed limit of 45 mph. In November 2008, Sand Canyon Road carried 11,100 ADT north of Lost Canyon Road.

Via Princessa (Lost Canyon Road to current western terminus) – is a four- to six-lane major highway. It is four lanes with a posted speed limit of 35 mph from Lost Canyon Road to Jason Drive, six lanes from north of Jason Drive to north of Sierra Highway, narrowing to four lanes as it continues in a northwesterly direction. It heads in a westerly direction west of Whites Canyon Road, terminating about 2/3 of a mile from Golden Valley Road. The posted speed limit ranges from 40 to 50 mph. In November 2008, Via Princessa carried 12,600 ADT south of SR 14.

Sierra Highway – is a generally north-south regional travel route that parallels SR 14 from Palmdale/Lancaster southerly to I-5 where it becomes San Fernando Road. It is four lanes south of Via Princessa, six lanes between Via Princessa and Soledad Canyon Road, and four lanes north of Soledad Canyon Road, narrowing to two lanes north of Sand Canyon Road. Sections of Sierra Highway within the northerly portion of the study area are undivided (i.e., left-turns are made from the inside through lane). The posted speed limit is 45 mph. The segment south of Soledad Canyon Road carried 35,000 ADT in November 2008.

Secondary Highways

Secondary highways are arterials planned for an ultimate of four lanes and designed for high mobility and limited vehicular access to driveways and cross streets.

Sand Canyon Road (Soledad Canyon Road to Sierra Highway) – is a two-lane north-south arterial street. The southerly portion of this segment is separated by a two-way left-turn lane. The northerly portion is undivided. It has a posted speed limit of 45 mph. This segment carried 7,100 ADT in 2005.

Canyon Park Boulevard – begins at Lost Canyon Road and extends under SR 14 to Sierra Highway. It is generally a four-lane divided arterial with a posted speed limit of 45 mph, with the exception of the segment between Sierra Highway and Jakes Way, which is two lanes with on-street parking. The Metrolink railroad tracks cross Canyon Park Boulevard at-grade less than

100 feet south of Jakes Way. This segment carries approximately 5,100 ADT (estimated from peak hour counts).

Lost Canyon Road (west of Sand Canyon Road) – is a two-lane undivided roadway with a posted speed limit of 30 mph (25 mph when children are present). It currently terminates just west of La Veda Avenue. Sulphur Springs Elementary School and Pinecrest School are accessed from this street and described in more detail later in this chapter.

Placerita Canyon Road (Sierra Highway to Sand Canyon Road) – is a four-lane divided arterial from Sierra Highway to just east of SR 14, where it becomes a two-lane undivided road. The segment east of SR 14 has a posted speed limit of 50 mph. This segment carries approximately 4,000 ADT (estimated from peak hour counts).

Via Princessa (Lost Canyon Road to Golden Valley Road) – is a recently constructed four-lane arterial with a posted speed limit of 35 mph. This segment carries approximately 3,600 ADT (estimated from peak hour counts).

Limited Secondary Highways

Limited secondary highways are two-lane streets with more limited mobility and greater access to adjacent land uses. These roadways are typically undivided and may include on-street parking.

Jakes Way – extends easterly from Canyon Park Boulevard under SR 14 to provide access to the Colony Townhomes. It is a wide street with one lane in each direction (a center left-turn lane in some sections), and on-street parking. It has a posted speed limit of 40 mph. The segment east of Canyon Park Boulevard carried 5,500 ADT in November 2008.

Sand Canyon Road (Lost Canyon Road to Placerita Canyon Road) – is a two-lane north-south undivided roadway. It has a posted speed limit of 45 mph. The northerly portion of this segment carried 9,300 ADT in November 2008.

Traffic Volumes

Fehr & Peers retained National Data Services to collect weekday morning (6:30 to 9:00 a.m.) and evening (4:00 to 6:30 p.m.) peak period traffic counts in early and mid November 2008 at all study locations. Counts were conducted on a Tuesday, Wednesday, or Thursday, and avoided the National Election (November 4th) and Veterans Holiday (November 11th). Weather conditions were generally dry, and no unusual traffic conditions were present. Local schools were in session at the time of the counts.

Fehr & Peers also collected average daily traffic (tube) counts on two mid-week days at seven locations near the project site for the Traffic Model Validation exercise described in Chapter 5. These daily counts, which were presented on the previous pages, varied by two percent or less from one day to the next. Since a similarly modest level of variability would also occur in the peak hour intersection counts, performing two sets of intersection turning movement counts and then averaging the results was unnecessary.

Figure 4 displays the existing AM and PM peak hour traffic volumes at the study intersections. This figure also displays the existing lane configurations and traffic control devices. As shown, 15 of the 23 study intersections are controlled by traffic signals.

AM and PM peak period traffic counts were conducted in November 2008 on SR 14 at the Sand Canyon Road and Golden Valley Road interchanges. Figure 3 shows the observed traffic flows in each direction for segments of SR 14 from north of Golden Valley Road to north of Sand Canyon Road. It should be noted that the AM peak hour southbound traffic volumes do not balance between segments and interchanges due to congestion that extended as far north (on the count day) as the Via Princessa interchange.

The peak hours of travel on Soledad Canyon Road generally occurred from 7:30 to 8:30 a.m. and from 5 to 6 p.m. The peak hours of travel in the peak direction of SR 14 occurred from 7:30 to 8:30 a.m. and from 4:30 to 5:30 p.m.

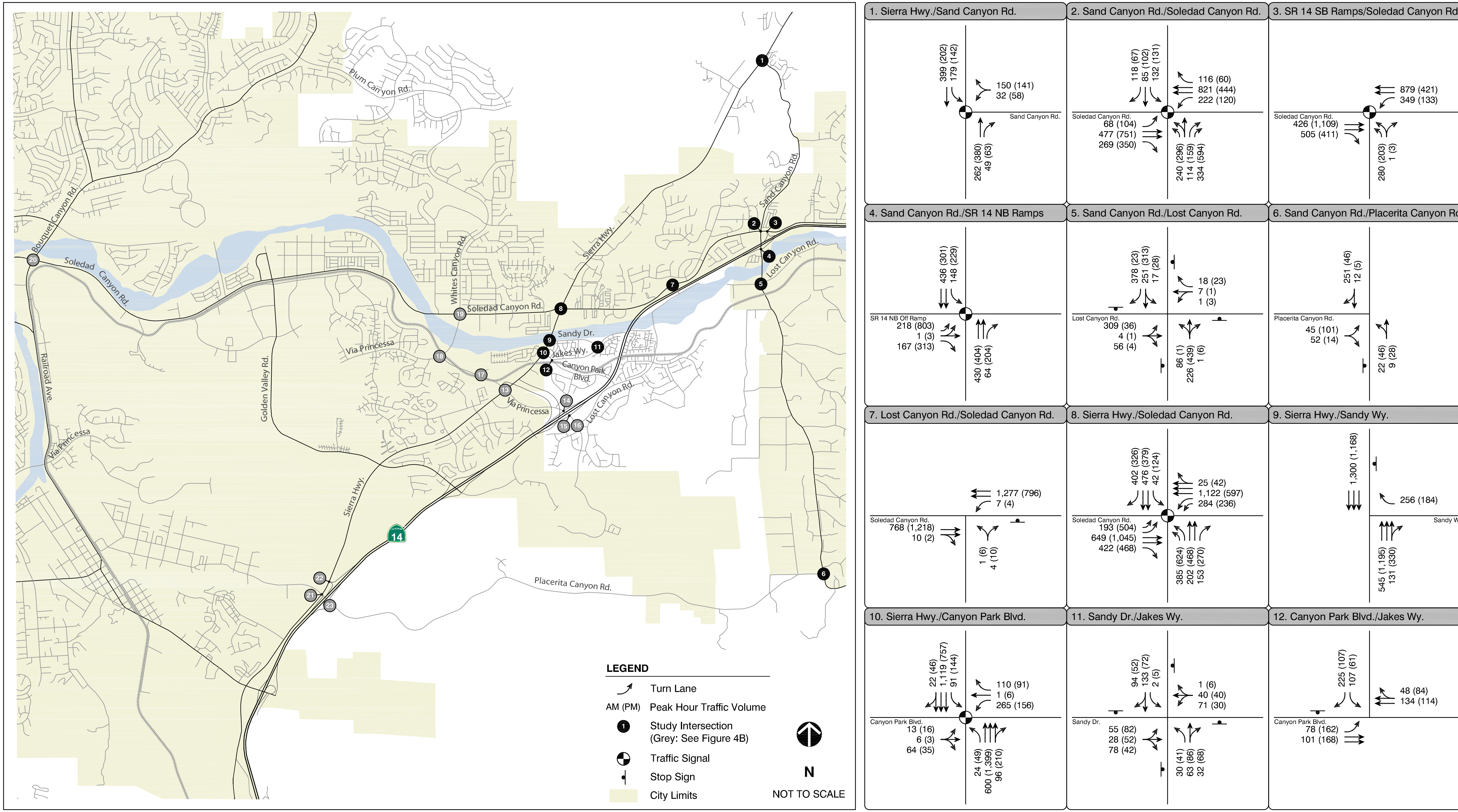
Usage of the peak direction HOV lane was also observed. During the AM peak hour, the southbound HOV lane carried approximately 1,375 vehicles south of the Via Princessa interchange, which represents about 26 percent of the total southbound hourly traffic flow. During the PM peak hour, the northbound HOV lane in this segment carried approximately 1,440 vehicles, which represents about 20 percent of the total northbound hourly traffic flow.

Intersection Operations

The following data was collected and used to analyze the study intersections:

1) Traffic volumes, lane configurations, and traffic control devices shown on Figure 4
2) Existing traffic signal phasing and timings (from the City and field-verified)
3) Presence of crosswalks, bicyclists, and pedestrians.

Table 3 displays the average delay and LOS for intersections analyzed using HCM procedures and v/c ratio and LOS for intersections analyzed using the ICU methodology (refer to separately bound Appendix A for technical calculations).



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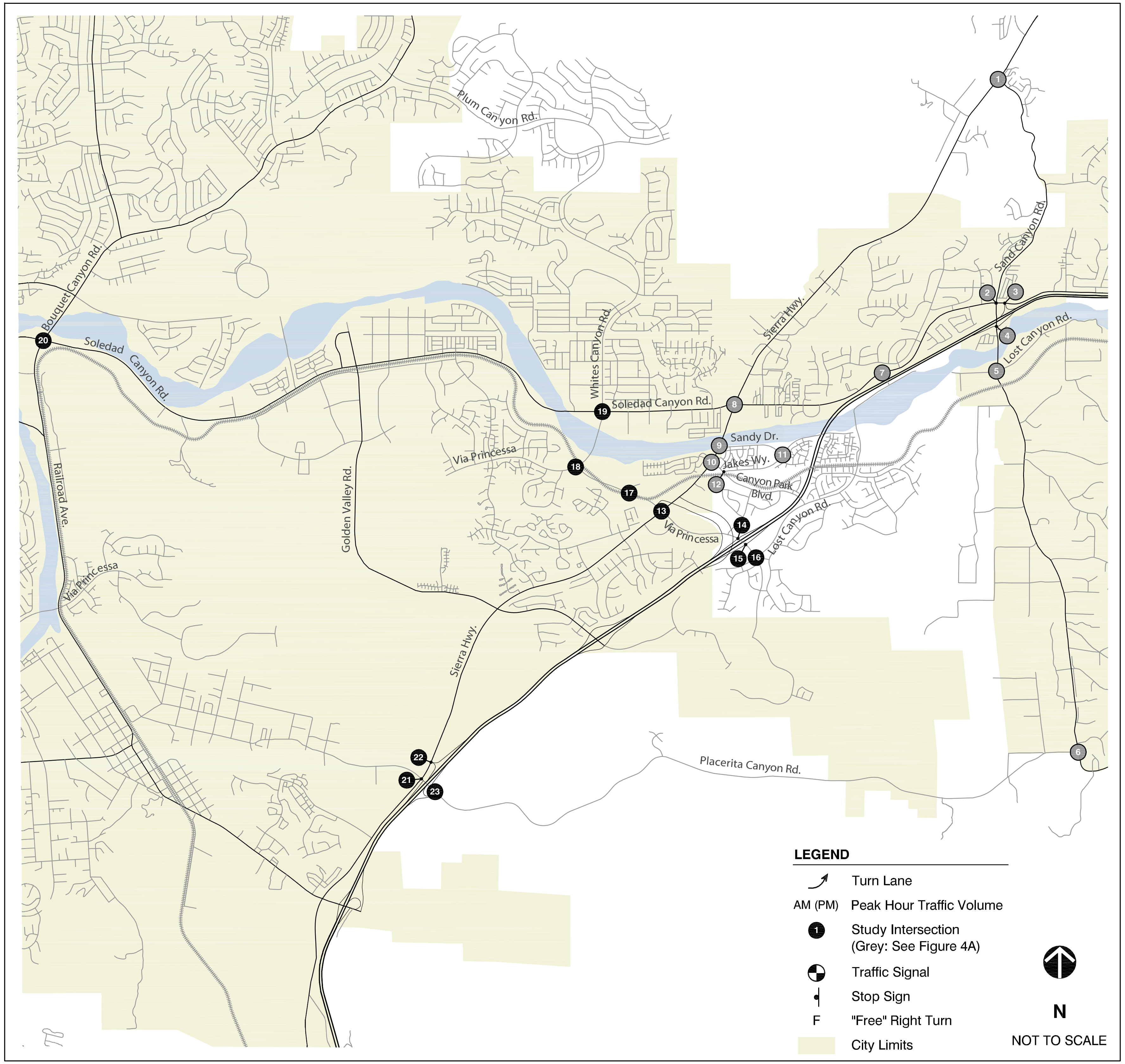
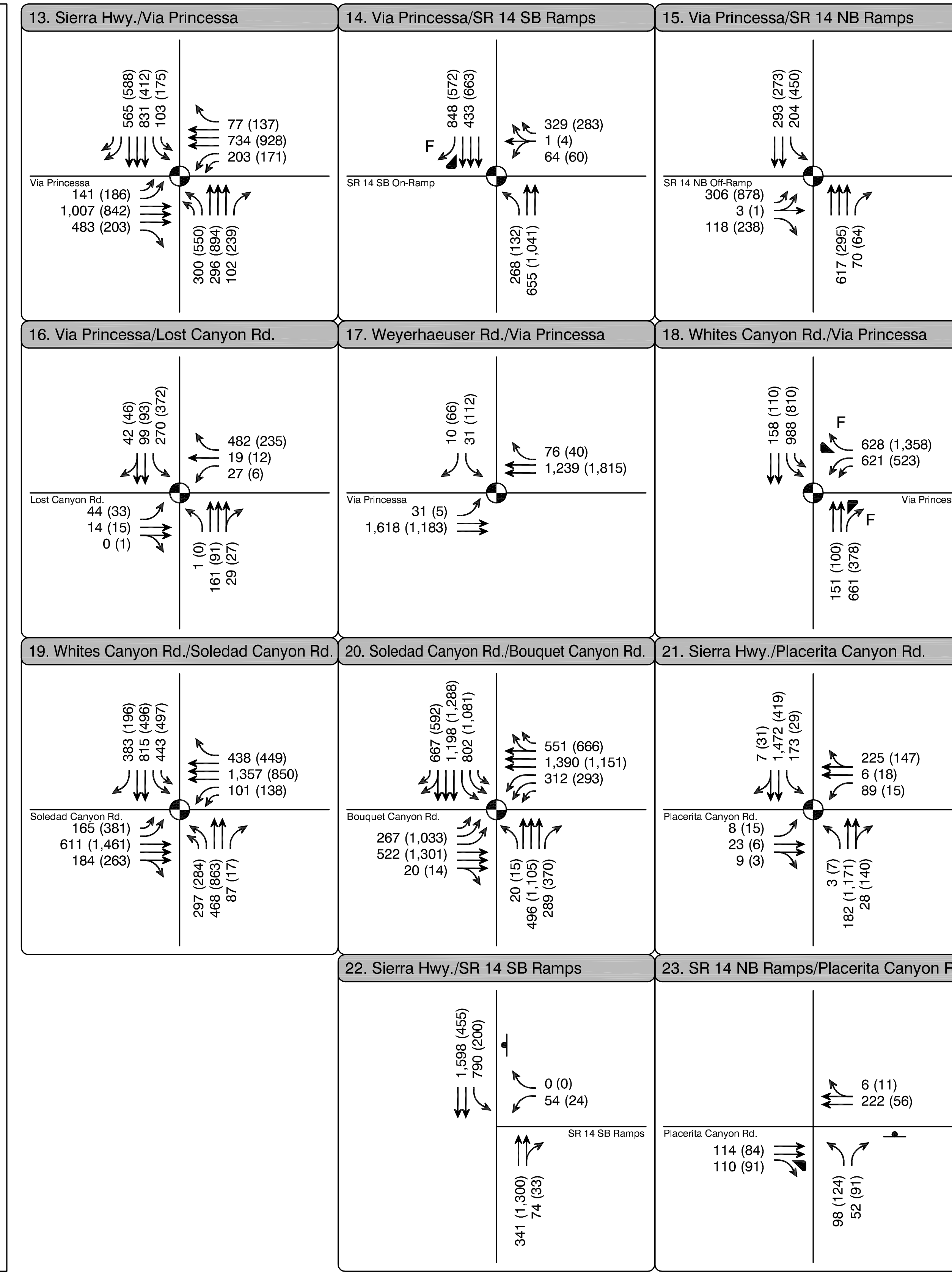
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - EXISTING CONDITIONS

FIGURE 4A





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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - EXISTING CONDITIONS

FIGURE 4B

TABLE 3:
INTERSECTION OPERATIONS – EXISTING CONDITIONS

#	Intersection	Traffic Control	Analysis Method	AM Peak Hour	PM Peak Hour
				Delay or V/C Ratio – LOS	Delay or V/C Ratio – LOS
1	Sand Canyon Road/Sierra Highway	Traffic Signal	ICU	0.49 - A	0.55 - A
2	Sand Canyon Road/Soledad Canyon Road	Traffic Signal	HCM/ SimTraffic	32 - C	34 - C
3	Soledad Canyon Road/SR 14 SB Ramps	Traffic Signal	HCM/ SimTraffic	23 - C	16 - B
4	Sand Canyon Road/SR 14 NB Ramps	Traffic Signal	HCM/ SimTraffic	12 - B	20 - C
5	Sand Canyon Road/Lost Canyon Road	All-Way Stop	HCM/ SimTraffic	27 - D	10 - A
6	Sand Canyon Rd./Placerita Canyon Road	Side-Street Stop	HCM	11 - B	11 - B
7	Soledad Canyon Road/Lost Canyon Road	Side-Street Stop	HCM	19 - C	33 - D
8	Sierra Highway/Soledad Canyon Road	Traffic Signal	HCM	37 - D	45 - D
9	Sierra Highway/Sandy Way	Side-Street Stop	HCM	17 - C	13 - B
10	Sierra Highway/Canyon Park Boulevard	Traffic Signal	HCM	21 - C	20 - C
11	Sandy Way/Jakes Way	All-Way Stop	HCM	11 - B	9 - A
12	Canyon Park Boulevard/Jakes Way	Side-Street Stop	HCM	14 - B	14 - B
13	Sierra Highway/Via Princessa	Traffic Signal	HCM	33 - C	38 - D
14	Via Princessa/SR 14 SB Ramps	Traffic Signal	HCM/ SimTraffic	18 - B	13 - B
15	Via Princessa/SR 14 NB Ramps	Traffic Signal	HCM/ SimTraffic	23 - C	28 - C
16	Via Princessa/Lost Canyon Road	Traffic Signal	ICU	0.64 - B	0.53 - A
17	Via Princessa/Weyerhaueser Way	Traffic Signal	HCM	4 - A	16 - B
18	Via Princessa/Whites Canyon Road	Traffic Signal	HCM	8 - A	8 - A
19	Soledad Canyon Road/Whites Canyon Road	Traffic Signal	HCM	40 - D	51 - D

TABLE 3:
INTERSECTION OPERATIONS – EXISTING CONDITIONS

#	Intersection	Traffic Control	Analysis Method	AM Peak Hour Delay or V/C Ratio – LOS	PM Peak Hour Delay or V/C Ratio – LOS
20	Soledad Canyon Road/Bouquet Canyon Road	Traffic Signal	HCM	38 - D	70 - E
21	Placerita Canyon Road/Sierra Highway	Traffic Signal	HCM	20 - B	16 - B
22	Placerita Canyon Road/SR 14 SB Ramps	Side-Street Stop	HCM	>50 - F	>50 - F
23	Placerita Canyon Road/SR 14 NB Ramps	Side-Street Stop	HCM	11 - B	10 - B

Notes:

ICU methodology was used for signalized intersections that are located in Los Angeles County, not directly adjacent to the City, pursuant to County requirements. HCM methodology was used for all unsignalized intersections and signalized intersections maintained by City of Santa Clarita or directly adjacent to the City and all Caltrans maintained signalized intersections.

Table 3 indicates that the following intersections operate at LOS D or worse during one or both peak hours:

5) Sand Canyon Road/Lost Canyon Road (LOS D during AM peak hour) [6]

7) Soledad Canyon Road/Lost Canyon Road (LOS D during PM peak hour) [7]

8) Sierra Highway/Soledad Canyon Road (LOS D during both peak hours)

13) Sierra Highway/Via Princessa (LOS D during PM peak hour)

19) Soledad Canyon Road/Whites Canyon Road (LOS D during both peak hours)

20) Soledad Canyon Road/Bouquet Canyon Road (LOS E during PM peak hour)

22) Placerita Canyon Road/SR 14 SB Ramps (LOS F during both peak hours)

All of the above intersections are located within the City of Santa Clarita. Intersection 22 is a Caltrans maintained intersection. Although the City considers LOS D to be acceptable, a significance threshold for project impacts when intersections are at LOS D is also applied.

6. Operations are at LOS E or F during the peak 15-minutes when adjacent schools begin session. However, intersection operates at an overall LOS D for the entire 60-minute AM peak hour.
7. Intersection LOS reported for minor street movement with greatest delay. This movement is 50 vehicles per hour or less. Majority of movements at intersection experience little or no delay.

Two-Lane Roadways (Los Angeles County)

Los Angeles County Traffic Impact Analysis Report Guidelines (Los Angeles County Department of Public Works, 1997) specifies that project impacts be evaluated on two-lane roadways. Thus, this report evaluates the following two-lane roadway segments in accordance with standards and methodologies set forth in the guidelines:

1) Sand Canyon Road south of Sierra Highway
2) Lost Canyon Road east of Medley Ridge Drive
3) Jakes Way east of Canyon Park Boulevard
4) Sandy Drive east of Sierra Highway
5) Placerita Canyon Road east of SR 14

Each of these segments currently operates at LOS C or better according to the methodology described in the *Los Angeles County Traffic Impact Analysis Report Guidelines*.

Freeway Operations

Fehr & Peers analyzed freeway mainline operations and ramp merge/diverge (ramp junction) operations using procedures described in Chapter 2. Table 4 summarizes the results. Refer to separately bound Appendix A for technical calculations.

TABLE 4:
FREEWAY OPERATIONS – EXISTING CONDITIONS

Freeway Facility	**Analysis Method**	**AM Peak Hour**	**PM Peak Hour**
		Density – LOS	**Density – LOS**
Freeway Mainline Sections			
NB SR 14: Between Golden Valley Road and Via Princessa/Sierra Highway (Weave)	HCM	A	E
NB SR 14: Between Via Princessa/Sierra Highway and Sand Canyon Road		8 - A	24 - C
NB SR 14: Between Sand Canyon Road and Soledad Canyon Road		10 - A	33 - D
SB SR 14: Between Soledad Canyon Road and Sand Canyon Road	AM Peak Hour: HI-Comp Report and average of two travel time surveys PM Peak Hour: HCM	24 - C	10 - A
SB SR 14: Between Sand Canyon Road and Via Princessa		F	9 - A
SB SR 14: Between Via Princessa/Sierra Highway and Golden Valley Road (Weave)		F	B

TABLE 4:
FREEWAY OPERATIONS – EXISTING CONDITIONS

Freeway Facility	Analysis Method	AM Peak Hour	PM Peak Hour
		Density – LOS	Density – LOS
Freeway Ramps			
SR 14 NB Off-Ramp/Sand Canyon Road	HCM (Lane Drop)	10 - B	28 - C
SR 14 NB On-Ramp/Sand Canyon Road	HCM	12 - B	34 - D
SR 14 SB Off-Ramp/Sand Canyon Road/Soledad Canyon Road	HCM	27 - C	13 - B
SR 14 SB On-Ramp/Sand Canyon Road/Soledad Canyon Road	HCM	24 - C	8 - A
SR 14 NB Off-Ramp/Via Princessa	HCM	11 - B	30 - D
SR 14 SB On-Ramp/Via Princessa	HCM	> 43 – F	14 - B

Notes:
- See discussion below for rationale for using HCM techniques versus field observations/travel time surveys.
- Ramps selected for analysis limited to those that would be used by the project to a significant degree.

Page 23-1 of the *HCM* specifies that the basic freeway segment analysis methodology does not apply or take into account demand conditions in excess of capacity and the influence of downstream queuing (as occurs on SR 14). Therefore, field observations and results of the two GPS travel time surveys were used to describe operations in the peak-direction for each peak hour. According to Exhibit 23-3 in the *HCM*, average passenger car speeds of less than 50 mph are associated with LOS F operations on a freeway segment. Thus, the southbound direction of SR 14 from south of Sand Canyon Road to Golden Valley Road is reported as operating at LOS F during the AM peak hour (i.e., GPS travel speed on this segment was less than 20 mph).

TRANSIT SYSTEM

This section describes existing public transportation services in the study area. Transit consists primarily of the Metrolink commuter rail line and City of Santa Clarita bus service.

Metrolink Commuter Rail

Metrolink is a commuter rail service that operates in Southern California. The major hub is Union Station in downtown Los Angeles, where seven lines radiate outward from this terminus station. Metrolink provides service between Lancaster and Union Station on the Antelope Valley line, with three stops in the Santa Clarita area, including the Via Princessa station.

The Antelope Valley line primarily runs a peak period schedule with limited midday and evening service. On weekdays, the Via Princessa Station receives 11 Union Station–bound and 11 Lancaster–bound trains. For trains to Los Angeles, service spans from 4:52 a.m. (first train to stop at Via Princessa) to 6:49 p.m. (last train to stop at Via Princessa). For trains to Lancaster, service spans from 7:35 a.m. to 9:54 p.m. Weekend service is less frequent. During the peak weekday periods, five Union Station–bound trains stop at Via Princessa in the AM compared to one in the PM. Two Lancaster bound trains stop at Via Princessa in the AM peak period while three stop in the PM peak period. Headways vary, but trains can be as frequent as every 30 minutes in the AM and every 40 minutes in the PM (peak direction only).

Metrolink charges time and distance-based fares, which vary by origin/destination and day of week (weekday versus weekend). For instance, the one-way fare to Union Station is $7.75 during the week and $5.75 during the weekend. To Lancaster, the one-way fare is $8.25 during the week and $6.25 during the weekend. Prepaid monthly passes are also available.

Via Princessa Metrolink Station

The Via Princessa station provides commuter rail access to the eastern and northeastern portions of Santa Clarita and adjacent areas of unincorporated Los Angeles County. The Santa Clarita and Newhall stations serve the western, southern, and northern areas of the City. This station preference is evidenced by the spatial distribution of home ZIP codes of Via Princessa Metrolink riders. On November 20, 2008, Fehr & Peers staff surveyed Metrolink riders boarding trains at Via Princessa during the AM peak period. Riders were asked their home and work ZIP codes. Figure 5a illustrates the spatial distribution of home ZIP codes among the surveyed riders. As shown, over 80 percent of surveyed riders reside in ZIP codes located north or east of the station. The data demonstrated that Via Princessa Metrolink riders typically come from nearby residential locations. Long distance commuting to the station, except in isolated cases, which included two riders traveling to the station from the Antelope Valley, was not observed.

Figure 5b illustrates the spatial distribution of work ZIP codes among the surveyed riders. Downtown Los Angeles and its environs (54%) were the most common work destinations, followed by Burbank (38%) and Glendale (8%).

The Via Princessa station has 392 parking spaces (378 regular, 14 disabled). Parking is free. Fehr & Peers conducted a parking survey at the station on November 12, 2008. The number of occupied parking spaces was 302 at 7:00 a.m., 338 at 8:00 a.m., and 362 at 9:00 a.m.

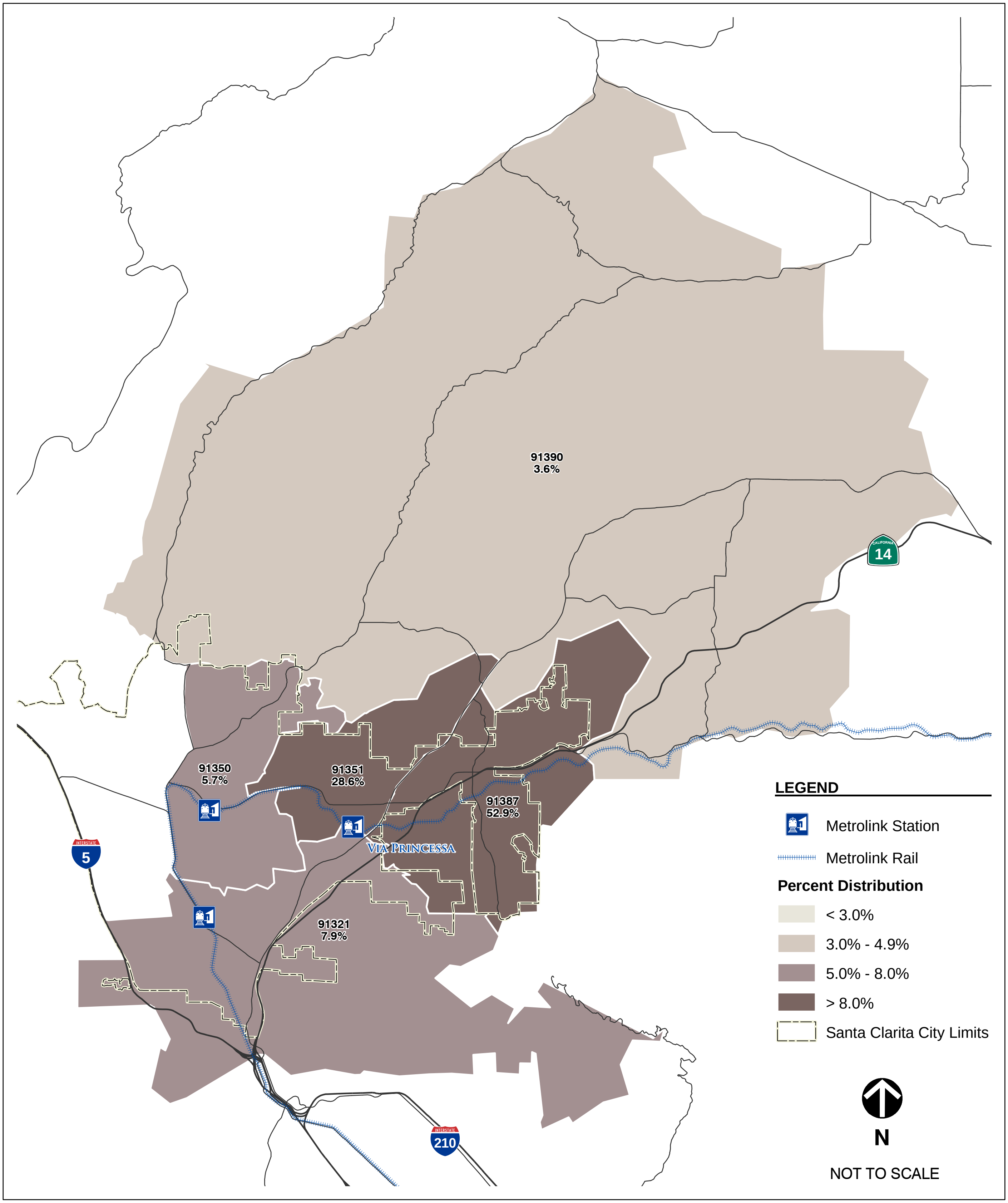
Via Princessa ridership data was obtained from Metrolink for June, July, and August, 2008. Because of the functionality of Metrolink service, only AM peak period boardings and alightings are recorded on a station-by-station basis. Southbound trains depart the station at 4:52, 6:02, 6:42, 7:15, 7:47, and 8:47 a.m. As noted above, by 9:00 a.m. the majority of the parking lot is full. During the weekday AM peak period, an average of 359 boardings and 16 alightings occur at the station.

During the AM peak period, southbound trains pick up a significant number of additional passengers at the Santa Clarita (531), Newhall (389), and Slymar (361) stations. These three downstream stations all add riders that cause certain trains to be at or near capacity. Metrolink has indicated that they are currently experiencing capacity issues on three AM trains (the 6:02 a.m., 6:42 a.m., and 7:15 a.m. trains that stop at Via Princessa) and two PM trains. In the AM peak period, alightings are greater than boardings at the Burbank station where capacity issues are alleviated. There are no weekend capacity issues.

View of Metrolink Train Traveling Northbound

Metrolink train capacity varies, but it is typically between 405 and 685 seated passengers. According to Metrolink, during the weekday AM peak period, the first southbound train to stop at Via Princessa has a seated capacity of 405 passengers, the next three trains have seated capacities of between 545 and 560 passengers, and the final train has a seated capacity of 685 passengers.

Reverse (trains traveling opposite the peak direction) rider capacity is not measured by Metrolink. However, it can be assumed that sufficient reverse rider capacity is available during both the AM and PM peak periods.



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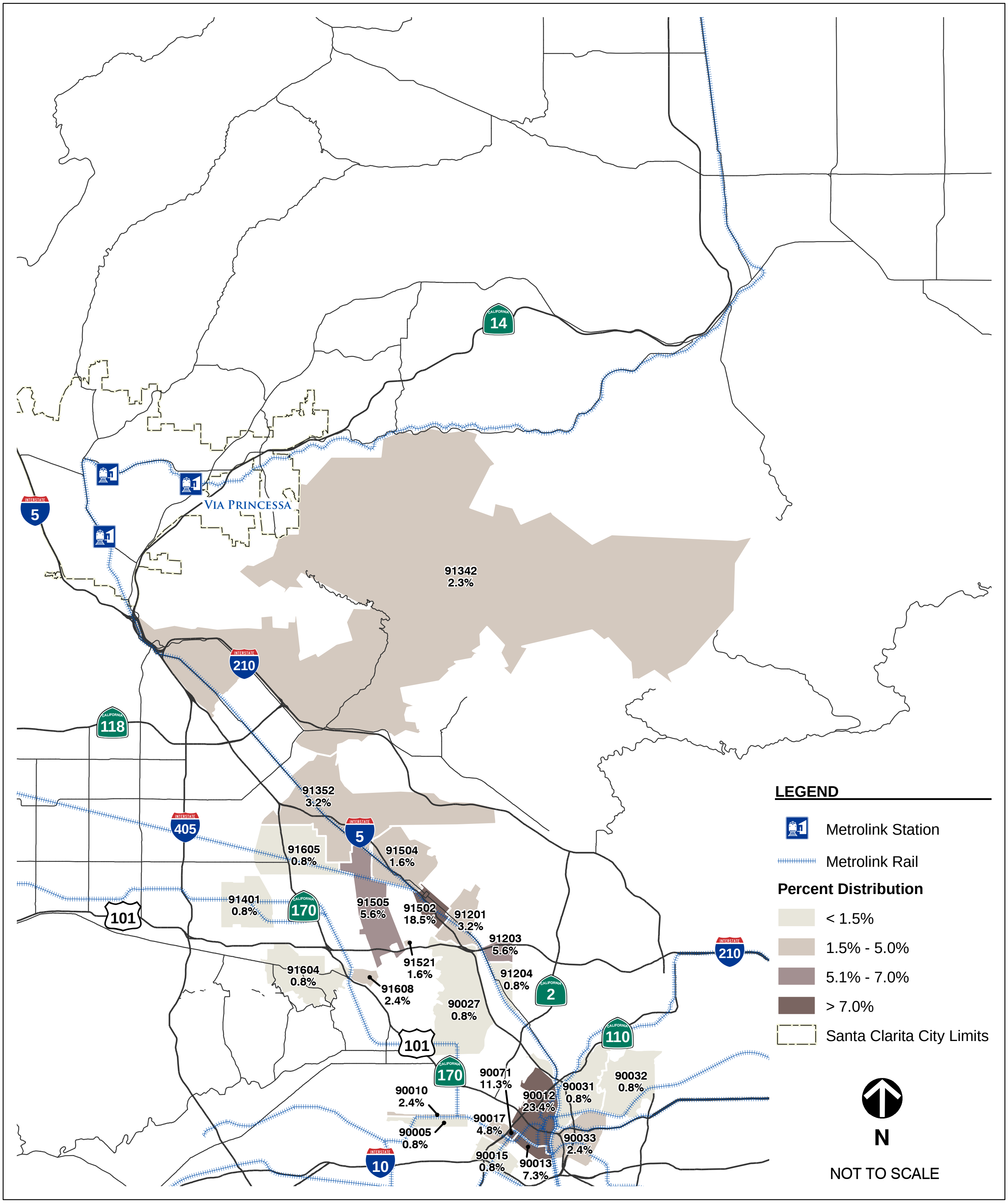
VIA PRINCESSA METROLINK RIDER SURVEY - HOME ZIP CODE DISTRIBUTION

FIGURE 5A



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VIA PRINCESSA METROLINK RIDER SURVEY - WORK ZIP CODE DISTRIBUTION

FIGURE 5B

Metrolink Versus Auto Travel Time Comparison

Fehr & Peers retained National Data Services to conduct GPS travel time runs on SR 14 on two weekdays (in the peak-period, peak-travel direction) in November 2008. No unusual traffic incidents were reported during any of the surveys. The following summarizes each route and the findings:

- Route #1: Southbound SR 14 beginning at the Palmdale Metrolink station at 6:30 a.m., stopping at the SR 14/Sand Canyon Road interchange, and then continuing to the Burbank Metrolink station.
  Finding: The 25-mile first leg of this trip took an average of 32 minutes, while the 28-mile second leg took an average of 66 minutes.

- Route #2: Northbound SR 14 beginning at the Burbank Metrolink station at 5:00 p.m., stopping at the SR 14/Sand Canyon Road interchange, and then continuing to the Palmdale Metrolink station.
  Finding: The first leg of this trip took an average of 57 minutes, while the second leg took an average of 31 minutes.

Using the Metrolink Web site scheduling page as a starting point, Fehr & Peers estimated that a Metrolink train would take 42 minutes to travel between the proposed station and the Burbank station. Travel from the proposed station to the Palmdale station would take about 44 minutes.

This evaluation shows that Metrolink would provide a 15 to 25 minute travel time savings during the peak hour of the peak travel direction between the proposed station and the Burbank station. The time required to travel to/from the station and wait for the train would consume a portion of this travel time savings. Nonetheless, this evaluation shows that the Metrolink transit service would provide a time-competitive alternative to the automobile for peak-period, peak-direction commuting to/from the south on SR 14.

This conclusion does not presently hold for travel between the proposed station and the Palmdale station given the lack of freeway congestion that would otherwise increase travel times. Although relative travel time savings is an important factor in the decision to select transit over the automobile, other factors such as cost, convenience, and free time during ride also influence the mode selection and therefore it is anticipated that the Metrolink system would be utilized by some Antelope Valley residents employed in the Santa Clarita Valley, including the Vista Canyon corporate center. It is also worth noting that under cumulative conditions, the segment of SR 14 between Palmdale and Vista Canyon will become more congested, making travel via Metrolink more time competitive.

City of Santa Clarita Bus Service

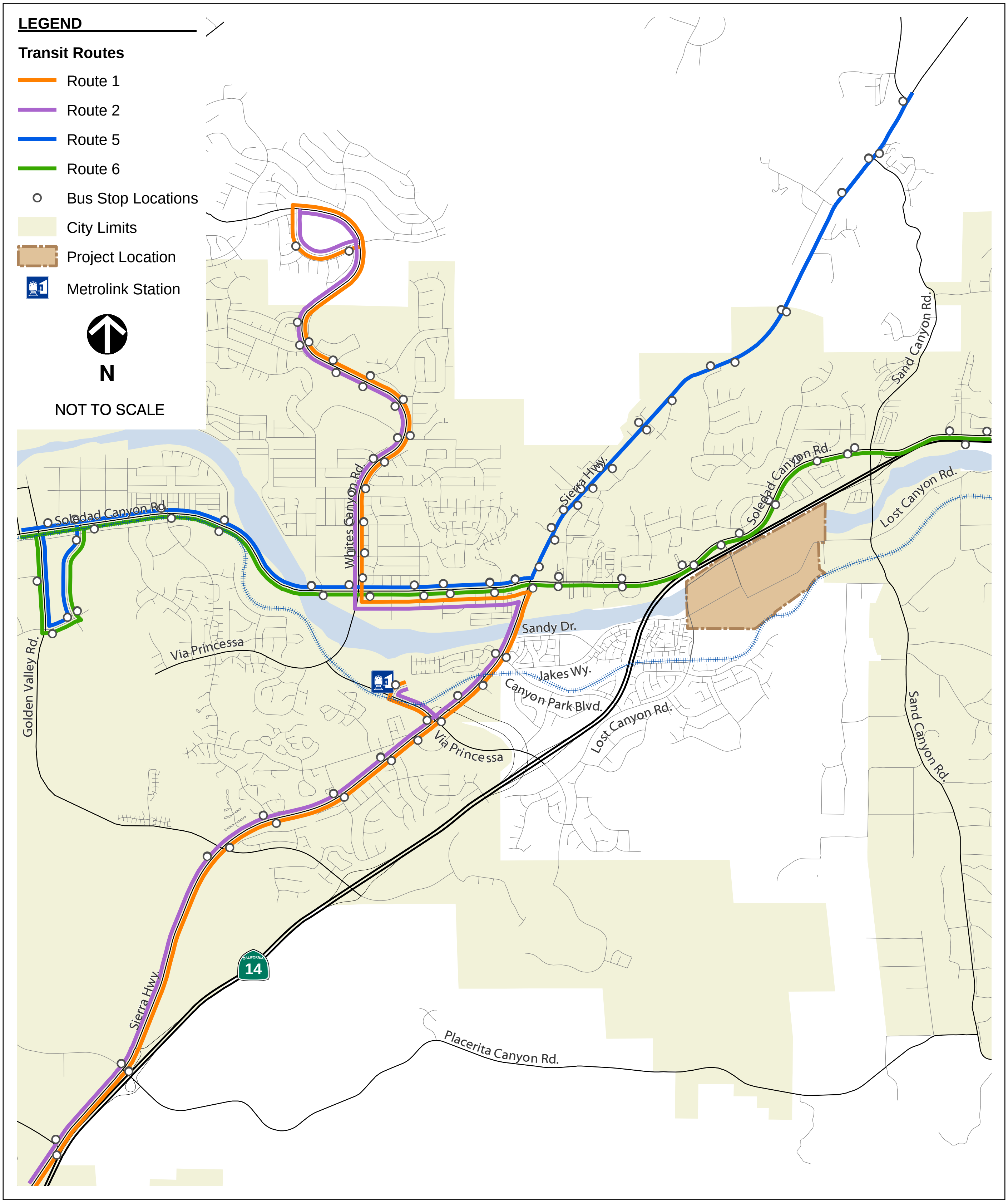
Santa Clarita Transit provides fixed route transit service throughout the City and in adjacent unincorporated areas. The system encompasses eight local-serving routes as well as four “Station Link” routes that serve the Santa Clarita Metrolink station. Commuter express bus service to Los Angeles employment destinations is also provided. One-way local fares are $1.00 with no fare for seniors, disabled, or children under five. A monthly pass costs $25.00.

Figure 6 shows that Routes 1, 2, 5, and 6 operate in the vicinity of the project site. Currently, no bus stops exist within ¼ mile of the project site. The closest existing stop (Route 6) is at the Soledad Canyon Road/Lost Canyon Road intersection. Routes 1, 2, and 5 stop at the Sierra Highway/Soledad Canyon Road intersection. The following describes each of these transit routes:

- **Routes 1 and 2** offer a connection to the Via Princessa Metrolink station. This dual route provides service every 20 to 30 minutes along Sierra Highway in the vicinity of the Via Princessa Metrolink station from approximately 4:00 a.m. to 11:00 p.m on weekdays; 30 minute service from approximately 7:00 a.m. to 11:00 p.m on Saturdays; and 30 minute service from approximately 8:00 a.m. to 9:00 p.m on Sundays and holidays. These routes serve McBean Regional Transit Center, Industrial Center, Commerce Center, Newhall Metrolink, City Hall, Valencia Town Center, River Oaks Shopping Center, Canyon High School, Sierra Vista Jr. High, and Plum Canyon. For the period of October through December, 2007, average weekday ridership on these combined routes was about 3,100 boardings (City of Santa Clarita).

- **Route 5** offers a schedule and route structure similar to Route 6 except for a split in the eastern portion of the service area. In this area, Route 5 travels along Sierra Highway instead of Soledad Canyon Road and also serves the College of the Canyons Canyon Country Campus. From October through December, 2007, average weekday ridership on this route was about 1,025 boardings (City of Santa Clarita).

- **Route 6** provides service closest to the project site along Soledad Canyon Road. This route provides 30- to 40-minute peak and 40- to 50-minute off-peak service from approximately 4:30 a.m. to 11:00 p.m. on weekdays; 30- to 60-minute service from approximately 7:00 a.m. to 10:30 p.m. on Saturdays; and 30- to 60-minute service from 7:00 a.m. to 8:30 p.m. on Sundays. The route serves Shadow Pines, Aquatics Center, Bowman High School, Santa Clarita Metrolink, McBean Regional Transit Center, Valencia Town Center, Henry Mayo Newhall Memorial Hospital, Hart High School, Placerita Junior High, Newhall Metrolink, Valencia Market Place, Stevenson Ranch, and Sunset Pointe. From October through December, 2007, average weekday ridership on this route was about 2,370 boardings (City of Santa Clarita).



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EXISTING TRANSIT FACILITIES

FIGURE 6

BICYCLE/PEDESTRIAN SYSTEM

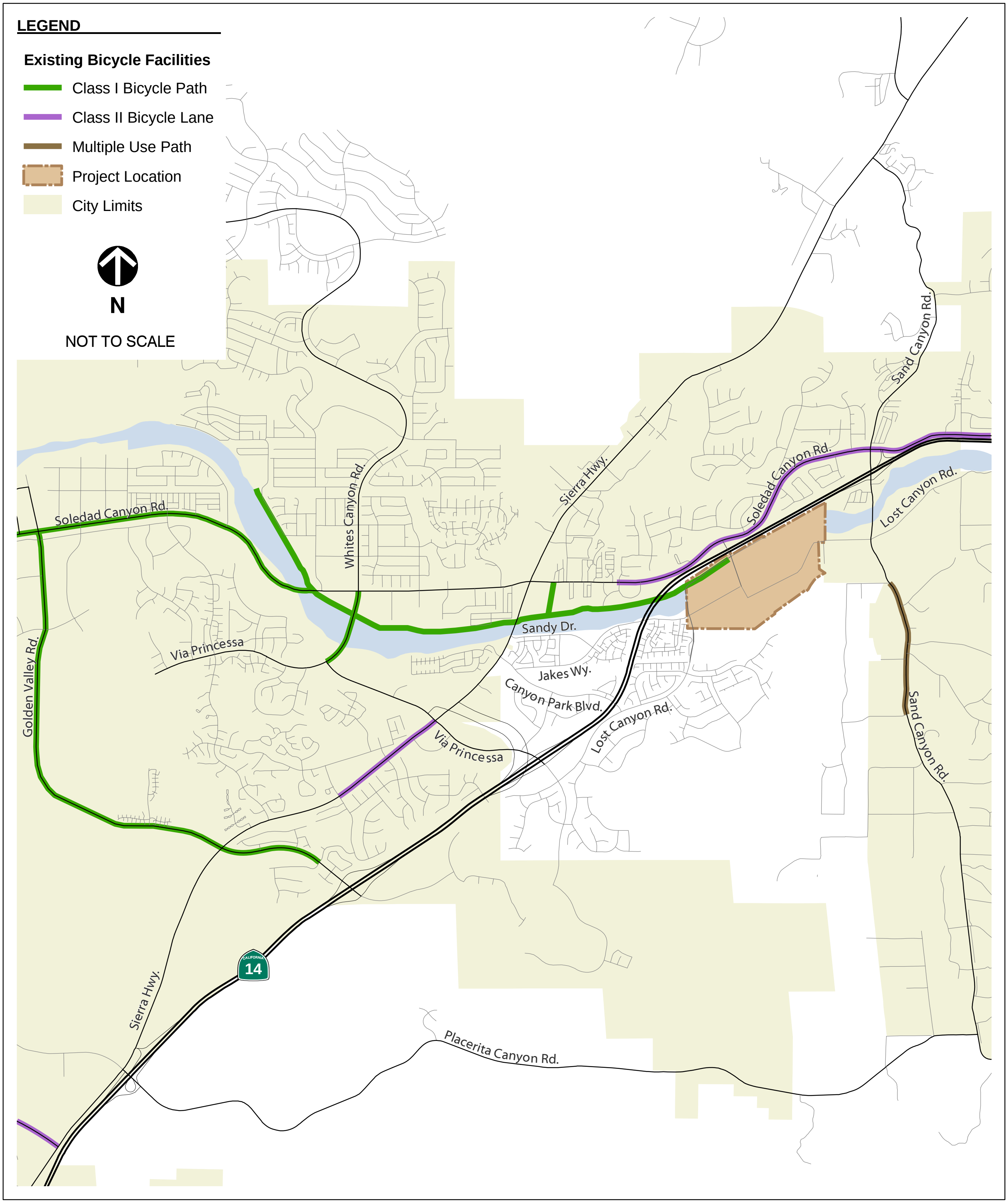
The City of Santa Clarita is an active promoter of non-motorized transportation modes, as is evidenced by its adoption in June 2008 of a *Non-Motorized Transportation Plan*. Bicycle and pedestrian facilities are part of the existing transportation environment and continue to play a key role in future development. Figure 7 shows the existing bicycle facilities in the vicinity of the project site.

The following describes the different classifications of bicycle facilities:

- Class I Bike Path – an exclusive, two-way path for bicycles that is completely separated from a street or highway.
- Class II Bicycle Lane – signed and striped one-way lanes on streets or highways, typically at the edge of the pavement. Bike lanes provide a demarcated space for bicyclists within the roadway right-of-way.
- Class III Bike Route – share the right-of-way with vehicles; they may be signed, but are not exclusively striped for use by cyclists.

The Santa Clara River Trail bike path (Class I) begins at the northern boundary of the project and parallels the Santa Clara River westerly to Whites Canyon Road and beyond. Class I paths are also provided along segments of Soledad Canyon Road, Golden Valley Road, and Sand Canyon Road. Class II bicycle lanes are present on Soledad Canyon Road west of Sand Canyon Road.

Santa Clarita's existing pedestrian network is comprised of sidewalks, paseos, and multi-use trails. Within the immediate project vicinity, pedestrian facilities are limited to sidewalks on portions of streets and crosswalks at intersections.



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EXISTING BICYCLE FACILITIES AND TRAILS

FIGURE 7

5. SUBAREA TRAVEL DEMAND MODEL VALIDATION

This chapter describes the process undertaken by Fehr & Peers to update the Santa Clarita Valley Consolidated Travel Demand Model's (SCVCTDM) ability to produce improved peak hour and daily traffic forecasts in the study area. This task is important in that inaccuracies in the base year model, if not corrected, could affect the quality of the interim and cumulative traffic forecasts.

This chapter describes the base year (2004) model's performance against standards set forth in the *Travel Forecasting Guidelines* (Caltrans, 1992), *Travel Model Improvement Program (TMIP) Model Validation and Reasonableness Checking Manual*, 1997, and Fehr & Peers' internal standards. The following sections describe the validation parameters, standards, and results.

VALIDATION PARAMETERS AND STANDARDS

For a model to be considered accurate and appropriate for use in traffic forecasting, it must replicate actual conditions to within a certain level of accuracy and demonstrate sufficient sensitivity to changes in the model's input variables. Since it is impossible for any model to precisely replicate all counts, validation guidelines have been established. The following describes four parameters and performance standards for evaluating the model accuracy.

1. **Model/Count Ratio**: Model/Count ratio is computed by dividing the volume assigned by the model and the actual traffic count for individual roadways model-wide.

   Standard: Model/count ratios should be close to 1.00 for both directions of the roadway links.

2. **Deviation**: Deviation is the difference between the model volume and the actual count divided by the actual count.

   Standard: A minimum of 75 percent of the roadway links should be within their maximum desirable deviation, which ranges from approximately 5 to 60 percent, depending on the total volume on the link.

3. **Correlation Coefficient**: The correlation coefficient estimates the correlation between the actual traffic counts and the estimated traffic volumes from the model.

   Standard: The model-wide correlation coefficient is suggested to be greater than 0.88.

4. **The Percent Root Mean Square Error (PRMSE)**: PRMSE is the square root of the model volume minus the actual count squared divided by the number of counts. It is a measure similar to standard deviation in that it assesses the accuracy of the entire model.

   Standard: Less than 30 percent is suggested for an appropriate aggregate PRMSE for all links with counts or by facility type and area type.

VALIDATION RESULTS

The process of validation started with the evaluation of the base year model obtained from the City of Santa Clarita. The initial model output was compared to the roadway traffic counts (collected between 2004 and 2008) and validation statistics were computed for the sub-area. These results are summarized in Table 5.

The model's roadway network was examined for accuracy and several link attributes, including posted speed limits, roadway lanes, functional classification and capacities were updated based on field observations. Traffic Analysis Zones (TAZs) within the sub-area were examined for appropriate loadings onto roadway links and corrected based on field information and aerial imagery. Land use data for these TAZs was also checked for accuracy and several changes were made to reflect the base year conditions. No modifications were made to the functionality of the traffic model (i.e., trip generation inputs, friction factors, assignment routines, etc.).

Validation statistics were calculated for the "enhanced" model and are shown in Table 5 (refer to separately bound Appendix B for detailed validation statistics). For the vast majority of time periods and validation parameters, the enhanced model validated better than the original model. As a result, the enhanced SCVCTDM was selected for use in the development of interim and cumulative traffic forecasts. The roadway and land use changes made to the base year model were also applied to the interim and cumulative model horizon years.

TABLE 5:
SCVCTDM SUB-AREA VALIDATION RESULTS

Time Period	Model/Count Ratio[1]		Percent within Maximum Deviation[2]		Percent RMSE[3]		Average Correlation Coefficient[4]	
	Original Model	Enhanced Model	Original Model	Enhanced Model	Original Model	Enhanced Model	Original Model	Enhanced Model
Daily	1.07	0.99	46%	65%	25%	16%	0.93	0.97
AM Peak Hour	0.97	0.89	69%	76%	39%	30%	0.90	0.95
PM Peak Hour	1.15	1.08	69%	74%	35%	28%	0.94	0.96

Notes:
[1] Standard is to have ratio be close to 1.0
[2] Standard is to have at least 75 percent of roadway links within their maximum desirable deviation.
[3] Standard is to have lower than 30 percent aggregate percent RMSE.
[4] Standard is to have correlation coefficient greater than 0.88.

The outcome of this model improvement exercise is a more reliable set of traffic forecasts, which translates into a more accurate assessment of the project's potential impacts on the surrounding roadway system.

6. PROJECT LAND USE AND TRAVEL CHARACTERISTICS

This chapter presents the following:

1) A discussion of current travel behavior and socio-economic characteristics of residents and workers in the City of Santa Clarita.
2) A summary of relevant research studies of TOD travel characteristics.
3) The proposed project's land use and circulation improvements.
4) The expected travel characteristics of the proposed project.

SANTA CLARITA TRAVEL BEHAVIOR AND SOCIO-ECONOMIC CHARACTERISTICS

According to the 2006 American Community Survey (ACS) from the US Census Bureau, 92 percent of Santa Clarita residents who work outside their residences indicated that they drove alone or carpooled to work. Approximately 5 percent took public transportation. The average travel time to work was 32 minutes.

According to information developed in conjunction with the Land Use element of the City's Draft General Plan update, over half of employed Valley residents travel out of the Valley to work, with the majority of those trips being to the south. The jobs-to-household ratio in the Valley has steadily increased from 0.88 in 2000 to a current ratio of 1.3 to 1.5 jobs per household. The City and County plan to adopt a goal of achieving at least 1.5 jobs per household to reduce the total number of vehicle trips on the road network and provide greater quality of life for residents.

About 65 percent of employed Santa Clarita residents are classified as being in management, professional, sales, and office occupations. The remaining 35 percent consist of service, construction, maintenance, production, and related occupations. The City's median household income was $76,000, and 33 percent of households earned $100,000 or more.

According to the 2006 ACS, about 45 percent of jobs within the City were classified as educational services, health care, social assistance, professional, scientific, management, retail/wholesale trade, and related occupations. Though the overall ratio of jobs to housing in the Santa Clarita Valley is fairly balanced, the area does not appear to have sufficient jobs to meet residents' salary needs. As a result, a significant proportion of City residents commute to jobs outside the Santa Clarita Valley (principally to the south).

Santa Clarita Trip Generation Surveys

In September 2008, Fehr & Peers conducted AM and PM peak period traffic counts for three consecutive mid-week days at the Valencia Town Center (portion west of McBean Parkway) and at the Newhall Creekside community located west of McBean Parkway and south of Decoro Drive in Valencia. The count data was used to calculate the internalization of trips for a mixed-use project

(Valencia Town Center) that is similar to the proposed project, and to compare residential trip rates in Creekside with ITE rates. The results, which are summarized in Appendix C, reveal the following:

- Valencia Town Center is a mixed-use project featuring residential, retail, office, a health club, and a hotel. During the PM peak hour, these uses generated 23 percent fewer trips than typical ITE rates assuming no internalization. When external walk trips (16 percent of total external trips) are considered, the project is estimated to have a PM peak hour internalization percentage of 15 to 20 percent.

- Newhall Creekside consists of a mix of single-family and attached homes totaling 709 units. The PM peak hour trip rate observed at this community was 10 percent lower than the ITE rate.

The implications of these findings are two-fold. First, the proposed project is expected to have an equivalent or greater level of internalization than at Valencia Town Center due to the project's greater size, greater diversity of on-site land uses and its accessibility to transit. Second, the use of ITE residential trip rates for the PM peak hour analysis would be conservative given the data at Creekside, which suggests that ITE rates overestimate PM peak hour trips by 10 percent.

GENERAL TRAVEL BEHAVIOR AND SOCIO-ECONOMIC CHARACTERISTICS OF TODS

A substantial amount of research has been conducted on the topic of TOD travel behavior. This section highlights the key findings of several recent research studies that are applicable to the proposed project's travel characteristics. Although a substantial amount of analysis at TODs has been conducted, this review focuses on those TODs located on transit lines similar to Metrolink (in terms of transit service headways and land uses at nearby stations). Below are findings summarized by topic area.

Transit Mode Share by User

A 2004 research paper entitled "*Travel Characteristics of Transit-Oriented Development in California*" by Cervero, Lund, and Willson analyzed travel behavior of TOD residents, employees, and retail patrons at various TODs located on rail transit lines in Northern and Southern California. The following summarizes some key findings from that research:

- Of <u>residents</u> surveyed on the Metrolink, Coaster, and Caltrain commuter rail lines (5 different locations), approximately 16 percent took rail transit and 2 percent took the bus for their work trip.

- Of <u>workers</u> at office buildings near rail stations, 12 percent traveled to work by rail transit.

- Of <u>hotel workers</u> at two hotels near rail stations, 41 percent traveled to work by rail transit, whereas no hotel guests did.

- Of 1,259 retail patrons surveyed at three shopping facilities near rail stations in California, 13 percent had arrived by rail transit.

The Cervero, Lund, and Willson (2004) research found that levels of transit usage varied significantly by region and rail type. In general, TODs located closer to central business district or adjacent to rail systems with more frequent headways tended to have greater levels of ridership.

A 2004 study entitled *Reconnecting America's Center for Transit-Oriented Development* by the Center for Transit Oriented Development (CTOD) found that commuters in transit zones are much more likely to use transit, and the size and speed of the rail systems is a significant determinant of whether TOD households use cars or transit. In Southern California, 16 percent of work trips in transit zones were made by transit, whereas 5 percent of work trips were made by transit in the metro area.

Effects of Transit Service Headways

Many researchers believe that transit service headways of 10 to 15 minutes during most of the day are ideal to support a transit lifestyle. However, in recognition of capital and operating costs associated with such frequencies, peak headways of 20 minutes and off-peak headways of 30 minutes are often recommended.

A study entitled *Peak and Off-Peak Frequencies, Out of Pocket Costs* (EcoNorthwest, 1991) estimated that a 10 percent increase in off-peak transit frequencies would cause an average increase in ridership of 7 percent.

Importance of Travel Times on TOD Commuting Habits

Not surprisingly, a number of different studies have concluded that the relative travel time provided by transit versus auto is a significant factor in the mode share decision. This travel time comparison is more important than other measures such as system connectivity, "track miles," and number of stations.

Benefits of Connecting Bus Service

Thompson & Matoff (2000) concluded that TODs with robust connecting bus service improves ridership. The provision of connecting bus service enlarges a rail system's catchment area.

Changes in Travel Patterns over Time Within TODs

According to the Cervero, Lund, & Willson research paper, those that live in TODs longer tend to use transit most often. Of those living in TODs for 10 or more years, 29 percent used transit for their "main" home-based work trip; residents living in TODs less than 5 years used transit only 17 percent for their "main" home-based work trip.

Auto Ownership Levels

Research shows that car ownership levels in TODs are significantly lower than region-wide averages. However, the need to use a car for some trips remains. Some TODs have used car-sharing as a means to reduce the need for parking in the TOD while providing the option to drive if needed. Transit agencies have played an important role in setting up and advocating for car sharing.

TOD Household Sizes

TODs often have smaller household sizes and fewer children than comparable developments in the same region. The Center for Transit-Oriented Development reports that in 2025, about 32 percent of households will have one or more children. However, in TODs this proportion will be closer to 21 percent. As evidence, a CTOD study of 5,304 residents in 26 housing projects near rail stations found that 83 percent of respondents lived in 1 or 2 person households.

Other Factors Affecting Transit Usage

The aforementioned literature reviews indicated that a TOD resident's or employee's decision to use transit is influenced by transit service headways, transit versus auto travel times, provision of robust connecting bus service, and age of the TOD. The decision to use transit is also influenced by a number of other variables such as the transit system's reliability, cost, safety, walk distance to the station, demand management strategies, provision of car sharing policies, and parking cost.

According to a published paper entitled *"Effects of TOD on Housing, Parking, and Travel"* (Transit Cooperative Research Program 128, Arrington and Cervero, 2008), research findings indicate that transit travel times are far stronger predictors of rail usage for TOD commuters than land use, urban design, and demand-management variables. Residents often rate community design, orientation, parks, town center, etc. as the "best aspects" of their community.

A June 2009 article in the ITE Journal entitled *New Transit Cooperative Research Program Research Confirms Transit-Oriented Developments Produce Fewer Auto Trips* (Arrington & Sloop) built off the TCRP 128 research results. The article concluded from observations at existing TODs that they generate approximately 50 percent fewer automobile trips than conventional developments. People living and working in TODs were found to walk and use transit more and own fewer cars.

Observed Trip Rates at TODs

A handful of studies have quantified auto trip generation rates at TODs. However, the majority of these studies are not applicable to the proposed project because they are based on data collected from transit lines in the San Francisco Bay Area, Portland, Washington DC, and Chicago. The transit service frequencies and higher density land uses surrounding these TODs is quite different from the densities in the proposed project.

TCRP 128 presents trip generation studies at two apartment TODs in lower-density settings in the Pennsylvania (Philadelphia) and New Jersey (Newark) regions. Both apartment complexes are located within ¼ mile of a commuter rail line and varied in height from 2 to 4 stories; much more similar to what is proposed with the project. These multi-family complexes were observed to generate an average of five auto trips per day per dwelling unit, with 0.38 trips per unit during the AM peak hour and 0.51 trips per unit during the PM peak hour. These rates are 25 percent lower than the ITE (LU Category 220 Low Rise Apartments) rate for daily and AM peak hour conditions, and 18 percent lower than the corresponding PM peak hour rate.

IMPLICATIONS OF LITERATURE REVIEW FINDINGS FOR THE PROPOSED PROJECT

The above literature findings offer several conclusions that are relevant to this study. They are summarized below:

1. Current Metrolink service frequencies will support moderate levels of ridership during peak periods (12 to 18 percent for TOD residents, employees, and retail patrons), but lower levels during off-peak periods.
2. The proposed Metrolink station will attract ridership not only from the Vista Canyon TOD, but also from adjacent residential uses located on Jakes Way and Lost Canyon Road, which are within a ½ mile walk of the station.
3. The provision of a bus transfer center within the project will tend to increase rail ridership at the proposed station and decrease external vehicle trips.
4. Metrolink will provide a time-competitive alternative to the automobile for peak hour (directional) travel between the project site and destinations in Burbank, Glendale, and Union Station. Based on calculated auto versus transit travel times, Metrolink would provide a 15- to 25-minute travel time savings during the peak hour of the peak travel direction between the proposed station and the Burbank station.
5. Higher levels of transit usage are expected 10 or more years after the project is constructed versus opening day.
6. Even if bus or rail service was not provided to the project site, the proposed project’s density, diversity of land uses, and design (to accommodate non-auto travel modes) will result in reductions in vehicle trips when compared to the “standard trip rates” used in the SCVCTDM and *Trip Generation* (ITE, 2008).

PROJECT DESCRIPTION

Figure 8 displays the project site plan as provided in April 2010 by Alliance Land Planning and Engineering. Full buildout of the project would include the following land uses:

- 1,021 attached, condominium units[8]
- 96 single-family dwelling units
- 646,000 square-feet of office space
- 164,000 square-feet of general retail space (including a ten-screen movie theater)
- 200-room hotel

In addition, the project would include a new Metrolink rail station, an adjacent bus transfer center, and a water reclamation plant (water factory). Figure 8 shows that Class I bicycle/pedestrian trails would be provided along the Santa Clara River, southern project boundary, and at various locations within the project. Parks, paseos, open space areas, and other amenities would also be provided. Figure 8 shows the proposed roadway system that would serve the project. As shown, access would be provided by the following four routes:

1) Lost Canyon Road (to Via Princessa)
2) Jakes Way (to Canyon Park Boulevard)
3) Vista Canyon Road (to Soledad Canyon Road)
4) Lost Canyon Road (to Sand Canyon Road)

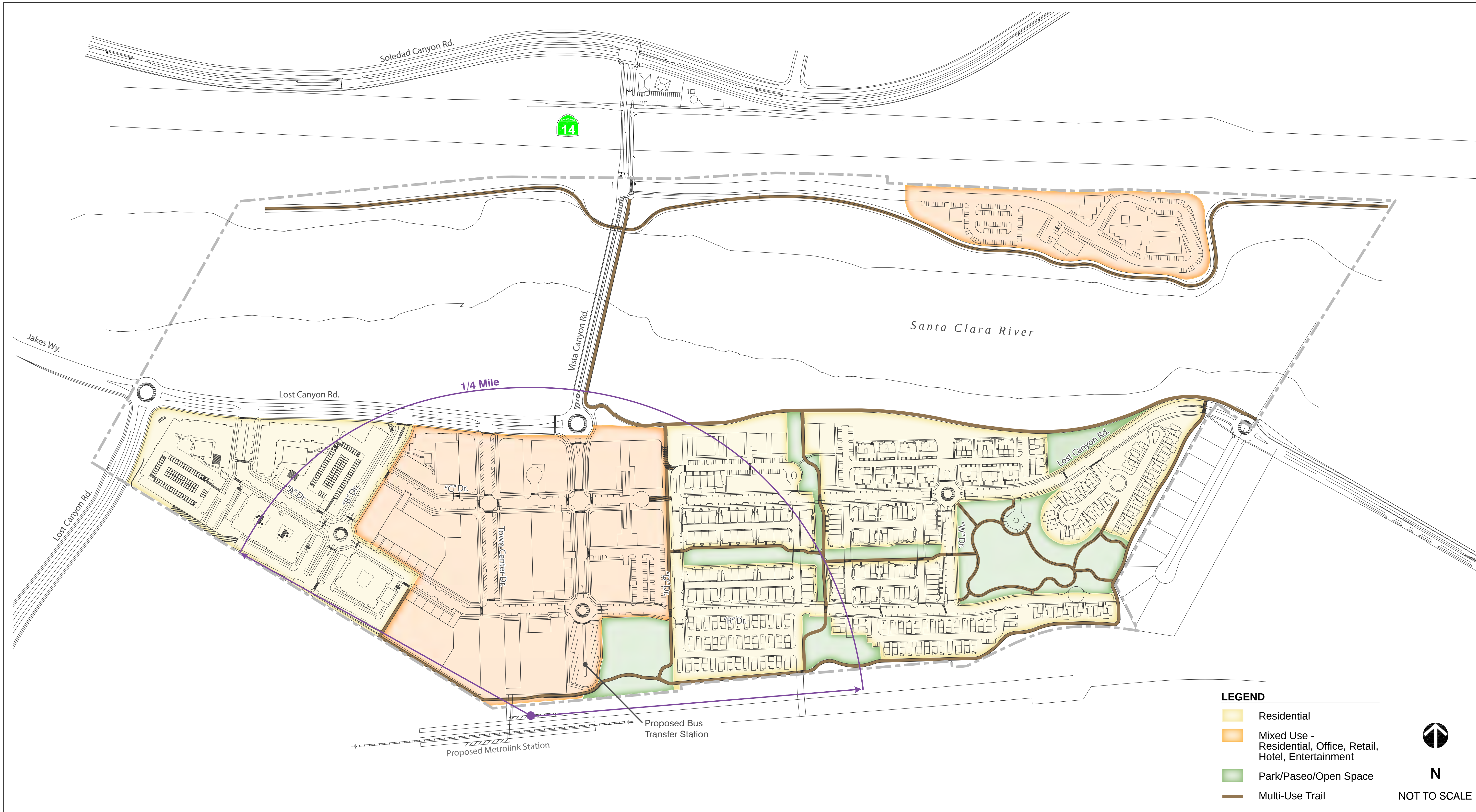
Lost Canyon Road would be a four- to six-lane major highway south of Jakes Way, a four-lane limited highway between Jakes Way and Vista Canyon Road, and a two-lane limited secondary (collector) street between Vista Canyon Road and Sand Canyon Road. Vista Canyon Road would be a two-lane limited highway.

Phase 1

Phase 1 of the project would consist of 680 multi-family units[9], 25,000 square feet of retail, and the water factory. The proposed Metrolink Station, the Vista Canyon Road Bridge over the Santa Clara River, and the easterly extension of Lost Canyon Road to La Veda Avenue would not be constructed or operational with Phase 1.

The project would alter travel patterns within the study area by virtue of adding new land uses, relocating the Metrolink station from the Via Princessa site to the project site, creating several new roadway connections, and modifying the school attendance boundaries for the Sulphur Springs Elementary School. Separate analytical processes are used to quantify changes in traffic patterns associated with each of these activities.

8. For purposes of this study, 579 of the attached, condominium units are assumed to be for-lease (apartment) units.
9. 430 of the 680 multi-family, attached condominiums are assumed to be for-lease (apartment) units.



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PROJECT SITE PLAN

FIGURE 8

PROJECT TRAVEL CHARACTERISTICS – PROPOSED LAND USES

This section describes the estimated travel characteristics of the proposed land uses. The focus is on estimating the project's external vehicle trip generation and determining the expected spatial distribution of those trips. Internal trip making and travel by rail and bus is also considered.

Trip Generation

The first step in estimating the project's gross, internal, and external trip generation is to obtain trip generation rates from *Trip Generation, 8th Edition* (Institute of Transportation Engineers, 2008). The land use quantities and trip rates for daily, AM and PM peak hour conditions were entered into the detailed spreadsheet in Table C-1 of separately bound Appendix C.

The project has a good diversity of land uses that complement each other. The following shows how the project compares to two land use diversity ratios often recommended by economists:

- The project provides about 120 square feet of retail space per dwelling unit, with much of this retail being local-serving, such as a market, restaurants, and banks. This is within the generally accepted "balanced" amount of 60 to 125 square feet of retail space per household. This suggests that much of the retail will serve the local area, but that some patrons will also come from surrounding areas.

- The project is likely to have a ratio of at least 2.5 jobs per household due to the substantial amount of office space (646,000 square feet) on-site. The professional office space is intended to satisfy many Santa Clarita residents' desire for locally-based management, professional, sales, and related occupations. However, since a regionally balanced ratio is about 1.2 jobs per household, a substantial percentage of office trips are expected to be external.

To estimate the project's internal-trip making, assumptions regarding internally paired trips were made for complementary land uses[10]. These assumptions are shown in the spreadsheets in Table C-1. It should be noted that no pass-by trip reductions were taken for the retail uses. This is because the majority of the retail uses will be "local-serving," and they are not located on existing streets from which "pass-by" can be taken.

Table 6 provides a summary of the gross trips, internal trips, transit trips, and external vehicle trips under "interim (project buildout)" conditions.

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10. Although an internal trip calculation methodology is contained in *Trip Generation Handbook* (ITE, 2004), it was not used in this instance because the procedure is based on only a handful of studies in Florida and has been found by Fehr & Peers through other applications to be unreliable.

TABLE 6:
PROJECT TRIP GENERATION – INTERIM CONDITIONS

Land Use	Quantity	Trip Rate			Trips		
		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Condominiums/Townhomes	442 du's	5.81	0.44	0.52	2,568	194	230
For-Lease Units (Apartments)	579 du's	6.65	0.51	0.62	3,850	295	359
Single-family dwelling units	96 du's	9.57	0.75	1.01	919	72	97
Business Professional	646 ksf	11.05	1.56	1.37	7,140	1,009	884
Retail	131 ksf	61.46	1.37	5.79	8,174	182	770
Multiplex Movie Theater	10 screens	150	0	13.6	1,500	0	136
Hotel	200 rooms	8.17	0.48	0.59	1,634	97	118
Gross Trips					25,785	1,849	2594
Internal Trips					2,544	170	259
External Trips – All Modes					23,241	1,679	2,335
External Transit (Metrolink/Bus) Trips					1,859	144	182
External Vehicle Trips					21,382	1,535	2,153

Notes: du's= dwelling units. ksf = thousand square feet.
Refer to Table C-1 in Appendix C for detailed assumptions and methodologies.

The following is a break-down of external daily vehicle trips to be generated by the various land uses contemplated as part of the proposed project:

- *Residential uses: 6,100 daily trips*
- *Non-residential uses: 15,300 daily trips*
- *Metrolink (auto travel to/from station): 1,430 daily trips*
- *Bus Transfer Station: 50 daily trips*

About two-thirds of trips to the office, retail, and entertainment uses in Vista Canyon are expected to come from locations within a 6-mile drive (i.e., from residences in the east side of the Valley). Many of these would be "replacement trips" otherwise made to other destinations in the west Valley or to the south.

According to Table 6, the combined effects of internalized trips and transit trips would cause the gross trip generation estimate to be reduced by about 17 percent for each analysis period. The project would generate approximately 1,540 external AM peak hour vehicle trips and 2,150 external PM peak hour vehicle trips under interim conditions. About 65 percent of AM peak hour trips would be inbound and 62 percent of PM peak hour trips would be outbound.

Table 6 is considered a conservative assessment of the project's external vehicular trip generation. The following "checks" confirm this conclusion:

- Appendix Table C-1 indicates that approximately 80 percent of gross residential trips enter/exit the project by automobile. The level of internalization and transit mode share (20 percent) is slightly lower than the observed trip rate reductions of 25 percent for the two apartment TODs located on commuter rail lines in the Philadelphia, PA and Newark, NJ regions.

- According to Table C-1, the analysis concluded that 10 percent of PM peak hour trips are expected to remain internal to the site, which is less than the range of 15 to 20 percent internal trips observed at Valencia Town Center (West), which is similar in land use mix to the proposed project.

- Mixed-Use (MXD) Trip Generation Spreadsheet – Fehr & Peers worked with several academic researchers to develop a state-of-the-art mixed-use trip generation spreadsheet. The spreadsheet estimates the percentage of daily trips that remain internal to a project site as well as external transit, walk, and vehicle mode splits. The spreadsheet is based on surveys of residents and employees in 240 mixed-use projects in six major metropolitan areas (Sacramento, Houston, Boston, Atlanta, Portland, and Seattle) in the United States. A set of 15 independent mixed use sites that were not included in the initial model were tested to validate the model. Appendix C contains the MXD trip generation model inputs and results for Vista Canyon. The model calculates the identical gross daily trip generation as shown in Table 6, and estimates that trip reductions (through internal trips, walk trips, and transit trips) will reduce the gross trip generation by 25 percent. The MXD model, which has been submitted to ITE for consideration of being included in a future update to the *Trip Generation Handbook*, predicts significantly more internal, walk, and transit trips than is assumed in this study.

- The 2010 Vista Canyon Parking Demand Analysis (Willson) study also presents mode share data at five residential projects located in commuter rail TODs. These stations were an average of 1,300 feet from the station, and exhibited an average of 11.9 percent rail/bus mode share. The rail/bus mode share for the Wilshire Promenade Apartments, located at a Metrolink station in Fullerton, was 16.7 percent. This study assumes 11 percent transit mode share for the residential uses.

Table 7 shows the same information for the cumulative year horizon scenarios. The only difference between Tables 6 and 7 is the percentage of external project trips made by transit under cumulative conditions (transit mode share assumed to increase by 25 percent over interim conditions). Transit trips are expected to represent a greater percentage of trips for the cumulative year scenario due to research findings that show greater transit patronage among 10-year or longer residents, likely increases in Metrolink service frequency, and increasing congestion on regional freeways.

The project includes a residential overlay zone, which could replace up to 250,000 square feet of office space with 233 multi-family residential units. As shown in Appendix C, the residential overlay would generate fewer trips than the proposed uses. When compared to the number of external trips shown in Table 6, the project with the overlay in place would generate 15 percent fewer AM peak hour trips, 8 percent fewer PM peak hour trips, and 5 percent fewer daily trips.

Table 8 displays the expected trip generation of Phase 1 of the project. As shown, Phase 1 would generate approximately 350 external AM peak hour vehicle trips and 500 external PM peak hour vehicle trips.

TABLE 7:
PROJECT TRIP GENERATION – CUMULATIVE CONDITIONS

Land Use	Quantity	Trip Rate			Trips		
		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Condominiums/Townhomes	442 du's	5.81	0.44	0.52	2,568	194	230
For-Lease Units (Apartments)	579 du's	6.65	0.51	0.62	3,850	295	359
Single-family dwelling units	96 du's	9.57	0.75	1.01	919	72	97
Business Professional	646 ksf	11.05	1.56	1.37	7,140	1,009	884
Retail	131 ksf	61.46	1.37	5.79	8,174	182	770
Multiplex Movie Theater	10 screens	150	0	13.6	1,500	0	136
Hotel	200 rooms	8.17	0.48	0.59	1,634	97	118
Gross Trips					25,785	1,849	2594
Internal Trips					2,544	170	259
External Trips – All Modes					23,241	1,679	2,335
External Transit (Metrolink/Bus) Trips					2,323	180	228
External Vehicle Trips					20,918	1,499	2,107

Notes: du's= dwelling units. ksf = thousand square feet.
Refer to Table C-1 in Appendix C for detailed assumptions and methodologies.

Trip Distribution/Assignment

The distribution of project trips was estimated for 2012 and interim conditions based on project-only traffic assignments from the SCVCTDM, travel time survey results, review of existing travel patterns, and locations of complementary land uses. The project-only SCVCTDM traffic assignment predicts that approximately 20 percent of external project trips will have one trip end (either origin or destination) within a couple of miles of the project. The remainder will be medium to longer distance trips, with commute trips being the most lengthy.

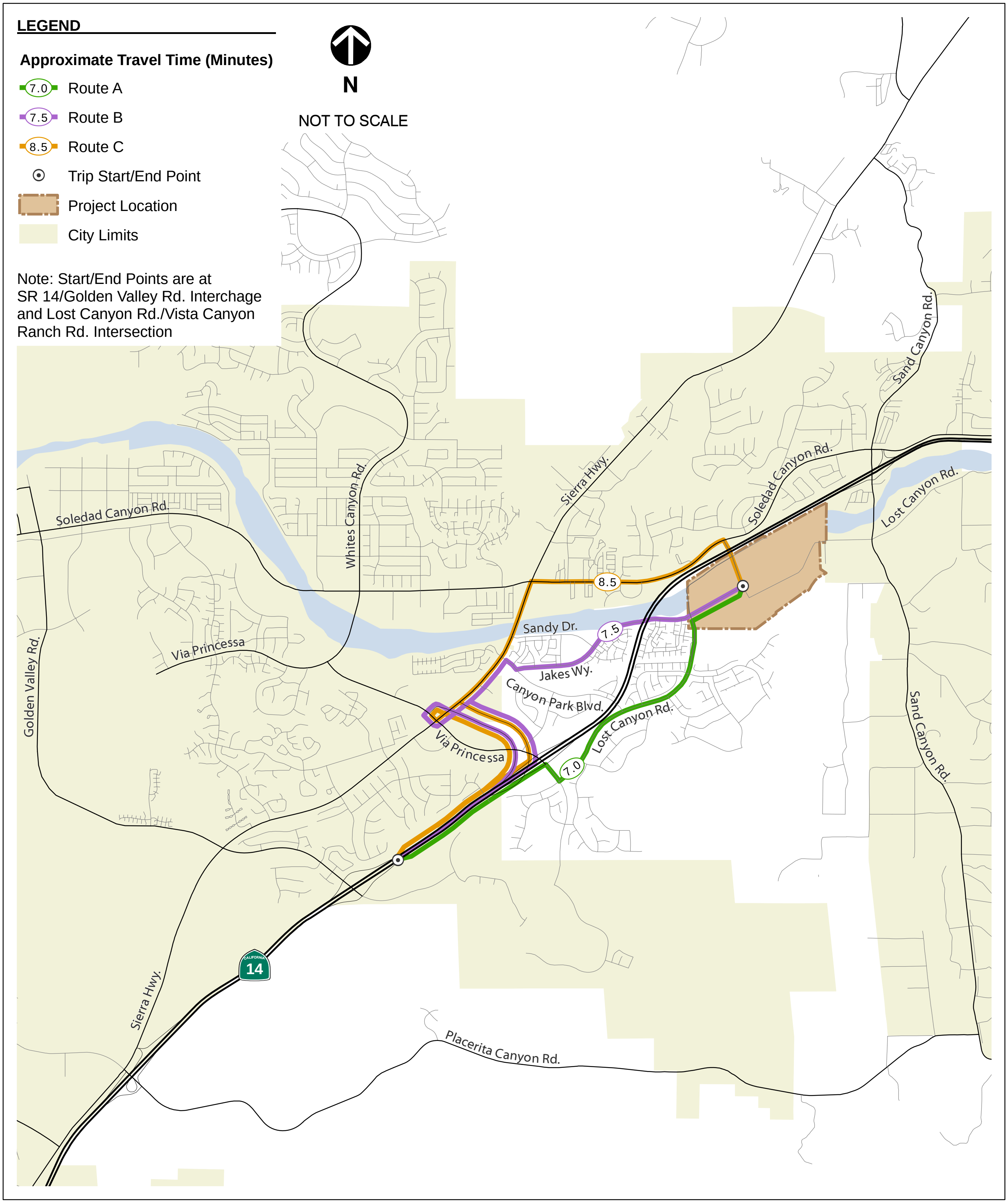
TABLE 8:
PHASE 1 TRIP GENERATION – YEAR 2012 CONDITIONS

Land Use	Quantity	Trip Rate			Trips		
		Daily	AM Peak Hour	PM Peak Hour	Daily	AM Peak Hour	PM Peak Hour
Condominiums/Townhomes	250 du's	5.81	0.44	0.52	1,453	110	130
Apartments	430 du's	6.65	0.51	0.62	2,860	219	267
Retail	25 ksf	61.46	1.37	5.79	1,536	34	145
				Gross Trips	5,849	363	542
				Internal Trips [1]	461	10	44
				External Trips [2]	5,388	353	498

Notes:
du's= dwelling units. ksf = thousand square feet.
[1] Assumes that 15 percent of retail trips will be internal to project site.
[2] Since Phase I of the project does not include the Metrolink station or bus transfer center, all external trips are assumed to be made by vehicle.

In November 2008, Fehr & Peers conducted in-vehicle surveys of several alternate routes to assess each route's relative travel time. Figures 9a, 9b, and 9c displays the approximate travel times between the project site and destinations to/from the south, west, and north, respectively. Refer to these figures for specific routes, start/end points, and travel times. This information was used in the assignment process of external project (vehicular) trips.

Figure 10 displays the expected distribution of external project trips under interim conditions. Of the four project accesses, the Lost Canyon Road access (to/from Via Princessa) and Vista Canyon Road access (to/from Soledad Canyon Road) are each expected to be used by 37-38 percent of project trips. The Jakes Way and Lost Canyon Road (to/from Sand Canyon Road) accesses would each serve 12 to 13 percent of project trips.



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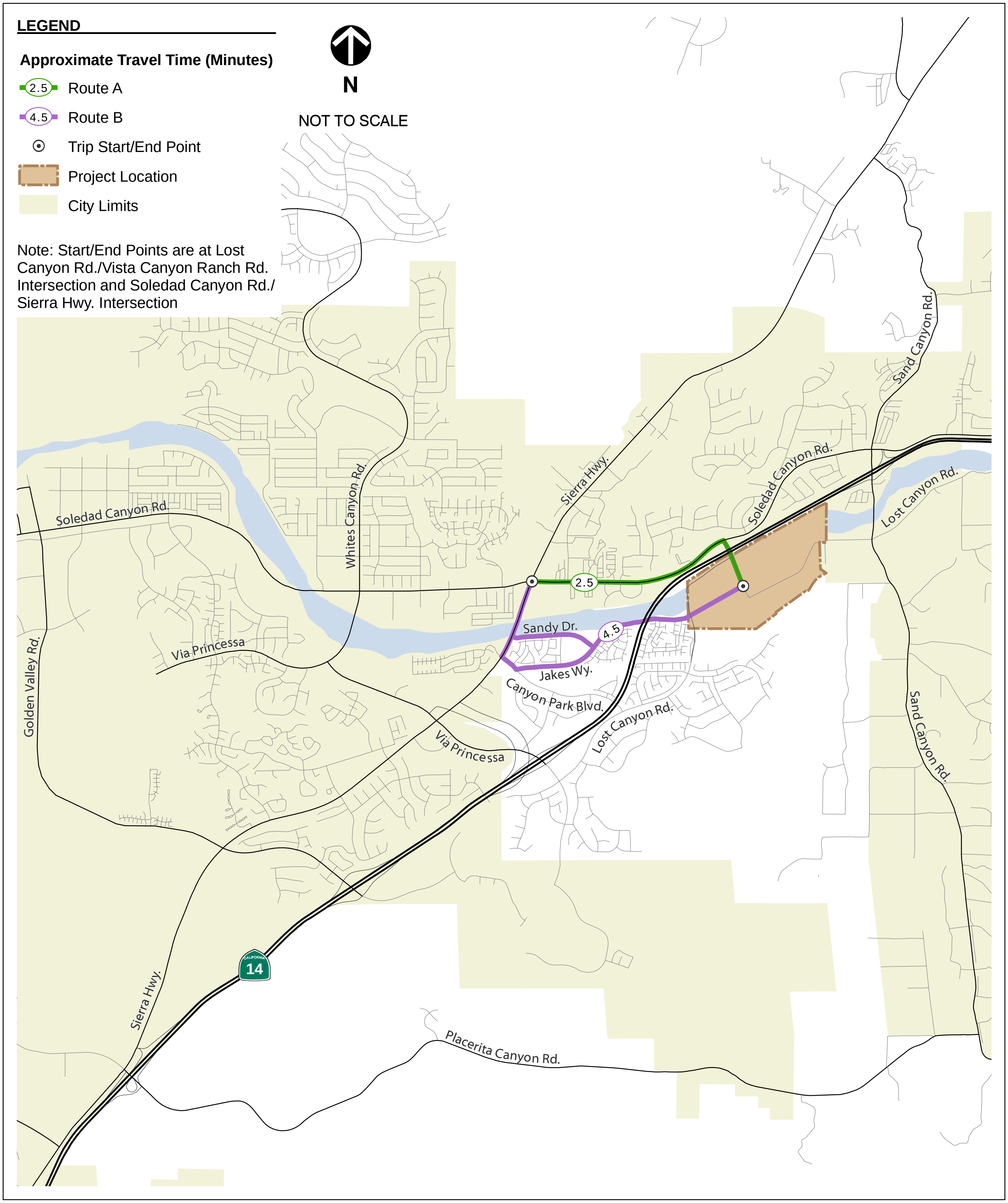
COMPARISON OF APPROXIMATE TRAVEL TIME - TO/FROM THE SOUTH

FIGURE 9A



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COMPARISON OF APPROXIMATE TRAVEL TIME - TO/FROM THE WEST

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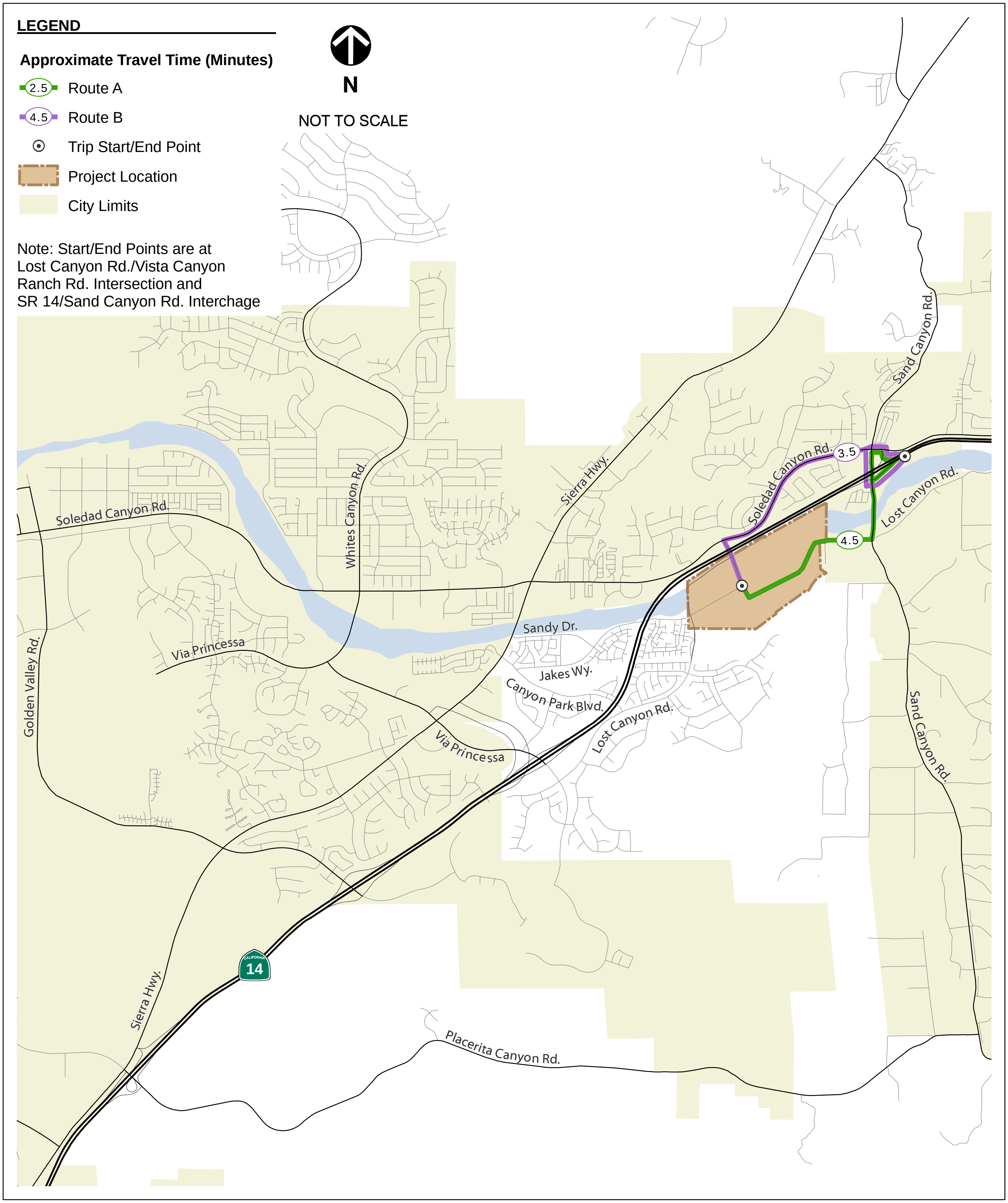
FIGURE 9B



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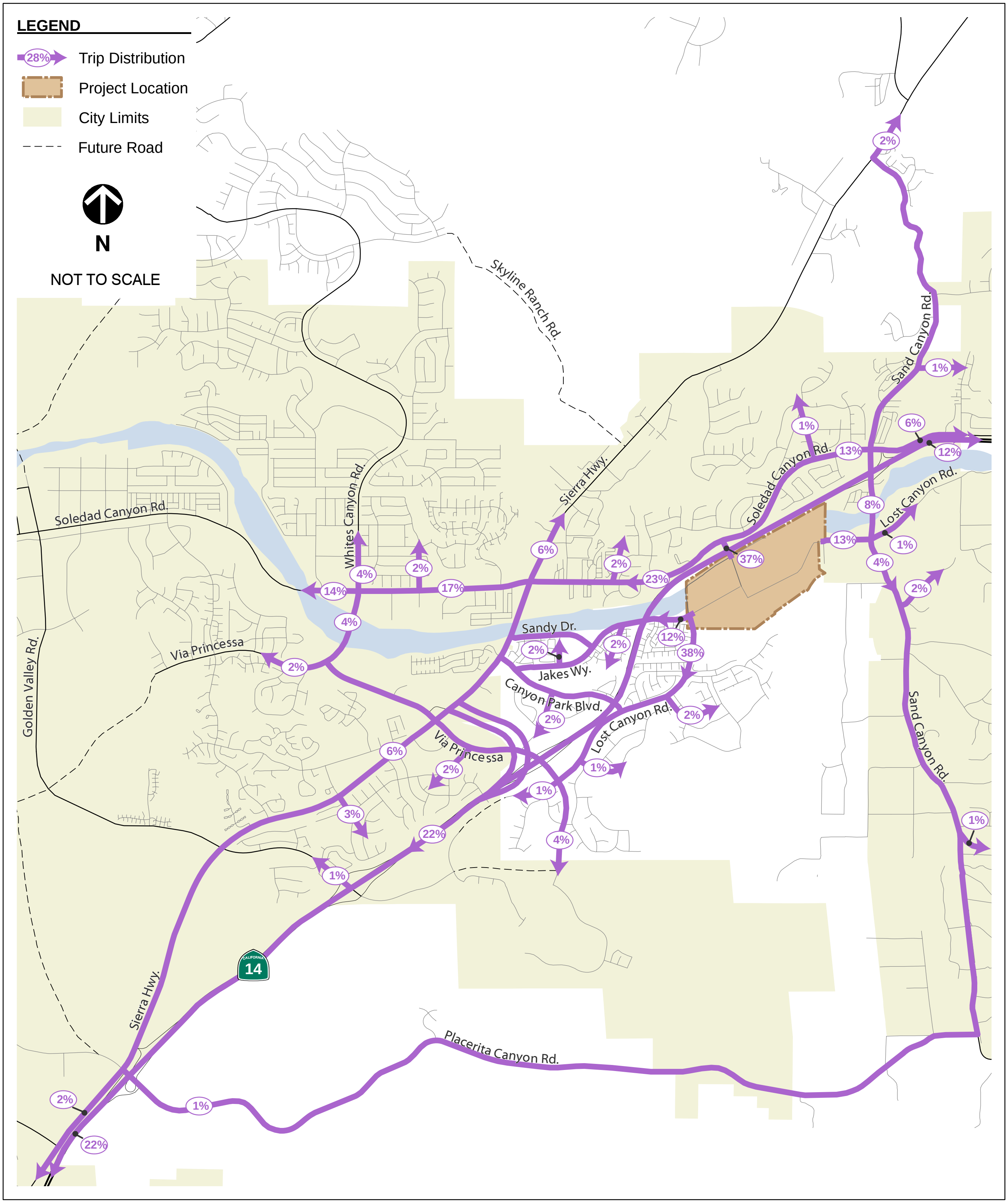
COMPARISON OF APPROXIMATE TRAVEL TIME - TO/FROM THE NORTH

FIGURE 9C



PROJECT TRIP DISTRIBUTION - INTERIM PLUS PROJECT CONDITIONS

FIGURE 10

PROJECT TRAVEL CHARACTERISTICS – NEW METROLINK STATION AND BUS TRANSFER STATION

This section estimates the number of new vehicle trips that would enter/exit the new Metrolink Station on the project site, which would replace the existing Via Princessa Metrolink Station.

A number of factors will affect the expected number of external trips to/from the new Metrolink station under interim conditions. These include:

- The SCVCTDM assumes a 22 percent increase in households in the study area from 2005 to 2015, which implies a greater number of potential riders under interim conditions.
- The proximity of the station to regional travel routes (SR 14 and Soledad Canyon Road, and Sierra Highway) and worsening congestion on SR 14 and I-5 will attract new riders.
- Approximately 30 percent of trips at the Via Princessa Station are to/from the west on Via Princessa. It is likely that some of these riders may choose to instead use the Santa Clarita station instead of traveling to the new station.
- Other factors such as increased service frequency, fares, greater train capacity and reliability, and new TODs at other Metrolink stops could also affect ridership.

Given the above factors, the new station was assumed for analysis purposes to have a 50 percent increase in peak parking demand over the existing Metrolink station. This implies that approximately 72 percent of the 750 planned parking spaces will be occupied under interim conditions.

Data from the Via Princessa station indicates that the majority of commuters arrive at the station before the beginning of the AM peak hour. By 7:00 a.m., 302 spaces are already occupied; at 9:00 a.m., an additional 60 more are occupied. Fehr & Peers surveyed 140 people waiting to board trains during a weekday morning in November 2008. Approximately 75 percent reported that they drove to the station, 20 percent were dropped off, and 5 percent took transit, biked, or walked. Based on this data and traffic counts, the existing Via Princessa Station is estimated to generate approximately 70 vehicle trips during the AM peak hour with approximately 80 percent being inbound. Since the proposed station is assumed to have a 50 percent increase in parking demand (with comparable increases in kiss-and-ride activity), it is assumed to generate approximately 110 vehicle trips during the AM peak hour.

Based on the parking survey results, the Via Princessa station experiences the greatest level of exiting vehicles from 5:30 to 6:30 p.m. During this hour, one northbound train stops at 5:56 p.m., and no southbound trains stop during this time. Observations of parking at 6:00 p.m. and at 7:00 p.m. showed 154 fewer parked vehicles. The existing Via Princessa Station is estimated to generate approximately 200 vehicle trips during the PM peak hour with approximately 85 percent being outbound. The proposed station is assumed to generate approximately 300 vehicle trips based on the assumed 50 percent increase in peak parking demand.

Based on parking occupancy and AM peak period boardings/alightings, the Via Princessa station is estimated to have approximately 800 daily combined boardings/alightings, 750 of which arrived by vehicle. Of those arriving by vehicle, approximately 75 percent drove to the station and 25 percent were dropped-off/picked-up. Accordingly, these two trip types are estimated to generate approximately 940 daily trips. With the addition of 10 inbound and 10 outbound connecting City buses, the existing trip generation is estimated to be approximately 960 daily trips. The proposed station is assumed to generate approximately 1,430 external vehicle trips based on the assumed 50 percent increase in peak parking demand.

Table 9 summarizes the expected external vehicle trip generation of the proposed station at Vista Canyon for the "interim plus project" scenario.

TABLE 9:
NEW METROLINK STATION TRIP GENERATION – INTERIM CONDITIONS

Land use	Quantity	External Vehicle Trips		
		Daily	AM Peak Hour	PM Peak Hour
Metrolink Station	750 parking spaces	1,430	110	300

Note: Refer to above text for methodology for estimating trip generation.

The reasonableness of these results was checked against assumptions made in the *Westgate Metrolink Station Draft EIR* (City of Placentia, 2006). The proposed station in Placentia would provide 500 parking spaces and was estimated to generate 1,180 external daily vehicle trips, which equates to a ratio of 2.36 daily trips per parking space. The proposed station's trip generation equates to a ratio of 1.91 daily trips per parking space. However, the 20 percent reduction in the rate is attributable to the assumption that only 72 percent of the 750 parking spaces are occupied under interim conditions. Under cumulative conditions, the vast majority of the spaces dedicated to the proposed Metrolink station are expected to be occupied, and the resulting trip generation would be 1,800 daily external vehicle trips.

REDISTRIBUTION EFFECTS OF CONNECTING ROADWAYS

The project would connect Lost Canyon Road between its current southern and northern termini. It would also create new connections with Jakes Way and Vista Canyon Road as described previously. These new connections would have the potential to cause a redistribution of interim and cumulative no project scenario traffic volumes.

To test the expected redistribution of background traffic due to these new streets, the street connections were added to the interim year version of the SCVCTDM but excluding all project land uses. The model estimates a modest amount of redistributed traffic to these streets. Specifically, about 350 ADT is added to the segment of Lost Canyon Road between Jakes Way and Vista Canyon Road. Vista Canyon Road and Lost Canyon Road east of Vista Canyon Road are each projected to accommodate less than 300 ADT. This is about 30 vehicles on a peak-hour basis. The "interim plus project" forecasts will incorporate these modest levels of redistributed traffic.

REDISTRIBUTION EFFECTS OF CHANGES IN ATTENDEES AT SULPHUR SPRINGS ELEMENTARY SCHOOL

Students in kindergarten through sixth grade who would reside in Vista Canyon are expected to attend Sulphur Springs Elementary School, which is a short walk to the east of the project. Presently, it is estimated that approximately 50 percent of the students who attend Sulphur Springs Elementary School come from residential neighborhoods north of SR 14. The Mitigation Agreement between Vista Canyon and the Sulphur Springs School District will require Vista Canyon to provide funding for the construction of a new school north and east of the project in the Spring Canyon development. Once the Spring Canyon School is completed, it is anticipated that the majority of future students residing north of SR14 and attending Sulphur Springs Elementary School will be relocated to the new Spring Canyon Elementary School, allowing future Vista Canyon students to attend Sulphur Springs Elementary School. For the purposes of this traffic study, 30 percent of future students who would attend Sulphur Springs Elementary School were assumed to be relocated to the Spring Canyon School and replaced by students who reside in Vista Canyon. Changes in traffic patterns associated with these shifts are accounted for in the analysis.

7. 2012 AND INTERIM (2015) BACKGROUND CONDITIONS

This chapter describes expected travel conditions in the study area under 2012 and interim (2015) conditions assuming the proposed project is not constructed. The process employed to develop forecasts is first described. Year 2012 and interim forecasts are then presented. This is followed by analysis of study locations under 2012 and interim conditions.

ROADWAY AND LAND USE ASSUMPTIONS

Fehr & Peers used the modified version of the interim year SCVCTDM to develop weekday AM and PM peak hour forecasts at the study locations. Fehr & Peers coordinated with City of Santa Clarita Traffic Division to identify and confirm General Plan roadway improvements anticipated by the interim year. These roadway improvements were included in the model.

The traffic forecasts and analysis for 2012 and the interim conditions not only includes certain roadway improvements but also takes into consideration all development projects that have been submitted and approved within the study area.

The interim year model also assumes the project roadway improvements. These improvements were excluded from the model for the no project scenario. Figure 11 illustrates the interim roadway improvements assumed in the study.

Fehr & Peers compared the 2004 and 2015 land use databases associated with the SCVCTDM to identify potential errors in inputs in the 2015 land use assumptions and general growth trends. In a couple instances, 2004 residential land uses were inadvertently placed in a different residential land use category in the 2015 land use database. These errors were corrected.

According to the SCVCTDM, the area south of SR 14 between Sand Canyon Road and Golden Valley Road is expected to gain approximately 1,300 dwelling units and 690,000 square feet of retail space between the base year and interim year models. The area located north of Soledad Canyon Road from east of Sierra Highway to west of Sand Canyon Road is expected to gain approximately 1,000 dwelling units and 150,000 square feet of non-residential space. Land use growth directly west of SR 14 and south of Soledad Canyon Road is expected to be more modest given that much of the area is already built-out. These growth trends are used to assess the reasonableness of expected traffic growth.

TRAFFIC FORECASTS

Fehr & Peers used existing traffic counts and the base year and interim year versions of the SCVCTDM to develop interim traffic forecasts. The procedure used to develop the forecasts, which is referred to as the “difference method,” is calculated as follows:

Adjusted Interim Year Forecast = Existing Traffic Volume + 0.64(Interim – Base Model Forecast)

This method accounts for potential inaccuracies in the base year model by adding the difference in traffic between the base and interim year models to the existing volume. Only 64 percent of the change in traffic is added to the existing volume because existing conditions represents four of the 11 years between base (2004) and interim (2015) model years. Due to the number of major new street connections assumed in the interim model, reductions in turning movements to below existing volumes were allowed to the extent they made sense.

The 2012 (No Project) forecasts were developed by applying linear interpolation between the existing and adjusted interim forecasts. These forecasts are shown on Figures 12a and 12b. Figures 13a and 13b display the Interim (No Project) traffic forecasts at the study intersections. These figures also illustrate the assumed lane configurations at the study intersections, which are unchanged with the exception of a third through lane in each direction on the major street at intersections 7, 17, and 21. The other planned roadways will act to divert traffic away from the study intersections, but do not increase the capacity at these locations.

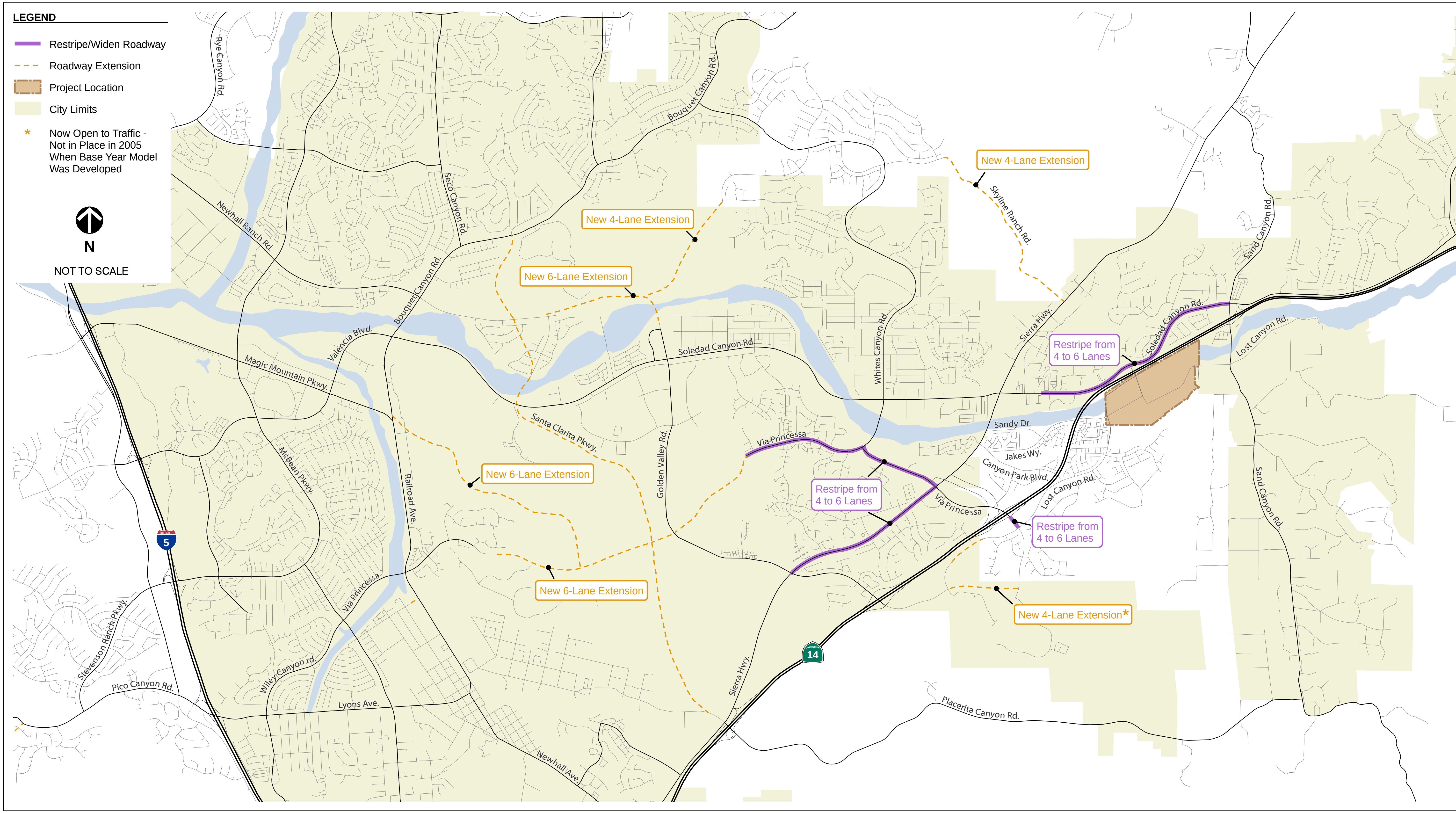
Table 10 displays the AM and PM peak hour traffic volumes on the study segments of SR 14 for these scenarios.

The *Draft 2008 Regional Transportation Plan* (Metro) includes direct carpool lane connector ramps at the I-5/SR 14 interchange in its recommended plan for highway improvements. The connector ramps would be open in 2013 according to the plan and are presently under construction. These improvements are likely to increase the corridor's capacity. However, the improvements (absent any changes in mode split from single-occupant to carpooling) would not appreciably improve operations in the mixed-use travel lanes. As a result, significant levels of congestion are anticipated to remain on SR 14.

TABLE 10:
SR 14 FREEWAY TRAFFIC FORECASTS – INTERIM (NO PROJECT) CONDITIONS

Freeway Segment	Existing Conditions		Interim (No Project) Conditions	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
NB SR 14 north of Golden Valley Road	2,407	7,083	2,860	8,670
NB SR 14 north of Via Princessa	1,903	5,741	2,320	7,950
NB SR 14 north of Sand Canyon Road	1,700	5,098	2,250	7,380
SB SR 14 north of Sand Canyon Road	3,983	1,906	6,040	2,940
SB SR 14 south of Sand Canyon Road	4,353	2,143	6,160	3,190
SB SR 14 south of Via Princessa	5,288	3,051	7,225	4,050

Note: These forecasts represent the demand for peak-hour travel through each segment. However, upstream and downstream bottlenecks may result in these demand numbers not being achieved within the peak hour.



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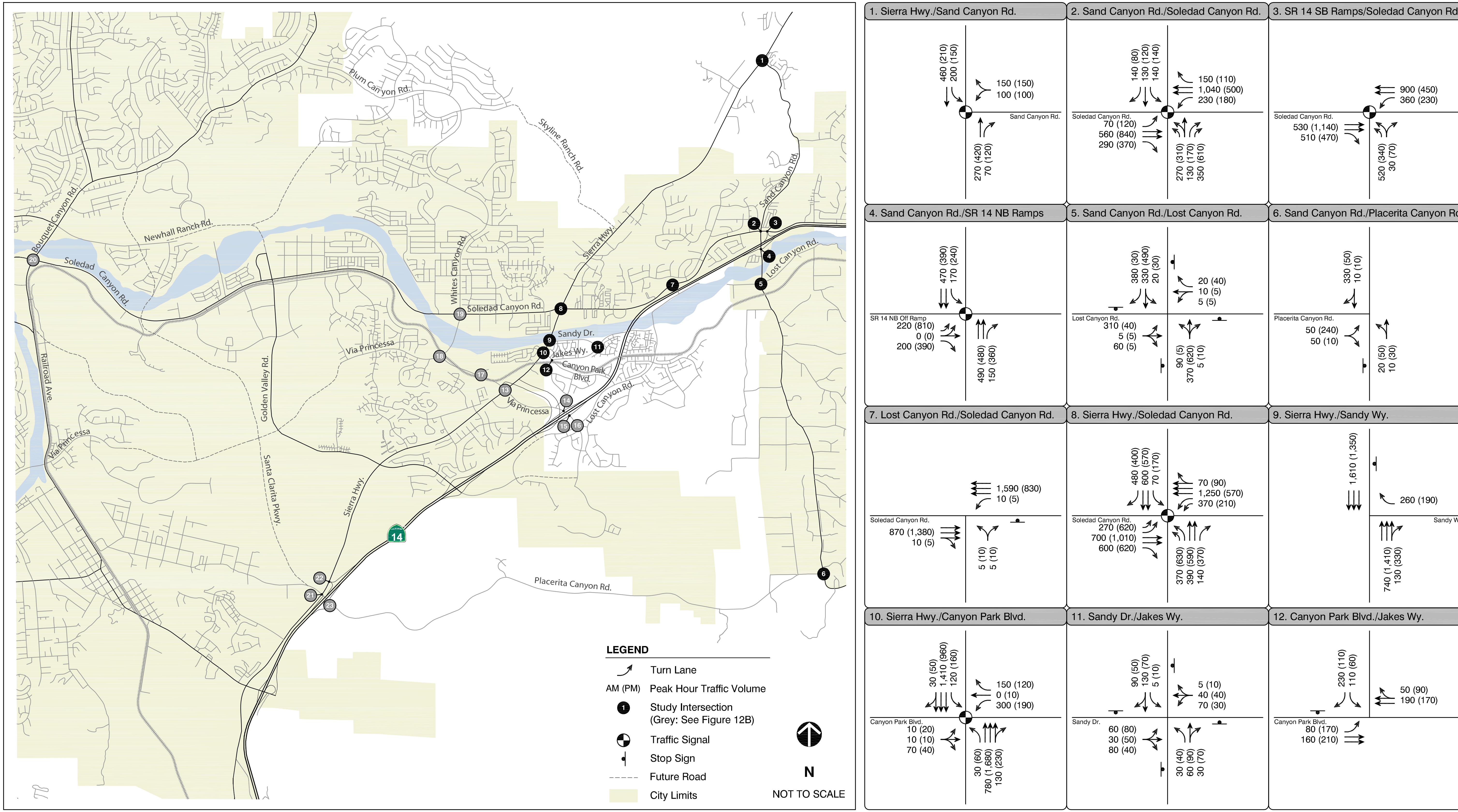
INTERIM ROADWAY IMPROVEMENTS
FIGURE 11



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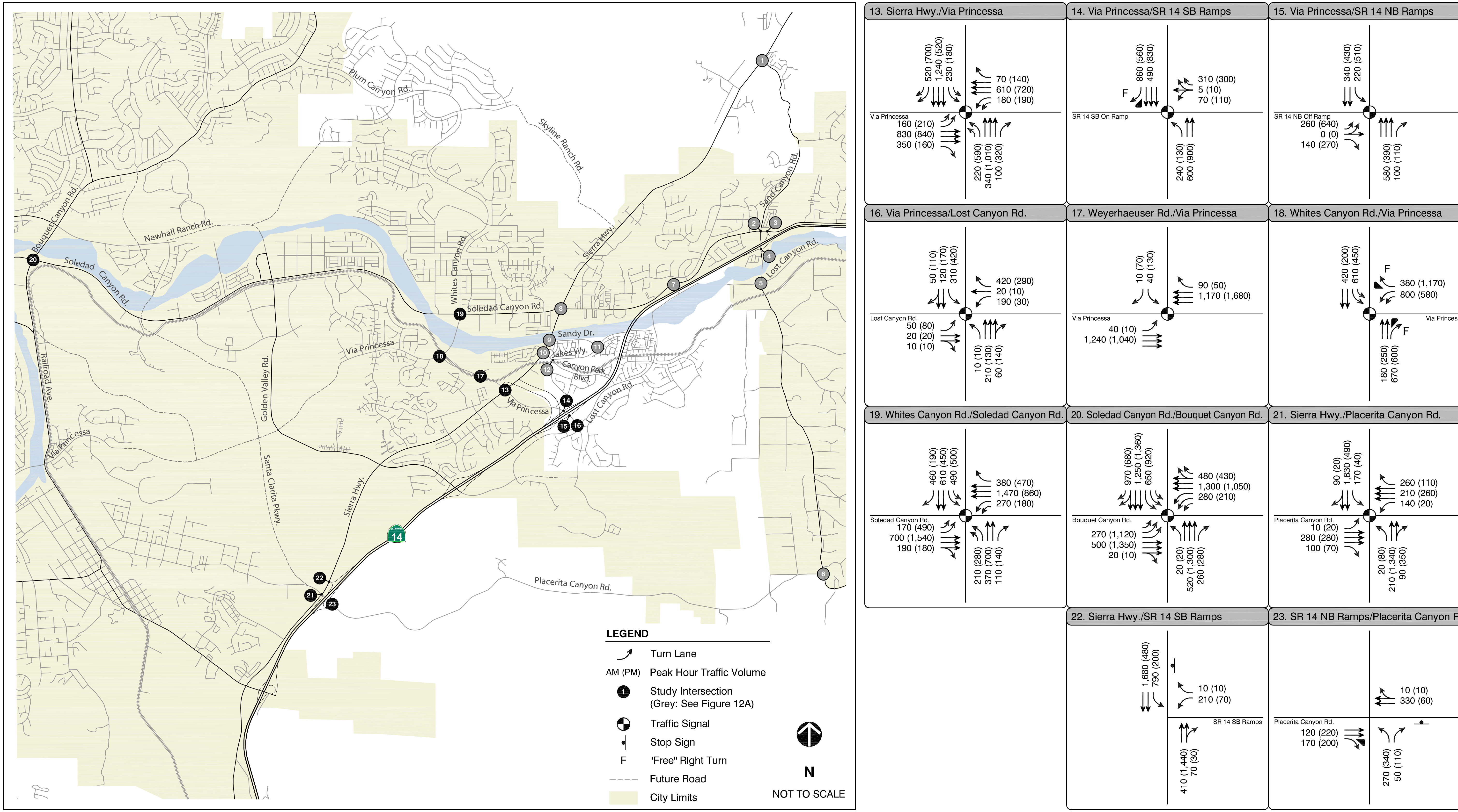
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2012 (NO PROJECT) CONDITIONS

FIGURE 12A



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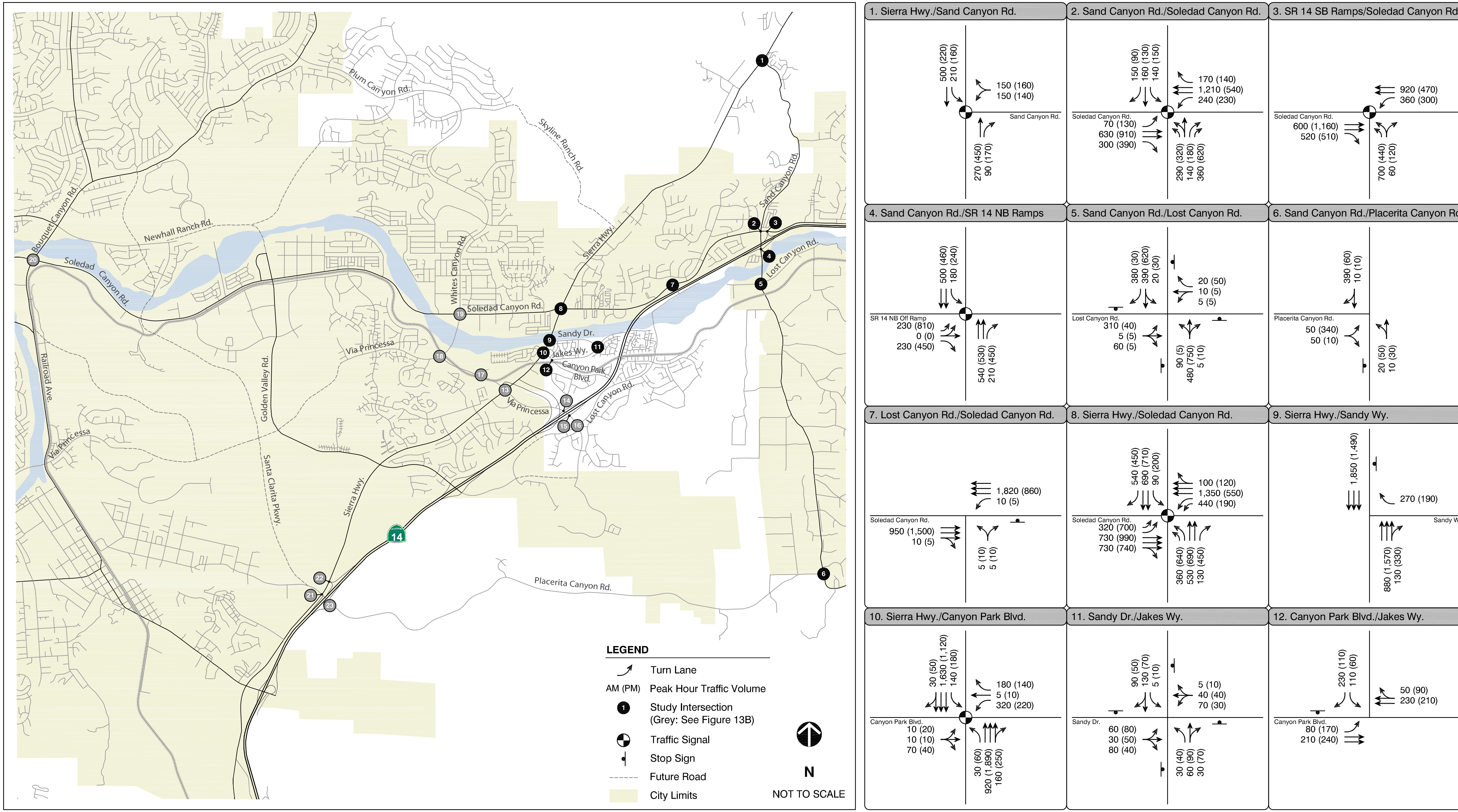
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2012 (NO PROJECT) CONDITIONS

FIGURE 12B



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 (NO PROJECT) CONDITIONS

FIGURE 13A

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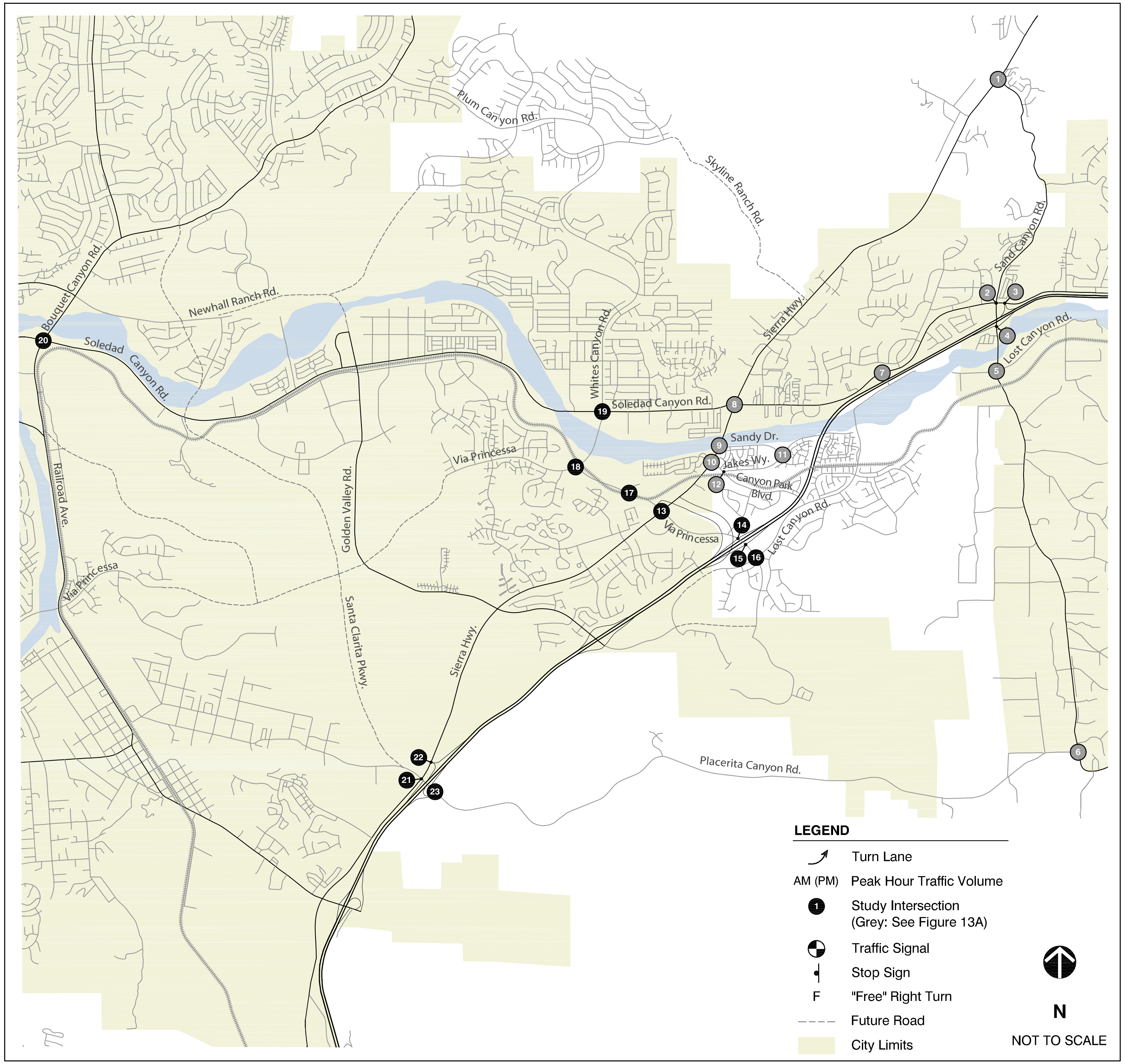

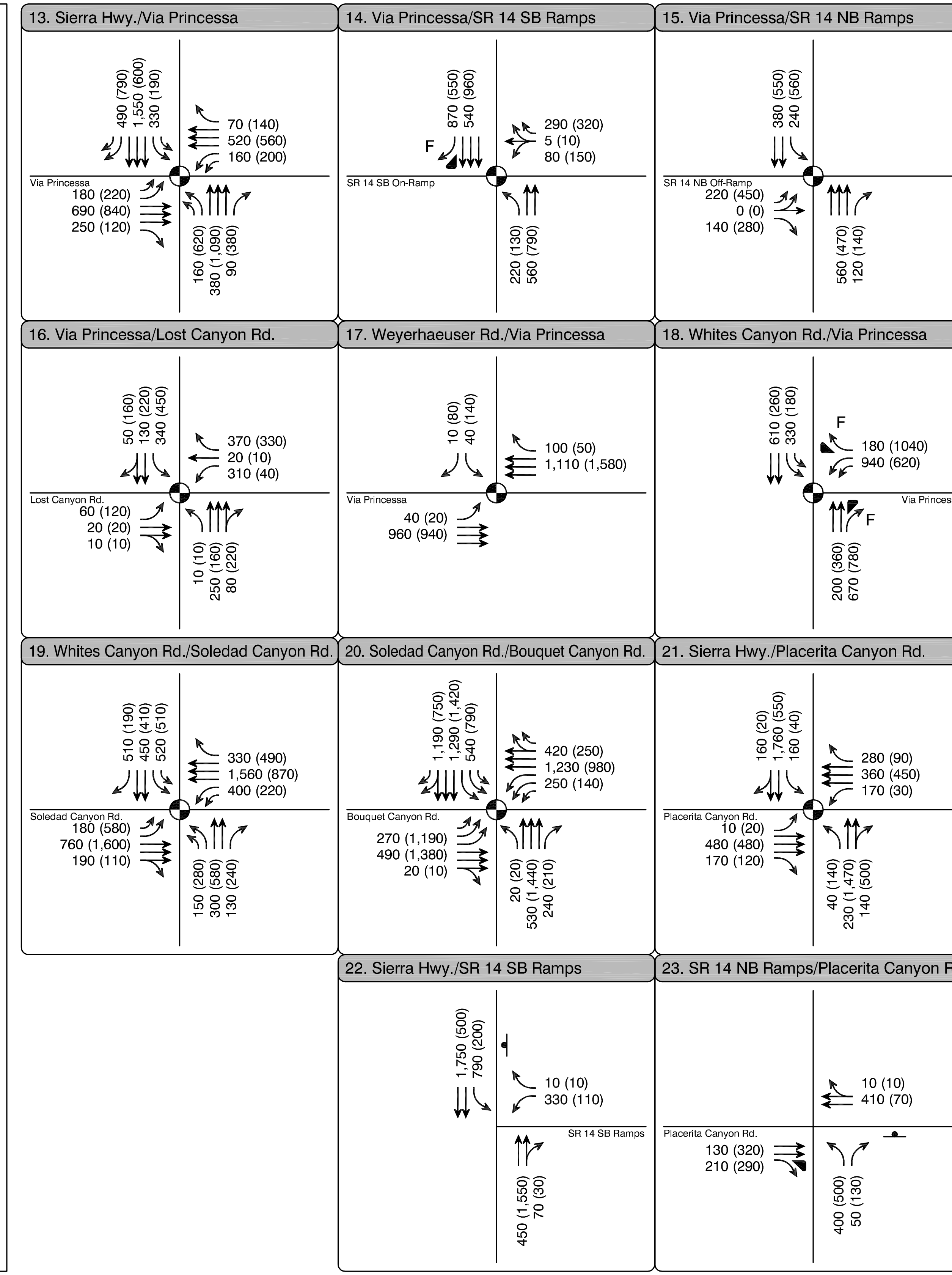

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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2015 (NO PROJECT) CONDITIONS

FIGURE 13B

INTERSECTION OPERATIONS

Fehr & Peers analyzed the study intersections using the procedures described in Chapter 2. The results are summarized in Table 11 (refer to separately bound Appendix D for technical calculations). Table 11 shows that five of the 23 intersections operate unacceptably under 2012 (No Project) conditions. Under Interim (No Project conditions, a total of nine intersections would operate unacceptably.

Degraded AM peak hour operations at the SR 14 SB Ramps/Soledad Canyon Road and Sand Canyon Road/Soledad Canyon Road intersections are the result, in part, of traffic diverting off SR 14 in response to worsening congestion.

FREEWAY OPERATIONS

Table 12 displays freeway mainline operations and ramp merge/diverge (ramp junction) operations under 2012 and Interim (No Project) conditions using procedures described in Chapter 2. Refer to separately bound Appendix D for technical calculations.

.According to Table 10, the AM peak hour travel demand on southbound SR 14 south of Sand Canyon Road is expected to increase from 4,350 vehicles under existing conditions to 6,160 vehicles under Interim (No Project) conditions, which is a 42 percent increase. Since no additional capacity improvements are anticipated under interim conditions, the added vehicles will cause southbound vehicle queues to extend northerly beyond the Sand Canyon Road interchange. The results in Table 12 reflect this expected operating condition.

Reported PM peak operations on northbound SR 14 assume that the travel demand for each segment can be delivered by the system. However, bottlenecks on I-5 and SR 14 will not allow the entire predicted increase to reach this segment within the peak hour. As such, reported operations on northbound SR 14 during the PM peak hour are considered conservative.

TABLE 11:
INTERSECTION OPERATIONS – 2012 AND INTERIM (NO PROJECT) CONDITIONS

#	Intersection	Traffic Control	AM (PM) Peak Hour	
			2012 Conditions	Interim Conditions
			Delay or V/C Ratio – LOS	Delay or V/C Ratio – LOS
1	Sand Canyon Road/Sierra Highway	Traffic Signal	0.55 - A (0.61 - B)	0.60 - A (0.67 - B)
2	Sand Canyon Road/Soledad Canyon Road	Traffic Signal	33 - C (37 - D)	**36 - D (68 - E)**
3	Soledad Canyon Road/SR 14 SB Ramps	Traffic Signal	51 - D (48 - D)	**151 - F (132 - F)**
4	Sand Canyon Road/SR 14 NB Ramps	Traffic Signal	13 - B (21 - C)	14 - B (20 - C)
5	Sand Canyon Road/Lost Canyon Road	All-Way Stop	**76 - F (19 - C)**	**209 - F (64 - F)**
6	Sand Canyon Rd./Placerita Canyon Road	Side-Street Stop	11 - B (13 - B)	11 - B (15 - C)
7	Soledad Canyon Road/Lost Canyon Road	Side-Street Stop	**32 - D (45 - E)**	**42 - E (59 - F)**
8	Sierra Highway/Soledad Canyon Road	Traffic Signal	**40 - D (56 - E)**	**44 - D (73 - E)**
9	Sierra Highway/Sandy Way	Side-Street Stop	16 - C (11 - B)	16 - C (12 - B)
10	Sierra Highway/Canyon Park Boulevard	Traffic Signal	23 - C (25 - C)	25 - C (28 - C)
11	Sandy Way/Jakes Way	All-Way Stop	10 - B (9 - A)	10 - B (9 - A)
12	Canyon Park Boulevard/Jakes Way	Side-Street Stop	16 - C (16 - C)	18 - C (18 - C)
13	Sierra Highway/Via Princessa	Traffic Signal	31 - C (37 - D)	30 - C (39 - D)
14	Via Princessa/SR 14 SB Ramps	Traffic Signal	15 - B (18 - B)	19 - B (23 - C)
15	Via Princessa/SR 14 NB Ramps	Traffic Signal	21 - C (27 - C)	34 - C (30 - C)
16	Via Princessa/Lost Canyon Road	Traffic Signal	0.60 - B (0.65 - B)	0.62 - B (0.77 - C)
17	Via Princessa/Weyerhaeuser Way	Traffic Signal	4 - A (19 - B)	5 - A (22 - C)
18	Via Princessa/Whites Canyon Road	Traffic Signal	8 - A (6 - A)	9 - A (6 - A)
19	Soledad Canyon Road/Whites Canyon Rd.	Traffic Signal	40 - D (49 - D)	42 - D (48 - D)
20	Soledad Canyon Road/Bouquet Canyon Rd.	Traffic Signal	**45 - D (66 - E)**	**65 - E (71 - E)**
21	Placerita Canyon Road/Sierra Highway	Traffic Signal	39 - D (41 - D)	48 - D (50 - D)
22	Placerita Canyon Road/SR 14 SB Ramps	Side-Street Stop	**>50 - F (>50 - F)**	**>50 - F (>50 - F)**
23	Placerita Canyon Road/SR 14 NB Ramps	Side-Street Stop	15 - C (18 - C)	**29 - D (63 - F)**

Notes:

Shaded and bolded cells indicate unacceptable operation.

- ICU methodology used for signalized intersections that are located in Los Angeles County.
- HCM methodology used for all unsignalized intersections and signalized intersections maintained by City of Santa Clarita or Caltrans. SimTraffic micro-simulation model used to evaluate closely spaced, coordinated intersections.

TABLE 12:
FREEWAY OPERATIONS – 2012 AND INTERIM (NO PROJECT) CONDITIONS

Freeway Facility	AM (PM) Peak Hour Density – LOS	
	2012	Interim
Freeway Mainline Sections		
NB SR 14: Between Golden Valley Road and Via Princessa/Sierra Highway (Weave)	**A (F)**	**A (F)**
NB SR 14: Between Via Princessa/Sierra Highway and Sand Canyon Rd	9-A (31-D)	10-A (40-E)
NB SR 14: Between Sand Canyon Road and Soledad Canyon Road	**12-B (F)**	**13-B (F)**
SB SR 14: Between Soledad Canyon Road and Sand Canyon Road	**F (14-B)**	**F (16-B)**
SB SR 14: Between Sand Canyon Road and Via Princessa	**F (11-B)**	**F (13-B)**
SB SR 14: Between Via Princessa/Sierra Highway and Golden Valley Road (Weave)	**F (B)**	**F (C)**
Freeway Ramps		
SR 14 NB Off-Ramp/Sand Canyon Road	11 - B (33 - D)	12 - B (36 - E)
SR 14 NB On-Ramp/Sand Canyon Road	**14 - B (43 - F)**	**15 - B (50 - F)**
SR 14 SB Off-Ramp/Sand Canyon Road/Soledad Canyon Road	32 - D (17 - B)	**41 - F (19 - B)**
SR 14 SB On-Ramp/Sand Canyon Road/Soledad Canyon Road	28 - C (12 - B)	**34 - F (14 - B)**
SR 14 NB Off-Ramp/Via Princessa	11 - B (33 - D)	11 - B (35 - D)
SR 14 SB On-Ramp/Via Princessa	28 - C (16 - B)	**>43- F (17- B)**

Notes:

- Results calculated using HCM procedures report density in passenger cars per hour per mile per lane. Leisch methodology used to analyze freeway weave sections presents LOS only. Density not provided where freeway or ramp is in LOS F condition based on field observations and/or GPS travel time survey.
- Ramps selected for analysis limited to those that would be used by the project to a significant degree.
- Cells that are shaded and bolded represent unacceptable operations.

8. 2012 (PHASE 1) CONDITIONS

This chapter analyzes the impacts of the Phase 1 of Vista Canyon on Year 2012 background transportation conditions. This analysis focuses on the impacts of this initial phase of the project at the study intersections and freeway facilities. Chapter 9 addresses the impacts of the full project at all study intersections, freeway facilities, and CMP facilities. It also covers project impacts to the transit, bicycle, and pedestrian systems.

As described in Chapter 6, Phase 1 consists of 680 multi-family dwelling units and 25,000 square feet of retail space. The proposed Metrolink Station, the Vista Canyon Road Bridge over the Santa Clara River, and the easterly extension of Lost Canyon Road to La Veda Avenue would not be constructed or operational with Phase 1.

TRAFFIC FORECASTS

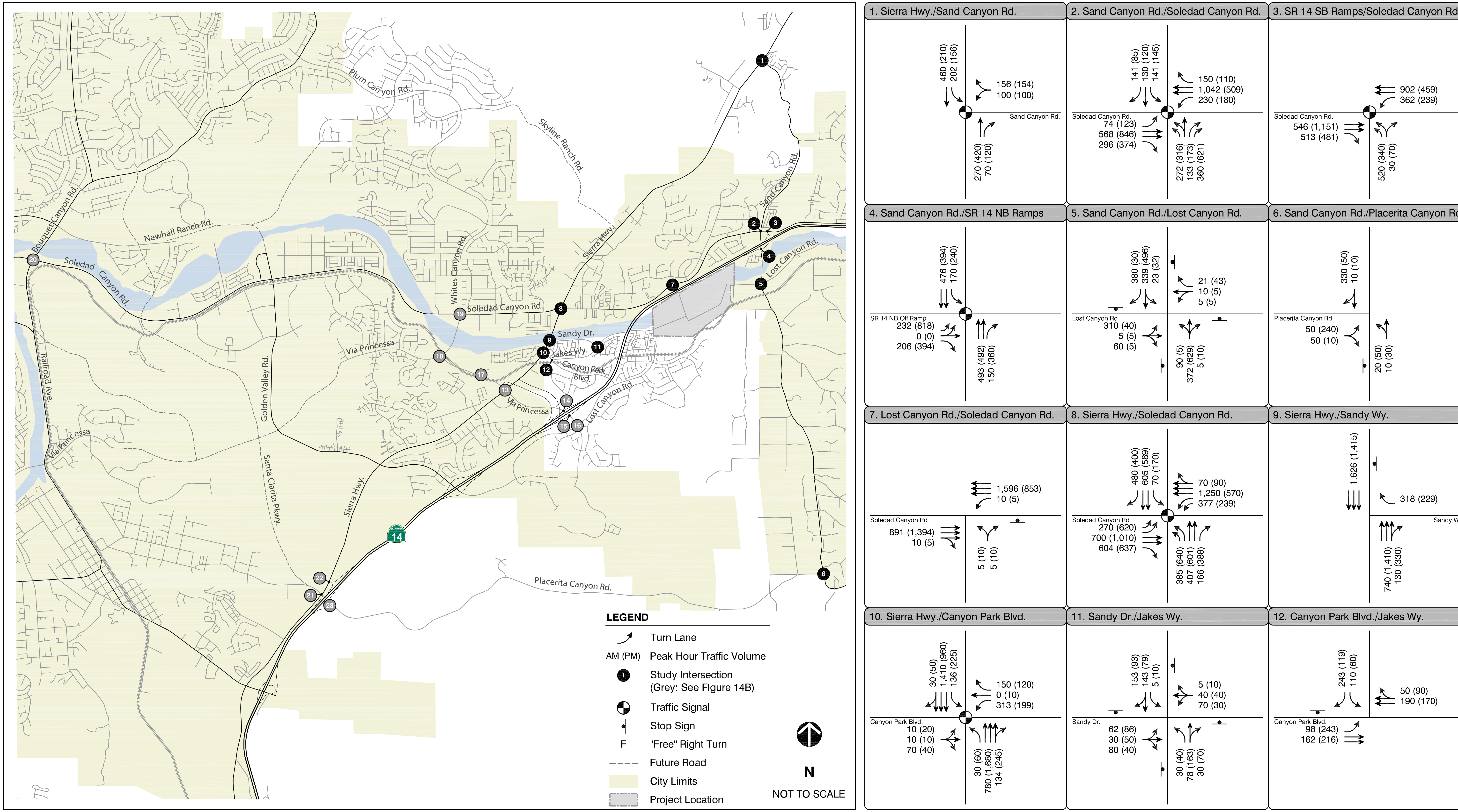
Fehr & Peers assigned trips associated with Phase 1 to the study locations in accordance with the assumptions described in Chapter 6. These trips were then added to the Year 2012 (No Project) background volumes to yield the 2012 (Phase 1) forecasts. Figures 14a and 14b display the peak hour traffic forecasts at the study intersections for this scenario.

INTERSECTION OPERATIONS

Fehr & Peers analyzed the study intersections under 2012 (Phase 1) conditions. Table 13 summarizes the results (refer to Appendix E for technical calculations). According to Table 13, the project would cause the number of study intersections operating at unacceptable levels to increase from five to nine. More specifically, Phase 1 of the project would cause a significant impact at five of these intersections.

FREEWAY OPERATIONS

Fehr & Peers analyzed the study freeway segments and ramps under 2012 (Phase 1) conditions. Table 14 summarizes the results (refer to Appendix E for technical calculations). According to Table 14, the project would further degrade unacceptable operations at several mainline segments and ramps of SR 14. However, no facilities would degrade from an acceptable to unacceptable level.



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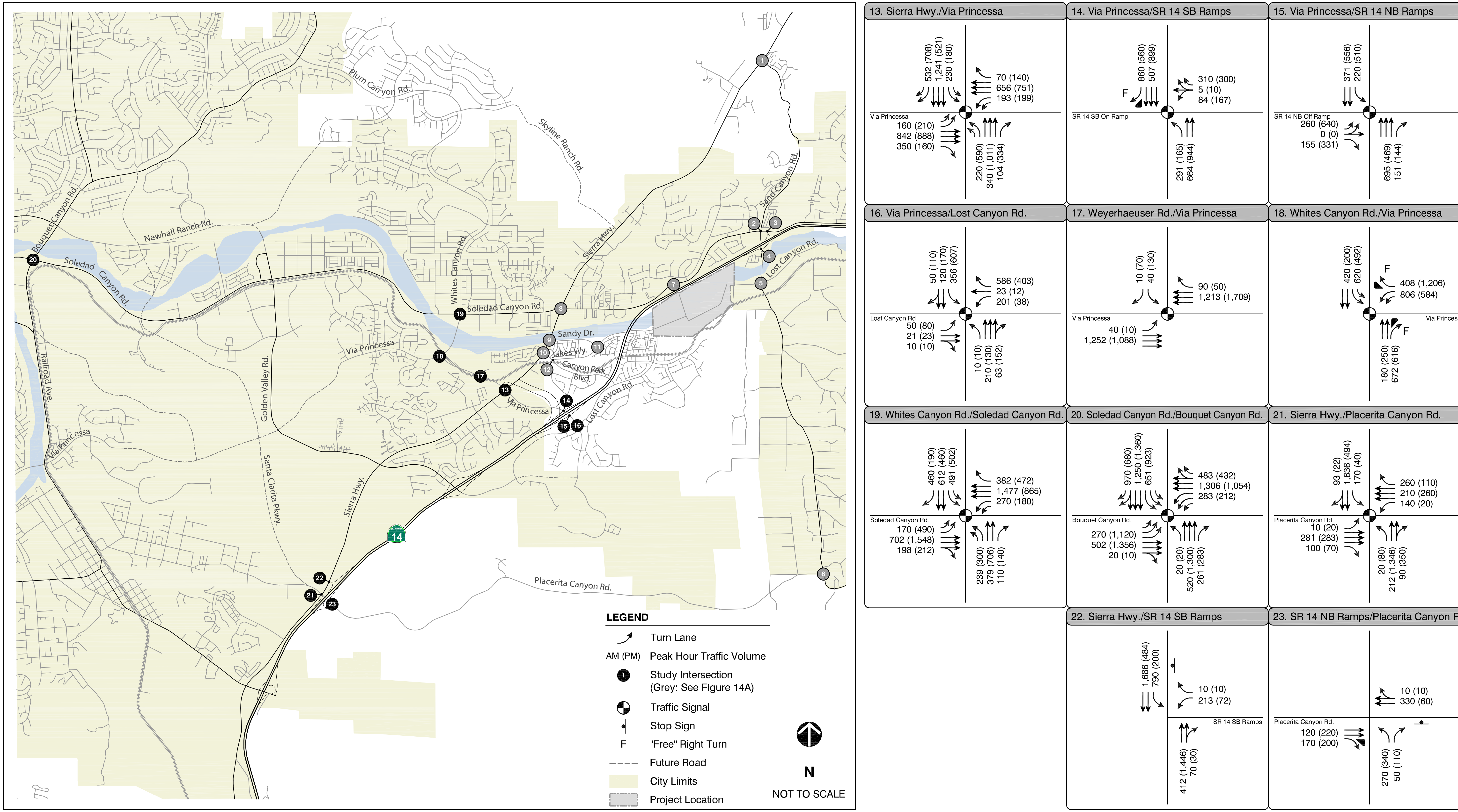
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2012 (PHASE 1) CONDITIONS

FIGURE 14A



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - 2012 (PHASE 1) CONDITIONS

FIGURE 14B

TABLE 13:
INTERSECTION OPERATIONS – 2012 (PHASE 1) CONDITIONS

#	Intersection	Traffic Control	AM (PM) Peak Hour	
			2012 No Project Conditions	2012 (Phase 1) Conditions
			Delay or V/C Ratio – LOS	Delay or V/C Ratio – LOS
1	Sand Canyon Road/Sierra Highway	Traffic Signal	0.55 - A (0.61 - B)	0.56 - A (0.62 - B)
2	Sand Canyon Road/Soledad Canyon Rd.	Traffic Signal	33 - C (37 - D)	33 - C (38 - D)
3	Soledad Canyon Road/SR 14 SB Ramps	Traffic Signal	51 - D (48 - D)	**57 - E (64 - E)**
4	Sand Canyon Road/SR 14 NB Ramps	Traffic Signal	13 - B (21 - C)	14 - B (22 - C)
5	Sand Canyon Road/Lost Canyon Road	All-Way Stop	**76 - F (19 - C)**	**96 - F (18 - C)**
6	Sand Canyon Rd./Placerita Canyon Road	Side-Street Stop	11 - B (13 - B)	11 - B (13 - B)
7	Soledad Canyon Road/Lost Canyon Road	Side-Street Stop	**32 - D (45 - E)**	**33 - D (47 - E)**
8	Sierra Highway/Soledad Canyon Road	Traffic Signal	**40 - D (56 - E)**	**41 - D (58 - E)**
9	Sierra Highway/Sandy Way	Side-Street Stop	16 - C (11 - B)	19 - C (12 - B)
10	Sierra Highway/Canyon Park Boulevard	Traffic Signal	23 - C (25 - C)	24 - C (29 - C)
11	Sandy Way/Jakes Way	All-Way Stop	10 - B (9 - A)	13 - B (10 - B)
12	Canyon Park Boulevard/Jakes Way	Side-Street Stop	16 - C (16 - C)	18 - C (21 - C)
13	Sierra Highway/Via Princessa	Traffic Signal	31 - C (37 - D)	31 - C (38 - D)
14	Via Princessa/SR 14 SB Ramps	Traffic Signal	15 - B (18 - B)	**47 - D (140 - F)**
15	Via Princessa/SR 14 NB Ramps	Traffic Signal	21 - C (27 - C)	**85 - F (>180 - F)**
16	Via Princessa/Lost Canyon Road	Traffic Signal	0.60 - B (0.65 - B)	**0.72 - C (0.84 - D)**
17	Via Princessa/Weyerhaueser Way	Traffic Signal	4 - A (19 - B)	4 - A (19 - B)
18	Via Princessa/Whites Canyon Road	Traffic Signal	8 - A (6 - A)	8 - A (6 - A)
19	Soledad Canyon Road/Whites Canyon Rd.	Traffic Signal	40 - D (49 - D)	41 - D (50 - D)
20	Soledad Canyon Road/Bouquet Canyon Rd.	Traffic Signal	**45 - D (66 - E)**	**45 - D (66 - E)**
21	Placerita Canyon Road/Sierra Highway	Traffic Signal	39 - D (41 - D)	39 - D (42 - D)
22	Placerita Canyon Road/SR 14 SB Ramps	Side-Street Stop	**>50 - F (>50 - F)**	**>50 - F(>50 - F)**
23	Placerita Canyon Road/SR 14 NB Ramps	Side-Street Stop	15 - C (18 - C)	15 - C (18 - C)

Notes:

- Delay at intersection 22 shown as "> 50" because volume inputs exceed software program's ability to produce reasonable delay estimates.
- ICU methodology used for signalized intersections that are located in Los Angeles County.
- HCM methodology used for all unsignalized intersections and signalized intersections maintained by City of Santa Clarita or Caltrans. SimTraffic micro-simulation model used to evaluate closely spaced, coordinated intersections.
- Shaded and bolded cells indicate unacceptable operation.

TABLE 14:
FREEWAY OPERATIONS – 2012 (PHASE 1) CONDITIONS

Freeway Facility	AM (PM) Peak Hour	
	2012 No Project Conditions	2012 (Phase 1) Conditions
	Density – LOS	Density – LOS
Freeway Mainline Sections		
NB SR 14: Between Golden Valley Road and Via Princessa/Sierra Highway (Weave)	**A (F)**	**A (F)**
NB SR 14: Between Via Princessa/Sierra Highway and Sand Canyon Road	9-A (31-D)	9-A (31-D)
NB SR 14: Between Sand Canyon Road and Soledad Canyon Road	**12-B (F)**	**12-B (F)**
SB SR 14: Between Soledad Canyon Road and Sand Canyon Road	**F (14-B)**	**F (14-B)**
SB SR 14: Between Sand Canyon Road and Via Princessa	**F (11-B)**	**F (12-B)**
SB SR 14: Between Via Princessa/Sierra Highway and Golden Valley Road (Weave)	**F (B)**	**F (B)**
Freeway Ramps		
SR 14 NB Off-Ramp/Sand Canyon Road	11 - B (33 - D)	11 - B (33 - D)
SR 14 NB On-Ramp/Sand Canyon Road	**14 - B (43 - F)**	**14 - B (43 - F)**
SR 14 SB Off-Ramp/Sand Canyon Road/Soledad Canyon Road	32 - D (17 - B)	32 - D (17 - B)
SR 14 SB On-Ramp/Sand Canyon Road/Soledad Canyon Road	28 - C (12 - B)	28 - C (12 - B)
SR 14 NB Off-Ramp/Via Princessa	11 - B (33 - D)	11 - B (33 - D)
SR 14 SB On-Ramp/Via Princessa	28 - C (16 - B)	28 - C (16 - B)

Notes:
- See discussion below for rationale for using HCM techniques versus field observations/travel time surveys.
- Ramps selected for analysis limited to those that would be used by the project to a significant degree.
- Shaded and bolded cells indicate unacceptable operation.

IMPACTS AND MITIGATIONS

According to the significance criteria and above results, Phase 1 would cause significant impacts at several study intersections. Each impact is described below followed by a proposed mitigation measure that would reduce the significance of the impact.

Impact TR-1 *Phase 1 would degrade AM and PM peak hour operations at the SR 14 SB Ramps/Soledad Canyon Road intersection from an acceptable to unacceptable level under 2012 (Phase 1) conditions.*

Phase 1 would worsen AM and PM peak hour operations at the SR 14 SB Ramps/Soledad Canyon Road intersection from LOS D to E. This is considered a **significant** impact.

Mitigation TR-1 Construction of the following improvements is recommended to restore operations to LOS D or better at the intersection (see Table 15):

- Convert the westbound left-turn lane on Soledad Canyon Road onto the SR 14 southbound on-ramp from a permitted to protected signal phase, and retime this traffic signal and the adjacent Sand Canyon Road/Soledad Canyon Toad signal to optimize traffic flow.

This mitigation would restore this impact to ***less-than-significant.***

Impact TR-2 *Phase 1 would degrade AM and PM peak hour operations at the Via Princessa/SR 14 SB ramps and Via Princessa/SR 14 NB ramps intersections from an acceptable to unacceptable level under 2012 (Phase 1) conditions.*

Phase 1 would worsen AM and PM peak hour operations at the Via Princessa/SR 14 SB ramps and Via Princessa/SR 14 NB ramps intersections from LOS C or better to LOS F. This is considered a **significant** impact.

Mitigation TR-2 Implementation of the following would restore operations to LOS C or better at each intersection (see Table 15):

- retime traffic signals to optimize traffic flow.

This mitigation would restore this impact to ***less-than-significant.***

Impact TR-3 *Phase 1 would degrade PM peak hour operations at the Via Princessa/Lost Canyon Road intersection to a significant degree under 2012 (Phase 1) conditions.*

Phase 1 would worsen PM peak hour operations at the Via Princessa/Lost Canyon Road intersection from LOS B to D. The corresponding increase in the v/c ratio of 0.19 is considered a **significant** impact.

Mitigation TR-3 Implementation of the following would restore PM peak hour operations to LOS B (see Table 15):

- install westbound right-turn overlap arrow.

This mitigation would restore this impact to ***less-than-significant.***

Impact TR-4 *Phase 1 would worsen unacceptable AM peak hour operations at the Sand Canyon Road/Lost Canyon Road intersection under 2012 (Phase 1) conditions.*

Phase 1 would increase delays during the AM peak hour at the Sand Canyon Road/Lost Canyon Road intersection, which is expected to operate at LOS F under no project conditions. This is considered a **significant** impact. Phase 1 of the project does not include a connection to Lost Canyon Road at La Veda Avenue. However, Phase 1 does include completion of the multi-use path along the Santa Clara River that would enable Vista Canyon residents to walk/bike to adjacent Sulphur Springs Elementary School. Phase 1 would create a minimal contribution of traffic to the intersection (15 AM peak hour trips, which is a one percent increase). Therefore improvements at the intersection would be completed in conjunction with buildout of the project, resulting in a temporary, unavoidable significant impact.

The above mitigations are also recommended for project buildout impacts under interim conditions. As shown in Table 15, the above mitigations would improve operations at the respective intersection to an acceptable level under 2012 conditions.

Phase 1 would add fewer than 100 new peak hour trips to any particular segment of SR 14. Since this level of added traffic represents less than a 2 percent increase in capacity, traffic from Phase 1 would not exceed this threshold. Therefore, impacts to SR 14 are considered less than significant.

TABLE 15:
INTERSECTION OPERATIONS – 2012 (PHASE 1) CONDITIONS WITH MITIGATION

#	Intersection	General Description of Mitigation	AM (PM) Peak Hour		
			No Project Conditions	Phase 1 Conditions	Phase 1 with Mitigations
			Avg. Delay or V/C Ratio – LOS		
3	Soledad Canyon Road/SR 14 SB Ramps	Convert WB left-turn onto SR 14 to a protected phase and retime signal to optimize traffic flow	51 - D (48 - D)	**57 - E (64 - E)**	45 - D (24 - C)
14	Via Princessa/SR 14 SB Ramps	Retime traffic signals	15 - B (18 - B)	**47 - D (140- F)**	13 - B (15 - B)
15	Via Princessa/SR 14 NB Ramps		21 - C (27 - C)	**85 - F (>180- F)**	16 - B (23 - C)
16	Via Princessa/Lost Canyon Road	Install right-turn overlap arrow	0.60 – B (0.65 - B)	**0.72 - C (0.84 - D)**	0.55 – B (0.63 - B)

Notes: Shaded and bolded cells indicate unacceptable operation.

9. INTERIM (PROJECT BUILDOUT) CONDITIONS

This chapter analyzes the impacts of buildout of Vista Canyon under interim conditions, and recommends mitigations to reduce the significance of those impacts.

TRAFFIC FORECASTS

Fehr & Peers assigned trips associated with project buildout to the study locations in accordance with the assumptions described in Chapter 6. Figures 15a and 15b display trips associated with project buildout at the study intersections. Project-only trips also include traffic entering/exiting the project to access the new Metrolink station. These trips were then added to the interim background volumes to yield Interim (Project Buildout) forecasts. Figures 16a and 16b display the peak hour traffic forecasts at the study intersections for this scenario.

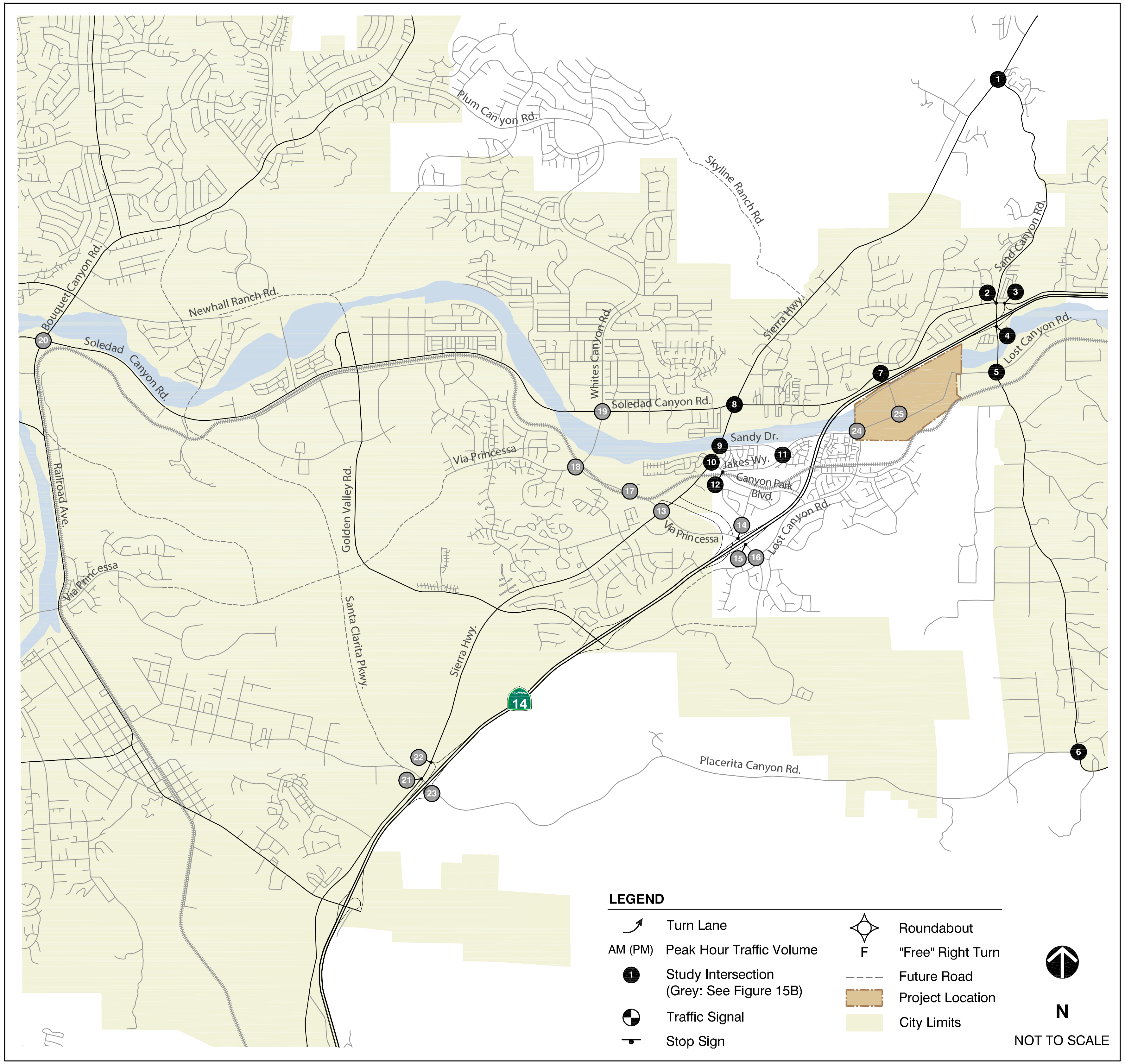
Table 16 shows the peak hour volumes on SR 14 under interim conditions, without and with the proposed project.

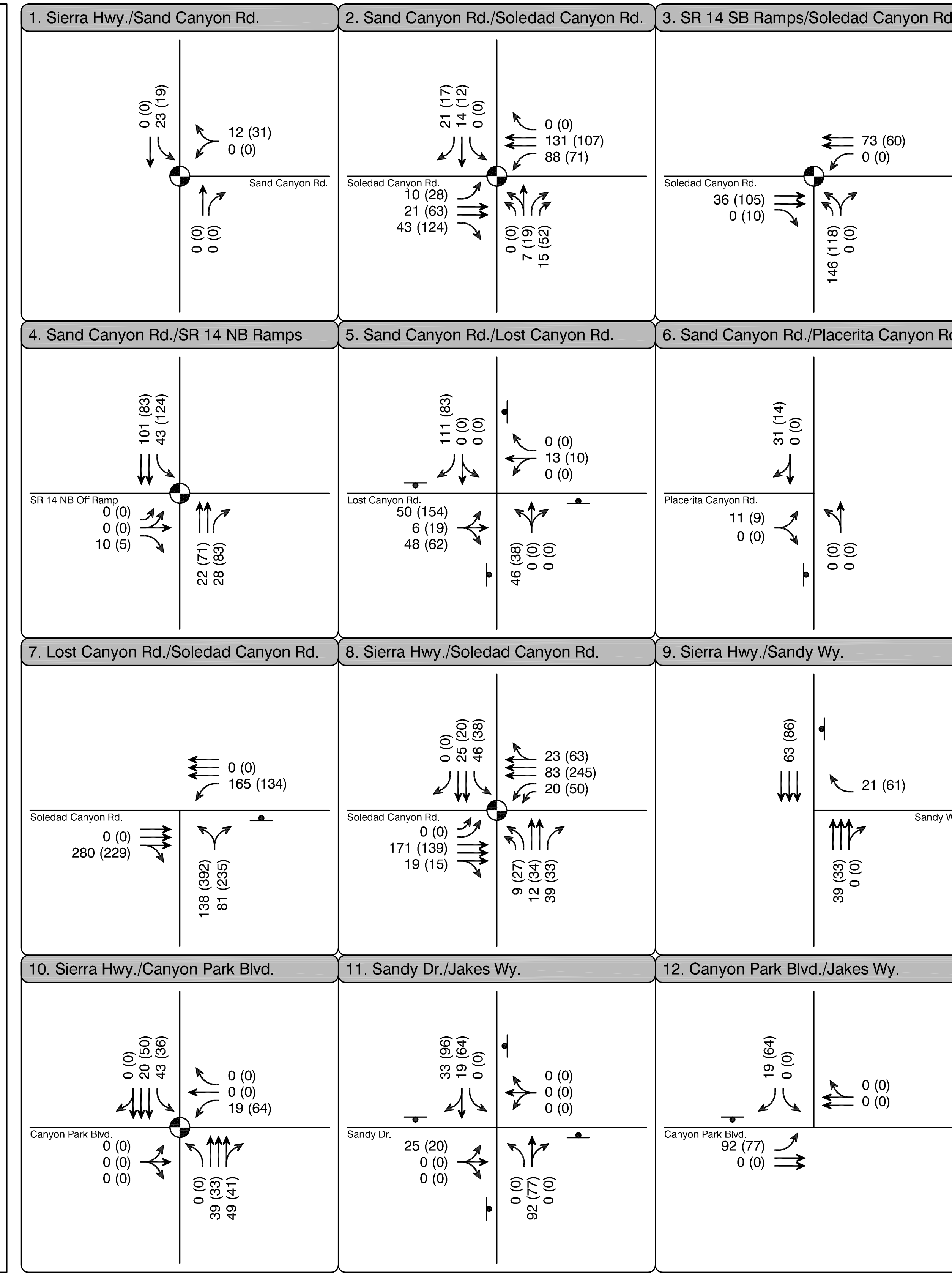
**TABLE 16:
SR 14 FREEWAY TRAFFIC FORECASTS – INTERIM (PROJECT BUILDOUT) CONDITIONS**

Freeway Segment	Interim (No Project) Conditions		Interim (Project Buildout) Conditions		Project Trips	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
NB SR 14 north of Golden Valley Road	2,860	8,670	3,080	8,707	220	37
NB SR 14 north of Via Princessa	2,320	7,950	2,330	7,955	10	5
NB SR 14 north of Sand Canyon Road	2,250	7,380	2,321	7,573	71	193
SB SR 14 north of Sand Canyon Road	6,040	2,940	6,175	3,058	135	118
SB SR 14 south of Sand Canyon Road	6,160	3,190	6,160	3,200	0	10
SB SR 14 south of Via Princessa	7,225	4,050	7,259	4,333	34	283

Note: These volumes represent the travel demand as predicted by the SCVCTDM. Due to various capacity constraints within the system, not all of the travel demand expected in each segment can be served within a single peak-hour.

Project trips reflect new vehicle trips generated by proposed land uses with adjustments for reductions in auto travel on SR 14 due to new Metrolink station and bus transfer station (see Chapter 10 for more information).





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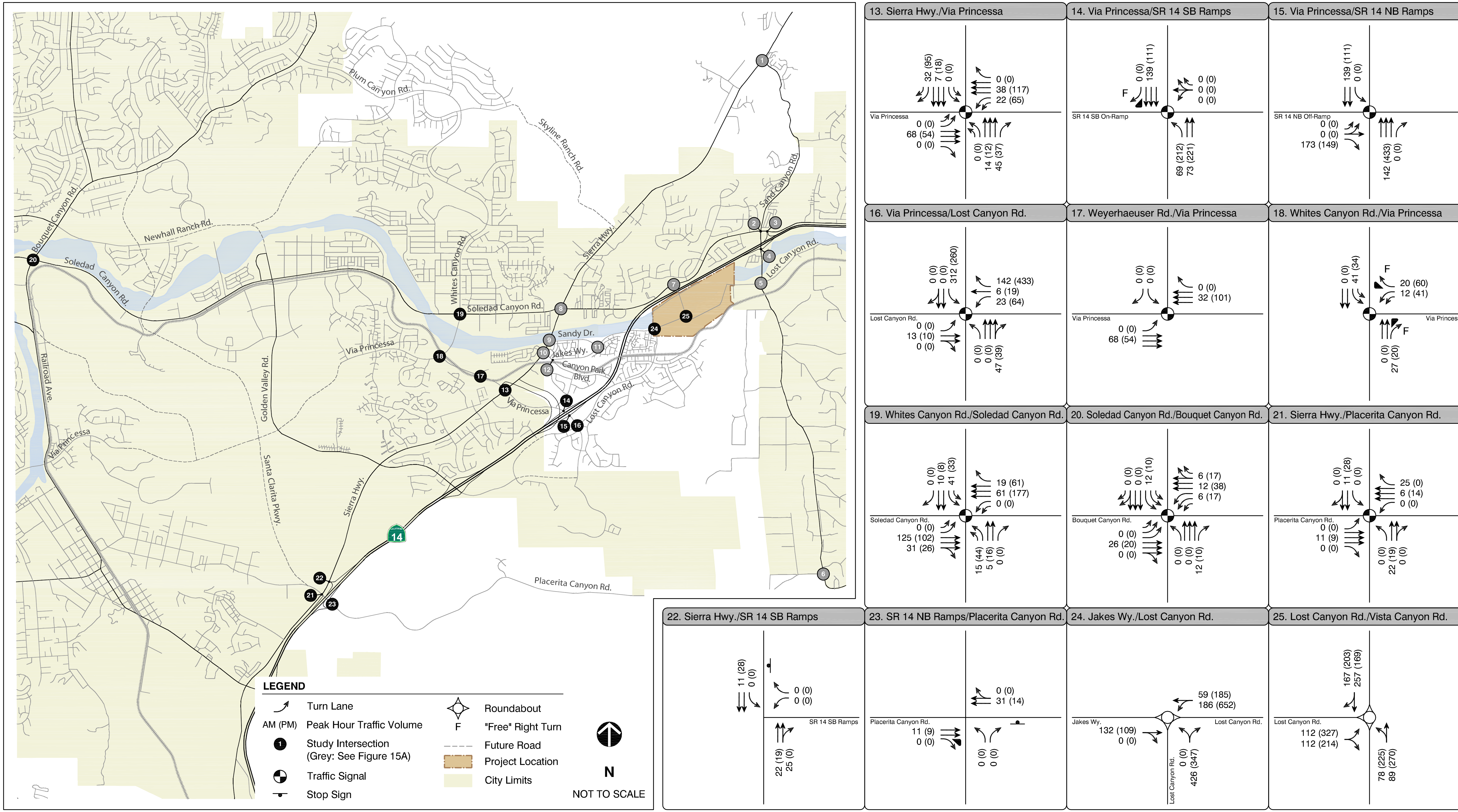
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - INTERIM (PROJECT BUILDOUT) TRIPS

FIGURE 15A



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - INTERIM (PROJECT BUILDOUT) TRIPS

FIGURE 15B

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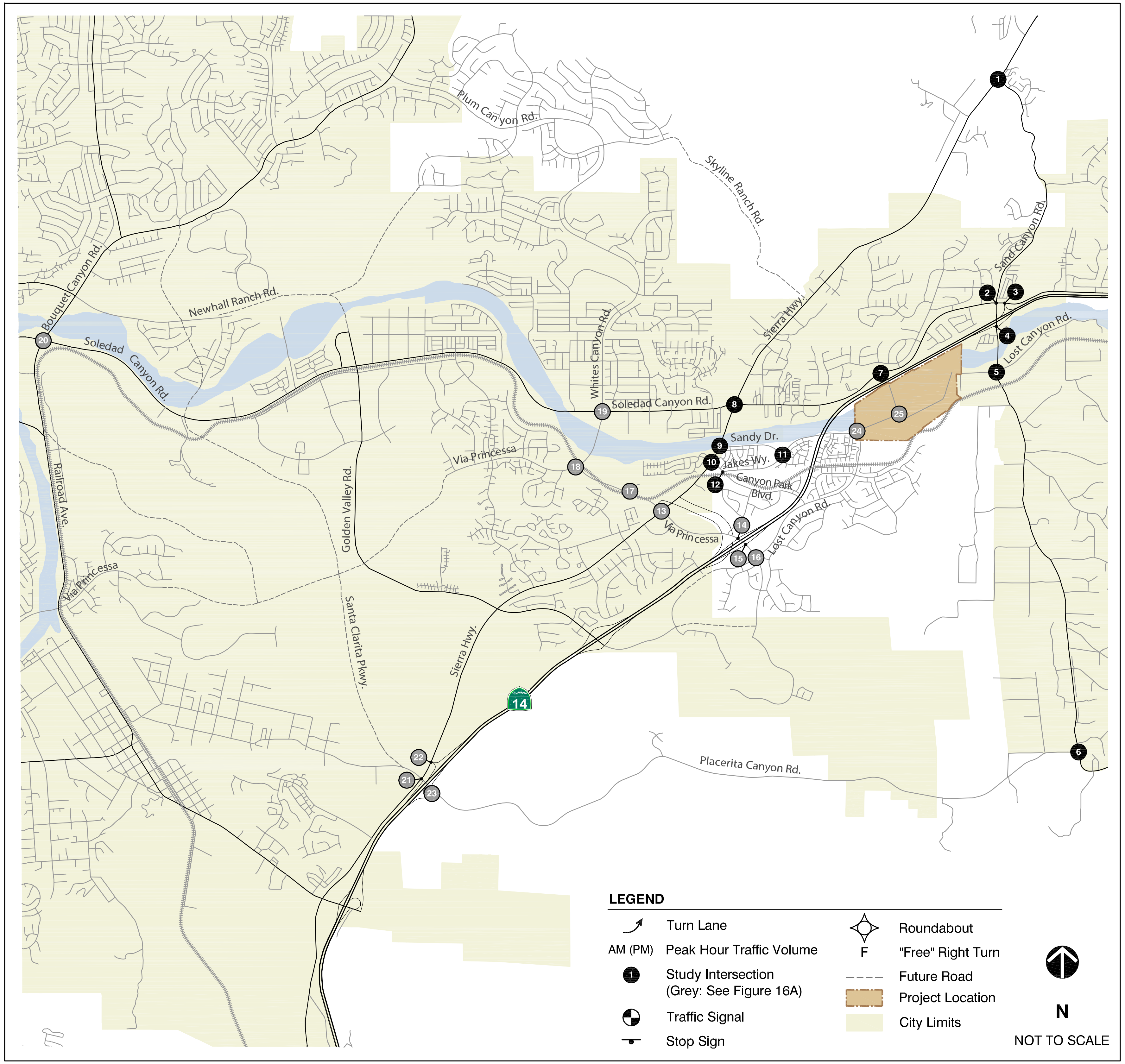

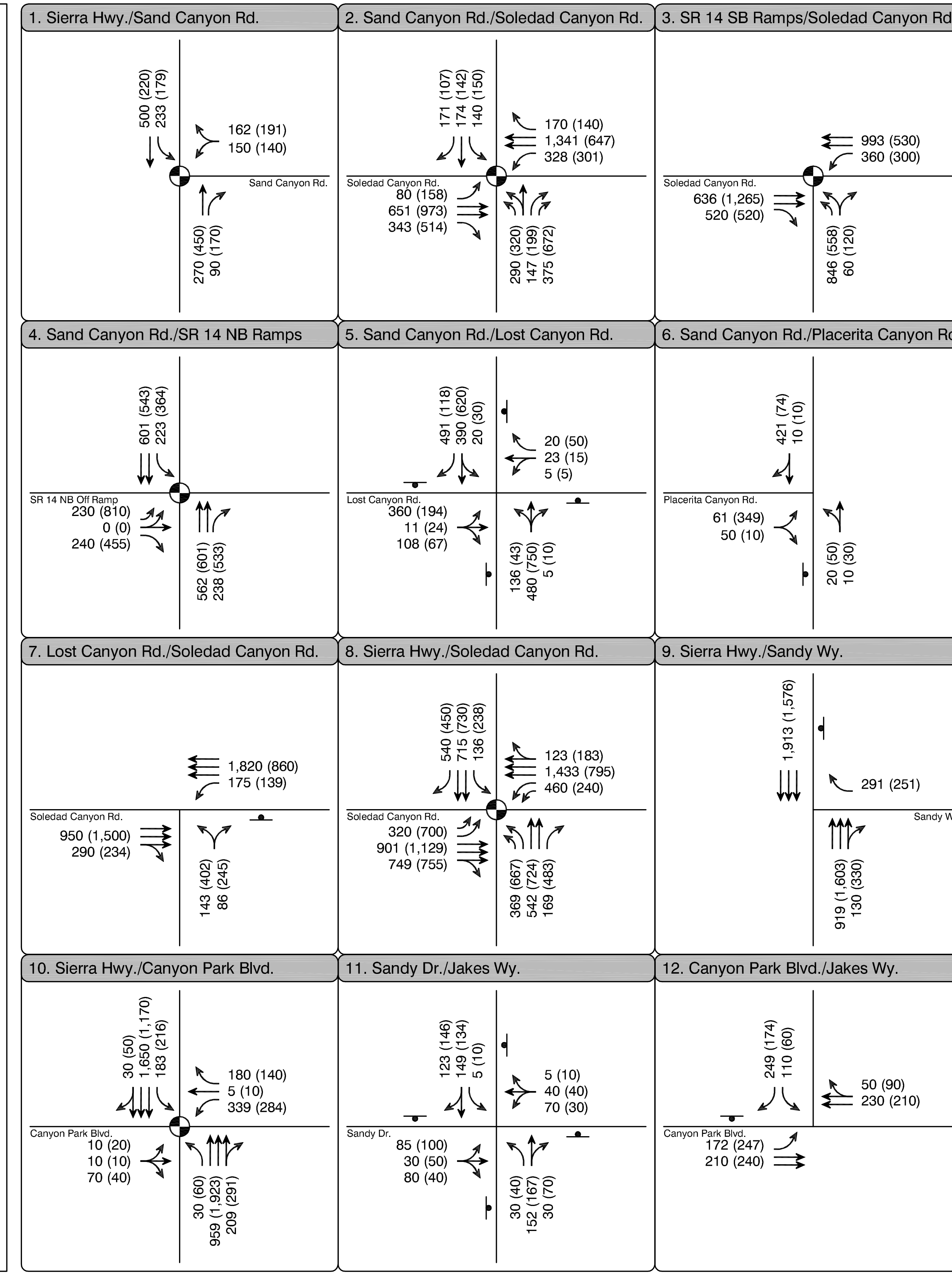

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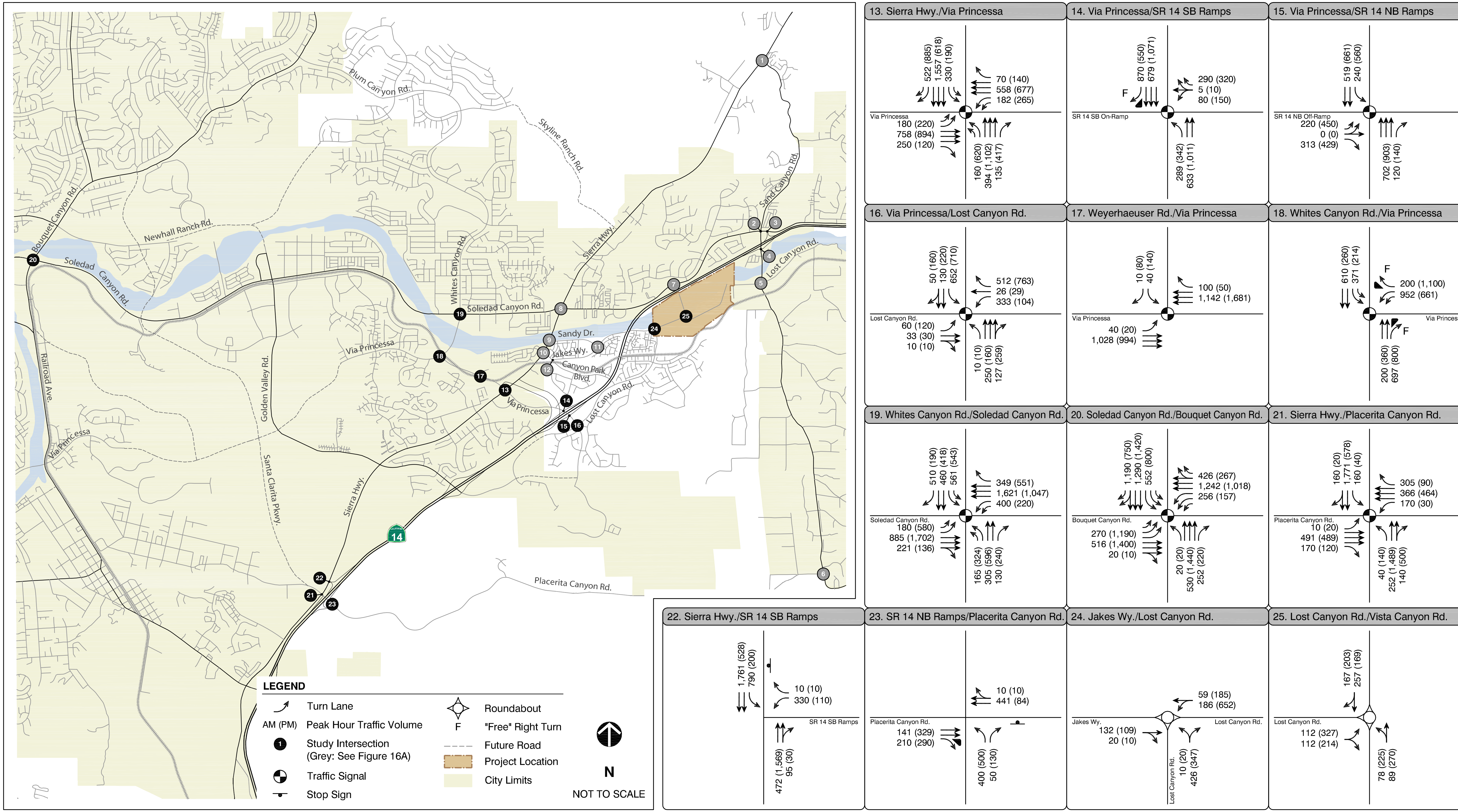
PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - INTERIM (PROJECT BUILDOUT) CONDITIONS

FIGURE 16A



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PEAK HOUR TRAFFIC VOLUMES AND LANE CONFIGURATIONS - INTERIM (PROJECT BUILDOUT) CONDITIONS

FIGURE 16B

INTERSECTION OPERATIONS

Fehr & Peers analyzed the study intersections under Interim (Project Buildout) conditions. Table 17 summarizes the results (refer to separately bound Appendix E for technical calculations). According to Table 18, the project would cause three study intersections to worsen from acceptable to unacceptable levels and would further degrade conditions at nine intersections that are projected to operate unacceptably under interim no project conditions.

TABLE 17:
INTERSECTION OPERATIONS – INTERIM (PROJECT BUILDOUT) CONDITIONS

#	Intersection	Traffic Control	AM (PM) Peak Hour		
			No Project Conditions	Interim Plus Project Conditions	Percent Increase in Traffic Due to Project
			Delay or V/C Ratio – LOS		
1	Sand Canyon Road/Sierra Highway	Traffic Signal	0.60 - A (0.67 - B)	0.61 - B (0.70 - C)	3% (4%)
2	Sand Canyon Road/Soledad Canyon Rd.	Traffic Signal	**36 - D (68 - E)**	**38 - D (140 - F)**	9% (13%)
3	Soledad Canyon Road/SR 14 SB Ramps	Traffic Signal	**151 - F (132 - F)**	**347 - F (350 - F)**	8% (9%)
4	Sand Canyon Road/SR 14 NB Ramps	Traffic Signal	14 - B (20 - C)	26 - C (62 - E)	10% (12%)
5	Sand Canyon Road/Lost Canyon Road	All-Way Stop	**209 - F (64 - F)**	**470 - F (404 - F)**	15% (23%)
6	Sand Canyon Rd./Placerita Canyon Road	Side-Street Stop	11 - B (15 - C)	12 - B (16 - C)	8% (5%)
7	Soledad Canyon Road/Lost Canyon Road	Side-Street Stop	**42 - E (59 - F)**	**>50 - F (>50 - F)**	24% (41%)
8	Sierra Highway/Soledad Canyon Road	Traffic Signal	**44 - D (73 - E)**	**50 - D (82 - F)**	7% (10%)
9	Sierra Highway/Sandy Way	Side-Street Stop	16 - C (12 - B)	15 - C (14 - B)	4% (5%)
10	Sierra Highway/Canyon Park Boulevard	Traffic Signal	25 - C (28 - C)	27 - C (35 - C)	5% (6%)
11	Sandy Way/Jakes Way	All-Way Stop	10 - B (9 - A)	13 - B (12 - B)	27% (44%)
12	Canyon Park Boulevard/Jakes Way	Side-Street Stop	18 - C (18 - C)	33 - D (33 - D)	12% (16%)
13	Sierra Highway/Via Princessa	Traffic Signal	30 - C (39 - D)	30 - C (40 - D)	5% (7%)
14	Via Princessa/SR 14 SB Ramps	Traffic Signal	19 - B (23 - C)	**>180 - F (>180- F)**	11% (19%)
15	Via Princessa/SR 14 NB Ramps	Traffic Signal	34 - C (30 - C)	**>180 - F (>180- F)**	28% (29%)
16	Via Princessa/Lost Canyon Road	Traffic Signal	0.62 - B (0.77 - C)	**0.90 – D (1.19 - F)**	34% (48%)

TABLE 17:
INTERSECTION OPERATIONS – INTERIM (PROJECT BUILDOUT) CONDITIONS

#	Intersection	Traffic Control	AM (PM) Peak Hour		
			No Project Conditions	Interim Plus Project Conditions	Percent Increase in Traffic Due to Project
			Delay or V/C Ratio – LOS		
17	Via Princessa/Weyerhaeuser Way	Traffic Signal	5 - A (22 - C)	5 - A (19 - B)	4% (6%)
18	Via Princessa/Whites Canyon Road	Traffic Signal	9 - A (6 - A)	9 - A (6 - A)	3% (5%)
19	Soledad Canyon Road/Whites Canyon Rd.	Traffic Signal	42 - D (48 - D)	45 - D (51 - D)	6% (8%)
20	Soledad Canyon Road/Bouquet Canyon Rd.	Traffic Signal	**65 - E (71 - E)**	**65 - E (72 - E)**	1% (1%)
21	Placerita Canyon Road/Sierra Highway	Traffic Signal	48 - D (50 - D)	49 - D (52 - D)	2% (2%)
22	Placerita Canyon Road/SR 14 SB Ramps	Side-Street Stop	**>50 - F (>50 - F)**	**>50 - F (>50 - F)**	2% (2%)
23	Placerita Canyon Road/SR 14 NB Ramps	Side-Street Stop	**29 - D (63 - F)**	**34 - D (71 - F)**	3% (2%)
24	Lost Canyon Road/Jakes Way	Roundabout	Does not exist	5 - A (9 - A)	100% (100%)
25	Lost Canyon Road/Vista Canyon Rd.	Roundabout		5 - A (7 - A)	100% (100%)

Notes:

Shaded and bolded cells indicate unacceptable operation (refer to following pages for identification of impacts).

- ICU methodology used for signalized intersections that are located in Los Angeles County.
- HCM methodology used for all unsignalized intersections and signalized intersections maintained by City of Santa Clarita or Caltrans. SimTraffic micro-simulation model used to evaluate closely spaced, coordinated intersections.
- Percent increase in traffic due to project calculated as project trips divided by total traffic under "no project" conditions.

FREEWAY OPERATIONS

Fehr & Peers analyzed the study freeway segments under "Interim Plus Project Buildout" conditions. Table 18 summarizes the results (refer to separately bound Appendix E for technical calculations). This table indicates that the project would contribute to further degraded operations on several mainline segments and ramps on SR 14.

Consistent with assumptions in the CMP, freeway facilities were assumed to have hourly capacities of 2,000 passenger cars per lane for mixed-flow lanes and 1,600 passenger cars per lane for HOV lanes. Based on these assumptions, SR 14 has a capacity of 7,600 passenger cars per hour in each direction between Golden Valley Road and Sand Canyon Road and 5,600 passenger cars per hour in each direction north of Sand Canyon Road. Two percent of capacity represents 152 vehicles per hour per direction for segments south of Sand Canyon Road and 112 vehicles per hour per direction north of Sand Canyon Road. According to Tables 16 and 18, project buildout would add traffic representing two percent or more of the capacity of the following freeway segments, which are projected to operate at LOS F under certain peak hour interim conditions:

- SB SR 14 north of Sand Canyon Road – AM peak hour
- NB SR 14 north of Sand Canyon Road – PM peak hour

TABLE 18:
FREEWAY OPERATIONS – INTERIM (PROJECT BUILDOUT) CONDITIONS

Freeway Facility	AM (PM) Peak Hour	
	No Project Conditions	Project Buildout Conditions
	Density – LOS	Density – LOS
Freeway Mainline Sections		
NB SR 14: Between Golden Valley Road and Via Princessa/Sierra Highway (Weave)	**A (F)**	**A (F)**
NB SR 14: Between Via Princessa/Sierra Highway and Sand Canyon Road	10-A (40-E)	10-A (40-E)
NB SR 14: Between Sand Canyon Road and Soledad Canyon Road	**13-B (F)**	**13-B (F)**
SB SR 14: Between Soledad Canyon Road and Sand Canyon Road	**F (16-B)**	**F (17-B)**
SB SR 14: Between Sand Canyon Road and Via Princessa	**F (13-B)**	**F (13-B)**
SB SR 14: Between Via Princessa/Sierra Highway and Golden Valley Road (Weave)	**F (C)**	**F (C)**
Freeway Ramps		
SR 14 NB Off-Ramp/Sand Canyon Road	12 - B (36 - E)	12 - B (36 - E)
SR 14 NB On-Ramp/Sand Canyon Road	**15 - B (50 - F)**	**16 - B (52 - F)**
SR 14 SB Off-Ramp/Sand Canyon Road/Soledad Canyon Road	**41 - F (19 - B)**	**42 - F (20 - C)**
SR 14 SB On-Ramp/Sand Canyon Road/Soledad Canyon Road	**34 - F (14 - B)**	**34 - F (15 - B)**
SR 14 NB Off-Ramp/Via Princessa	11 - B (35 - D)	13 - B (36 - E)
SR 14 SB On-Ramp/Via Princessa	**> 43 - F (17 - B)**	**> 43 - F (18 - B)**

Notes: Shaded and bolded cells indicate unacceptable operation (refer to following pages for identification of impacts).
- See discussion below for rationale for using HCM techniques versus field observations/travel time surveys.
- Ramps selected for analysis limited to those that would be used by the project to a significant degree.

TWO-LANE ROADWAYS IN LOS ANGELES COUNTY

Fehr & Peers analyzed operations of the five two-lane roadway segments located in Los Angeles County that would potentially be impacted by the proposed project. Table 19 summarizes the results. Each of these segments would continue to operate at LOS A with the project.

**TABLE 19:
OPERATIONS OF TWO-LANE ROADWAYS IN LOS ANGELES COUNTY –
INTERIM (PROJECT BUILDOUT) CONDITIONS**

Freeway Segment	AM (PM) Peak Hour			
	Interim No Project Conditions		Interim Plus Project Buildout Conditions	
	Traffic Volume	V/C Ratio – LOS	Traffic Volume	V/C Ratio – LOS
Sand Canyon Road south of Sierra Highway	600 (630)	0.21 – A (0.23 – A)	635 (680)	0.22 – A (0.24 – A)
Lost Canyon Road east of Medley Ridge Drive	620 (470)	0.22 – A (0.17 – A)	1,252 (1,539)	0.47 – A (0.58 – A)
Jakes Way east of Canyon Park Boulevard	470 (430)	0.19 – A (0.16 – A)	581 (570)	0.24 – A (0.22 – A)
Sandy Drive east of Sierra Highway	400 (520)	0.16 – A (0.20 – A)	421 (581)	0.17 – A (0.22 – A)
Placerita Canyon Road east of SR 14	630 (530)	0.25 – A (0.23 – A)	672 (553)	0.27 – A (0.24 – A)

Note: Capacities used to calculate v/c ratios based on *Los Angeles County Traffic Impact Analysis Report Guidelines*.

CMP ANALYSIS

Fehr & Peers analyzed operations at the three CMP study intersections and one CMP freeway segment on SR 14 under interim conditions, without and with the proposed project. Table 20 summarizes the results (refer to separately bound Appendix E for technical calculations). Table 20 indicates that the project would exacerbate LOS E or F operations at the Sierra Highway/Soledad Canyon Road and Sierra Highway/Placerita Canyon Road intersections.

Immediately north of I-5, SR 14 consists of six total northbound lanes and five total southbound lanes. Per CMP analysis methods, each lane is assumed to have a capacity of 2,000 vehicles per hour. The southbound direction operates at LOS F in the AM peak hour and the northbound direction operates at LOS F in the PM peak hour. According to the data in Table 20, the project would increase the v/c ratio during the AM peak hour in the southbound direction by 0.009. Similarly, the project would increase the v/c ratio during the PM peak hour in the northbound direction by 0.013.

TABLE 20:
CMP ANALYSIS – INTERIM (PROJECT BUILDOUT) CONDITIONS

CMP Facility	AM (PM) Peak Hour			
	Interim No Project Conditions		Interim Plus Project Conditions	
	Traffic Volume	V/C Ratio – LOS	Traffic Volume	V/C Ratio – LOS
Sierra Highway/Sand Canyon Road Intersection	N/A	0.600 – A (0.669 – B)	N/A	0.609 – A (0.700 – B)
Sierra Highway/Soledad Canyon Road Intersection	N/A	1.019 – F (1.103 – F)	N/A	1.037 – F (1.137 – F)
Sierra Highway/Placerita Canyon Road Intersection	N/A	0.965 – E (0.934 – E)	N/A	0.983 – E (0.945 – E)
SR 14 north of I-5 to Newhall Avenue (Northbound)	3,150 (8,970)	N/A	3,333 (9,124)	N/A
SR 14 north of I-5 to Newhall Avenue (Southbound)	7,105 (4,200)	N/A	7,199 (4,422)	N/A

Note: N/A = Not Applicable.
Capacities used to calculate v/c ratios based on *Los Angeles County Traffic Impact Analysis Report Guidelines.*

PROJECT IMPACTS ON BICYCLE/PEDESTRIAN SYSTEM

The project would add a substantial amount of bicycle and pedestrian facilities within the project site. New facilities would also be provided along Lost Canyon Road between the project site and Sand Canyon Road. The project would not adversely affect an existing bicycle/pedestrian facility, nor cause an inconsistency with relevant policies in the City's *Non-Motorized Transportation Plan* (2008). This plan includes a number of strategies and policies that are intended to promote biking and walking. Therefore, project impacts to the bicycle and pedestrian systems are considered **less-than-significant**.

PROJECT IMPACTS ON TRANSIT SYSTEM

The proposed project would replace the existing Via Princessa Metrolink rail station with a new on-site rail station. The new station would help relieve parking shortages at other existing stations in the Valley and draw new riders to Metrolink commuter rail. The project also includes a bus transfer center that would connect with Metrolink service. The applicant would contribute funding toward the new Metrolink Station and Bus Transfer Station as required by the City's Transit Mitigation Fee. The project would not cause an inconsistency with a policy related to transit in the City's *Transportation Development Plan* Therefore, project impacts to the transit system are considered **less-than-significant**.

BRIDGE AND THOROUGHFARE FEE DISTRICTS

The City of Santa Clarita and County of Los Angeles have established a fee program to fund construction of new significant transportation infrastructure improvements. This program consists of six Bridge & Major Thoroughfare (B&T) Fee Districts, which provide an equitable financing mechanism by which new development within an identified area will share the cost of providing full mitigation improvements by payment of appropriate fees. Each of the B&T Districts within the study area is considered a full-improvement district, meaning that the collected fees, combined with other sources have been calculated to cover all needed improvements.

The proposed project is located within the Eastside B&T District. The Eastside and Via Princessa B&T Districts include a number of major infrastructure improvements within the study area. Specific improvements are listed during the discussion of impacts and mitigations. If a developer constructs District-identified improvements, that developer becomes eligible for District credit which can be used to offset District fee payments.

LOST CANYON ROAD IMPROVEMENTS (PROJECT SITE TO SAND CANYON ROAD)

Appendix H (Lost Canyon Road School Access Memo) to the Vista Canyon Transportation Impact Study evaluates circulation on the above referenced segment of Lost Canyon Road. The purpose of the evaluation is to 1) describe the circulation in this segment; 2) estimate travel changes in travel patterns from the construction of Vista Canyon; and, 3) identify recommendations to improve circulation and access on this segment.

This segment presently has one lane in each direction with a posted speed limit of 30 mph (25 mph when children are present). A continuous sidewalk is provided on the south side of the street, from the project site to Sand Canyon Road. Sulphur Springs Elementary School and Pinecrest School both take vehicular access from this segment of Lost Canyon Road. Presently, this segment of Lost Canyon Road is congested when school is in session during the morning when students are being dropped off and in the afternoon when students are being picked up.

Fehr and Peers conducted field observations on this segment in September 2008. All trips accessing the two schools must pass through the Lost Canyon Road/Sand Canyon Road intersection. Vehicle queues on Lost Canyon Road approaching this intersection spill back a considerable distance blocking inbound and outbound traffic to the Pinecrest School and hindering vehicles exiting Sulphur Springs Elementary School's drop off driveway. Since exclusive left-turn pockets are not provided on Lost Canyon Road, queued vehicles waiting to enter the two school driveways frequently block through vehicles on Lost Canyon Road, impacting La Veda Avenue and Sand Canyon Road.

Traffic counts were conducted on Wednesday, October 8, 2008 from 7-9 a.m. and from 2-4 p.m. The morning peak hour occurred from 8-9 a.m. and the afternoon peak hour occurred from 2-3 p.m. This segment of Lost Canyon Road carried approximately 850 morning peak hour vehicles and 550 afternoon peak hour vehicles. This roadway was busiest during the morning peak hour.

To alleviate existing congestion on this roadway and to accommodate project generated traffic, Fehr and Peers is recommending that the following improvements be implemented. The improvements include:

- Pavement widening and striping of this segment of Lost Canyon Road to accommodate one travel lane in each direction with a median turn lane, a trail along the north side of the roadway, a roundabout at the intersection of La Veda Avenue and Lost Canyon Road and parallel parking on the south side of Lost Canyon Road. These improvements would be completed within the existing right-of-way.

- Restricting the outbound-only driveways at each school to right-turns to minimize conflicting turning movements, provided that a roundabout (versus a traffic signal) is constructed at the Lost Canyon Road/Sand Canyon Road intersection.

- Constructing a narrow raised median at the easterly Pinecrest School driveway and posting a sign in the median prohibiting u-turns.

Finally, this memorandum also includes a recommendation that the City and project applicant work with the Sulphur Springs School District on potentially creating an on-site pick-up/drop-off area in the parking area directly east of the School buildings, which would, if implemented, further alleviate congestion on this roadway during the peak hours.

At the request of surrounding residents and for comparison purposes, Fehr & Peers conducted traffic counts on June 4, 2009 (a Thursday evening) during evening hours before and after the Sulphur Springs Elementary School open-house. The peak hour occurred from 6:45 to 7:45 p.m. During this hour, the two-way volume on Lost Canyon Road was 585 vehicles. These peak hour volumes were lower than the typical morning peak hour volumes (approximately 850 vehicles) and comparable to the typical afternoon peak hour volumes (approximately 550). Therefore, the improvements recommended above for this roadway segment would also accommodate traffic generated from school related special events, such as an open house.

SAND CANYON ROAD/LOST CANYON ROAD INTERSECTION DESIGN OPTIONS

As part of buildout, the proposed project would implement one of the four design options for the Sand Canyon Road/Lost Canyon Road intersection. Refer to Appendix H for exhibits of each design option. The four options include:

- <u>Option 1 (Four-Way Stop)</u> – this design option is presently in place at the intersection. Under this design option, the operation of this intersection in the future would worsen to LOS F with or without the Vista Canyon project. If this option is selected by the City, the project would result in a significant unavoidable impact at the intersection.

- <u>Option 2 (Signalized Intersection with “Look Ahead Signal”)</u> – this design option would result in a signalized intersection, with a “look ahead” signal head at the southwest corner to address northbound "line of sight" requirements. Minimal widening of the intersection would occur with this design option, with right-of-way necessary at the northwest and southeast corners. Encroachment within the protected zone of the heritage oak tree located along the eastern edge of Sand Canyon Road would remain similar to the existing condition. A fence, located within the right-of-way, would have to be removed to adhere to "line of sight" requirements. Option 2 would result in the improved operation of the intersection in the future (LOS D) even with future growth (including Vista Canyon), as compared to the existing four-way stop design.

- Option 3 (Roundabout) – this design option would include the installation of a "roundabout" or traffic circle at the intersection. This option would involve the relocation of the intersection to the north and west to adhere to northbound "line of sight" requirements. Right-of-way acquisition would be necessary on all four corners; most of it would come from the northwest corner (which is presently vacant). Encroachment within the protected zone of the heritage oak tree located along the eastern edge of Sand Canyon Road would still occur, consistent with the existing condition. From a traffic operational standpoint, this design option would be the best of the four, improving the future LOS F under the existing design to an LOS C in the AM peak hour and LOS B in the PM peak hour even with future growth (including the Vista Canyon project).

- Option 4 (Signalized Intersection - Standard Configuration) – this design option improves the Lost Canyon Road/Sand Canyon Road intersection with a fully signalized intersection complying with all of the City's standard intersection design criteria. This option would require the acquisition of right-of-way on the northwest and southeast corner. A "line of sight" easement would be needed from three properties located east of Sand Canyon Road and south of the intersection. All vegetation and fencing within this easement would need to be removed, including the heritage oak tree located along the eastern edge of Sand Canyon Road. Similar to the "Look Ahead Signal" design option, this option would result in the improved operation of the intersection (LOS D), as compared to the existing design, even with future growth (including the Vista Canyon project).

PROJECT IMPACTS AND MITIGATIONS

According to the significance criteria and results presented thus far in this chapter, implementation of the full project would cause significant impacts at several study intersections, freeway facilities, and CMP facilities. Each impact is described below followed by a proposed mitigation measure that would reduce the significance of the impact. Technical calculations associated with the proposed mitigations are included in Appendix E.

The end of this chapter includes Figure 17, which illustrates the proposed mitigation measures at the significantly impacted study intersections. Table 21 summarizes the resulting traffic operations at the impacted study intersections with implementation of the proposed mitigations.

Impact TR-5 *The project would further degrade unacceptable operations at the Sand Canyon Road/Soledad Canyon Road and SR 14 SB Ramps/Soledad Canyon Road intersections under interim (Project Buildout) conditions.*

The project would worsen the PM peak hour LOS from E to F at the Sand Canyon Road/Soledad Canyon Road intersection. The project would also exacerbate LOS F conditions at the SR 14 SB Ramps/Soledad Canyon Road intersection. This is considered a ***significant*** impact.

Mitigation TR-5 Implement Mitigation TR-1 (convert the left-turn lane from westbound Soledad Canyon Road onto the SR 14 southbound on-ramp from permitted to protected signal phasing) and construct the following improvements to restore operations to LOS E or better at both intersections:

- Restripe Soledad Canyon Road to include a third through lane in each direction from east of the SR 14 ramp intersection to west of the Sand Canyon Road intersection (see Figure 17).
- Install a right-turn overlap arrow on the northbound Sand Canyon Road approach to Soledad Canyon Road.
- Retime and optimize operations of both traffic signals based on the revised lane geometrics and signal phasings.

The restriping of Soledad Canyon Road to include a third through lane in each direction through these intersections is feasible and can be accommodated within the existing right-of-way. As shown in Table 21, both intersections would improve to an acceptable level with these improvements. Therefore, this mitigation would restore this impact to ***less-than-significant.***

Impact TR-6 *The project would further degrade unacceptable operations at the Sand Canyon Road/Lost Canyon Road intersection under interim (Project Buildout) conditions.*

The project would worsen LOS F conditions at the Sand Canyon Road/Lost Canyon Road intersection during the AM and PM peak hours. This is considered a ***significant*** impact.

Mitigation TR-6 Construct the following improvements:

- Complete the improvements to Lost Canyon Road between La Veda Avenue and Sand Canyon Road.
- Construct Intersection Design Option No. 2, 3, or 4 at the Lost Canyon Road/Sand Canyon Road intersection.

From a traffic operational standpoint, construction of Option 2 (Roundabout) is recommended. However, implementation of any of these three options would restore operations to an acceptable level; therefore this impact is considered ***less-than-significant*** after mitigation.

Impact TR-7 *The project would further degrade unacceptable operations at the Soledad Canyon Road/Lost Canyon Road (Vista Canyon Road) intersection under interim (Project Buildout) conditions.*

The project would worsen this minor-street stop-controlled intersection from LOS E to F during the AM peak hour. The project would further degrade LOS F operations during the PM peak hour. Since these increases exceed the threshold of significance, this is considered a ***significant*** impact.

Mitigation TR-7 Construction of the following improvements is recommended to restore operations to an acceptable level during the AM and PM peak hours:

- Install a traffic signal with signal equipment placed in locations that accommodates the planned restriping of the road to six lanes.
- Construct an exclusive right-turn lane on the eastbound Soledad Canyon Road approach consistent with the condition of approval previously placed on the undeveloped parcel adjacent to this intersection.
- Construct two left-turn lanes and one right-turn lane (with a right-turn overlap phase) on the Vista Canyon Road approach. Each lane should provide 125 feet of storage. Provision of additional storage is limited by an existing office driveway, which if all turning movements are to be permitted, limits the turn lane lengths. The dual left-turn lanes are estimated to have a 95th percentile vehicle queue of 200 feet. This suggests that queued vehicles will occasionally block this driveway during several instances of the PM peak hour.
- Lengthen the westbound left-turn lane on Soledad Canyon Road from 140 feet to 200 feet to accommodate the projected 95th percentile vehicle queue of 140 feet and to provide opportunities for deceleration.

Since the above improvements would restore operations to an acceptable level, this impact is considered ***less-than-significant*** after mitigation.

Impact TR-8 *The project would further degrade unacceptable operations at the Soledad Canyon Road/Sierra Highway intersection under interim (Project Buildout) conditions.*

According to Table 17, this intersection would operate at LOS D during the AM peak hour and LOS E during the PM peak hour under interim conditions using the HCM analysis method recommended by the City. According to Table 20, the ICU analysis method, which is more conservative at large intersections such as this that have coordinated traffic signal timing, indicates that this intersection would operate at LOS F, without or with the proposed project.

The addition of project traffic would cause average delay increases and v/c ratio increases that exceed the significance thresholds for City and CMP impacts. Therefore, this is considered a ***significant*** impact.

Mitigation TR-8 Install a right-turn overlap phase on the southbound Sierra Highway approach.

This mitigation would improve intersection operations. Although operations would remain at LOS E during the PM peak hour under interim plus project buildout conditions, the average delay would be reduced to less than "no project" levels. Similarly, the v/c ratio (based on the ICU method for the CMP analysis) would be reduced to below "no project" levels. Since this mitigation would restore intersection operations to "no project" levels, this impact is considered ***less-than-significant*** after mitigation.

Impact TR-9 *The project would worsen operations at the Via Princessa/Lost Canyon Road intersection to an unacceptable level under interim (Project Buildout) conditions.*

The addition of project traffic would worsen operations at this intersection from LOS B to E during the AM peak hour and from LOS C to F during the PM peak hour. The project adds a significant amount of southbound left-turn and westbound right-turn traffic. This is considered a ***significant*** impact.

Mitigation TR-9 Implement Mitigation TR-3 (install a right-turn overlap phase on the westbound approach) and construct the following improvement to improve operations:

- Restripe the southbound approach to include a second left-turn lane.

The improvements would restore operations to LOS A during the AM peak hour and LOS D during the PM peak hour. Since this intersection will be annexed into the City if the project is approved and LOS D is considered acceptable in the City, this impact is considered ***less-than-significant*** after mitigation.

Impact TR-10 *The project would worsen operations at the SR 14 NB Ramps/Via Princessa and SR 14 SB Ramps/Via Princessa intersections to an unacceptable level under interim (Project Buildout) conditions.*

The addition of project traffic would worsen operations at these intersections from LOS C to F during the AM and PM peak hours. The degraded operations are caused by extensive queuing in the southbound left-turn lane at the Via Princessa/Lost Canyon Road intersection, which extends into the interchange. This is considered a ***significant*** impact.

Mitigation TR-10 Implement each of the previously identified mitigation measures:

- Mitigation Measure TR-2 (retime traffic signals at SR 14/Via Princessa interchange)
- Mitigation Measure TR-3 (install westbound right-turn arrow at Via Princessa/Lost Canyon Road intersection)
- Mitigation Measure TR-9 (install a second southbound left-turn lane at Via Princessa/Lost Canyon Road intersection).

Results of the SimTraffic micro-simulation model analysis of the SR 14/Via Princessa interchange and Via Princessa/Lost Canyon Road intersection indicate that the above improvements will eliminate the excessive queuing that affects interchange operations. With the recommended improvements in place, operations at each ramp intersection are restored to acceptable levels (see Table 21). Therefore, this impact is considered ***less-than-significant.***

Impact TR-11 *Buildout of the project would further degrade unacceptable operations on portions of SR 14 under interim (Project Buildout) conditions.*

The following segments of SR 14, which are projected to operate at LOS F without the project, would experience a project-added traffic increase that is two or more percent of the facility's capacity:

- NB SR 14 north of Sand Canyon Road to Soledad Canyon Road (PM peak hour)
- SB SR 14 north of Sand Canyon Road to Soledad Canyon Road (AM peak hour)

The NB on-ramp and SB off-ramp at the SR 14/Sand Canyon Road interchange would also be significantly impacted. This is considered a ***significant*** impact.

Mitigation TR-11 None Available.

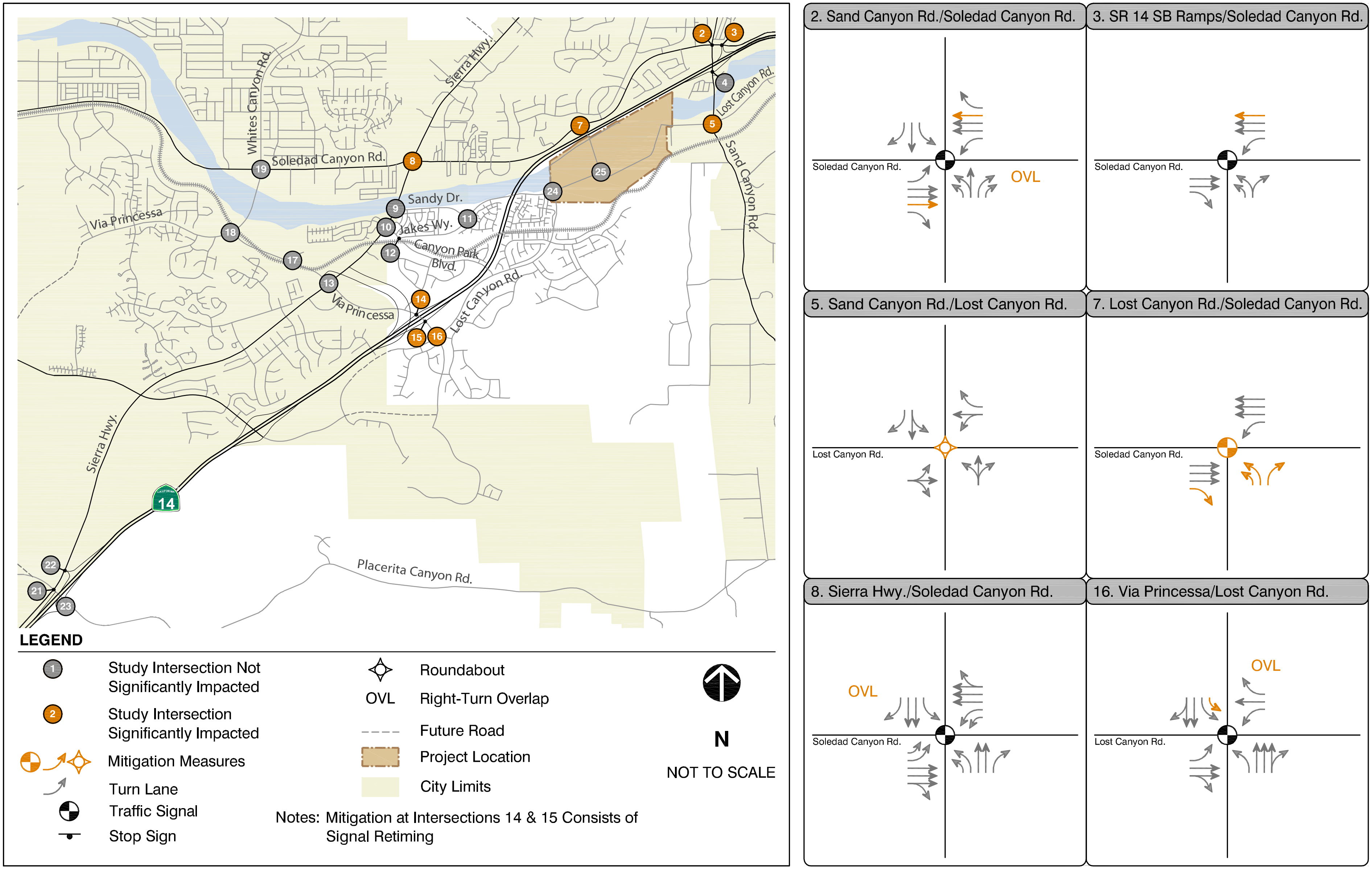
There presently are no improvements for the SR 14 planned and programmed by Caltrans that would mitigate the identified impacts, nor is there an established funding program in place to collect developer fees to implement any such improvements. Notwithstanding, the project applicant and Caltrans have negotiated a Traffic Mitigation Agreement that requires the applicant to pay an in-lieu fee to Caltrans for future improvements to SR 14 based upon the project's fair share. However, because there are presently no planned and programmed improvements for SR 14, nor is there an established funding program, the project's payment of an in-lieu fee would not fully mitigate the identified significant impacts. Therefore, mitigation is considered infeasible and the identified impacts would remain significant and unavoidable.

Project impacts were less than significant at several study intersections that are expected to operate unacceptably because the project-related increase in average delay or capacity use did not exceed a level of significance. Similarly, project impacts on the two-lane highway segments in Los Angeles County and on CMP freeway facilities are less-than-significant.

TABLE 21:
INTERSECTION OPERATIONS – INTERIM (PROJECT BUILDOUT) CONDITIONS WITH MITIGATION

#	Intersection	General Description of Mitigation	AM (PM) Peak Hour		
			No Project Conditions	Plus Project Conditions	Plus Project w/ Mitigations
			Delay or V/C Ratio – LOS		
2	Sand Canyon Rd./ Soledad Canyon Rd.	Restripe Soledad Canyon to 3 TH Lanes, Add NB right-turn overlap arrow	**36 – D (68 - E)**	**38 - D (140 - F)**	37 - D (57 - E)
3	Soledad Canyon Road/SR 14 SB Ramps	Restripe Soledad Canyon to 3 TH Lanes, Convert WB left-turn onto SR 14 to protected phase	**151 – F (132 - F)**	**347 - F (366 - F)**	57 - E (80 - E)
5	Sand Canyon Road/ Lost Canyon Road	Install roundabout	**209 – F (64 - F)**	**407 - F (373 - F)**	22 - C (12 - B)
7	Soledad Canyon Road/ Lost Canyon Road	Install traffic signal	**42 – E (59 - F)**	**>50 - F (>50 - F)**	14 - B (20 - B)
8	Sierra Highway/Soledad Canyon Road	Install SB RT overlap phase	**44 - D (73 - E)**	**50 - D (82 - F)**	**48 - D (72 - E)**
14	Via Princessa/SR 14 SB Ramps	Add 2nd SB LT lane and WB RT overlap phase	19 – B (23 - C)	**>180 - F (>180- F)**	15 - B (40 - D)
15	Via Princessa/SR 14 NB Ramps		34 – C (30 - C)	**>180 – F (>180- F)**	19 - B (28 - C)
16	Via Princessa/Lost Canyon Road		0.65 – B (0.80 - C)	**0.90 - E (1.19 - F)**	0.60 - A (0.81 - D)

Notes: Shaded and bolded cells indicate unacceptable operation.



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RECOMMENDED MITIGATION MEASURES FOR PROJECT IMPACTS UNDER INTERIM CONDITIONS

FIGURE 17

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10. CUMULATIVE (2030) CONDITIONS

This chapter describes the effects of the proposed project under cumulative conditions. Per City practice, the analysis of the roadway system under cumulative conditions focuses on daily roadway segment operations. This chapter also evaluates the project's cumulative impacts on CMP facilities. Finally, a description of the project's expected daily Vehicle Miles of Travel (VMT) for use in the greenhouse gas emissions analysis is presented.

The Draft EIR addresses the annexation by the City of Santa Clarita of the Vista Canyon project site and various properties in the site vicinity. The annexation area includes Vista Canyon (approximately 185 acres), Fair Oaks Ranch (approximately 1,082 acres), the Jakes Way multi-family area (approximately 260 acres), and the unincorporated Sand Canyon area (approximately 1,723 aces). The majority of the annexation area outside of the Vista Canyon site is built out and, therefore, the City's annexation of these properties generally would not result in additional future development nor in the addition of new vehicle trips. There are, however, three remaining undeveloped areas within the annexation area that could result in additional traffic: (i) the as yet unbuilt portion of the approved Fair Oaks Ranch (approximately 500 approved dwelling units which remain to be built); (ii) the undeveloped or underutilized areas of Sand Canyon, which could add 150 residential units to that area; and (iii) the Jakes Way area, which, for purposes of this analysis, was assumed could be developed with up to 436,000 square feet of business park related uses under the City's General Plan.

Excluding the approved Fair Oaks Ranch, none of the areas are expected to be developed prior to buildout of the Vista Canyon project and, therefore, no additional vehicle trips attributable to these areas were considered in the 2012 or Interim (2015) analyses. Other than Fair Oaks Ranch, no development has yet been proposed or approved for the undeveloped areas. However, for purposes of this cumulative analysis, it was assumed that in addition to the remainder of the Fair Oaks Ranch development, the remaining annexation property ultimately would be developed with 150 dwelling units and 436,000 square feet of business park uses by year 2030. Accordingly, the vehicle trips generated by the corresponding traffic analysis zones include these potential land uses.

LAND USE AND ROADWAY NETWORK ASSUMPTIONS

Fehr & Peers used the 2030 version of the SCVCTDM to develop "Cumulative No Project" and "Cumulative Plus Project" daily traffic forecasts. No changes to the model's land use inputs were made other than to reflect no development on the project site for "no project' conditions and the proposed land uses for "plus project" conditions. The following roadway improvements, in addition to those assumed under interim conditions, were assumed in place for cumulative conditions:

- Sierra Highway is widened to six lanes from Soledad Canyon Road north beyond Sand Canyon Road and from Golden Valley Road south to beyond Placerita Canyon Road

- Sand Canyon Road is widened to four lanes from Sierra Highway south to Soledad Canyon Road
- Sand Canyon Road is widened to six lanes from SR 14 south to Lost Canyon Road
- Whites Canyon Road is widened to six lanes north of Soledad Canyon Road
- SR 14 is assumed to have one additional mixed-use travel lane in each direction plus a reversible HOV lane beginning at I-5 and extending throughout the study area

The “no project” scenario assumes that the roadways within the project site are not constructed.

TRAFFIC FORECASTS

Fehr & Peers used the same traffic forecasting procedures as described in the previous chapter to develop the “Cumulative No Project” traffic forecasts. Changes in travel associated with the proposed project (including its land uses, Metrolink station, and connecting roadways) were estimated using the SCVCTDM. This is different than the interim scenario, in which project trips were “layered on top of” the interim no project forecasts. Since the cumulative scenario represents a “snapshot” of conditions in 2030, it is reasonable to expect area residents and workers to alter their home, work, shopping, and mode choice preferences in response to changes in land uses. This is accomplished by using the model to estimate cumulative plus project traffic volumes.

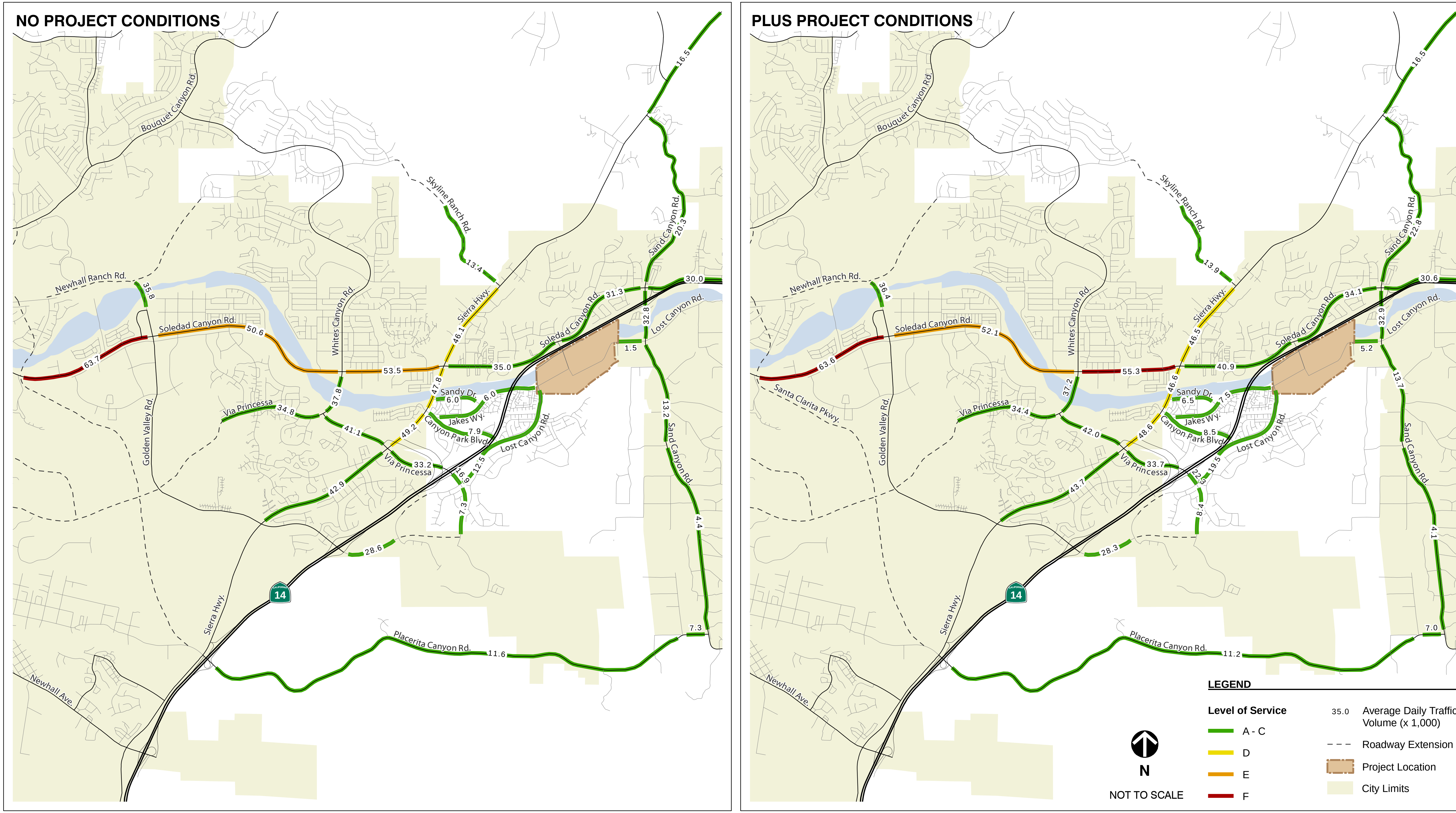
Since the SCVCTDM does not have a mode share component, Fehr & Peers performed an iterative process to identify the percentage of project land uses that should be included in the model to match the expected external vehicle trip generation of approximately 21,000 trips per day (per Table 7). Through trial and error, it was determined that entering 90 percent of the project land uses resulted in an external trip generation total that matched Table 7.

Figure 18 displays the average daily traffic volumes on the study roadways under cumulative no project and with project conditions.

FAIR SHARE CALCULATIONS

A significant percentage of the overall growth in traffic on SR 14 can be attributed to additional travel to and from the Antelope Valley. This trend is illustrated by the following comparison of existing volumes and cumulative (2030) travel demand projections in the peak direction of SR 14 north of Sand Canyon Road.

- AM Peak Hour (Southbound): Existing = 3,980 vehicles. Cumulative = 7,750 vehicles
- PM Peak Hour (Northbound): Existing = 5,100 vehicles. Cumulative = 9,130 vehicles



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AVERAGE DAILY TRAFFIC VOLUMES AND ROADWAY LEVEL OF SERVICE - CUMULATIVE CONDITIONS

FIGURE 18

The project's fair share traffic contribution to the two impacted segments of SR 14 was calculated in accordance with Caltrans' standard methodology (as described in their *Guide for the Preparation of Traffic Impact Studies*, 2002). With the exception of analysis of SR 14, the project impact analysis did not account for the following beneficial aspects of the project:

1. Contributing financially to construction of a new on-site Metrolink station that is more convenient and provides more parking than the existing Via Princessa station, thereby providing additional Metrolink commuter capacity.
2. Contributing financially to construction of a new on-site bus transfer station with new express commuter bus service, thereby providing alternatives to single occupant vehicle travel on SR 14.
3. Providing new office space in the eastern Santa Clarita Valley, which will provide employment opportunities for Santa Clarita and Antelope Valley residents without requiring lengthy commutes to/from the south on SR 14 (e.g., downtown Los Angeles, Burbank, Glendale), thereby contributing to the removal of peak hour traffic from SR 14.

In discussions with Caltrans staff, they recommended that the fair share calculations consider some of the other beneficial aspects (i.e., specifically items No. 1 and 2 listed above) of the project that were not otherwise considered in the previous chapter. The following is an analysis of the estimated vehicle trip reductions attributable to the new Metrolink station and new bus transfer station/commuter service.

<u>Effects of New Metrolink Station</u>

In-person rider surveys, parking data, and transit patronage data collected at the Via Princessa Metrolink station revealed the following important characteristics:

- Over 80 percent of Via Princessa Metrolink riders reside in nearby residential areas to the north or east of the station. Most of the riders work in downtown Los Angeles, Burbank, or Glendale. Travel to the station from the Antelope Valley was uncommon.
  <u>Implication</u>: The new station will serve primarily local residents who desire to commute to work destinations to the south.

- Over 90 percent of the 392 parking spaces at the Via Princessa station are occupied during typical weekdays. Parking shortfalls have been observed at the two other Metrolink stations in the Santa Clarita Valley, which suggests there may be some unmet demand for commuter rail service.
  <u>Implication</u>: The additional parking to be provided at the new station is expected to serve some of the latent demand for commuter rail service. Since Metrolink provides a time-competitive alternative to traveling by automobile for destinations to/from the south, some shifts in travel mode from auto to transit are expected.

- The vast majority of parking spaces at the Via Princessa station are occupied by 7 a.m., which suggests that many transit patrons arrive prior to the beginning of the AM peak hour. Conversely, the largest decrease in occupied parking spaces at the Via Princessa Station occurs from 5:30 to 6:30 p.m., which suggests many riders exit the train during the PM peak hour.
  Implication: The new Metrolink station will result in shifts in mode choice from auto to transit during both peak hours; a greater number of drivers will shift from auto to transit during the PM peak hour versus the AM peak hour given Metrolink train schedules.

The Via Princessa station data showed a net increase of 36 parked vehicles between 7 and 8 a.m. According to rider surveys, 75 percent of riders drove to the station with the remainder using transit, walking/biking, or being dropped-off. Accordingly, about 50 persons boarded trains to travel southbound between 7 and 8 a.m. Given the new station's additional parking supply and convenient location, it is reasonable to assume an additional 25 persons would use Metrolink instead of driving south on SR 14 during the AM peak hour.

The Via Princessa station was estimated to generate 200 PM peak hour trips. The new station is estimated to cause about 100 additional persons to use Metrolink instead of driving north on SR 14 during the PM peak hour. Since most Metrolink riders originate from the Santa Clarita Valley, these reductions in travel on SR 14 apply primarily to the segment south of Via Princessa. The resultant traffic removed from SR 14 during the AM and PM peak hours would be 125 trips south of Via Princessa and 13 trips north of Sand Canyon Road.

Effects of New Bus Transfer Station and Express Commuter Bus Service

The number of riders that may use express commuter bus service from the new bus transfer station at Vista Canyon was estimated by first reviewing ridership levels for existing commuter bus service for Santa Clarita residents. Four routes to the south (routes 757, 796, 797, and 799) and one route to the north (795) are currently available and operate with headways ranging from 15 to 30 minutes during peak periods. Several reasonable assumptions were then made to arrive at the expected number of express commuter bus riders departing and returning to the Vista Canyon station. These assumptions include:

- When a current route has a headway of 30 minutes or more, assume one bus per hour.
- When a current route has a headway of 20 minutes or less, assume two buses per hour.
- Assume "per bus ridership" levels for new service routes departing from Vista Canyon that are comparable to the existing routes that depart the western Santa Clarita Valley).
- Using the ridership numbers in the attachment and the above assumptions, the five new express bus routes (six total buses per hour) at Vista Canyon were assumed to have approximately 200 AM peak hour riders and 175 PM peak hour riders. However, because Vista Canyon may have a smaller catchment area of potential riders, it was assumed that only two-thirds of these ridership estimates will occur.

To determine how many vehicles would be eliminated from SR 14, it was assumed that 50 percent of the new express commuter bus riders were previously commuting on SR 14. The new bus riders that were not previously driving on SR 14 may have instead traveled by auto via other routes (e.g., I-5), been traveling by Metrolink, or not have made the trip at all. Based on the above methodology, the new express commuter bus service at the Vista Canyon bus transfer station would eliminate a combined 113 AM and PM peak hour vehicles from SR 14 south of Via Princessa. A more modest reduction of 12 AM and PM peak hour vehicles would occur on SR 14 north of Sand Canyon Road because the overwhelming directionality of express commuter bus riders is toward the south.[11]

Table 22 shows the resulting SR 14 freeway fair share calculations. Since the fair share is based on cumulative traffic growth, the project's cumulative trip generation (less reductions for eliminated trips on SR 14 due to Metrolink and the bus transfer station) was used for this calculation. Project trips are estimated at 3.8 percent of future traffic growth for the impacted segment north of Sand Canyon Road to Soledad Canyon Road. The majority of the future traffic growth on SR 14 comes from areas east and north of the Santa Clarita Valley.

TABLE 22:
SR 14 FREEWAY FAIR SHARE CALCULATIONS

Freeway Segment	Traffic Growth (Cumulative Plus Project Minus Existing Conditions)	Project Buildout Trips	Fair Share Percentage
SR 14 north of Sand Canyon Road	12,231	470	3.8%
SR 14 south of Sand Canyon Road	14,946	16	0.1%
SR 14 south of Via Princessa	15,237	555	3.6%
SR 14 south of Golden Valley Road	12,889	519	4.0%

Note: Refer to previous pages for discussion of methodologies used to calculate fair share percentages.

TRAFFIC OPERATIONS

Fehr & Peers calculated the LOS for each study roadway segment by comparing the ADT to the daily volume LOS threshold table in Chapter 2. The resulting LOS is shown on Figure 18. This figure indicates that all study roadways are expected to operate at LOS C or better under cumulative no project conditions with the exception of portions of Sierra Highway (north of Via Princessa) and Soledad Canyon Road (west of Sierra Highway).

The addition of project traffic worsens the segment of Soledad Canyon Road between Sierra Highway and Whites Canyon Road from LOS E to F. Although the net increase in trips is only

11. Calculation is as follows: 375 AM and PM riders x 67% (for reduced catchment area) x 50% (for portion of riders otherwise driving on SR 14) = 125 vehicles. This equals the combined reductions on SR 14 south of Via Princessa (113 vehicles) and north of Sand Canyon Road (12 vehicles).

1,800 ADT, it causes the LOS E/F threshold to be exceeded. In addition, project traffic would increase the V/C ratio from 0.94 to 0.97 on Soledad Canyon Road between Whites Canyon Road and Golden Valley Road.

According to the SCVCTDM output, SR 14 is expected to continue having directional peak-period congestion under cumulative conditions despite the assumed addition of one mixed-flow lane in each direction plus a reversible HOV lane within the study area. In addition, significant increases in traffic in the currently non-peak directions of SR 14 are also anticipated. The assumed SR 14 improvements would increase the per direction capacity of SR 14 to 11,200 passenger vehicles per hour south of Sand Canyon Road and 9,200 passenger vehicles per hour north of Sand Canyon Road.

Impacts are considered significant if a project contributes trips representing two percent or more of the capacity of an LOS F segment of SR 14. Two percent represents 224 peak hour trips on a segment of SR 14 south of Sand Canyon Road and 184 peak hour trips on a segment of SR 14 north of Sand Canyon Road. According to Table 16, project traffic would exceed these thresholds during the PM peak hour on northbound SR 14 north of Sand Canyon Road, which is expected to operate at LOS F. Although traffic conditions on this segment will be dictated by the extent to which upstream improvements (i.e., I-5/SR 14 interchange improvements) enable more peak hour traffic to reach it is assumed for analysis and traffic impact purposes to be operating at LOS F under cumulative conditions.

EFFECTS OF MODIFIED ROADWAY SYSTEM

The Vista Canyon project would result in a slightly different roadway system in the project vicinity than the circulation plan contemplated in the City's General Plan and Draft OVOV plan. The City's circulation plan would extend Lost Canyon Road northeasterly from Jakes Way as a four-lane major highway to Sand Canyon Road. The Vista Canyon project would construct Vista Canyon Road as a two-lane secondary highway across the Santa Clara River to Soledad Canyon Road. With Vista Canyon project, Lost Canyon Road would be four lanes between Jakes Way and Vista Canyon Road, and two lanes between Vista Canyon Road and Sand Canyon Road.

Fehr & Peers analyzed the effects of the modified circulation system under "Cumulative Plus Vista Canyon" conditions using the SCVCTDM. The results are summarized in Table 23.

TABLE 23:
COMPARISON OF CUMULATIVE DAILY TRAFFIC VOLUMES

Segment	Cumulative Plus Vista Canyon Conditions		
	Existing City Circulation Plan	Vista Canyon Circulation Plan	Difference
Lost Canyon Road – east of Via Princessa	21,000 / A	19,500 / A	- 1,500
Lost Canyon Road – west of Sand Canyon Road	8,300 / A	5,200 / A	- 3,100
Sand Canyon Road – south of Lost Canyon Road	13,800 / C	13,700 / C	- 100
Sand Canyon Road – north of Lost Canyon Road	35,900 / A	32,900 / A	- 3,000
Soledad Canyon Road – west of Sand Canyon Road	33,800 / A	34,100 / A	+ 300
Soledad Canyon Road – east of Sierra Highway	38,300 / B	40,900 / C	+ 2,600
Soledad Canyon Road – west of Sierra Highway	55,000 / F	55,300/ F	+ 300
Sierra Highway – north of Soledad Canyon Road	46,200 / D	46,500 / D	+ 300
Sierra Highway – south of Soledad Canyon Road	48,600 / D	46,600 / D	- 2,000
Via Princessa – south of SR 14	23,900 / A	22,300 / A	- 1,600
Jakes Way – west of Lost Canyon Road	8,100 / A	7,500 / A	- 600
Vista Canyon Road – south of Soledad Canyon Road	--	9,100 / A	+ 9,100
		Total:	+ 700

Notes: 20,000 / A = Average Daily Traffic / Level of Service

1. The City's plan would extend/expand Lost Canyon Road to be a four-lane major highway from the terminus of Jakes Way to Sand Canyon Road.
2. The Vista Canyon project would construct a two-lane secondary highway across the Santa Clara River to Soledad Canyon Road. Lost Canyon Road would be four lanes between Jakes Way and Vista Canyon Road, and two lanes between Vista Canyon Road and Sand Canyon Road.

The proposed Vista Canyon street system would cause a modest redistribution of cumulative traffic when compared to volumes under the existing City circulation plan. The Vista Canyon street system would not cause any street segments to worsen from an acceptable (i.e., LOS D or better) to an unacceptable (i.e., LOS E or F) level.

The Vista Canyon Road connection to Soledad Canyon Road would result in a net reduction in traffic at several intersections (Lost Canyon Road/Sand Canyon Road, Sand Canyon Road/Soledad Canyon Road, and Lost Canyon Road/Via Princessa) that were shown as operating unacceptably under interim (2015) conditions. Therefore, based on the above results, it can be concluded that the proposed Vista Canyon circulation system would not cause any adverse circulatory impacts when compared to the City's Existing General Plan and the Draft OVOV circulation plan.

CMP ANALYSIS

Fehr & Peers analyzed the three CMP study intersections and CMP freeway segment under cumulative conditions. The results are summarized in Table 24 (refer to separately bound Appendix F for technical calculations). As shown, the project would further worsen unacceptable operations at the Sierra Highway/Soledad Canyon Road and Sierra Highway/Placerita Canyon Road intersections. However, in neither case would the v/c ratio increase by 0.02. Therefore, these increases are not considered significant.

TABLE 24:
CMP ANALYSIS – CUMULATIVE CONDITIONS

CMP Facility	AM (PM) Peak Hour			
	Cumulative No Project Conditions		Cumulative Plus Project Conditions	
	Traffic Volume	V/C Ratio – LOS	Traffic Volume	V/C Ratio – LOS
Sierra Highway/Sand Canyon Road Intersection	N/A	0.53 – A (0.57 – A)	N/A	0.56 – A (0.59 – A)
Sierra Highway/Soledad Canyon Road Intersection	N/A	1.14 – F (1.03 – F)	N/A	1.13 – F (1.02 – F)
Sierra Highway/Placerita Canyon Road Intersection	N/A	1.19 – F (1.02 – F)	N/A	1.20 – F (1.03 – F)
SR 14 north of I-5 (Northbound)	6,220 (14,620)	N/A	6,300 (14,600)	N/A
SR 14 north of I-5 (Southbound)	14,250 (8,300)	N/A	14,200 (8,340)	N/A

Note: N/A = Not Applicable.
Capacities used to calculate v/c ratios based on *Los Angeles County Traffic Impact Analysis Report Guidelines.*

IMPACTS AND MITIGATIONS

Based on the standards of significance and results on Figure 18, the project would cause the following two significant impacts to roadways in the City under cumulative conditions:

- Soledad Canyon Road between Sierra Highway and Whites Canyon Road – LOS E to F (v/c ratio increases from 0.99 to 1.02)
- Soledad Canyon Road between Whites Canyon Road and Golden Valley Road – LOS E maintained (v/c ratio increases from 0.94 to 0.97)

As these roadways are already constructed to their ultimate width of six lanes, no feasible mitigation measures are available to mitigate these impacts.

The project would result in a net increase of 1,500 to 1,800 vehicles per day on the impacted segments of Soledad Canyon Road under cumulative conditions. According to the City's website, these segments carried about 46,000 to 50,000 ADT in 2004-2005. Based on the SCVCTDM, these segments are expected to carry between 52,000 and 55,000 ADT under cumulative conditions. Thus, the cumulative levels of traffic projected on these facilities will be similar to today.

It is important to note that the project will be providing complementary land uses adjacent to a transit station to provide opportunities for internal trip-making and external trips made by transit. In addition, the project will be paying B&T fees or constructing eligible improvements that help fund major roadways, which provide parallel capacity to Soledad Canyon Road. The project would also provide a significant amount of office space, which would enable more City residents to work in the City versus traveling south to work.

The project would cause significant impacts during the PM peak hour on northbound SR 14 north of Sand Canyon Road and on southbound SR 14 south of Via Princessa. There presently are no improvements for the SR 14 planned and programmed by Caltrans that would mitigate the identified impacts, nor is there an established funding program in place to collect developer fees to implement any such improvements. Notwithstanding, the project applicant and Caltrans have negotiated a Traffic Mitigation Agreement that requires the applicant to pay an in-lieu fee to Caltrans for future improvements to SR 14 based upon the project's fair share. However, because there are presently no planned and programmed improvements for SR 14, nor is there an established funding program, the project's payment of an in-lieu fee would not fully mitigate the identified significant impacts. Therefore, mitigation is considered infeasible and the identified impacts would remain significant and unavoidable.

VMT CALCULATION

Fehr & Peers estimated the average weekday daily Vehicle Miles of Travel (VMT) associated with the residential portion of the project. This information has been used by Environ to conduct an analysis of the project's potential effects on climate change and greenhouse gas emissions. The VMT associated with residents of Vista Canyon can be broadly classified into three groups:

- Part A – Home-Based Trips by project residents
- Part B – Non-Home-Based Trips by project residents[12]
- Part C – Trips Attracted to residential units[13]

To estimate each component of VMT, the spreadsheet contained in Appendix G was developed. The spreadsheet employs a number of assumptions from various resources including the SCVCTDM, NCHRP Report 365, the OVOV Land Use Element update, and the project's trip generation estimate.

12. As an example, a trip made by a resident from an off-site employment center to an off-site deli would be a non-home-based trip.
13. An example of this type of trip is a truck delivery to a project residence.

According to the spreadsheet, each household in Vista Canyon is expected to generate an average of 58 VMT per day. It is important to note that this estimate includes both VMT associated with home-based and non-home-based travel by Vista Canyon residents. This distinction is important in that some VMT estimates in other studies and documents consider only home-based trips.

The following offers some perspective on this estimate:

- According to data from the Metropolitan Transportation Commission (MTC), the nine-county San Francisco Bay Area generated an average of 58 miles of travel per household per day in 2006. The Sacramento Area Council of Governments estimates that the seven-county Sacramento region has an average daily VMT of about 52 miles per household. Comparable data for the Southern California region was not available.

- Given the above data and the fact that rural areas are known to generate greater VMT per household than urban areas, it is believed that the state-wide average VMT per household ranges from 55 to 65 miles per day. It is worth noting that an exact average is not known given that VMT is currently difficult to measure directly.

- The VMT per household within a geographic area can vary substantially depending on the household location (i.e., distance from regional attractions), household size, number of vehicles, number of employed persons, availability of transit, presence of bicycle/pedestrian facilities, and other factors. For instance, according to a 2001 survey by from the US Energy Information Administration, households with children drove an average of 29,000 miles per year, while households without children drove an average of 20,000 miles per year.

The project's estimated average daily VMT of 58 miles per household does not explicitly consider the following factors, which tend to reduce VMT. As a result, the VMT estimate for Vista Canyon is considered conservative.

1) Research shows that auto ownership levels in TODs are lower than region-wide averages; fewer vehicles/drivers per household are linked to reduced levels of VMT.

2) TODs often have smaller household sizes and fewer children than comparable developments in the same region. Again, these factors are linked to reduced VMT.

3) Research suggests that developments that are dense and have supportive non-motorized design elements (e.g., connections to bicycle paths, grid streets, etc.) generate less VMT per household than traditional low-density projects.

As noted previously, this study assumed fairly low levels of transit use and internal trip-capture to ensure that project impacts on the surrounding roadways are not understated. These assumptions result in greater numbers of off-site vehicle trips each day, which translate into greater amounts of VMT. Fehr & Peers' analysis of the TOD travel research suggests that a higher level of internal trip-capture and transit mode share, perhaps in the range of 25 percent, is likely for Vista Canyon. If achieved, this would translate into 54 VMT per household.

VMT per Household Under Draft OVOV Land Use Designation

Fehr & Peers estimated the average daily VMT per household associated with the draft OVOV residential land use designation for the site. The analysis was conducted assuming the site yields 700 dwelling units with the same mix of single-family, condominiums, and apartment units as that of the proposed project for comparison purposes. The site would not have any non-residential uses and would not have a Metrolink Station or bus transfer center. According to the spreadsheet in Appendix G, the draft land use designation would result in an average of 71 VMT per day per household.

11. INTERNAL CIRCULATION

This chapter describes the analyses conducted by Fehr & Peers to assist the applicant and Alliance Land Planning and Engineering in refining the project site plan. It also evaluates the planned haul routes for adding fill to the project site in order to facilitate project construction.

The latest project site plan (shown on Figure 8) reflects a number of recommendations provided by Fehr & Peers including:

- Layout and lane markings of on-site roundabouts including adequacy to accommodate school buses, public buses, and delivery vehicles.
- Permitted turning movements for project streets that intersect Lost Canyon Road west of Vista Canyon Road.
- Width and number of lanes on Vista Canyon Road.
- Improvements along Lost Canyon Road between project site and Sand Canyon Road to improve access to Sulphur Springs Elementary School and Pinecrest School, while also providing additional capacity to accommodate project trips (see Figure 20).

INTERNAL STREET ADT ESTIMATES

Fehr & Peers estimated the ADT on the primary project roadways including Lost Canyon Road, Vista Canyon Road, A Street, B Street, and Town Center Drive (Vista Square). The estimated ADTs, shown on Figure 19, are based on the project's expected vehicular trip generation, number of Metrolink and Santa Clarita bus trips, and redistributed background traffic associated with the new street connections. The results in Figure 19 suggest the following:

- Lost Canyon Road between Jakes Way and Vista Canyon Road is expected to carry between 11,000 and 12,000 ADT, which is within the capacity of the four travel lanes that will be provided. The recommended number of circulating lanes at the roundabouts on each end of this segment has been developed based on these volumes and directional movements at these locations.
- Vista Canyon Road is expected to carry approximately 9,200 ADT between Soledad Canyon Road and Lost Canyon Road. The two-lane limited highway designation for this street will accommodate this amount of traffic.
- Traffic volumes will be less than 3,000 ADT on the two-lane segment of Lost Canyon Road between the project's easterly boundary and D Street. This amount of traffic will be accommodated with the typical cross-section of on-street parallel parking and two 13-foot travel lanes. Roundabouts and pedestrian bulbouts have been placed along this roadway as traffic calming measures.

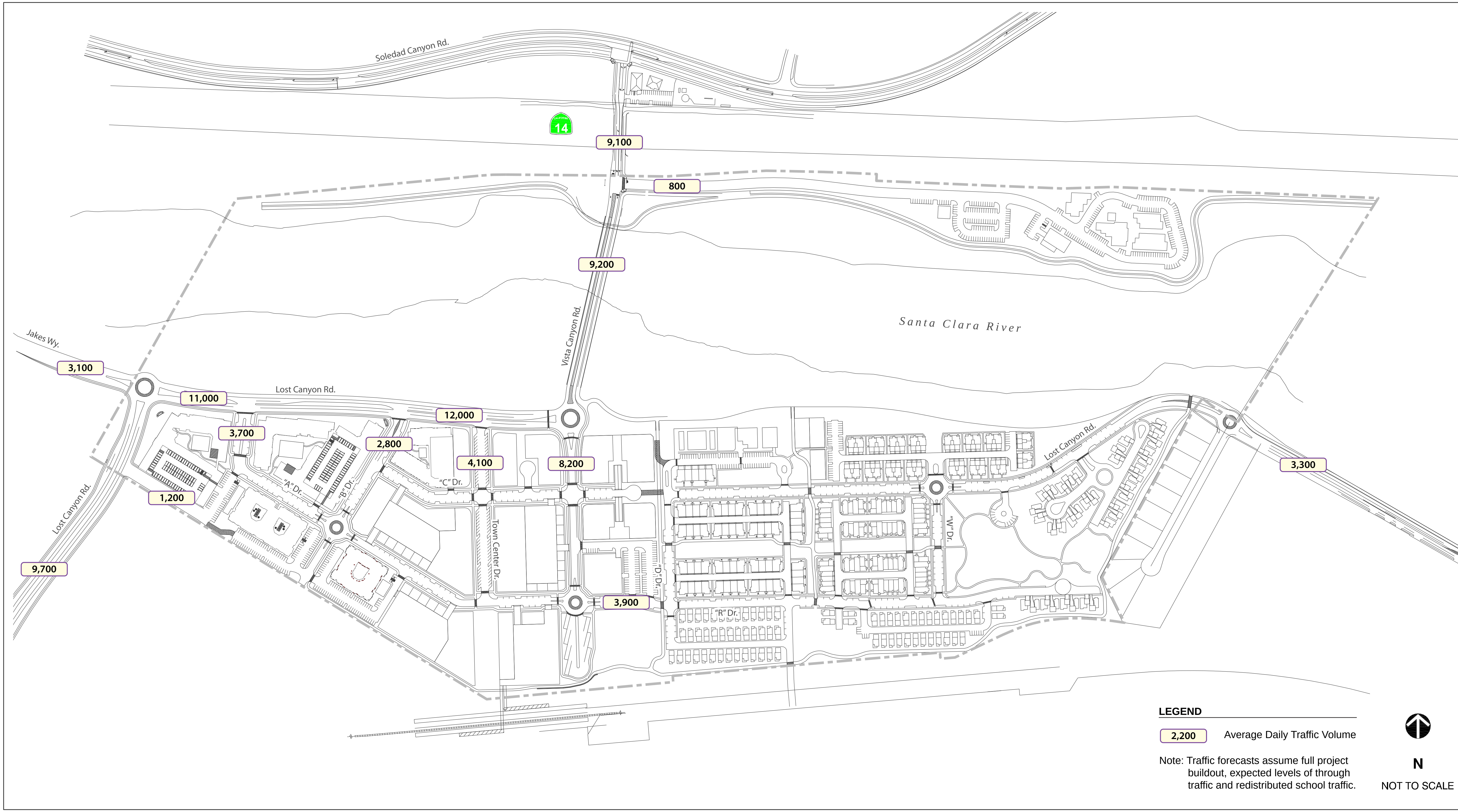
- Traffic volumes are fairly balanced on the internal street accesses to the mixed-use area of the project. Projected volumes range from 2,800 ADT on B Drive, 3,700 ADT on A Drive, 4,100 ADT on Town Center Drive (Vista Square), and 8,200 ADT on Vista Canyon Road all of which can accommodate those projected volumes.

TRAFFIC EFFECTS OF TRANSPORTING FILL TO PROJECT SITE

Up to 500,000 cubic yards of dirt are anticipated to be moved to the project site from two off-site locations. These two sites are located on Golden Valley Road between Soledad Canyon Road and Sierra Highway. For approximately six months, an average of 600 loaded trucks per day (1,200 total trips) will transport materials from these two locations to the project site. Materials will be transported during off-peak hours (generally 9 to 3:30) to avoid contributing to peak hour congestion. Trucks will use Golden Valley Road-to-Sierra Highway-to-Via Princessa-to-Lost Canyon Road to haul the materials.

This temporary condition would not cause any significant impacts to the surrounding roadway system because truck trips will be made outside of the weekday AM and PM peak hours. According to the November 2008 traffic counts on Sierra Highway, hourly traffic volumes between 9 and 3 p.m. were an average of 40 percent lower than the PM peak hour volume. Truck trips would pass through four study intersections, each of which currently operates at LOS D or better during the AM and PM peak hours. Given that traffic volumes are lower during off-peak hours, operations are in the LOS A – C range.

This evaluation has concluded that the roadway system has adequacy capacity to accommodate these trips during the off-peak hours. Therefore, no temporary construction-related traffic impacts were identified.



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TRANSPORTATION CONSULTANTS

Feb 13, 2009 SRH
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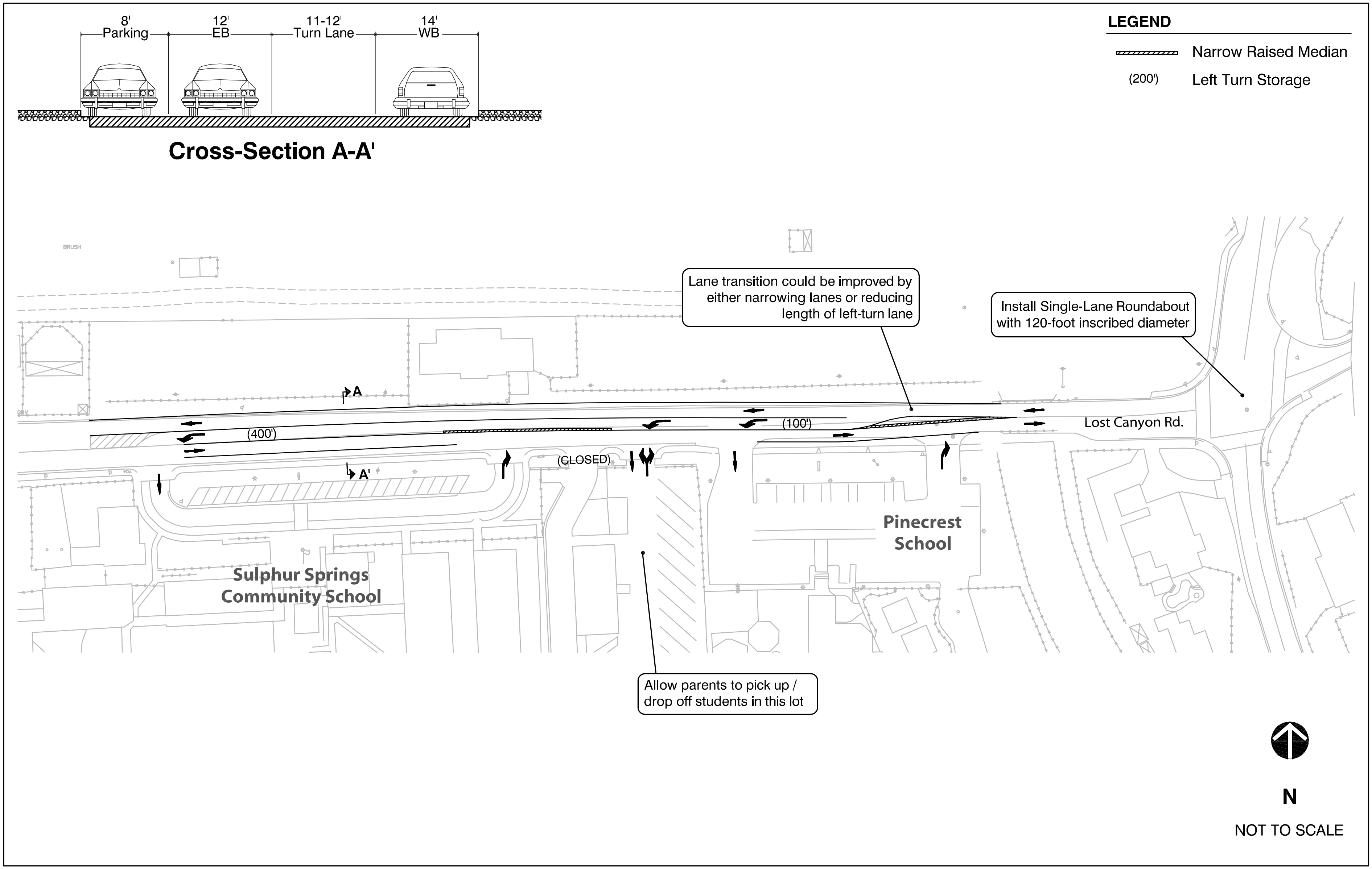
AVERAGE DAILY TRAFFIC VOLUMES

FIGURE 19



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RECOMMENDATIONS

FIGURE 20

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Technical Appendix

Transportation Impact Study for Vista Canyon Transit-Oriented Development

Prepared for: Vista Canyon Ranch, LLC

Submitted by: FEHR & PEERS TRANSPORTATION CONSULTANTS

May 2010

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APPENDIX A:

TECHNICAL CALCULATIONS FOR EXISTING CONDITIONS

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	45	52	22	9	12	251
Peak Hour Factor	0.55	0.55	0.80	0.80	0.90	0.90
Hourly flow rate (vph)	82	95	28	11	13	279
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	219	153	292			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219	153	292			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	89	98			
cM capacity (veh/h)	753	893	1269			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	176	39	292
Volume Left	82	28	0
Volume Right	95	0	279
cSH	822	1269	1700
Volume to Capacity	0.21	0.02	0.17
Queue Length 95th (ft)	20	2	0
Control Delay (s)	10.6	5.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	5.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	32.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	768	10	7	1277	1	4
Peak Hour Factor	0.85	0.85	0.90	0.90	0.40	0.40
Hourly flow rate (vph)	904	12	8	1419	2	10
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			915		1634	458
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			915		1634	458
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	98
cM capacity (veh/h)			741		91	550

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	602	313	8	709	709	12
Volume Left	0	0	8	0	0	2
Volume Right	0	12	0	0	0	10
cSH	1700	1700	741	1700	1700	274
Volume to Capacity	0.35	0.18	0.01	0.42	0.42	0.05
Queue Length 95th (ft)	0	0	1	0	0	4
Control Delay (s)	0.0	0.0	9.9	0.0	0.0	18.8
Lane LOS			A			C
Approach Delay (s)	0.0		0.1			18.8
Approach LOS						C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.93	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1480	3433	5064		3433	3539	1546	1770	3539	1489
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1480	3433	5064		3433	3539	1546	1770	3539	1489
Volume (vph)	193	649	422	284	1122	25	385	202	153	42	476	402
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	193	649	422	284	1122	25	385	202	153	42	476	402
RTOR Reduction (vph)	0	0	215	0	2	0	0	0	102	0	0	272
Lane Group Flow (vph)	193	649	207	284	1145	0	385	202	51	42	476	130
Confl. Peds. (#/hr)			49			22			8			39
Confl. Bikes (#/hr)			2			4			2			6
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	10.8	44.4	44.4	13.9	47.5		18.6	38.1	38.1	4.6	24.1	24.1
Effective Green, g (s)	10.3	46.4	46.4	13.4	49.5		18.1	40.1	40.1	4.1	26.1	26.1
Actuated g/C Ratio	0.09	0.39	0.39	0.11	0.41		0.15	0.33	0.33	0.03	0.22	0.22
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5	4.5	2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	295	1368	572	383	2089		518	1183	517	60	770	324
v/s Ratio Prot	0.06	0.18		c0.08	c0.23		c0.11	0.06		0.02	c0.13	
v/s Ratio Perm			0.14						0.03			0.09
v/c Ratio	0.65	0.47	0.36	0.74	0.55		0.74	0.17	0.10	0.70	0.62	0.40
Uniform Delay, d1	53.1	27.6	26.2	51.6	26.8		48.7	28.2	27.5	57.3	42.4	40.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.96	0.90	1.48	1.00	1.00	1.00
Incremental Delay, d2	3.9	1.2	1.8	6.6	1.0		5.4	0.1	0.1	25.9	1.9	1.4
Delay (s)	57.1	28.8	28.0	58.3	27.8		51.9	25.4	40.9	83.2	44.4	41.7
Level of Service	E	C	C	E	C		D	C	D	F	D	D
Approach Delay (s)		32.9			33.8			42.4			45.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	256	545	131	0	1300
Peak Hour Factor	0.75	0.75	0.90	0.90	0.95	0.95
Hourly flow rate (vph)	0	341	606	146	0	1368
Pedestrians	72					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	6					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.99	0.99			0.99	
vC, conflicting volume	1206	347			823	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1181	309			792	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	46			100	
cM capacity (veh/h)	170	637			764	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	341	242	242	267	456	456	456
Volume Left	0	0	0	0	0	0	0
Volume Right	341	0	0	146	0	0	0
cSH	637	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.54	0.14	0.14	0.16	0.27	0.27	0.27
Queue Length 95th (ft)	80	0	0	0	0	0	0
Control Delay (s)	17.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	17.0	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.93	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.90		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1656		1770	1863	1471	1770	4953		1770	5068	
Flt Permitted		0.97		0.68	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1618		1267	1863	1471	1770	4953		1770	5068	
Volume (vph)	13	6	64	265	1	110	24	600	96	91	1119	22
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	13	6	64	265	1	110	24	600	96	91	1119	22
RTOR Reduction (vph)	0	49	0	0	0	84	0	14	0	0	1	0
Lane Group Flow (vph)	0	34	0	265	1	26	24	682	0	91	1140	0
Confl. Peds. (#/hr)						46			18			1
Confl. Bikes (#/hr)						1						
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		28.2		28.2	28.2	28.2	4.0	67.7		10.1	73.8	
Effective Green, g (s)		28.7		28.7	28.7	28.7	3.5	69.7		9.6	75.8	
Actuated g/C Ratio		0.24		0.24	0.24	0.24	0.03	0.58		0.08	0.63	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		387		303	446	352	52	2877		142	3201	
v/s Ratio Prot					0.00		0.01	0.14		c0.05	c0.22	
v/s Ratio Perm		0.02		c0.21		0.02						
v/c Ratio		0.09		0.87	0.00	0.07	0.46	0.24		0.64	0.36	
Uniform Delay, d1		35.5		43.9	34.8	35.4	57.3	12.2		53.5	10.5	
Progression Factor		1.00		1.00	1.00	1.00	1.18	0.69		1.03	1.09	
Incremental Delay, d2		0.1		23.2	0.0	0.1	2.3	0.2		6.2	0.3	
Delay (s)		35.6		67.2	34.8	35.5	70.0	8.6		61.1	11.7	
Level of Service		D		E	C	D	E	A		E	B	
Approach Delay (s)		35.6			57.8			10.6			15.4	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	55	28	78	71	40	1	30	63	32	2	133	94
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.90	0.90	0.90	0.75	0.75	0.75
Hourly flow rate (vph)	73	37	104	84	47	1	33	70	36	3	177	125

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	215	132	33	106	3	303
Volume Left (vph)	73	84	33	0	3	0
Volume Right (vph)	104	1	0	36	0	125
Hadj (s)	-0.19	0.16	0.53	-0.20	0.53	-0.26
Departure Headway (s)	5.1	5.6	6.4	5.7	6.2	5.4
Degree Utilization, x	0.31	0.20	0.06	0.17	0.00	0.45
Capacity (veh/h)	649	586	521	586	549	637
Control Delay (s)	10.4	10.0	8.6	8.6	8.0	11.6
Approach Delay (s)	10.4	10.0	8.6		11.6	
Approach LOS	B	B	A		B	

Intersection Summary			
Delay	10.5		
HCM Level of Service	B		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	78	101	134	48	107	225
Peak Hour Factor	0.80	0.80	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	98	126	149	53	119	250
Pedestrians		1				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	202				434	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	202				434	102
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				77	73
cM capacity (veh/h)	1367				511	932

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	98	63	63	99	103	119	250
Volume Left	98	0	0	0	0	119	0
Volume Right	0	0	0	0	53	0	250
cSH	1367	1700	1700	1700	1700	511	932
Volume to Capacity	0.07	0.04	0.04	0.06	0.06	0.23	0.27
Queue Length 95th (ft)	6	0	0	0	0	22	27
Control Delay (s)	7.8	0.0	0.0	0.0	0.0	14.2	10.3
Lane LOS	A					B	B
Approach Delay (s)	3.4			0.0		11.5	
Approach LOS						B	

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	25.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Volume (vph)	141	1007	483	203	734	77	300	296	102	103	831	565
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	141	1007	483	203	734	77	300	296	102	103	831	565
RTOR Reduction (vph)	0	0	178	0	0	51	0	0	61	0	0	257
Lane Group Flow (vph)	141	1007	305	203	734	26	300	296	41	103	831	308
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.2	36.7	36.7	10.4	38.9	38.9	13.7	46.3	46.3	6.6	39.2	39.2
Effective Green, g (s)	8.2	38.7	38.7	10.4	40.9	40.9	13.7	48.3	48.3	6.6	41.2	41.2
Actuated g/C Ratio	0.07	0.32	0.32	0.09	0.34	0.34	0.11	0.40	0.40	0.06	0.34	0.34
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	235	1640	511	298	1733	540	392	2047	637	189	1746	957
v/s Ratio Prot	0.04	c0.20		c0.06	0.14		c0.09	0.06		0.03	c0.16	
v/s Ratio Perm			0.19			0.02			0.03			0.11
v/c Ratio	0.60	0.61	0.60	0.68	0.42	0.05	0.77	0.14	0.06	0.54	0.48	0.32
Uniform Delay, d1	54.3	34.3	34.1	53.2	30.5	26.5	51.6	22.7	22.0	55.2	30.9	29.1
Progression Factor	1.07	0.93	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.07	0.79	0.73
Incremental Delay, d2	2.6	0.8	2.2	5.0	0.3	0.1	7.8	0.1	0.2	1.6	0.9	0.8
Delay (s)	60.9	32.8	30.6	58.2	30.8	26.6	59.4	22.9	22.2	60.6	25.2	22.0
Level of Service	E	C	C	E	C	C	E	C	C	E	C	C
Approach Delay (s)		34.6			35.9			38.5			26.4	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	365	3539	3539	1583	1770	1583
Volume (vph)	31	1618	1239	76	31	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	1618	1239	76	31	10
RTOR Reduction (vph)	0	0	0	15	0	9
Lane Group Flow (vph)	31	1618	1239	61	31	1
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	101.4	101.4	94.5	94.5	8.1	8.1
Effective Green, g (s)	103.4	103.4	96.5	96.5	8.6	8.6
Actuated g/C Ratio	0.86	0.86	0.80	0.80	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	348	3049	2846	1273	127	113
v/s Ratio Prot	0.00	c0.46	0.35		c0.02	
v/s Ratio Perm	0.07			0.04		0.00
v/c Ratio	0.09	0.53	0.44	0.05	0.24	0.01
Uniform Delay, d1	2.0	2.1	3.5	2.4	52.6	51.7
Progression Factor	1.00	1.00	0.90	0.56	1.00	1.00
Incremental Delay, d2	0.1	0.7	0.4	0.1	0.4	0.0
Delay (s)	2.1	2.8	3.6	1.4	53.0	51.7
Level of Service	A	A	A	A	D	D
Approach Delay (s)		2.8	3.5		52.7	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.44	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1574	3539
Volume (vph)	621	628	151	661	988	158
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	621	628	151	661	988	158
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	621	628	151	661	988	158
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	18.2	53.5	7.9	53.5	27.3	27.3
Effective Green, g (s)	18.2	53.5	7.9	53.5	27.3	27.3
Actuated g/C Ratio	0.34	1.00	0.15	1.00	0.51	0.51
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1168	1583	523	1583	1338	1806
v/s Ratio Prot	c0.18		0.04		c0.21	0.04
v/s Ratio Perm		0.40		0.42	c0.16	
v/c Ratio	0.53	0.40	0.29	0.42	0.74	0.09
Uniform Delay, d1	14.2	0.0	20.3	0.0	9.3	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.7	0.5	0.8	1.9	0.0
Delay (s)	14.9	0.7	20.8	0.8	11.1	6.8
Level of Service	B	A	C	A	B	A
Approach Delay (s)	7.8		4.5			10.5
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4886		3433	5085	1554	3433	3539	1554	3433	3539	1551
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4886		3433	5085	1554	3433	3539	1554	3433	3539	1551
Volume (vph)	165	611	184	101	1357	438	297	468	87	443	815	383
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	165	611	184	101	1357	438	297	468	87	443	815	383
RTOR Reduction (vph)	0	41	0	0	0	31	0	0	59	0	0	100
Lane Group Flow (vph)	165	754	0	101	1357	407	297	468	28	443	815	283
Confl. Peds. (#/hr)			6			11			7			6
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	11.9	48.5		7.4	44.0	61.8	12.5	26.3	33.7	17.8	31.6	31.6
Effective Green, g (s)	11.9	50.5		7.4	46.0	63.8	12.5	28.3	35.7	17.8	33.6	33.6
Actuated g/C Ratio	0.10	0.42		0.06	0.38	0.53	0.10	0.24	0.30	0.15	0.28	0.28
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	340	2056		212	1949	826	358	835	514	509	991	434
v/s Ratio Prot	c0.05	0.15		0.03	c0.27	0.07	c0.09	0.13	0.00	0.13	c0.23	
v/s Ratio Perm						0.19			0.01			0.18
v/c Ratio	0.49	0.37		0.48	0.70	0.49	0.83	0.56	0.05	0.87	0.82	0.65
Uniform Delay, d1	51.2	23.8		54.4	31.1	17.8	52.7	40.4	30.1	50.0	40.4	38.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.5		0.6	2.1	0.2	14.0	1.2	0.0	14.6	6.1	4.2
Delay (s)	56.0	24.3		55.0	33.2	18.0	66.7	41.6	30.1	64.5	46.5	42.3
Level of Service	E	C		E	C	B	E	D	C	E	D	D
Approach Delay (s)		29.8			30.9			49.2			50.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5057		4990	4806	1362	1770	5085	1574	4990	4777	1348
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5057		4990	4806	1362	1770	5085	1574	4990	4777	1348
Volume (vph)	267	522	20	312	1390	551	20	496	289	802	1198	667
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	267	522	20	312	1390	551	20	496	289	802	1198	667
RTOR Reduction (vph)	0	2	0	0	0	45	0	0	12	0	2	114
Lane Group Flow (vph)	267	540	0	312	1390	506	20	496	277	802	1242	507
Confl. Peds. (#/hr)									3			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	12.3	19.8		38.7	46.2	73.9	2.5	20.3	59.0	27.7	45.5	57.8
Effective Green, g (s)	13.3	21.8		39.7	48.2	76.9	3.5	22.3	62.0	28.7	47.5	60.8
Actuated g/C Ratio	0.10	0.17		0.31	0.38	0.60	0.03	0.17	0.48	0.22	0.37	0.47
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	516	858		1542	1803	815	48	882	808	1114	1766	680
v/s Ratio Prot	0.05	0.11		0.06	c0.29	0.14	0.01	c0.10	0.11	0.16	0.26	c0.08
v/s Ratio Perm						0.23			0.07			0.30
v/c Ratio	0.52	0.63		0.20	0.77	0.62	0.42	0.56	0.34	0.72	0.70	0.75
Uniform Delay, d1	54.6	49.6		32.7	35.3	16.5	61.5	48.6	20.6	46.2	34.5	27.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.5		0.0	2.4	1.1	2.1	1.2	0.1	1.9	1.5	3.9
Delay (s)	54.9	51.1		32.8	37.7	17.6	63.6	49.8	20.7	48.1	36.0	31.5
Level of Service	D	D		C	D	B	E	D	C	D	D	C
Approach Delay (s)		52.4			32.1			39.7			38.6	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	38.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	128.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3392		1770	3022		1770	3470		1770	3537	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3392		1770	3022		1770	3470		1770	3537	
Volume (vph)	8	23	9	89	6	225	3	182	28	173	1472	7
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	26	10	105	7	265	3	192	29	182	1549	7
RTOR Reduction (vph)	0	9	0	0	228	0	0	10	0	0	0	0
Lane Group Flow (vph)	9	27	0	105	44	0	3	211	0	182	1556	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	6.2	6.2		10.3	10.3		0.6	31.3		10.4	41.1	
Effective Green, g (s)	6.2	6.2		10.3	10.3		0.6	31.3		10.4	41.1	
Actuated g/C Ratio	0.08	0.08		0.14	0.14		0.01	0.42		0.14	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	148	283		246	419		14	1464		248	1959	
v/s Ratio Prot	0.01	c0.01		c0.06	0.01		0.00	0.06		c0.10	c0.44	
v/s Ratio Perm												
v/c Ratio	0.06	0.09		0.43	0.10		0.21	0.14		0.73	0.79	
Uniform Delay, d1	31.3	31.4		29.2	27.9		36.6	13.2		30.6	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.1		1.2	0.1		7.6	0.0		10.7	2.3	
Delay (s)	31.5	31.6		30.4	28.0		44.1	13.3		41.3	15.5	
Level of Service	C	C		C	C		D	B		D	B	
Approach Delay (s)		31.5			28.7			13.7			18.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	54	0	341	74	790	1598
Peak Hour Factor	0.65	0.65	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	83	0	379	82	878	1776
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked						
vC, conflicting volume	3063	231			461	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3063	231			461	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	100			20	
cM capacity (veh/h)	2	772			1096	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	83	0	253	209	878	888	888
Volume Left	83	0	0	0	878	0	0
Volume Right	0	0	0	82	0	0	0
cSH	2	1700	1700	1700	1096	1700	1700
Volume to Capacity	43.57	0.00	0.15	0.12	0.80	0.52	0.52
Queue Length 95th (ft)	Err	0	0	0	226	0	0
Control Delay (s)	Err	0.0	0.0	0.0	20.0	0.0	0.0
Lane LOS	F	A			C		
Approach Delay (s)	Err		0.0		6.6		
Approach LOS	F						

Intersection Summary			
Average Delay	265.3		
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	114	110	0	222	6	98	8	52	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.92	0.92	0.92
Hourly flow rate (vph)	0	127	122	0	247	7	115	9	61	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	253			127			250	380	63	349	377	127
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	253			127			250	380	63	349	377	127
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			83	98	94	100	100	100
cM capacity (veh/h)	1309			1457			683	551	988	538	553	900

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	63	63	122	164	89	186
Volume Left	0	0	0	0	0	115
Volume Right	0	0	122	0	7	61
cSH	1700	1700	1700	1700	1700	1003
Volume to Capacity	0.04	0.04	0.07	0.10	0.05	0.19
Queue Length 95th (ft)	0	0	0	0	0	17
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.7
Lane LOS						B
Approach Delay (s)	0.0			0.0		10.7
Approach LOS						B

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	101	14	46	28	5	46
Peak Hour Factor	0.90	0.90	0.75	0.75	0.80	0.80
Hourly flow rate (vph)	112	16	61	37	6	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	195	35	64			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	195	35	64			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	99	96			
cM capacity (veh/h)	762	1038	1539			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	128	99	64
Volume Left	112	61	0
Volume Right	16	0	58
cSH	788	1539	1700
Volume to Capacity	0.16	0.04	0.04
Queue Length 95th (ft)	14	3	0
Control Delay (s)	10.5	4.7	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	4.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	23.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1218	2	4	796	6	10
Peak Hour Factor	0.95	0.95	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	1282	2	4	884	12	20
Pedestrians				1	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1285		1735	644
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1285		1735	644
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		85	95
cM capacity (veh/h)			535		78	415

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	855	429	4	442	442	32
Volume Left	0	0	4	0	0	12
Volume Right	0	2	0	0	0	20
cSH	1700	1700	535	1700	1700	158
Volume to Capacity	0.50	0.25	0.01	0.26	0.26	0.20
Queue Length 95th (ft)	0	0	1	0	0	18
Control Delay (s)	0.0	0.0	11.8	0.0	0.0	33.4
Lane LOS			B			D
Approach Delay (s)	0.0		0.1			33.4
Approach LOS						D

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1429	3433	5027		3433	3539	1521	1770	3539	1473
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1429	3433	5027		3433	3539	1521	1770	3539	1473
Volume (vph)	504	1045	468	236	597	42	624	468	270	124	379	326
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	504	1045	468	236	597	42	624	468	270	124	379	326
RTOR Reduction (vph)	0	0	206	0	6	0	0	0	199	0	0	280
Lane Group Flow (vph)	504	1045	262	236	633	0	624	468	71	124	379	46
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot		Perm	Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2						8			4
Actuated Green, G (s)	38.0	55.2	55.2	13.0	30.2		28.3	32.5	32.5	12.3	16.5	16.5
Effective Green, g (s)	37.5	57.2	57.2	12.5	32.2		27.8	34.5	34.5	11.8	18.5	18.5
Actuated g/C Ratio	0.28	0.43	0.43	0.09	0.24		0.21	0.26	0.26	0.09	0.14	0.14
Clearance Time (s)	3.5	6.0	6.0	3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5	4.5	2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	975	1534	619	325	1226		723	925	398	158	496	206
v/s Ratio Prot	0.15	c0.30		c0.07	0.13		c0.18	0.13		0.07	c0.11	
v/s Ratio Perm			0.18						0.05			0.03
v/c Ratio	0.52	0.68	0.42	0.73	0.52		0.86	0.51	0.18	0.78	0.76	0.22
Uniform Delay, d1	39.6	30.1	25.9	58.1	43.2		50.3	41.5	37.8	58.9	54.6	50.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.5	2.1	6.7	1.6		10.3	0.8	0.4	20.6	7.7	0.9
Delay (s)	41.6	32.5	28.1	64.8	44.7		60.6	42.3	38.1	79.4	62.4	51.3
Level of Service	D	C	C	E	D		E	D	D	E	E	D
Approach Delay (s)		33.8			50.1			49.8			60.6	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM Average Control Delay	45.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	94.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	184	1195	330	0	1168
Peak Hour Factor	0.85	0.85	1.00	1.00	0.95	0.95
Hourly flow rate (vph)	0	216	1195	330	0	1229
Pedestrians	32					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1802	595			1557	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1600	190			1314	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	68			100	
cM capacity (veh/h)	81	682			435	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	216	478	478	569	410	410	410
Volume Left	0	0	0	0	0	0	0
Volume Right	216	0	0	330	0	0	0
cSH	682	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.32	0.28	0.28	0.33	0.24	0.24	0.24
Queue Length 95th (ft)	34	0	0	0	0	0	0
Control Delay (s)	12.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.7	0.0			0.0		
Approach LOS	B						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✢		↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.91		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1675		1770	1863	1538	1770	4966		1770	5035	
Flt Permitted		0.93		0.74	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1583		1374	1863	1538	1770	4966		1770	5035	
Volume (vph)	16	3	35	156	6	91	49	1399	210	144	757	46
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	16	3	35	156	6	91	49	1399	210	144	757	46
RTOR Reduction (vph)	0	30	0	0	0	77	0	13	0	0	3	0
Lane Group Flow (vph)	0	24	0	156	6	14	49	1596	0	144	800	0
Confl. Peds. (#/hr)						11			11			1
Confl. Bikes (#/hr)						2			5			
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		18.0		18.0	18.0	18.0	5.1	74.3		13.7	82.9	
Effective Green, g (s)		18.5		18.5	18.5	18.5	4.6	76.3		13.2	84.9	
Actuated g/C Ratio		0.15		0.15	0.15	0.15	0.04	0.64		0.11	0.71	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		244		212	287	237	68	3158		195	3562	
v/s Ratio Prot					0.00		0.03	c0.32		c0.08	0.16	
v/s Ratio Perm		0.02		c0.11		0.01						
v/c Ratio		0.10		0.74	0.02	0.06	0.72	0.51		0.74	0.22	
Uniform Delay, d1		43.6		48.4	43.1	43.3	57.1	11.7		51.7	6.1	
Progression Factor		1.00		1.00	1.00	1.00	1.09	1.24		1.00	1.00	
Incremental Delay, d2		0.2		12.5	0.0	0.1	26.1	0.6		11.8	0.1	
Delay (s)		43.8		60.9	43.1	43.4	88.5	15.1		63.6	6.2	
Level of Service		D		E	D	D	F	B		E	A	
Approach Delay (s)		43.8			54.2			17.3			15.0	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	82	52	42	30	40	6	41	86	68	5	72	52
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	91	58	47	33	44	7	48	101	80	6	85	61

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	196	84	48	181	6	146
Volume Left (vph)	91	33	48	0	6	0
Volume Right (vph)	47	7	0	80	0	61
Hadj (s)	-0.02	0.07	0.53	-0.28	0.53	-0.26
Departure Headway (s)	4.9	5.2	6.0	5.1	6.0	5.2
Degree Utilization, x	0.27	0.12	0.08	0.26	0.01	0.21
Capacity (veh/h)	677	631	574	664	558	645
Control Delay (s)	9.8	8.9	8.3	8.7	7.9	8.5
Approach Delay (s)	9.8	8.9	8.6		8.4	
Approach LOS	A	A	A		A	

Intersection Summary			
Delay	9.0		
HCM Level of Service	A		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	162	168	114	84	61	107
Peak Hour Factor	0.95	0.95	0.85	0.85	0.80	0.80
Hourly flow rate (vph)	171	177	134	99	76	134
Pedestrians			3			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	233				616	116
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	233				616	116
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				79	85
cM capacity (veh/h)	1332				367	914

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	171	88	88	89	144	210
Volume Left	171	0	0	0	0	76
Volume Right	0	0	0	0	99	134
cSH	1332	1700	1700	1700	1700	593
Volume to Capacity	0.13	0.05	0.05	0.05	0.08	0.35
Queue Length 95th (ft)	11	0	0	0	0	40
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	14.4
Lane LOS	A					B
Approach Delay (s)	4.0			0.0		14.4
Approach LOS						B

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Volume (vph)	186	842	203	171	928	137	550	894	239	175	412	588
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	186	842	203	171	928	137	550	894	239	175	412	588
RTOR Reduction (vph)	0	0	147	0	0	98	0	0	114	0	0	195
Lane Group Flow (vph)	186	842	56	171	928	39	550	894	126	175	412	393
Confl. Peds. (#/hr)			2			2			5			2
Confl. Bikes (#/hr)			2						1			1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.9	31.3	31.3	9.4	31.8	31.8	21.6	49.9	49.9	9.4	37.7	37.7
Effective Green, g (s)	8.9	33.3	33.3	9.4	33.8	33.8	21.6	51.9	51.9	9.4	39.7	39.7
Actuated g/C Ratio	0.07	0.28	0.28	0.08	0.28	0.28	0.18	0.43	0.43	0.08	0.33	0.33
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	255	1411	432	269	1432	440	618	2199	673	269	1682	908
v/s Ratio Prot	c0.05	0.17		0.05	c0.18		c0.16	0.18		0.05	0.08	
v/s Ratio Perm			0.04			0.02			0.08			c0.14
v/c Ratio	0.73	0.60	0.13	0.64	0.65	0.09	0.89	0.41	0.19	0.65	0.24	0.43
Uniform Delay, d1	54.4	37.5	32.5	53.6	37.9	31.7	48.0	23.4	21.0	53.7	29.2	31.4
Progression Factor	1.03	1.08	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.06	0.86	0.74
Incremental Delay, d2	7.7	0.8	0.2	3.6	1.3	0.1	14.3	0.6	0.6	4.2	0.3	1.5
Delay (s)	63.5	41.3	32.1	57.2	39.1	31.9	62.4	24.0	21.6	60.9	25.5	24.5
Level of Service	E	D	C	E	D	C	E	C	C	E	C	C
Approach Delay (s)		43.2			40.8			36.2			30.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.05	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	95	3539	3539	1583	1770	1583
Volume (vph)	5	1183	1815	40	112	66
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	1183	1815	40	112	66
RTOR Reduction (vph)	0	0	0	14	0	49
Lane Group Flow (vph)	5	1183	1815	26	112	17
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	79.6	79.6	75.2	75.2	29.9	29.9
Effective Green, g (s)	81.6	81.6	77.2	77.2	30.4	30.4
Actuated g/C Ratio	0.68	0.68	0.64	0.64	0.25	0.25
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	70	2407	2277	1018	448	401
v/s Ratio Prot	0.00	c0.33	c0.51		c0.06	
v/s Ratio Perm	0.05			0.02		0.01
v/c Ratio	0.07	0.49	0.80	0.03	0.25	0.04
Uniform Delay, d1	16.1	9.2	15.7	7.8	35.7	33.8
Progression Factor	1.00	1.00	1.01	1.39	1.00	1.00
Incremental Delay, d2	0.3	0.7	2.2	0.0	1.3	0.2
Delay (s)	16.5	9.9	18.1	10.8	37.0	34.0
Level of Service	B	A	B	B	D	C
Approach Delay (s)		10.0	17.9		35.9	
Approach LOS		A	B		D	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.43	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1554	3539
Volume (vph)	523	1358	100	378	810	110
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	523	1358	100	378	810	110
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	523	1358	100	378	810	110
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	15.8	45.3	5.3	45.3	21.5	21.5
Effective Green, g (s)	15.8	45.3	5.3	45.3	21.5	21.5
Actuated g/C Ratio	0.35	1.00	0.12	1.00	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1197	1583	414	1583	1244	1680
v/s Ratio Prot	0.15		0.03		0.18	0.03
v/s Ratio Perm		c0.86		0.24	0.13	
v/c Ratio	0.44	0.86	0.24	0.24	0.65	0.07
Uniform Delay, d1	11.3	0.0	18.2	0.0	8.4	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	6.3	0.5	0.4	0.9	0.0
Delay (s)	11.8	6.3	18.7	0.4	9.4	6.5
Level of Service	B	A	B	A	A	A
Approach Delay (s)	7.8		4.2			9.0
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	0.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.95	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4938		3433	5085	1542	3433	3539	1511	3433	3539	1527
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4938		3433	5085	1542	3433	3539	1511	3433	3539	1527
Volume (vph)	381	1461	263	138	850	449	284	863	17	497	496	196
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	381	1461	263	138	850	449	284	863	17	497	496	196
RTOR Reduction (vph)	0	18	0	0	0	14	0	0	7	0	0	155
Lane Group Flow (vph)	381	1706	0	138	850	435	284	863	10	497	496	41
Confl. Peds. (#/hr)			18			23			27			13
Confl. Bikes (#/hr)			3			2			2			3
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	26.0	47.2		9.1	30.3	51.7	30.3	34.3	43.4	21.4	25.4	25.4
Effective Green, g (s)	26.0	49.2		9.1	32.3	53.7	30.3	36.3	45.4	21.4	27.4	27.4
Actuated g/C Ratio	0.20	0.37		0.07	0.24	0.41	0.23	0.27	0.34	0.16	0.21	0.21
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	676	1841		237	1244	627	788	973	565	557	735	317
v/s Ratio Prot	0.11	c0.35		0.04	0.17	c0.11	0.08	c0.24	0.00	c0.14	0.14	
v/s Ratio Perm						0.17			0.01			0.03
v/c Ratio	0.56	0.93		0.58	0.68	0.69	0.36	0.89	0.02	0.89	0.67	0.13
Uniform Delay, d1	47.9	39.7		59.6	45.2	32.3	42.7	45.9	28.6	54.2	48.2	42.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	9.6		2.3	1.8	2.7	0.1	10.3	0.0	16.1	2.9	0.3
Delay (s)	51.3	49.2		61.9	47.0	35.0	42.8	56.2	28.6	70.3	51.1	42.9
Level of Service	D	D		E	D	D	D	E	C	E	D	D
Approach Delay (s)		49.6			44.7			52.5			57.8	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	50.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5076		4990	4771	1344	1770	5085	1549	4990	4806	1362
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5076		4990	4771	1344	1770	5085	1549	4990	4806	1362
Volume (vph)	1033	1301	14	293	1151	666	15	1105	370	1081	1288	592
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1033	1301	14	293	1151	666	15	1105	370	1081	1288	592
RTOR Reduction (vph)	0	1	0	0	3	1	0	0	1	0	0	108
Lane Group Flow (vph)	1033	1314	0	293	1198	615	15	1105	369	1081	1288	484
Confl. Peds. (#/hr)			9			10			12			
Confl. Bikes (#/hr)						1			2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.1	49.7		15.8	35.4	68.5	2.7	39.3	55.1	33.1	69.7	99.8
Effective Green, g (s)	31.1	51.7		16.8	37.4	71.5	3.7	41.3	58.1	34.1	71.7	102.8
Actuated g/C Ratio	0.19	0.32		0.11	0.23	0.45	0.02	0.26	0.36	0.21	0.45	0.64
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	971	1641		524	1116	635	41	1313	563	1064	2155	876
v/s Ratio Prot	c0.21	0.26		0.06	c0.25	c0.21	0.01	c0.22	0.07	c0.22	0.27	0.11
v/s Ratio Perm						0.25			0.17			0.25
v/c Ratio	1.06	0.80		0.56	1.07	0.97	0.37	0.84	0.66	1.02	0.60	0.55
Uniform Delay, d1	64.4	49.4		68.0	61.2	43.1	76.9	56.2	42.5	62.9	33.2	15.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.4	3.0		0.7	49.0	27.5	2.0	5.5	2.1	31.6	0.6	0.4
Delay (s)	111.8	52.4		68.8	110.2	70.6	79.0	61.7	44.7	94.5	33.8	16.2
Level of Service	F	D		E	F	E	E	E	D	F	C	B
Approach Delay (s)		78.5			92.9			57.6			52.5	
Approach LOS		E			F			E			D	

Intersection Summary			
HCM Average Control Delay	69.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	159.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.87		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3362		1770	3066		1770	3483		1770	3502	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3362		1770	3066		1770	3483		1770	3502	
Volume (vph)	15	6	3	15	18	147	7	1171	140	29	419	31
Peak-hour factor, PHF	0.60	0.60	0.60	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	10	5	18	21	173	7	1233	147	31	441	33
RTOR Reduction (vph)	0	5	0	0	152	0	0	8	0	0	4	0
Lane Group Flow (vph)	25	10	0	18	42	0	7	1372	0	31	470	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	6.6	6.6		8.3	8.3		1.1	35.5		1.4	35.8	
Effective Green, g (s)	6.6	6.6		8.3	8.3		1.1	35.5		1.4	35.8	
Actuated g/C Ratio	0.10	0.10		0.12	0.12		0.02	0.52		0.02	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	172	327		217	375		29	1824		37	1849	
v/s Ratio Prot	c0.01	0.00		0.01	c0.01		0.00	c0.39		c0.02	0.13	
v/s Ratio Perm												
v/c Ratio	0.15	0.03		0.08	0.11		0.24	0.75		0.84	0.25	
Uniform Delay, d1	28.0	27.7		26.4	26.5		32.9	12.7		33.1	8.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.0		0.2	0.1		4.3	1.8		84.7	0.1	
Delay (s)	28.4	27.7		26.5	26.6		37.2	14.5		117.8	8.8	
Level of Service	C	C		C	C		D	B		F	A	
Approach Delay (s)		28.2			26.6			14.6			15.5	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	67.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	24	0	1300	33	200	455
Peak Hour Factor	0.50	0.50	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	48	0	1368	35	211	479
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked	0.71	0.71			0.71	
vC, conflicting volume	2046	702			1403	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2065	180			1164	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	100			51	
cM capacity (veh/h)	17	593			425	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	48	0	912	491	211	239	239
Volume Left	48	0	0	0	211	0	0
Volume Right	0	0	0	35	0	0	0
cSH	17	1700	1700	1700	425	1700	1700
Volume to Capacity	2.83	0.00	0.54	0.29	0.49	0.14	0.14
Queue Length 95th (ft)	165	0	0	0	67	0	0
Control Delay (s)	1291.5	0.0	0.0	0.0	21.5	0.0	0.0
Lane LOS	F	A			C		
Approach Delay (s)	1291.5		0.0		6.6		
Approach LOS	F						

Intersection Summary			
Average Delay	31.1		
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	84	91	0	56	11	124	0	91	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92
Hourly flow rate (vph)	0	93	101	0	66	13	146	0	107	0	0	0
Pedestrians								1				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	79			94			127	173	48	226	167	39
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79			94			127	173	48	226	167	39
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			82	100	89	100	100	100
cM capacity (veh/h)	1517			1496			832	718	1010	634	724	1023

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	47	47	101	44	35	146	107
Volume Left	0	0	0	0	0	146	0
Volume Right	0	0	101	0	13	0	107
cSH	1700	1700	1700	1700	1700	832	1010
Volume to Capacity	0.03	0.03	0.06	0.03	0.02	0.18	0.11
Queue Length 95th (ft)	0	0	0	0	0	16	9
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	10.2	9.0
Lane LOS						B	A
Approach Delay (s)	0.0			0.0		9.7	
Approach LOS						A	

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	17.2%	ICU Level of Service	A
Analysis Period (min)	15		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	Existing Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	240	245	102	13	47.7	D	--
	T	114	135	118	8	42.0	D	--
	R	334	345	103	9	10.0	B	--
	Subtotal	**688**	**724**	**105**	**--**	**28.7**	**C**	**--**
SB	L	132	135	102	12	51.8	D	--
	T	85	88	104	11	47.0	D	--
	R	118	116	98	11	14.9	B	--
	Subtotal	**335**	**339**	**101**	**--**	**37.9**	**D**	**--**
EB	L	68	69	101	8	62.1	E	--
	T	477	477	100	20	38.9	D	--
	R	269	274	102	16	13.3	B	--
	Subtotal	**814**	**821**	**101**	**--**	**32.3**	**C**	**--**
WB	L	222	210	95	12	60.3	E	--
	T	821	868	106	18	27.8	C	--
	R	116	118	102	12	3.3	A	--
	Subtotal	**1159**	**1196**	**103**	**--**	**31.1**	**C**	**--**
	Total	**2996**	**3079**	**103**	**--**	**31.6**	**C**	**--**

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	280	279	100	18	47.5	D	--
	R	1	3	300	2	30.1	C	--
	Subtotal	**281**	**282**	**100**	**--**	**47.3**	**D**	**--**
EB	T	426	485	114	19	9.2	A	--
	R	505	512	101	19	3.2	A	--
	Subtotal	**931**	**997**	**107**	**--**	**6.1**	**A**	**--**
WB	L	349	341	98	19	47.5	D	--
	T	879	888	101	16	23.8	C	--
	Subtotal	**1228**	**1228**	**100**	**--**	**30.4**	**C**	**--**
	Total	**2440**	**2507**	**103**	**--**	**22.6**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: Existing Conditions **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	430	503	117	18	11.5	B	--
	R	64	62	97	5	4.4	A	--
	Subtotal	**494**	**566**	**115**	--	**10.7**	**B**	--
SB	L	148	149	101	9	33.3	C	--
	T	436	454	104	23	6.8	A	--
	Subtotal	**584**	**604**	**103**	--	**13.3**	**B**	--
EB	L	218	216	99	12	19.9	B	--
	T	1	2	200	1	22.0	C	--
	R	167	168	101	14	3.5	A	--
	Subtotal	**386**	**386**	**100**	--	**12.7**	**B**	--
	Total	**1464**	**1555**	**106**	--	**12.2**	**B**	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	86	82	95	11	16.6	C	--
	T	226	227	100	12	16.3	C	--
	R	1	2	200	1	14.4	B	--
	Subtotal	**313**	**310**	**99**	--	**16.4**	**C**	--
SB	L	17	18	106	4	22.0	C	--
	T	251	248	99	16	22.3	C	--
	R	378	378	100	30	16.5	C	--
	Subtotal	**646**	**644**	**100**	--	**18.8**	**C**	--
EB	L	309	318	103	17	52.3	F	--
	T	4	5	125	2	44.7	E	--
	R	56	57	102	9	50.1	F	--
	Subtotal	**369**	**379**	**103**	--	**51.9**	**F**	--
WB	L	1	1	100	0	7.5	A	--
	T	7	7	100	3	9.4	A	--
	R	18	20	111	2	6.9	A	--
	Subtotal	**26**	**28**	**108**	--	**7.5**	**A**	--
	Total	**1354**	**1361**	**101**	--	**27.3**	**D**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	Existing Conditions	**PHF:**	1
TOD:	AM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa   **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	268	266	99	21	90.9	F	--
	T	655	682	104	18	4.8	A	--
	Subtotal	**923**	**947**	**103**	--	**28.9**	**C**	--
SB	T	433	425	98	22	14.0	B	--
	R	848	852	100	34	9.7	A	--
	Subtotal	**1281**	**1277**	**100**	--	**11.1**	**B**	--
WB	L	64	69	108	5	41.8	D	--
	T	1	1	100	1	20.9	C	--
	R	329	343	104	17	11.6	B	--
	Subtotal	**394**	**413**	**105**	--	**16.6**	**B**	--
	Total	**2598**	**2637**	**102**	--	**18.4**	**B**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa   **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	617	660	107	26	26.7	C	--
	R	70	70	100	8	5.2	A	--
	Subtotal	**687**	**730**	**106**	--	**24.6**	**C**	--
SB	L	204	202	99	18	39.6	D	--
	T	293	303	103	12	7.8	A	--
	Subtotal	**497**	**505**	**102**	--	**20.5**	**C**	--
EB	L	306	317	104	11	26.4	C	--
	T	3	3	100	1	27.4	C	--
	R	118	119	101	7	8.6	A	--
	Subtotal	**427**	**439**	**103**	--	**21.6**	**C**	--
	Total	**1611**	**1674**	**104**	--	**22.6**	**C**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	Existing Conditions			**PHF:**	1
TOD:	PM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	296	301	102	18	41.1	D	--
	T	159	319	201	23	25.2	C	--
	R	594	603	102	27	25.7	C	--
	Subtotal	**1049**	**1223**	**117**	--	**29.4**	**C**	--
SB	L	131	131	100	12	48.0	D	--
	T	102	103	101	11	41.5	D	--
	R	67	71	106	8	11.3	B	--
	Subtotal	**300**	**305**	**102**	--	**37.3**	**D**	--
EB	L	104	105	101	16	61.9	E	--
	T	751	748	100	28	49.1	D	--
	R	350	353	101	21	17.6	B	--
	Subtotal	**1205**	**1207**	**100**	--	**41.0**	**D**	--
WB	L	120	122	102	12	61.5	E	--
	T	444	441	99	28	20.6	C	--
	R	60	63	105	8	2.8	A	--
	Subtotal	**624**	**626**	**100**	--	**26.8**	**C**	--
	Total	**3178**	**3361**	**106**	--	**33.8**	**C**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	203	199	98	19	33.7	C	--
	R	3	4	133	2	16.0	B	--
	Subtotal	**206**	**203**	**99**	--	**33.3**	**C**	--
EB	T	1109	1103	99	31	11.6	B	--
	R	411	418	102	18	2.4	A	--
	Subtotal	**1520**	**1521**	**100**	--	**9.0**	**A**	--
WB	L	133	136	102	11	79.1	E	--
	T	421	419	100	16	12.4	B	--
	Subtotal	**554**	**555**	**100**	--	**28.7**	**C**	--
	Total	**2280**	**2279**	**100**	--	**16.0**	**B**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	Existing Conditions	**PHF:**	1
TOD:	PM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	404	409	101	18	22.8	C	--
	R	244	244	100	16	8.3	A	--
	Subtotal	**648**	**653**	**101**	**--**	**17.4**	**B**	**--**
SB	L	229	228	100	15	45.8	D	--
	T	301	349	116	23	9.6	A	--
	Subtotal	**530**	**576**	**109**	**--**	**23.9**	**C**	**--**
EB	L	803	807	100	26	25.7	C	--
	T	3	3	100	1	24.2	C	--
	R	313	312	100	17	5.8	A	--
	Subtotal	**1119**	**1121**	**100**	**--**	**20.2**	**C**	**--**
	Total	**2297**	**2350**	**102**	**--**	**20.3**	**C**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	1	1	100	0	11.4	B	--
	T	439	443	101	26	12.0	B	--
	R	6	7	117	3	8.9	A	--
	Subtotal	**446**	**451**	**101**	**--**	**11.9**	**B**	**--**
SB	L	28	28	100	4	12.0	B	--
	T	313	570	182	34	8.8	A	--
	R	23	22	96	4	8.1	A	--
	Subtotal	**364**	**620**	**170**	**--**	**8.9**	**A**	**--**
EB	L	36	37	103	6	6.1	A	--
	T	1	2	200	1	8.2	A	--
	R	4	5	125	2	3.6	A	--
	Subtotal	**41**	**43**	**105**	**--**	**5.9**	**A**	**--**
WB	L	3	3	67	2	5.3	A	--
	T	1	1	100	1	7.8	A	--
	R	23	25	109	5	4.1	A	--
	Subtotal	**27**	**29**	**107**	**--**	**4.4**	**A**	**--**
	Total	**878**	**1143**	**130**	**--**	**9.9**	**A**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	Existing Conditions	**PHF:**	1
TOD:	PM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	132	125	95	8	48.8	D	--
	T	1041	1038	100	32	5.8	A	--
	Subtotal	**1173**	**1163**	**99**	--	**10.4**	**B**	--
SB	T	663	660	100	22	19.0	B	--
	R	572	581	102	21	7.3	A	--
	Subtotal	**1235**	**1241**	**100**	--	**13.5**	**B**	--
WB	L	60	57	95	7	41.3	D	--
	T	4	3	75	1	45.0	D	--
	R	283	288	102	19	14.1	B	--
	Subtotal	**347**	**348**	**100**	--	**18.8**	**B**	--
	Total	**2755**	**2752**	**100**	--	**12.9**	**B**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	295	302	102	19	28.2	C	--
	R	64	63	98	9	8.1	A	--
	Subtotal	**359**	**365**	**102**	--	**24.7**	**C**	--
SB	L	450	444	99	20	44.6	D	--
	T	273	276	101	22	10.8	B	--
	Subtotal	**723**	**720**	**100**	--	**31.7**	**C**	--
EB	L	878	864	98	17	29.6	C	--
	T	1	1	100	1	43.3	D	--
	R	238	241	101	13	11.9	B	--
	Subtotal	**1117**	**1106**	**99**	--	**25.8**	**C**	--
	Total	**2199**	**2191**	**100**	--	**27.6**	**C**	--

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Existing AM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Permit/Rights=Include
Initial Vol: 0 399 179***
Lanes: 0 0 1 0 1

Initial Vol: Lanes: Signal=Split Rights=Include
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.489
Avg Crit Del (sec/veh): 22.2
Avg Delay (sec/veh): 15.9
LOS: A

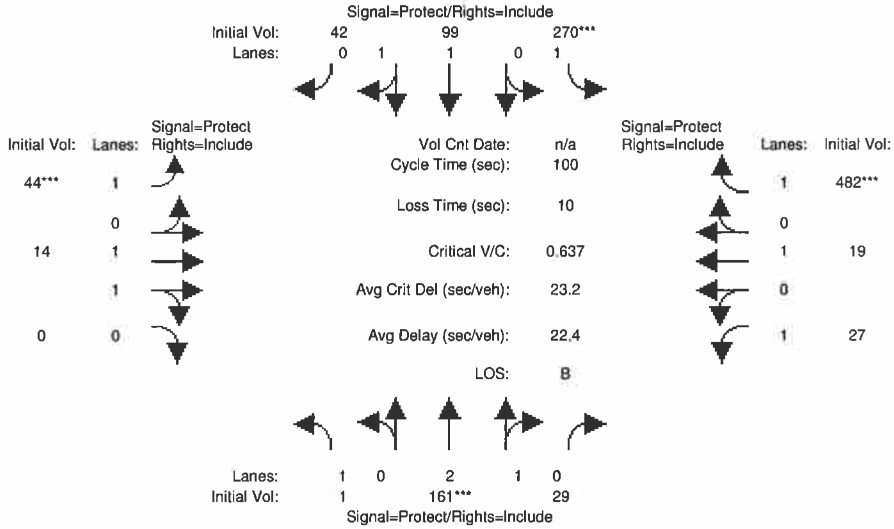
Signal=Split Rights=Include Lanes: Initial Vol:
0 150
0
1! 0
0
0 32***

Lanes: 0 0 1 0 1
Initial Vol: 0 262*** 49
Signal=Permit/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	262	49	179	399	0	0	0	0	32	0	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	262	49	179	399	0	0	0	0	32	0	150
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	262	49	179	399	0	0	0	0	32	0	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	262	49	179	399	0	0	0	0	32	0	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	262	49	179	399	0	0	0	0	32	0	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	262	49	179	399	0	0	0	0	32	0	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.18	0.00	0.82
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	281	0	1319
Capacity Analysis Module:												
Vol/Sat:	0.00	0.16	0.03	0.11	0.25	0.00	0.00	0.00	0.00	0.11	0.00	0.11
Crit Moves:		****		****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Existing AM

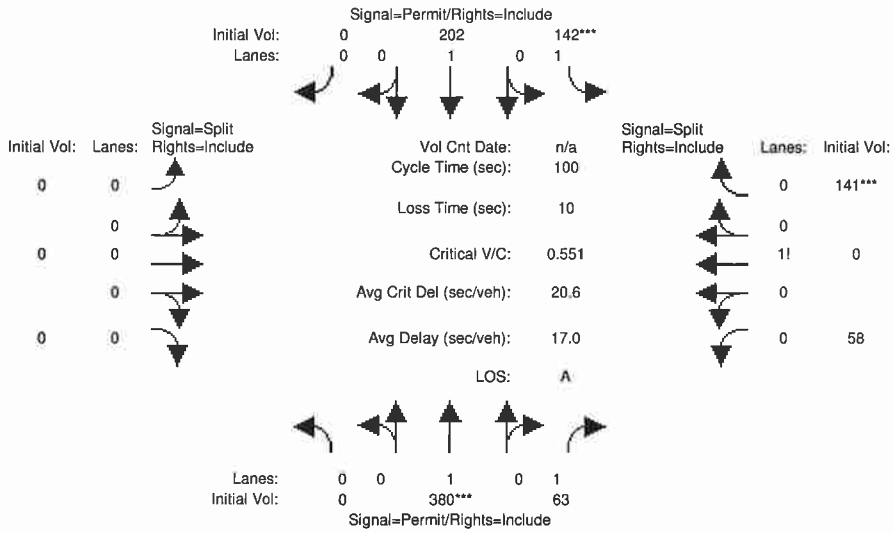
Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	1	161	29	270	99	42	44	14	0	27	19	482
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	1	161	29	270	99	42	44	14	0	27	19	482
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	1	161	29	270	99	42	44	14	0	27	19	482
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	1	161	29	270	99	42	44	14	0	27	19	482
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	1	161	29	270	99	42	44	14	0	27	19	482
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	1	161	29	270	99	42	44	14	0	27	19	482
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.54	0.46	1.00	1.40	0.60	1.00	2.00	0.00	1.00	1.00	1.00
Final Sat.:	1600	4067	733	1600	2247	953	1600	3200	0	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.04	0.04	0.17	0.04	0.04	0.03	0.00	0.00	0.02	0.01	0.30
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Existing PM

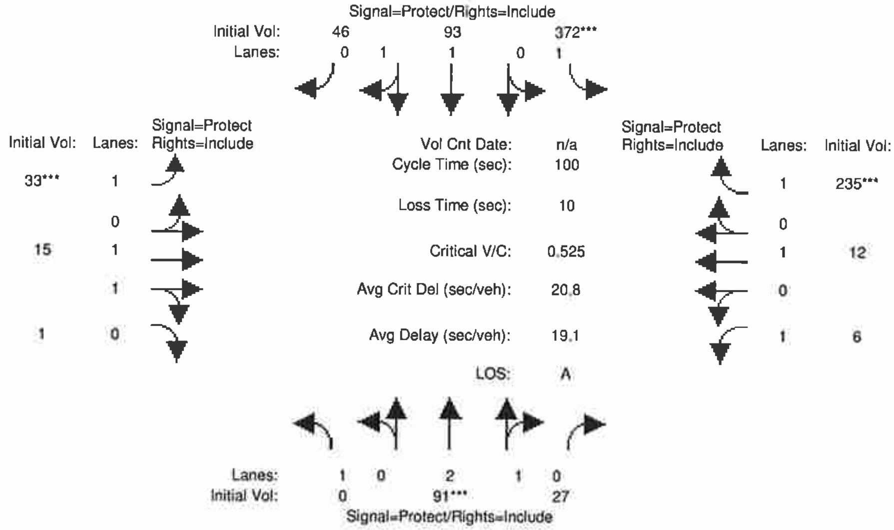
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	380	63	142	202	0	0	0	0	58	0	141
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	380	63	142	202	0	0	0	0	58	0	141
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	380	63	142	202	0	0	0	0	58	0	141
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	380	63	142	202	0	0	0	0	58	0	141
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	380	63	142	202	0	0	0	0	58	0	141
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	380	63	142	202	0	0	0	0	58	0	141
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.29	0.00	0.71
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	466	0	1134
Capacity Analysis Module:												
Vol/Sat:	0.00	0.24	0.04	0.09	0.13	0.00	0.00	0.00	0.00	0.12	0.00	0.12
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Existing PM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	91	27	372	93	46	33	15	1	6	12	235
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	91	27	372	93	46	33	15	1	6	12	235
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	91	27	372	93	46	33	15	1	6	12	235
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	91	27	372	93	46	33	15	1	6	12	235
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	91	27	372	93	46	33	15	1	6	12	235
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	91	27	372	93	46	33	15	1	6	12	235
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.31	0.69	1.00	1.34	0.66	1.00	1.88	0.12	1.00	1.00	1.00
Final Sat.:	1600	3702	1098	1600	2141	1059	1600	3000	200	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.02	0.02	0.23	0.04	0.04	0.02	0.01	0.01	0.00	0.01	0.15
Crit Moves:		****		****			****					****

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	1903	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	512	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	522	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	522	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	8.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Sand Canyon to Soledad Canyon
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	1700	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	457	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	622	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	622	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	9.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 SB
From/To: Soledad Canyon to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2908	veh/h
Peak-hour factor, PHF	0.94	
Peak 15-min volume, v15	773	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1578	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1578	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	2	
Density, D	24.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	4367	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1149	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1563	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1563	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	3	
Density, D	24.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Sand Canyon to Soledad Canyon
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	3759	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	989	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2018	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2018	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	61.1	mi/h
Number of lanes, N	2	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Soledad Canyon to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	1906	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	496	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	675	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	675	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	10.4	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Sand Canyon to Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	2143	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	558	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	569	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	569	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	8.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Leisch Method for Weaving Analysis

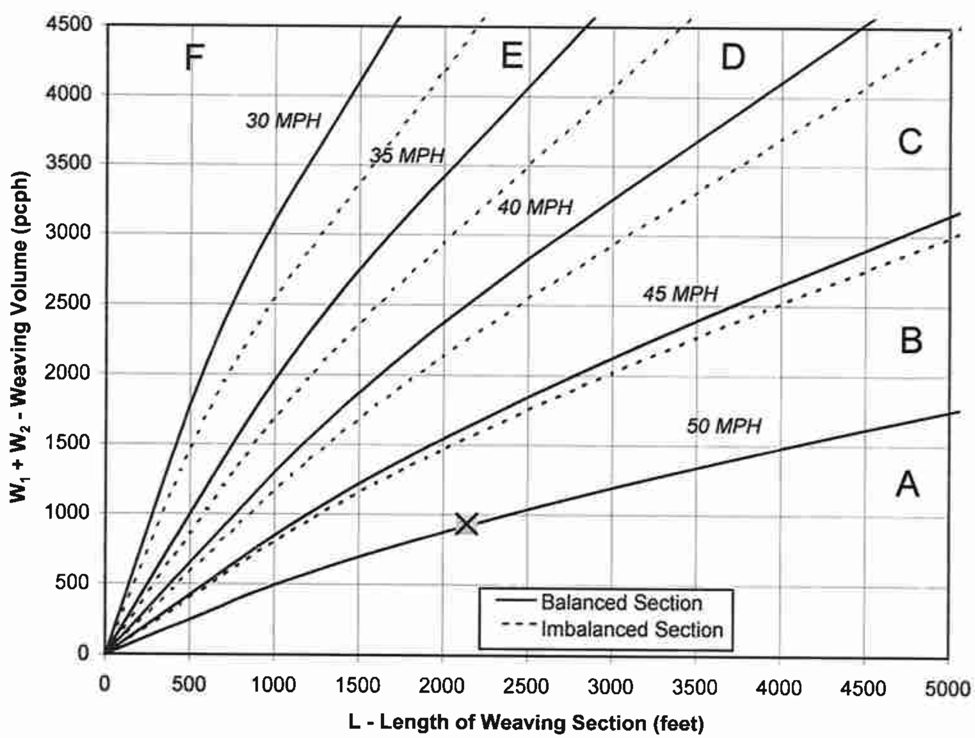
Data Input

Number of Entering Mainline Lanes	N_b	4
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,140

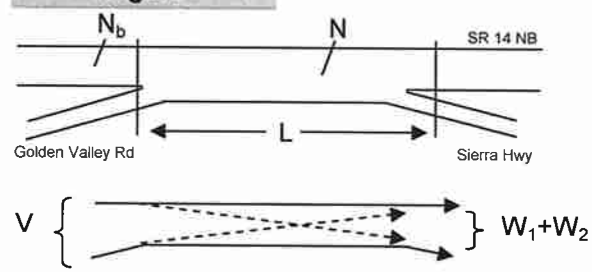
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,407	Volume (vph)*	500	Volume (vph)*	352
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	2,888	Volume (pcph)	550	Volume (pcph)	387

Project Information

Project	Vista Canyon Ranch
Scenario	Existing Conditions - AM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.9**
4. Weaving Intensity Factor (k) **1.20**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **593**
6. Level of Service (LOS) **A**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

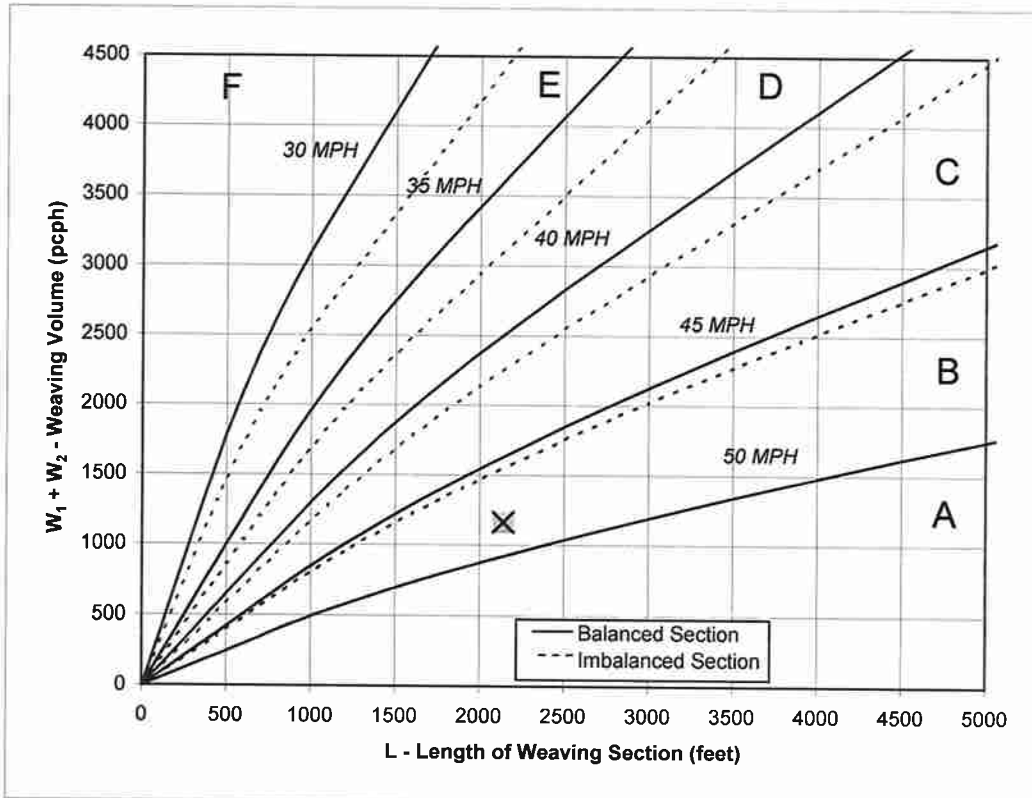
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,140

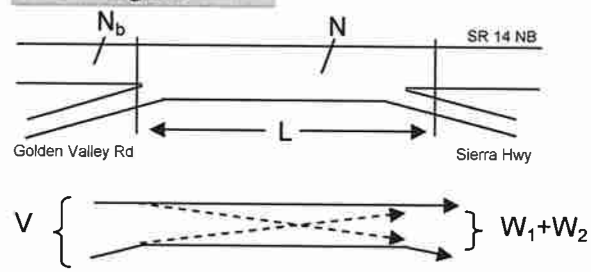
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	5,643	Volume (vph)*	300	Volume (vph)*	758
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	6,772	Volume (pcph)	330	Volume (pcph)	834

Project Information

Project	Vista Canyon Ranch
Scenario	Existing Conditions - PM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 48.3
4. Weaving Intensity Factor (k) 1.47
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ 1,732
6. Level of Service (LOS) E

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.
Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Fehr & Peers

2/12/2009

Leisch Method for Weaving Analysis

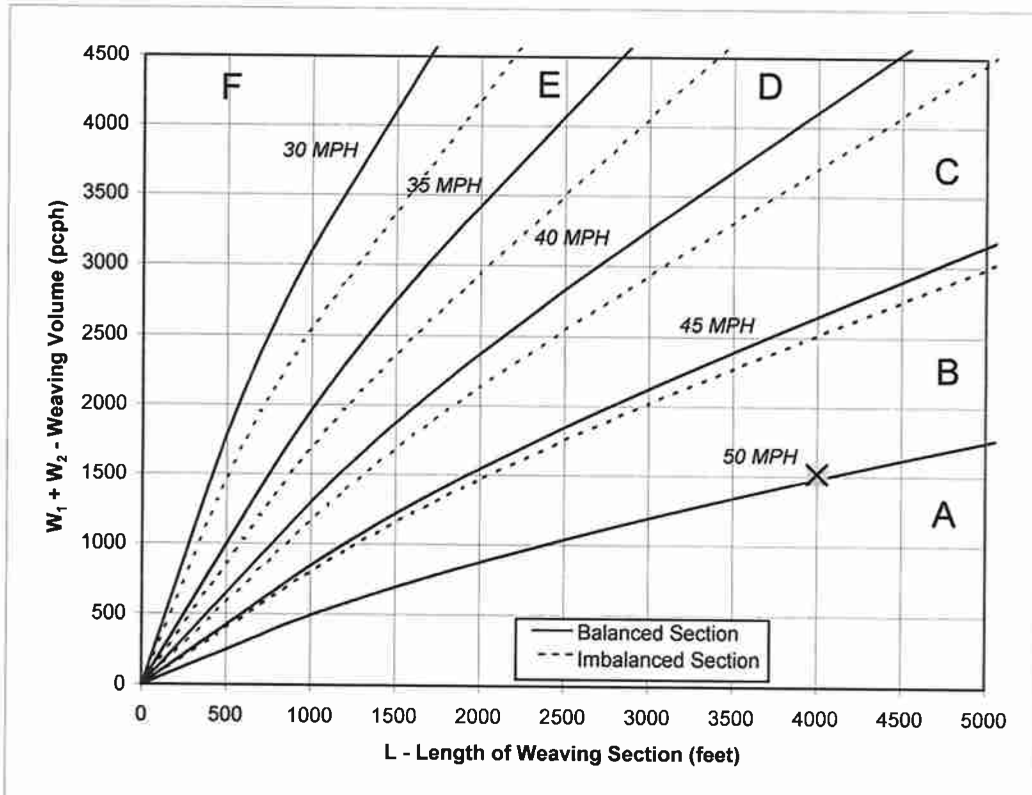
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,000

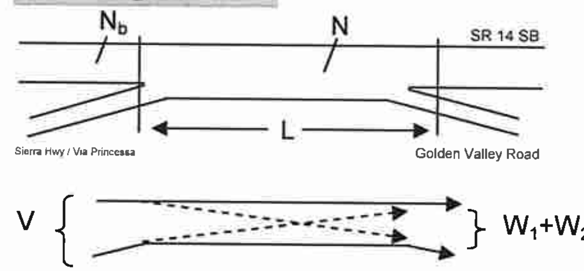
Project Information

Project	Vista Canyon Ranch
Scenario	Existing Conditions - PM
Freeway	SR 14 SB
On-ramp	Sierra Hwy / Via Princessa
Off-ramp	Golden Valley Road

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,051	Volume (vph)*	1,269	Volume (vph)*	114
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,661	Volume (pcph)	1,396	Volume (pcph)	125



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? N
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 49.8
4. Weaving Intensity Factor (k) 1.00
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]$ 915
6. Level of Service (LOS) B

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Fehr & Peers

2/12/2009

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1903	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	429	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1903		429			vph
Peak-hour factor, PHF	0.93		0.80			
Peak 15-min volume, v15	512		134			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2087		542			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1216 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2087	9400	No
$v_{FO} = v_F - v_R$	1545	9400	No
v_R	542	2000	No
v_{3} or v_{av34}	435 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1216	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 10.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.477

Space mean speed in ramp influence area, S_R = 54.0 mph

Space mean speed in outer lanes, S_0 = 71.3 mph

Space mean speed for all vehicles, S = 60.1 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1474	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	226	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1474		226			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	396		66			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1617		269			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 956 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1886	7050	No
v_3 or v_{av34}	661 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	956	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 11.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.299	
Space mean speed in ramp influence area,	S_R = 58.1	mph
Space mean speed in outer lanes,	S_0 = 64.4	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2908	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	355	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2908		355			vph
Peak-hour factor, PHF	0.94		0.90			
Peak 15-min volume, v15	773		99			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3155		398			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3155 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
$v_{Fi} = v_F$	3155		4700	No
$v_{FO} = v_F - v_R$	2757		4700	No
v_R	398		2000	No
v_3 or v_{av34}	0	pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} =			(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3155	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 26.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.464	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.3	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2553	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	725	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2553		725			vph
Peak-hour factor, PHF	0.94		0.88			
Peak 15-min volume, v15	679		206			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2770		832			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2770 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3602	4700	No
v_{3} or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2770	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.359	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 56.7	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description: Vista Canyon Ranch	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2055	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	449	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2055		449			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	552		132			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2254		534			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1284 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2254	9400	No
$v_{FO} = v_F - v_R$	1720	9400	No
v_R	534	2000	No
v_3 or v_{av34}	485 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1284	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 10.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.476

Space mean speed in ramp influence area, S_R = 54.1 mph

Space mean speed in outer lanes, S_0 = 71.3 mph

Space mean speed for all vehicles, S = 60.3 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4367	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1119	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4367		1119			vph
Peak-hour factor, PHF	0.95		0.90			
Peak 15-min volume, v15	1149		311			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	4689		1256			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.585 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3264 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4689	7050	No
$v_{FO} = v_F - v_R$	3433	7050	No
v_R	1256	2000	No
v_3 or v_{av34}	1425 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3264	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 27.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.541	
Space mean speed in ramp influence area,	S_R = 52.6	mph
Space mean speed in outer lanes,	S_0 = 69.6	mph
Space mean speed for all vehicles,	S = 56.8	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3283	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	476	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3283	476		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	864	125		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	3525	506		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3525 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4031	4700	No
v_3 or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3525	4400	No

!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A$ = 33.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, M_S = 0.506

Space mean speed in ramp influence area, S_R = 53.4 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 53.4 mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1906	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	224	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1906		224			vph
Peak-hour factor, PHF	0.96		0.85			
Peak 15-min volume, v15	496		66			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2025		266			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.697 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1492 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
$v_{Fi} = v_F$	2025		7050	No
$v_{FO} = v_F - v_R$	1759		7050	No
v_R	266		2000	No
v_{3} or v_{av34}	533 pc/h		(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34}	> 2700 pc/h?		No	
Is v_{3} or v_{av34}	> 1.5 v_{12} /2		No	
If yes, v_{12A} =			(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1492	4600	No

!

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.452	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 58.2	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1682	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	461	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1682		461			vph
Peak-hour factor, PHF	0.96		0.98			
Peak 15-min volume, v15	438		118			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1787		475			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1107 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2262	7050	No
v_3 or v_{av34}	680 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1107	4400	No

!

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 8.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, M_S = 0.235

Space mean speed in ramp influence area, S_R = 59.6 mph

Space mean speed in outer lanes, S_0 = 64.4 mph

Space mean speed for all vehicles, S = 60.9 mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: Existing Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4918	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1091	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4918		1091			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1294		287			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	5280		1160			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.575 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3528 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5280	7050	No
$v_{FO} = v_F - v_R$	4120	7050	No
v_R	1160	2000	No
v_{3} or v_{av34}	1752 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3528	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 30.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.532

Space mean speed in ramp influence area, S_R = 52.8 mph

Space mean speed in outer lanes, S_0 = 68.4 mph

Space mean speed for all vehicles, S = 57.1 mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	Existing Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1782	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	711	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1782		711			vph
Peak-hour factor, PHF	0.96		0.95			
Peak 15-min volume, v15	464		187			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1893		756			pcph

Estimation of V12 Merge Areas

$L_{EQ} =$ (Equation 25-2 or 25-3)

$P_{FM} =$ 0.283 Using Equation 4

$v_{12} = v_F (P_{FM}) =$ 535 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2649	9400	No
v_3 or v_{av34}	679 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 757		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	757	4400	No

!

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_0 = 64.8	mph
Space mean speed for all vehicles,	S = 60.7	mph

APPENDIX B:

SUBAREA MODEL VALIDATION SPREADSHEETS

Average Daily Traffic Validation - Enhanced Model

number	segment	from	to	NB/EB Model Volume	NB/EB Traffic Count	NB/EB Date Collected	NB/EB Model /Count	NB/EB Allowable Deviation	NB/EB Within Deviation	NB/EB Model - Count	NB/EB Difference Squared	SB/WB Model Volume	SB/WB Traffic Count	SB/WB Date Collected	SB/WB Model /Count	SB/WB Allowable Deviation	SB/WB Within Deviation	SB/WB Model - Count	SB/WB Difference Squared
	Sand Canyon Rd	Lost Canyon Road	SR 14 Ramps	4,020	5,728		0.70	0.20	No	-1,708	2,917,264	4,315	5,255		0.82	0.20	Yes	-940	883,600
	Sand Canyon Rd	Road Runner Road	Lost Canyon Road	3,665	4,446		0.82	0.22	Yes	-781	609,961	3,970	4,890		0.81	0.21	Yes	-920	846,400
	Jake's Way	Canyon Park Blvd	Jake's Way	6,834	2,569		2.66	0.26	No	4,265	18,190,225	6,802	2,887		2.36	0.26	No	3,915	15,327,225
	Sierra Highway	Sandy Drive	Soledad Canyon Road	15,214	17,245		0.88	0.14	Yes	-2,031	4,124,961	13,809	17,804		0.78	0.14	No	-3,995	15,960,025
	Via Princessa	South	SR-14 Ramps	4,934	6,224		0.79	0.18	No	-1,290	1,664,100	4,627	6,513		0.71	0.18	No	-1,886	3,556,996
	Sierra Highway	Soledad Canyon Road	North	11,301	12,671	2005	0.89	0.14	Yes	-1,370	1,876,900	11,343	12,671	2005	0.90	0.14	Yes	-1,328	1,763,584
	Sierra Highway	Soledad Canyon Road	South	13,809	19,446	2005	0.71	0.14	No	-5,637	31,775,769	15,214	19,446	2005	0.78	0.14	No	-4,232	17,909,824
	Soledad Canyon Road	Sierra Highway	East	14,768	13,425	2004	1.10	0.14	Yes	1,343	1,803,649	14,949	13,425	2004	1.11	0.14	Yes	1,524	2,322,576
	Sand Canyon Rd	Soledad Canyon Road	North	4,254	3,540	2005	1.20	0.24	Yes	714	509,796	4,297	3,540	2005	1.21	0.24	Yes	757	573,049
	Sand Canyon Rd	Soledad Canyon Road	South	10,606	13,505	2005	0.79	0.14	No	-2,899	8,404,201	13,432	13,505	2005	0.99	0.14	Yes	-73	5,329
	Soledad Canyon Road	White's Canyon	Sierra Highway	25,676	25,050	2004	1.02	0.14	Yes	626	391,876	27,231	25,050	2004	1.09	0.14	Yes	2,181	4,756,761
	SR 14 NB	South of Sand Canyon Rd		59,735	57,181	2004	1.04	0.14	Yes	2,554	6,522,916								
	SR 14 SB	South of Sand Canyon Rd		59,303	56,136	2004	1.06	0.14	Yes	3,167	10,029,889								
				255,132	256,216							141,238	144,036						

NB/EB

Model/Count Ratio =	1.00	
Percent Within Caltrans Maximum Deviation =	64%	>75%
Percent Root Mean Square Error =	14%	<30%
Correlation Coefficient =	0.99	>0.88

Total Count	14
Link Within Deviation	9
Link Outside Deviation	5

SB/WB

Model/Count Ratio =	0.98	
Percent Within Caltrans Maximum Deviation =	67%	>75%
Percent Root Mean Square Error =	20%	<30%
Correlation Coefficient =	0.94	>0.88

Total Count	12
Link Within Deviation	8
Link Outside Deviation	4

Total

396,370	400,252	Model/Count Ratio =	0.99	
		Percent Within Caltrans Maximum Deviation =	65%	>75%
		Percent Root Mean Square Error =	16%	<30%
		Average Correlation Coefficient =	0.967	>0.88

Total Count	26
Link Within Deviation	17
Link Outside Deviation	9

AM Peak Hour Volume Validation - Enhanced Model

				NB/EB								SB/WB							
number	segment	from	to	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
	Sierra Highway	South	Sand Canyon Rd	105	311		0.34	0.60	No	-206	42,436	149	578		0.26	0.45	No	-429	164,041
	Sierra Highway	Sand Canyon Rd	North	335	228		1.47	0.60	Yes	107	11,449	267	578		0.46	0.45	No	-311	96,721
	Sand Canyon Rd	Sierra Highway	East	209	487		0.43	0.60	Yes	-278	77,284	316	624		0.51	0.44	No	-308	94,864
	Sand Canyon Rd	South	Soledad Canyon Road	519	306		1.70	0.60	No	213	45,369	394	345		1.14	0.60	Yes	49	2,401
	Sand Canyon Rd	Soledad Canyon Road	North	395	1,029		0.38	0.37	No	-634	401,956	325	1,063			0.36	No	-738	544,644
	Soledad Canyon Road	Sand Canyon Rd	East	891	1,048		0.85	0.37	Yes	-157	24,649	1,088	868		1.25	0.39	Yes	220	48,400
	Soledad Canyon Road	Sand Canyon Rd	West	965	1,048		0.92	0.37	Yes	-83	6,889	714	868		0.82	0.39	Yes	-154	23,716
	Sand Canyon Rd	South	SR-14 NB Ramps	333	674		0.49	0.43	No	-341	116,281	314	823			0.40	No	-509	259,081
	Sand Canyon Rd	SR-14 NB Ramps	North	571	821		0.70	0.40	Yes	-250	62,500	370	745			0.42	No	-375	140,625
	SR 14 NB Ramp	SR-14 NB	Sand Canyon Rd	415	463		0.90	0.60	Yes	-48	2,304								
	SR 14 NB Ramp	Sand Canyon Rd	SR-14 NB	233	238		0.98	0.60	Yes	-5	25								
	Sand Canyon Rd	South	Lost Canyon Road	300	324		0.93	0.60	Yes	-24	576	303	304		1.00	0.60	Yes	-1	1
	Sand Canyon Rd	Lost Canyon Road	North	333	584		0.57	0.45	Yes	-251	63,001	314	823			0.40	No	-509	259,081
	Lost Canyon Road	Sand Canyon Rd	East	14	22		0.64	0.60	Yes	-8	64	36	26		1.38	0.60	Yes	10	100
	Lost Canyon Road	Sand Canyon Rd	West	0	659		0.00	0.43	No	-659	434,281	0	396			0.60	No	-396	156,816
	Sand Canyon Rd	Placerita Canyon Road	North	16	45		0.36	0.60	No	-29	841	103	263			0.60	No	-160	25,600
	Placerita Canyon Road	Sand Canyon Rd	West	239	273		0.88	0.60	Yes	-34	1,156	45	97			0.60	Yes	-52	2,704
	SR 14 NB	South of Sand Canyon Rd		2,130	2,000	2004	1.07	0.28	Yes	130	16,900								
	SR 14 SB	South of Sand Canyon Rd				2004						5,501	5,364		1.03	0.20	Yes	137	18,769
	SR 14 SB Ramps	SR 14 SB	Soledad Canyon Road	480	281		1.71	0.60	No	199	39,601	1,162	854		1.36	0.39	Yes	308	94,864
	Soledad Canyon Road	SR 14 SB Ramps	East	425	427		1.00	0.60	Yes	-2	4	1,305	1,191		1.10	0.34	Yes	114	12,996
	Soledad Canyon Road	SR 14 SB Ramps	West	1,088	1,122		0.97	0.35	Yes	-34	1,156	891	931		0.96	0.38	Yes	-40	1,600
	Soledad Canyon Road	Sierra Highway	East	747	844		0.89	0.40	Yes	-97	9,409	1,650	1,431		1.15	0.31	Yes	219	47,961
	Soledad Canyon Road	Sierra Highway	West	2,114	1,909		1.11	0.28	Yes	205	42,025	809	1,264		0.64	0.33	No	-455	207,025
	Sierra Highway	South	Soledad Canyon Road	745	740		1.01	0.42	Yes	5	25	962	1,182		0.81	0.34	Yes	-220	48,400
	Sierra Highway	Soledad Canyon Road	North	359	420		0.85	0.60	Yes	-61	3,721	978	920		1.06	0.38	Yes	58	3,364
	Sierra Highway	South	Canyon Park Blvd	507	720		0.70	0.42	Yes	-213	45,369	1,297	1,448		0.90	0.31	Yes	-151	22,801
	Sierra Highway	Canyon Park Blvd	North	745	723		1.03	0.42	Yes	22	484	962	1,232		0.78	0.33	Yes	-270	72,900
	Canyon Park Blvd	Sierra Highway	East	210	193		1.09	0.60	Yes	17	289	728	376		1.94	0.60	No	352	123,904
	Canyon Park Blvd	Sierra Highway	West	40	47		0.85	0.60	Yes	-7	49	95	83		1.14	0.60	Yes	12	144
	Canyon Park Blvd	South	Jake's Way	105	179		0.59	0.60	Yes	-74	5,476	95	359			0.60	No	-264	69,696
	Sierra Highway	South	Via Princessa	778	698		1.11	0.43	Yes	80	6,400	1,765	1,517		1.16	0.31	Yes	248	61,504
	Sierra Highway	Via Princessa	North	252	514		0.49	0.47	No	-262	68,644	1,561	1,499		1.04	0.31	Yes	62	3,844
	Via Princessa	Sierra Highway	East	935	1,212		0.77	0.33	Yes	-277	76,729	1,025	1,014		1.01	0.37	Yes	11	121
	SR 14 SB Ramp	SR 14 SB	Via Princessa									1,110	1,130		0.98	0.35	Yes	-20	400
	SR 14 SB Ramp	Via Princessa	SR 14 SB									509	628		0.81	0.44	Yes	-119	14,161
	Via Princessa	SR 14 SB Ramp	East	513	420		1.22	0.60	Yes	93	8,649	834	786		1.06	0.41	Yes	48	2,304
	Via Princessa	SR 14 SB Ramp	West	911	1,070		0.85	0.36	Yes	-159	25,281	1,190	1,206		0.99	0.33	Yes	-16	256
	SR 14 NB Ramp	SR 14 NB	Via Princessa	316	427		0.74	0.60	Yes	-111	12,321								
	SR 14 NB Ramp	Via Princessa	SR 14 NB	412	277		1.49	0.60	Yes	135	18,225								
	Via Princessa	SR 14 NB Ramp	East	245	403		0.61	0.60	Yes	-158	24,964	661	687		0.96	0.43	Yes	-26	676
	Via Princessa	SR 14 NB Ramp	West	834	923		0.90	0.38	Yes	-89	7,921	513	489		1.05	0.60	Yes	24	576
	Lost Canyon Road	South	Via Princessa	81	58		1.40	0.60	Yes	23	529	31	62		0.50	0.60	Yes	-31	961
	Lost Canyon Road	Via Princessa	North	40	313		0.13	0.60	No	-273	74,529	320	528		0.61	0.46	Yes	-208	43,264
	Via Princessa	Lost Canyon Road	East	187	127		1.47	0.60	Yes	60	3,600	271	192		1.41	0.60	Yes	79	6,241
	Via Princessa	Lost Canyon Road	West	661	688		0.96	0.43	Yes	-27	729	245	411		0.60	0.60	Yes	-166	27,556
	Via Princessa	Weyerhaeuser Way	East	1,721	1,626		1.06	0.30	Yes	95	9,025	1,433	1,315		1.09	0.32	Yes	118	13,924
	Via Princessa	Weyerhaeuser Way	West	1,467	1,249		1.17	0.33	Yes	218	47,524	1,557	1,626		0.96	0.30	Yes	-69	4,761

NB/EB

Model Volume	Traffic Count			
24,921	28,170	Model/Count Ratio =	0.88	
		Percent Within Caltrans Maximum Deviation =	80%	>75%
		Percent Root Mean Square Error =	32%	<30%
		Correlation Coefficient =	0.93	>0.88

Total Count	45
Link Within Deviation	36
Link Outside Deviation	9

SB/WB

Model Volume	Traffic Count			
34,198	38,126	Model/Count Ratio =	0.90	
		Percent Within Caltrans Maximum Deviation =	72%	>75%
		Percent Root Mean Square Error =	28%	<30%
		Correlation Coefficient =	0.96	>0.88

Total Count	43
Link Within Deviation	31
Link Outside Deviation	12

Total

Model Volume	Traffic Count			
59,119	66,296	Model/Count Ratio =	0.89	
		Percent Within Caltrans Maximum Deviation =	76%	>75%
		Percent Root Mean Square Error =	30%	<30%
		Average Correlation Coefficient =	0.946	>0.88

Total Count	88
Link Within Deviation	67
Link Outside Deviation	21

PM Peak Hour Volume Validation - Enhanced Model

						NB/EB									SB/WB									
number	segment	from	to	A Node	B Node	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared	Model B-A Node	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
	Sierra Highway	South	Sand Canyon Rd	737	738	189	431		0.44	0.60	Yes	-242	58,564	00738-00737	186	260		0.72	0.60	Yes	-74	5,476
	Sierra Highway	Sand Canyon Rd	North	738	742	388	521		0.74	0.47	Yes	-133	17,689	00742-00738	408	344		1.19	0.60	Yes	64	4,096
	Sand Canyon Rd	Sierra Highway	East	738	767	350	205		1.71	0.60	No	145	21,025	00767-00738	334	199		[illegible]	0.60	[illegible]	135	18,225
	Sand Canyon Rd	South	Soledad Canyon Road	766	734	1,192	1,049		1.14	0.37	Yes	143	20,449	00734-00766	1,103	572		[illegible]	0.45	[illegible]	531	281,961
	Sand Canyon Rd	Soledad Canyon Road	North	734	735	442	323		1.37	0.60	Yes	119	14,161	00735-00734	434	300		1.45	0.60	Yes	134	17,956
	Soledad Canyon Road	Sand Canyon Rd	East	734	1,243	1,427	1,476		0.97	0.31	Yes	-49	2,401	01243-00734	962	607		1.58	0.44	No	355	126,025
	Soledad Canyon Road	Sand Canyon Rd	West	734	733	890	790		1.13	0.41	Yes	100	10,000	00733-00734	1,275	1,205		1.06	0.33	Yes	70	4,900
	Sand Canyon Rd	South	SR-14 NB Ramps	789	1,241	303	624		0.49	0.44	No	-321	103,041	01241-00789	370	653		0.57	0.43	No	-283	80,089
	Sand Canyon Rd	SR-14 NB Ramps	North	1,241	766	1,369	1,225		1.12	0.33	Yes	144	20,736	00766-01241	1,069	554		[illegible]	0.45	No	515	265,225
	SR 14 NB Ramp	SR-14 NB	Sand Canyon Rd	1,239	1,241	1,252	1,213		1.03	0.33	Yes	39	1,521	01241-01239								
	SR 14 NB Ramp	Sand Canyon Rd	SR-14 NB	1,241	1,240	886	512		1.73	0.47	No	374	139,876	01240-01241								
	Sand Canyon Rd	South	Lost Canyon Road	1,162	789	278	446		0.62	0.60	Yes	-168	28,224	00789-01162	331	320		1.03	0.60	Yes	11	121
	Sand Canyon Rd	Lost Canyon Road	North	789	1,241	303	498		0.61	0.60	Yes	-195	38,025	01241-00789	370	364		1.02	0.60	Yes	6	36
	Lost Canyon Road	Sand Canyon Rd	East	789	790	40	35		1.14	0.60	Yes	5	25	00790-00789	26	27		0.96	0.60	Yes	-1	1
	Lost Canyon Road	Sand Canyon Rd	West	789	1,297	0	25		0.00	0.60	No	-25	625	01297-00789	0	41		[illegible]	0.60	No	-41	1,681
	Sand Canyon Rd	Placerita Canyon Road	North	780	785	83	129		0.64	0.60	Yes	-46	2,116	00785-00780	59	51		1.16	0.60	Yes	8	64
	Placerita Canyon Road	Sand Canyon Rd	West	780	779	110	92		1.20	0.60	Yes	18	324	00779-00780	209	115		[illegible]	0.60	No	94	8,836
	SR 14 NB	South of Sand Canyon Rd		1,266	1,239	4,991	5,532	2004	0.90	0.20	Yes	-541	292,681	01239-01266								
	SR 14 SB	South of Sand Canyon Rd		1,267	1,242			2004						01242-01267	2,635	2,531		1.04	0.26	Yes	104	10,816
	SR 14 SB Ramps	SR 14 SB	Soledad Canyon Road	832	1,243	637	206		3.09	0.60	No	431	185,761	01243-00832	575	544		1.06	0.46	Yes	31	961
	Soledad Canyon Road	SR 14 SB Ramps	East	1,243	743	1,103	1,112		0.99	0.35	Yes	-9	81	00743-01243	577	554		1.04	0.45	Yes	23	529
	Soledad Canyon Road	SR 14 SB Ramps	West	1,243	734	962	624		1.54	0.44	No	338	114,244	00734-01243	1,427	1,520		0.94	0.31	Yes	-93	8,649
	Soledad Canyon Road	Sierra Highway	East	728	730	2,029	1,439		1.41	0.31	No	590	348,100	00730-00728	1,451	875		[illegible]	0.39	No	576	331,776
	Soledad Canyon Road	Sierra Highway	West	728	725	1,909	1,547		1.23	0.31	Yes	362	131,044	00725-00728	2,236	2,017		1.11	0.28	Yes	219	47,961
	Sierra Highway	South	Soledad Canyon Road	726	728	1,443	1,362		1.06	0.32	Yes	81	6,561	00728-00726	834	1,085		0.77	0.36	Yes	-251	63,001
	Sierra Highway	Soledad Canyon Road	North	728	1,354	1,145	1,014		1.13	0.37	Yes	131	17,161	01354-00728	788	829		0.95	0.40	Yes	-41	1,681
	Sierra Highway	South	Canyon Park Blvd	1,084	726	1,824	1,658		1.10	0.30	Yes	166	27,556	00726-01084	878	948		0.93	0.38	Yes	-70	4,900
	Sierra Highway	Canyon Park Blvd	North	726	728	1,443	1,506		0.96	0.31	Yes	-63	3,969	00728-00726	834	947		0.88	0.38	Yes	-113	12,769
	Canyon Park Blvd	Sierra Highway	East	726	1,299	834	357		2.34	0.60	No	477	227,529	01299-00726	523	253		[illegible]	0.60	No	270	72,900
	Canyon Park Blvd	Sierra Highway	West	726	279	142	101		1.41	0.60	Yes	41	1,681	00279-00726	118	54		[illegible]	0.60	No	64	4,096
	Canyon Park Blvd	South	Jake's Way	1,273	1,524	197	330		0.60	0.60	Yes	-133	17,689	01524-01273	208	221		0.94	0.60	Yes	-13	169
	Sierra Highway	South	Via Princessa	723	724	1,546	1,683		0.92	0.30	Yes	-137	18,769	00724-00723	1,263	786		[illegible]	0.41	No	477	227,529
	Sierra Highway	Via Princessa	North	724	773	1,051	1,217		0.86	0.33	Yes	-166	27,556	00773-00724	1,380	1,175		1.17	0.34	Yes	205	42,025
	Via Princessa	Sierra Highway	East	724	1,136	1,266	1,256		1.01	0.33	Yes	10	100	01136-00724	1,310	1,236		1.06	0.33	Yes	74	5,476
	SR 14 SB Ramp	SR 14 SB	Via Princessa	1,057	1,227									01227-01057	675	708		0.95	0.42	Yes	-33	1,089
	SR 14 SB Ramp	Via Princessa	SR 14 SB	1,227	1,229									01229-01227	539	347		[illegible]	0.60	Yes	192	36,864
	Via Princessa	SR 14 SB Ramp	East	1,227	1,228	770	723		1.07	0.42	Yes	47	2,209	01228-01227	1,144	1,169		0.98	0.34	Yes	-25	625
	Via Princessa	SR 14 SB Ramp	West	1,227	849	1,508	1,320		1.14	0.32	Yes	188	35,344	00849-01227	1,271	1,235		1.03	0.33	Yes	36	1,296
	SR 14 NB Ramp	SR 14 NB	Via Princessa	1,103	1,228	1,150	1,117		1.03	0.35	Yes	33	1,089	01228-01103								
	SR 14 NB Ramp	Via Princessa	SR 14 NB	1,228	1,230	555	515		1.08	0.47	Yes	40	1,600	01230-01228								
	Via Princessa	SR 14 NB Ramp	East	1,228	783	506	509		0.99	0.47	Yes	-3	9	00783-01228	282	353		0.80	0.60	Yes	-71	5,041
	Via Princessa	SR 14 NB Ramp	West	1,228	1,227	1,144	1,167		0.98	0.34	Yes	-23	529	01227-01228	770	721		1.07	0.42	Yes	49	2,401
	Lost Canyon Road	South	Via Princessa	269	783	56	49		1.14	0.60	Yes	7	49	00783-00269	86	58		1.48	0.60	Yes	28	784
	Lost Canyon Road	Via Princessa	North	783	761	215	414		0.52	0.60	Yes	-199	39,601	00761-00783	95	253		[illegible]	0.60	No	-158	24,964
	Via Princessa	Lost Canyon Road	East	783	262	212	96		2.21	0.60	No	116	13,456	00262-00783	139	118		1.18	0.60	Yes	21	441
	Via Princessa	Lost Canyon Road	West	783	1,228	282	359		0.79	0.60	Yes	-77	5,929	01228-00783	506	508		1.00	0.47	Yes	-2	4
	Via Princessa	Weyerhaeuser Way	East	679	633	1,750	1,295		1.35	0.33	No	455	207,025	00633-00679	2,010	1,855		1.08	0.29	Yes	155	24,025
	Via Princessa	Weyerhaeuser Way	West	679	1,269	1,845	1,881		0.98	0.29	Yes	-36	1,296	01269-00679	1,663	1,188		1.40	0.34	No	475	225,625

NB/EB

42,017	39,983	Model/Count Ratio =	1.05	
		Percent Within Caltrans Maximum Deviation =	78%	>75%
		Percent Root Mean Square Error =	25%	<30%
		Correlation Coefficient =	0.97	>0.88

Total Count 45
Link Within Deviation 35
Link Outside Deviation 10

SB/WB

33,353	29,700	Model/Count Ratio =	1.12	
		Percent Within Caltrans Maximum Deviation =	70%	>75%
		Percent Root Mean Square Error =	31%	<30%
		Correlation Coefficient =	0.95	>0.88

Total Count 43
Link Within Deviation 30
Link Outside Deviation 13

Total

75,370	69,683	Model/Count Ratio =	1.08	
		Percent Within Caltrans Maximum Deviation =	74%	>75%
		Percent Root Mean Square Error =	28%	<30%
		Average Correlation Coefficient =	0.959	>0.88

Total Count 88
Link Within Deviation 65
Link Outside Deviation 23

Average Daily Traffic Validation - Original Model

NB/EB

number	segment	from	to	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
	Sand Canyon Rd	Lost Canyon Road	SR 14 Ramps	11,691	5,728		2.04	0.20	No	5,963	35,557,369
	Sand Canyon Rd	Road Runner Road	Lost Canyon Road	5,679	4,446		1.28	0.22	No	1,233	1,520,289
	Sierra Highway	Sandy Drive	Soledad Canyon Road	19,120	17,245		1.11	0.14	Yes	1,875	3,515,625
	Via Princessa	South	SR-14 Ramps	2,682	6,224		0.43	0.18	No	-3,542	12,545,764
	Sierra Highway	Soledad Canyon Road	North	11,061	12,671	2005	0.87	0.14	Yes	-1,610	2,592,100
	Sierra Highway	Soledad Canyon Road	South	18,677	19,446	2005	0.96	0.14	Yes	-769	591,361
	Soledad Canyon Road	Sierra Highway	East	14,683	13,425	2004	1.09	0.14	Yes	1,258	1,582,564
				12,691	19,050		0.67	0.14	No	-6,359	40,436,881
	Sand Canyon Rd	Soledad Canyon Road	North	4,153	3,540	2005	1.17	0.24	Yes	613	375,769
	Sand Canyon Rd	Soledad Canyon Road	South	11,845	13,505	2005	0.88	0.14	Yes	-1,660	2,755,600
	Soledad Canyon Road	White's Canyon	Sierra Highway	29,681	25,050	2004	1.18	0.14	No	4,631	21,446,161
	SR 14 NB	South of Sand Canyon R		65,013	57,181	2004	1.14	0.14	Yes	7,832	61,340,224
	SR 14 SB	South of Sand Canyon R		64,184	56,136	2004	1.14	0.14	No	8,048	64,770,304

271,160	253,647	Model/Count Ratio =	1.07	
		Percent Within Caltrans Maximum Deviation =	54%	>75%
		Percent Root Mean Square Error =	22%	<30%
		Correlation Coefficient =	0.99	>0.88

Total Count	13
Link Within Deviation	7
Link Outside Deviation	6

SB/WB

segment	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
Sand Canyon Rd	12,069	5,255		2.30	0.20	No	6,814	46,430,596
Sand Canyon Rd	5,992	4,890		1.23	0.21	No	1,102	1,214,404
Sierra Highway	18,677	17,804		1.05	0.14	Yes	873	762,129
Via Princessa	2,651	6,513			0.18	No	-3,862	14,915,044
Sierra Highway	10,980	12,671	2005	0.87	0.14	Yes	-1,691	2,859,481
Sierra Highway	19,120	19,446	2005	0.98	0.14	Yes	-326	106,276
Soledad Canyon Road	15,422	13,425	2004	1.15	0.14	No	1,997	3,988,009
	13,056	19,050		0.69	0.14	No	-5,994	35,928,036
Sand Canyon Rd	4,327	3,540	2005	1.22	0.24	Yes	787	619,369
Sand Canyon Rd	18,960	13,505	2005	1.40	0.14	No	5,455	29,757,025
Soledad Canyon Road	30,777	25,050	2004	1.23	0.14	No	5,727	32,798,529
SR 14 NB								
SR 14 SB								

152,031	141,149	Model/Count Ratio =	1.08	
		Percent Within Caltrans Maximum Deviation =	36%	>75%
		Percent Root Mean Square Error =	31%	<30%
		Correlation Coefficient =	0.87	>0.88

Total Count	11
Link Within Deviation	4
Link Outside Deviation	7

Total

423,191	394,796	Model/Count Ratio =	1.07	
		Percent Within Caltrans Maximum Deviation =	46%	>75%
		Percent Root Mean Square Error =	25%	<30%
		Average Correlation Coefficient =	0.928	>0.88

Total Count	24
Link Within Deviation	11
Link Outside Deviation	13

AM Peak Hour Volume Validation - Original Model

number	segment	from	to	NB/EB Model Volume	NB/EB Traffic Count	NB/EB Date Collected	NB/EB Model /Count	NB/EB Allowable Deviation	NB/EB Within Deviation	NB/EB Model - Count	NB/EB Difference Squared	SB/WB Model Volume	SB/WB Traffic Count	SB/WB Date Collected	SB/WB Model /Count	SB/WB Allowable Deviation	SB/WB Within Deviation	SB/WB Model - Count	SB/WB Difference Squared
	Sierra Highway	South	Sand Canyon Rd	87	311		0.28	0.60	No	-224	50,176	165	578			0.45	No	-413	170,569
	Sierra Highway	Sand Canyon Rd	North	323	228		1.42	0.60	Yes	95	9,025	256	578			0.45	No	-322	103,684
	Sand Canyon Rd	Sierra Highway	East	177	487		0.36	0.60	No	-310	96,100	317	624		0.51	0.44	No	-307	94,249
	Sand Canyon Rd	South	Soledad Canyon Road	1,217	306		3.98	0.60	No	911	829,921	390	345		1.13	0.60	Yes	45	2,025
	Sand Canyon Rd	Soledad Canyon Road	North	410	1,029		0.40	0.37	No	-619	383,161	305	1,063			0.36	No	-758	574,564
	Soledad Canyon Road	Sand Canyon Rd	East	1,311	1,048		1.25	0.37	Yes	263	69,169	1,076	868		1.24	0.39	Yes	208	43,264
	Soledad Canyon Road	Sand Canyon Rd	West	1,178	1,048		1.12	0.37	Yes	130	16,900	690	868		0.79	0.39	Yes	-178	31,684
	Sand Canyon Rd	South	SR-14 NB Ramps	1,074	674		1.59	0.43	No	400	160,000	550	823		0.67	0.40	Yes	-273	74,529
	Sand Canyon Rd	SR-14 NB Ramps	North	1,277	821		1.56	0.40	No	456	207,936	380	745		0.51	0.42	No	-365	133,225
	SR 14 NB Ramp	SR-14 NB	Sand Canyon Rd	570	463		1.23	0.60	Yes	107	11,449								
	SR 14 NB Ramp	Sand Canyon Rd	SR-14 NB	195	238		0.82	0.60	Yes	-43	1,849								
	Sand Canyon Rd	South	Lost Canyon Road	440	324		1.36	0.60	Yes	116	13,456	390	304		1.28	0.60	Yes	86	7,396
	Sand Canyon Rd	Lost Canyon Road	North	1,074	584		1.84	0.45	No	490	240,100	550	823		0.67	0.40	Yes	-273	74,529
	Lost Canyon Road	Sand Canyon Rd	East	136	22		6.18	0.60	No	114	12,996	378	26		14.54	0.60	No	352	123,904
	Lost Canyon Road	Sand Canyon Rd	West	66	659		0.10	0.43	No	-593	351,649	298	396		0.75	0.60	Yes	-98	9,604
	Sand Canyon Rd	Placerita Canyon Road	North	32	45		0.71	0.60	Yes	-13	169	61	263			0.60	No	-202	40,804
	Placerita Canyon Road	Sand Canyon Rd	West	156	273		0.57	0.60	Yes	-117	13,689	3	97			0.60	No	-94	8,836
	SR 14 NB	South of Sand Canyon Rd		2,271	2,000	2004	1.14	0.28	Yes	271	73,441								
	SR 14 SB Ramps	SR 14 SB	Soledad Canyon Road	538	281		1.91	0.60	No	257	66,049	1,528	854			0.39	No	674	454,276
	Soledad Canyon Road	SR 14 SB Ramps	East	495	427		1.16	0.60	Yes	68	4,624	1,253	1,191		1.05	0.34	Yes	62	3,844
	Soledad Canyon Road	SR 14 SB Ramps	West	1,076	1,122		0.96	0.35	Yes	-46	2,116	1,311	931		1.41	0.38	No	380	144,400
	Soledad Canyon Road	Sierra Highway	East	683	844		0.81	0.40	Yes	-161	25,921	1,837	1,431		1.28	0.31	Yes	406	164,836
	Soledad Canyon Road	Sierra Highway	West	2,436	1,909		1.28	0.28	Yes	527	277,729	1,000	1,264		0.79	0.33	Yes	-264	69,696
	Sierra Highway	South	Soledad Canyon Road	908	740		1.23	0.42	Yes	168	28,224	1,268	1,182		1.07	0.34	Yes	86	7,396
	Sierra Highway	Soledad Canyon Road	North	354	420		0.84	0.60	Yes	-66	4,356	996	920		1.08	0.38	Yes	76	5,776
	Sierra Highway	South	Canyon Park Blvd	602	720		0.84	0.42	Yes	-118	13,924	1,529	1,448		1.06	0.31	Yes	81	6,561
	Sierra Highway	Canyon Park Blvd	North	908	723		1.26	0.42	Yes	185	34,225	1,268	1,232		1.03	0.33	Yes	36	1,296
	Canyon Park Blvd	Sierra Highway	East	206	193		1.07	0.60	Yes	13	169	718	376		1.91	0.60	No	342	116,964
	Canyon Park Blvd	Sierra Highway	West	38	47		0.81	0.60	Yes	-9	81	94	83		1.13	0.60	Yes	11	121
	Sierra Highway	South	Via Princessa	705	698		1.01	0.43	Yes	7	49	1,822	1,517		1.20	0.31	Yes	305	93,025
	Sierra Highway	Via Princessa	North	251	514		0.49	0.47	No	-263	69,169	1,535	1,499		1.02	0.31	Yes	36	1,296
	Via Princessa	Sierra Highway	East	877	1,212		0.72	0.33	Yes	-335	112,225	979	1,014		0.97	0.37	Yes	-35	1,225
	SR 14 SB Ramp	SR 14 SB	Via Princessa									949	1,130		0.84	0.35	Yes	-181	32,761
	SR 14 SB Ramp	Via Princessa	SR 14 SB									481	628		0.77	0.44	Yes	-147	21,609
	Via Princessa	SR 14 SB Ramp	East	527	420		1.25	0.60	Yes	107	11,449	648	786		0.82	0.41	Yes	-138	19,044
	Via Princessa	SR 14 SB Ramp	West	886	1,070		0.83	0.36	Yes	-184	33,856	1,232	1,206		1.02	0.33	Yes	26	676
	SR 14 NB Ramp	SR 14 NB	Via Princessa	428	427		1.00	0.60	Yes	1	1								
	SR 14 NB Ramp	Via Princessa	SR 14 NB	418	277		1.51	0.60	Yes	141	19,881								
	Via Princessa	SR 14 NB Ramp	East	221	403		0.55	0.60	Yes	-182	33,124	332	687		0.48	0.43	No	-355	126,025
	Via Princessa	SR 14 NB Ramp	West	648	923		0.70	0.38	Yes	-275	75,625	527	489		1.08	0.60	Yes	38	1,444
	Lost Canyon Road	South	Via Princessa	79	58		1.36	0.60	Yes	21	441	29	62		0.47	0.60	Yes	-33	1,089
	Lost Canyon Road	Via Princessa	North	0	313		0.00	0.60	No	-313	97,969	0	528		0.00	0.46	No	-528	278,784
	Via Princessa	Lost Canyon Road	East	195	127		1.54	0.60	Yes	68	4,624	256	192		1.33	0.60	Yes	64	4,096
	Via Princessa	Lost Canyon Road	West	332	688		0.48	0.43	No	-356	126,736	221	411		0.54	0.60	Yes	-190	36,100
	Via Princessa	Weyerhaeuser Way	East	1,275	1,626		0.78	0.30	Yes	-351	123,201	910	1,315		0.69	0.32	Yes	-405	164,025
	Via Princessa	Weyerhaeuser Way	West	941	1,249		0.75	0.33	Yes	-308	94,864	1,107	1,626		0.68	0.30	No	-519	269,361

NB/EB

Model Volume	Traffic Count		Value	Target
28,021	27,991	Model/Count Ratio =	1.00	
		Percent Within Caltrans Maximum Deviation =	70%	>75%
		Percent Root Mean Square Error =	46%	<30%
		Correlation Coefficient =	0.84	>0.88

Total Count	44
Link Within Deviation	31
Link Outside Deviation	13

SB/WB

Model Volume	Traffic Count		Value	Target
35,489	37,767	Model/Count Ratio =	0.94	
		Percent Within Caltrans Maximum Deviation =	67%	>75%
		Percent Root Mean Square Error =	33%	<30%
		Correlation Coefficient =	0.95	>0.88

Total Count	42
Link Within Deviation	28
Link Outside Deviation	14

Total

Model Volume	Traffic Count		Value	Target
63,510	65,758	Model/Count Ratio =	0.97	
		Percent Within Caltrans Maximum Deviation =	69%	>75%
		Percent Root Mean Square Error =	39%	<30%
		Average Correlation Coefficient =	0.896	>0.88

Total Count	86
Link Within Deviation	59
Link Outside Deviation	27

PM Peak Hour Volume Validation - Original Model

NB/EB

number	segment	from	to	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
	Sierra Highway	South	Sand Canyon Rd	201	431		0.47	0.60	Yes	-230	52,900
	Sierra Highway	Sand Canyon Rd	North	338	521		0.65	0.47	Yes	-183	33,489
	Sand Canyon Rd	Sierra Highway	East	355	205		1.73	0.60	No	150	22,500
	Sand Canyon Rd	South	Soledad Canyon Road	1,360	1,049		1.30	0.37	Yes	311	96,721
	Sand Canyon Rd	Soledad Canyon Road	North	374	323		1.16	0.60	Yes	51	2,601
	Soledad Canyon Road	Sand Canyon Rd	East	1,607	1,476		1.09	0.31	Yes	131	17,161
	Soledad Canyon Road	Sand Canyon Rd	West	919	790		1.16	0.41	Yes	129	16,641
	Sand Canyon Rd	South	SR-14 NB Ramps	766	624		1.23	0.44	Yes	142	20,164
	Sand Canyon Rd	SR-14 NB Ramps	North	1,557	1,225		1.27	0.33	Yes	332	110,224
	SR 14 NB Ramp	SR-14 NB	Sand Canyon Rd	1,589	1,213		1.31	0.33	Yes	376	141,376
	SR 14 NB Ramp	Sand Canyon Rd	SR-14 NB	716	512		1.40	0.47	Yes	204	41,616
	Sand Canyon Rd	South	Lost Canyon Road	408	446		0.91	0.60	Yes	-38	1,444
	Sand Canyon Rd	Lost Canyon Road	North	766	498		1.54	0.60	Yes	268	71,824
	Lost Canyon Road	Sand Canyon Rd	East	438	35		12.51	0.60	No	403	162,409
	Lost Canyon Road	Sand Canyon Rd	West	292	25		11.68	0.60	No	267	71,289
	Sand Canyon Rd	Placerita Canyon Road	North	32	129		0.25	0.60	No	-97	9,409
	Placerita Canyon Road	Sand Canyon Rd	West	22	92		0.24	0.60	No	-70	4,900
	SR 14 NB	South of Sand Canyon Rd		5,583	5,532	2004	1.01	0.20	Yes	51	2,601
	SR 14 SB	South of Sand Canyon Rd				2004					
	SR 14 SB Ramps	SR 14 SB	Soledad Canyon Road	658	206		3.19	0.60	No	452	204,304
	Soledad Canyon Road	SR 14 SB Ramps	East	1,026	1,112		0.92	0.35	Yes	-86	7,396
	Soledad Canyon Road	SR 14 SB Ramps	West	1,018	624		1.63	0.44	No	394	155,236
	Soledad Canyon Road	Sierra Highway	East	2,019	1,439		1.40	0.31	No	580	336,400
	Soledad Canyon Road	Sierra Highway	West	2,106	1,547		1.36	0.31	No	559	312,481
	Sierra Highway	South	Soledad Canyon Road	1,745	1,362		1.28	0.32	Yes	383	146,689
	Sierra Highway	Soledad Canyon Road	North	1,130	1,014		1.11	0.37	Yes	116	13,456
	Sierra Highway	South	Canyon Park Blvd	1,760	1,658		1.06	0.30	Yes	102	10,404
	Sierra Highway	Canyon Park Blvd	North	1,745	1,506		1.16	0.31	Yes	239	57,121
	Canyon Park Blvd	Sierra Highway	East	730	357		2.04	0.60	No	373	139,129
	Canyon Park Blvd	Sierra Highway	West	148	101		1.47	0.60	Yes	47	2,209
	Sierra Highway	South	Via Princessa	1,569	1,683		0.93	0.30	Yes	-114	12,996
	Sierra Highway	Via Princessa	North	867	1,217		0.70	0.33	Yes	-360	129,600
	Via Princessa	Sierra Highway	East	1,330	1,256		1.06	0.33	Yes	74	5,476
	SR 14 SB Ramp	SR 14 SB	Via Princessa								
	SR 14 SB Ramp	Via Princessa	SR 14 SB								
	Via Princessa	SR 14 SB Ramp	East	810	723		1.12	0.42	Yes	87	7,569
	Via Princessa	SR 14 SB Ramp	West	1,516	1,320		1.15	0.32	Yes	196	38,416
	SR 14 NB Ramp	SR 14 NB	Via Princessa	1,018	1,117		0.91	0.35	Yes	-99	9,801
	SR 14 NB Ramp	Via Princessa	SR 14 NB	694	515		1.35	0.47	Yes	179	32,041
	Via Princessa	SR 14 NB Ramp	East	285	509		0.56	0.47	Yes	-224	50,176
	Via Princessa	SR 14 NB Ramp	West	1,044	1,167		0.89	0.34	Yes	-123	15,129
	Lost Canyon Road	South	Via Princessa	57	49		1.16	0.60	Yes	8	64
	Lost Canyon Road	Via Princessa	North	0	414		0.00	0.60	No	-414	171,396
	Via Princessa	Lost Canyon Road	East	197	96		2.05	0.60	No	101	10,201
	Via Princessa	Lost Canyon Road	West	193	359		0.54	0.60	Yes	-166	27,556
	Via Princessa	Weyerhaeuser Way	East	1,275	1,295		0.98	0.33	Yes	-20	400
	Via Princessa	Weyerhaeuser Way	West	1,343	1,881		0.71	0.29	Yes	-538	289,444

Model Volume	Traffic Count			
43,596	39,653	Model/Count Ratio =	1.10	
		Percent Within Caltrans Maximum Deviation =	73%	>75%
		Percent Root Mean Square Error =	29%	<30%
		Correlation Coefficient =	0.96	>0.88

Total Count	44
Link Within Deviation	32
Link Outside Deviation	12

SB/WB

number	segment	from	to	Model Volume	Traffic Count	Date Collected	Model /Count	Allowable Deviation	Within Deviation	Model - Count	Difference Squared
	Sierra Highway	South	Sand Canyon Rd	137	260		0.53	0.60	Yes	-123	15,129
	Sierra Highway	Sand Canyon Rd	North	365	344		1.06	0.60	Yes	21	441
	Sand Canyon Rd	Sierra Highway	East	271	199		1.36	0.60	Yes	72	5,184
	Sand Canyon Rd	South	Soledad Canyon Road	1,162	572		2.03	0.45	No	590	348,100
	Sand Canyon Rd	Soledad Canyon Road	North	423	300		1.41	0.60	Yes	123	15,129
	Soledad Canyon Road	Sand Canyon Rd	East	1,018	607		1.68	0.44	No	411	168,921
	Soledad Canyon Road	Sand Canyon Rd	West	1,262	1,205		1.05	0.33	Yes	57	3,249
	Sand Canyon Rd	South	SR-14 NB Ramps	1,251	653		1.92	0.43	No	598	357,604
	Sand Canyon Rd	SR-14 NB Ramps	North	1,167	554		2.11	0.45	No	613	375,769
	SR 14 NB Ramp	SR-14 NB	Sand Canyon Rd								
	SR 14 NB Ramp	Sand Canyon Rd	SR-14 NB								
	Sand Canyon Rd	South	Lost Canyon Road	582	320		1.82	0.60	No	262	68,644
	Sand Canyon Rd	Lost Canyon Road	North	1,251	364		3.44	0.60	No	887	786,769
	Lost Canyon Road	Sand Canyon Rd	East	249	27		9.22	0.60	No	222	49,284
	Lost Canyon Road	Sand Canyon Rd	West	170	41		4.15	0.60	No	129	16,641
	Sand Canyon Rd	Placerita Canyon Road	North	40	51		0.78	0.60	Yes	-11	121
	Placerita Canyon Road	Sand Canyon Rd	West	53	115		0.46	0.60	Yes	-62	3,844
	SR 14 NB	South of Sand Canyon Rd									
	SR 14 SB	South of Sand Canyon Rd		2,918	2,531		1.15	0.26	Yes	387	149,769
	SR 14 SB Ramps	SR 14 SB	Soledad Canyon Road	835	544		1.53	0.46	No	291	84,681
	Soledad Canyon Road	SR 14 SB Ramps	East	612	554		1.10	0.45	Yes	58	3,364
	Soledad Canyon Road	SR 14 SB Ramps	West	1,607	1,520		1.06	0.31	Yes	87	7,569
	Soledad Canyon Road	Sierra Highway	East	1,460	875		1.67	0.39	No	585	342,225
	Soledad Canyon Road	Sierra Highway	West	2,538	2,017		1.26	0.28	Yes	521	271,441
	Sierra Highway	South	Soledad Canyon Road	1,219	1,085		1.12	0.36	Yes	134	17,956
	Sierra Highway	Soledad Canyon Road	North	732	829		0.88	0.40	Yes	-97	9,409
	Sierra Highway	South	Canyon Park Blvd	947	948		1.00	0.38	Yes	-1	1
	Sierra Highway	Canyon Park Blvd	North	1,219	947		1.29	0.38	Yes	272	73,984
	Canyon Park Blvd	Sierra Highway	East	472	253		1.87	0.60	No	219	47,961
	Canyon Park Blvd	Sierra Highway	West	119	54		2.20	0.60	No	65	4,225
	Sierra Highway	South	Via Princessa	1,213	786		1.54	0.41	No	427	182,329
	Sierra Highway	Via Princessa	North	1,293	1,175		1.10	0.34	Yes	118	13,924
	Via Princessa	Sierra Highway	East	1,212	1,236		0.98	0.33	Yes	-24	576
	SR 14 SB Ramp	SR 14 SB	Via Princessa	660	708		0.93	0.42	Yes	-48	2,304
	SR 14 SB Ramp	Via Princessa	SR 14 SB	568	347		1.64	0.60	No	221	48,841
	Via Princessa	SR 14 SB Ramp	East	1,044	1,169		0.89	0.34	Yes	-125	15,625
	Via Princessa	SR 14 SB Ramp	West	1,374	1,235		1.11	0.33	Yes	139	19,321
	SR 14 NB Ramp	SR 14 NB	Via Princessa								
	SR 14 NB Ramp	Via Princessa	SR 14 NB								
	Via Princessa	SR 14 NB Ramp	East	193	353		0.55	0.60	Yes	-160	25,600
	Via Princessa	SR 14 NB Ramp	West	810	721		1.12	0.42	Yes	89	7,921
	Lost Canyon Road	South	Via Princessa	90	58		1.55	0.60	Yes	32	1,024
	Lost Canyon Road	Via Princessa	North	0	253		0.00	0.60	No	-253	64,009
	Via Princessa	Lost Canyon Road	East	138	118		1.17	0.60	Yes	20	400
	Via Princessa	Lost Canyon Road	West	285	508		0.56	0.47	Yes	-223	49,729
	Via Princessa	Weyerhaeuser Way	East	1,564	1,855		0.84	0.29	Yes	-301	90,601
	Via Princessa	Weyerhaeuser Way	West	1,153	1,188		0.97	0.34	Yes	-35	1,225

Model Volume	Traffic Count			
35,666	29,479	Model/Count Ratio =	1.21	
		Percent Within Caltrans Maximum Deviation =	64%	>75%
		Percent Root Mean Square Error =	43%	<30%
		Correlation Coefficient =	0.91	>0.88

Total Count	42
Link Within Deviation	27
Link Outside Deviation	15

Total

Model Volume	Traffic Count			
79,262	69,132	Model/Count Ratio =	1.15	
		Percent Within Caltrans Maximum Deviation =	69%	>75%
		Percent Root Mean Square Error =	35%	<30%
		Average Correlation Coefficient =	0.939	>0.88

Total Count	86
Link Within Deviation	59
Link Outside Deviation	27

APPENDIX C:

PROJECT TRIP GENERATION CALCULATIONS

Table C-1

Trip Generation for Vista Canyon - AM and PM Peak Hour Under Interim Conditions

Land Use						Trip Rates						Trip Estimates					
					Trip Generation Category (ITE unless otherwise specified)	AM Peak Hour			PM Peak Hour			AM Peak Hour			PM Peak Hour		
Land Use	Land Use Definition	Gross Quantity	GLA	Unit		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Villages PA-1 thru PA-4																	
Residential	Detached SFR	96		DU	ITE 210 - SFD	0.19	0.56	0.75	0.64	0.37	1.01	18	54	72	61	36	97
High Density Residential	Apartment	579		DU	ITE 220 - Apart	0.10	0.41	0.51	0.40	0.22	0.62	58	237	295	232	127	359
Medium-Density Resid.	Condos/Townhomes	442		DU	ITE 230	0.07	0.37	0.44	0.35	0.17	0.52	31	164	194	155	75	230
Movie Theater	Multiplex			10 screens	ITE 445							0	0	0	61	75	136
Hotel	Hotel		200.00	rooms	ITE - 310							59	38	97	63	55	118
Retail	Neighborhood SC		131.00	KSF	ITE 820-SC	0.85	0.54	1.39	2.82	3.05	5.88	111	71	182	370	400	770
General Office	Office Park		646.00	KSF	ITE 750	1.39	0.17	1.56	0.19	1.18	1.37	898	111	1,009	124	760	884
TOTAL		**1,117**									***Gross Trips***	***1,175***	***675***	***1,849***	***1,065***	***1,529***	***2,594***

			AM In	AM Out	AM Total	PM In	PM Out	PM Total
TOTAL GROSS TRIPS			1,175	675	**1,849**	1,065	1,529	**2,594**
Gross Residential Trips			107	455	562	447	238	686
Gross Retail/Movie Trips			111	71	182	431	475	906
Gross Hotel Trips			59	38	97	63	55	118
Gross Office Trips			898	111	1,009	124	760	884
INTERNAL TRIP ASSUMPTIONS/CALCULATIONS								
Percentage of Hotel Trips Internal to Retail/Movie	***4%***	***5%***	2	2		3	3	
Percentage of Hotel Trips Internal to Office	***5%***	***5%***	3	2		3	3	
Percentage of Residential Trips Internal to Office	***8%***	***8%***	9	36		36	19	
Percentage of Residential Trips Internal to Retail/Movie	***2%***	***4%***	2	9		18	10	
Percentage of Office Trips Internal to Retail/Movie	***2%***	***4%***	18	2		5	30	
OTHER END OF INTERNAL TRIP								
Retail Trips			13	22		43	26	
Office Trips			38	11		22	39	
External Trips (by land use for all modes)								
External Residential Trips			96	409		394	210	
External Retail/Movie Trips			98	49		388	449	
External Hotel Trips			54	34		56	50	
External Office Trips			842	97		97	691	
TOTAL EXTERNAL TRIPS			1,090	590	1,679	935	1,399	2,335
Overall Internalization Percentage					*9.20%*			*9.98%*
Metrolink Mode Share								
	AM	***PM***						
Transit Trips (Residential)	***8%***	***8%***	8	33		31	17	
Transit Trips (Retail/Movie)	***5%***	***5%***	5	2		19	22	
Transit Trips (Hotel)	***5%***	***5%***	3	2		3	2	
Transit Trips (Office)	***8%***	***8%***	67	8		8	55	
TOTAL METROLINK TRIPS			83	45	127	62	97	158
CONVERSION TO PERSON TRIPS AVO=		***1.1***	91	49	140	68	107	174
Santa Clarita Bus Mode Share								
	AM	***PM***						
Transit Trips (Residential)	***1%***	***1%***	1	4		4	2	
Transit Trips (Retail/Movie)	***1%***	***1%***	1	0		4	4	
Transit Trips (Hotel)	***1%***	***1%***	1	0		1	0	
Transit Trips (Office)	***1%***	***1%***	8	1		1	7	
TOTAL BUS TRIPS			11	6	17	9	14	23
CONVERSION TO PERSON TRIPS AVO=		***1.1***	12	6	18	10	15	26
Percentage of External Trips that use bus/rail					8.58%			7.79%
External Vehicle Trips								
External Residential Trips			88	373		358	191	
External Retail/Movie Trips			92	46		365	422	
External Hotel Trips			50	32		53	47	
External Office Trips			766	89		88	629	
TOTAL EXTERNAL TRIPS			996	539	1,535	865	1,288	2,153
Overall Internalization/Transit Mode Share Percentage (1 minus ext vehicle trips divided by gross trips)					*16.99%*			*16.99%*

Notes:

1. Average rate used for residential uses and hotel. Fitted curve regression equation used for the retail and office uses.
2. "Mid-Rise" or "High-Rise" categories for apartments and condominiums/townhomes purposefully not selected because these rates presumably include some levels of internal trip-making, walking, and/or transit use.

Source: Fehr & Peers, 2008.

Table C-2

Trip Generation for Vista Canyon - AM and PM Peak Hour Under Interim Conditions Assuming Residential Overlay (233 MF units would replace 250 ksf office)

Land Use	Land Use Definition	Gross Quantity	GLA	Unit	Trip Generation Category (ITE unless otherwise specified)	Trip Rates AM Peak Hour In	Trip Rates AM Peak Hour Out	Trip Rates AM Peak Hour Total	Trip Rates PM Peak Hour In	Trip Rates PM Peak Hour Out	Trip Rates PM Peak Hour Total	Trip Estimates AM Peak Hour In	Trip Estimates AM Peak Hour Out	Trip Estimates AM Peak Hour Total	Trip Estimates PM Peak Hour In	Trip Estimates PM Peak Hour Out	Trip Estimates PM Peak Hour Total
Villages PA-1 thru PA-4																	
Residential	Detached SFR	96		DU	ITE 210 - SFD	0.19	0.56	0.75	0.64	0.37	1.01	18	54	72	61	36	97
High Density Residential	Apartment	579		DU	ITE 220 - Apart	0.10	0.41	0.51	0.40	0.22	0.62	58	237	295	232	127	359
Medium-Density Resid.	Condos/Townhomes	675		DU	ITE 230	0.07	0.37	0.44	0.35	0.17	0.52	47	250	297	236	115	351
Movie Theater	Multiplex			10 screens	ITE 445							0	0	0	61	75	136
Hotel	Hotel		200.00	rooms	ITE - 310							59	38	97	63	55	118
Retail	Neighborhood SC		131.00	KSF	ITE 820-SC	0.85	0.54	1.39	2.82	3.05	5.88	111	71	182	370	400	770
General Office	Office Park		396.00	KSF	ITE 750	1.50	0.18	1.68	0.20	1.26	1.46	594	73	667	81	498	579
TOTAL		**1,350**									*Gross Trips*	*887*	*723*	*1,610*	*1,103*	*1,306*	*2,410*

	AM	PM	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
TOTAL GROSS TRIPS			887	723	**1,610**	1,103	1,306	**2,410**
Gross Residential Trips			123	541	664	529	278	807
Gross Retail/Movie Trips			111	71	182	431	475	906
Gross Hotel Trips			59	38	97	63	55	118
Gross Office Trips			594	73	667	81	498	579
INTERNAL TRIP ASSUMPTIONS/CALCULATIONS								
Percentage of Hotel Trips Internal to Retail/Movie	*4%*	*5%*	2	2		3	3	
Percentage of Hotel Trips Internal to Office	*5%*	*5%*	3	2		3	3	
Percentage of Residential Trips Internal to Office	*8%*	*8%*	10	43		42	22	
Percentage of Residential Trips Internal to Retail/Movie	*2%*	*4%*	2	11		21	11	
Percentage of Office Trips Internal to Retail/Movie	*2%*	*4%*	12	1		3	20	
OTHER END OF INTERNAL TRIP								
Retail Trips			14	17		34	28	
Office Trips			45	13		25	45	
External Trips (by land use for all modes)								
External Residential Trips			111	487		465	245	
External Retail/Movie Trips			97	54		397	447	
External Hotel Trips			54	34		56	50	
External Office Trips			537	59		53	433	
TOTAL EXTERNAL TRIPS			799	634	1,433	972	1,175	2,146
Overall Internalization Percentage					*10.99%*			*10.94%*
Metrolink Mode Share								
	AM	*PM*						
Transit Trips (Residential)	*8%*	*8%*	9	39		37	20	
Transit Trips (Retail/Movie)	*5%*	*5%*	5	3		20	22	
Transit Trips (Hotel)	*5%*	*5%*	3	2		3	2	
Transit Trips (Office)	*8%*	*8%*	43	5		4	35	
TOTAL METROLINK TRIPS			59	48	107	64	79	143
CONVERSION TO PERSON TRIPS AVO=		*1.1*	65	53	118	71	87	158
Santa Clarita Bus Mode Share								
	AM	*PM*						
Transit Trips (Residential)	*1%*	*1%*	1	5		5	2	
Transit Trips (Retail/Movie)	*1%*	*1%*	1	1		4	4	
Transit Trips (Hotel)	*1%*	*1%*	1	0		1	0	
Transit Trips (Office)	*1%*	*1%*	5	1		1	4	
TOTAL BUS TRIPS			8	6	14	10	12	21
CONVERSION TO PERSON TRIPS AVO=		*1.1*	9	7	16	11	13	24
Percentage of External Trips that use bus/rail					8.50%			7.67%
External Vehicle Trips								
External Residential Trips			101	443		424	223	
External Retail/Movie Trips			91	51		373	421	
External Hotel Trips			50	32		53	47	
External Office Trips			489	53		48	394	
TOTAL EXTERNAL TRIPS			731	580	1,311	898	1,084	1,982
Overall Internalization/Transit Mode Share Percentage (1 minus ext vehicle trips divided by gross trips)					*18.55%*			*17.77%*

Notes:

1. Average rate used for residential uses and hotel. Fitted curve regression equation used for the retail and office uses.
2. "Mid-Rise" or "High-Rise" categories for apartments and condominiums/townhomes purposefully not selected because these rates presumably include some levels of internal trip-making, walking, and/or transit use.

Source: Fehr & Peers, 2008.

Table C-1 (cont.)

Trip Generation for Vista Canyon - Daily Conditions for Interim Scenario

Land Use					Trip Generation Category (ITE unless otherwise specified)	Trip Rates	Trip Estimates
						Daily	Daily
Land Use	Land Use Definition	Gross Quantity	GLA	Unit		Total	Total
Villages PA-1 thru PA-4							
Residential	Detached SFR	96		DU	ITE 210 - SFD	9.57	919
High Density Residential	Apartment	579		DU	ITE 220 - Apart	6.65	3,850
Medium-Density Resid.	Condos/Townhomes	442		DU	ITE 230	5.81	2,568
Movie Theater	Multiplex			10 screens	ITE 445	n/a	1,500
Hotel	Hotel			200 rooms	ITE - 310	8.17	1,634
Retail	Neighborhood SC		131.00	KSF	ITE 820-SC	61.46	8,174
General Office	Office Park		646.00	KSF	ITE 750	11.05	7,140
	TOTAL	**1,117**				***Gross Trips***	***25,785***
						TOTAL GROSS TRIPS	**25,785**

During AM and PM peak hours, about 10% of gross trips are internal. Assume 10% internalization [1]

External Trips= 23,241

During AM and PM peak hours, about 8% of external trips are via bus/rail Assume 8% bus/rail

External Vehicle Trips= **21,382**

Source: Fehr & Peers, 2009.

Note;

1. This internalization percentage was selected because it is in the low end of range observed at Valencia Town Center, and slightly lower than MXD estimate.

Table C-2 (cont.)

Trip Generation for Vista Canyon - Daily Conditions for Interim Scenario (Assuming Residential Overlay (233 MF units would replace 250 ksf office)

Land Use					Trip Generation Category (ITE unless otherwise specified)	Trip Rates	Trip Estimates
						Daily	Daily
Land Use	Land Use Definition	Gross Quantity	GLA	Unit		Total	Total
Villages PA-1 thru PA-4							
Residential	Detached SFR	96		DU	ITE 210 - SFD	9.57	919
High Density Residential	Apartment	579		DU	ITE 220 - Apart	6.65	3,850
Medium-Density Resid.	Condos/Townhomes	675		DU	ITE 230	5.81	3,922
Movie Theater	Multiplex			10 screens	ITE 445	n/a	1,500
Hotel	Hotel			200 rooms	ITE - 310	8.17	1,634
Retail	Neighborhood SC		131.00	KSF	ITE 820-SC	61.46	8,174
General Office	Office Park		396.00	KSF	ITE 750	11.45	4,535
TOTAL		**1,350**				***Gross Trips***	***24,534***
						TOTAL GROSS TRIPS	**24,534**
During AM and PM peak hours, about 10% of gross trips are internal.					Assume 10% internalization [1]		
					External Trips=		22,080
During AM and PM peak hours, about 8% of external trips are via bus/rail					Assume 8% bus/rail		
					External Vehicle Trips=		**20,314**

Source: Fehr & Peers, 2009.

Note;

1. This internalization percentage was selected because it is in the low end of range observed at Valencia Town Center, and slightly lower than MXD estimate.

Trip Generation Summary

Creekside Development, Santa Clarita, CA

Land Use:

- 220 single family homes
- 144 attached courtyard homes
- 207 detached condos
- 138 attached condos

	Observed Vehicle Trips[1]			ITE Gross Trip Generation Estimate			Difference
	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
AM Peak Hour	550	186	364	425	94	331	125 / 29.4%
PM Peak Hour	490	289	201	547	352	195	-57 / -10.4%

Conclusions:

1. AM peak hour inbound trips are higher than ITE trip generation estimate likely due to parents returning home after dropping their student off at the nearby elementary school.
2. PM peak hour trips are approximately 10% lower than ITE trip generation estimates.

Notes:

[1]8% of total AM peak hour trips and 6% of total PM peak hour trips were bike/pedestrian trips.

Valencia Town Center West Development, Santa Clarita, CA

Land Use:

- 244 room hotel
- 22,740 square feet of retail
- 12,800 square feet of office
- 55,000 square foot health club
- 210 apartment units
- 341 condo units

	Observed Vehicle Trips[1]			ITE Gross Trip Generation Estimate			Difference
	Total	Inbound	Outbound	Total	Inbound	Outbound	Total
AM Peak Hour	479	262	217	504	190	314	-25 / -4.9%
PM Peak Hour	603	331	272	779	438	341	-176 / -22.6%

Conclusions:

1. The observed trips would equal the ITE trip generation estimate if an internalization percentage of 4.9% was assumed for the AM peak hour and 22.6% was assumed for the PM peak hour for the ITE calculation. However, given the significant amount of bike/ped trips, the project's actual internalization is likely in the 15-20% range, which appears reasonable given the mix of uses on-site.
2. A high number of external bike/ped trips were observed because of the close proximity of complementary land uses near the project location.

Notes:

[1]13% of total AM peak hour trips and 16% of total PM peak hour trips were bike/pedestrian trips.

Mixed Use Development (MXD) Trip Generation Model

Name of MXD	VCR	
Location	Santa Clarita	
MXD Characteristics		
Geographic		**Notes:**
Area (in acres)	105	Excludes Santa Clara River
Number of Intersections	12	Includes most internal intersections (excluding those into apartment/parking structures). This is a proxy for street connectivity and walkability.
Number of bus stops	4	
Number of rail stops	1	
Land Use		
Population	2010	Assumes 1.8 person per HH given lower household sizes in TODs
Employment	3050	Assumes 4 emps per ksf of BP, 2 emps per ksf of retail, and a combined 200 additional employees in Hotel, and Theater
Number of Dwelling Units		
Single Family	105	
Multi-Family	579	
High Rise Condo	433	
Retail Floor Space (ksf)		
General Retail other than those listed below	133	
Supermarket		
Bank		
Health Club		
Restaurant (non-fast food)		
Fast-Food Restaurant		
Gas Station		
Auto Repair		
Office Floor Space (ksf)		
Non-Medical	646	
Medical		
Industrial Floor Space (ksf)		
Manufacturing		
Warehousing		
Hotel Rooms	200	
Movie Screens	10	
School Enrollment		
Grade School	0	
High School	0	
College	0	
Misc Floor Space (ksf) not covered above	0	
Number of Daily Trips expected from misc. uses	0	
Surrounding Area		
Employment within one mile of the MXD	1000	Excludes employment within the MXD itself
Employment within a 30 minute Transit Trip	20000	Estimated based on Metrolink/City buses and non-resid land uses.
Regional Jobs / Housing Ratio	1.30	Southern California region-wide ratio per 2008 APA Planning Roundtable

Mixed Use Development (MXD) Trip Generation Model

Name of MXD		VCR	
Location		Santa Clarita	
Number of "Raw" ITE Trips		24701	Slightly different than shown in Table C-1 due to different land use ca
Predicted Probabilities:			
	Internal Capture	17%	Slightly higher than 15% daily internalization in Table B-1
	Walking External	5%	Independent Calculation of Likelihood of "Walk" as External Trip
	Transit External	5%	Independent Calculation of Likelihood of "Transit" as External Trip
Number of Trips:			
	Internal Capture	4262	
	Walking External	988	
	Transit External	986	
Net Number of External Vehicle Trips		**18464**	
Overall Trip Reduction Percentage		**25%**	The MXD model is validated to this percentage reduction

APPENDIX D:

TECHNICAL CALCULATIONS FOR 2012 & INTERIM NO PROJECT CONDITIONS

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	50	50	20	10	10	330
Peak Hour Factor	0.55	0.55	0.80	0.80	0.90	0.90
Hourly flow rate (vph)	91	91	25	12	11	367
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	257	194	378			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	194	378			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	89	98			
cM capacity (veh/h)	716	847	1181			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	182	38	378
Volume Left	91	25	0
Volume Right	91	0	367
cSH	776	1181	1700
Volume to Capacity	0.23	0.02	0.22
Queue Length 95th (ft)	23	2	0
Control Delay (s)	11.1	5.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	5.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	870	10	10	1590	5	5
Peak Hour Factor	0.85	0.85	0.90	0.90	0.40	0.40
Hourly flow rate (vph)	1024	12	11	1767	12	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1035		1641	347
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1035		1641	347
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		86	98
cM capacity (veh/h)			667		89	649

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	409	409	216	11	589	589	589	25
Volume Left	0	0	0	11	0	0	0	12
Volume Right	0	0	12	0	0	0	0	12
cSH	1700	1700	1700	667	1700	1700	1700	157
Volume to Capacity	0.24	0.24	0.13	0.02	0.35	0.35	0.35	0.16
Queue Length 95th (ft)	0	0	0	1	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	10.5	0.0	0.0	0.0	32.2
Lane LOS				B				D
Approach Delay (s)	0.0			0.1				32.2
Approach LOS								D

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4590		3433	5034		3433	3539	1546	1770	3539	1490
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4590		3433	5034		3433	3539	1546	1770	3539	1490
Volume (vph)	270	700	600	370	1250	70	370	390	140	70	600	480
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	700	600	370	1250	70	370	390	140	70	600	480
RTOR Reduction (vph)	0	119	0	0	4	0	0	0	95	0	0	265
Lane Group Flow (vph)	270	1181	0	370	1316	0	370	390	45	70	600	215
Confl. Peds. (#/hr)			49			22			8			39
Confl. Bikes (#/hr)			2			4			2			6
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	13.4	40.5		16.9	44.0		17.4	36.4	36.4	7.2	26.2	26.2
Effective Green, g (s)	12.9	42.5		16.4	46.0		16.9	38.4	38.4	6.7	28.2	28.2
Actuated g/C Ratio	0.11	0.35		0.14	0.38		0.14	0.32	0.32	0.06	0.24	0.24
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	369	1626		469	1930		483	1132	495	99	832	350
v/s Ratio Prot	0.08	c0.26		c0.11	c0.26		c0.11	0.11		0.04	c0.17	
v/s Ratio Perm									0.03			0.14
v/c Ratio	0.73	0.92dr		0.79	0.68		0.77	0.34	0.09	0.71	0.72	0.61
Uniform Delay, d1	51.9	33.7		50.1	30.9		49.6	31.2	28.6	55.7	42.3	41.0
Progression Factor	1.00	1.00		1.00	1.00		0.85	0.76	1.02	1.00	1.00	1.00
Incremental Delay, d2	6.3	2.9		7.9	2.0		6.7	0.3	0.1	17.1	3.5	4.1
Delay (s)	58.2	36.6		58.1	32.9		49.0	24.0	29.1	72.8	45.8	45.1
Level of Service	E	D		E	C		D	C	C	E	D	D
Approach Delay (s)		40.3			38.4			35.1			47.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	260	740	130	0	1610
Peak Hour Factor	0.75	0.75	0.90	0.90	0.95	0.95
Hourly flow rate (vph)	0	347	822	144	0	1695
Pedestrians	72					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	6					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.94	0.94			0.94	
vC, conflicting volume	1531	418			1039	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1436	251			911	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	48			100	
cM capacity (veh/h)	110	661			656	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	347	329	329	309	565	565	565
Volume Left	0	0	0	0	0	0	0
Volume Right	347	0	0	144	0	0	0
cSH	661	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.52	0.19	0.19	0.18	0.33	0.33	0.33
Queue Length 95th (ft)	77	0	0	0	0	0	0
Control Delay (s)	16.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.3	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑	↱	↰	↑↑↑↱		↰	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00		0.93	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00	1.00	1.00		1.00	1.00	
Frt		0.90		1.00		0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658		1770		1471	1770	4948		1770	5067	
Flt Permitted		0.98		0.68		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1635		1258		1471	1770	4948		1770	5067	
Volume (vph)	10	10	70	300	0	150	30	780	130	120	1410	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	10	70	300	0	150	30	780	130	120	1410	30
RTOR Reduction (vph)	0	51	0	0	0	109	0	17	0	0	1	0
Lane Group Flow (vph)	0	39	0	300	0	41	30	893	0	120	1439	0
Confl. Peds. (#/hr)						46			18			1
Confl. Bikes (#/hr)						1						
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		32.4		32.4		32.4	4.1	61.5		12.1	69.5	
Effective Green, g (s)		32.9		32.9		32.9	3.6	63.5		11.6	71.5	
Actuated g/C Ratio		0.27		0.27		0.27	0.03	0.53		0.10	0.60	
Clearance Time (s)		4.5		4.5		4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0		3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		448		345		403	53	2618		171	3019	
v/s Ratio Prot							0.02	0.18		c0.07	c0.28	
v/s Ratio Perm		0.02		c0.24		0.03						
v/c Ratio		0.09		0.87		0.10	0.57	0.34		0.70	0.48	
Uniform Delay, d1		32.4		41.5		32.5	57.4	16.2		52.5	13.7	
Progression Factor		1.00		1.00		1.00	1.14	0.56		0.96	1.30	
Incremental Delay, d2		0.1		20.1		0.1	7.9	0.4		7.4	0.4	
Delay (s)		32.5		61.6		32.6	73.2	9.4		57.9	18.2	
Level of Service		C		E		C	E	A		E	B	
Approach Delay (s)		32.5			52.0			11.5			21.3	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	60	30	80	70	40	5	30	60	30	5	130	90
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.90	0.90	0.90	0.75	0.75	0.75
Hourly flow rate (vph)	80	40	107	82	47	6	33	67	33	7	173	120

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	227	135	33	100	7	293
Volume Left (vph)	80	82	33	0	7	0
Volume Right (vph)	107	6	0	33	0	120
Hadj (s)	-0.18	0.13	0.53	-0.20	0.53	-0.25
Departure Headway (s)	5.1	5.6	6.5	5.7	6.2	5.4
Degree Utilization, x	0.32	0.21	0.06	0.16	0.01	0.44
Capacity (veh/h)	652	590	516	580	545	632
Control Delay (s)	10.5	10.0	8.7	8.6	8.1	11.5
Approach Delay (s)	10.5	10.0	8.6		11.4	
Approach LOS	B	B	A		B	

Intersection Summary			
Delay	10.4		
HCM Level of Service	B		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	80	160	190	50	110	230
Peak Hour Factor	0.80	0.80	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	100	200	211	56	122	256
Pedestrians		1				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	267				539	134
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267				539	134
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				72	71
cM capacity (veh/h)	1294				436	889

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	100	100	100	141	126	122	256
Volume Left	100	0	0	0	0	122	0
Volume Right	0	0	0	0	56	0	256
cSH	1294	1700	1700	1700	1700	436	889
Volume to Capacity	0.08	0.06	0.06	0.08	0.07	0.28	0.29
Queue Length 95th (ft)	6	0	0	0	0	28	30
Control Delay (s)	8.0	0.0	0.0	0.0	0.0	16.4	10.7
Lane LOS	A					C	B
Approach Delay (s)	2.7			0.0		12.5	
Approach LOS						B	

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Volume (vph)	160	830	350	180	610	70	220	340	100	230	1240	520
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	830	350	180	610	70	220	340	100	230	1240	520
RTOR Reduction (vph)	0	0	183	0	0	50	0	0	59	0	0	271
Lane Group Flow (vph)	160	830	167	180	610	20	220	340	41	230	1240	249
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.3	30.7	30.7	9.8	32.2	32.2	11.4	46.7	46.7	12.8	48.1	48.1
Effective Green, g (s)	8.3	32.7	32.7	9.8	34.2	34.2	11.4	48.7	48.7	12.8	50.1	50.1
Actuated g/C Ratio	0.07	0.27	0.27	0.08	0.29	0.29	0.10	0.41	0.41	0.11	0.42	0.42
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	237	1386	431	280	1449	451	326	2064	642	366	2123	1164
v/s Ratio Prot	0.05	c0.16		c0.05	0.12		0.06	0.07		c0.07	c0.24	
v/s Ratio Perm			0.11			0.01			0.03			0.09
v/c Ratio	0.68	0.60	0.39	0.64	0.42	0.04	0.67	0.16	0.06	0.63	0.58	0.21
Uniform Delay, d1	54.5	37.9	35.5	53.4	34.9	31.1	52.5	22.7	21.7	51.3	26.9	22.4
Progression Factor	1.09	0.95	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.15	0.63	0.33
Incremental Delay, d2	5.7	0.9	1.0	3.8	0.3	0.1	4.3	0.2	0.2	2.2	1.1	0.4
Delay (s)	65.0	37.1	29.4	57.2	35.2	31.1	56.8	22.9	21.9	61.0	18.0	7.8
Level of Service	E	D	C	E	D	C	E	C	C	E	B	A
Approach Delay (s)		38.4			39.5			34.0			20.3	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.21	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	396	5085	5085	1583	1770	1583
Volume (vph)	40	1240	1170	90	40	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	1240	1170	90	40	10
RTOR Reduction (vph)	0	0	0	18	0	9
Lane Group Flow (vph)	40	1240	1170	72	40	1
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	101.2	101.2	94.2	94.2	8.3	8.3
Effective Green, g (s)	103.2	103.2	96.2	96.2	8.8	8.8
Actuated g/C Ratio	0.86	0.86	0.80	0.80	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	375	4373	4076	1269	130	116
v/s Ratio Prot	0.00	c0.24	0.23		c0.02	
v/s Ratio Perm	0.09			0.05		0.00
v/c Ratio	0.11	0.28	0.29	0.06	0.31	0.01
Uniform Delay, d1	1.5	1.6	3.1	2.5	52.7	51.5
Progression Factor	1.00	1.00	1.48	2.13	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.1	0.5	0.0
Delay (s)	1.5	1.7	4.7	5.3	53.2	51.6
Level of Service	A	A	A	A	D	D
Approach Delay (s)		1.7	4.8		52.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	4.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.43	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1544	3539
Volume (vph)	800	380	180	670	610	420
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	800	380	180	670	610	420
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	800	380	180	670	610	420
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	21.2	52.9	8.1	52.9	23.7	23.7
Effective Green, g (s)	21.2	52.9	8.1	52.9	23.7	23.7
Actuated g/C Ratio	0.40	1.00	0.15	1.00	0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1376	1583	542	1583	1106	1586
v/s Ratio Prot	c0.23		0.05		c0.12	0.12
v/s Ratio Perm		0.24		0.42	c0.13	
v/c Ratio	0.58	0.24	0.33	0.42	0.55	0.26
Uniform Delay, d1	12.4	0.0	20.0	0.0	10.0	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.4	0.6	0.8	0.3	0.2
Delay (s)	13.2	0.4	20.6	0.8	10.3	9.3
Level of Service	B	A	C	A	B	A
Approach Delay (s)	9.1		5.0			9.9
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	52.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4901		3433	5085	1554	3433	3539	1558	3433	3539	1551
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4901		3433	5085	1554	3433	3539	1558	3433	3539	1551
Volume (vph)	170	700	190	270	1470	380	210	370	110	490	610	460
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	700	190	270	1470	380	210	370	110	490	610	460
RTOR Reduction (vph)	0	38	0	0	0	45	0	0	41	0	0	107
Lane Group Flow (vph)	170	852	0	270	1470	335	210	370	69	490	610	353
Confl. Peds. (#/hr)			6			11			7			6
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	10.3	46.6		12.1	48.4	66.9	10.9	22.8	34.9	18.5	30.4	30.4
Effective Green, g (s)	10.3	48.6		12.1	50.4	68.9	10.9	24.8	36.9	18.5	32.4	32.4
Actuated g/C Ratio	0.09	0.40		0.10	0.42	0.57	0.09	0.21	0.31	0.15	0.27	0.27
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	295	1985		346	2136	892	312	731	531	529	956	419
v/s Ratio Prot	c0.05	0.17		c0.08	c0.29	0.06	c0.06	0.10	0.01	c0.14	0.17	
v/s Ratio Perm						0.16			0.03			c0.23
v/c Ratio	0.58	0.43		0.78	0.69	0.38	0.67	0.51	0.13	0.93	0.64	0.84
Uniform Delay, d1	52.8	25.7		52.7	28.4	13.9	52.8	42.2	30.0	50.1	38.6	41.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.0	0.7		10.1	1.8	0.1	4.5	1.0	0.0	22.0	1.8	15.2
Delay (s)	60.7	26.4		62.7	30.2	14.0	57.3	43.1	30.0	72.1	40.4	56.6
Level of Service	E	C		E	C	B	E	D	C	E	D	E
Approach Delay (s)		31.9			31.5			45.3			55.1	
Approach LOS		C			C			D			E	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5056		4990	4806	1362	1770	5085	1575	4990	4682	1350
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5056		4990	4806	1362	1770	5085	1575	4990	4682	1350
Volume (vph)	270	500	20	280	1300	480	20	520	260	650	1250	970
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	500	20	280	1300	480	20	520	260	650	1250	970
RTOR Reduction (vph)	0	3	0	0	0	49	0	0	14	0	15	106
Lane Group Flow (vph)	270	517	0	280	1300	431	20	520	246	650	1470	629
Confl. Peds. (#/hr)									3			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	22.3	20.1		46.3	44.1	70.3	3.6	21.8	68.1	26.2	44.4	66.7
Effective Green, g (s)	23.3	22.1		47.3	46.1	73.3	4.6	23.8	71.1	27.2	46.4	69.7
Actuated g/C Ratio	0.17	0.16		0.35	0.34	0.54	0.03	0.17	0.52	0.20	0.34	0.51
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	852	819		1730	1624	732	60	887	867	995	1593	729
v/s Ratio Prot	0.05	0.10		0.06	c0.27	0.12	0.01	c0.10	0.10	0.13	c0.31	c0.15
v/s Ratio Perm						0.20			0.06			0.32
v/c Ratio	0.32	0.63		0.16	0.80	0.59	0.33	0.59	0.28	0.65	0.92	0.86
Uniform Delay, d1	49.6	53.4		30.8	41.0	21.4	64.4	51.8	18.3	50.3	43.3	29.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.7		0.0	3.3	0.8	1.2	1.4	0.1	1.2	9.6	10.0
Delay (s)	49.7	55.0		30.8	44.2	22.1	65.6	53.1	18.4	51.4	52.9	39.2
Level of Service	D	E		C	D	C	E	D	B	D	D	D
Approach Delay (s)		53.2			37.3			42.2			49.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	136.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.92		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3400		1770	3245		1770	3380		1770	3511	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3400		1770	3245		1770	3380		1770	3511	
Volume (vph)	10	280	100	140	210	260	20	210	90	170	1630	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	295	105	165	247	306	21	221	95	179	1716	95
RTOR Reduction (vph)	0	33	0	0	213	0	0	40	0	0	3	0
Lane Group Flow (vph)	11	367	0	165	340	0	21	276	0	179	1808	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	14.3	14.3		14.9	14.9		1.4	41.5		14.5	54.6	
Effective Green, g (s)	14.3	14.3		14.9	14.9		1.4	41.5		14.5	54.6	
Actuated g/C Ratio	0.14	0.14		0.15	0.15		0.01	0.41		0.14	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	480		261	478		24	1386		254	1894	
v/s Ratio Prot	0.01	c0.11		0.09	c0.10		0.01	0.08		c0.10	c0.51	
v/s Ratio Perm												
v/c Ratio	0.04	0.77		0.63	0.71		0.88	0.20		0.70	0.95	
Uniform Delay, d1	37.5	41.8		40.6	41.1		49.8	19.2		41.3	22.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	7.1		4.9	4.9		127.4	0.1		8.6	11.7	
Delay (s)	37.6	49.0		45.5	46.0		177.2	19.2		49.9	33.8	
Level of Service	D	D		D	D		F	B		D	C	
Approach Delay (s)		48.7			45.9			29.1			35.2	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	101.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	210	10	410	70	790	1680
Peak Hour Factor	0.70	0.70	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	300	14	456	78	878	1867
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked						
vC, conflicting volume	3183	267			533	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3183	267			533	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			15	
cM capacity (veh/h)	1	731			1030	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	300	14	304	230	878	933	933
Volume Left	300	0	0	0	878	0	0
Volume Right	0	14	0	78	0	0	0
cSH	1	731	1700	1700	1030	1700	1700
Volume to Capacity	257.28	0.02	0.18	0.14	0.85	0.55	0.55
Queue Length 95th (ft)	Err	1	0	0	274	0	0
Control Delay (s)	Err	10.0	0.0	0.0	24.7	0.0	0.0
Lane LOS	F	B			C		
Approach Delay (s)	9545.0		0.0		7.9		
Approach LOS	F						

Intersection Summary			
Average Delay	841.2		
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↱			↰	↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	120	170	0	330	10	270	0	50	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	133	189	0	367	11	300	0	56	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	378			133			317	511	67	467	506	189
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378			133			317	511	67	467	506	189
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			51	100	94	100	100	100
cM capacity (veh/h)	1177			1449			613	464	983	452	468	821

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	67	67	189	244	133	356
Volume Left	0	0	0	0	0	300
Volume Right	0	0	189	0	11	56
cSH	1700	1700	1700	1700	1700	726
Volume to Capacity	0.04	0.04	0.11	0.14	0.08	0.49
Queue Length 95th (ft)	0	0	0	0	0	68
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.2
Lane LOS						C
Approach Delay (s)	0.0			0.0		15.2
Approach LOS						C

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	240	10	50	30	10	50
Peak Hour Factor	0.90	0.90	0.75	0.75	0.80	0.80
Hourly flow rate (vph)	267	11	67	40	12	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	217	44	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217	44	75			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	99	96			
cM capacity (veh/h)	737	1026	1524			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	278	107	75
Volume Left	267	67	0
Volume Right	11	0	62
cSH	746	1524	1700
Volume to Capacity	0.37	0.04	0.04
Queue Length 95th (ft)	43	3	0
Control Delay (s)	12.7	4.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	4.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1380	5	5	830	10	10
Peak Hour Factor	0.95	0.95	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	1453	5	6	922	20	20
Pedestrians				1	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1459		1775	489
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1459		1775	489
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		73	96
cM capacity (veh/h)			459		73	524

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	581	581	296	6	307	307	307	40
Volume Left	0	0	0	6	0	0	0	20
Volume Right	0	0	5	0	0	0	0	20
cSH	1700	1700	1700	459	1700	1700	1700	128
Volume to Capacity	0.34	0.34	0.17	0.01	0.18	0.18	0.18	0.31
Queue Length 95th (ft)	0	0	0	1	0	0	0	31
Control Delay (s)	0.0	0.0	0.0	12.9	0.0	0.0	0.0	45.4
Lane LOS				B				E
Approach Delay (s)	0.0			0.1				45.4
Approach LOS								E

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4617		3433	4964		3433	3539	1520	1770	3539	1473
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4617		3433	4964		3433	3539	1520	1770	3539	1473
Volume (vph)	620	1010	620	210	570	90	630	590	370	170	570	400
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	1010	620	210	570	90	630	590	370	170	570	400
RTOR Reduction (vph)	0	68	0	0	17	0	0	0	278	0	0	310
Lane Group Flow (vph)	620	1562	0	210	643	0	630	590	92	170	570	90
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	37.4	54.6		12.1	29.3		29.8	30.7	30.7	15.6	16.5	16.5
Effective Green, g (s)	36.9	56.6		11.6	31.3		29.3	32.7	32.7	15.1	18.5	18.5
Actuated g/C Ratio	0.28	0.43		0.09	0.24		0.22	0.25	0.25	0.11	0.14	0.14
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	960	1980		302	1177		762	877	377	202	496	206
v/s Ratio Prot	0.18	c0.34		c0.06	0.13		c0.18	c0.17		0.10	c0.16	
v/s Ratio Perm									0.06			0.06
v/c Ratio	0.65	0.91dr		0.70	0.55		0.83	0.67	0.24	0.84	1.15	0.43
Uniform Delay, d1	41.8	32.5		58.5	44.1		48.9	44.8	39.7	57.3	56.8	52.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	3.3		5.5	1.8		7.2	2.4	0.6	25.0	88.4	2.5
Delay (s)	45.2	35.8		64.0	46.0		56.1	47.2	40.3	82.2	145.1	54.5
Level of Service	D	D		E	D		E	D	D	F	F	D
Approach Delay (s)		38.4			50.3			49.1			103.9	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	55.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.1%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	190	1410	330	0	1350
Peak Hour Factor	0.85	0.85	1.00	1.00	0.95	0.95
Hourly flow rate (vph)	0	224	1410	330	0	1421
Pedestrians	32					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	2081	667			1772	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1830	31			1437	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	72			100	
cM capacity (veh/h)	52	793			358	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	224	564	564	612	474	474	474
Volume Left	0	0	0	0	0	0	0
Volume Right	224	0	0	330	0	0	0
cSH	793	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.28	0.33	0.33	0.36	0.28	0.28	0.28
Queue Length 95th (ft)	29	0	0	0	0	0	0
Control Delay (s)	11.3	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.3	0.0			0.0		
Approach LOS	B						

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.92		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695		1770	1863	1539	1770	4975		1770	5042	
Flt Permitted		0.93		0.70	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1602		1299	1863	1539	1770	4975		1770	5042	
Volume (vph)	20	10	40	190	10	120	60	1680	230	160	960	50
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	10	40	190	10	120	60	1680	230	160	960	50
RTOR Reduction (vph)	0	33	0	0	0	98	0	12	0	0	3	0
Lane Group Flow (vph)	0	37	0	190	10	22	60	1898	0	160	1007	0
Confl. Peds. (#/hr)						11			11			1
Confl. Bikes (#/hr)						2			5			
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		21.4		21.4	21.4	21.4	6.6	70.6		14.0	78.0	
Effective Green, g (s)		21.9		21.9	21.9	21.9	6.1	72.6		13.5	80.0	
Actuated g/C Ratio		0.18		0.18	0.18	0.18	0.05	0.60		0.11	0.67	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		292		237	340	281	90	3010		199	3361	
v/s Ratio Prot					0.01		0.03	c0.38		c0.09	0.20	
v/s Ratio Perm		0.02		c0.15		0.01						
v/c Ratio		0.13		0.80	0.03	0.08	0.67	0.63		0.80	0.30	
Uniform Delay, d1		41.1		47.0	40.3	40.7	56.0	15.1		52.0	8.3	
Progression Factor		1.00		1.00	1.00	1.00	0.90	1.40		1.00	1.00	
Incremental Delay, d2		0.2		17.5	0.0	0.1	13.0	1.0		19.5	0.2	
Delay (s)		41.3		64.4	40.4	40.8	63.3	22.2		71.4	8.6	
Level of Service		D		E	D	D	E	C		E	A	
Approach Delay (s)		41.3			54.8			23.5			17.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	80	50	40	30	40	10	40	90	70	10	70	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	89	56	44	33	44	11	47	106	82	12	82	59

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	189	89	47	188	12	141
Volume Left (vph)	89	33	47	0	12	0
Volume Right (vph)	44	11	0	82	0	59
Hadj (s)	-0.01	0.03	0.53	-0.27	0.53	-0.26
Departure Headway (s)	5.0	5.2	6.0	5.1	6.0	5.2
Degree Utilization, x	0.26	0.13	0.08	0.27	0.02	0.21
Capacity (veh/h)	673	634	575	664	558	644
Control Delay (s)	9.7	8.9	8.3	8.8	8.0	8.4
Approach Delay (s)	9.7	8.9	8.7		8.4	
Approach LOS	A	A	A		A	

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	170	210	170	90	60	110
Peak Hour Factor	0.95	0.95	0.85	0.85	0.80	0.80
Hourly flow rate (vph)	179	221	200	106	75	138
Pedestrians			3			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	306				724	153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306				724	153
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				76	84
cM capacity (veh/h)	1252				308	866

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	179	111	111	133	173	212
Volume Left	179	0	0	0	0	75
Volume Right	0	0	0	0	106	138
cSH	1252	1700	1700	1700	1700	528
Volume to Capacity	0.14	0.07	0.07	0.08	0.10	0.40
Queue Length 95th (ft)	12	0	0	0	0	48
Control Delay (s)	8.4	0.0	0.0	0.0	0.0	16.3
Lane LOS	A					C
Approach Delay (s)	3.7			0.0		16.3
Approach LOS						C

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Volume (vph)	210	840	160	190	720	140	590	1010	320	180	520	700
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	210	840	160	190	720	140	590	1010	320	180	520	700
RTOR Reduction (vph)	0	0	118	0	0	102	0	0	110	0	0	213
Lane Group Flow (vph)	210	840	42	190	720	38	590	1010	210	180	520	487
Confl. Peds. (#/hr)			2			2			5			2
Confl. Bikes (#/hr)			2						1			1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.9	29.4	29.4	9.7	30.2	30.2	22.5	51.4	51.4	9.5	38.4	38.4
Effective Green, g (s)	8.9	31.4	31.4	9.7	32.2	32.2	22.5	53.4	53.4	9.5	40.4	40.4
Actuated g/C Ratio	0.07	0.26	0.26	0.08	0.27	0.27	0.19	0.44	0.44	0.08	0.34	0.34
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	255	1331	408	278	1364	419	644	2263	692	272	1712	924
v/s Ratio Prot	c0.06	c0.17		0.06	0.14		c0.17	0.20		0.05	0.10	
v/s Ratio Perm			0.03			0.02			0.14			c0.18
v/c Ratio	0.82	0.63	0.10	0.68	0.53	0.09	0.92	0.45	0.30	0.66	0.30	0.53
Uniform Delay, d1	54.8	39.2	33.6	53.7	37.4	32.9	47.8	23.1	21.4	53.7	29.4	32.1
Progression Factor	1.20	0.97	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.85	0.71
Incremental Delay, d2	17.5	1.2	0.2	5.4	0.6	0.2	17.5	0.6	1.1	4.5	0.4	2.1
Delay (s)	83.5	39.2	22.7	59.1	38.0	33.1	65.3	23.7	22.5	60.4	25.4	24.9
Level of Service	F	D	C	E	D	C	E	C	C	E	C	C
Approach Delay (s)		44.7			41.2			36.3			29.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.08	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	142	5085	5085	1583	1770	1583
Volume (vph)	10	1040	1680	50	130	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	1040	1680	50	130	70
RTOR Reduction (vph)	0	0	0	23	0	45
Lane Group Flow (vph)	10	1040	1680	27	130	25
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	66.3	66.3	61.9	61.9	43.2	43.2
Effective Green, g (s)	68.3	68.3	63.9	63.9	43.7	43.7
Actuated g/C Ratio	0.57	0.57	0.53	0.53	0.36	0.36
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	86	2894	2708	843	645	576
v/s Ratio Prot	0.00	c0.20	c0.33		c0.07	
v/s Ratio Perm	0.07			0.02		0.02
v/c Ratio	0.12	0.36	0.62	0.03	0.20	0.04
Uniform Delay, d1	14.9	14.0	19.6	13.3	26.2	24.7
Progression Factor	1.00	1.00	1.04	1.55	1.00	1.00
Incremental Delay, d2	0.4	0.3	0.8	0.1	0.7	0.1
Delay (s)	15.3	14.3	21.2	20.7	26.9	24.8
Level of Service	B	B	C	C	C	C
Approach Delay (s)		14.4	21.2		26.2	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1461	3539
Volume (vph)	580	1170	250	600	450	200
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	580	1170	250	600	450	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	580	1170	250	600	450	200
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	16.1	45.2	8.4	45.2	21.1	21.1
Effective Green, g (s)	16.1	45.2	8.4	45.2	21.1	21.1
Actuated g/C Ratio	0.36	1.00	0.19	1.00	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1223	1583	658	1583	1062	1652
v/s Ratio Prot	0.17		0.07		0.08	0.06
v/s Ratio Perm		c0.74		0.38	0.12	
v/c Ratio	0.47	0.74	0.38	0.38	0.42	0.12
Uniform Delay, d1	11.3	0.0	16.1	0.0	7.6	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.1	0.6	0.7	0.1	0.1
Delay (s)	11.8	3.1	16.8	0.7	7.7	6.9
Level of Service	B	A	B	A	A	A
Approach Delay (s)	6.0		5.4			7.5
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	45.2	Sum of lost time (s)	0.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4984		3433	5085	1542	3433	3539	1515	3433	3539	1527
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4984		3433	5085	1542	3433	3539	1515	3433	3539	1527
Volume (vph)	490	1540	180	180	860	470	280	700	140	500	450	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	490	1540	180	180	860	470	280	700	140	500	450	190
RTOR Reduction (vph)	0	10	0	0	0	13	0	0	6	0	0	152
Lane Group Flow (vph)	490	1710	0	180	860	457	280	700	134	500	450	38
Confl. Peds. (#/hr)			18			23			27			13
Confl. Bikes (#/hr)			3			2			2			3
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	28.3	48.1		10.7	30.5	52.0	29.1	31.7	42.4	21.5	24.1	24.1
Effective Green, g (s)	28.3	50.1		10.7	32.5	54.0	29.1	33.7	44.4	21.5	26.1	26.1
Actuated g/C Ratio	0.21	0.38		0.08	0.25	0.41	0.22	0.26	0.34	0.16	0.20	0.20
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	736	1892		278	1252	631	757	904	556	559	700	302
v/s Ratio Prot	0.14	c0.34		0.05	0.17	c0.12	0.08	c0.20	0.02	c0.15	c0.13	
v/s Ratio Perm						0.18			0.07			0.02
v/c Ratio	0.67	0.90		0.65	0.69	0.72	0.37	0.77	0.24	0.89	0.64	0.12
Uniform Delay, d1	47.5	38.7		58.8	45.1	32.7	43.7	45.6	31.6	54.1	48.7	43.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	7.6		3.9	1.9	3.5	0.1	4.7	0.1	16.3	2.5	0.3
Delay (s)	52.2	46.3		62.7	47.0	36.2	43.8	50.3	31.7	70.4	51.2	43.9
Level of Service	D	D		E	D	D	D	D	C	E	D	D
Approach Delay (s)		47.6			45.5			46.4			58.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5079		4990	4806	1343	1770	5085	1547	4990	4806	1362
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5079		4990	4806	1343	1770	5085	1547	4990	4806	1362
Volume (vph)	1120	1350	10	210	1050	430	20	1300	280	920	1360	680
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1120	1350	10	210	1050	430	20	1300	280	920	1360	680
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	1	0	0	104
Lane Group Flow (vph)	1120	1359	0	210	1050	429	20	1300	279	920	1360	576
Confl. Peds. (#/hr)			9			10			12			
Confl. Bikes (#/hr)						1			2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.0	53.0		12.4	35.4	67.2	4.1	40.0	52.4	31.8	67.7	97.7
Effective Green, g (s)	31.0	55.0		13.4	37.4	70.2	5.1	42.0	55.4	32.8	69.7	100.7
Actuated g/C Ratio	0.19	0.35		0.08	0.23	0.44	0.03	0.26	0.35	0.21	0.44	0.63
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	972	1755		420	1129	626	57	1342	538	1028	2104	862
v/s Ratio Prot	c0.22	0.27		0.04	c0.22	0.14	0.01	c0.26	0.04	c0.18	0.28	0.13
v/s Ratio Perm						0.18			0.14			0.29
v/c Ratio	1.15	0.77		0.50	0.93	0.69	0.35	0.97	0.52	0.89	0.65	0.67
Uniform Delay, d1	64.1	46.6		69.7	59.6	35.7	75.4	58.0	41.3	61.5	35.1	18.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.5	2.3		0.3	13.6	2.5	1.4	17.6	0.4	9.9	0.9	1.5
Delay (s)	144.6	48.8		70.0	73.2	38.2	76.8	75.5	41.6	71.4	35.9	20.1
Level of Service	F	D		E	E	D	E	E	D	E	D	C
Approach Delay (s)		92.1			63.9			69.6			43.3	
Approach LOS		F			E			E			D	

Intersection Summary

HCM Average Control Delay	66.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	159.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.7%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3433		1770	3382		1770	3429		1770	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3433		1770	3382		1770	3429		1770	3518	
Volume (vph)	20	280	70	20	260	110	80	1340	350	40	490	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	311	78	24	306	129	84	1411	368	42	516	21
RTOR Reduction (vph)	0	21	0	0	44	0	0	20	0	0	3	0
Lane Group Flow (vph)	22	368	0	24	391	0	84	1759	0	42	534	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	14.6	14.6		16.5	16.5		7.9	54.4		3.1	49.6	
Effective Green, g (s)	14.6	14.6		16.5	16.5		7.9	54.4		3.1	49.6	
Actuated g/C Ratio	0.14	0.14		0.16	0.16		0.08	0.52		0.03	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	479		279	533		134	1783		52	1668	
v/s Ratio Prot	0.01	c0.11		0.01	c0.12		c0.05	c0.51		0.02	0.15	
v/s Ratio Perm												
v/c Ratio	0.09	0.77		0.09	0.73		0.63	0.99		0.81	0.32	
Uniform Delay, d1	39.2	43.4		37.6	42.0		46.9	24.7		50.5	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	7.3		0.1	5.2		8.8	18.0		58.8	0.1	
Delay (s)	39.4	50.7		37.7	47.2		55.8	42.7		109.3	17.2	
Level of Service	D	D		D	D		E	D		F	B	
Approach Delay (s)		50.1			46.7			43.3			23.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	104.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	70	10	1440	30	200	480
Peak Hour Factor	0.50	0.50	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	140	20	1516	32	211	505
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked	0.55	0.55			0.55	
vC, conflicting volume	2205	774			1547	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2377	0			1170	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	97			35	
cM capacity (veh/h)	5	591			323	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	140	20	1011	537	211	253	253
Volume Left	140	0	0	0	211	0	0
Volume Right	0	20	0	32	0	0	0
cSH	5	591	1700	1700	323	1700	1700
Volume to Capacity	25.56	0.03	0.59	0.32	0.65	0.15	0.15
Queue Length 95th (ft)	Err	3	0	0	107	0	0
Control Delay (s)	Err	11.3	0.0	0.0	34.7	0.0	0.0
Lane LOS	F	B			D		
Approach Delay (s)	8750.5		0.0		10.2		
Approach LOS	F						

Intersection Summary			
Average Delay	580.8		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑↱			↰	↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	220	200	0	60	10	340	0	110	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	244	222	0	71	12	378	0	122	0	0	0
Pedestrians								1				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	82			245			281	328	123	321	322	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	82			245			281	328	123	321	322	41
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			42	100	86	100	100	100
cM capacity (veh/h)	1513			1317			649	589	904	526	594	1021

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	122	122	222	47	35	378	122
Volume Left	0	0	0	0	0	378	0
Volume Right	0	0	222	0	12	0	122
cSH	1700	1700	1700	1700	1700	649	904
Volume to Capacity	0.07	0.07	0.13	0.03	0.02	0.58	0.14
Queue Length 95th (ft)	0	0	0	0	0	94	12
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	18.0	9.6
Lane LOS						C	A
Approach Delay (s)	0.0			0.0		15.9	
Approach LOS						C	

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 No Project Conditions **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	270	269	100	19	46.9	D	--
	T	130	150	115	12	45.0	D	--
	R	350	341	97	17	10.5	B	--
	Subtotal	**750**	**761**	**101**	--	**30.2**	**C**	--
SB	L	140	142	101	15	51.8	D	--
	T	130	138	106	9	49.0	D	--
	R	140	138	99	9	19.9	B	--
	Subtotal	**410**	**418**	**102**	--	**40.3**	**D**	--
EB	L	70	68	97	9	65.0	E	--
	T	560	547	98	22	42.9	D	--
	R	290	288	99	28	15.6	B	--
	Subtotal	**920**	**903**	**98**	--	**35.8**	**D**	--
WB	L	230	222	97	22	60.6	E	--
	T	1040	1050	101	24	26.7	C	--
	R	150	140	93	11	4.7	A	--
	Subtotal	**1420**	**1412**	**99**	--	**28.8**	**C**	--
	Total	**3500**	**3493**	**100**	--	**32.7**	**C**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	520	483	93	35	183.8	F	--
	R	30	28	93	5	159.1	F	--
	Subtotal	**550**	**511**	**93**	--	**182.5**	**F**	--
EB	T	530	574	108	26	8.4	A	--
	R	510	501	98	14	3.3	A	--
	Subtotal	**1040**	**1075**	**103**	--	**6.0**	**A**	--
WB	L	360	347	96	17	65.0	E	--
	T	900	889	99	28	23.2	C	--
	Subtotal	**1260**	**1236**	**98**	--	**34.9**	**C**	--
	Total	**2850**	**2822**	**99**	--	**50.6**	**D**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2012 No Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	490	542	111	16	12.8	B	--
	R	150	149	99	9	5.3	A	--
	Subtotal	**640**	**691**	**108**	**--**	**11.2**	**B**	**--**
SB	L	170	167	98	11	41.4	D	--
	T	470	509	108	20	7.7	A	--
	Subtotal	**640**	**676**	**106**	**--**	**16.1**	**B**	**--**
EB	L	220	214	97	15	19.7	B	--
	R	200	198	99	13	4.0	A	--
	Subtotal	**420**	**412**	**98**	**--**	**12.2**	**B**	**--**
	Total	**1700**	**1779**	**105**	**--**	**13.3**	**B**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	90	88	98	9	138.1	F	--
	T	370	357	96	14	131.4	F	--
	R	5	5	100	2	128.1	F	--
	Subtotal	**465**	**450**	**97**	**--**	**132.7**	**F**	**--**
SB	L	20	19	95	7	40.2	E	--
	T	330	331	100	16	37.1	E	--
	R	380	378	99	20	26.9	D	--
	Subtotal	**730**	**729**	**100**	**--**	**31.9**	**D**	**--**
EB	L	310	313	101	14	99.2	F	--
	T	5	6	120	2	100.7	F	--
	R	60	58	97	5	95.0	F	--
	Subtotal	**375**	**377**	**101**	**--**	**98.6**	**F**	**--**
WB	L	5	4	80	2	7.8	A	--
	T	10	9	90	3	11.3	B	--
	R	20	20	100	4	7.4	A	--
	Subtotal	**35**	**34**	**97**	**--**	**8.5**	**A**	**--**
	Total	**1605**	**1589**	**99**	**--**	**75.7**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2012 No Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	240	225	93	12	63.1	E	--
	T	600	615	102	36	4.1	A	--
	Subtotal	**840**	**839**	**100**	**--**	**19.9**	**B**	**--**
SB	T	490	498	102	14	13.4	B	--
	R	860	855	99	21	9.8	A	--
	Subtotal	**1350**	**1352**	**100**	**--**	**11.1**	**B**	**--**
WB	L	70	70	100	7	44.7	D	--
	T	5	5	100	2	39.6	D	--
	R	310	308	99	12	11.3	B	--
	Subtotal	**385**	**383**	**99**	**--**	**17.7**	**B**	**--**
	Total	**2575**	**2574**	**100**	**--**	**15.0**	**B**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	580	609	105	29	17.9	B	--
	R	100	103	103	12	5.4	A	--
	Subtotal	**680**	**712**	**105**	**--**	**16.1**	**B**	**--**
SB	L	220	226	103	15	39.4	D	--
	T	340	352	104	16	15.7	B	--
	Subtotal	**560**	**578**	**103**	**--**	**25.0**	**C**	**--**
EB	L	260	269	103	23	26.7	C	--
	R	140	138	99	14	22.2	C	--
	Subtotal	**400**	**407**	**102**	**--**	**25.1**	**C**	**--**
	Total	**1640**	**1697**	**103**	**--**	**21.3**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 No Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	310	305	98	18	46.6	D	--
	T	170	380	224	16	24.6	C	--
	R	610	611	100	17	21.1	C	--
	Subtotal	**1090**	**1295**	**119**	--	**28.1**	**C**	--
SB	L	140	142	101	7	49.5	D	--
	T	120	118	98	11	42.9	D	--
	R	80	82	103	9	12.2	B	--
	Subtotal	**340**	**342**	**101**	--	**38.3**	**D**	--
EB	L	120	117	98	6	68.5	E	--
	T	840	844	100	25	61.1	E	--
	R	370	374	101	11	27.8	C	--
	Subtotal	**1330**	**1335**	**100**	--	**52.4**	**D**	--
WB	L	180	176	98	11	66.9	E	--
	T	500	518	104	24	17.6	B	--
	R	110	108	98	9	3.3	A	--
	Subtotal	**790**	**802**	**102**	--	**26.5**	**C**	--
	Total	**3550**	**3774**	**106**	--	**37.3**	**D**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	340	334	98	23	60.5	E	--
	R	70	73	104	7	40.2	D	--
	Subtotal	**410**	**407**	**99**	--	**56.9**	**E**	--
EB	T	1140	1143	100	31	5.3	A	--
	R	470	471	100	17	2.8	A	--
	Subtotal	**1610**	**1614**	**100**	--	**4.6**	**A**	--
WB	L	230	190	83	10	440.8	F	--
	T	450	442	98	25	26.7	C	--
	Subtotal	**680**	**632**	**93**	--	**151.1**	**F**	--
	Total	**2700**	**2653**	**98**	--	**47.5**	**D**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2012 No Project Conditions	**PHF:**	1
TOD:	PM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	480	483	101	22	23.9	C	--
	R	360	371	103	20	9.1	A	--
	Subtotal	**840**	**854**	**102**	**--**	**17.5**	**B**	**--**
SB	L	240	234	98	11	54.2	D	--
	T	390	435	112	16	11.5	B	--
	Subtotal	**630**	**668**	**106**	**--**	**26.4**	**C**	**--**
EB	L	810	816	101	27	26.8	C	--
	R	390	389	100	26	7.2	A	--
	Subtotal	**1200**	**1205**	**100**	**--**	**20.6**	**C**	**--**
	Total	**2670**	**2728**	**102**	**--**	**21.0**	**C**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	5	3	60	1	21.8	C	--
	T	620	625	101	23	27.4	D	--
	R	10	12	120	3	25.6	D	--
	Subtotal	**635**	**640**	**101**	**--**	**27.3**	**D**	**--**
SB	L	30	27	90	6	17.5	C	--
	T	490	725	148	33	13.3	B	--
	R	30	29	97	4	11.2	B	--
	Subtotal	**550**	**780**	**142**	**--**	**13.3**	**B**	**--**
EB	L	40	41	103	7	6.7	A	--
	T	5	7	140	2	8.3	A	--
	R	5	5	100	2	4.2	A	--
	Subtotal	**50**	**53**	**106**	**--**	**6.7**	**A**	**--**
WB	L	5	5	100	2	7.3	A	--
	T	5	6	120	2	9.0	A	--
	R	40	44	110	6	5.8	A	--
	Subtotal	**50**	**54**	**108**	**--**	**6.2**	**A**	**--**
	Total	**1285**	**1527**	**119**	**--**	**18.7**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 No Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

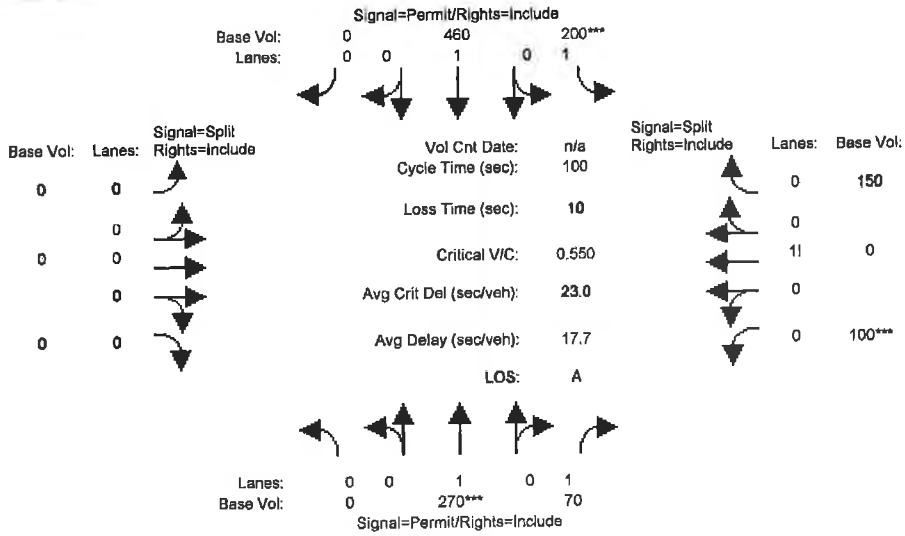
Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	130	125	96	10	49.8	D	--
	T	900	915	102	27	6.7	A	--
	Subtotal	**1030**	1040	**101**	--	**11.9**	**B**	--
SB	T	830	836	101	28	30.8	C	--
	R	560	560	100	29	7.6	A	--
	Subtotal	**1390**	**1397**	**101**	--	**21.5**	**C**	--
WB	L	110	109	99	14	40.1	D	--
	T	10	9	90	4	42.6	D	--
	R	300	296	99	14	13.0	B	--
	Subtotal	**420**	414	99	--	**20.8**	**C**	--
	Total	**2840**	**2851**	100	--	**17.9**	**B**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	390	391	100	27	28.8	C	--
	R	110	107	97	15	11.4	B	--
	Subtotal	**500**	**498**	**100**	--	**25.1**	**C**	--
SB	L	510	509	100	28	38.2	D	--
	T	430	435	101	16	12.7	B	--
	Subtotal	**940**	**944**	**100**	--	**26.5**	**C**	--
EB	L	640	645	101	11	29.5	C	--
	R	270	274	101	14	23.0	C	--
	Subtotal	**910**	**919**	**101**	--	**27.6**	**C**	--
	Total	**2350**	**2361**	**100**	--	**26.6**	**C**	--

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
2012 No Project AM

Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	270	70	200	460	0	0	0	0	100	0	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	270	70	200	460	0	0	0	0	100	0	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	270	70	200	460	0	0	0	0	100	0	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	270	70	200	460	0	0	0	0	100	0	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	270	70	200	460	0	0	0	0	100	0	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.40	0.00	0.60
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	640	0	960
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.04	0.13	0.29	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:		****		****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
2012 No Project AM

Intersection #16: Via Princessa/Lost Canyon Road

Signal=Protect/Rights=Include
Base Vol: 50 120 310***
Lanes: 0 1 1 0 1

Signal=Protect
Rights=Include
Base Vol: Lanes:
50*** 1
0
20 1
1
10 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.604
Avg Crit Del (sec/veh): 25.0
Avg Delay (sec/veh): 22.7
LOS: B

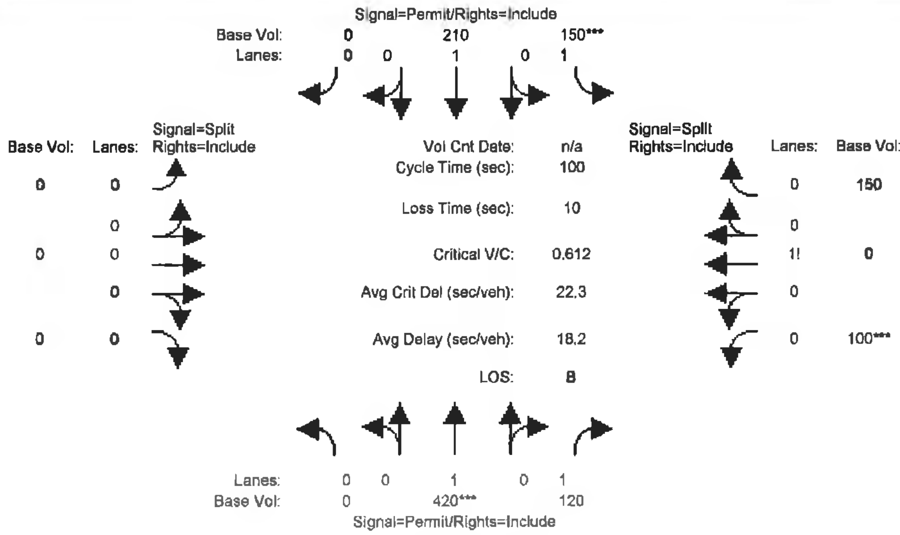
Signal=Protect
Rights=Include
Lanes: Base Vol:
1 420***
0
1 20
0
1 190

Lanes: 1 0 2 1 0
Base Vol: 10 210*** 60
Signal=Protect/Rights=Include

Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	210	60	310	120	50	50	20	10	190	20	420
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	210	60	310	120	50	50	20	10	190	20	420
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	210	60	310	120	50	50	20	10	190	20	357
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	210	60	310	120	50	50	20	10	190	20	357
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	210	60	310	120	50	50	20	10	190	20	357
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.33	0.67	1.00	1.41	0.59	1.00	1.33	0.67	1.00	1.00	1.00
Final Sat.:	1600	3733	1067	1600	2259	941	1600	2133	1067	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.06	0.06	0.19	0.05	0.05	0.03	0.01	0.01	0.12	0.01	0.22
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
2012 No Project PM

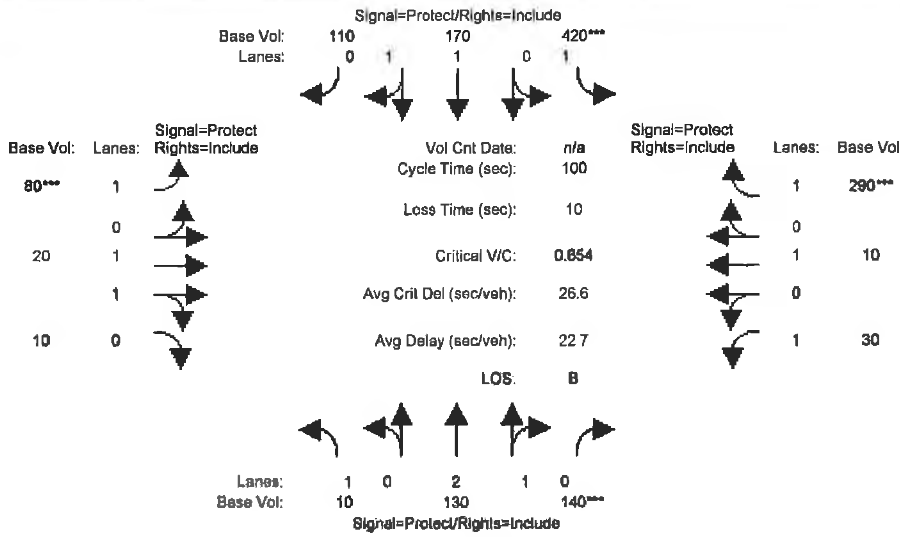
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	420	120	150	210	0	0	0	0	100	0	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	420	120	150	210	0	0	0	0	100	0	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	420	120	150	210	0	0	0	0	100	0	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	420	120	150	210	0	0	0	0	100	0	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	420	120	150	210	0	0	0	0	100	0	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.40	0.00	0.60
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	640	0	960
Capacity Analysis Module:												
Vol/Sat:	0.00	0.26	0.08	0.09	0.13	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:		****		****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
2012 No Project PM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	130	140	420	170	110	80	20	10	30	10	290
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	130	140	420	170	110	80	20	10	30	10	290
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	130	140	420	170	110	80	20	10	30	10	247
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	130	140	420	170	110	80	20	10	30	10	247
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	130	140	420	170	110	80	20	10	30	10	247
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.21	0.79	1.00	1.33	0.67	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	1943	1257	1600	2133	1067	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.04	0.09	0.26	0.09	0.09	0.05	0.01	0.01	0.02	0.01	0.15
Crit Moves:			****	****			****					****

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	50	50	20	10	10	390
Peak Hour Factor	0.55	0.55	0.80	0.80	0.90	0.90
Hourly flow rate (vph)	91	91	25	12	11	433
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	290	228	444			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	228	444			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	89	98			
cM capacity (veh/h)	685	812	1116			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	182	38	444
Volume Left	91	25	0
Volume Right	91	0	433
cSH	743	1116	1700
Volume to Capacity	0.24	0.02	0.26
Queue Length 95th (ft)	24	2	0
Control Delay (s)	11.4	5.6	0.0
Lane LOS	B	A	
Approach Delay (s)	11.4	5.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	37.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	950	10	10	1820	5	5
Peak Hour Factor	0.85	0.85	0.90	0.90	0.40	0.40
Hourly flow rate (vph)	1118	12	11	2022	12	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1129		1820	378
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1129		1820	378
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		82	98
cM capacity (veh/h)			614		68	619

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	447	447	235	11	674	674	674	25
Volume Left	0	0	0	11	0	0	0	12
Volume Right	0	0	12	0	0	0	0	12
cSH	1700	1700	1700	614	1700	1700	1700	122
Volume to Capacity	0.26	0.26	0.14	0.02	0.40	0.40	0.40	0.20
Queue Length 95th (ft)	0	0	0	1	0	0	0	18
Control Delay (s)	0.0	0.0	0.0	11.0	0.0	0.0	0.0	41.9
Lane LOS				B				E
Approach Delay (s)	0.0			0.1				41.9
Approach LOS								E

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑↱		↰↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4550		3433	5019		3433	3539	1546	1770	3539	1490
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4550		3433	5019		3433	3539	1546	1770	3539	1490
Volume (vph)	320	730	730	440	1350	100	360	530	130	90	690	540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	320	730	730	440	1350	100	360	530	130	90	690	540
RTOR Reduction (vph)	0	143	0	0	6	0	0	0	89	0	0	264
Lane Group Flow (vph)	320	1317	0	440	1444	0	360	530	41	90	690	276
Confl. Peds. (#/hr)			49			22			8			39
Confl. Bikes (#/hr)			2			4			2			6
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	15.1	38.0		18.8	41.7		17.2	35.8	35.8	8.4	27.0	27.0
Effective Green, g (s)	14.6	40.0		18.3	43.7		16.7	37.8	37.8	7.9	29.0	29.0
Actuated g/C Ratio	0.12	0.33		0.15	0.36		0.14	0.32	0.32	0.07	0.24	0.24
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	418	1517		524	1828		478	1115	487	117	855	360
v/s Ratio Prot	0.09	c0.29		c0.13	c0.29		c0.10	0.15		0.05	c0.19	
v/s Ratio Perm									0.03			0.19
v/c Ratio	0.77	1.13dr		0.84	0.79		0.75	0.48	0.08	0.77	0.81	0.77
Uniform Delay, d1	51.0	37.5		49.4	34.0		49.7	33.1	28.9	55.2	42.9	42.4
Progression Factor	1.00	1.00		1.00	1.00		0.80	0.70	0.82	1.00	1.00	1.00
Incremental Delay, d2	7.4	7.0		10.9	3.6		6.1	0.5	0.1	23.4	6.2	10.5
Delay (s)	58.4	44.5		60.3	37.6		45.6	23.7	23.9	78.6	49.1	52.9
Level of Service	E	D		E	D		D	C	C	E	D	D
Approach Delay (s)		47.0			42.9			31.5			52.7	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	44.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	270	880	130	0	1850
Peak Hour Factor	0.75	0.75	0.90	0.90	0.95	0.95
Hourly flow rate (vph)	0	360	978	144	0	1947
Pedestrians	72					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	6					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1771	470			1194	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1641	202			1003	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	47			100	
cM capacity (veh/h)	77	684			583	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	360	391	391	340	649	649	649
Volume Left	0	0	0	0	0	0	0
Volume Right	360	0	0	144	0	0	0
cSH	684	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.53	0.23	0.23	0.20	0.38	0.38	0.38
Queue Length 95th (ft)	77	0	0	0	0	0	0
Control Delay (s)	16.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	16.0	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.93	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.90		1.00	1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658		1770	1863	1471	1770	4943		1770	5069	
Flt Permitted		0.98		0.68	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1635		1265	1863	1471	1770	4943		1770	5069	
Volume (vph)	10	10	70	320	5	180	30	920	160	140	1630	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	10	70	320	5	180	30	920	160	140	1630	30
RTOR Reduction (vph)	0	50	0	0	0	129	0	19	0	0	1	0
Lane Group Flow (vph)	0	40	0	320	5	51	30	1061	0	140	1659	0
Confl. Peds. (#/hr)						46			18			1
Confl. Bikes (#/hr)						1						
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		33.8		33.8	33.8	33.8	4.2	58.9		13.3	68.0	
Effective Green, g (s)		34.3		34.3	34.3	34.3	3.7	60.9		12.8	70.0	
Actuated g/C Ratio		0.29		0.29	0.29	0.29	0.03	0.51		0.11	0.58	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		467		362	533	420	55	2509		189	2957	
v/s Ratio Prot					0.00		0.02	0.21		c0.08	c0.33	
v/s Ratio Perm		0.02		c0.25		0.03						
v/c Ratio		0.09		0.88	0.01	0.12	0.55	0.42		0.74	0.56	
Uniform Delay, d1		31.4		40.9	30.7	31.7	57.3	18.5		52.0	15.5	
Progression Factor		1.00		1.00	1.00	1.00	1.10	0.60		1.00	1.38	
Incremental Delay, d2		0.1		21.6	0.0	0.1	5.7	0.5		7.6	0.4	
Delay (s)		31.4		62.6	30.7	31.8	68.8	11.6		59.4	21.8	
Level of Service		C		E	C	C	E	B		E	C	
Approach Delay (s)		31.4			51.3			13.1			24.7	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↱		↰	↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	60	30	80	70	40	5	30	60	30	5	130	90
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.90	0.90	0.90	0.75	0.75	0.75
Hourly flow rate (vph)	80	40	107	82	47	6	33	67	33	7	173	120

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	227	135	33	100	7	293
Volume Left (vph)	80	82	33	0	7	0
Volume Right (vph)	107	6	0	33	0	120
Hadj (s)	-0.18	0.13	0.53	-0.20	0.53	-0.25
Departure Headway (s)	5.1	5.6	6.5	5.7	6.2	5.4
Degree Utilization, x	0.32	0.21	0.06	0.16	0.01	0.44
Capacity (veh/h)	652	590	516	580	545	632
Control Delay (s)	10.5	10.0	8.7	8.6	8.1	11.5
Approach Delay (s)	10.5	10.0	8.6		11.4	
Approach LOS	B	B	A		B	

Intersection Summary			
Delay	10.4		
HCM Level of Service	B		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	80	210	230	50	110	230
Peak Hour Factor	0.80	0.80	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	100	262	256	56	122	256
Pedestrians		1				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	311				615	157
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	311				615	157
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				69	70
cM capacity (veh/h)	1246				389	860

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	100	131	131	170	141	122	256
Volume Left	100	0	0	0	0	122	0
Volume Right	0	0	0	0	56	0	256
cSH	1246	1700	1700	1700	1700	389	860
Volume to Capacity	0.08	0.08	0.08	0.10	0.08	0.31	0.30
Queue Length 95th (ft)	7	0	0	0	0	33	31
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	18.4	10.9
Lane LOS	A					C	B
Approach Delay (s)	2.2			0.0		13.4	
Approach LOS						B	

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Volume (vph)	180	690	250	160	520	70	160	380	90	330	1550	490
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	180	690	250	160	520	70	160	380	90	330	1550	490
RTOR Reduction (vph)	0	0	193	0	0	54	0	0	55	0	0	212
Lane Group Flow (vph)	180	690	57	160	520	16	160	380	35	330	1550	278
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.6	25.2	25.2	9.3	25.9	25.9	9.3	44.4	44.4	21.1	56.2	56.2
Effective Green, g (s)	8.6	27.2	27.2	9.3	27.9	27.9	9.3	46.4	46.4	21.1	58.2	58.2
Actuated g/C Ratio	0.07	0.23	0.23	0.08	0.23	0.23	0.08	0.39	0.39	0.18	0.49	0.49
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	246	1153	359	266	1182	368	266	1966	612	604	2466	1352
v/s Ratio Prot	c0.05	c0.14		0.05	0.10		0.05	0.07		c0.10	c0.30	
v/s Ratio Perm			0.04			0.01			0.02			0.10
v/c Ratio	0.73	0.60	0.16	0.60	0.44	0.04	0.60	0.19	0.06	0.55	0.63	0.21
Uniform Delay, d1	54.6	41.5	37.2	53.6	39.4	35.7	53.6	24.4	23.1	45.1	22.9	17.7
Progression Factor	1.02	0.96	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.56	0.41
Incremental Delay, d2	9.2	1.1	0.4	2.6	0.5	0.1	2.6	0.2	0.2	0.5	1.1	0.3
Delay (s)	64.7	41.1	36.4	56.2	39.8	35.8	56.2	24.6	23.3	55.3	14.0	7.6
Level of Service	E	D	D	E	D	D	E	C	C	E	B	A
Approach Delay (s)		43.9			42.9			32.4			18.4	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.23	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	424	5085	5085	1583	1770	1583
Volume (vph)	40	960	1110	100	40	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	960	1110	100	40	10
RTOR Reduction (vph)	0	0	0	20	0	9
Lane Group Flow (vph)	40	960	1110	80	40	1
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	101.2	101.2	94.2	94.2	8.3	8.3
Effective Green, g (s)	103.2	103.2	96.2	96.2	8.8	8.8
Actuated g/C Ratio	0.86	0.86	0.80	0.80	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	398	4373	4076	1269	130	116
v/s Ratio Prot	0.00	c0.19	c0.22		c0.02	
v/s Ratio Perm	0.08			0.05		0.00
v/c Ratio	0.10	0.22	0.27	0.06	0.31	0.01
Uniform Delay, d1	1.4	1.4	3.0	2.5	52.7	51.5
Progression Factor	1.00	1.00	1.85	3.05	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.2	0.1	0.5	0.0
Delay (s)	1.5	1.6	5.7	7.7	53.2	51.6
Level of Service	A	A	A	A	D	D
Approach Delay (s)		1.6	5.9		52.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	5.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.42	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1533	3539
Volume (vph)	940	180	200	670	330	610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	940	180	200	670	330	610
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	940	180	200	670	330	610
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	23.8	53.6	8.4	53.6	21.8	21.8
Effective Green, g (s)	23.8	53.6	8.4	53.6	21.8	21.8
Actuated g/C Ratio	0.44	1.00	0.16	1.00	0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1524	1583	555	1583	957	1439
v/s Ratio Prot	c0.27		0.06		0.06	0.17
v/s Ratio Perm		0.11		c0.42	0.08	
v/c Ratio	0.62	0.11	0.36	0.42	0.34	0.42
Uniform Delay, d1	11.4	0.0	20.2	0.0	10.6	11.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.1	0.7	0.8	0.1	0.3
Delay (s)	12.4	0.1	20.9	0.8	10.7	11.7
Level of Service	B	A	C	A	B	B
Approach Delay (s)	10.4		5.4			11.4
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4913		3433	5085	1554	3433	3539	1562	3433	3539	1551
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4913		3433	5085	1554	3433	3539	1562	3433	3539	1551
Volume (vph)	180	760	190	400	1560	330	150	300	130	520	450	510
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	180	760	190	400	1560	330	150	300	130	520	450	510
RTOR Reduction (vph)	0	36	0	0	0	61	0	0	31	0	0	118
Lane Group Flow (vph)	180	914	0	400	1560	269	150	300	99	520	450	392
Confl. Peds. (#/hr)			6			11			7			6
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	9.7	42.3		17.4	50.0	69.0	9.1	21.3	38.7	19.0	31.2	31.2
Effective Green, g (s)	9.7	44.3		17.4	52.0	71.0	9.1	23.3	40.7	19.0	33.2	33.2
Actuated g/C Ratio	0.08	0.37		0.14	0.43	0.59	0.08	0.19	0.34	0.16	0.28	0.28
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	278	1814		498	2204	919	260	687	582	544	979	429
v/s Ratio Prot	c0.05	0.19		c0.12	c0.31	0.05	c0.04	0.08	0.02	0.15	0.13	
v/s Ratio Perm						0.13			0.04			c0.25
v/c Ratio	0.65	0.50		0.80	0.71	0.29	0.58	0.44	0.17	0.96	0.46	0.91
Uniform Delay, d1	53.5	29.3		49.6	27.8	12.1	53.6	42.6	27.8	50.1	36.0	42.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.1	1.0		8.6	1.9	0.1	1.9	0.8	0.1	27.4	0.6	24.4
Delay (s)	64.6	30.3		58.2	29.7	12.2	55.5	43.3	27.9	77.5	36.6	66.4
Level of Service	E	C		E	C	B	E	D	C	E	D	E
Approach Delay (s)		35.8			32.2			43.0			61.2	
Approach LOS		D			C			D			E	

Intersection Summary

HCM Average Control Delay	41.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰↰	↑↑↱		↰↰↰	↑↑↱	↱	↰	↑↑↑	↱	↰↰↰	↑↑↱	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5055		4990	4806	1362	1770	5085	1575	4990	4631	1352
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5055		4990	4806	1362	1770	5085	1575	4990	4631	1352
Volume (vph)	270	490	20	250	1230	420	20	530	240	540	1290	1190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	490	20	250	1230	420	20	530	240	540	1290	1190
RTOR Reduction (vph)	0	3	0	0	0	52	0	0	16	0	30	102
Lane Group Flow (vph)	270	507	0	250	1230	368	20	530	224	540	1633	715
Confl. Peds. (#/hr)									3			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.3	20.6		54.5	44.8	68.8	3.8	22.7	77.2	24.0	42.9	73.2
Effective Green, g (s)	31.3	22.6		55.5	46.8	71.8	4.8	24.7	80.2	25.0	44.9	76.2
Actuated g/C Ratio	0.22	0.16		0.39	0.33	0.50	0.03	0.17	0.56	0.17	0.31	0.53
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	1086	794		1926	1564	680	59	873	922	868	1446	754
v/s Ratio Prot	0.05	0.10		0.05	c0.26	0.09	0.01	c0.10	0.09	0.11	c0.35	c0.21
v/s Ratio Perm						0.18			0.05			0.32
v/c Ratio	0.25	0.64		0.13	0.79	0.54	0.34	0.61	0.24	0.62	1.13	0.95
Uniform Delay, d1	46.5	56.8		28.5	44.0	24.7	67.9	55.1	16.3	55.0	49.4	31.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	1.8		0.0	3.0	0.5	1.2	1.6	0.1	1.0	67.7	20.6
Delay (s)	46.6	58.6		28.6	47.0	25.2	69.2	56.6	16.3	56.0	117.1	52.5
Level of Service	D	E		C	D	C	E	E	B	E	F	D
Approach Delay (s)		54.4			39.7			44.7			88.7	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	64.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	143.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3339		1770	3495	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3339		1770	3495	
Volume (vph)	10	480	170	170	360	280	40	230	140	160	1760	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	505	179	200	424	329	42	242	147	168	1853	168
RTOR Reduction (vph)	0	0	86	0	0	283	0	65	0	0	5	0
Lane Group Flow (vph)	11	505	93	200	424	46	42	324	0	168	2016	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6			2						
Actuated Green, G (s)	15.4	15.4	15.4	17.9	17.9	17.9	3.1	61.0		16.4	74.3	
Effective Green, g (s)	15.4	15.4	15.4	17.9	17.9	17.9	3.1	61.0		16.4	74.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.14	0.14	0.14	0.02	0.48		0.13	0.59	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	618	192	250	718	224	43	1608		229	2050	
v/s Ratio Prot	0.01	c0.10		c0.11	0.08		0.02	0.10		c0.09	c0.58	
v/s Ratio Perm			0.06			0.03						
v/c Ratio	0.05	0.82	0.48	0.80	0.59	0.21	0.98	0.20		0.73	0.98	
Uniform Delay, d1	49.2	54.3	51.9	52.7	51.0	48.1	61.8	18.9		53.0	25.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	8.2	1.9	16.5	1.3	0.5	127.2	0.1		11.5	16.0	
Delay (s)	49.3	62.5	53.9	69.2	52.3	48.6	189.0	18.9		64.5	41.6	
Level of Service	D	E	D	E	D	D	F	B		E	D	
Approach Delay (s)		60.1			54.6			35.5			43.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	126.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	330	10	450	70	790	1750
Peak Hour Factor	0.70	0.70	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	471	14	500	78	878	1944
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked						
vC, conflicting volume	3267	289			578	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3267	289			578	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			12	
cM capacity (veh/h)	1	708			992	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	471	14	333	244	878	972	972
Volume Left	471	0	0	0	878	0	0
Volume Right	0	14	0	78	0	0	0
cSH	1	708	1700	1700	992	1700	1700
Volume to Capacity	596.78	0.02	0.20	0.14	0.88	0.57	0.57
Queue Length 95th (ft)	Err	2	0	0	309	0	0
Control Delay (s)	Err	10.2	0.0	0.0	28.7	0.0	0.0
Lane LOS	F	B			D		
Approach Delay (s)	9705.2		0.0		8.9		
Approach LOS	F						

Intersection Summary			
Average Delay	1219.6		
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	130	210	0	410	10	400	0	50	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	144	233	0	456	11	444	0	56	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	467			144			372	611	72	561	606	233
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	467			144			372	611	72	561	606	233
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			21	100	94	100	100	100
cM capacity (veh/h)	1091			1436			560	407	975	387	410	769

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	72	72	233	304	163	500
Volume Left	0	0	0	0	0	444
Volume Right	0	0	233	0	11	56
cSH	1700	1700	1700	1700	1700	629
Volume to Capacity	0.04	0.04	0.14	0.18	0.10	0.79
Queue Length 95th (ft)	0	0	0	0	0	195
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	29.3
Lane LOS						D
Approach Delay (s)	0.0			0.0		29.3
Approach LOS						D

Intersection Summary				
Average Delay	10.9			
Intersection Capacity Utilization	40.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	340	10	50	30	10	60
Peak Hour Factor	0.90	0.90	0.75	0.75	0.80	0.80
Hourly flow rate (vph)	378	11	67	40	12	75
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	223	50	88			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	223	50	88			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	48	99	96			
cM capacity (veh/h)	731	1018	1508			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	389	107	88
Volume Left	378	67	0
Volume Right	11	0	75
cSH	737	1508	1700
Volume to Capacity	0.53	0.04	0.05
Queue Length 95th (ft)	78	3	0
Control Delay (s)	15.2	4.8	0.0
Lane LOS	C	A	
Approach Delay (s)	15.2	4.8	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	11.0		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1500	5	5	860	10	10
Peak Hour Factor	0.95	0.95	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	1579	5	6	956	20	20
Pedestrians				1	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1585		1912	531
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1585		1912	531
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		66	96
cM capacity (veh/h)			410		59	492

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	632	632	321	6	319	319	319	40
Volume Left	0	0	0	6	0	0	0	20
Volume Right	0	0	5	0	0	0	0	20
cSH	1700	1700	1700	410	1700	1700	1700	105
Volume to Capacity	0.37	0.37	0.19	0.01	0.19	0.19	0.19	0.38
Queue Length 95th (ft)	0	0	0	1	0	0	0	39
Control Delay (s)	0.0	0.0	0.0	13.9	0.0	0.0	0.0	58.8
Lane LOS				B				F
Approach Delay (s)	0.0			0.1				58.8
Approach LOS								F

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↱		↰↰	↑↑↱		↰↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4561		3433	4926		3433	3539	1520	1770	3539	1473
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4561		3433	4926		3433	3539	1520	1770	3539	1473
Volume (vph)	700	990	740	190	550	120	640	690	450	200	710	450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	700	990	740	190	550	120	640	690	450	200	710	450
RTOR Reduction (vph)	0	84	0	0	28	0	0	0	315	0	0	312
Lane Group Flow (vph)	700	1646	0	190	642	0	640	690	135	200	710	138
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	37.0	53.3		11.3	27.6		31.9	30.9	30.9	17.5	16.5	16.5
Effective Green, g (s)	36.5	55.3		10.8	29.6		31.4	32.9	32.9	17.0	18.5	18.5
Actuated g/C Ratio	0.28	0.42		0.08	0.22		0.24	0.25	0.25	0.13	0.14	0.14
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	949	1911		281	1105		817	882	379	228	496	206
v/s Ratio Prot	0.20	c0.36		c0.06	0.13		0.19	c0.19		0.11	c0.20	
v/s Ratio Perm									0.09			0.09
v/c Ratio	0.74	1.09dr		0.68	0.58		0.78	0.78	0.36	0.88	1.43	0.67
Uniform Delay, d1	43.4	34.9		58.9	45.7		47.1	46.2	40.8	56.5	56.8	53.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	5.4		5.0	2.2		4.8	5.1	1.0	28.5	205.5	9.5
Delay (s)	48.5	40.2		63.9	47.9		51.9	51.3	41.8	85.0	262.3	63.4
Level of Service	D	D		E	D		D	D	D	F	F	E
Approach Delay (s)		42.6			51.4			49.1			170.4	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	72.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	190	1570	330	0	1490
Peak Hour Factor	0.85	0.85	1.00	1.00	0.95	0.95
Hourly flow rate (vph)	0	224	1570	330	0	1568
Pedestrians	32					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.72	0.72			0.72	
vC, conflicting volume	2290	720			1932	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2011	0			1513	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	71			100	
cM capacity (veh/h)	36	758			306	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	224	628	628	644	523	523	523
Volume Left	0	0	0	0	0	0	0
Volume Right	224	0	0	330	0	0	0
cSH	758	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.29	0.37	0.37	0.38	0.31	0.31	0.31
Queue Length 95th (ft)	31	0	0	0	0	0	0
Control Delay (s)	11.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.7	0.0			0.0		
Approach LOS	B						

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.92		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695		1770	1863	1539	1770	4978		1770	5048	
Flt Permitted		0.93		0.70	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1605		1309	1863	1539	1770	4978		1770	5048	
Volume (vph)	20	10	40	220	10	140	60	1890	250	180	1120	50
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	10	40	220	10	140	60	1890	250	180	1120	50
RTOR Reduction (vph)	0	32	0	0	0	112	0	13	0	0	3	0
Lane Group Flow (vph)	0	38	0	220	10	28	60	2127	0	180	1167	0
Confl. Peds. (#/hr)						11			11			1
Confl. Bikes (#/hr)						2			5			
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		23.5		23.5	23.5	23.5	6.7	67.7		14.8	75.8	
Effective Green, g (s)		24.0		24.0	24.0	24.0	6.2	69.7		14.3	77.8	
Actuated g/C Ratio		0.20		0.20	0.20	0.20	0.05	0.58		0.12	0.65	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		321		262	373	308	91	2891		211	3273	
v/s Ratio Prot					0.01		0.03	c0.43		c0.10	0.23	
v/s Ratio Perm		0.02		c0.17		0.02						
v/c Ratio		0.12		0.84	0.03	0.09	0.66	0.74		0.85	0.36	
Uniform Delay, d1		39.3		46.2	38.6	39.1	55.9	18.4		51.8	9.7	
Progression Factor		1.00		1.00	1.00	1.00	0.83	1.40		1.00	1.00	
Incremental Delay, d2		0.2		20.4	0.0	0.1	11.8	1.6		26.0	0.3	
Delay (s)		39.5		66.6	38.6	39.2	58.0	27.4		77.8	10.0	
Level of Service		D		E	D	D	E	C		E	A	
Approach Delay (s)		39.5			55.5			28.2			19.0	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣		↰	↱		↰	↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	80	50	40	30	40	10	40	90	70	10	70	50
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	89	56	44	33	44	11	47	106	82	12	82	59

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	189	89	47	188	12	141
Volume Left (vph)	89	33	47	0	12	0
Volume Right (vph)	44	11	0	82	0	59
Hadj (s)	-0.01	0.03	0.53	-0.27	0.53	-0.26
Departure Headway (s)	5.0	5.2	6.0	5.1	6.0	5.2
Degree Utilization, x	0.26	0.13	0.08	0.27	0.02	0.21
Capacity (veh/h)	673	634	575	664	558	644
Control Delay (s)	9.7	8.9	8.3	8.8	8.0	8.4
Approach Delay (s)	9.7	8.9	8.7		8.4	
Approach LOS	A	A	A		A	

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		Y	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	170	240	210	90	60	110
Peak Hour Factor	0.95	0.95	0.85	0.85	0.80	0.80
Hourly flow rate (vph)	179	253	247	106	75	138
Pedestrians			3			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	353				787	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353				787	176
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				73	84
cM capacity (veh/h)	1202				279	836

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	179	126	126	165	188	212
Volume Left	179	0	0	0	0	75
Volume Right	0	0	0	0	106	138
cSH	1202	1700	1700	1700	1700	490
Volume to Capacity	0.15	0.07	0.07	0.10	0.11	0.43
Queue Length 95th (ft)	13	0	0	0	0	54
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	17.8
Lane LOS	A					C
Approach Delay (s)	3.5			0.0		17.8
Approach LOS						C

Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Volume (vph)	220	840	120	200	560	140	620	1090	380	190	600	790
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	220	840	120	200	560	140	620	1090	380	190	600	790
RTOR Reduction (vph)	0	0	87	0	0	100	0	0	112	0	0	252
Lane Group Flow (vph)	220	840	33	200	560	40	620	1090	268	190	600	538
Confl. Peds. (#/hr)			2			2			5			2
Confl. Bikes (#/hr)			2						1			1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.5	30.8	30.8	9.9	32.2	32.2	22.6	49.6	49.6	9.7	36.7	36.7
Effective Green, g (s)	8.5	32.8	32.8	9.9	34.2	34.2	22.6	51.6	51.6	9.7	38.7	38.7
Actuated g/C Ratio	0.07	0.27	0.27	0.08	0.29	0.29	0.19	0.43	0.43	0.08	0.32	0.32
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	243	1390	426	283	1449	445	647	2187	669	278	1640	886
v/s Ratio Prot	c0.06	c0.17		0.06	0.11		c0.18	0.21		0.06	0.12	
v/s Ratio Perm			0.02			0.03			0.17			c0.20
v/c Ratio	0.91	0.60	0.08	0.71	0.39	0.09	0.96	0.50	0.40	0.68	0.37	0.61
Uniform Delay, d1	55.4	38.0	32.4	53.6	34.5	31.5	48.2	24.8	23.6	53.7	31.2	34.2
Progression Factor	1.24	0.89	0.53	1.00	1.00	1.00	1.00	1.00	1.00	1.03	0.87	0.73
Incremental Delay, d2	32.1	1.0	0.1	6.4	0.3	0.2	25.0	0.8	1.8	5.2	0.6	2.9
Delay (s)	100.8	34.7	17.1	60.1	34.8	31.6	73.2	25.6	25.3	60.3	27.7	27.9
Level of Service	F	C	B	E	C	C	E	C	C	E	C	C
Approach Delay (s)		45.2			39.9			39.7			31.7	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑↑	↑↑↑	↱	↰	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.08	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	146	5085	5085	1583	1770	1583
Volume (vph)	20	940	1580	50	140	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	940	1580	50	140	80
RTOR Reduction (vph)	0	0	0	26	0	48
Lane Group Flow (vph)	20	940	1580	24	140	32
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	61.4	61.4	56.1	56.1	48.1	48.1
Effective Green, g (s)	63.4	63.4	58.1	58.1	48.6	48.6
Actuated g/C Ratio	0.53	0.53	0.48	0.48	0.40	0.40
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	95	2687	2462	766	717	641
v/s Ratio Prot	0.00	c0.18	c0.31		c0.08	
v/s Ratio Perm	0.11			0.02		0.02
v/c Ratio	0.21	0.35	0.64	0.03	0.20	0.05
Uniform Delay, d1	17.4	16.4	23.2	16.2	23.1	21.7
Progression Factor	1.00	1.00	1.02	1.41	1.00	1.00
Incremental Delay, d2	0.8	0.4	0.9	0.1	0.6	0.1
Delay (s)	18.2	16.7	24.5	22.8	23.7	21.8
Level of Service	B	B	C	C	C	C
Approach Delay (s)		16.8	24.4		23.0	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1455	3539
Volume (vph)	620	1040	360	780	180	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	1040	360	780	180	260
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	620	1040	360	780	180	260
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	16.3	45.8	12.0	45.8	21.5	21.5
Effective Green, g (s)	16.3	45.8	12.0	45.8	21.5	21.5
Actuated g/C Ratio	0.36	1.00	0.26	1.00	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1222	1583	927	1583	921	1661
v/s Ratio Prot	0.18		0.10		0.02	0.07
v/s Ratio Perm		c0.66		0.49	0.07	
v/c Ratio	0.51	0.66	0.39	0.49	0.20	0.16
Uniform Delay, d1	11.6	0.0	13.9	0.0	7.0	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	2.1	0.5	1.1	0.0	0.1
Delay (s)	12.2	2.1	14.4	1.1	7.0	7.0
Level of Service	B	A	B	A	A	A
Approach Delay (s)	5.9		5.3			7.0
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5023		3433	5085	1542	3433	3539	1518	3433	3539	1527
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5023		3433	5085	1542	3433	3539	1518	3433	3539	1527
Volume (vph)	580	1600	110	220	870	490	280	580	240	510	410	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	580	1600	110	220	870	490	280	580	240	510	410	190
RTOR Reduction (vph)	0	5	0	0	0	18	0	0	6	0	0	154
Lane Group Flow (vph)	580	1705	0	220	870	472	280	580	234	510	410	36
Confl. Peds. (#/hr)			18			23			27			13
Confl. Bikes (#/hr)			3			2			2			3
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	31.2	50.3		11.8	30.9	52.6	27.1	28.2	40.0	21.7	22.8	22.8
Effective Green, g (s)	31.2	52.3		11.8	32.9	54.6	27.1	30.2	42.0	21.7	24.8	24.8
Actuated g/C Ratio	0.24	0.40		0.09	0.25	0.41	0.21	0.23	0.32	0.16	0.19	0.19
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	811	1990		307	1267	638	705	810	529	564	665	287
v/s Ratio Prot	0.17	c0.34		0.06	0.17	c0.12	0.08	c0.16	0.04	c0.15	0.12	
v/s Ratio Perm						0.18			0.11			0.02
v/c Ratio	0.72	0.86		0.72	0.69	0.74	0.40	0.72	0.44	0.90	0.62	0.12
Uniform Delay, d1	46.3	36.4		58.5	44.9	32.7	45.4	46.9	35.7	54.1	49.2	44.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.3	5.0		6.5	1.8	3.9	0.1	3.5	0.2	17.6	2.2	0.3
Delay (s)	51.7	41.4		65.0	46.7	36.6	45.5	50.4	35.9	71.7	51.4	44.9
Level of Service	D	D		E	D	D	D	D	D	E	D	D
Approach Delay (s)		44.0			46.1			46.0			59.6	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5079		4990	4806	1343	1770	5085	1545	4990	4797	1362
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5079		4990	4806	1343	1770	5085	1545	4990	4797	1362
Volume (vph)	1190	1380	10	140	980	250	20	1440	210	790	1420	750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1190	1380	10	140	980	250	20	1440	210	790	1420	750
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	2	0	1	106
Lane Group Flow (vph)	1190	1389	0	140	980	250	20	1440	208	790	1437	626
Confl. Peds. (#/hr)			9			10			12			
Confl. Bikes (#/hr)						1			2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.0	55.4		9.6	35.0	64.4	4.0	40.0	49.6	29.4	65.4	95.4
Effective Green, g (s)	31.0	57.4		10.6	37.0	67.4	5.0	42.0	52.6	30.4	67.4	98.4
Actuated g/C Ratio	0.20	0.37		0.07	0.24	0.43	0.03	0.27	0.34	0.19	0.43	0.63
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	989	1864		338	1137	613	57	1366	520	970	2067	857
v/s Ratio Prot	c0.24	0.27		0.03	c0.20	0.08	0.01	c0.28	0.03	c0.16	0.30	0.14
v/s Ratio Perm						0.11			0.11			0.32
v/c Ratio	1.20	0.75		0.41	0.86	0.41	0.35	1.05	0.40	0.81	0.70	0.73
Uniform Delay, d1	62.7	43.1		69.9	57.3	30.7	74.1	57.2	39.8	60.3	36.2	19.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.2	1.7		0.3	7.4	0.2	1.4	40.0	0.2	5.1	1.2	2.8
Delay (s)	163.9	44.8		70.2	64.6	30.9	75.5	97.2	40.0	65.4	37.4	22.7
Level of Service	F	D		E	E	C	E	F	D	E	D	C
Approach Delay (s)		99.8			59.0			89.7			41.2	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM Average Control Delay	71.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	156.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	102.5%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3405		1770	3521	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3405		1770	3521	
Volume (vph)	20	480	120	30	450	90	140	1470	500	40	550	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	533	133	35	529	106	147	1547	526	42	579	21
RTOR Reduction (vph)	0	0	118	0	0	92	0	23	0	0	2	0
Lane Group Flow (vph)	22	533	15	35	529	14	147	2050	0	42	598	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6			2						
Actuated Green, G (s)	15.9	15.9	15.9	18.4	18.4	18.4	15.9	84.1		3.1	71.3	
Effective Green, g (s)	15.9	15.9	15.9	18.4	18.4	18.4	15.9	84.1		3.1	71.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.12	0.61		0.02	0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	588	183	237	680	212	205	2083		40	1826	
v/s Ratio Prot	0.01	c0.10		0.02	c0.10		c0.08	c0.60		0.02	0.17	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.11	0.91	0.08	0.15	0.78	0.07	0.72	0.98		1.05	0.33	
Uniform Delay, d1	54.4	60.1	54.3	52.6	57.6	52.0	58.6	26.0		67.2	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	17.6	0.2	0.3	5.6	0.1	11.3	16.0		157.5	0.1	
Delay (s)	54.7	77.6	54.5	52.9	63.2	52.2	70.0	42.0		224.7	19.3	
Level of Service	D	E	D	D	E	D	E	D		F	B	
Approach Delay (s)		72.4			60.9			43.9			32.7	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	137.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	110	10	1550	30	200	500
Peak Hour Factor	0.50	0.50	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	220	20	1632	32	211	526
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked	0.54	0.54			0.54	
vC, conflicting volume	2332	832			1663	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2614	0			1376	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	97			21	
cM capacity (veh/h)	2	585			267	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	220	20	1088	575	211	263	263
Volume Left	220	0	0	0	211	0	0
Volume Right	0	20	0	32	0	0	0
cSH	2	585	1700	1700	267	1700	1700
Volume to Capacity	97.91	0.03	0.64	0.34	0.79	0.15	0.15
Queue Length 95th (ft)	Err	3	0	0	151	0	0
Control Delay (s)	Err	11.4	0.0	0.0	54.9	0.0	0.0
Lane LOS	F	B			F		
Approach Delay (s)	9166.7		0.0		15.7		
Approach LOS	F						

Intersection Summary			
Average Delay	837.7		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	320	290	0	70	10	500	0	130	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	356	322	0	82	12	556	0	144	0	0	0
Pedestrians								1				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	94			357			398	451	179	338	445	47
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	94			357			398	451	179	338	445	47
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			0	100	83	100	100	100
cM capacity (veh/h)	1498			1198			536	502	833	489	506	1012

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	178	178	322	55	39	700
Volume Left	0	0	0	0	0	556
Volume Right	0	0	322	0	12	144
cSH	1700	1700	1700	1700	1700	675
Volume to Capacity	0.10	0.10	0.19	0.03	0.02	1.04
Queue Length 95th (ft)	0	0	0	0	0	446
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	62.9
Lane LOS						F
Approach Delay (s)	0.0			0.0		62.9
Approach LOS						F

Intersection Summary			
Average Delay	29.9		
Intersection Capacity Utilization	43.4%	ICU Level of Service	A
Analysis Period (min)	15		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2015 No Project Conditions	**PHF:**	1
TOD:	AM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	290	260	90	13	48.1	D	--
	T	140	167	119	13	41.3	D	--
	R	360	335	93	18	11.0	B	--
	Subtotal	**790**	**763**	**97**	**--**	**30.3**	**C**	**--**
SB	L	140	140	100	14	51.8	D	--
	T	160	156	98	11	51.0	D	--
	R	150	155	103	9	22.4	C	--
	Subtotal	**450**	**451**	**100**	**--**	**41.4**	**D**	**--**
EB	L	70	74	106	14	68.6	E	--
	T	630	617	98	24	44.0	D	--
	R	300	300	100	22	15.8	B	--
	Subtotal	**1000**	**991**	**99**	**--**	**37.3**	**D**	**--**
WB	L	240	211	88	17	58.5	E	--
	T	1210	1157	96	26	35.3	D	--
	R	170	152	89	18	8.5	A	--
	Subtotal	**1620**	**1518**	**94**	**--**	**35.8**	**D**	**--**
	Total	**3860**	**3724**	**96**	**--**	**35.8**	**D**	**--**

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	700	554	79	24	635.2	F	--
	R	60	48	80	7	616.9	F	--
	Subtotal	**760**	**603**	**79**	**--**	**633.7**	**F**	**--**
EB	T	600	634	106	18	10.8	B	--
	R	520	503	97	18	3.5	A	--
	Subtotal	**1120**	**1137**	**102**	**--**	**7.6**	**A**	**--**
WB	L	360	353	98	15	64.5	E	--
	T	920	920	100	29	44.8	D	--
	Subtotal	**1280**	**1272**	**99**	**--**	**50.3**	**D**	**--**
	Total	**3160**	**3012**	**95**	**--**	**150.9**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 No Project Conditions **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	540	532	99	14	13.0	B	--
	R	210	195	93	13	5.8	A	--
	Subtotal	**750**	**727**	**97**	**--**	**11.0**	**B**	**--**
SB	L	180	170	94	15	47.6	D	--
	T	500	521	104	28	8.0	A	--
	Subtotal	**680**	**690**	**101**	**--**	**17.7**	**B**	**--**
EB	L	230	236	103	11	19.6	B	--
	R	230	230	100	6	4.7	A	--
	Subtotal	**460**	**465**	**101**	**--**	**12.3**	**B**	**--**
	Total	**1890**	**1882**	**100**	**--**	**13.8**	**B**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	90	75	83	6	495.4	F	--
	T	480	392	82	16	500.4	F	--
	R	5	4	80	2	501.6	F	--
	Subtotal	**575**	**471**	**82**	**--**	**499.6**	**F**	**--**
SB	L	20	21	105	4	94.4	F	--
	T	390	374	96	15	100.2	F	--
	R	380	378	99	17	87.6	F	--
	Subtotal	**790**	**773**	**98**	**--**	**93.9**	**F**	**--**
EB	L	310	313	101	14	99.4	F	--
	T	5	5	100	2	96.2	F	--
	R	60	56	93	7	96.4	F	--
	Subtotal	**375**	**374**	**100**	**--**	**98.9**	**F**	**--**
WB	L	5	4	80	2	8.5	A	--
	T	10	11	110	6	11.3	B	--
	R	20	21	105	3	8.0	A	--
	Subtotal	**35**	**36**	**103**	**--**	**9.0**	**A**	**--**
	Total	**1775**	**1654**	**93**	**--**	**208.6**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 No Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	220	201	91	15	78.2	E	--
	T	560	569	102	26	5.3	A	--
	Subtotal	**780**	**769**	**99**	**--**	**24.3**	**C**	**--**
SB	T	540	533	99	23	18.9	B	--
	R	870	885	102	34	10.5	B	--
	Subtotal	**1410**	**1419**	**101**	**--**	**13.6**	**B**	**--**
WB	L	80	76	95	9	81.7	F	--
	T	5	6	120	2	45.6	D	--
	R	290	283	98	16	11.6	B	--
	Subtotal	**375**	**365**	**97**	**--**	**26.9**	**C**	**--**
	Total	**2565**	**2554**	**100**	**--**	**18.7**	**B**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	560	595	106	23	23.2	C	--
	R	120	125	104	11	6.2	A	--
	Subtotal	**680**	**720**	**106**	**--**	**20.2**	**C**	**--**
SB	L	240	239	100	13	38.9	D	--
	T	380	377	99	21	41.3	D	--
	Subtotal	**620**	**616**	**99**	**--**	**40.4**	**D**	**--**
EB	L	220	222	101	15	25.7	C	--
	R	140	139	99	9	84.6	F	--
	Subtotal	**360**	**361**	**100**	**--**	**48.4**	**D**	**--**
	Total	**1660**	**1697**	**102**	**--**	**33.5**	**C**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 No Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	320	319	100	14	49.5	D	--
	T	180	400	222	17	27.3	C	--
	R	620	621	100	21	21.3	C	--
	Subtotal	**1120**	**1339**	**120**	--	**29.8**	**C**	--
SB	L	150	145	97	13	48.1	D	--
	T	130	125	96	7	44.2	D	--
	R	90	85	94	7	13.8	B	--
	Subtotal	**370**	**355**	**96**	--	**38.5**	**D**	--
EB	L	130	120	92	17	144.8	F	--
	T	910	897	99	16	147.8	F	--
	R	390	375	96	24	105.3	F	--
	Subtotal	**1430**	**1392**	**97**	--	**136.1**	**F**	--
WB	L	230	205	89	14	79.3	E	--
	T	540	538	100	23	15.3	B	--
	R	140	131	93	6	3.3	A	--
	Subtotal	**910**	**874**	**96**	--	**28.5**	**C**	--
	Total	**3830**	**3960**	**103**	--	**67.7**	**E**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	440	397	90	16	380.7	F	--
	R	120	100	83	14	348.7	F	--
	Subtotal	**560**	**497**	**89**	--	**374.3**	**F**	--
EB	T	1160	1160	100	29	5.4	A	--
	R	510	498	98	18	2.9	A	--
	Subtotal	**1670**	**1659**	**99**	--	**4.7**	**A**	--
WB	L	300	234	78	11	616.3	F	--
	T	470	446	95	30	82.8	F	--
	Subtotal	**770**	**681**	**88**	--	**266.4**	**F**	--
	Total	**3000**	**2836**	**95**	--	**132.2**	**F**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 No Project Conditions			**PHF:**	1
TOD:	PM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	530	532	100	19	25.7	C	--
	R	450	439	98	22	10.2	B	--
	Subtotal	**980**	**971**	**99**	**--**	**18.7**	**B**	**--**
SB	L	240	228	95	14	49.7	D	--
	T	460	478	104	19	11.8	B	--
	Subtotal	**700**	**706**	**101**	**--**	**24.1**	**C**	**--**
EB	L	810	811	100	20	25.5	C	--
	R	450	448	100	26	8.2	A	--
	Subtotal	**1260**	**1259**	**100**	**--**	**19.3**	**B**	**--**
	Total	**2940**	**2936**	**100**	**--**	**20.3**	**C**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	5	100	3	131.2	F	--
	T	750	736	98	15	125.8	F	--
	R	10	10	100	1	126.2	F	--
	Subtotal	**765**	**752**	**98**	**--**	**125.8**	**F**	**--**
SB	L	30	29	97	5	22.8	C	--
	T	620	820	132	41	17.9	C	--
	R	30	29	97	6	14.1	B	--
	Subtotal	**680**	**878**	**129**	**--**	**17.9**	**C**	**--**
EB	L	40	41	103	9	7.6	A	--
	T	5	4	80	2	8.2	A	--
	R	5	5	100	2	5.3	A	--
	Subtotal	**50**	**50**	**100**	**--**	**7.4**	**A**	**--**
WB	L	5	4	80	1	6.7	A	--
	T	5	4	80	2	10.3	B	--
	R	50	51	102	7	6.5	A	--
	Subtotal	**60**	**60**	**100**	**--**	**6.8**	**A**	**--**
	Total	**1555**	**1739**	**112**	**--**	**63.9**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 No Project Conditions			**PHF:**	1
TOD:	PM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	130	123	95	13	48.9	D	--
	T	790	793	100	34	7.1	A	--
	Subtotal	**920**	**916**	**99**	**--**	**12.8**	**B**	**--**
SB	T	960	942	98	25	43.3	D	--
	R	550	548	100	16	7.7	A	--
	Subtotal	**1510**	**1490**	**99**	**--**	**30.2**	**C**	**--**
WB	L	150	142	95	14	38.5	D	--
	T	10	10	100	2	42.8	D	--
	R	320	326	102	25	13.3	B	--
	Subtotal	**480**	**477**	**99**	**--**	**21.4**	**C**	**--**
	Total	**2910**	**2883**	**99**	**--**	**23.2**	**C**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	470	474	101	22	31.2	C	--
	R	140	135	96	8	12.6	B	--
	Subtotal	**610**	**608**	**100**	**--**	**27.1**	**C**	**--**
SB	L	560	555	99	13	39.8	D	--
	T	550	528	96	14	14.3	B	--
	Subtotal	**1110**	**1083**	**98**	**--**	**27.4**	**C**	**--**
EB	L	450	441	98	21	26.5	C	--
	R	280	280	100	15	47.5	D	--
	Subtotal	**730**	**721**	**99**	**--**	**34.7**	**C**	**--**
	Total	**2450**	**2412**	**98**	**--**	**29.5**	**C**	**--**

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim No Project AM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Permit/Rights=Include

Initial Vol:	0		500***		210
Lanes:	0	0	1	0	1

Signal=Split
Rights=Include

Initial Vol:	Lanes:
0	0
	0
0	0
	0
0	0

Vol Cnt Date:	n/a
Cycle Time (sec):	100
Loss Time (sec):	10
Critical V/C:	0.600
Avg Crit Del (sec/veh):	15.6
Avg Delay (sec/veh):	16.8
LOS:	A

Signal=Split
Rights=Include

Lanes:	Initial Vol:
0	150
0	
1!	0
0	
0	150***

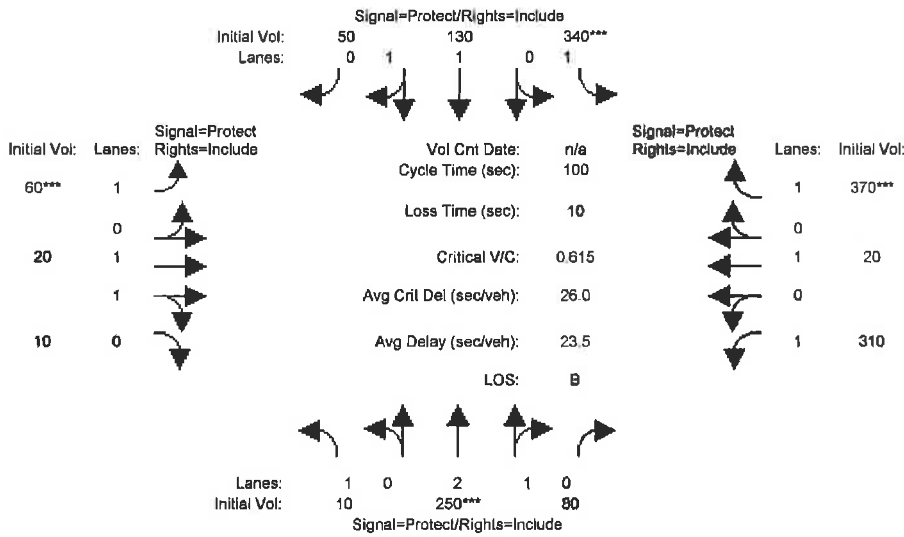
Lanes:	0	0	1	0	1
Initial Vol:	0***		270		90

Signal=Permit/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	270	90	210	500	0	0	0	0	150	0	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	270	90	210	500	0	0	0	0	150	0	150
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	270	90	210	500	0	0	0	0	150	0	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	270	90	210	600	0	0	0	0	150	0	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	270	90	210	500	0	0	0	0	150	0	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	270	90	210	500	0	0	0	0	150	0	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.50	0.00	0.50
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	800	0	800
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.06	0.13	0.31	0.00	0.00	0.00	0.00	0.19	0.00	0.19
Crit Moves:	****				****					****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim No Project AM

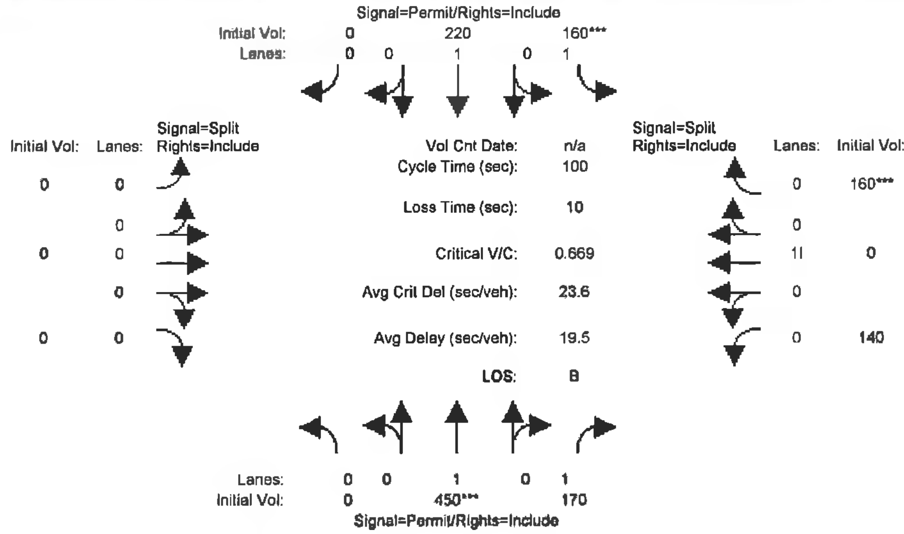
Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	250	80	340	130	50	60	20	10	310	20	370
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	250	80	340	130	50	60	20	10	310	20	370
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	250	80	340	130	50	60	20	10	310	20	370
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	250	80	340	130	50	60	20	10	310	20	315
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	250	80	340	130	50	60	20	10	310	20	315
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	250	80	340	130	50	60	20	10	310	20	315
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.27	0.73	1.00	1.44	0.56	1.00	1.33	0.67	1.00	1.00	1.00
Final Sat.:	1600	3636	1164	1600	2311	889	1600	2133	1067	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.07	0.07	0.21	0.06	0.06	0.04	0.01	0.01	0.19	0.01	0.20
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim No Project PM

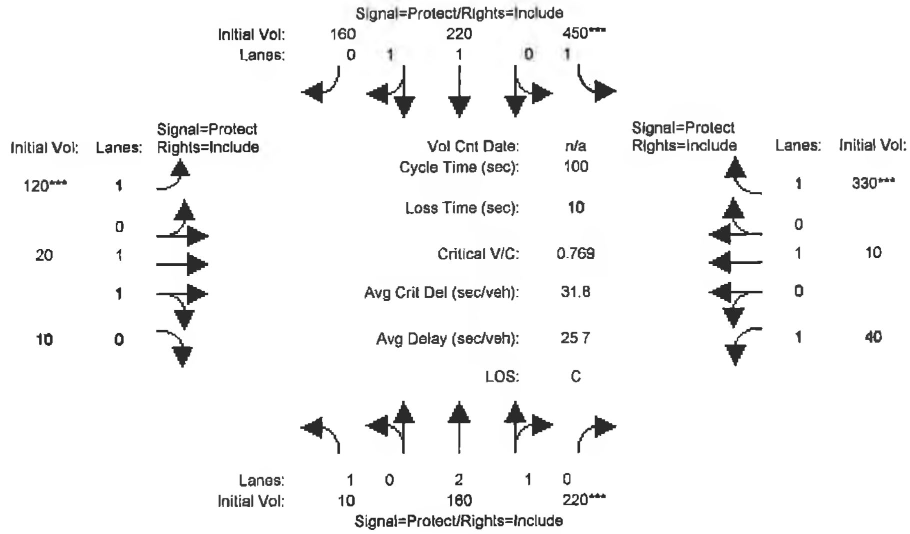
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	450	170	160	220	0	0	0	0	140	0	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	450	170	160	220	0	0	0	0	140	0	160
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	450	170	160	220	0	0	0	0	140	0	160
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	450	170	160	220	0	0	0	0	140	0	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	450	170	160	220	0	0	0	0	140	0	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	450	170	160	220	0	0	0	0	140	0	160
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.47	0.00	0.53
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	747	0	853
Capacity Analysis Module:												
Vol/Sat:	0.00	0.28	0.11	0.10	0.14	0.00	0.00	0.00	0.00	0.19	0.00	0.19
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim No Project PM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	160	220	450	220	160	120	20	10	40	10	330
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	160	220	450	220	160	120	20	10	40	10	330
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	160	220	450	220	160	120	20	10	40	10	330
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	160	220	450	220	160	120	20	10	40	10	281
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	160	220	450	220	160	120	20	10	40	10	281
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	160	220	450	220	160	120	20	10	40	10	281
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.16	0.84	1.00	1.33	0.67	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	1853	1347	1600	2133	1067	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.14	0.28	0.12	0.12	0.08	0.01	0.01	0.03	0.01	0.18
Crit Moves:			****	****			****					****

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2140	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	575	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	9.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Sand Canyon to Soledad Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2040	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	548	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	746	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	746	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	5410	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1424	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1936	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1936	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.4	mi/h
Number of lanes, N	3	
Density, D	31.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Sand Canyon to Soledad Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	4850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1276	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2604	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2604	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	2	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Soledad Canyon to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2500	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	651	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	885	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	885	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	13.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone:
E-mail:
Fax:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Sand Canyon to Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2790	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	727	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	741	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	741	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	11.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Leisch Method for Weaving Analysis

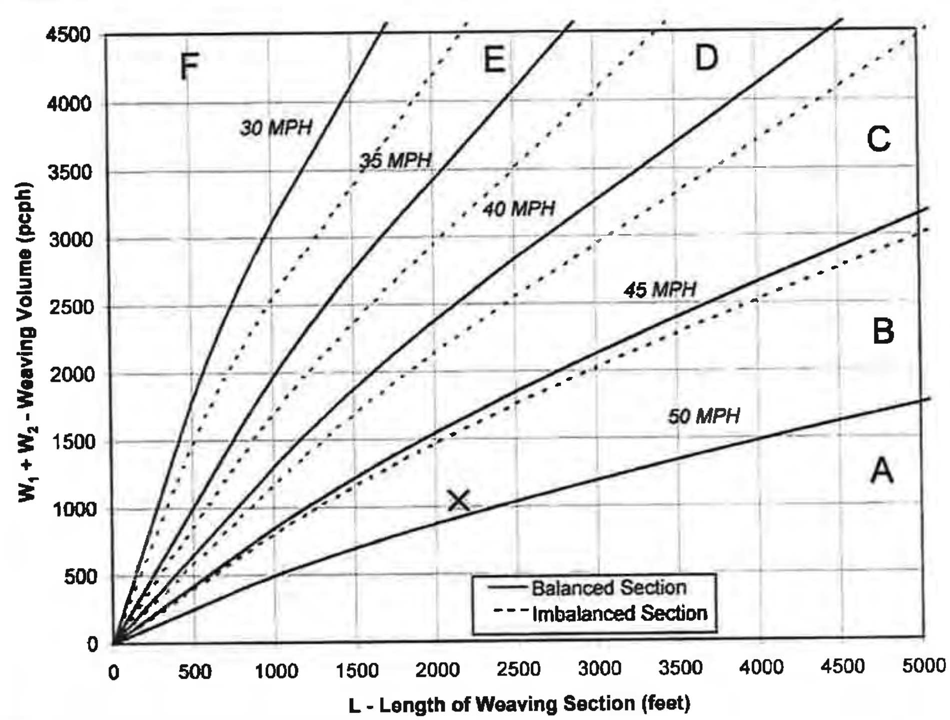
Data Input

Number of Entering Mainline Lanes	N_b	4
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,140

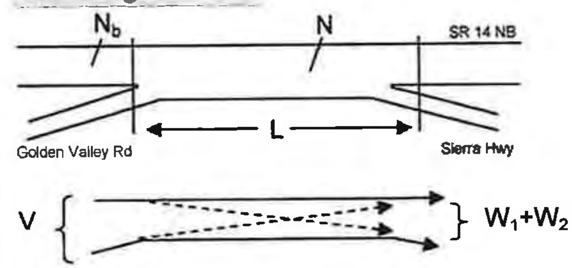
Project Information

Project	Vista Canyon Ranch
Scenario	2012 Conditions - AM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,670	Volume (vph)*	500	Volume (vph)*	450
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,204	Volume (pcph)	550	Volume (pcph)	495



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.1**
4. Weaving Intensity Factor (k) **1.34**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **674**
6. Level of Service (LOS) **A**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

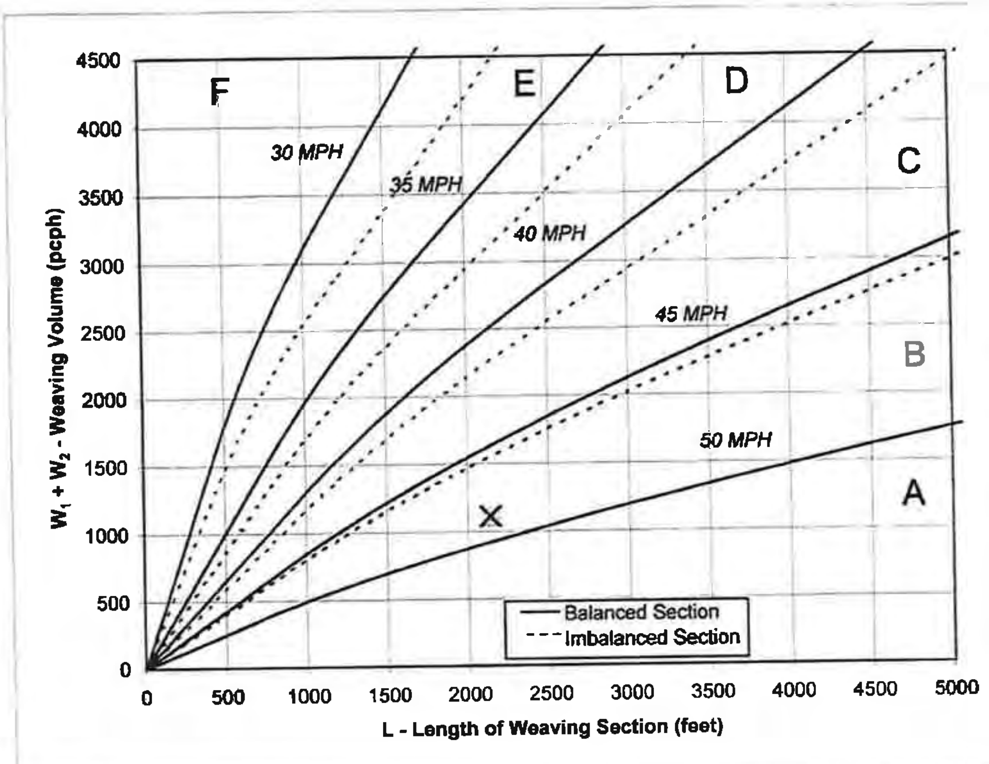
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,140

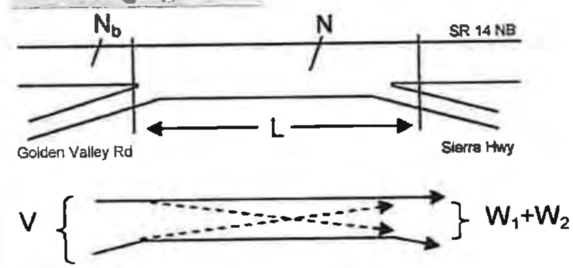
Project Information

Project	Vista Canyon Ranch
Scenario	2012 Conditions - PM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,360	Volume (vph)*	310	Volume (vph)*	700
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	7,632	Volume (pcph)	341	Volume (pcph)	770



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **48.7**
4. Weaving Intensity Factor (k) **1.40**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,942**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

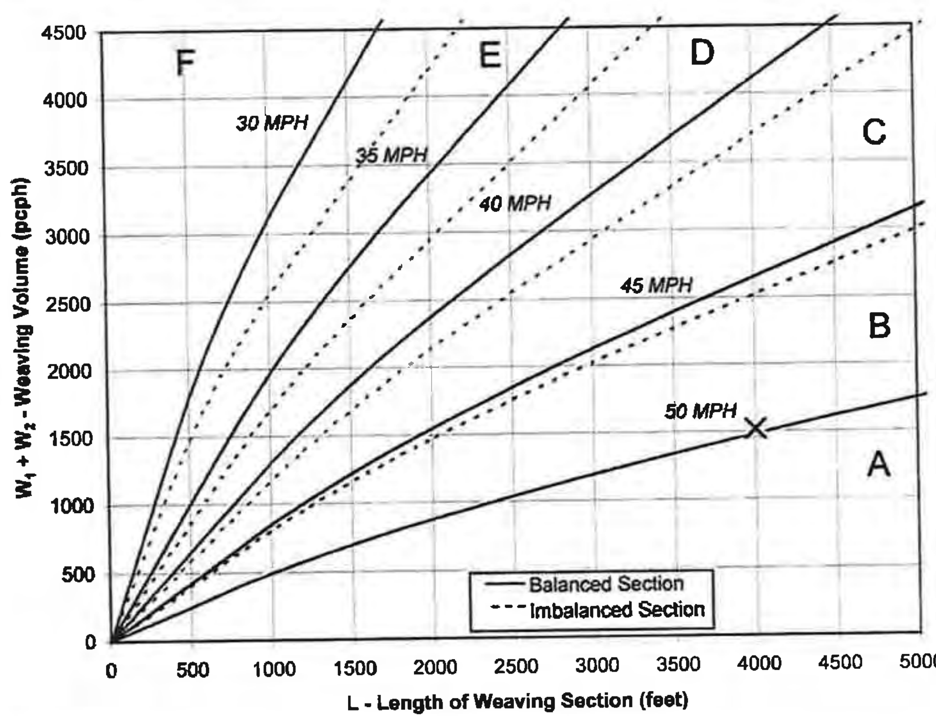
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,000

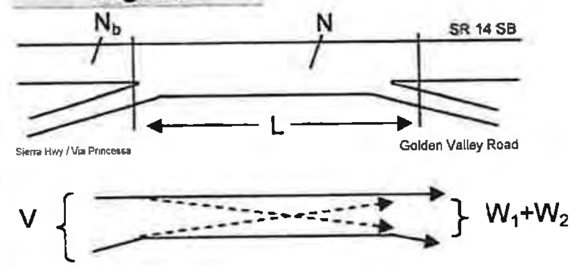
Project Information

Project	Vista Canyon Ranch
Scenario	2012 Conditions - PM
Freeway	SR 14 SB
On-ramp	Sierra Hwy / Via Princessa
Off-ramp	Golden Valley Road

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,620	Volume (vph)*	1,250	Volume (vph)*	130
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,344	Volume (pcph)	1,375	Volume (pcph)	143



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.8**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,086**
6. Level of Service (LOS) **B**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2140	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2140		420			vph
Peak-hour factor, PHF	0.93		0.80			
Peak 15-min volume, v15	575		131			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2347		530			pcph

Estimation of V12 Diverge Areas

$L_{EQ} =$ (Equation 25-8 or 25-9)

$P_{FD} =$ 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD} = 1322$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2347	9400	No
$v_{FO} = v_F - v_R$	1817	9400	No
v_R	530	2000	No
v_{3} or v_{av34}	512 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1322		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1322	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 11.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	$D_S = 0.476$	
Space mean speed in ramp influence area,	$S_R = 54.1$	mph
Space mean speed in outer lanes,	$S_O = 71.3$	mph
Space mean speed for all vehicles,	$S = 60.4$	mph

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Phone:
E-mail:
Fax:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	320	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	1720		320			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	462		94			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	1886		380			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1116 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	2266		7050	No
v_3 or v_{av34}	770	pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12} /2			No	
If yes, v_{12A} = 1116			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1116	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.303	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_0 = 64.0	mph
Space mean speed for all vehicles,	S = 59.9	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3435	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3435		550			vph
Peak-hour factor, PHF	0.94		0.90			
Peak 15-min volume, v15	914		153			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3727		617			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3727 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
$v_{Fi} = v_F$	3727		4700	No
$v_{FO} = v_F - v_R$	3110		4700	No
v_R	617		2000	No
v_{3} or v_{av34}	0	pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?			No	
Is v_{3} or v_{av34} > 1.5 v_{12} /2			No	
If yes, v_{12A} = 3727			(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3727	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 31.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.484

Space mean speed in ramp influence area, S_R = 53.9 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 53.9 mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2885		870			vph
Peak-hour factor, PHF	0.94		0.88			
Peak 15-min volume, v15	767		247			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3131		999			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3131 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	4130		4700	No
v_{3} or v_{av34}	0	pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?			No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} = 3131			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3131	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.458	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 54.5	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions

Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2220	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2220		400			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	597		118			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2435		475			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1330 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2435	9400	No
$v_{FO} = v_F - v_R$	1960	9400	No
v_R	475	2000	No
v_3 or v_{av34}	552 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1330		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1330	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 54.2	mph
Space mean speed in outer lanes,	S_O = 71.3	mph
Space mean speed for all vehicles,	S = 60.8	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3310	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1100	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3310		1100			vph
Peak-hour factor, PHF	0.94		0.95			
Peak 15-min volume, v15	880		289			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3592	1169	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4761	7050	No
v_{3} or v_{av34}	1467 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2125		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2125	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.391	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_0 = 61.5	mph
Space mean speed for all vehicles,	S = 57.6	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1200	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5410		1200			vph
Peak-hour factor, PHF	0.95		0.90			
Peak 15-min volume, v15	1424		333			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	5809		1347			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.553 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3814 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5809	7050	No
$v_{FO} = v_F - v_R$	4462	7050	No
v_R	1347	2000	No
v_3 or v_{av34}	1995 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3814		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3814	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 32.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.549	
Space mean speed in ramp influence area,	S_R = 52.4	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 56.7	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	**Fehr & Peers**
Date performed:	**12/16/2008**
Analysis time period:	**AM Peak Hour**
Freeway/Dir of Travel:	**SR 14 NB**
Junction:	**Sand Canyon Rd**
Jurisdiction:	**Santa Clarita**
Analysis Year:	**2012 Conditions**
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	**Merge**	
Number of lanes in freeway	**2**	
Free-flow speed on freeway	**65.0**	mph
Volume on freeway	**4250**	vph

On Ramp Data

Side of freeway	**Right**	
Number of lanes in ramp	**1**	
Free-flow speed on ramp	**35.0**	**mph**
Volume on ramp	**600**	**vph**
Length of first accel/decel lane	**500**	**ft**
Length of second accel/decel lane		**ft**

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4250		600			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1118		158			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%	%	
Length		mi		mi	mi	
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	4563		638			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 4563 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	5201		4700	Yes
v_{3} or v_{av34}	0	pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?			No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} = 4563			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4563	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 42.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.994	
Space mean speed in ramp influence area,	S_R = 42.1	**mph**
Space mean speed in outer lanes,	S_0 = N/A	**mph**
Space mean speed for all vehicles,	S = 42.1	**mph**

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2500	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2500		410			vph
Peak-hour factor, PHF	0.96		0.85			
Peak 15-min volume, v15	651		121			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2656		487			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.671 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1943 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2656	7050	No
$v_{FO} = v_F - v_R$	2169	7050	No
v_R	487	2000	No
v_{3} or v_{av34}	713 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1943		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1943	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 16.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.472

Space mean speed in ramp influence area, S_R = 54.1 mph

Space mean speed in outer lanes, S_0 = 71.3 mph

Space mean speed for all vehicles, S = 57.9 mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2090	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	700	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2090		700			vph
Peak-hour factor, PHF	0.96		0.98			
Peak 15-min volume, v15	544		179			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2221		721			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1376 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2942	7050	No
v_3 or v_{av34}	845 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1376		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1376	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.248	
Space mean speed in ramp influence area,	S_R = 59.3	mph
Space mean speed in outer lanes,	S_0 = 63.8	mph
Space mean speed for all vehicles,	S = 60.5	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5670	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	910	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5670		910			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1492		239			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6088		967			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.563 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6088	7050	No
$v_{FO} = v_F - v_R$	5121	7050	No
v_R	967	2000	No
v_{3} or v_{av34}	2236 pc/h	(Equation 25-15 or 25-16)	

Is v_{3} or v_{av34} > 2700 pc/h? No

Is v_{3} or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3852 (Equation 25-18)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3852	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_0 = 66.5	mph
Space mean speed for all vehicles,	S = 57.4	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	690	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2370	690		vph
Peak-hour factor, PHF	0.96	0.95		
Peak 15-min volume, v15	617	182		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2518	734		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.285 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 718 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3252	9400	No
v_3 or v_{av34}	900 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1007		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1007	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_0 = 64.1	mph
Space mean speed for all vehicles,	S = 60.6	mph

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2320	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	624	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	636	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	636	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	9.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 SB
From/To: Sand Canyon to Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	3190	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	831	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	847	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	847	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	13.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Via Princessa to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	6260	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1647	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2240	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2240	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	55.9	mi/h
Number of lanes, N	3	
Density, D	40.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 SB
From/To: Soledad Canyon to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2940	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	766	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.21

Phone:
E-mail:

Fax:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Sand Canyon to Soledad Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2250	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	605	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	823	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	823	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Leisch Method for Weaving Analysis

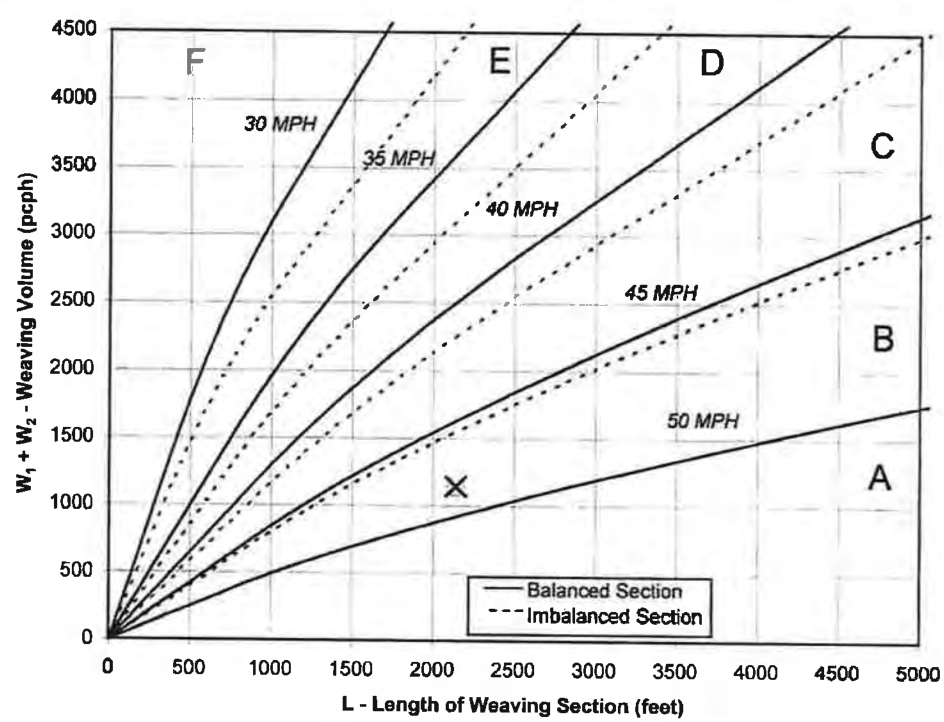
Data Input

Number of Entering Mainline Lanes	N_b	4
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,140

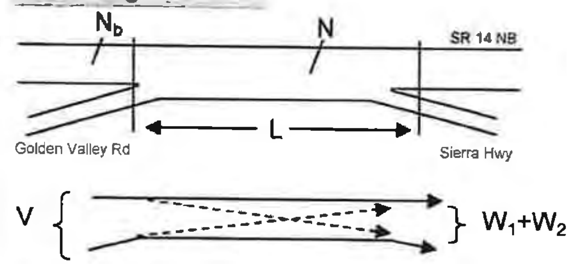
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,860	Volume (vph)*	500	Volume (vph)*	540
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,432	Volume (pcph)	550	Volume (pcph)	594

Project Information

Project	Vista Canyon Ranch
Scenario	2015 Conditions - AM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 48.4
4. Weaving Intensity Factor (k) 1.45
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ 736
6. Level of Service (LOS) A

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

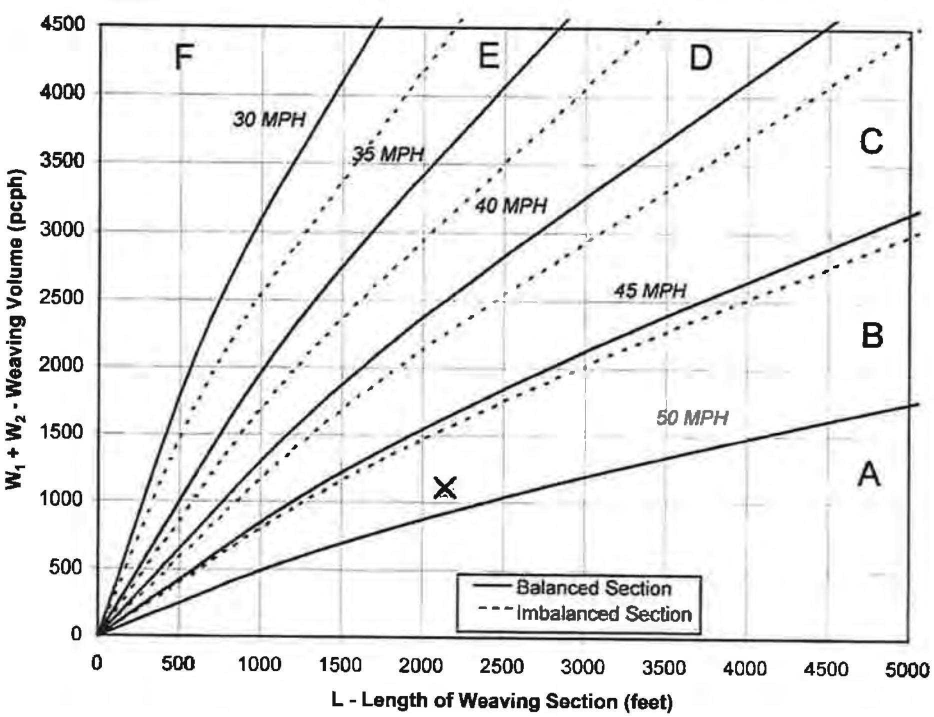
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,140

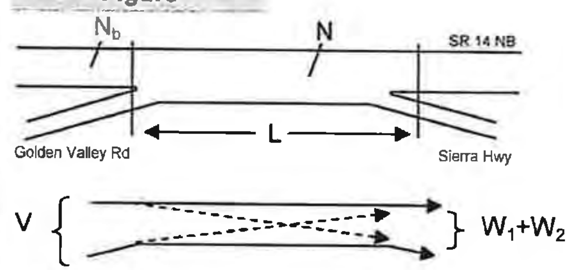
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,900	Volume (vph)*	320	Volume (vph)*	690
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	8,280	Volume (pcph)	352	Volume (pcph)	759

Project Information

Project	Vista Canyon Ranch
Scenario	2015 Conditions - PM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **48.7**
4. Weaving Intensity Factor (k) **1.40**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **2,106**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Fehr & Peers

2/12/2009

Leisch Method for Weaving Analysis

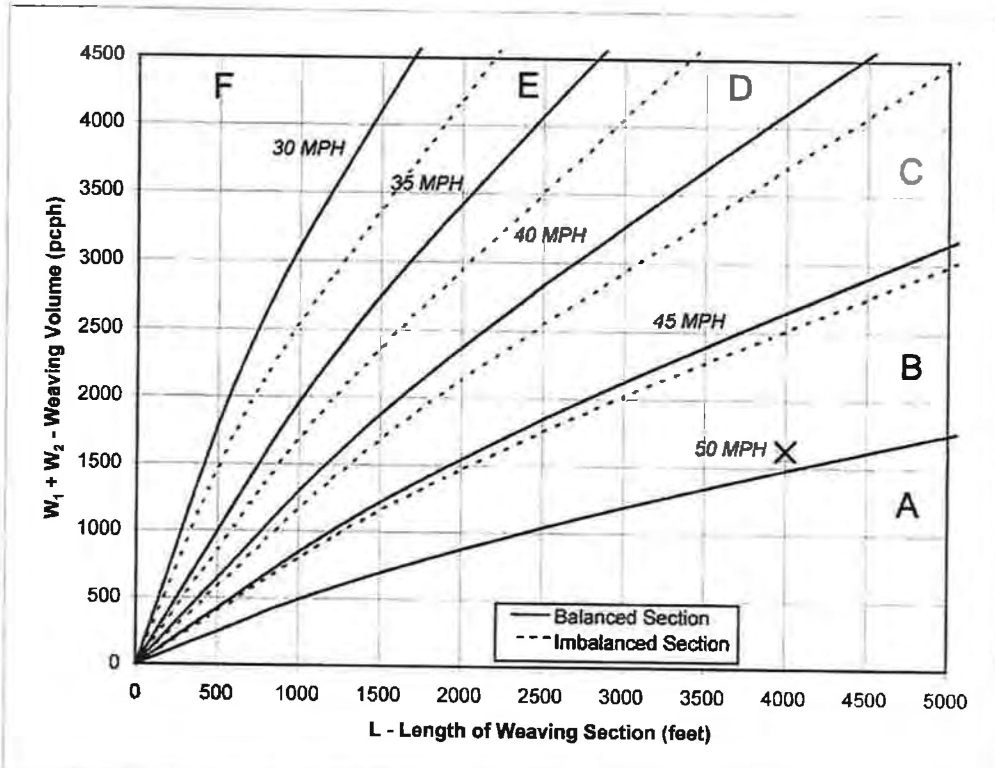
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,000

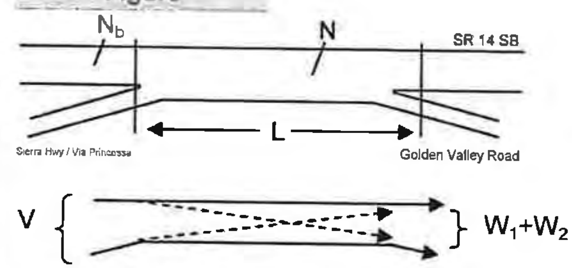
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,050	Volume (vph)*	1,340	Volume (vph)*	140
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,860	Volume (pcph)	1,474	Volume (pcph)	154

Project Information

Project	Vista Canyon Ranch
Scenario	2015 Conditions - PM
Freeway	SR 14 SB
On-ramp	Sierra Hwy / Via Princessa
Off-ramp	Golden Valley Road



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.3**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*min(W_1, W_2)]$ **1,215**
6. Level of Service (LOS) **C**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.
* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.
Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2320	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2320		460			vph
Peak-hour factor, PHF	0.93		0.80			
Peak 15-min volume, v15	624		144			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2545		581			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1437 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
$v_{Fi} = v_F$	2545		9400	No
$v_{FO} = v_F - v_R$	1964		9400	No
v_R	581		2000	No
v_{3} or v_{av34}	554	pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?			No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} =			(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1437	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.480	
Space mean speed in ramp influence area,	S_R = 54.0	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 60.3	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1860	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1860	390		vph
Peak-hour factor, PHF	0.93	0.85		
Peak 15-min volume, v15	500	115		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2040	463		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1207 pc/h

Capacity Checks

		Actual	Maximum	LOS F?
	v_{FO}	2503	7050	No
	v_3 or v_{av34}	833 pc/h	(Equation 25-4 or 25-5)	
Is	v_3 or v_{av34} > 2700 pc/h?		No	
Is	v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes,	v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1207	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.307	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = 63.8	mph
Space mean speed for all vehicles,	S = 59.8	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4410	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	760	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4410		760			vph
Peak-hour factor, PHF	0.94		0.90			
Peak 15-min volume, v15	1173		211			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	4785		853			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4785 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4785	4700	Yes
$v_{FO} = v_F - v_R$	3932	4700	No
v_R	853	2000	No
v_{3} or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4785	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 40.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.505

Space mean speed in ramp influence area, S_R = 53.4 mph

Space mean speed in outer lanes, S_O = N/A mph

Space mean speed for all vehicles, S = 53.4 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3650	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	880	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3650		880			vph
Peak-hour factor, PHF	0.94		0.88			
Peak 15-min volume, v15	971		250			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3961		1010			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3961 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	4971		4700	Yes
v_3 or v_{av34}	0	pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3961	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 34.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.778

Space mean speed in ramp influence area, S_R = 47.1 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 47.1 mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2320	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2320		360			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	624		106			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2545		428			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1351 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2545	9400	No
$v_{FO} = v_F - v_R$	2117	9400	No
v_R	428	2000	No
v_{3} or v_{av34}	597 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1351	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 61.1	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: **Fehr & Peers**
Date performed: **12/16/2008**
Analysis time period: **PM Peak Hour**
Freeway/Dir of Travel: **SR 14 NB**
Junction: **Sand Canyon Rd**
Jurisdiction: **Santa Clarita**
Analysis Year: **2015 Conditions**
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	**Diverge**	
Number of lanes in freeway	**3**	
Free-flow speed on freeway	**65.0**	mph
Volume on freeway	**6260**	vph

Off Ramp Data

Side of freeway	**Right**	
Number of lanes in ramp	**1**	
Free-Flow speed on ramp	**35.0**	**mph**
Volume on ramp	**1260**	**vph**
Length of first accel/decel lane	**500**	**ft**
Length of second accel/decel lane		**ft**

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6260		1260			vph
Peak-hour factor, PHF	0.95		0.90			
Peak 15-min volume, v15	1647		350			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, **ER**	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6721		1414			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.527 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4210 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6721	7050	No
$v_{FO} = v_F - v_R$	5307	7050	No
v_R	1414	2000	No
v_{3} or v_{av34}	2511 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4210	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 36.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.555	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_0 = 65.4	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5040	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	690	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5040	690		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1326	182		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	5411	734		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 5411 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	6145		4700	Yes
v_3 or v_{av34}	0	pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} =			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	5411	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 49.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 2.105	
Space mean speed in ramp influence area,	S_R = 16.6	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 16.6	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2940	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2940		560			vph
Peak-hour factor, PHF	0.96		0.85			
Peak 15-min volume, v15	766		165			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3124		665			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.651 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2267 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
$v_{Fi} = v_F$	3124		7050	No
$v_{FO} = v_F - v_R$	2459		7050	No
v_R	665		2000	No
v_{3} or v_{av34}	857	pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12}/2			No	
If yes, v_{12A} =			(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2267	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.488

Space mean speed in ramp influence area, S_R = 53.8 mph

Space mean speed in outer lanes, S_O = 71.3 mph

Space mean speed for all vehicles, S = 57.7 mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2380	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	810	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2380	810		vph
Peak-hour factor, PHF	0.96	0.98		
Peak 15-min volume, v15	620	207		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2529	835		pcph

Estimation of V12 Merge Areas

$L_{EQ} =$ (Equation 25-2 or 25-3)

$P_{FM} =$ 0.619 Using Equation 1

$v_{12} = v_F (P_{FM}) =$ 1567 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3364	7050	No
v_{3} or v_{av34}	962 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1567	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A =$ 14.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.259	
Space mean speed in ramp influence area,	S_R = 59.0	mph
Space mean speed in outer lanes,	S_0 = 63.3	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	730	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6250		730			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1645		192			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6711		776			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.557 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4079 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6711	7050	No
$v_{FO} = v_F - v_R$	5935	7050	No
v_R	776	2000	No
v_{3} or v_{av34}	2632 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} =		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4079	4600	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.498	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_0 = 64.9	mph
Space mean speed for all vehicles,	S = 57.5	mph

HCS+: Ramps and Ramp Junctions Release 5.21

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2015 Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2710	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2710	680		vph
Peak-hour factor, PHF	0.96	0.95		
Peak 15-min volume, v15	706	179		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2879	723		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.287 Using Equation 4

$v_{12} = v_F (P_{FM}) =$ 825 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3602	9400	No
v_3 or v_{av34}	1027 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		Yes	
If yes, v_{12A} = 1151		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1151	4400	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 16.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.311

Space mean speed in ramp influence area, S_R = 57.8 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 60.5 mph

APPENDIX E:

TECHNICAL CALCULATIONS FOR 2012 & INTERIM PLUS PROJECT CONDITIONS

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	50	50	20	10	10	330
Peak Hour Factor	0.55	0.55	0.80	0.80	0.90	0.90
Hourly flow rate (vph)	91	91	25	12	11	367
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	257	194	378			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	257	194	378			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	89	98			
cM capacity (veh/h)	716	847	1181			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	182	38	378
Volume Left	91	25	0
Volume Right	91	0	367
cSH	776	1181	1700
Volume to Capacity	0.23	0.02	0.22
Queue Length 95th (ft)	23	2	0
Control Delay (s)	11.1	5.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	5.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	891	10	10	1596	5	5
Peak Hour Factor	0.85	0.85	0.90	0.90	0.40	0.40
Hourly flow rate (vph)	1048	12	11	1773	12	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1060		1667	355
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1060		1667	355
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		85	98
cM capacity (veh/h)			653		86	641

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	419	419	221	11	591	591	591	25
Volume Left	0	0	0	11	0	0	0	12
Volume Right	0	0	12	0	0	0	0	12
cSH	1700	1700	1700	653	1700	1700	1700	151
Volume to Capacity	0.25	0.25	0.13	0.02	0.35	0.35	0.35	0.17
Queue Length 95th (ft)	0	0	0	1	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	10.6	0.0	0.0	0.0	33.4
Lane LOS				B				D
Approach Delay (s)	0.0			0.1				33.4
Approach LOS								D

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4588		3433	5034		3433	3539	1546	1770	3539	1490
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4588		3433	5034		3433	3539	1546	1770	3539	1490
Volume (vph)	270	700	604	377	1250	70	385	407	166	70	605	480
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	700	604	377	1250	70	385	407	166	70	605	480
RTOR Reduction (vph)	0	120	0	0	4	0	0	0	112	0	0	265
Lane Group Flow (vph)	270	1184	0	377	1316	0	385	407	54	70	605	215
Confl. Peds. (#/hr)			49			22			8			39
Confl. Bikes (#/hr)			2			4			2			6
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	13.4	39.9		17.1	43.6		17.8	36.8	36.8	7.2	26.2	26.2
Effective Green, g (s)	12.9	41.9		16.6	45.6		17.3	38.8	38.8	6.7	28.2	28.2
Actuated g/C Ratio	0.11	0.35		0.14	0.38		0.14	0.32	0.32	0.06	0.24	0.24
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	369	1602		475	1913		495	1144	500	99	832	350
v/s Ratio Prot	0.08	c0.26		c0.11	c0.26		c0.11	0.11		0.04	c0.17	
v/s Ratio Perm									0.03			0.14
v/c Ratio	0.73	0.94dr		0.79	0.69		0.78	0.36	0.11	0.71	0.73	0.62
Uniform Delay, d1	51.9	34.3		50.0	31.2		49.5	31.0	28.5	55.7	42.4	41.0
Progression Factor	1.00	1.00		1.00	1.00		0.85	0.76	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.3	3.1		8.3	2.0		7.2	0.3	0.2	17.1	3.6	4.1
Delay (s)	58.2	37.3		58.3	33.3		49.4	24.0	28.8	72.8	46.0	45.2
Level of Service	E	D		E	C		D	C	C	E	D	D
Approach Delay (s)		40.9			38.8			35.1			47.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	318	740	130	0	1626
Peak Hour Factor	0.75	0.75	0.90	0.90	0.95	0.95
Hourly flow rate (vph)	0	424	822	144	0	1712
Pedestrians	72					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	6					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.93	0.93			0.93	
vC, conflicting volume	1537	418			1039	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1433	234			899	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	37			100	
cM capacity (veh/h)	110	674			659	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	424	329	329	309	571	571	571
Volume Left	0	0	0	0	0	0	0
Volume Right	424	0	0	144	0	0	0
cSH	674	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.63	0.19	0.19	0.18	0.34	0.34	0.34
Queue Length 95th (ft)	111	0	0	0	0	0	0
Control Delay (s)	19.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	19.0	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00		1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00		0.93	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00		1.00	1.00	1.00		1.00	1.00	
Frt		0.90		1.00		0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.99		0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658		1770		1471	1770	4945		1770	5067	
Flt Permitted		0.98		0.68		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1635		1266		1471	1770	4945		1770	5067	
Volume (vph)	10	10	70	313	0	150	30	780	134	136	1410	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	10	70	313	0	150	30	780	134	136	1410	30
RTOR Reduction (vph)	0	50	0	0	0	107	0	19	0	0	1	0
Lane Group Flow (vph)	0	40	0	313	0	43	30	895	0	136	1439	0
Confl. Peds. (#/hr)						46			18			1
Confl. Bikes (#/hr)						1						
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		34.0		34.0		34.0	4.2	58.8		13.2	67.8	
Effective Green, g (s)		34.5		34.5		34.5	3.7	60.8		12.7	69.8	
Actuated g/C Ratio		0.29		0.29		0.29	0.03	0.51		0.11	0.58	
Clearance Time (s)		4.5		4.5		4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0		3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		470		364		423	55	2505		187	2947	
v/s Ratio Prot							0.02	0.18		c0.08	c0.28	
v/s Ratio Perm		0.02		c0.25		0.03						
v/c Ratio		0.09		0.86		0.10	0.55	0.36		0.73	0.49	
Uniform Delay, d1		31.2		40.5		31.4	57.3	17.8		52.0	14.7	
Progression Factor		1.00		1.00		1.00	1.08	0.56		0.97	1.29	
Incremental Delay, d2		0.1		18.0		0.1	5.8	0.4		8.2	0.4	
Delay (s)		31.3		58.4		31.5	67.7	10.4		58.7	19.3	
Level of Service		C		E		C	E	B		E	B	
Approach Delay (s)		31.3			49.7			12.3			22.7	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥		↰	↱		↰	↱	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	62	30	80	70	40	5	30	78	30	5	143	153
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.90	0.90	0.90	0.75	0.75	0.75
Hourly flow rate (vph)	83	40	107	82	47	6	33	87	33	7	191	204

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	229	135	33	120	7	395
Volume Left (vph)	83	82	33	0	7	0
Volume Right (vph)	107	6	0	33	0	204
Hadj (s)	-0.17	0.13	0.53	-0.16	0.53	-0.33
Departure Headway (s)	5.5	6.0	6.7	6.0	6.4	5.5
Degree Utilization, x	0.35	0.22	0.06	0.20	0.01	0.60
Capacity (veh/h)	602	539	496	552	539	625
Control Delay (s)	11.4	10.7	8.9	9.3	8.2	15.2
Approach Delay (s)	11.4	10.7	9.2		15.1	
Approach LOS	B	B	A		C	

Intersection Summary			
Delay	12.5		
HCM Level of Service	B		
Intersection Capacity Utilization	40.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	98	162	190	50	110	243
Peak Hour Factor	0.80	0.80	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	122	202	211	56	122	270
Pedestrians		1				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	267				585	134
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	267				585	134
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	91				69	70
cM capacity (veh/h)	1294				400	889

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	122	101	101	141	126	122	270
Volume Left	122	0	0	0	0	122	0
Volume Right	0	0	0	0	56	0	270
cSH	1294	1700	1700	1700	1700	400	889
Volume to Capacity	0.09	0.06	0.06	0.08	0.07	0.31	0.30
Queue Length 95th (ft)	8	0	0	0	0	32	32
Control Delay (s)	8.1	0.0	0.0	0.0	0.0	17.9	10.8
Lane LOS	A					C	B
Approach Delay (s)	3.0			0.0		13.0	
Approach LOS						B	

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Volume (vph)	160	842	350	193	656	70	220	340	104	230	1241	532
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	160	842	350	193	656	70	220	340	104	230	1241	532
RTOR Reduction (vph)	0	0	181	0	0	50	0	0	62	0	0	262
Lane Group Flow (vph)	160	842	169	193	656	20	220	340	42	230	1241	270
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.3	31.1	31.1	10.2	33.0	33.0	11.4	46.3	46.3	12.4	47.3	47.3
Effective Green, g (s)	8.3	33.1	33.1	10.2	35.0	35.0	11.4	48.3	48.3	12.4	49.3	49.3
Actuated g/C Ratio	0.07	0.28	0.28	0.08	0.29	0.29	0.10	0.40	0.40	0.10	0.41	0.41
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	237	1403	437	292	1483	462	326	2047	637	355	2089	1145
v/s Ratio Prot	0.05	c0.17		c0.06	0.13		0.06	0.07		c0.07	c0.24	
v/s Ratio Perm			0.11			0.01			0.03			0.10
v/c Ratio	0.68	0.60	0.39	0.66	0.44	0.04	0.67	0.17	0.07	0.65	0.59	0.24
Uniform Delay, d1	54.5	37.7	35.2	53.2	34.6	30.5	52.5	23.0	22.0	51.7	27.6	23.1
Progression Factor	1.11	0.95	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.65	0.33
Incremental Delay, d2	5.7	0.9	1.0	4.3	0.4	0.1	4.3	0.2	0.2	2.7	1.1	0.4
Delay (s)	66.2	36.8	29.1	57.5	34.9	30.6	56.8	23.1	22.2	61.8	19.1	8.0
Level of Service	E	D	C	E	C	C	E	C	C	E	B	A
Approach Delay (s)		38.3			39.3			34.1			21.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.20	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	377	5085	5085	1583	1770	1583
Volume (vph)	40	1252	1213	90	40	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	1252	1213	90	40	10
RTOR Reduction (vph)	0	0	0	18	0	9
Lane Group Flow (vph)	40	1252	1213	72	40	1
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	101.2	101.2	94.2	94.2	8.3	8.3
Effective Green, g (s)	103.2	103.2	96.2	96.2	8.8	8.8
Actuated g/C Ratio	0.86	0.86	0.80	0.80	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	359	4373	4076	1269	130	116
v/s Ratio Prot	0.00	c0.25	c0.24		c0.02	
v/s Ratio Perm	0.09			0.05		0.00
v/c Ratio	0.11	0.29	0.30	0.06	0.31	0.01
Uniform Delay, d1	1.5	1.6	3.1	2.5	52.7	51.5
Progression Factor	1.00	1.00	1.35	1.85	1.00	1.00
Incremental Delay, d2	0.1	0.2	0.2	0.1	0.5	0.0
Delay (s)	1.6	1.7	4.4	4.6	53.2	51.6
Level of Service	A	A	A	A	D	D
Approach Delay (s)		1.7	4.4		52.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	4.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.43	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1544	3539
Volume (vph)	806	408	180	672	620	420
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	806	408	180	672	620	420
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	806	408	180	672	620	420
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	21.4	53.3	8.1	53.3	23.9	23.9
Effective Green, g (s)	21.4	53.3	8.1	53.3	23.9	23.9
Actuated g/C Ratio	0.40	1.00	0.15	1.00	0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1378	1583	538	1583	1111	1587
v/s Ratio Prot	c0.23		0.05		c0.12	0.12
v/s Ratio Perm		0.26		0.42	c0.13	
v/c Ratio	0.58	0.26	0.33	0.42	0.56	0.26
Uniform Delay, d1	12.5	0.0	20.2	0.0	10.1	9.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.4	0.6	0.8	0.3	0.2
Delay (s)	13.3	0.4	20.8	0.8	10.4	9.4
Level of Service	B	A	C	A	B	A
Approach Delay (s)	9.0		5.1			10.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	53.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4896		3433	5085	1554	3433	3539	1558	3433	3539	1551
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4896		3433	5085	1554	3433	3539	1558	3433	3539	1551
Volume (vph)	170	702	198	270	1477	382	239	379	110	491	612	460
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	170	702	198	270	1477	382	239	379	110	491	612	460
RTOR Reduction (vph)	0	40	0	0	0	43	0	0	41	0	0	104
Lane Group Flow (vph)	170	860	0	270	1477	339	239	379	69	491	612	356
Confl. Peds. (#/hr)			6			11			7			6
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	10.3	45.9		12.1	47.7	66.2	11.5	23.5	35.6	18.5	30.5	30.5
Effective Green, g (s)	10.3	47.9		12.1	49.7	68.2	11.5	25.5	37.6	18.5	32.5	32.5
Actuated g/C Ratio	0.09	0.40		0.10	0.41	0.57	0.10	0.21	0.31	0.15	0.27	0.27
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	295	1954		346	2106	883	329	752	540	529	958	420
v/s Ratio Prot	c0.05	0.18		0.08	c0.29	0.06	c0.07	0.11	0.01	c0.14	0.17	
v/s Ratio Perm						0.16			0.03			c0.23
v/c Ratio	0.58	0.44		0.78	0.70	0.38	0.73	0.50	0.13	0.93	0.64	0.85
Uniform Delay, d1	52.8	26.3		52.7	29.0	14.3	52.7	41.7	29.5	50.1	38.6	41.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.0	0.7		10.1	2.0	0.1	6.6	0.9	0.0	22.3	1.8	15.8
Delay (s)	60.7	27.0		62.7	31.0	14.4	59.3	42.6	29.5	72.4	40.3	57.2
Level of Service	E	C		E	C	B	E	D	C	E	D	E
Approach Delay (s)		32.4			32.0			46.1			55.4	
Approach LOS		C			C			D			E	

Intersection Summary

HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5056		4990	4806	1362	1770	5085	1575	4990	4682	1350
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5056		4990	4806	1362	1770	5085	1575	4990	4682	1350
Volume (vph)	270	502	20	283	1306	483	20	520	261	651	1250	970
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	502	20	283	1306	483	20	520	261	651	1250	970
RTOR Reduction (vph)	0	3	0	0	0	48	0	0	13	0	15	106
Lane Group Flow (vph)	270	519	0	283	1306	435	20	520	248	651	1470	629
Confl. Peds. (#/hr)									3			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	22.3	20.2		46.6	44.5	70.8	3.6	21.8	68.4	26.3	44.5	66.8
Effective Green, g (s)	23.3	22.2		47.6	46.5	73.8	4.6	23.8	71.4	27.3	46.5	69.8
Actuated g/C Ratio	0.17	0.16		0.35	0.34	0.54	0.03	0.17	0.52	0.20	0.34	0.51
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	849	820		1735	1632	734	59	884	867	995	1590	728
v/s Ratio Prot	0.05	0.10		0.06	c0.27	0.12	0.01	c0.10	0.10	0.13	c0.31	c0.15
v/s Ratio Perm						0.20			0.06			0.32
v/c Ratio	0.32	0.63		0.16	0.80	0.59	0.34	0.59	0.29	0.65	0.92	0.86
Uniform Delay, d1	49.8	53.6		30.9	41.0	21.4	64.7	52.0	18.4	50.5	43.5	29.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.7		0.0	3.2	0.9	1.2	1.4	0.1	1.2	9.8	10.1
Delay (s)	49.9	55.2		30.9	44.2	22.2	65.9	53.4	18.5	51.6	53.3	39.4
Level of Service	D	E		C	D	C	E	D	B	D	D	D
Approach Delay (s)		53.4			37.3			42.3			49.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	136.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3400		1770	3245		1770	3381		1770	3511	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3400		1770	3245		1770	3381		1770	3511	
Volume (vph)	10	281	100	140	210	260	20	212	90	170	1636	93
Peak-hour factor, PHF	0.95	0.95	0.95	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	296	105	165	247	306	21	223	95	179	1722	98
RTOR Reduction (vph)	0	33	0	0	213	0	0	40	0	0	3	0
Lane Group Flow (vph)	11	368	0	165	340	0	21	278	0	179	1817	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	14.3	14.3		14.9	14.9		1.4	41.5		14.5	54.6	
Effective Green, g (s)	14.3	14.3		14.9	14.9		1.4	41.5		14.5	54.6	
Actuated g/C Ratio	0.14	0.14		0.15	0.15		0.01	0.41		0.14	0.54	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	480		261	478		24	1386		254	1894	
v/s Ratio Prot	0.01	c0.11		0.09	c0.10		0.01	0.08		c0.10	c0.52	
v/s Ratio Perm												
v/c Ratio	0.04	0.77		0.63	0.71		0.88	0.20		0.70	0.96	
Uniform Delay, d1	37.5	41.8		40.6	41.1		49.8	19.2		41.3	22.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	7.2		4.9	4.9		127.4	0.1		8.6	12.3	
Delay (s)	37.6	49.1		45.5	46.0		177.2	19.3		49.9	34.5	
Level of Service	D	D		D	D		F	B		D	C	
Approach Delay (s)		48.8			45.9			29.0			35.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	101.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	213	10	412	70	790	1686
Peak Hour Factor	0.70	0.70	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	304	14	458	78	878	1873
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked						
vC, conflicting volume	3189	268			536	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3189	268			536	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			15	
cM capacity (veh/h)	1	730			1029	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	304	14	305	230	878	937	937
Volume Left	304	0	0	0	878	0	0
Volume Right	0	14	0	78	0	0	0
cSH	1	730	1700	1700	1029	1700	1700
Volume to Capacity	266.25	0.02	0.18	0.14	0.85	0.55	0.55
Queue Length 95th (ft)	Err	1	0	0	276	0	0
Control Delay (s)	Err	10.0	0.0	0.0	24.8	0.0	0.0
Lane LOS	F	B			C		
Approach Delay (s)	9551.1		0.0		7.9		
Approach LOS	F						

Intersection Summary			
Average Delay	850.0		
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑↱			↰	↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	120	170	0	330	10	270	0	50	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	1	133	189	0	367	11	300	0	56	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	378			133			319	513	67	469	508	189
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	378			133			319	513	67	469	508	189
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			51	100	94	100	100	100
cM capacity (veh/h)	1177			1449			610	463	983	450	466	821

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	46	89	189	244	133	356
Volume Left	1	0	0	0	0	300
Volume Right	0	0	189	0	11	56
cSH	1177	1700	1700	1700	1700	723
Volume to Capacity	0.00	0.05	0.11	0.14	0.08	0.49
Queue Length 95th (ft)	0	0	0	0	0	68
Control Delay (s)	0.2	0.0	0.0	0.0	0.0	15.3
Lane LOS	A					C
Approach Delay (s)	0.0			0.0		15.3
Approach LOS						C

Intersection Summary			
Average Delay	5.2		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	240	10	50	30	10	50
Peak Hour Factor	0.90	0.90	0.75	0.75	0.80	0.80
Hourly flow rate (vph)	267	11	67	40	12	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	217	44	75			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	217	44	75			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	99	96			
cM capacity (veh/h)	737	1026	1524			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	278	107	75
Volume Left	267	67	0
Volume Right	11	0	62
cSH	746	1524	1700
Volume to Capacity	0.37	0.04	0.04
Queue Length 95th (ft)	43	3	0
Control Delay (s)	12.7	4.8	0.0
Lane LOS	B	A	
Approach Delay (s)	12.7	4.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	8.8		
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1394	5	5	853	10	10
Peak Hour Factor	0.95	0.95	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	1467	5	6	948	20	20
Pedestrians				1	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1474		1798	494
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1474		1798	494
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		72	96
cM capacity (veh/h)			453		70	520

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	587	587	299	6	316	316	316	40
Volume Left	0	0	0	6	0	0	0	20
Volume Right	0	0	5	0	0	0	0	20
cSH	1700	1700	1700	453	1700	1700	1700	124
Volume to Capacity	0.35	0.35	0.18	0.01	0.19	0.19	0.19	0.32
Queue Length 95th (ft)	0	0	0	1	0	0	0	32
Control Delay (s)	0.0	0.0	0.0	13.0	0.0	0.0	0.0	47.3
Lane LOS				B				E
Approach Delay (s)	0.0			0.1				47.3
Approach LOS								E

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4610		3433	4964		3433	3539	1520	1770	3539	1473
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4610		3433	4964		3433	3539	1520	1770	3539	1473
Volume (vph)	620	1010	637	239	570	90	640	601	388	170	589	400
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	620	1010	637	239	570	90	640	601	388	170	589	400
RTOR Reduction (vph)	0	71	0	0	17	0	0	0	291	0	0	310
Lane Group Flow (vph)	620	1576	0	239	643	0	640	601	97	170	589	90
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	37.4	53.3		13.2	29.1		30.0	30.9	30.9	15.6	16.5	16.5
Effective Green, g (s)	36.9	55.3		12.7	31.1		29.5	32.9	32.9	15.1	18.5	18.5
Actuated g/C Ratio	0.28	0.42		0.10	0.24		0.22	0.25	0.25	0.11	0.14	0.14
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	960	1931		330	1170		767	882	379	202	496	206
v/s Ratio Prot	0.18	c0.34		c0.07	0.13		c0.19	c0.17		0.10	c0.17	
v/s Ratio Perm									0.06			0.06
v/c Ratio	0.65	0.95dr		0.72	0.55		0.83	0.68	0.26	0.84	1.19	0.44
Uniform Delay, d1	41.8	33.9		57.9	44.3		48.9	44.8	39.7	57.3	56.8	52.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	3.9		6.5	1.9		7.7	2.6	0.6	25.0	103.2	2.6
Delay (s)	45.2	37.8		64.5	46.2		56.6	47.4	40.3	82.2	159.9	54.6
Level of Service	D	D		E	D		E	D	D	F	F	D
Approach Delay (s)		39.8			51.0			49.3			112.2	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	58.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	229	1410	330	0	1415
Peak Hour Factor	0.85	0.85	1.00	1.00	0.95	0.95
Hourly flow rate (vph)	0	269	1410	330	0	1489
Pedestrians	32					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.74	0.74			0.74	
vC, conflicting volume	2103	667			1772	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1795	0			1350	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	66			100	
cM capacity (veh/h)	52	785			366	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	269	564	564	612	496	496	496
Volume Left	0	0	0	0	0	0	0
Volume Right	269	0	0	330	0	0	0
cSH	785	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.34	0.33	0.33	0.36	0.29	0.29	0.29
Queue Length 95th (ft)	38	0	0	0	0	0	0
Control Delay (s)	12.0	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	12.0	0.0			0.0		
Approach LOS	B						

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.92		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695		1770	1863	1539	1770	4969		1770	5042	
Flt Permitted		0.93		0.70	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1603		1302	1863	1539	1770	4969		1770	5042	
Volume (vph)	20	10	40	199	10	120	60	1680	245	225	960	50
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	10	40	199	10	120	60	1680	245	225	960	50
RTOR Reduction (vph)	0	33	0	0	0	98	0	16	0	0	3	0
Lane Group Flow (vph)	0	38	0	199	10	23	60	1909	0	225	1007	0
Confl. Peds. (#/hr)						11			11			1
Confl. Bikes (#/hr)						2			5			
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		22.0		22.0	22.0	22.0	6.6	63.1		20.9	77.4	
Effective Green, g (s)		22.5		22.5	22.5	22.5	6.1	65.1		20.4	79.4	
Actuated g/C Ratio		0.19		0.19	0.19	0.19	0.05	0.54		0.17	0.66	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		301		244	349	289	90	2696		301	3336	
v/s Ratio Prot					0.01		0.03	c0.38		c0.13	0.20	
v/s Ratio Perm		0.02		c0.15		0.01						
v/c Ratio		0.12		0.82	0.03	0.08	0.67	0.71		0.75	0.30	
Uniform Delay, d1		40.6		46.8	39.8	40.2	56.0	20.4		47.4	8.6	
Progression Factor		1.00		1.00	1.00	1.00	0.87	1.43		1.00	1.00	
Incremental Delay, d2		0.2		18.6	0.0	0.1	13.0	1.5		8.6	0.2	
Delay (s)		40.7		65.3	39.9	40.3	61.6	30.6		55.9	8.8	
Level of Service		D		E	D	D	E	C		E	A	
Approach Delay (s)		40.7			55.4			31.5			17.4	
Approach LOS		D			E			C			B	

Intersection Summary			
HCM Average Control Delay	29.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	86	50	40	30	40	10	40	163	70	10	79	93
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	96	56	44	33	44	11	47	192	82	12	93	109

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	196	89	47	274	12	202
Volume Left (vph)	96	33	47	0	12	0
Volume Right (vph)	44	11	0	82	0	109
Hadj (s)	0.00	0.03	0.53	-0.18	0.53	-0.34
Departure Headway (s)	5.4	5.6	6.1	5.4	6.3	5.4
Degree Utilization, x	0.29	0.14	0.08	0.41	0.02	0.30
Capacity (veh/h)	613	570	561	638	539	630
Control Delay (s)	10.6	9.5	8.5	11.0	8.2	9.5
Approach Delay (s)	10.6	9.5	10.6		9.4	
Approach LOS	B	A	B		A	

Intersection Summary			
Delay	10.2		
HCM Level of Service	B		
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰↱	
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	243	216	170	90	60	119
Peak Hour Factor	0.95	0.95	0.85	0.85	0.80	0.80
Hourly flow rate (vph)	256	227	200	106	75	149
Pedestrians			3			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	306				881	153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	306				881	153
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	80				67	83
cM capacity (veh/h)	1252				227	866

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	256	114	114	133	173	224
Volume Left	256	0	0	0	0	75
Volume Right	0	0	0	0	106	149
cSH	1252	1700	1700	1700	1700	446
Volume to Capacity	0.20	0.07	0.07	0.08	0.10	0.50
Queue Length 95th (ft)	19	0	0	0	0	69
Control Delay (s)	8.6	0.0	0.0	0.0	0.0	21.0
Lane LOS	A					C
Approach Delay (s)	4.6			0.0		21.0
Approach LOS						C

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Volume (vph)	210	888	160	199	751	140	590	1011	334	180	521	708
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	210	888	160	199	751	140	590	1011	334	180	521	708
RTOR Reduction (vph)	0	0	118	0	0	102	0	0	109	0	0	210
Lane Group Flow (vph)	210	888	42	199	751	38	590	1011	225	180	521	498
Confl. Peds. (#/hr)			2			2			5			2
Confl. Bikes (#/hr)			2						1			1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.9	29.6	29.6	9.9	30.6	30.6	22.5	51.0	51.0	9.5	38.0	38.0
Effective Green, g (s)	8.9	31.6	31.6	9.9	32.6	32.6	22.5	53.0	53.0	9.5	40.0	40.0
Actuated g/C Ratio	0.07	0.26	0.26	0.08	0.27	0.27	0.19	0.44	0.44	0.08	0.33	0.33
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	255	1339	410	283	1381	424	644	2246	687	272	1695	915
v/s Ratio Prot	c0.06	c0.17		0.06	0.15		c0.17	0.20		0.05	0.10	
v/s Ratio Perm			0.03			0.02			0.14			c0.18
v/c Ratio	0.82	0.66	0.10	0.70	0.54	0.09	0.92	0.45	0.33	0.66	0.31	0.54
Uniform Delay, d1	54.8	39.5	33.5	53.6	37.3	32.6	47.8	23.3	21.9	53.7	29.7	32.6
Progression Factor	1.20	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.85	0.71
Incremental Delay, d2	17.5	1.4	0.2	6.3	0.7	0.2	17.5	0.7	1.3	4.5	0.5	2.2
Delay (s)	82.9	41.0	25.2	59.9	38.0	32.8	65.3	24.0	23.1	60.3	25.6	25.3
Level of Service	F	D	C	E	D	C	E	C	C	E	C	C
Approach Delay (s)		46.0			41.3			36.4			29.9	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	138	5085	5085	1583	1770	1583
Volume (vph)	10	1088	1709	50	130	70
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	1088	1709	50	130	70
RTOR Reduction (vph)	0	0	0	23	0	45
Lane Group Flow (vph)	10	1088	1709	27	130	25
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	67.1	67.1	62.7	62.7	42.4	42.4
Effective Green, g (s)	69.1	69.1	64.7	64.7	42.9	42.9
Actuated g/C Ratio	0.58	0.58	0.54	0.54	0.36	0.36
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	85	2928	2742	854	633	566
v/s Ratio Prot	0.00	c0.21	c0.34		c0.07	
v/s Ratio Perm	0.07			0.02		0.02
v/c Ratio	0.12	0.37	0.62	0.03	0.21	0.04
Uniform Delay, d1	14.6	13.7	19.2	13.0	26.7	25.2
Progression Factor	1.00	1.00	1.02	1.53	1.00	1.00
Incremental Delay, d2	0.5	0.4	0.8	0.0	0.7	0.1
Delay (s)	15.1	14.1	20.4	19.8	27.5	25.3
Level of Service	B	B	C	B	C	C
Approach Delay (s)		14.1	20.4		26.7	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1461	3539
Volume (vph)	584	1206	250	616	492	200
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	584	1206	250	616	492	200
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	584	1206	250	616	492	200
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	16.3	45.8	8.4	45.8	21.5	21.5
Effective Green, g (s)	16.3	45.8	8.4	45.8	21.5	21.5
Actuated g/C Ratio	0.36	1.00	0.18	1.00	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1222	1583	649	1583	1078	1661
v/s Ratio Prot	0.17		0.07		0.09	0.06
v/s Ratio Perm		c0.76		0.39	0.12	
v/c Ratio	0.48	0.76	0.39	0.39	0.46	0.12
Uniform Delay, d1	11.4	0.0	16.4	0.0	7.8	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.5	0.7	0.7	0.1	0.1
Delay (s)	12.0	3.5	17.1	0.7	7.9	6.9
Level of Service	B	A	B	A	A	A
Approach Delay (s)	6.3		5.4			7.6
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	45.8	Sum of lost time (s)	0.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4969		3433	5085	1541	3433	3539	1515	3433	3539	1527
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4969		3433	5085	1541	3433	3539	1515	3433	3539	1527
Volume (vph)	490	1548	212	180	865	472	300	706	140	502	460	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	490	1548	212	180	865	472	300	706	140	502	460	190
RTOR Reduction (vph)	0	12	0	0	0	12	0	0	6	0	0	152
Lane Group Flow (vph)	490	1748	0	180	865	460	300	706	134	502	460	38
Confl. Peds. (#/hr)			18			23			27			13
Confl. Bikes (#/hr)			3			2			2			3
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	27.9	47.9		10.7	30.7	52.2	29.0	31.9	42.6	21.5	24.4	24.4
Effective Green, g (s)	27.9	49.9		10.7	32.7	54.2	29.0	33.9	44.6	21.5	26.4	26.4
Actuated g/C Ratio	0.21	0.38		0.08	0.25	0.41	0.22	0.26	0.34	0.16	0.20	0.20
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	726	1878		278	1260	633	754	909	558	559	708	305
v/s Ratio Prot	0.14	c0.35		0.05	0.17	c0.12	0.09	c0.20	0.02	c0.15	c0.13	
v/s Ratio Perm						0.18			0.07			0.02
v/c Ratio	0.67	0.93		0.65	0.69	0.73	0.40	0.78	0.24	0.90	0.65	0.12
Uniform Delay, d1	47.9	39.4		58.8	45.0	32.7	44.0	45.5	31.5	54.2	48.5	43.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	9.8		3.9	1.8	3.5	0.1	4.7	0.1	16.7	2.5	0.3
Delay (s)	52.9	49.2		62.7	46.8	36.2	44.2	50.3	31.6	70.9	51.1	43.6
Level of Service	D	D		E	D	D	D	D	C	E	D	D
Approach Delay (s)		50.0			45.4			46.4			58.5	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	49.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5079		4990	4806	1343	1770	5085	1547	4990	4806	1362
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5079		4990	4806	1343	1770	5085	1547	4990	4806	1362
Volume (vph)	1120	1356	10	212	1054	432	20	1300	283	923	1360	680
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1120	1356	10	212	1054	432	20	1300	283	923	1360	680
RTOR Reduction (vph)	0	1	0	0	0	1	0	0	1	0	0	104
Lane Group Flow (vph)	1120	1365	0	212	1054	431	20	1300	282	923	1360	576
Confl. Peds. (#/hr)			9			10			12			
Confl. Bikes (#/hr)						1			2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.0	52.9		12.5	35.4	67.3	4.1	40.0	52.5	31.9	67.8	97.8
Effective Green, g (s)	31.0	54.9		13.5	37.4	70.3	5.1	42.0	55.5	32.9	69.8	100.8
Actuated g/C Ratio	0.19	0.34		0.08	0.23	0.44	0.03	0.26	0.35	0.21	0.44	0.63
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	971	1750		423	1128	626	57	1341	539	1031	2106	862
v/s Ratio Prot	c0.22	0.27		0.04	c0.22	0.14	0.01	c0.26	0.04	c0.18	0.28	0.13
v/s Ratio Perm						0.18			0.14			0.29
v/c Ratio	1.15	0.78		0.50	0.93	0.69	0.35	0.97	0.52	0.90	0.65	0.67
Uniform Delay, d1	64.2	46.8		69.7	59.7	35.7	75.5	58.0	41.3	61.5	35.1	18.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.9	2.4		0.3	14.1	2.5	1.4	17.7	0.4	9.9	0.8	1.5
Delay (s)	145.1	49.2		70.0	73.8	38.3	76.8	75.7	41.8	71.4	35.9	20.1
Level of Service	F	D		E	E	D	E	E	D	E	D	C
Approach Delay (s)		92.4			64.3			69.7			43.4	
Approach LOS		F			E			E			D	

Intersection Summary			
HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	159.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3434		1770	3382		1770	3430		1770	3517	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3434		1770	3382		1770	3430		1770	3517	
Volume (vph)	20	283	70	20	260	110	80	1346	350	40	494	22
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	314	78	24	306	129	84	1417	368	42	520	23
RTOR Reduction (vph)	0	20	0	0	44	0	0	20	0	0	3	0
Lane Group Flow (vph)	22	372	0	24	391	0	84	1765	0	42	540	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	14.6	14.6		16.5	16.5		7.9	54.4		3.1	49.6	
Effective Green, g (s)	14.6	14.6		16.5	16.5		7.9	54.4		3.1	49.6	
Actuated g/C Ratio	0.14	0.14		0.16	0.16		0.08	0.52		0.03	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	247	479		279	533		134	1784		52	1668	
v/s Ratio Prot	0.01	c0.11		0.01	c0.12		c0.05	c0.51		0.02	0.15	
v/s Ratio Perm												
v/c Ratio	0.09	0.78		0.09	0.73		0.63	0.99		0.81	0.32	
Uniform Delay, d1	39.2	43.4		37.6	42.0		46.9	24.8		50.5	17.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	7.8		0.1	5.2		8.8	18.6		58.8	0.1	
Delay (s)	39.4	51.2		37.7	47.2		55.8	43.4		109.3	17.2	
Level of Service	D	D		D	D		E	D		F	B	
Approach Delay (s)		50.6			46.7			44.0			23.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	41.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	104.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	72	10	1446	30	200	484
Peak Hour Factor	0.50	0.50	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	144	20	1522	32	211	509
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked	0.54	0.54			0.54	
vC, conflicting volume	2214	777			1554	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2393	0			1179	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	97			34	
cM capacity (veh/h)	5	589			320	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	144	20	1015	539	211	255	255
Volume Left	144	0	0	0	211	0	0
Volume Right	0	20	0	32	0	0	0
cSH	5	589	1700	1700	320	1700	1700
Volume to Capacity	27.66	0.03	0.60	0.32	0.66	0.15	0.15
Queue Length 95th (ft)	Err	3	0	0	110	0	0
Control Delay (s)	Err	11.3	0.0	0.0	35.6	0.0	0.0
Lane LOS	F	B			E		
Approach Delay (s)	8781.0		0.0		10.4		
Approach LOS	F						

Intersection Summary			
Average Delay	593.8		
Intersection Capacity Utilization	66.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↱			↰↑	↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	3	220	200	0	60	10	340	0	110	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	3	244	222	0	71	12	378	0	122	0	0	0
Pedestrians								1				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	82			245			287	334	123	328	329	41
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	82			245			287	334	123	328	329	41
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			41	100	86	100	100	100
cM capacity (veh/h)	1513			1317			641	583	904	519	587	1021

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2
Volume Total	85	163	222	47	35	378	122
Volume Left	3	0	0	0	0	378	0
Volume Right	0	0	222	0	12	0	122
cSH	1513	1700	1700	1700	1700	641	904
Volume to Capacity	0.00	0.10	0.13	0.03	0.02	0.59	0.14
Queue Length 95th (ft)	0	0	0	0	0	96	12
Control Delay (s)	0.3	0.0	0.0	0.0	0.0	18.4	9.6
Lane LOS	A					C	A
Approach Delay (s)	0.1			0.0		16.2	
Approach LOS						C	

Intersection Summary			
Average Delay	7.7		
Intersection Capacity Utilization	33.9%	ICU Level of Service	A
Analysis Period (min)	15		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2012 Plus Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	272	271	100	13	47.1	D	--
	T	133	152	114	10	44.2	D	--
	R	360	358	99	16	10.9	B	--
	Subtotal	**765**	**781**	**102**	**--**	**30.0**	**C**	**--**
SB	L	141	145	103	9	56.2	E	--
	T	130	131	101	13	47.1	D	--
	R	141	139	99	10	20.4	C	--
	Subtotal	**412**	**415**	**101**	**--**	**41.4**	**D**	**--**
EB	L	74	77	104	11	71.3	E	--
	T	568	566	100	20	43.0	D	--
	R	296	297	100	18	15.5	B	--
	Subtotal	**938**	**940**	**100**	**--**	**36.6**	**D**	**--**
WB	L	230	218	95	13	58.8	E	--
	T	1042	1050	101	34	26.7	C	--
	R	150	151	101	11	5.0	A	--
	Subtotal	**1422**	**1418**	**100**	**--**	**29.3**	**C**	**--**
	Total	**3537**	**3554**	**100**	**--**	**32.8**	**C**	**--**

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	520	484	93	28	224.6	F	--
	R	30	30	100	5	207.5	F	--
	Subtotal	**550**	**514**	**93**	**--**	**223.6**	**F**	**--**
EB	T	546	597	109	16	7.5	A	--
	R	513	516	101	19	3.3	A	--
	Subtotal	**1059**	**1113**	**105**	**--**	**5.6**	**A**	**--**
WB	L	362	355	98	23	64.2	E	--
	T	902	894	99	31	22.8	C	--
	Subtotal	**1264**	**1249**	**99**	**--**	**34.6**	**C**	**--**
	Total	**2873**	**2876**	**100**	**--**	**57.2**	**E**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2012 Plus Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	493	551	112	23	12.5	B	--
	R	150	147	97	9	5.4	A	--
	Subtotal	**643**	**697**	**108**	**--**	**11.0**	**B**	**--**
SB	L	170	168	99	18	53.4	D	--
	T	476	507	107	21	8.0	A	--
	Subtotal	**646**	**675**	**104**	**--**	**19.3**	**B**	**--**
EB	L	232	225	97	19	19.8	B	--
	R	206	207	100	13	3.9	A	--
	Subtotal	**438**	**432**	**99**	**--**	**12.2**	**B**	**--**
	Total	**1727**	**1805**	**105**	**--**	**14.4**	**B**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	90	88	98	7	172.1	F	--
	T	372	366	98	18	175.0	F	--
	R	5	5	100	2	185.7	F	--
	Subtotal	**467**	**459**	**98**	**--**	**174.5**	**F**	**--**
SB	L	23	22	96	5	55.6	F	--
	T	339	333	98	14	56.9	F	--
	R	380	384	101	16	43.2	E	--
	Subtotal	**742**	**739**	**100**	**--**	**49.8**	**E**	**--**
EB	L	310	311	100	13	101.2	F	--
	T	5	4	80	2	95.4	F	--
	R	60	59	98	8	96.1	F	--
	Subtotal	**375**	**374**	**100**	**--**	**100.3**	**F**	**--**
WB	L	5	5	100	2	8.9	A	--
	T	10	11	110	3	10.9	B	--
	R	21	22	105	3	7.9	A	--
	Subtotal	**36**	**38**	**106**	**--**	**8.9**	**A**	**--**
	Total	**1620**	**1610**	**99**	**--**	**96.1**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2012 Plus Project Conditions	**PHF:**	1
TOD:	AM Peak Hr — **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	291	220	76	19	171.4	F	--
	T	664	623	94	34	6.4	A	--
	Subtotal	**955**	**843**	**88**	**--**	**49.4**	**D**	**--**
SB	T	507	471	93	24	99.6	F	--
	R	860	859	100	19	10.6	B	--
	Subtotal	**1367**	**1330**	**97**	**--**	**42.1**	**D**	**--**
WB	L	84	71	83	6	214.6	F	--
	T	5	3	60	1	218.0	F	--
	R	310	317	102	17	18.1	B	--
	Subtotal	**399**	**391**	**98**	**--**	**55.2**	**E**	**--**
	Total	**2721**	**2564**	**94**	**--**	**46.5**	**D**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	695	623	90	45	83.8	F	--
	R	151	136	90	19	5.7	A	--
	Subtotal	**846**	**759**	**90**	**--**	**69.8**	**E**	**--**
SB	L	220	202	92	17	52.4	D	--
	T	371	336	91	16	100.6	F	--
	Subtotal	**591**	**538**	**91**	**--**	**82.5**	**F**	**--**
EB	L	260	264	102	10	27.0	C	--
	R	155	131	85	5	296.1	F	--
	Subtotal	**415**	**395**	**95**	**--**	**116.3**	**F**	**--**
	Total	**1852**	**1691**	**91**	**--**	**84.7**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	316	321	101	15	47.8	D	--
	T	173	374	216	19	26.7	C	--
	R	621	619	100	20	20.8	C	--
	Subtotal	**1110**	**1313**	**118**	**--**	**29.1**	**C**	**--**
SB	L	145	144	99	11	47.9	D	--
	T	120	123	103	13	43.7	D	--
	R	85	88	104	13	12.7	B	--
	Subtotal	**350**	**354**	**101**	**--**	**37.7**	**D**	**--**
EB	L	123	126	102	9	70.5	E	--
	T	846	855	101	19	61.9	E	--
	R	374	367	98	22	28.1	C	--
	Subtotal	**1343**	**1348**	**100**	**--**	**53.5**	**D**	**--**
WB	L	180	171	95	19	71.0	E	--
	T	509	533	105	29	17.6	B	--
	R	110	103	94	13	3.1	A	--
	Subtotal	**799**	**808**	**101**	**--**	**27.1**	**C**	**--**
	Total	**3602**	**3824**	**106**	**--**	**38.1**	**D**	**--**

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	340	340	100	21	75.1	E	--
	R	70	69	99	10	48.6	D	--
	Subtotal	**410**	**409**	**100**	**--**	**70.6**	**E**	**--**
EB	T	1151	1152	100	23	5.3	A	--
	R	481	484	101	13	2.9	A	--
	Subtotal	**1632**	**1636**	**100**	**--**	**4.6**	**A**	**--**
WB	L	239	200	84	7	566.5	F	--
	T	459	445	97	30	49.2	D	--
	Subtotal	**698**	**645**	**92**	**--**	**209.7**	**F**	**--**
	Total	**2740**	**2690**	**98**	**--**	**63.8**	**E**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	492	495	101	21	24.2	C	–
	R	360	353	98	10	8.9	A	–
	Subtotal	**852**	**848**	**100**	**–**	**17.8**	**B**	**–**
SB	L	240	235	98	16	63.4	E	–
	T	394	427	108	26	12.3	B	–
	Subtotal	**634**	**661**	**104**	**–**	**30.4**	**C**	**–**
EB	L	818	824	101	21	25.4	C	–
	R	394	388	98	22	7.0	A	–
	Subtotal	**1212**	**1212**	**100**	**–**	**19.5**	**B**	**–**
	Total	**2698**	**2721**	**101**	**–**	**21.6**	**C**	**–**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	5	100	1	23.4	C	–
	T	629	629	100	21	25.9	D	–
	R	10	11	110	4	23.8	C	–
	Subtotal	**644**	**645**	**100**	**–**	**25.9**	**D**	**–**
SB	L	32	30	94	8	16.2	C	–
	T	496	719	145	28	12.8	B	–
	R	30	30	100	4	10.3	B	–
	Subtotal	**558**	**778**	**139**	**–**	**12.9**	**B**	**–**
EB	L	40	39	98	6	6.9	A	–
	T	5	5	80	3	8.0	A	–
	R	5	5	100	2	4.2	A	–
	Subtotal	**50**	**49**	**98**	**–**	**6.7**	**A**	**–**
WB	L	5	3	60	2	6.3	A	–
	T	5	5	80	2	9.4	A	–
	R	43	45	102	7	6.0	A	–
	Subtotal	**53**	**52**	**98**	**–**	**6.3**	**A**	**–**
	Total	**1305**	**1524**	**117**	**–**	**17.9**	**C**	**–**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

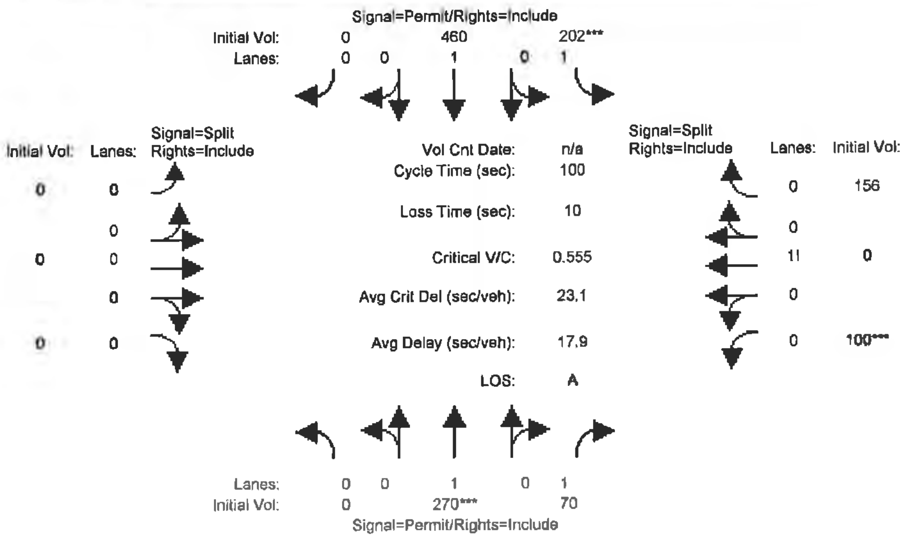
Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	165	158	96	10	79.4	E	--
	T	944	799	85	54	9.7	A	--
	Subtotal	**1109**	**957**	**86**	**--**	**21.1**	**C**	**--**
SB	T	899	780	87	29	253.2	F	--
	R	560	528	94	35	108.2	F	--
	Subtotal	**1459**	**1308**	**90**	**--**	**194.7**	**F**	**--**
WB	L	167	134	80	9	410.6	F	--
	T	10	9	90	3	454.4	F	--
	R	300	286	95	29	148.3	F	--
	Subtotal	**477**	**429**	**90**	**--**	**236.4**	**F**	**--**
	Total	**3045**	**2694**	**88**	**--**	**139.7**	**F**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	469	481	102	31	28.7	C	--
	R	144	145	101	12	9.8	A	--
	Subtotal	**613**	**626**	**102**	**--**	**24.3**	**C**	**--**
SB	L	510	439	86	24	38.5	D	--
	T	556	470	85	13	82.0	F	--
	Subtotal	**1066**	**908**	**85**	**--**	**61.0**	**E**	**--**
EB	L	640	483	75	41	438.9	F	--
	R	331	211	64	18	1152.4	F	--
	Subtotal	**971**	**693**	**71**	**--**	**655.9**	**F**	**--**
	Total	**2650**	**2228**	**84**	**--**	**236.9**	**F**	**--**

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project AM

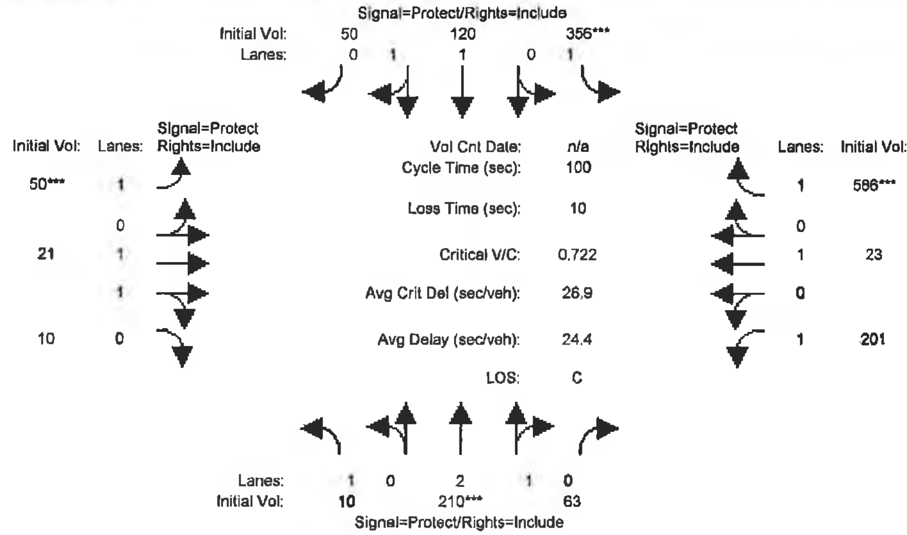
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	270	70	202	460	0	0	0	0	100	0	156
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	270	70	202	460	0	0	0	0	100	0	156
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	270	70	202	460	0	0	0	0	100	0	156
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	270	70	202	460	0	0	0	0	100	0	156
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	270	70	202	460	0	0	0	0	100	0	156
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	270	70	202	460	0	0	0	0	100	0	156
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.39	0.00	0.61
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	625	0	975
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.04	0.13	0.29	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:		****		****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project AM

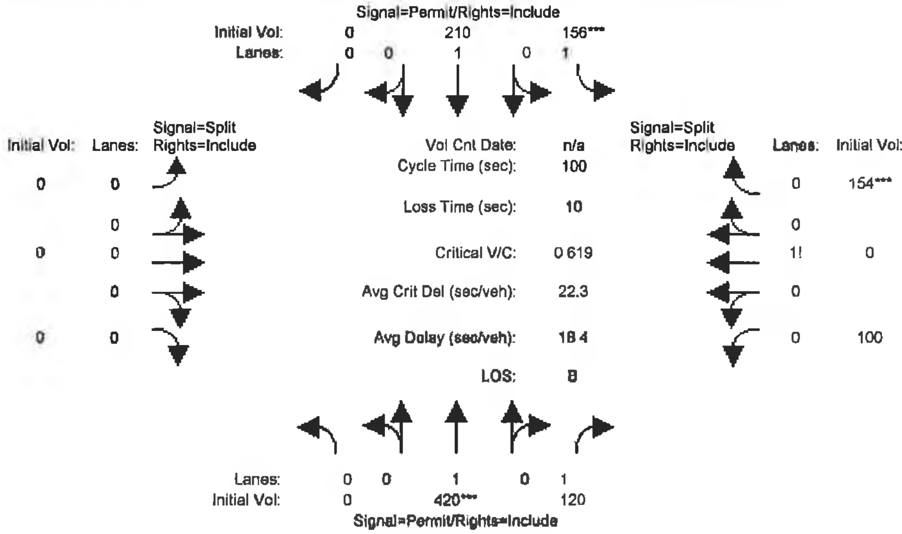
Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	210	63	356	120	50	50	21	10	201	23	586
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	210	63	356	120	50	50	21	10	201	23	586
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	210	63	356	120	50	50	21	10	201	23	586
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	210	63	356	120	50	50	21	10	201	23	498
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	210	63	356	120	50	50	21	10	201	23	498
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	210	63	356	120	50	50	21	10	201	23	498
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.31	0.69	1.00	1.41	0.59	1.00	1.35	0.65	1.00	1.00	1.00
Final Sat.:	1600	3692	1108	1600	2259	941	1600	2168	1032	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.06	0.06	0.22	0.05	0.05	0.03	0.01	0.01	0.13	0.01	0.31
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project PM

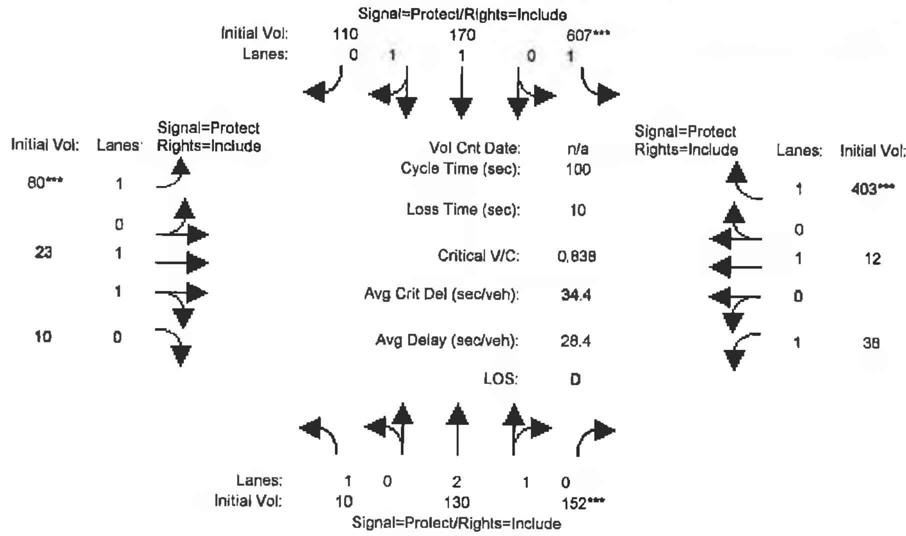
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	420	120	156	210	0	0	0	0	100	0	154
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	420	120	156	210	0	0	0	0	100	0	154
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	420	120	156	210	0	0	0	0	100	0	154
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	420	120	156	210	0	0	0	0	100	0	154
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	420	120	156	210	0	0	0	0	100	0	154
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	420	120	156	210	0	0	0	0	100	0	154
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.39	0.00	0.61
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	630	0	970
Capacity Analysis Module:												
Vol/Sat:	0.00	0.26	0.08	0.10	0.13	0.00	0.00	0.00	0.00	0.16	0.00	0.16
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project PM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	130	152	607	170	110	80	23	10	38	12	403
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	130	152	607	170	110	80	23	10	38	12	403
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	130	152	607	170	110	80	23	10	38	12	403
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	130	152	607	170	110	80	23	10	38	12	343
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	130	152	607	170	110	80	23	10	38	12	343
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	130	152	607	170	110	80	23	10	38	12	343
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.21	0.79	1.00	1.39	0.61	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	1943	1257	1600	2230	970	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.04	0.10	0.38	0.09	0.09	0.05	0.01	0.01	0.02	0.01	0.21
Crit Moves:			****	****			****					****

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Via Princessa to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Plus Project Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2140	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	575	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	587	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	9.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Sand Canyon to Soledad Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Plus Project Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2073	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	557	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	758	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	758	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	11.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

______Operational Analysis______

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Via Princessa to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

______Flow Inputs and Adjustments______

Volume, V	5444	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1433	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1948	pc/h/ln

______Speed Inputs and Adjustments______

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

______LOS and Performance Measures______

Flow rate, vp	1948	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	62.3	mi/h
Number of lanes, N	3	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Sand Canyon to Soledad Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Plus Project Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	4872	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1282	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2615	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2615	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	2	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Soledad Canyon to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Plus Project Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	2546	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	663	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	902	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	902	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	13.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: PM Peak Hour
Freeway/Direction: SR 14 SB
From/To: Sand Canyon to Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

_____Flow Inputs and Adjustments_____

Volume, V	2847	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	741	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	756	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	756	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	11.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Leisch Method for Weaving Analysis

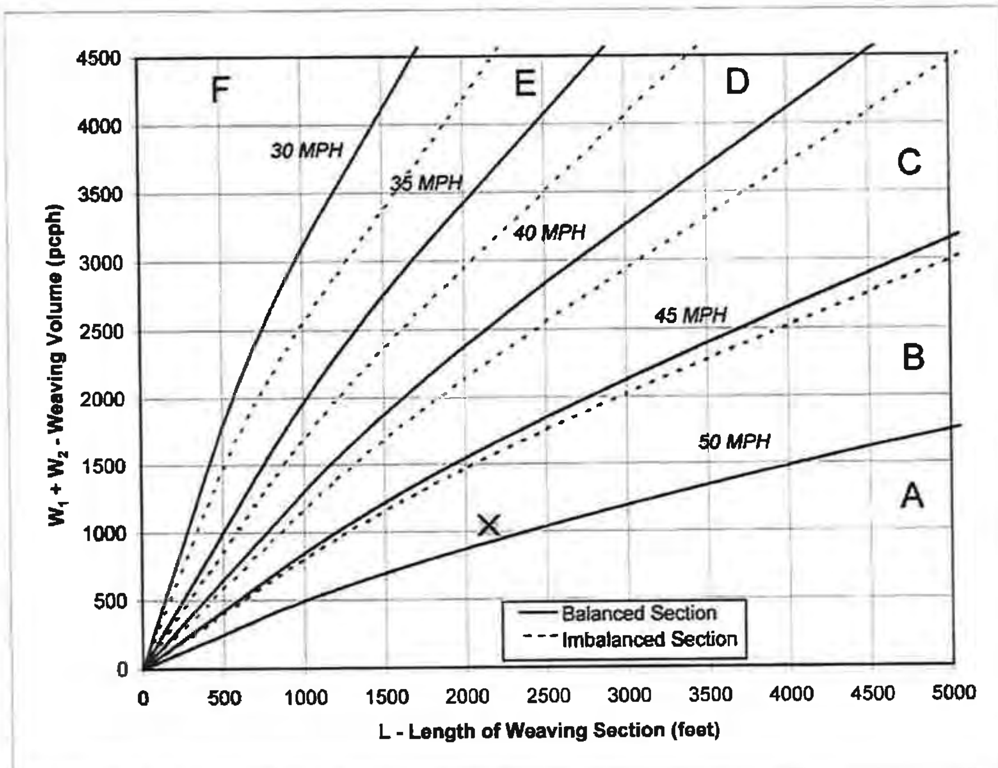
Data Input

Number of Entering Mainline Lanes	N_b	4
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,140

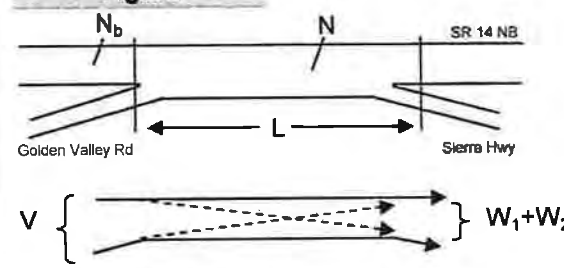
Project Information

Project	Vista Canyon Ranch
Scenario	2012 PP Conditions - AM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	2,685	Volume (vph)*	500	Volume (vph)*	450
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,222	Volume (pcph)	550	Volume (pcph)	495



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**
   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.1**
4. Weaving Intensity Factor (k) **1.34**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **678**
6. Level of Service (LOS) **A**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

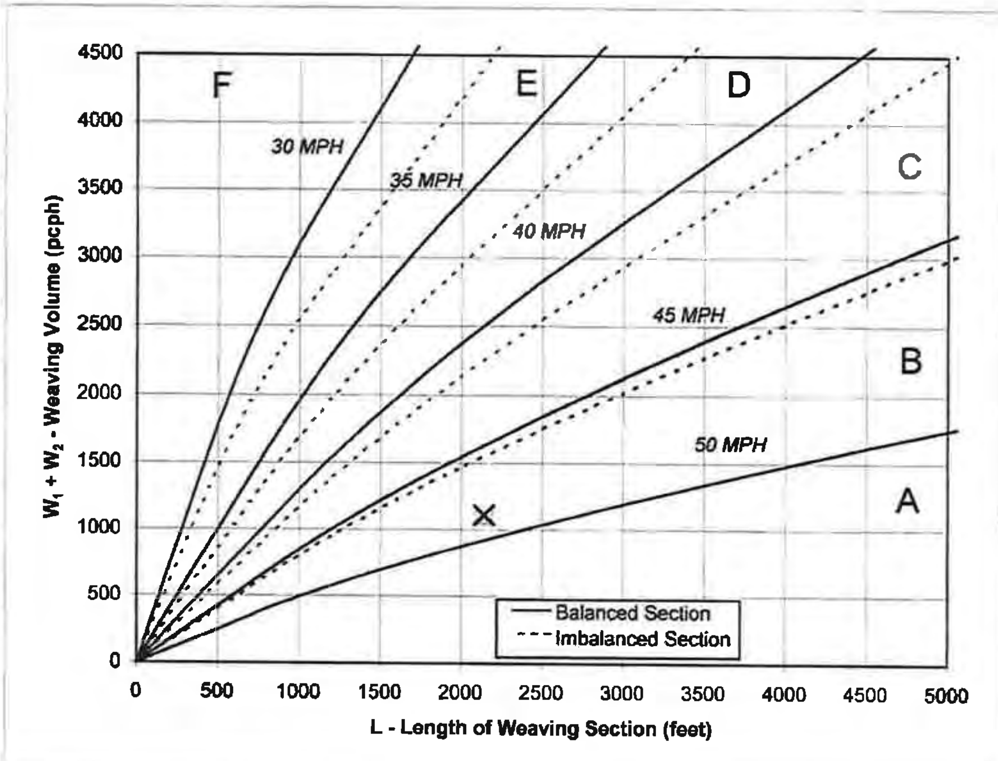
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,140

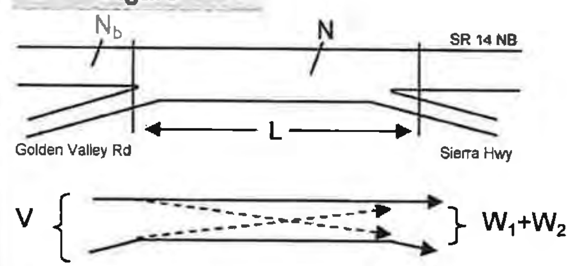
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,421	Volume (vph)*	310	Volume (vph)*	700
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	7,705	Volume (pcph)	341	Volume (pcph)	770

Project Information

Project	Vista Canyon Ranch
Scenario	2012 PP Conditions - PM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **48.7**
4. Weaving Intensity Factor (k) **1.40**
5. Service Volume (SV, pcph)
   SV = (1/N)*[V + (k - 1)*min(W_1, W_2)] **1,961**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

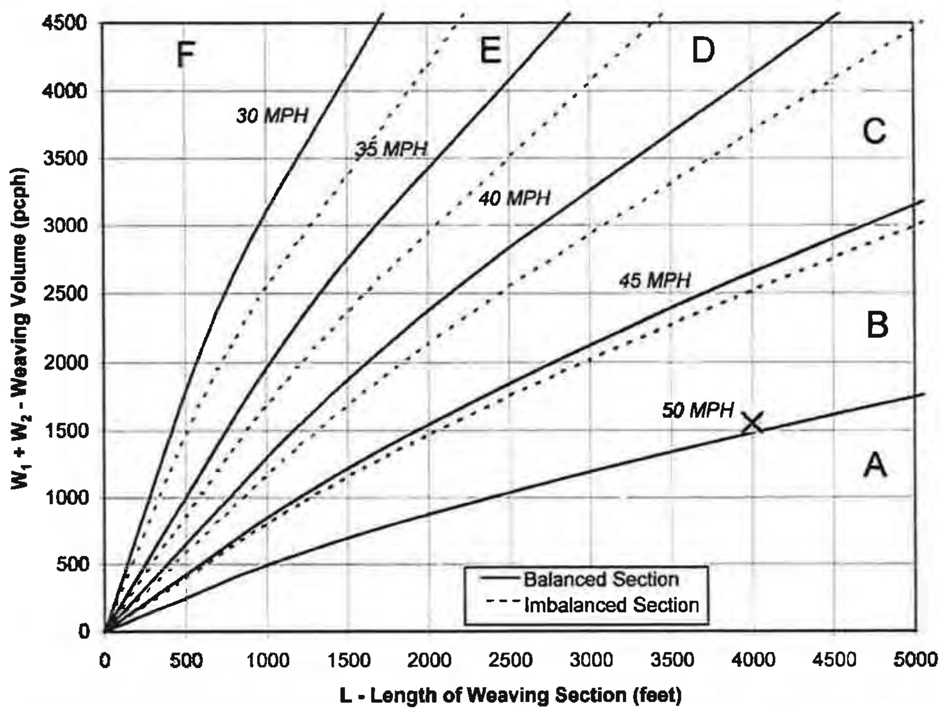
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,000

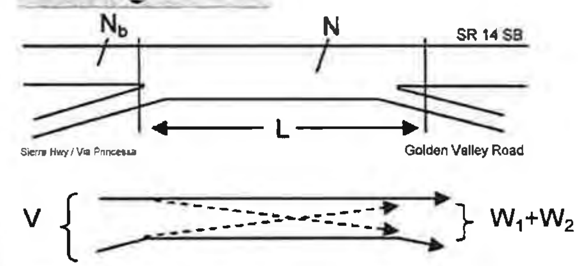
Project Information

Project	Vista Canyon Ranch
Scenario	2012 PP Conditions - PM
Freeway	SR 14 SB
On-ramp	Sierra Hwy / Via Princessa
Off-ramp	Golden Valley Road

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,655	Volume (vph)*	1,285	Volume (vph)*	130
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	4,386	Volume (pcph)	1,414	Volume (pcph)	143



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **49.6**
4. Weaving Intensity Factor (k) **1.00**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **1,097**
6. Level of Service (LOS) **B**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2140	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	438	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2140		438			vph
Peak-hour factor, PHF	0.93		0.80			
Peak 15-min volume, v15	575		137			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2347		553			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1335 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2347	9400	No
$v_{FO} = v_F - v_R$	1794	9400	No
v_R	553	2000	No
v_3 or v_{av34}	506 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1335		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1335	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 11.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.478

Space mean speed in ramp influence area, S_R = 54.0 mph

Space mean speed in outer lanes, S_0 = 71.3 mph

Space mean speed for all vehicles, S = 60.3 mph

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Phone: Fax:
E-mail:

______Merge Analysis______

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

______Freeway Data______

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1753	vph

______On Ramp Data______

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	320	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

______Adjacent Ramp Data (if one exists)______

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

______Conversion to pc/h Under Base Conditions______

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1753	320		vph
Peak-hour factor, PHF	0.93	0.85		
Peak 15-min volume, v15	471	94		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1923	380		pcph

______Estimation of V12 Merge Areas______

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1137 pc/h

______Capacity Checks______

	Actual	Maximum	LOS F?
v_{FO}	2303	7050	No
v_3 or v_{av34}	786 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1137		(Equation 25-8)	

______Flow Entering Merge Influence Area______

	Actual	Max Desirable	Violation?
v_{R12}	1137	4600	No

______Level of Service Determination (if not F)______

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

______Speed Estimation______

Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 58.0	mph
Space mean speed in outer lanes,	S_0 = 64.0	mph
Space mean speed for all vehicles,	S = 59.9	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2012 Plus Project Conditions
Description: Vista Canyon Ranch	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3446	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3446		550			vph
Peak-hour factor, PHF	0.94		0.90			
Peak 15-min volume, v15	916		153			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3739		617			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3739 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3739	4700	No
$v_{FO} = v_F - v_R$	3122	4700	No
v_R	617	2000	No
v_{3} or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3739		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3739	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.484	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 53.9	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2896	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	873	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2896	873		vph
Peak-hour factor, PHF	0.94	0.88		
Peak 15-min volume, v15	770	248		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	3142	1002		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3142 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4144	4700	No
v_{3} or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3142		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3142	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.462	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 54.4	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2235	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2235		415			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	601		122			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2451		493			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1347 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2451	9400	No
$v_{FO} = v_F - v_R$	1958	9400	No
v_R	493	2000	No
$v_{3 \text{ or } av34}$	552 pc/h	(Equation 25-15 or 25-16)	
Is $v_{3 \text{ or } av34}$ > 2700 pc/h?		No	
Is $v_{3 \text{ or } av34}$ > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1347		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1347	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.472	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 60.7	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3310	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1151	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3310		1151			vph
Peak-hour factor, PHF	0.94		0.95			
Peak 15-min volume, v15	880		303			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3592		1224			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 2125 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4816	7050	No
v_3 or v_{av34}	1467 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 2125		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	2125	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 27.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.397	
Space mean speed in ramp influence area,	S_R = 55.9	mph
Space mean speed in outer lanes,	S_0 = 61.5	mph
Space mean speed for all vehicles,	S = 57.5	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5444	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1212	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5444		1212			vph
Peak-hour factor, PHF	0.95		0.90			
Peak 15-min volume, v15	1433		337			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	5845		1360			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.551 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3833 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5845	7050	No
$v_{FO} = v_F - v_R$	4485	7050	No
v_R	1360	2000	No
v_{3} or v_{av34}	2012 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3833		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3833	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 32.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.550	
Space mean speed in ramp influence area,	S_R = 52.3	mph
Space mean speed in outer lanes,	S_0 = 67.4	mph
Space mean speed for all vehicles,	S = 56.7	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4272	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4272		600			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1124		158			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	4587		638			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 4587 pc/h

Capacity Checks

	Actual		Maximum	LOS F?
v_{FO}	5225		4700	Yes
v_3 or v_{av34}	0	pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?			No	
Is v_3 or v_{av34} > 1.5 v_{12} /2			No	
If yes, v_{12A} = 4587			(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	4587	4600	Yes

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 42.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.011	
Space mean speed in ramp influence area,	S_R = 41.8	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 41.8	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2546	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2546		410			vph
Peak-hour factor, PHF	0.96		0.85			
Peak 15-min volume, v15	663		121			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2705		487			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.670 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1973 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2705	7050	No
$v_{FO} = v_F - v_R$	2218	7050	No
v_R	487	2000	No
v_3 or v_{av34}	732 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1973		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1973	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 16.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.472	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 57.9	mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2136	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	711	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2136	711		vph
Peak-hour factor, PHF	0.96	0.98		
Peak 15-min volume, v15	556	181		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2270	733		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1406 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3003	7050	No
v_{3} or v_{av34}	864 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1406		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1406	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.249

Space mean speed in ramp influence area, S_R = 59.3 mph

Space mean speed in outer lanes, S_0 = 63.7 mph

Space mean speed for all vehicles, S = 60.5 mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5731	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	971	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5731		971			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1508		256			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6153		1032			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.559 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3893 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6153	7050	No
$v_{FO} = v_F - v_R$	5121	7050	No
v_R	1032	2000	No
v_3 or v_{av34}	2260 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 3893		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3893	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.521	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_0 = 66.4	mph
Space mean speed for all vehicles,	S = 57.3	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Via Princessa
Jurisdiction: Santa Clarita
Analysis Year: 2012 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	725	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2370		725			vph
Peak-hour factor, PHF	0.96		0.95			
Peak 15-min volume, v15	617		191			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2518		771			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.281 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 707 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3289	9400	No
v_3 or v_{av34}	905 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1007		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1007	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 15.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, M_S = 0.309

Space mean speed in ramp influence area, S_R = 57.9 mph

Space mean speed in outer lanes, S_0 = 64.1 mph

Space mean speed for all vehicles, S = 60.6 mph

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	272	281	103	7	54.7	D	--
	T	133	159	120	9	51.2	D	--
	R	360	355	99	24	9.8	A	--
	Subtotal	**765**	**795**	**104**	--	**34.0**	**C**	--
SB	L	141	146	104	13	54.4	D	--
	T	130	131	101	11	49.8	D	--
	R	141	139	99	15	19.3	B	--
	Subtotal	**412**	**416**	**101**	--	**41.2**	**D**	--
EB	L	74	68	92	10	64.1	E	--
	T	568	564	99	27	38.6	D	--
	R	296	296	100	18	13.4	B	--
	Subtotal	**938**	**927**	**99**	--	**32.4**	**C**	--
WB	L	230	219	95	8	58.9	E	--
	T	1042	1035	99	24	30.6	C	--
	R	150	148	99	5	6.2	A	--
	Subtotal	**1422**	**1402**	**99**	--	**32.5**	**C**	--
	Total	**3537**	**3540**	**100**	--	**33.8**	**C**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	520	471	91	19	165.9	F	--
	R	30	29	93	5	134.5	F	--
	Subtotal	**550**	**499**	**91**	--	**164.1**	**F**	--
EB	T	546	588	108	20	17.6	B	--
	R	513	516	101	28	7.3	A	--
	Subtotal	**1059**	**1104**	**104**	--	**12.8**	**B**	--
WB	L	362	356	98	23	43.3	D	--
	T	902	893	99	28	18.8	B	--
	Subtotal	**1264**	**1249**	**99**	--	**25.7**	**C**	--
	Total	**2873**	**2852**	**99**	--	**44.9**	**D**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	493	561	114	23	15.8	B	--
	R	150	153	102	13	5.7	A	--
	Subtotal	**643**	**714**	**111**	--	**13.6**	**B**	--
SB	L	170	169	99	14	26.6	C	--
	T	476	502	105	22	7.7	A	--
	Subtotal	**646**	**670**	**104**	--	**12.5**	**B**	--
EB	L	232	230	99	14	22.0	C	--
	R	206	202	98	19	4.1	A	--
	Subtotal	**438**	**432**	**99**	--	**13.6**	**B**	--
	Total	**1727**	**1816**	**105**	--	**13.2**	**B**	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	90	93	103	7	8.0	A	--
	T	372	377	101	18	9.1	A	--
	R	5	6	120	3	6.4	A	--
	Subtotal	**467**	**476**	**102**	--	**8.8**	**A**	--
SB	L	23	21	91	5	10.5	B	--
	T	339	320	94	17	13.4	B	--
	R	380	386	102	18	11.9	B	--
	Subtotal	**742**	**727**	**98**	--	**12.5**	**B**	--
EB	L	310	313	101	16	10.3	B	--
	T	5	4	80	1	13.6	B	--
	R	60	56	93	6	10.8	B	--
	Subtotal	**375**	**374**	**100**	--	**10.5**	**B**	--
WB	L	5	5	100	3	7.7	A	--
	T	10	12	120	3	7.8	A	--
	R	21	24	114	4	7.6	A	--
	Subtotal	**36**	**41**	**114**	--	**7.7**	**A**	--
	Total	**1620**	**1617**	**100**	--	**10.8**	**B**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	291	281	97	15	29.3	C	--
	T	664	684	103	20	4.8	A	--
	Subtotal	**955**	**965**	**101**	--	**11.9**	**B**	--
SB	T	507	502	99	15	18.0	B	--
	R	860	862	100	28	9.9	A	--
	Subtotal	**1367**	**1364**	**100**	--	**12.9**	**B**	--
WB	L	84	86	102	9	36.0	D	--
	T	5	5	100	2	40.2	D	--
	R	310	315	102	17	10.8	B	--
	Subtotal	**399**	**406**	**102**	--	**16.5**	**B**	--
	Total	**2721**	**2735**	**101**	--	**13.1**	**B**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	695	740	106	18	12.8	B	--
	R	151	150	99	14	5.3	A	--
	Subtotal	**846**	**890**	**105**	--	**11.6**	**B**	--
SB	L	220	212	96	11	42.5	D	--
	T	371	384	104	14	3.3	A	--
	Subtotal	**591**	**596**	**101**	--	**17.2**	**B**	--
EB	L	260	271	104	14	33.4	C	--
	R	155	161	104	12	10.1	B	--
	Subtotal	**415**	**432**	**104**	--	**24.7**	**C**	--
	Total	**1852**	**1918**	**104**	--	**16.3**	**B**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2012 Plus Project Conditions w/ Mitigation	**PHF:**	1
TOD:	PM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd.   **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	316	314	99	13	49.0	D	--
	T	173	379	219	21	27.1	C	--
	R	621	617	99	23	20.7	C	--
	Subtotal	**1110**	**1310**	**118**	--	**29.3**	**C**	--
SB	L	145	148	102	10	51.2	D	--
	T	120	129	108	11	45.9	D	--
	R	85	87	102	9	13.3	B	--
	Subtotal	**350**	**364**	**104**	--	**40.3**	**D**	--
EB	L	123	114	93	12	66.5	E	--
	T	846	851	101	26	47.9	D	--
	R	374	366	98	16	16.8	B	--
	Subtotal	**1343**	**1331**	**99**	--	**40.9**	**D**	--
WB	L	180	175	97	12	52.7	D	--
	T	509	521	102	23	26.6	C	--
	R	110	109	99	15	5.0	A	--
	Subtotal	**799**	**805**	**101**	--	**29.3**	**C**	--
	Total	**3602**	**3811**	**106**	--	**34.4**	**C**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps   **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	340	339	100	18	20.6	C	--
	R	70	70	100	6	11.2	B	--
	Subtotal	**410**	**409**	**100**	--	**19.0**	**B**	--
EB	T	1151	1159	101	30	16.0	B	--
	R	481	477	99	17	4.5	A	--
	Subtotal	**1632**	**1635**	**100**	--	**12.6**	**B**	--
WB	L	239	224	94	9	145.7	F	--
	T	459	441	96	18	8.8	A	--
	Subtotal	**698**	**665**	**95**	--	**55.0**	**E**	--
	Total	**2740**	**2710**	**99**	--	**24.0**	**C**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch — **HCM:** 2000
Scenario: 2012 Plus Project Conditions w/ Mitigation — **PHF:** 1
TOD: PM Peak Hr — **Analysis Period:** Hourly — **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	492	493	100	27	26.9	C	--
	R	360	355	99	21	9.6	A	--
	Subtotal	**852**	**848**	**100**	--	**19.6**	**B**	--
SB	L	240	243	101	17	31.5	C	--
	T	394	432	110	20	10.7	B	--
	Subtotal	**634**	**675**	**106**	--	**18.2**	**B**	--
EB	L	818	811	99	22	35.8	D	--
	R	394	398	101	18	7.4	A	--
	Subtotal	**1212**	**1209**	**100**	--	**26.4**	**C**	--
	Total	**2698**	**2732**	**101**	--	**22.3**	**C**	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	5	5	100	2	5.6	A	--
	T	629	619	98	15	8.1	A	--
	R	10	10	100	3	6.8	A	--
	Subtotal	**644**	**634**	**98**	--	**8.1**	**A**	--
SB	L	32	32	100	7	8.6	A	--
	T	496	728	147	25	8.2	A	--
	R	30	28	93	8	9.0	A	--
	Subtotal	**558**	**788**	**141**	--	**8.3**	**A**	--
EB	L	40	41	103	4	4.5	A	--
	T	5	4	80	2	6.4	A	--
	R	5	5	100	2	3.9	A	--
	Subtotal	**50**	**50**	**100**	--	**4.6**	**A**	--
WB	L	5	4	80	2	6.8	A	--
	T	5	5	100	2	6.6	A	--
	R	43	44	102	7	5.6	A	--
	Subtotal	**53**	**53**	**100**	--	**5.8**	**A**	--
	Total	**1305**	**1525**	**117**	--	**8.0**	**A**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2012 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

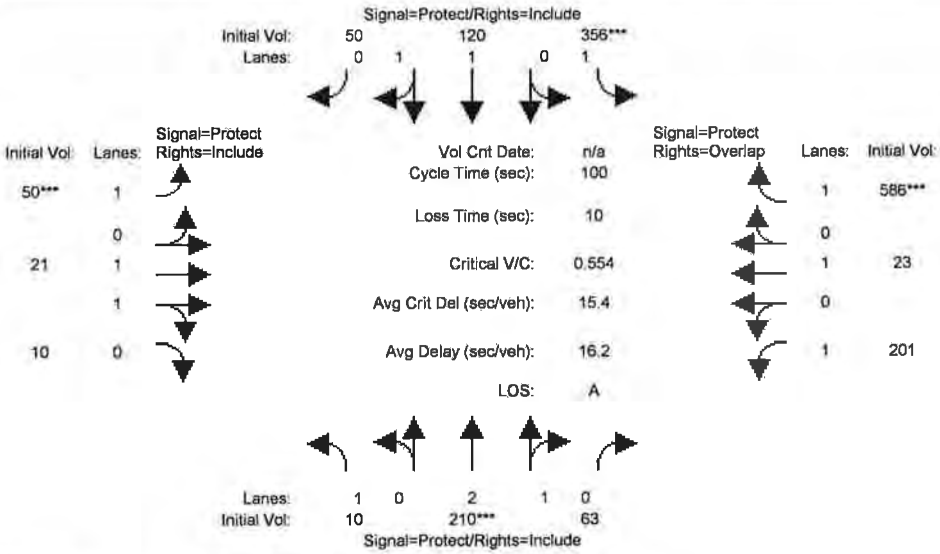
Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	165	160	97	8	55.5	E	--
	T	944	956	101	25	1.6	A	--
	Subtotal	**1109**	**1115**	**101**	--	**9.3**	**A**	--
SB	T	899	888	99	18	21.1	C	--
	R	560	564	101	27	7.4	A	--
	Subtotal	**1459**	**1453**	**100**	--	**15.8**	**B**	--
WB	L	167	162	97	8	44.9	D	--
	T	10	10	100	4	46.9	D	--
	R	300	296	99	14	16.5	B	--
	Subtotal	**477**	**468**	**98**	--	**27.0**	**C**	--
	Total	**3045**	**3035**	**100**	--	**15.1**	**B**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	469	475	101	15	31.2	C	--
	R	144	150	104	8	10.6	B	--
	Subtotal	**613**	**624**	**102**	--	**26.3**	**C**	--
SB	L	510	501	98	17	16.8	B	--
	T	556	548	99	19	12.9	B	--
	Subtotal	**1066**	**1048**	**98**	--	**14.8**	**B**	--
EB	L	640	642	100	21	33.3	C	--
	R	331	331	100	16	24.2	C	--
	Subtotal	**971**	**973**	**100**	--	**30.2**	**C**	--
	Total	**2650**	**2645**	**100**	--	**23.2**	**C**	--

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project Mitigation AM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	210	63	356	120	50	50	21	10	201	23	586
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	210	63	356	120	50	50	21	10	201	23	586
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	210	63	356	120	50	50	21	10	201	23	586
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	210	63	356	120	50	50	21	10	201	23	586
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	210	63	356	120	50	50	21	10	201	23	586
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	210	63	356	120	50	50	21	10	201	23	586
OvlAdjVol:												230
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.31	0.69	1.00	1.41	0.59	1.00	1.35	0.65	1.00	1.00	1.00
Final Sat.:	1600	3692	1108	1600	2259	941	1600	2168	1032	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.06	0.06	0.22	0.05	0.05	0.03	0.01	0.01	0.13	0.01	0.37
OvlAdjV/S:												0.14
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
2012 Plus Project Mitigation PM

Intersection #16: Via Princessa/Lost Canyon Road

Signal=Protect/Rights=Include

Initial Vol: 110 170 607***

Lanes: 0 1 1 0 1

Initial Vol:	Lanes:	Signal=Protect Rights=Include			Signal=Protect Rights=Overlap	Lanes:	Initial Vol:
80***	1		Vol Cnt Date:	n/a		1	403
			Cycle Time (sec):	100			
	0		Loss Time (sec):	10		0	
23	1		Critical V/C:	0.632		1	12***
	1		Avg Crit Del (sec/veh):	18.6		0	
10	0		Avg Delay (sec/veh):	13.7		1	38
			LOS:	B			

Lanes: 1 0 2 1 0

Initial Vol: 10 130 152***

Signal=Protect/Rights=Include

Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	130	152	607	170	110	80	23	10	38	12	403
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	130	152	607	170	110	80	23	10	38	12	403
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	130	152	607	170	110	80	23	10	38	12	403
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	130	152	607	170	110	80	23	10	38	12	403
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	130	152	607	170	110	80	23	10	38	12	403
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	130	152	607	170	110	80	23	10	38	12	403
OvlAdjVol:												0
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.21	0.79	1.00	1.39	0.61	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	1943	1257	1600	2230	970	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.04	0.10	0.38	0.09	0.09	0.05	0.01	0.01	0.02	0.01	0.25
OvlAdjV/S:												0.00
Crit Moves:			****	****			****				****	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	61	50	20	10	10	421
Peak Hour Factor	0.55	0.55	0.80	0.80	0.90	0.90
Hourly flow rate (vph)	111	91	25	12	11	468
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	308	245	479			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	308	245	479			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	89	98			
cM capacity (veh/h)	669	794	1083			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	202	38	479
Volume Left	111	25	0
Volume Right	91	0	468
cSH	720	1083	1700
Volume to Capacity	0.28	0.02	0.28
Queue Length 95th (ft)	29	2	0
Control Delay (s)	11.9	5.7	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	5.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	950	290	175	1820	143	86
Peak Hour Factor	0.85	0.85	0.90	0.90	0.40	0.40
Hourly flow rate (vph)	1118	341	194	2022	358	215
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1459		2351	543
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1459		2351	543
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			58		0	56
cM capacity (veh/h)			459		17	484

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	447	447	565	194	674	674	674	572
Volume Left	0	0	0	194	0	0	0	358
Volume Right	0	0	341	0	0	0	0	215
cSH	1700	1700	1700	459	1700	1700	1700	27
Volume to Capacity	0.26	0.26	0.33	0.42	0.40	0.40	0.40	21.11
Queue Length 95th (ft)	0	0	0	52	0	0	0	Err
Control Delay (s)	0.0	0.0	0.0	18.5	0.0	0.0	0.0	Err
Lane LOS				C				F
Approach Delay (s)	0.0			1.6				Err
Approach LOS								F

Intersection Summary			
Average Delay	1348.4		
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑↱		↰↰	↑↑	↱	↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.94
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4598		3433	5009		3433	3539	1546	1770	3539	1490
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4598		3433	5009		3433	3539	1546	1770	3539	1490
Volume (vph)	320	901	749	460	1433	123	369	542	169	136	715	540
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	320	901	749	460	1433	123	369	542	169	136	715	540
RTOR Reduction (vph)	0	119	0	0	8	0	0	0	121	0	0	263
Lane Group Flow (vph)	320	1531	0	460	1548	0	369	542	48	136	715	277
Confl. Peds. (#/hr)			49			22			8			39
Confl. Bikes (#/hr)			2			4			2			6
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	15.1	38.1		19.2	42.2		16.7	32.0	32.0	11.7	27.0	27.0
Effective Green, g (s)	14.6	40.1		18.7	44.2		16.2	34.0	34.0	11.2	29.0	29.0
Actuated g/C Ratio	0.12	0.33		0.16	0.37		0.13	0.28	0.28	0.09	0.24	0.24
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	418	1536		535	1845		463	1003	438	165	855	360
v/s Ratio Prot	0.09	c0.33		c0.13	0.31		c0.11	0.15		0.08	c0.20	
v/s Ratio Perm									0.03			0.19
v/c Ratio	0.77	1.22dr		0.86	0.84		0.80	0.54	0.11	0.82	0.84	0.77
Uniform Delay, d1	51.0	39.9		49.4	34.7		50.3	36.4	31.8	53.4	43.2	42.4
Progression Factor	1.00	1.00		1.00	1.00		0.76	0.67	0.84	1.00	1.00	1.00
Incremental Delay, d2	7.4	22.3		12.6	4.8		8.6	0.9	0.2	26.0	7.7	10.6
Delay (s)	58.4	62.2		61.9	39.4		47.0	25.3	26.8	79.5	51.0	53.0
Level of Service	E	E		E	D		D	C	C	E	D	D
Approach Delay (s)		61.6			44.6			33.0			54.6	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM Average Control Delay	50.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	291	919	130	0	1913
Peak Hour Factor	0.75	0.75	0.90	0.90	0.95	0.95
Hourly flow rate (vph)	0	388	1021	144	0	2014
Pedestrians	72					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	6					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1837	485			1238	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1671	127			987	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	48			100	
cM capacity (veh/h)	71	740			573	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	388	408	408	349	671	671	671
Volume Left	0	0	0	0	0	0	0
Volume Right	388	0	0	144	0	0	0
cSH	740	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.52	0.24	0.24	0.21	0.39	0.39	0.39
Queue Length 95th (ft)	77	0	0	0	0	0	0
Control Delay (s)	15.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	15.1	0.0			0.0		
Approach LOS	C						

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.93	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1658		1770	1863	1472	1770	4914		1770	5070	
Flt Permitted		0.98		0.68	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1635		1274	1863	1472	1770	4914		1770	5070	
Volume (vph)	10	10	70	339	5	180	30	959	209	183	1650	30
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	10	10	70	339	5	180	30	959	209	183	1650	30
RTOR Reduction (vph)	0	49	0	0	0	125	0	30	0	0	1	0
Lane Group Flow (vph)	0	41	0	339	5	55	30	1138	0	183	1679	0
Confl. Peds. (#/hr)						46			18			1
Confl. Bikes (#/hr)						1						
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		35.9		35.9	35.9	35.9	4.1	51.7		18.4	66.0	
Effective Green, g (s)		36.4		36.4	36.4	36.4	3.6	53.7		17.9	68.0	
Actuated g/C Ratio		0.30		0.30	0.30	0.30	0.03	0.45		0.15	0.57	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		496		386	565	447	53	2199		264	2873	
v/s Ratio Prot					0.00		0.02	0.23		c0.10	c0.33	
v/s Ratio Perm		0.03		c0.27		0.04						
v/c Ratio		0.08		0.88	0.01	0.12	0.57	0.52		0.69	0.58	
Uniform Delay, d1		29.9		39.7	29.2	30.2	57.4	23.8		48.4	16.8	
Progression Factor		1.00		1.00	1.00	1.00	1.06	0.64		1.03	1.36	
Incremental Delay, d2		0.1		19.6	0.0	0.1	7.9	0.9		3.0	0.4	
Delay (s)		29.9		59.3	29.2	30.4	68.8	16.2		52.7	23.3	
Level of Service		C		E	C	C	E	B		D	C	
Approach Delay (s)		29.9			49.1			17.5			26.2	
Approach LOS		C			D			B			C	

Intersection Summary

HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	85	30	80	70	40	5	30	152	30	5	149	123
Peak Hour Factor	0.75	0.75	0.75	0.85	0.85	0.85	0.90	0.90	0.90	0.75	0.75	0.75
Hourly flow rate (vph)	113	40	107	82	47	6	33	169	33	7	199	164

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	260	135	33	202	7	363
Volume Left (vph)	113	82	33	0	7	0
Volume Right (vph)	107	6	0	33	0	164
Hadj (s)	-0.12	0.13	0.53	-0.08	0.53	-0.28
Departure Headway (s)	5.8	6.3	6.8	6.2	6.7	5.8
Degree Utilization, x	0.42	0.24	0.06	0.35	0.01	0.59
Capacity (veh/h)	562	503	487	536	510	582
Control Delay (s)	12.8	11.2	9.1	11.3	8.5	15.5
Approach Delay (s)	12.8	11.2	11.0		15.4	
Approach LOS	B	B	B		C	

Intersection Summary			
Delay	13.1		
HCM Level of Service	B		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	172	210	230	50	110	249
Peak Hour Factor	0.80	0.80	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	215	262	256	56	122	277
Pedestrians		1				
Lane Width (ft)		12.0				
Walking Speed (ft/s)		4.0				
Percent Blockage		0				
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	311				845	157
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	311				845	157
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	83				51	68
cM capacity (veh/h)	1246				250	860

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	215	131	131	170	141	122	277
Volume Left	215	0	0	0	0	122	0
Volume Right	0	0	0	0	56	0	277
cSH	1246	1700	1700	1700	1700	250	860
Volume to Capacity	0.17	0.08	0.08	0.10	0.08	0.49	0.32
Queue Length 95th (ft)	16	0	0	0	0	62	35
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	32.5	11.2
Lane LOS	A					D	B
Approach Delay (s)	3.8			0.0		17.7	
Approach LOS						C	

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1583	3433	5085	1583	3433	5085	1583	3433	5085	2787
Volume (vph)	180	758	250	182	558	70	160	394	135	330	1557	522
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	180	758	250	182	558	70	160	394	135	330	1557	522
RTOR Reduction (vph)	0	0	189	0	0	52	0	0	83	0	0	236
Lane Group Flow (vph)	180	758	61	182	558	18	160	394	52	330	1557	286
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.6	27.5	27.5	9.9	28.8	28.8	9.3	44.0	44.0	18.6	53.3	53.3
Effective Green, g (s)	8.6	29.5	29.5	9.9	30.8	30.8	9.3	46.0	46.0	18.6	55.3	55.3
Actuated g/C Ratio	0.07	0.25	0.25	0.08	0.26	0.26	0.08	0.38	0.38	0.16	0.46	0.46
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	246	1250	389	283	1305	406	266	1949	607	532	2343	1284
v/s Ratio Prot	0.05	c0.15		c0.05	0.11		0.05	0.08		c0.10	c0.31	
v/s Ratio Perm			0.04			0.01			0.03			0.10
v/c Ratio	0.73	0.61	0.16	0.64	0.43	0.04	0.60	0.20	0.09	0.62	0.66	0.22
Uniform Delay, d1	54.6	40.1	35.5	53.3	37.2	33.5	53.6	24.7	23.6	47.4	25.1	19.4
Progression Factor	1.05	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.59	0.39
Incremental Delay, d2	9.2	1.1	0.3	3.7	0.4	0.1	2.6	0.2	0.3	1.4	1.3	0.3
Delay (s)	66.3	39.7	34.5	57.1	37.6	33.6	56.2	25.0	23.9	58.3	16.0	8.0
Level of Service	E	D	C	E	D	C	E	C	C	E	B	A
Approach Delay (s)		42.6			41.6			32.0			20.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.22	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	409	5085	5085	1583	1770	1583
Volume (vph)	40	1028	1142	100	40	10
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	1028	1142	100	40	10
RTOR Reduction (vph)	0	0	0	20	0	9
Lane Group Flow (vph)	40	1028	1142	80	40	1
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	101.2	101.2	94.2	94.2	8.3	8.3
Effective Green, g (s)	103.2	103.2	96.2	96.2	8.8	8.8
Actuated g/C Ratio	0.86	0.86	0.80	0.80	0.07	0.07
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	386	4373	4076	1269	130	116
v/s Ratio Prot	0.00	c0.20	c0.22		c0.02	
v/s Ratio Perm	0.09			0.05		0.00
v/c Ratio	0.10	0.24	0.28	0.06	0.31	0.01
Uniform Delay, d1	1.4	1.5	3.0	2.5	52.7	51.5
Progression Factor	1.00	1.00	1.66	2.58	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.2	0.1	0.5	0.0
Delay (s)	1.5	1.6	5.2	6.5	53.2	51.6
Level of Service	A	A	A	A	D	D
Approach Delay (s)		1.6	5.3		52.9	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	4.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↱	↑↑	↱	↰↰	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.42	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1533	3539
Volume (vph)	952	200	200	697	371	610
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	952	200	200	697	371	610
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	952	200	200	697	371	610
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	24.4	54.8	8.4	54.8	22.4	22.4
Effective Green, g (s)	24.4	54.8	8.4	54.8	22.4	22.4
Actuated g/C Ratio	0.45	1.00	0.15	1.00	0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1529	1583	542	1583	973	1447
v/s Ratio Prot	c0.28		0.06		0.07	0.17
v/s Ratio Perm		0.13		c0.44	0.09	
v/c Ratio	0.62	0.13	0.37	0.44	0.38	0.42
Uniform Delay, d1	11.7	0.0	20.8	0.0	10.9	11.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.2	0.7	0.9	0.1	0.3
Delay (s)	12.7	0.2	21.6	0.9	11.0	11.9
Level of Service	B	A	C	A	B	B
Approach Delay (s)	10.5		5.5			11.6
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4913		3433	5085	1554	3433	3539	1562	3433	3539	1551
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4913		3433	5085	1554	3433	3539	1562	3433	3539	1551
Volume (vph)	180	885	221	400	1621	349	165	305	130	561	460	510
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	180	885	221	400	1621	349	165	305	130	561	460	510
RTOR Reduction (vph)	0	36	0	0	0	60	0	0	19	0	0	113
Lane Group Flow (vph)	180	1070	0	400	1621	289	165	305	111	561	460	397
Confl. Peds. (#/hr)			6			11			7			6
Confl. Bikes (#/hr)									2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	9.4	42.1		17.0	49.7	68.7	9.6	21.9	38.9	19.0	31.3	31.3
Effective Green, g (s)	9.4	44.1		17.0	51.7	70.7	9.6	23.9	40.9	19.0	33.3	33.3
Actuated g/C Ratio	0.08	0.37		0.14	0.43	0.59	0.08	0.20	0.34	0.16	0.28	0.28
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	269	1806		486	2191	916	275	705	584	544	982	430
v/s Ratio Prot	0.05	c0.22		c0.12	c0.32	0.05	c0.05	0.09	0.03	c0.16	0.13	
v/s Ratio Perm						0.14			0.04			c0.26
v/c Ratio	0.67	0.59		0.82	0.74	0.32	0.60	0.43	0.19	1.03	0.47	0.92
Uniform Delay, d1	53.8	30.7		50.0	28.5	12.4	53.3	42.1	27.9	50.5	36.0	42.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.5	1.4		10.3	2.3	0.1	2.5	0.7	0.1	46.8	0.6	25.8
Delay (s)	66.3	32.1		60.3	30.8	12.5	55.9	42.8	27.9	97.3	36.6	67.9
Level of Service	E	C		E	C	B	E	D	C	F	D	E
Approach Delay (s)		36.9			33.1			43.2			69.3	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	44.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5057		4990	4806	1362	1770	5085	1575	4990	4631	1352
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5057		4990	4806	1362	1770	5085	1575	4990	4631	1352
Volume (vph)	270	516	20	256	1242	426	20	530	252	552	1290	1190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	270	516	20	256	1242	426	20	530	252	552	1290	1190
RTOR Reduction (vph)	0	3	0	0	0	51	0	0	14	0	30	102
Lane Group Flow (vph)	270	533	0	256	1242	375	20	530	238	552	1633	715
Confl. Peds. (#/hr)									3			1
Confl. Bikes (#/hr)									1			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.3	21.2		54.1	45.0	69.3	3.8	22.7	76.8	24.3	43.2	73.5
Effective Green, g (s)	31.3	23.2		55.1	47.0	72.3	4.8	24.7	79.8	25.3	45.2	76.5
Actuated g/C Ratio	0.22	0.16		0.38	0.33	0.50	0.03	0.17	0.55	0.18	0.31	0.53
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	1082	813		1905	1565	682	59	870	915	875	1451	754
v/s Ratio Prot	0.05	0.11		0.05	c0.26	0.10	0.01	c0.10	0.10	0.11	c0.35	c0.21
v/s Ratio Perm						0.18			0.05			0.32
v/c Ratio	0.25	0.66		0.13	0.79	0.55	0.34	0.61	0.26	0.63	1.13	0.95
Uniform Delay, d1	46.8	56.8		29.1	44.2	24.8	68.2	55.3	16.8	55.2	49.6	32.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	2.0		0.0	3.2	0.5	1.2	1.6	0.1	1.1	66.1	20.6
Delay (s)	46.8	58.8		29.1	47.4	25.3	69.4	56.9	16.9	56.3	115.6	52.6
Level of Service	D	E		C	D	C	E	E	B	E	F	D
Approach Delay (s)		54.8			40.1			44.7			87.8	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	64.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	144.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↱		↰	↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3350		1770	3495	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3350		1770	3495	
Volume (vph)	10	491	170	170	366	305	40	252	140	160	1771	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	517	179	200	431	359	42	265	147	168	1864	168
RTOR Reduction (vph)	0	0	86	0	0	308	0	54	0	0	5	0
Lane Group Flow (vph)	11	517	93	200	431	51	42	358	0	168	2027	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6			2						
Actuated Green, G (s)	15.4	15.4	15.4	18.1	18.1	18.1	3.1	61.1		16.3	74.3	
Effective Green, g (s)	15.4	15.4	15.4	18.1	18.1	18.1	3.1	61.1		16.3	74.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.14	0.14	0.14	0.02	0.48		0.13	0.59	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	617	192	252	725	226	43	1613		227	2046	
v/s Ratio Prot	0.01	c0.10		c0.11	0.08		0.02	0.11		c0.09	c0.58	
v/s Ratio Perm			0.06			0.03						
v/c Ratio	0.05	0.84	0.48	0.79	0.59	0.23	0.98	0.22		0.74	0.99	
Uniform Delay, d1	49.3	54.5	52.0	52.6	51.0	48.2	61.9	19.1		53.3	26.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	9.7	1.9	15.7	1.3	0.5	127.2	0.1		12.2	17.7	
Delay (s)	49.4	64.2	54.0	68.3	52.3	48.7	189.1	19.2		65.4	43.6	
Level of Service	D	E	D	E	D	D	F	B		E	D	
Approach Delay (s)		61.4			54.2			34.9			45.3	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM Average Control Delay	48.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	126.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	330	10	472	95	790	1761
Peak Hour Factor	0.70	0.70	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	471	14	524	106	878	1957
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked						
vC, conflicting volume	3311	315			630	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3311	315			630	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	98			7	
cM capacity (veh/h)	0	681			948	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	471	14	350	280	878	978	978
Volume Left	471	0	0	0	878	0	0
Volume Right	0	14	0	106	0	0	0
cSH	0	681	1700	1700	948	1700	1700
Volume to Capacity	993.05	0.02	0.21	0.16	0.93	0.58	0.58
Queue Length 95th (ft)	Err	2	0	0	357	0	0
Control Delay (s)	Err	10.4	0.0	0.0	35.2	0.0	0.0
Lane LOS	F	B			E		
Approach Delay (s)	9705.2		0.0		10.9		
Approach LOS	F						

Intersection Summary			
Average Delay	1201.2		
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↱			↰	↱			
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	141	210	0	441	10	400	0	50	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	157	233	0	490	11	444	0	56	0	0	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	501			157			402	658	78	602	652	251
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	501			157			402	658	78	602	652	251
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			17	100	94	100	100	100
cM capacity (veh/h)	1059			1421			533	383	966	362	386	749

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	78	78	233	327	174	500
Volume Left	0	0	0	0	0	444
Volume Right	0	0	233	0	11	56
cSH	1700	1700	1700	1700	1700	600
Volume to Capacity	0.05	0.05	0.14	0.19	0.10	0.83
Queue Length 95th (ft)	0	0	0	0	0	220
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	33.9
Lane LOS						D
Approach Delay (s)	0.0			0.0		33.9
Approach LOS						D

Intersection Summary			
Average Delay	12.2		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	349	10	50	30	10	74
Peak Hour Factor	0.90	0.90	0.75	0.75	0.80	0.80
Hourly flow rate (vph)	388	11	67	40	12	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	232	59	105			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	232	59	105			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	46	99	96			
cM capacity (veh/h)	722	1007	1486			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	399	107	105
Volume Left	388	67	0
Volume Right	11	0	92
cSH	728	1486	1700
Volume to Capacity	0.55	0.04	0.06
Queue Length 95th (ft)	84	4	0
Control Delay (s)	15.8	4.8	0.0
Lane LOS	C	A	
Approach Delay (s)	15.8	4.8	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	11.2		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑↱		↰	↑↑↑	Y	
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1500	234	139	860	402	245
Peak Hour Factor	0.95	0.95	0.90	0.90	0.50	0.50
Hourly flow rate (vph)	1579	246	154	956	804	490
Pedestrians				1	1	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1826		2331	651
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1826		2331	651
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			53		0	0
cM capacity (veh/h)			331		17	410

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	NB 1
Volume Total	632	632	562	154	319	319	319	1294
Volume Left	0	0	0	154	0	0	0	804
Volume Right	0	0	246	0	0	0	0	490
cSH	1700	1700	1700	331	1700	1700	1700	26
Volume to Capacity	0.37	0.37	0.33	0.47	0.19	0.19	0.19	49.91
Queue Length 95th (ft)	0	0	0	59	0	0	0	Err
Control Delay (s)	0.0	0.0	0.0	25.1	0.0	0.0	0.0	Err
Lane LOS				D				F
Approach Delay (s)	0.0			3.5				Err
Approach LOS								F

Intersection Summary			
Average Delay	3060.2		
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4592		3433	4919		3433	3539	1520	1770	3539	1473
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4592		3433	4919		3433	3539	1520	1770	3539	1473
Volume (vph)	700	1129	755	240	795	183	667	724	483	238	730	450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	700	1129	755	240	795	183	667	724	483	238	730	450
RTOR Reduction (vph)	0	79	0	0	28	0	0	0	306	0	0	295
Lane Group Flow (vph)	700	1805	0	240	950	0	667	724	177	238	730	155
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	29.5	49.9		13.2	33.6		33.4	30.3	30.3	19.6	16.5	16.5
Effective Green, g (s)	29.0	51.9		12.7	35.6		32.9	32.3	32.3	19.1	18.5	18.5
Actuated g/C Ratio	0.22	0.39		0.10	0.27		0.25	0.24	0.24	0.14	0.14	0.14
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	6.0
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	4.5
Lane Grp Cap (vph)	754	1805		330	1327		856	866	372	256	496	206
v/s Ratio Prot	0.20	c0.39		0.07	c0.19		0.19	c0.20		0.13	c0.21	
v/s Ratio Perm									0.12			0.11
v/c Ratio	0.93	1.18dr		0.73	0.72		0.78	0.84	0.48	0.93	1.47	0.75
Uniform Delay, d1	50.5	40.0		58.0	43.6		46.2	47.3	42.6	55.8	56.8	54.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	19.3	21.1		6.6	3.3		4.4	7.6	1.7	36.8	223.1	16.0
Delay (s)	69.8	61.2		64.6	46.9		50.5	55.0	44.3	92.6	279.8	70.6
Level of Service	E	E		E	D		D	D	D	F	F	E
Approach Delay (s)		63.5			50.4			50.6			182.0	
Approach LOS		E			D			D			F	

Intersection Summary

HCM Average Control Delay	81.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↱	↑↑↑↱			↑↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	251	1603	330	0	1576
Peak Hour Factor	0.85	0.85	1.00	1.00	0.95	0.95
Hourly flow rate (vph)	0	295	1603	330	0	1659
Pedestrians	32					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	3					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			702			
pX, platoon unblocked	0.66	0.66			0.66	
vC, conflicting volume	2353	731			1965	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2023	0			1437	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	58			100	
cM capacity (veh/h)	32	699			302	

Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	295	641	641	651	553	553	553
Volume Left	0	0	0	0	0	0	0
Volume Right	295	0	0	330	0	0	0
cSH	699	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.42	0.38	0.38	0.38	0.33	0.33	0.33
Queue Length 95th (ft)	53	0	0	0	0	0	0
Control Delay (s)	13.9	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.9	0.0			0.0		
Approach LOS	B						

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↑	↱	↰	↑↑↑↱		↰	↑↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.92		1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1695		1770	1863	1539	1770	4965		1770	5049	
Flt Permitted		0.94		0.71	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1609		1323	1863	1539	1770	4965		1770	5049	
Volume (vph)	20	10	40	284	10	140	60	1923	291	216	1170	50
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	10	40	284	10	140	60	1923	291	216	1170	50
RTOR Reduction (vph)	0	31	0	0	0	107	0	17	0	0	3	0
Lane Group Flow (vph)	0	39	0	284	10	33	60	2197	0	216	1217	0
Confl. Peds. (#/hr)						11			11			1
Confl. Bikes (#/hr)						2			5			
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8						
Actuated Green, G (s)		27.6		27.6	27.6	27.6	6.7	62.0		16.4	71.7	
Effective Green, g (s)		28.1		28.1	28.1	28.1	6.2	64.0		15.9	73.7	
Actuated g/C Ratio		0.23		0.23	0.23	0.23	0.05	0.53		0.13	0.61	
Clearance Time (s)		4.5		4.5	4.5	4.5	3.5	6.0		3.5	6.0	
Vehicle Extension (s)		3.0		3.0	3.0	3.0	1.5	4.5		1.5	4.5	
Lane Grp Cap (vph)		377		310	436	360	91	2648		235	3101	
v/s Ratio Prot					0.01		0.03	c0.44		c0.12	0.24	
v/s Ratio Perm		0.02		c0.21		0.02						
v/c Ratio		0.10		0.92	0.02	0.09	0.66	0.83		0.92	0.39	
Uniform Delay, d1		36.1		44.8	35.4	36.0	55.9	23.4		51.4	11.8	
Progression Factor		1.00		1.00	1.00	1.00	0.80	1.42		1.00	1.00	
Incremental Delay, d2		0.1		30.2	0.0	0.1	11.8	3.0		36.5	0.4	
Delay (s)		36.2		75.0	35.4	36.1	56.5	36.4		87.9	12.1	
Level of Service		D		E	D	D	E	D		F	B	
Approach Delay (s)		36.2			61.5			36.9			23.5	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	100	50	40	30	40	10	40	167	70	10	134	146
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	111	56	44	33	44	11	47	196	82	12	158	172

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total (vph)	211	89	47	279	12	329
Volume Left (vph)	111	33	47	0	12	0
Volume Right (vph)	44	11	0	82	0	172
Hadj (s)	0.01	0.03	0.53	-0.17	0.53	-0.33
Departure Headway (s)	5.8	6.1	6.4	5.7	6.4	5.5
Degree Utilization, x	0.34	0.15	0.08	0.44	0.02	0.51
Capacity (veh/h)	563	509	530	600	530	620
Control Delay (s)	11.8	10.2	8.8	12.0	8.4	12.9
Approach Delay (s)	11.8	10.2	11.5		12.8	
Approach LOS	B	B	B		B	

Intersection Summary			
Delay	11.9		
HCM Level of Service	B		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↑↑	↑↱		↰	↱
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	247	240	210	90	60	174
Peak Hour Factor	0.95	0.95	0.85	0.85	0.80	0.80
Hourly flow rate (vph)	260	253	247	106	75	218
Pedestrians			3			
Lane Width (ft)			12.0			
Walking Speed (ft/s)			4.0			
Percent Blockage			0			
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		580				
pX, platoon unblocked						
vC, conflicting volume	353				949	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	353				949	176
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	78				63	74
cM capacity (veh/h)	1202				202	836

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1	SB 2
Volume Total	260	126	126	165	188	75	218
Volume Left	260	0	0	0	0	75	0
Volume Right	0	0	0	0	106	0	218
cSH	1202	1700	1700	1700	1700	202	836
Volume to Capacity	0.22	0.07	0.07	0.10	0.11	0.37	0.26
Queue Length 95th (ft)	21	0	0	0	0	40	26
Control Delay (s)	8.8	0.0	0.0	0.0	0.0	33.0	10.8
Lane LOS	A					D	B
Approach Delay (s)	4.5			0.0		16.5	
Approach LOS						C	

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.91	0.88
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5085	1558	3433	5085	1561	3433	5085	1555	3433	5085	2746
Volume (vph)	220	894	120	265	677	140	620	1102	417	190	618	885
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	220	894	120	265	677	140	620	1102	417	190	618	885
RTOR Reduction (vph)	0	0	87	0	0	99	0	0	112	0	0	227
Lane Group Flow (vph)	220	894	33	265	677	41	620	1102	305	190	618	658
Confl. Peds. (#/hr)			2			2			5			2
Confl. Bikes (#/hr)			2						1			1
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.5	31.0	31.0	10.8	33.3	33.3	22.6	48.5	48.5	9.7	35.6	35.6
Effective Green, g (s)	8.5	33.0	33.0	10.8	35.3	35.3	22.6	50.5	50.5	9.7	37.6	37.6
Actuated g/C Ratio	0.07	0.28	0.28	0.09	0.29	0.29	0.19	0.42	0.42	0.08	0.31	0.31
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5	1.5	4.5	4.5
Lane Grp Cap (vph)	243	1398	428	309	1496	459	647	2140	654	278	1593	860
v/s Ratio Prot	0.06	c0.18		c0.08	0.13		c0.18	0.22		0.06	0.12	
v/s Ratio Perm			0.02			0.03			0.20			c0.24
v/c Ratio	0.91	0.64	0.08	0.86	0.45	0.09	0.96	0.51	0.47	0.68	0.39	0.76
Uniform Delay, d1	55.4	38.3	32.2	53.8	34.5	30.7	48.2	25.7	25.0	53.7	32.2	37.2
Progression Factor	1.21	0.84	0.54	1.00	1.00	1.00	1.00	1.00	1.00	1.04	0.86	0.73
Incremental Delay, d2	32.1	1.2	0.1	19.6	0.4	0.1	25.0	0.9	2.4	5.0	0.7	5.9
Delay (s)	99.2	33.3	17.6	73.5	34.9	30.8	73.2	26.6	27.4	60.8	28.4	33.2
Level of Service	F	C	B	E	C	C	E	C	C	E	C	C
Approach Delay (s)		43.5			43.8			40.3			34.6	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	0.91	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	5085	5085	1583	1770	1583
Flt Permitted	0.07	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	139	5085	5085	1583	1770	1583
Volume (vph)	20	994	1681	50	140	80
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	994	1681	50	140	80
RTOR Reduction (vph)	0	0	0	24	0	51
Lane Group Flow (vph)	20	994	1681	26	140	29
Turn Type	pm+pt			Perm		Perm
Protected Phases	1	6	2		4	
Permitted Phases	6			2		4
Actuated Green, G (s)	66.3	66.3	61.0	61.0	43.2	43.2
Effective Green, g (s)	68.3	68.3	63.0	63.0	43.7	43.7
Actuated g/C Ratio	0.57	0.57	0.52	0.52	0.36	0.36
Clearance Time (s)	3.5	6.0	6.0	6.0	4.5	4.5
Vehicle Extension (s)	2.5	2.5	4.5	4.5	2.0	2.0
Lane Grp Cap (vph)	97	2894	2670	831	645	576
v/s Ratio Prot	0.00	c0.20	c0.33		c0.08	
v/s Ratio Perm	0.12			0.02		0.02
v/c Ratio	0.21	0.34	0.63	0.03	0.22	0.05
Uniform Delay, d1	15.2	13.8	20.2	13.8	26.3	24.7
Progression Factor	1.00	1.00	0.99	1.46	1.00	1.00
Incremental Delay, d2	0.8	0.3	0.7	0.0	0.8	0.2
Delay (s)	16.0	14.2	20.7	20.2	27.1	24.9
Level of Service	B	B	C	C	C	C
Approach Delay (s)		14.2	20.7		26.3	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	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	3433	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.40	1.00
Satd. Flow (perm)	3433	1583	3539	1583	1448	3539
Volume (vph)	661	1100	360	800	214	260
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	661	1100	360	800	214	260
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	661	1100	360	800	214	260
Turn Type		Free		Free	pm+pt	
Protected Phases	4		2		1	6
Permitted Phases		Free		Free	6	
Actuated Green, G (s)	16.7	46.5	12.0	46.5	21.8	21.8
Effective Green, g (s)	16.7	46.5	12.0	46.5	21.8	21.8
Actuated g/C Ratio	0.36	1.00	0.26	1.00	0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	4.5		4.5		1.5	4.5
Lane Grp Cap (vph)	1233	1583	913	1583	926	1659
v/s Ratio Prot	0.19		0.10		0.03	0.07
v/s Ratio Perm		c0.69		0.51	0.08	
v/c Ratio	0.54	0.69	0.39	0.51	0.23	0.16
Uniform Delay, d1	11.8	0.0	14.2	0.0	7.2	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	2.5	0.5	1.2	0.0	0.1
Delay (s)	12.5	2.5	14.7	1.2	7.2	7.2
Level of Service	B	A	B	A	A	A
Approach Delay (s)	6.3		5.4			7.2
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	0.0
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰↰	↑↑	↱
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91	1.00	0.97	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	5014		3433	5085	1540	3433	3539	1518	3433	3539	1527
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	5014		3433	5085	1540	3433	3539	1518	3433	3539	1527
Volume (vph)	580	1702	136	220	1047	551	324	596	240	543	418	190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	580	1702	136	220	1047	551	324	596	240	543	418	190
RTOR Reduction (vph)	0	6	0	0	0	16	0	0	4	0	0	154
Lane Group Flow (vph)	580	1832	0	220	1047	535	324	596	236	543	418	36
Confl. Peds. (#/hr)			18			23			27			13
Confl. Bikes (#/hr)			3			2			2			3
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		Perm
Protected Phases	5	2		1	6	7	3	8	1	7	4	
Permitted Phases						6			8			4
Actuated Green, G (s)	26.2	49.2		11.8	34.8	57.1	28.0	28.7	40.5	22.3	23.0	23.0
Effective Green, g (s)	26.2	51.2		11.8	36.8	59.1	28.0	30.7	42.5	22.3	25.0	25.0
Actuated g/C Ratio	0.20	0.39		0.09	0.28	0.45	0.21	0.23	0.32	0.17	0.19	0.19
Clearance Time (s)	4.0	6.0		4.0	6.0	4.0	4.0	6.0	4.0	4.0	6.0	6.0
Vehicle Extension (s)	1.5	4.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	4.5
Lane Grp Cap (vph)	681	1945		307	1418	690	728	823	535	580	670	289
v/s Ratio Prot	0.17	c0.37		0.06	0.21	c0.13	0.09	c0.17	0.04	c0.16	0.12	
v/s Ratio Perm						0.22			0.12			0.02
v/c Ratio	0.85	0.94		0.72	0.74	0.78	0.45	0.72	0.44	0.94	0.62	0.12
Uniform Delay, d1	51.0	39.0		58.5	43.2	30.8	45.2	46.7	35.4	54.1	49.2	44.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.7	10.7		6.5	2.3	5.0	0.2	3.6	0.2	22.4	2.3	0.3
Delay (s)	63.8	49.6		65.0	45.6	35.8	45.4	50.4	35.6	76.5	51.5	44.8
Level of Service	E	D		E	D	D	D	D	D	E	D	D
Approach Delay (s)		53.0			44.9			45.9			62.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	51.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.94	0.91		0.94	0.86	0.86	1.00	0.91	1.00	0.94	0.86	0.86
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4990	5079		4990	4806	1343	1770	5085	1546	4990	4797	1362
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	4990	5079		4990	4806	1343	1770	5085	1546	4990	4797	1362
Volume (vph)	1190	1400	10	157	1018	267	20	1440	220	800	1420	750
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1190	1400	10	157	1018	267	20	1440	220	800	1420	750
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	1	0	1	106
Lane Group Flow (vph)	1190	1409	0	157	1018	267	20	1440	219	800	1437	626
Confl. Peds. (#/hr)			9			10			12			
Confl. Bikes (#/hr)						1			2			
Turn Type	Prot			Prot		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	7	4		3	8	1	5	2	3	1	6	7
Permitted Phases						8			2			6
Actuated Green, G (s)	30.1	55.4		10.0	35.3	64.9	4.0	40.0	50.0	29.6	65.6	95.7
Effective Green, g (s)	31.1	57.4		11.0	37.3	67.9	5.0	42.0	53.0	30.6	67.6	98.7
Actuated g/C Ratio	0.20	0.37		0.07	0.24	0.43	0.03	0.27	0.34	0.19	0.43	0.63
Clearance Time (s)	5.0	6.0		5.0	6.0	5.0	5.0	6.0	5.0	5.0	6.0	5.0
Vehicle Extension (s)	1.5	3.5		1.5	4.5	1.5	1.5	4.5	1.5	1.5	4.5	1.5
Lane Grp Cap (vph)	988	1857		350	1142	615	56	1360	522	973	2065	856
v/s Ratio Prot	c0.24	0.28		0.03	c0.21	0.08	0.01	c0.28	0.03	c0.16	0.30	0.14
v/s Ratio Perm						0.11			0.11			0.31
v/c Ratio	1.20	0.76		0.45	0.89	0.43	0.36	1.06	0.42	0.82	0.70	0.73
Uniform Delay, d1	63.0	43.7		70.1	57.9	31.1	74.4	57.5	40.1	60.6	36.3	20.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.7	1.9		0.3	9.4	0.2	1.4	41.6	0.2	5.4	1.2	2.8
Delay (s)	164.7	45.6		70.4	67.3	31.3	75.8	99.1	40.3	66.0	37.6	22.8
Level of Service	F	D		E	E	C	E	F	D	E	D	C
Approach Delay (s)		100.1			61.0			91.1			41.6	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM Average Control Delay	71.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	157.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	103.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰	↑↑↱		↰	↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	1770	3406		1770	3521	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	5085	1583	1770	5085	1583	1770	3406		1770	3521	
Volume (vph)	20	489	120	30	464	90	140	1489	500	40	578	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.85	0.85	0.85	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	543	133	35	546	106	147	1567	526	42	608	21
RTOR Reduction (vph)	0	0	118	0	0	92	0	23	0	0	1	0
Lane Group Flow (vph)	22	543	15	35	546	14	147	2070	0	42	628	0
Turn Type	Split		Perm	Split		Perm	Prot			Prot		
Protected Phases	6	6		2	2		3	8		7	4	
Permitted Phases			6			2						
Actuated Green, G (s)	16.0	16.0	16.0	18.6	18.6	18.6	15.9	84.1		3.1	71.3	
Effective Green, g (s)	16.0	16.0	16.0	18.6	18.6	18.6	15.9	84.1		3.1	71.3	
Actuated g/C Ratio	0.12	0.12	0.12	0.13	0.13	0.13	0.12	0.61		0.02	0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	206	590	184	239	686	214	204	2079		40	1822	
v/s Ratio Prot	0.01	c0.11		0.02	c0.11		c0.08	c0.61		0.02	0.18	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.11	0.92	0.08	0.15	0.80	0.07	0.72	1.00		1.05	0.34	
Uniform Delay, d1	54.5	60.3	54.4	52.6	57.8	52.0	58.8	26.7		67.4	19.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	19.8	0.2	0.3	6.4	0.1	11.8	18.6		157.5	0.1	
Delay (s)	54.7	80.1	54.6	52.9	64.1	52.2	70.6	45.3		224.8	19.6	
Level of Service	D	F	D	D	E	D	E	D		F	B	
Approach Delay (s)		74.4			61.7			46.9			32.5	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	51.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	137.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↑↱		↰	↑↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	110	10	1569	30	200	528
Peak Hour Factor	0.50	0.50	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	220	20	1652	32	211	556
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)			768			
pX, platoon unblocked	0.45	0.45			0.45	
vC, conflicting volume	2366	842			1683	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2816	0			1294	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	96			12	
cM capacity (veh/h)	1	487			239	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	220	20	1101	582	211	278	278
Volume Left	220	0	0	0	211	0	0
Volume Right	0	20	0	32	0	0	0
cSH	1	487	1700	1700	239	1700	1700
Volume to Capacity	292.56	0.04	0.65	0.34	0.88	0.16	0.16
Queue Length 95th (ft)	Err	3	0	0	183	0	0
Control Delay (s)	Err	12.7	0.0	0.0	75.5	0.0	0.0
Lane LOS	F	B			F		
Approach Delay (s)	9166.8		0.0		20.7		
Approach LOS	F						

Intersection Summary			
Average Delay	823.9		
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	329	290	0	84	10	500	0	130	0	0	0
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	366	322	0	99	12	556	0	144	0	0	0
Pedestrians								1				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)									30			
Median type								None			None	
Median storage veh)												
Upstream signal (ft)		718										
pX, platoon unblocked												
vC, conflicting volume	111			367			416	477	184	360	471	55
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	111			367			416	477	184	360	471	55
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			0	100	83	100	100	100
cM capacity (veh/h)	1477			1188			520	485	826	471	489	1000

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1
Volume Total	183	183	322	66	45	700
Volume Left	0	0	0	0	0	556
Volume Right	0	0	322	0	12	144
cSH	1700	1700	1700	1700	1700	655
Volume to Capacity	0.11	0.11	0.19	0.04	0.03	1.07
Queue Length 95th (ft)	0	0	0	0	0	481
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	71.1
Lane LOS						F
Approach Delay (s)	0.0			0.0		71.1
Approach LOS						F

Intersection Summary			
Average Delay	33.2		
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 Plus Project Conditions **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	290	241	83	13	48.3	D	--
	T	147	157	107	8	41.6	D	--
	R	375	314	84	15	11.4	B	--
	Subtotal	**812**	**712**	**88**	**--**	**30.6**	**C**	**--**
SB	L	140	140	100	12	53.4	D	--
	T	174	175	101	8	51.3	D	--
	R	171	172	101	11	25.2	C	--
	Subtotal	**485**	**487**	**100**	**--**	**42.7**	**D**	**--**
EB	L	80	75	94	10	70.5	E	--
	T	651	653	100	10	51.9	D	--
	R	343	342	100	19	20.2	C	--
	Subtotal	**1074**	**1070**	**100**	**--**	**43.1**	**D**	**--**
WB	L	328	267	81	10	63.9	E	--
	T	1341	1124	84	45	34.6	C	--
	R	170	136	80	11	7.4	A	--
	Subtotal	**1839**	**1526**	**83**	**--**	**37.3**	**D**	**--**
	Total	**4210**	**3795**	**90**	**--**	**38.4**	**D**	**--**

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	846	483	57	48	1831.0	F	--
	R	60	37	62	6	1774.4	F	--
	Subtotal	**906**	**520**	**57**	**--**	**1826.9**	**F**	**--**
EB	T	636	667	105	29	10.8	B	--
	R	520	496	95	16	3.6	A	--
	Subtotal	**1156**	**1162**	**101**	**--**	**7.7**	**A**	**--**
WB	L	360	366	102	10	93.8	F	--
	T	993	988	99	32	61.6	E	--
	Subtotal	**1353**	**1354**	**100**	**--**	**70.3**	**E**	**--**
	Total	**3415**	**3036**	**89**	**--**	**347.1**	**F**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 Plus Project Conditions **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	562	485	86	16	13.2	B	--
	R	238	188	79	14	5.8	A	--
	Subtotal	800	673	84	--	11.2	B	--
SB	L	223	207	93	10	115.7	F	--
	T	601	600	100	18	18.7	B	--
	Subtotal	824	807	98	--	43.6	D	--
EB	L	230	227	99	20	22.2	C	--
	R	240	242	101	8	10.8	B	--
	Subtotal	470	469	100	--	16.3	B	--
	Total	2094	1948	93	--	26.8	C	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	136	98	72	9	1096.4	F	--
	T	480	337	70	10	1116.9	F	--
	R	5	4	80	2	1159.4	F	--
	Subtotal	621	439	71	--	1112.7	F	--
SB	L	20	16	80	3	212.1	F	--
	T	390	366	94	12	163.6	F	--
	R	491	451	92	22	147.9	F	--
	Subtotal	901	834	93	--	156.0	F	--
EB	L	360	313	87	8	476.4	F	--
	T	11	9	82	3	508.8	F	--
	R	108	97	89	10	477.7	F	--
	Subtotal	479	418	87	--	477.4	F	--
WB	L	5	5	80	2	9.0	A	--
	T	23	26	113	4	12.1	B	--
	R	20	22	110	4	8.1	A	--
	Subtotal	48	52	108	--	10.2	B	--
	Total	2049	1743	85	--	469.8	F	--

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 Plus Project Conditions			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	289	163	56	7	292.1	F	--
	T	633	386	61	33	17.6	B	--
	Subtotal	**922**	**549**	**60**	--	**99.1**	**F**	--
SB	T	679	294	43	25	2292.2	F	--
	R	870	445	51	41	1541.9	F	--
	Subtotal	**1549**	**739**	**48**	--	**1840.4**	**F**	--
WB	L	80	48	60	9	974.4	F	--
	T	5	3	60	1	832.9	F	--
	R	290	255	88	33	174.5	F	--
	Subtotal	**375**	**306**	**82**	--	**306.9**	**F**	--
	Total	**2846**	**1594**	**56**	--	**946.3**	**F**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	702	494	70	34	166.2	F	--
	R	120	74	62	9	6.1	A	--
	Subtotal	**822**	**568**	**69**	--	**145.3**	**F**	--
SB	L	240	99	41	12	105.3	F	--
	T	519	247	47	16	251.8	F	--
	Subtotal	**759**	**345**	**45**	--	**210.0**	**F**	--
EB	L	220	103	47	10	1880.6	F	--
	R	313	112	36	11	3653.5	F	--
	Subtotal	**533**	**214**	**40**	--	**2805.1**	**F**	--
	Total	**2114**	**1128**	**53**	--	**670.8**	**F**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 Plus Project Conditions			**PHF:**	1
TOD:	PM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	320	285	89	21	47.7	D	--
	T	199	382	192	16	27.5	C	--
	R	672	589	88	21	20.1	C	--
	Subtotal	1191	1256	105	--	28.6	C	--
SB	L	150	145	97	15	56.8	E	--
	T	142	135	95	11	67.8	E	--
	R	107	104	97	9	26.9	C	--
	Subtotal	399	383	96	--	52.6	D	--
EB	L	158	144	91	14	295.0	F	--
	T	973	869	89	18	312.8	F	--
	R	514	437	85	30	300.2	F	--
	Subtotal	1646	1450	88	--	307.1	F	--
WB	L	301	198	66	23	141.1	F	--
	T	647	481	74	46	22.4	C	--
	R	140	97	69	10	4.8	A	--
	Subtotal	1088	777	71	--	50.5	D	--
	Total	4323	3866	89	--	139.8	F	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	558	256	46	32	2352.6	F	--
	R	120	60	50	11	2217.6	F	--
	Subtotal	678	316	47	--	2327.1	F	--
EB	T	1265	1130	89	33	4.8	A	--
	R	520	469	90	16	2.8	A	--
	Subtotal	1785	1599	90	--	4.2	A	--
WB	L	300	247	82	12	556.2	F	--
	T	530	496	94	53	98.1	F	--
	Subtotal	830	743	90	--	251.2	F	--
	Total	3293	2658	81	--	349.5	F	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 Plus Project Conditions **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	601	478	80	14	23.9	C	--
	R	533	427	80	16	10.2	B	--
	Subtotal	1134	904	80	--	17.5	B	--
SB	L	364	270	74	11	191.2	F	--
	T	543	483	89	31	48.1	D	--
	Subtotal	907	754	83	--	99.4	F	--
EB	L	810	786	97	38	60.0	E	--
	R	455	430	95	28	91.7	F	--
	Subtotal	1265	1216	96	--	71.2	E	--
	Total	3306	2874	87	--	61.7	E	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Un-Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	43	30	70	6	1020.7	F	--
	T	750	517	69	12	1060.7	F	--
	R	10	6	60	2	984.4	F	--
	Subtotal	803	553	69	--	1057.7	F	--
SB	L	30	25	83	5	161.2	F	--
	T	620	727	117	23	139.4	F	--
	R	118	99	84	15	142.4	F	--
	Subtotal	768	851	111	--	140.4	F	--
EB	L	194	193	99	10	17.4	C	--
	T	24	22	92	5	18.2	C	--
	R	67	64	96	8	14.4	B	--
	Subtotal	285	279	98	--	16.8	C	--
WB	L	5	4	80	2	9.1	A	--
	T	15	17	113	6	12.1	B	--
	R	50	54	108	11	8.4	A	--
	Subtotal	70	74	106	--	9.3	A	--
	Total	1926	1758	91	--	403.8	F	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 Plus Project Conditions			**PHF:**	1
TOD:	PM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	342	201	59	12	221.8	F	--
	T	1011	611	60	31	15.9	B	--
	Subtotal	**1353**	**812**	**60**	**--**	**66.8**	**E**	**--**
SB	T	1071	636	59	26	1234.6	F	--
	R	550	351	64	23	921.8	F	--
	Subtotal	**1621**	**987**	**61**	**--**	**1123.4**	**F**	**--**
WB	L	150	104	69	14	823.6	F	--
	T	10	7	70	2	798.4	F	--
	R	320	252	79	37	308.9	F	--
	Subtotal	**480**	**364**	**76**	**--**	**466.3**	**F**	**--**
	Total	**3454**	**2163**	**63**	**--**	**616.3**	**F**	**--**

Intersection: 15: SR 14 NB Ramps & Via Princessa **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	903	592	66	26	148.8	F	--
	R	140	98	70	10	9.7	A	--
	Subtotal	**1043**	**690**	**66**	**--**	**129.1**	**F**	**--**
SB	L	560	333	59	19	39.3	D	--
	T	661	408	62	22	109.0	F	--
	Subtotal	**1221**	**741**	**61**	**--**	**77.7**	**E**	**--**
EB	L	450	226	50	21	1596.8	F	--
	R	429	178	41	12	2703.8	F	--
	Subtotal	**879**	**404**	**46**	**--**	**2083.8**	**F**	**--**
	Total	**3143**	**1835**	**58**	**--**	**538.2**	**F**	**--**

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project AM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Permit/Rights=Include
Initial Vol: 0 500 233***
Lanes: 0 0 1 0 1

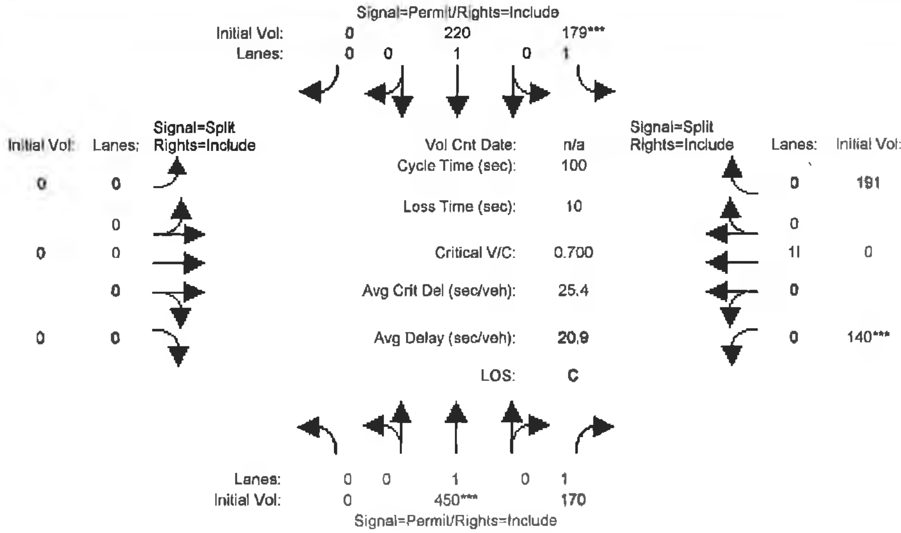
Initial Vol:	Lanes:	Signal=Split Rights=Include			Signal=Split Rights=Include	Lanes:	Initial Vol:
0	0		Vol Cnt Date:	n/a		0	162***
	0		Cycle Time (sec):	100		0	
0	0		Loss Time (sec):	10		1!	0
	0		Critical V/C:	0.609		0	
0	0		Avg Crit Del (sec/veh):	24.1		0	150
			Avg Delay (sec/veh):	19.4			
			LOS:	B			

Lanes: 0 0 1 0 1
Initial Vol: 0 270*** 90
Signal=Permit/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	270	90	233	500	0	0	0	0	150	0	162
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	270	90	233	500	0	0	0	0	150	0	162
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	270	90	233	500	0	0	0	0	150	0	162
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	270	90	233	500	0	0	0	0	150	0	162
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	270	90	233	500	0	0	0	0	150	0	162
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	270	90	233	500	0	0	0	0	150	0	162
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.48	0.00	0.52
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	769	0	831
Capacity Analysis Module:												
Vol/Sat:	0.00	0.17	0.06	0.15	0.31	0.00	0.00	0.00	0.00	0.19	0.00	0.20
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project PM

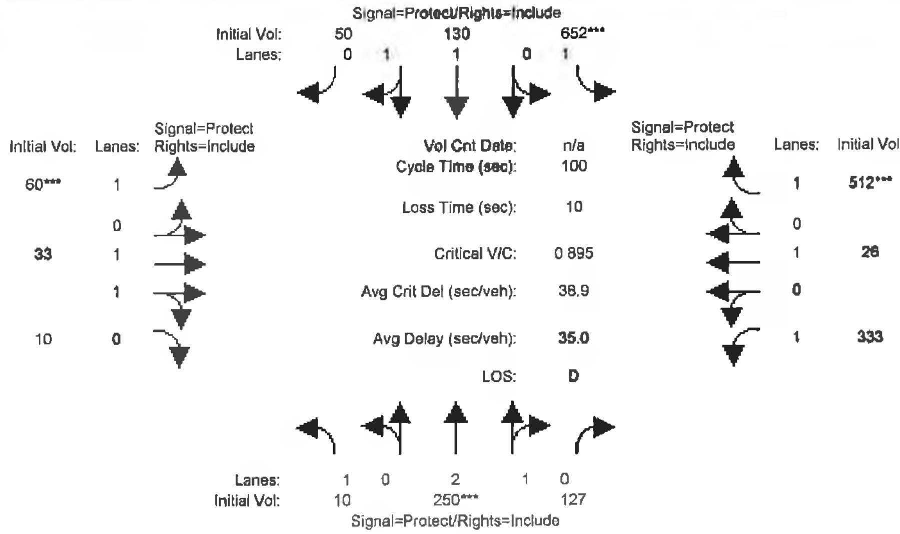
Intersection #1: Sand Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	450	170	179	220	0	0	0	0	140	0	191
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	450	170	179	220	0	0	0	0	140	0	191
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	450	170	179	220	0	0	0	0	140	0	191
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	450	170	179	220	0	0	0	0	140	0	191
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	450	170	179	220	0	0	0	0	140	0	191
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	450	170	179	220	0	0	0	0	140	0	191
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.42	0.00	0.58
Final Sat.:	0	1600	1600	1600	1600	0	0	0	0	677	0	923
Capacity Analysis Module:												
Vol/Sat:	0.00	0.28	0.11	0.11	0.14	0.00	0.00	0.00	0.00	0.21	0.00	0.21
Crit Moves:		****		****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project AM

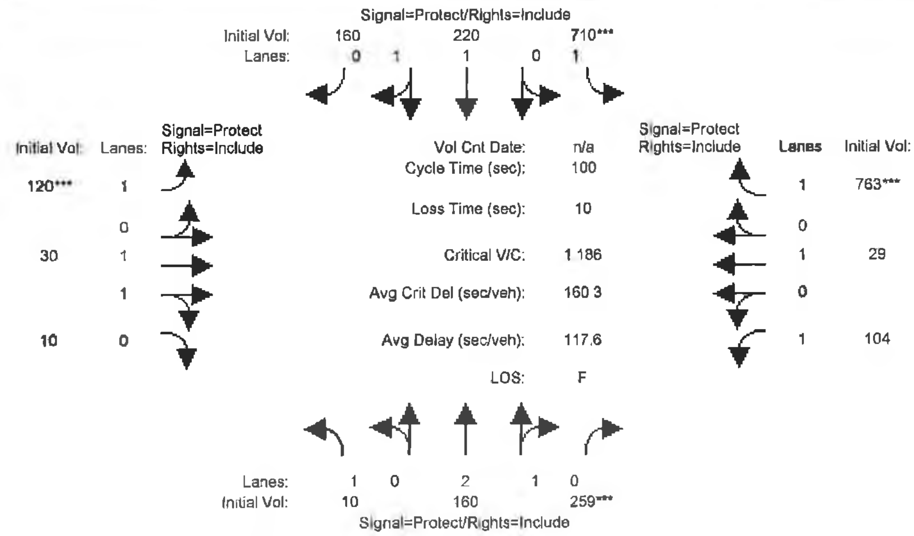
Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	250	127	652	130	50	60	33	10	333	26	512
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	250	127	652	130	50	60	33	10	333	26	512
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	250	127	652	130	50	60	33	10	333	26	512
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	250	127	652	130	50	60	33	10	333	26	435
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	250	127	652	130	50	60	33	10	333	26	435
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	250	127	652	130	50	60	33	10	333	26	435
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.44	0.56	1.00	1.53	0.47	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	2311	889	1600	2456	744	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.08	0.08	0.41	0.06	0.06	0.04	0.01	0.01	0.21	0.02	0.27
Crit Moves:		****		****			****					****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project PM

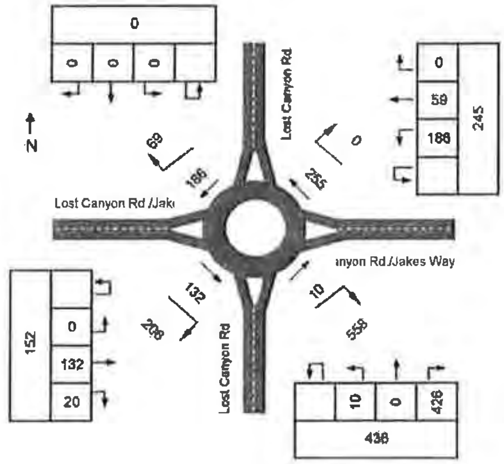
Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	160	259	710	220	160	120	30	10	104	29	763
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	160	259	710	220	160	120	30	10	104	29	763
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	160	259	710	220	160	120	30	10	104	29	763
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	160	259	710	220	160	120	30	10	104	29	649
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	160	259	710	220	160	120	30	10	104	29	649
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	160	259	710	220	160	120	30	10	104	29	649
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	1.16	0.84	1.00	1.50	0.50	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	1600	1853	1347	1600	2400	800	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.16	0.44	0.12	0.12	0.08	0.01	0.01	0.07	0.02	0.41
Crit Moves:			****	****			****					****

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

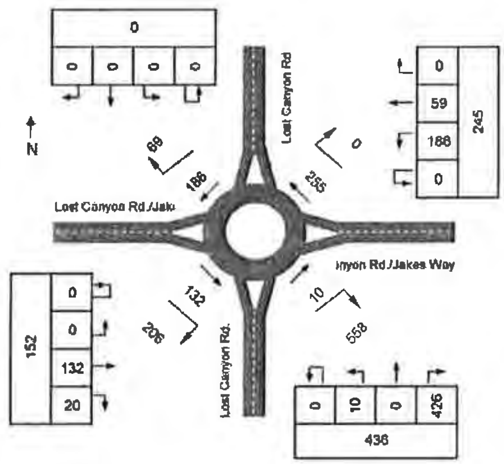
Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)							2
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	AM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	436	132	1112	0.43	6	A	50
South							
East	152	186	1072	0.15	4	A	25
West	245	10	1203	0.22	4	A	25
All	833				5	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)
Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft)
Does not account for flared entry lanes or pedestrian effects
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

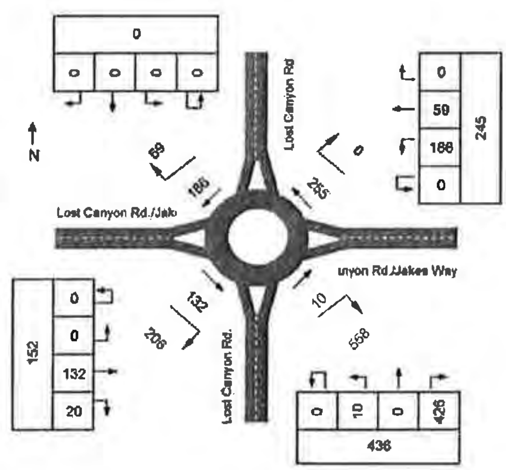
Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	AM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	436	132	1140	0.42	10	B	50
South							
East	152	186	1090	0.15	9	A	25
West	245	10	1261	0.21	9	A	25
All	833				10	A	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000
Includes a "+5" factor to account for start-up delay under higher v/c ratios, so the delay for lower v/c ratios may be over-estimated.
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (NCHRP 572)

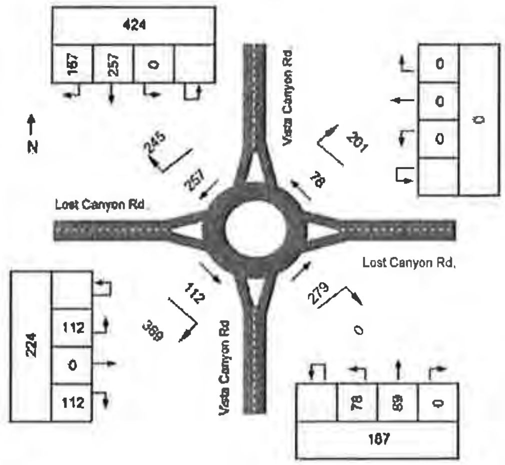
Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	AM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS**	**Queue** (ft)**
North	436	132	990	0.48	12	B	75
South							
East	152	186	938	0.18	10	A	25
West	245	10	1119	0.24	9	A	25
All	833				11	B	



Source: NCHRP 572: Roundabouts in the United States (TRB, 2007)
Includes a "+5" factor to account for start-up delay under higher v/c ratios, so the delay for lower v/c ratios may be over-estimated.
Does not account for flared entry lanes or pedestrian effects.

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)							2
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	AM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	167	112	1127	0.16	4	A	25
South	424	78	1152	0.40	5	A	50
East	224	257	1020	0.24	5	A	25
West							
All	815				5	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)
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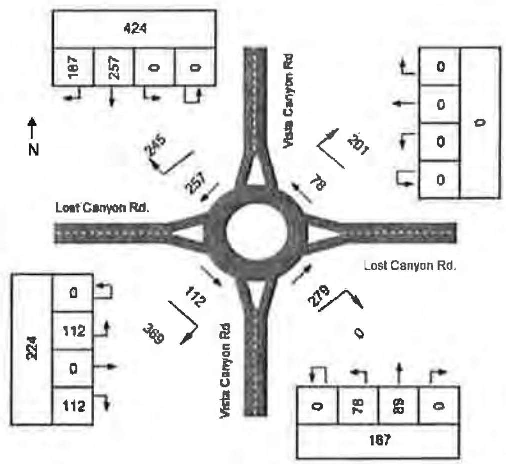
Does not account for flared entry lanes or pedestrian effects
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	AM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	167	112	1159	0.16	9	A	25
South	424	78	1192	0.39	10	A	50
East	224	257	1027	0.24	10	A	25
West							
All	815				10	A	



Capacity based on average of upper and lower values provided in Highway Capacity Manual 2000
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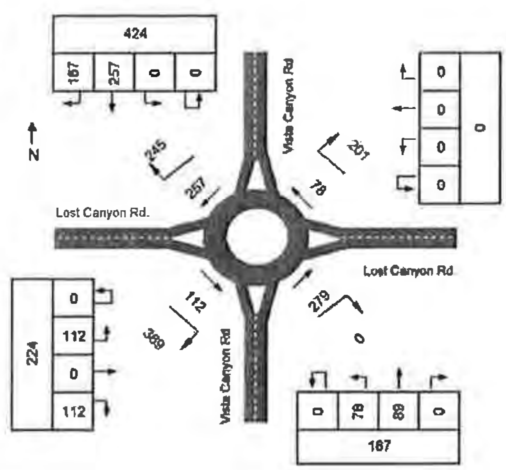
Does not account for flared entry lanes or pedestrian effects
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (NCHRP 572)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	AM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS**	**Queue** (ft)**
North	167	112	1010	0.16	9	A	25
South	424	78	1045	0.44	11	B	50
East	224	257	874	0.28	11	B	25
West							
All	815				11	B	



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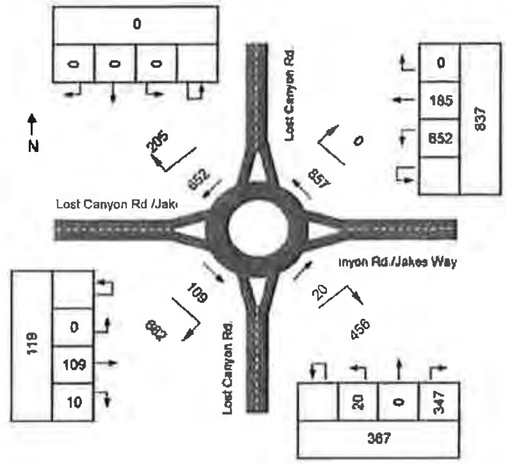
Does not account for flared entry lanes or pedestrian effects.

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)							2
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	PM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	367	109	1129	0.35	5	A	50
South							
East	119	652	728	0.18	6	A	25
West	837	20	1195	0.76	12	B	200
All	1323				9	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)
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Does not account for flared entry lanes or pedestrian effects.
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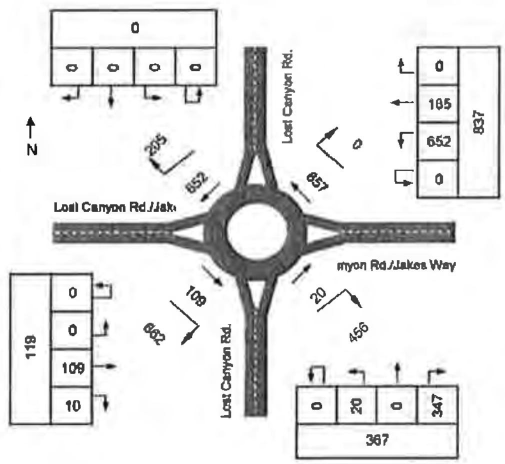
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	PM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	367	109	1162	0.34	10	A	50
South							
East	119	652	739	0.17	11	B	25
West	837	20	1251	0.73	15	C	175
All	1323				13	B	



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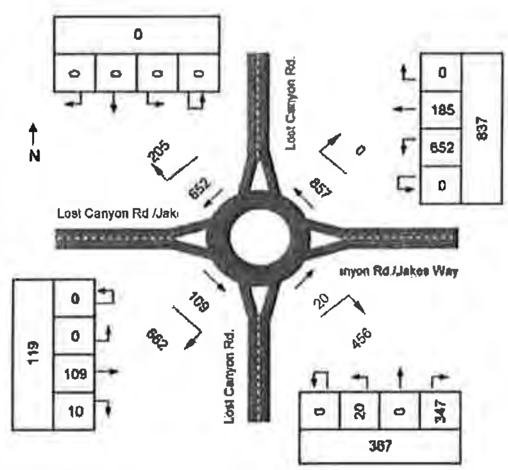
Does not account for flared entry lanes or pedestrian effects
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (NCHRP 572)

Type of Design		Single-Lane Roundabout					
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd./Jakes Way		
PHF	0.92	Time	PM	N-S	Lost Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS**	**Queue** (ft)**
North	367	109	1013	0.39	11	B	50
South							
East	119	652	589	0.22	13	B	25
West	837	20	1108	0.82	21	C	250
All	1323				18	C	



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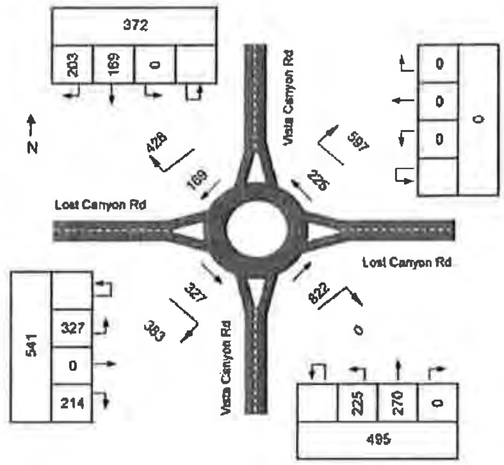
Does not account for flared entry lanes or pedestrian effects.

ROUNDABOUT OPERATIONS ANALYSIS (FHWA)

Type of Design (1 - Urban & Rural Single Lane or 2 - Urban Compact)							2
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	PM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	495	327	968	0.56	8	A	100
South	372	225	1044	0.39	6	A	50
East	541	169	1085	0.54	7	A	75
West							
All	1408				7	A	



Source: Roundabouts: An Informational Guide (FHWA, 2000)
Capacity calculation is valid for inscribed diameters of 25 to 55 m (80 to 180 ft).
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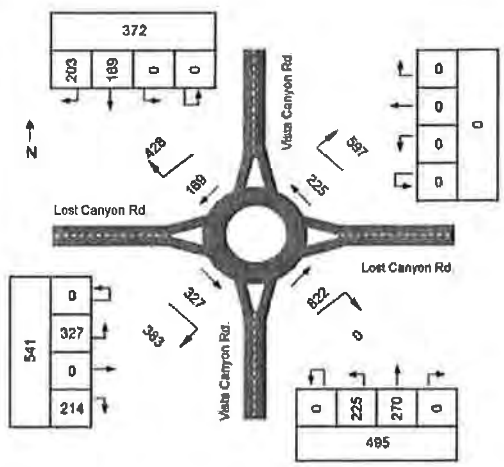
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (HCM 2000 - AVERAGE VALUES)

Type of Design	Single-Lane Roundabout						
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	PM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS***	**Queue** (ft)**
North	495	327	969	0.56	13	B	100
South	372	225	1055	0.38	11	B	50
East	541	169	1105	0.53	12	B	75
West							
All	1408				12	B	



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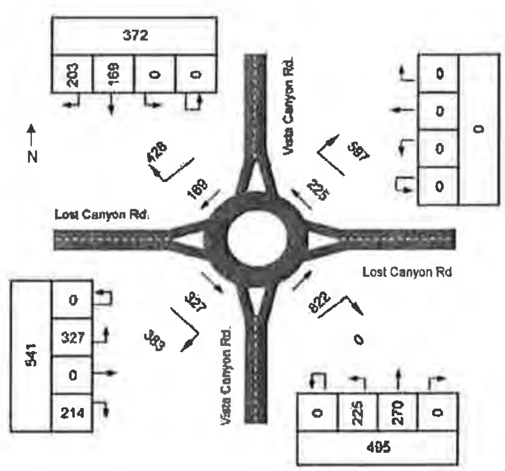
Does not account for flared entry lanes or pedestrian effects.
** LOS criteria for unsignalized intersections from the Highway Capacity Manual 2000*
*** Assumes a queued vehicle length of 25 feet*

ROUNDABOUT OPERATIONS ANALYSIS (NCHRP 572)

Type of Design	Single-Lane Roundabout						
Period (hr)	0.25	Date	2009	E-W	Lost Canyon Rd.		
PHF	0.92	Time	PM	N-S	Vista Canyon Rd.		
Approach	**Total Volume (vph)**	**Circ. Flow (vph)**	**Capacity (vph)**	**v/c**	**Control Delay (sec)**	**LOS**	**Queue** (ft)**
North	495	327	815	0.66	18	C	125
South	372	225	902	0.45	12	B	50
East	541	169	954	0.62	15	B	100
West							
All	1408				15	C	



Source: NCHRP 572: Roundabouts in the United States (TRB, 2007)
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Does not account for flared entry lanes or pedestrian effects.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Via Princessa to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	2330	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	626	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	639	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	639	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	9.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 NB
From/To: Sand Canyon to Soledad Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	2321	veh/h
Peak-hour factor, PHF	0.93	
Peak 15-min volume, v15	624	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	849	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	849	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Via Princessa to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	6265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1649	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2242	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.60	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2242	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	55.8	mi/h
Number of lanes, N	3	
Density, D	40.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 NB
From/To:	Sand Canyon to Soledad Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	5923	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1559	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	3180	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	3180	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	2	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:
Agency or Company: Fehr & Peers
Date Performed: 12/16/2008
Analysis Time Period: AM Peak Hour
Freeway/Direction: SR 14 SB
From/To: Soledad Canyon to Sand Canyon
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	4545	veh/h
Peak-hour factor, PHF	0.94	
Peak 15-min volume, v15	1209	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2466	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	2466	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	2	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Soledad Canyon to Sand Canyon
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description:	Vista Canyon Ranch

Flow Inputs and Adjustments

Volume, V	3058	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	796	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1083	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	1083	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	3	
Density, D	16.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS+: Basic Freeway Segments Release 5.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	
Agency or Company:	Fehr & Peers
Date Performed:	12/16/2008
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR 14 SB
From/To:	Sand Canyon to Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description: Vista Canyon Ranch	

Flow Inputs and Adjustments

Volume, V	3200	veh/h
Peak-hour factor, PHF	0.96	
Peak 15-min volume, v15	833	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	850	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	4	
Free-flow speed:	Measured	
FFS or BFFS	65.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	1.5	mi/h
Free-flow speed, FFS	65.0	mi/h
	Urban Freeway	

LOS and Performance Measures

Flow rate, vp	850	pc/h/ln
Free-flow speed, FFS	65.0	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Leisch Method for Weaving Analysis

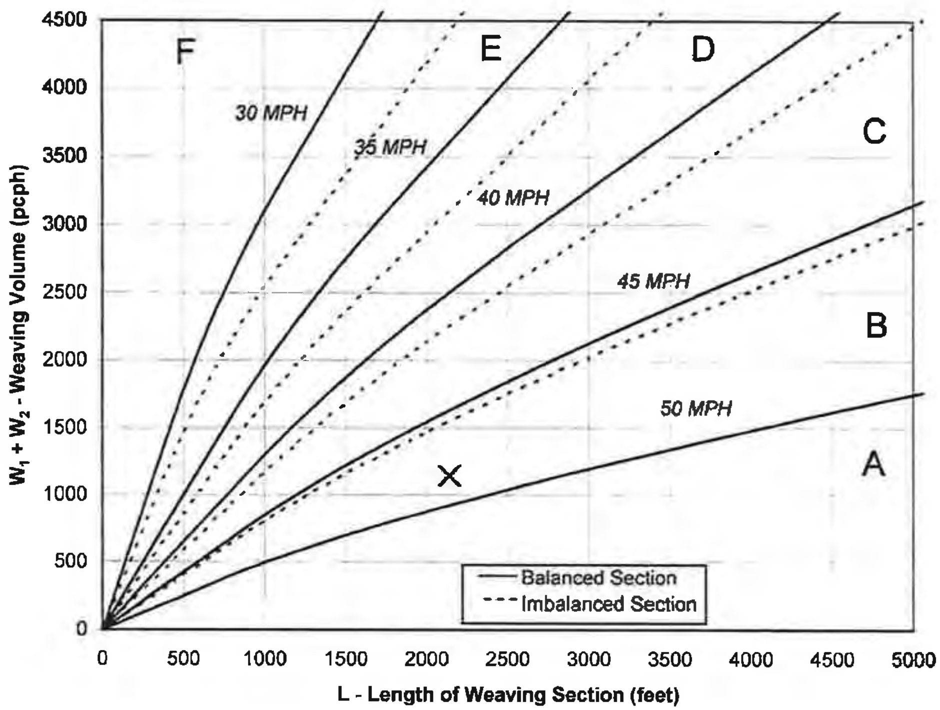
Data Input

Number of Entering Mainline Lanes	N_b	4
Number of Lanes in Weaving Section	N	5
Length of Weaving Section (feet)	L	2,140

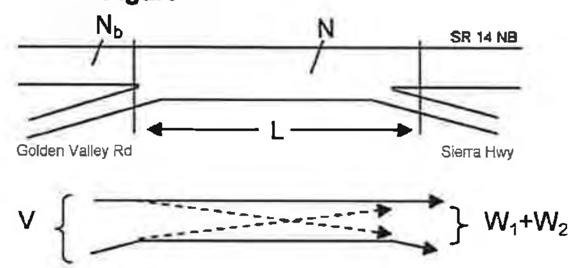
Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	3,043	Volume (vph)*	500	Volume (vph)*	540
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	3,652	Volume (pcph)	550	Volume (pcph)	594

Project Information

Project	Vista Canyon Ranch
Scenario	2015 PP Conditions - AM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? Y
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**

   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 48.4
4. Weaving Intensity Factor (k) 1.45
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ 780
6. Level of Service (LOS) A

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

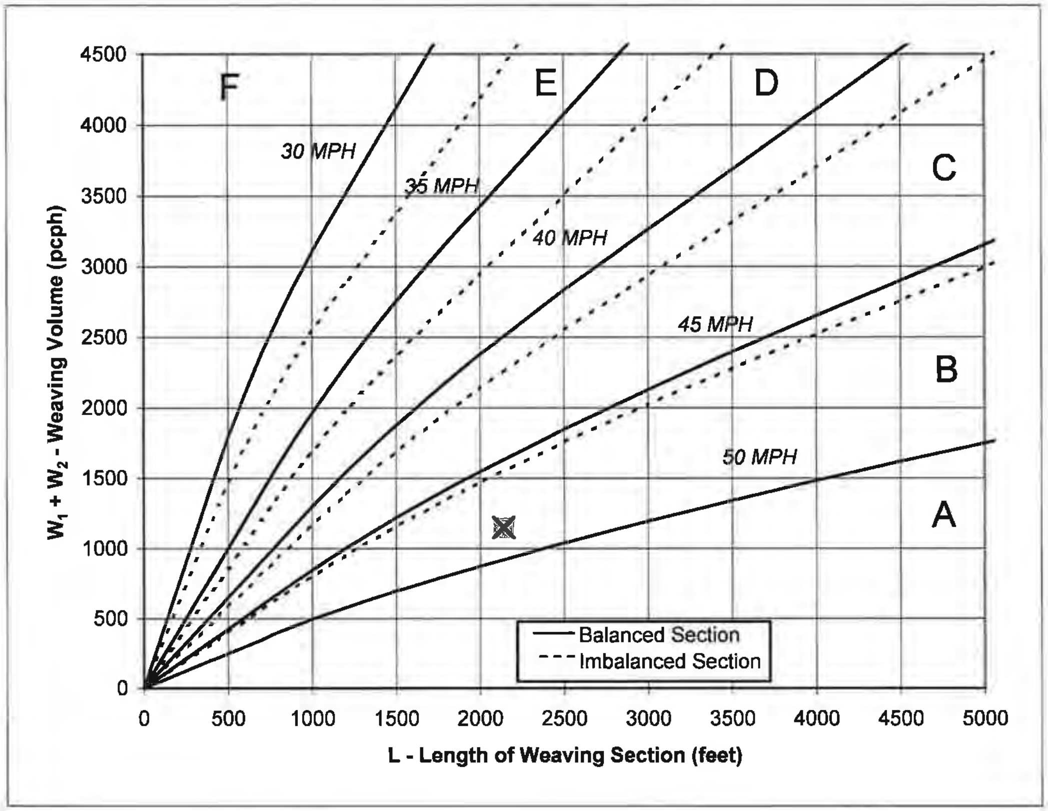
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	2,140

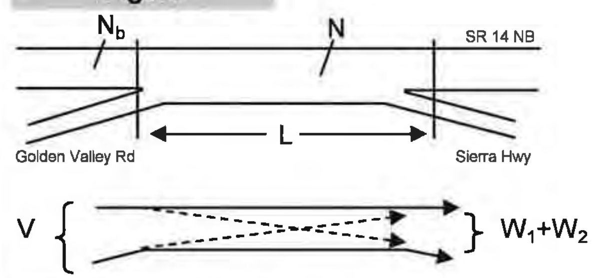
Project Information

Project	Vista Canyon Ranch
Scenario	2015 PP Conditions - PM
Freeway	SR 14 NB
On-ramp	Golden Valley Rd
Off-ramp	Sierra Hwy

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	6,937	Volume (vph)*	320	Volume (vph)*	726
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	8,324	Volume (pcph)	352	Volume (pcph)	799



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **Y**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**
   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) **48.4**
4. Weaving Intensity Factor (k) **1.45**
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ **2,121**
6. Level of Service (LOS) **F**

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

Leisch Method for Weaving Analysis

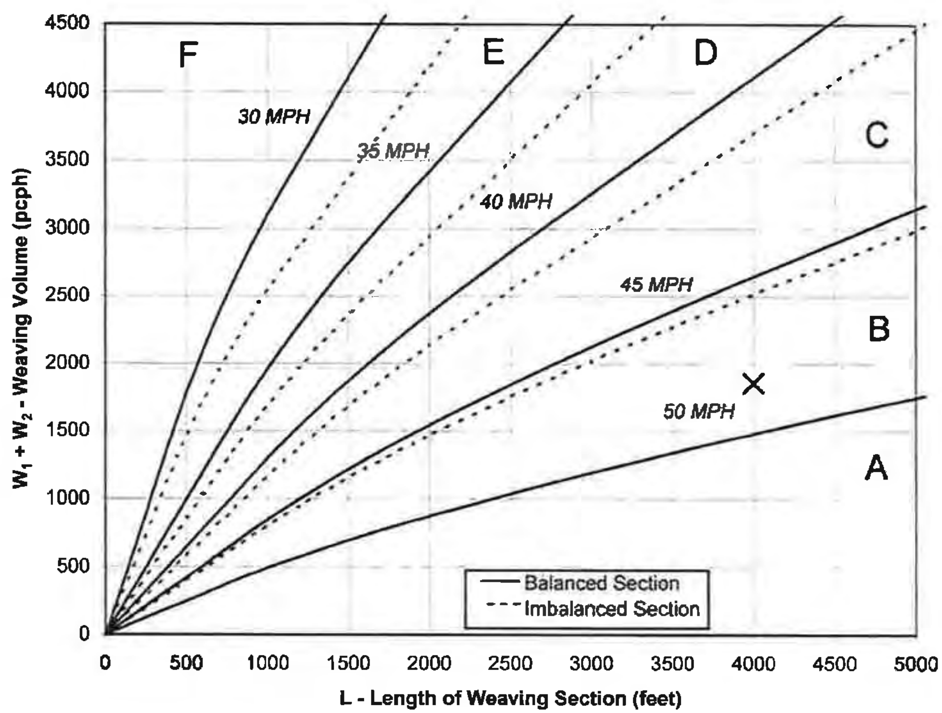
Data Input

Number of Entering Mainline Lanes	N_b	3
Number of Lanes in Weaving Section	N	4
Length of Weaving Section (feet)	L	4,000

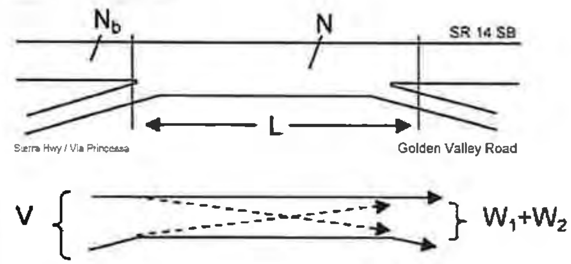
Project Information

Project	Vista Canyon Ranch
Scenario	2015 PP Conditions - PM
Freeway	SR 14 SB
On-ramp	Sierra Hwy / Via Princessa
Off-ramp	Golden Valley Road

Total Weaving Section (V)		On-ramp to Mainline (W_1)		Mainline to Off-ramp (W_2)	
Volume (vph)*	4,272	Volume (vph)*	1,552	Volume (vph)*	140
Truck Percentage	40%	Truck Percentage	20%	Truck Percentage	20%
PCE for Trucks	1.5	PCE for Trucks	1.5	PCE for Trucks	1.5
Volume (pcph)	5,126	Volume (pcph)	1,707	Volume (pcph)	154



Figure



Capacity Analysis

1. Is the weaving section balanced (Y / N)? **N**
   [If optional exit lane, then "Y". Otherwise "N".]
2. In the Weaving Speed Chart to the left, which two speed curves is the black "x" between?
   45 MPH and **50 MPH**
   If below the 50 MPH curve, out of the realm of weaving.
   If left of the 30 MPH curve, LOS is F.
3. Interpolated Weaving Speed (S_w, mph) 48.2
4. Weaving Intensity Factor (k) 1.72
5. Service Volume (SV, pcph)
   $SV = (1/N)*[V + (k - 1)*\min(W_1, W_2)]$ 1,309
6. Level of Service (LOS) C

The LOS in the chart above refers to the capacity of weaving traffic only; through and ramp to ramp traffic is not included.

* Note: **Do not adjust by a Peak Hour Factor (PHF).** The methodology incorporates the PHF in the Service Volume tables.

Source: *Completion of Procedures for Analysis and Design of Traffic Weaving Sections*, Jack E. Leisch & Associates, September 1983.

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2330	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2330		470			vph
Peak-hour factor, PHF	0.93		0.80			
Peak 15-min volume, v15	626		147			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2555		593			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2555	9400	No
$v_{FO} = v_F - v_R$	1962	9400	No
v_R	593	2000	No
v_{3} or v_{av34}	553 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1448		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1448	4400	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 12.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.481

Space mean speed in ramp influence area, S_R = 53.9 mph

Space mean speed in outer lanes, S_0 = 71.3 mph

Space mean speed for all vehicles, S = 60.3 mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 NB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1860	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	461	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1860	461		vph
Peak-hour factor, PHF	0.93	0.85		
Peak 15-min volume, v15	500	136		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	2040	548		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.591 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1207 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2588	7050	No
v_3 or v_{av34}	833 pc/h	(Equation 25-4 or 25-5)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 1207		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1207	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_0 = 63.8	mph
Space mean speed for all vehicles,	S = 59.7	mph

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Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4556	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	906	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4556		906			vph
Peak-hour factor, PHF	0.94		0.90			
Peak 15-min volume, v15	1212		252			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	4944		1017			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 1.000 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4944 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4944	4700	Yes
$v_{FO} = v_F - v_R$	3927	4700	No
v_R	1017	2000	No
v_3 or v_{av34}	0 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 4944		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4944	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 42.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, D_S = 0.520

Space mean speed in ramp influence area, S_R = 53.1 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 53.1 mph

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Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: AM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3650	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	880	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3650	880		vph
Peak-hour factor, PHF	0.94	0.86		
Peak 15-min volume, v15	971	250		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	0.980	0.990		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	3961	1010		pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 1.000 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3961 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4971	4700	Yes
v_{3} or v_{av34}	0 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 3961		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	3961	4600	Yes

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 34.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable, M_S = 0.778

Space mean speed in ramp influence area, S_R = 47.1 mph

Space mean speed in outer lanes, S_0 = N/A mph

Space mean speed for all vehicles, S = 47.1 mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions

Description: **Vista Canyon Ranch**

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2503	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	533	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2503		533			vph
Peak-hour factor, PHF	0.93		0.85			
Peak 15-min volume, v15	673		157			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2745		633			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1554 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2745	9400	No
$v_{FO} = v_F - v_R$	2112	9400	No
v_R	633	2000	No
v_{3} or v_{av34}	595 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1554		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1554	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 13.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.485	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_0 = 71.3	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Sand Canyon Rd
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions

Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6265	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1265	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6265		1265			vph
Peak-hour factor, PHF	0.95		0.90			
Peak 15-min volume, v15	1649		351			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6727		1420			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.527 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4214 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6727	7050	No
$v_{FO} = v_F - v_R$	5307	7050	No
v_R	1420	2000	No
v_{3} or v_{av34}	2513 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12} /2		No	
If yes, v_{12A} = 4214		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4214	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 36.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.556	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_0 = 65.4	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS+: Ramps and Ramp Junctions Release 5.3

```
Phone:                                    Fax:
E-mail:

_________________________________Merge Analysis_______________________________

Analyst:
Agency/Co.:             Fehr & Peers
Date performed:         12/16/2008
Analysis time period:   AM Peak Hour
Freeway/Dir of Travel:  SR 14 NB
Junction:               Sand Canyon Rd
Jurisdiction:           Santa Clarita
Analysis Year:          2015 Plus Project Conditions
Description:  Vista Canyon Ranch

_________________________________Freeway Data_________________________________

Type of analysis                          Merge
Number of lanes in freeway                2
Free-flow speed on freeway                65.0           mph
Volume on freeway                         5040           vph

_________________________________On Ramp Data_________________________________

Side of freeway                           Right
Number of lanes in ramp                   1
Free-flow speed on ramp                   35.0           mph
Volume on ramp                            897            vph
Length of first accel/decel lane          500            ft
Length of second accel/decel lane                        ft

_________________________Adjacent Ramp Data (if one exists)____________________

Does adjacent ramp exist?                 No
Volume on adjacent Ramp                                  vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp                                ft

_____________________Conversion to pc/h Under Base Conditions_________________

Junction Components                 Freeway     Ramp          Adjacent
                                                              Ramp
Volume, V (vph)                     5040        897                     vph
Peak-hour factor, PHF               0.95        0.95
Peak 15-min volume, v15             1326        236                     v
Trucks and buses                    4           2                       %
Recreational vehicles               0           0                       %
Terrain type:                       Level       Level
     Grade                                %           %             %
     Length                               mi          mi            mi
Trucks and buses PCE, ET            1.5         1.5
Recreational vehicle PCE, ER        1.2         1.2
Heavy vehicle adjustment, fHV              0.980        0.990
Driver population factor, fP               1.00         1.00
Flow rate, vp                              5411         954                 pcph

____________________Estimation of V12 Merge Areas______________________

                  L  =              (Equation 25-2 or 25-3)
                   EQ
                  P  =    1.000   Using Equation  0
                   FM
                  v  = v  (P  ) =  5411   pc/h
                   12   F   FM

__________________________Capacity Checks_______________________________

                          Actual          Maximum          LOS F?
     v                    6365            4700             Yes
      FO
     v    v               0     pc/h      (Equation 25-4 or 25-5)
      3 or  av34
Is   v    v       > 2700 pc/h?            No
      3 or  av34
Is   v    v       > 1.5 v  /2             No
      3 or  av34         12
If yes, v    = 5411                       (Equation 25-8)
         12A

_____________________Flow Entering Merge Influence Area__________________
                     Actual         Max Desirable          Violation?
     v               5411           4600                   Yes
      R12
___________________Level of Service Determination (if not F)_____________

Density, D = 5.475 + 0.00734 v  + 0.0078 v   - 0.00627 L   =   51.5    pc/mi/ln
                              R            12           A
Level of service for ramp-freeway junction areas of influence  F

____________________________Speed Estimation_____________________________

Intermediate speed variable,                  M  = 2.552
                                               S
Space mean speed in ramp influence area,      S  = 6.3      mph
                                               R
Space mean speed in outer lanes,              S  =  N/A     mph
                                               0
Space mean speed for all vehicles,            S  = 6.3      mph
_________________________________________________________________________
```

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	3058	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	678	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3058		678			vph
Peak-hour factor, PHF	0.96		0.85			
Peak 15-min volume, v15	796		199			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	3249		806			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.642 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2374 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3249	7050	No
$v_{FO} = v_F - v_R$	2443	7050	No
v_R	806	2000	No
v_{3} or v_{av34}	875 pc/h	(Equation 25-15 or 25-16)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 2374		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2374	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.501

Space mean speed in ramp influence area, S_R = 53.5 mph

Space mean speed in outer lanes, S_O = 71.3 mph

Space mean speed for all vehicles, S = 57.3 mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:
Agency/Co.: Fehr & Peers
Date performed: 12/16/2008
Analysis time period: PM Peak Hour
Freeway/Dir of Travel: SR 14 SB
Junction: Sand Canyon Rd
Jurisdiction: Santa Clarita
Analysis Year: 2015 Plus Project Conditions
Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2380	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2380		820			vph
Peak-hour factor, PHF	0.96		0.98			
Peak 15-min volume, v15	620		209			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2529		845			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.619 Using Equation 1

$v_{12} = v_F (P_{FM})$ = 1567 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3374	7050	No
v_{3} or v_{av34}	962 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 1567		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{R12}	1567	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 14.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.260	
Space mean speed in ramp influence area,	S_R = 59.0	mph
Space mean speed in outer lanes,	S_0 = 63.3	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 NB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions

Description: Vista Canyon Ranch

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6404	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	879	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6404		879			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1685		231			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	6876		935			pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 25-8 or 25-9)

P_{FD} = 0.545 Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4173 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6876	7050	No
$v_{FO} = v_F - v_R$	5941	7050	No
v_R	935	2000	No
v_3 or v_{av34}	2703 pc/h	(Equation 25-15 or 25-16)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	
If yes, v_{12A} = 4176		(Equation 25-18)	

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4176	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ = 35.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence E

Speed Estimation

Intermediate speed variable,	D_S = 0.512	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_0 = 64.7	mph
Space mean speed for all vehicles,	S = 57.2	mph

HCS+: Ramps and Ramp Junctions Release 5.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	
Agency/Co.:	Fehr & Peers
Date performed:	12/16/2008
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR 14 SB
Junction:	Via Princessa
Jurisdiction:	Santa Clarita
Analysis Year:	2015 Plus Project Conditions
Description:	Vista Canyon Ranch

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	892	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2720		892			vph
Peak-hour factor, PHF	0.96		0.95			
Peak 15-min volume, v15	708		235			v
Trucks and buses	4		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade		%		%		%
Length		mi		mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			
Heavy vehicle adjustment, fHV	0.980		0.990			
Driver population factor, fP	1.00		1.00			
Flow rate, vp	2890		948			pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 25-2 or 25-3)

P_{FM} = 0.099 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 287 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3838	9400	No
v_{3} or v_{av34}	1301 pc/h	(Equation 25-4 or 25-5)	
Is v_{3} or v_{av34} > 2700 pc/h?		No	
Is v_{3} or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1156		(Equation 25-8)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1156	4600	No

Level of Service Determination (if not F)

Density, $D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.318	
Space mean speed in ramp influence area,	S_R = 57.7	mph
Space mean speed in outer lanes,	S_0 = 63.7	mph
Space mean speed for all vehicles,	S = 60.2	mph

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: AM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 2: Soledad Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	290	294	101	21	61.8	E	--
	T	147	182	124	10	57.2	E	--
	R	375	382	102	15	11.0	B	--
	Subtotal	**812**	**858**	**106**	--	**38.2**	**D**	--
SB	L	140	141	101	6	57.0	E	--
	T	174	177	102	12	53.5	D	--
	R	171	164	96	16	24.7	C	--
	Subtotal	**485**	**482**	**99**	--	**44.7**	**D**	--
EB	L	80	76	95	8	66.0	E	--
	T	651	663	102	28	47.9	D	--
	R	343	342	100	24	16.5	B	--
	Subtotal	**1074**	**1081**	**101**	--	**39.2**	**D**	--
WB	L	328	315	96	13	64.2	E	--
	T	1341	1349	101	35	28.9	C	--
	R	170	167	98	15	12.0	B	--
	Subtotal	**1839**	**1830**	**100**	--	**33.4**	**C**	--
	Total	**4210**	**4250**	**101**	--	**37.1**	**D**	--

Intersection: 3: Soledad Canyon Rd. & SR 14 SB Ramps **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	846	796	94	21	157.6	F	--
	R	60	59	98	8	153.1	F	--
	Subtotal	**906**	**855**	**94**	--	**157.3**	**F**	--
EB	T	636	703	110	22	21.5	C	--
	R	520	532	102	24	7.4	A	--
	Subtotal	**1156**	**1235**	**107**	--	**15.4**	**B**	--
WB	L	360	357	99	15	52.0	D	--
	T	993	982	99	18	23.6	C	--
	Subtotal	**1353**	**1338**	**99**	--	**31.2**	**C**	--
	Total	**3415**	**3428**	**100**	--	**57.0**	**E**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch			**HCM:**	2000
Scenario:	2015 Plus Project Conditions w/ Mitigation			**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:**	Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	562	634	113	29	18.3	B	--
	R	238	237	100	16	7.8	A	--
	Subtotal	**800**	**871**	**109**	--	**15.4**	**B**	--
SB	L	223	220	99	12	29.5	C	--
	T	601	644	107	22	8.3	A	--
	Subtotal	**824**	**865**	**105**	--	**13.7**	**B**	--
EB	L	230	229	100	19	23.7	C	--
	R	240	239	100	10	4.8	A	--
	Subtotal	**470**	**468**	**100**	--	**14.1**	**B**	--
	Total	**2094**	**2204**	**105**	--	**14.4**	**B**	--

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	136	139	102	9	15.9	B	--
	T	480	490	102	27	16.5	B	--
	R	5	6	120	2	15.6	B	--
	Subtotal	**621**	**635**	**102**	--	**16.4**	**B**	--
SB	L	20	18	90	4	32.6	C	--
	T	390	394	101	19	26.5	C	--
	R	491	483	98	18	24.5	C	--
	Subtotal	**901**	**895**	**99**	--	**25.5**	**C**	--
EB	L	360	360	100	10	24.2	C	--
	T	11	11	100	2	24.9	C	--
	R	108	107	99	7	25.5	C	--
	Subtotal	**479**	**478**	**100**	--	**24.5**	**C**	--
WB	L	5	5	100	2	11.0	B	--
	T	23	22	96	4	14.0	B	--
	R	20	21	105	4	11.9	B	--
	Subtotal	**48**	**48**	**100**	--	**12.7**	**B**	--
	Total	**2049**	**2056**	**100**	--	**22.2**	**C**	--

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch		**HCM:**	2000
Scenario:	2015 Plus Project Conditions w/ Mitigation		**PHF:**	1
TOD:	AM Peak Hr	**Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 7: Soledad Canyon Rd. & Lost Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	143	141	99	10	21.6	C	--
	R	86	88	102	10	7.9	A	--
	Subtotal	**229**	**229**	**100**	--	**16.3**	**B**	--
EB	T	950	954	100	30	14.2	B	--
	R	290	288	99	10	8.7	A	--
	Subtotal	**1240**	**1242**	**100**	--	**12.9**	**B**	--
WB	L	175	165	94	9	32.2	C	--
	T	1820	1780	98	21	12.2	B	--
	Subtotal	**1995**	**1945**	**97**	--	**13.9**	**B**	--
	Total	**3464**	**3415**	**99**	--	**13.7**	**B**	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2015 Plus Project Conditions w/ Mitigation	**PHF:**	1
TOD:	AM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 14: SR 14 SB Ramps & Via Princessa   **Type:** Signalized

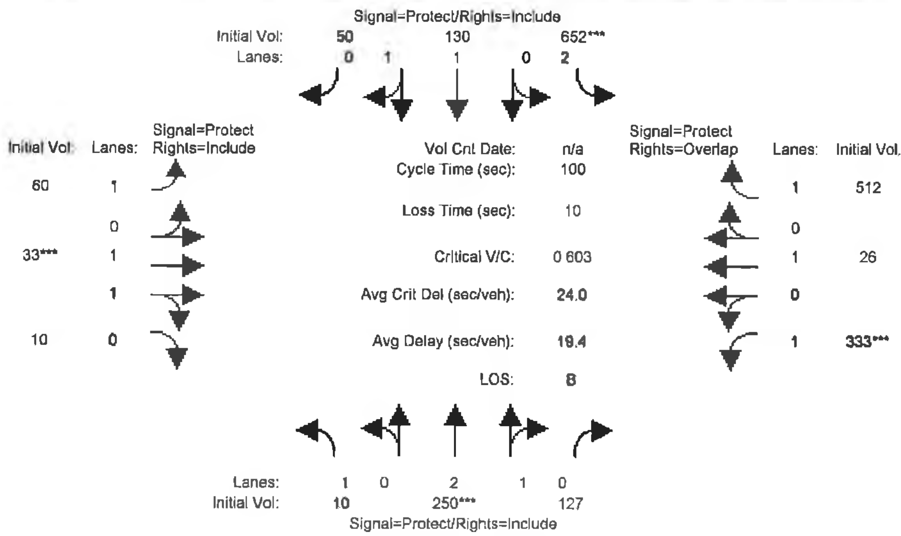
Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	289	283	98	26	38.0	D	--
	T	633	659	104	23	4.2	A	--
	Subtotal	922	941	102	--	14.3	B	--
SB	T	679	697	103	22	21.2	C	--
	R	870	874	100	36	10.6	B	--
	Subtotal	1549	1570	101	--	15.3	B	--
WB	L	80	75	94	8	37.7	D	--
	T	5	6	120	3	40.7	D	--
	R	290	295	102	14	10.8	B	--
	Subtotal	375	376	100	--	16.7	B	--
	Total	2846	2887	101	--	15.2	B	--

Intersection: 15: SR 14 NB Ramps & Via Princessa   **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	702	772	110	37	16.5	B	--
	R	120	121	101	11	6.7	A	--
	Subtotal	822	893	109	--	15.1	B	--
SB	L	240	249	104	12	36.8	D	--
	T	519	535	103	28	8.1	A	--
	Subtotal	759	784	103	--	17.2	B	--
EB	L	220	219	99	13	31.1	C	--
	R	313	324	104	12	23.7	C	--
	Subtotal	533	543	102	--	26.7	C	--
	Total	2114	2220	105	--	18.7	B	--

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project Mitigation AM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	250	127	652	130	50	60	33	10	333	26	512
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	250	127	652	130	50	60	33	10	333	26	512
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	250	127	652	130	50	60	33	10	333	26	512
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	250	127	652	130	50	60	33	10	333	26	512
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	250	127	652	130	50	60	33	10	333	26	512
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	250	127	652	130	50	60	33	10	333	26	512
OvlAdjVol:												186
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	1.44	0.56	1.00	1.53	0.47	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	3200	2311	889	1600	2456	744	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.08	0.08	0.20	0.06	0.06	0.04	0.01	0.01	0.21	0.02	0.32
OvlAdjV/S:												0.12
Crit Moves:		****		****				****		****		

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: *Vista Canyon Ranch* **HCM:** *2000*
Scenario: *2015 Plus Project Conditions w/ Mitigation* **PHF:** *1*
TOD: *PM Peak Hr* **Analysis Period:** *Hourly* **# of Runs:** *10*

Intersection: *2: Soledad Canyon Rd. & Sand Canyon Rd.* **Type:** *Signalized*

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	320	321	100	16	74.8	E	--
	T	199	425	213	16	41.2	D	--
	R	672	658	98	24	35.0	C	--
	Subtotal	1191	1403	118	--	46.0	D	--
SB	L	150	146	97	16	54.5	D	--
	T	142	138	97	8	50.1	D	--
	R	107	103	96	9	14.9	B	--
	Subtotal	399	387	97	--	42.4	D	--
EB	L	158	157	99	15	102.7	F	--
	T	973	942	97	36	99.7	F	--
	R	514	507	99	23	50.5	D	--
	Subtotal	1645	1605	98	--	84.4	F	--
WB	L	301	281	93	24	71.6	E	--
	T	647	651	101	45	26.3	C	--
	R	140	134	96	8	9.4	A	--
	Subtotal	1088	1066	98	--	36.2	D	--
	Total	4323	4461	103	--	67.2	E	--

Intersection: *3: Soledad Canyon Rd. & SR 14 SB Ramps* **Type:** *Signalized*

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	558	537	96	54	56.4	E	--
	R	120	113	93	15	54.1	D	--
	Subtotal	678	650	96	--	56.0	E	--
EB	T	1265	1234	98	41	20.6	C	--
	R	520	508	98	20	5.0	A	--
	Subtotal	1785	1742	98	--	16.1	B	--
WB	L	300	237	79	10	587.7	F	--
	T	530	498	94	33	95.1	F	--
	Subtotal	830	734	88	--	253.9	F	--
	Total	3293	3126	95	--	80.3	F	--

FEHR & PEERS
TRANSPORTATION CONSULTANTS

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project:	Vista Canyon Ranch	**HCM:**	2000
Scenario:	2015 Plus Project Conditions w/ Mitigation	**PHF:**	1
TOD:	PM Peak Hr **Analysis Period:** Hourly	**# of Runs:**	10

Intersection: 4: SR 14 NB Ramps & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	T	601	610	101	30	45.2	D	--
	R	533	538	101	31	18.2	B	--
	Subtotal	**1134**	**1147**	**101**	**--**	**32.5**	**C**	**--**
SB	L	364	354	97	11	57.8	E	--
	T	543	575	106	35	14.9	B	--
	Subtotal	**907**	**929**	**102**	**--**	**31.2**	**C**	**--**
EB	L	810	794	98	39	47.5	D	--
	R	455	451	99	30	11.5	B	--
	Subtotal	**1265**	**1245**	**98**	**--**	**34.4**	**C**	**--**
	Total	**3306**	**3321**	**100**	**--**	**32.9**	**C**	**--**

Intersection: 5: Lost Canyon Rd. & Sand Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	43	40	93	5	12.2	B	--
	T	750	761	101	26	13.5	B	--
	R	10	9	90	4	11.5	B	--
	Subtotal	**803**	**810**	**101**	**--**	**13.5**	**B**	**--**
SB	L	30	27	90	4	11.9	B	--
	T	620	831	134	33	11.1	B	--
	R	118	115	97	11	11.3	B	--
	Subtotal	**768**	**973**	**127**	**--**	**11.1**	**B**	**--**
EB	L	194	193	99	9	12.0	B	--
	T	24	25	104	4	13.2	B	--
	R	67	67	100	7	12.2	B	--
	Subtotal	**285**	**285**	**100**	**--**	**12.1**	**B**	**--**
WB	L	5	4	80	2	11.9	B	--
	T	15	16	107	3	14.2	B	--
	R	50	51	102	8	12.3	B	--
	Subtotal	**70**	**72**	**103**	**--**	**12.7**	**B**	**--**
	Total	**1926**	**2140**	**111**	**--**	**12.2**	**B**	**--**

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch **HCM:** 2000
Scenario: 2015 Plus Project Conditions w/ Mitigation **PHF:** 1
TOD: PM Peak Hr **Analysis Period:** Hourly **# of Runs:** 10

Intersection: 7: Soledad Canyon Rd. & Lost Canyon Rd. **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served			Delay/Veh (sec)		
			Avg	%	Std Dev	Avg	LOS	Std Dev
NB	L	402	401	100	14	39.7	D	--
	R	245	244	100	21	26.9	C	--
	Subtotal	647	644	100	--	34.9	C	--
EB	T	1500	1498	100	35	19.3	B	--
	R	234	237	101	18	9.7	A	--
	Subtotal	1734	1735	100	--	18.0	B	--
WB	L	139	133	96	13	32.4	C	--
	T	860	856	100	22	10.8	B	--
	Subtotal	999	989	99	--	13.7	B	--
	Total	3380	3368	100	--	20.0	B	--

SIMTRAFFIC LEVEL OF SERVICE REPORT
Including Upstream Delays

Project: Vista Canyon Ranch — **HCM:** 2000
Scenario: 2015 Plus Project Conditions w/ Mitigation — **PHF:** 1
TOD: PM Peak Hr — **Analysis Period:** Hourly — **# of Runs:** 10

Intersection: 14: SR 14 SB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	L	342	339	99	21	23.7	C	--
	T	1011	1027	102	34	6.2	A	--
	Subtotal	**1353**	**1365**	**101**	--	**10.6**	**B**	--
SB	T	1071	1032	96	40	100.1	F	--
	R	550	553	101	12	20.0	C	--
	Subtotal	**1621**	**1585**	**98**	--	**72.2**	**E**	--
WB	L	150	149	99	9	23.3	C	--
	T	10	10	100	2	24.1	C	--
	R	320	314	98	12	10.7	B	--
	Subtotal	**480**	**472**	**98**	--	**14.9**	**B**	--
	Total	**3454**	**3422**	**99**	--	**39.7**	**D**	--

Intersection: 15: SR 14 NB Ramps & Via Princessa — **Type:** Signalized

Approach	Movement	Demand Volume	Volume Served Avg	Volume Served %	Volume Served Std Dev	Delay/Veh (sec) Avg	Delay/Veh (sec) LOS	Delay/Veh (sec) Std Dev
NB	T	903	904	100	28	41.1	D	--
	R	140	144	103	10	14.2	B	--
	Subtotal	**1043**	**1049**	**100**	--	**37.4**	**D**	--
SB	L	560	537	96	15	29.4	C	--
	T	661	647	98	34	9.0	A	--
	Subtotal	**1221**	**1184**	**97**	--	**18.2**	**B**	--
EB	L	450	461	102	23	30.9	C	--
	R	429	430	100	21	25.2	C	--
	Subtotal	**879**	**890**	**101**	--	**28.1**	**C**	--
	Total	**3143**	**3122**	**99**	--	**27.6**	**C**	--

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.91		0.97	0.91		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.96		1.00	1.00		1.00	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	4592		3433	4919		3433	3539	1521	1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	4592		3433	4919		3433	3539	1521	1770	3539	1521
Volume (vph)	700	1129	755	240	795	183	667	724	483	238	730	450
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	700	1129	755	240	795	183	667	724	483	238	730	450
RTOR Reduction (vph)	0	92	0	0	29	0	0	0	141	0	0	5
Lane Group Flow (vph)	700	1792	0	240	949	0	667	724	342	238	730	445
Confl. Peds. (#/hr)			70			9			17			48
Confl. Bikes (#/hr)			7			2			5			1
Turn Type	Prot			Prot			Prot		Perm	Prot		pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases									8			4
Actuated Green, G (s)	25.8	46.0		9.5	29.7		25.9	37.6	37.6	19.9	31.6	57.4
Effective Green, g (s)	25.3	48.0		9.0	31.7		25.4	39.6	39.6	19.4	33.6	58.9
Actuated g/C Ratio	0.19	0.36		0.07	0.24		0.19	0.30	0.30	0.15	0.25	0.45
Clearance Time (s)	3.5	6.0		3.5	6.0		3.5	6.0	6.0	3.5	6.0	3.5
Vehicle Extension (s)	2.0	4.5		2.0	4.5		2.5	4.5	4.5	1.0	4.5	2.0
Lane Grp Cap (vph)	658	1670		234	1181		661	1062	456	260	901	725
v/s Ratio Prot	0.20	c0.39		c0.07	0.19		c0.19	0.20		c0.13	c0.21	0.12
v/s Ratio Perm									0.22			0.17
v/c Ratio	1.06	1.24dr		1.03	0.80		1.01	0.68	0.75	0.92	0.81	0.61
Uniform Delay, d1	53.4	42.0		61.5	47.2		53.3	40.7	41.7	55.5	46.2	27.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	53.3	44.6		65.6	5.9		37.3	2.1	7.7	33.4	6.1	2.0
Delay (s)	106.6	86.6		127.1	53.1		90.6	42.8	49.4	88.9	52.3	29.9
Level of Service	F	F		F	D		F	D	D	F	D	C
Approach Delay (s)		92.1			67.7			61.5			51.4	
Approach LOS		F			E			E			D	

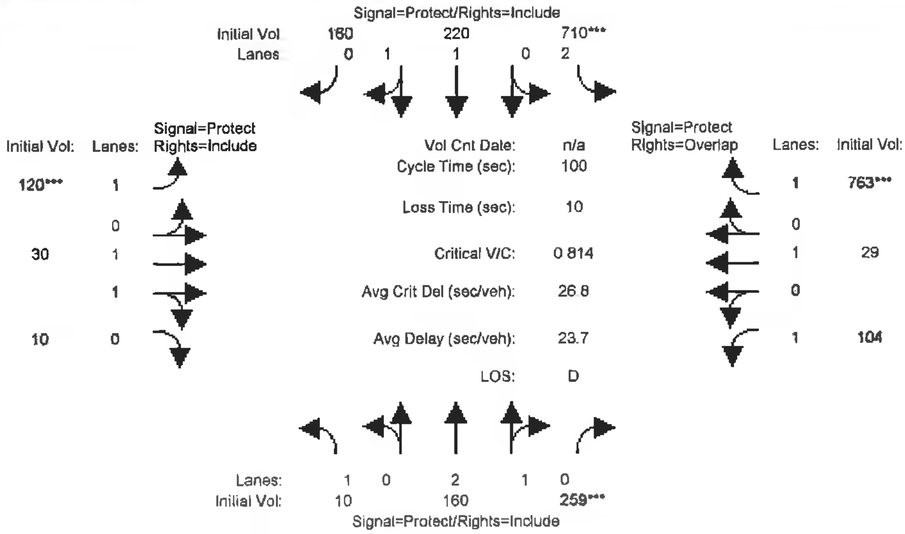
Intersection Summary			
HCM Average Control Delay	71.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.9%	ICU Level of Service	G
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Future Volume Alternative)
Interim Plus Project Mitigation PM

Intersection #16: Via Princessa/Lost Canyon Road



Street Name:	Lost Canyon Road						Via Princessa					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	10	160	259	710	220	160	120	30	10	104	29	763
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	10	160	259	710	220	160	120	30	10	104	29	763
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	10	160	259	710	220	160	120	30	10	104	29	763
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	10	160	259	710	220	160	120	30	10	104	29	763
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	10	160	259	710	220	160	120	30	10	104	29	763
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	10	160	259	710	220	160	120	30	10	104	29	763
OvlAdjVol:												408
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	2.00	1.16	0.84	1.00	1.50	0.50	1.00	1.00	1.00
Final Sat.:	1600	3200	1600	3200	1853	1347	1600	2400	800	1600	1600	1600
Capacity Analysis Module:												
Vol/Sat:	0.01	0.05	0.16	0.22	0.12	0.12	0.08	0.01	0.01	0.07	0.02	0.48
OvlAdjV/S:												0.26
Crit Moves:			****	****			****					****

APPENDIX F:

TECHNICAL CALCULATIONS FOR CUMULATIVE CONDITIONS

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project AM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 0 1100 400***
Lanes: 0 0 3 0 1

West approach: Signal=Split, Rights=Include
Base Vol: 0, 0, 0 — Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.531
Avg Crit Del (sec/veh): 18.9
Avg Delay (sec/veh): 14.3
LOS: A

East approach: Signal=Split, Rights=Include
Lanes: 1, 0, 0, 0, 1 — Base Vol: 130, 0, 180***

Lanes: 0 0 3 0 1
Base Vol: 0 310 110***
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	310	110	400	1100	0	0	0	0	180	0	130
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	310	110	400	1100	0	0	0	0	180	0	130
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	310	110	400	1100	0	0	0	0	180	0	130
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	310	110	400	1100	0	0	0	0	180	0	130
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	310	110	400	1100	0	0	0	0	180	0	130
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	1.00	3.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	4800	1600	1600	4800	0	0	0	0	1600	0	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.07	0.25	0.23	0.00	0.00	0.00	0.00	0.11	0.00	0.08
Crit Moves:			****	****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project AM

Intersection #8: Soledad Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 760*** 990 110
Lanes: 1 0 3 0 1

Base Vol:	Lanes:	Signal=Protect Rights=Include			Signal=Protect Rights=Include	Lanes:	Base Vol:
420	2		Vol Cnt Date:	n/a		0	140
			Cycle Time (sec):	100			
	0		Loss Time (sec):	10		1	
720	3		Critical V/C:	1.141		2	1380
	0		Avg Crit Del (sec/veh):	124.8		0	
520***	1		Avg Delay (sec/veh):	70.2		2	740***
			LOS:	F			

Lanes: 2 0 3 0 1
Base Vol: 390*** 680 80
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Soledad Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	390	680	80	110	990	760	420	720	520	740	1380	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	390	680	80	110	990	760	420	720	520	740	1380	140
User Adj:	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	0.80	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	390	680	80	110	990	684	420	720	416	740	1380	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	390	680	80	110	990	684	420	720	416	740	1380	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	390	680	80	110	990	684	420	720	416	740	1380	140
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	2.72	0.28
Final Sat.:	3200	4800	1600	1600	4800	1600	3200	4800	1600	3200	4358	442
Capacity Analysis Module:												
Vol/Sat:	0.12	0.14	0.05	0.07	0.21	0.43	0.13	0.15	0.26	0.23	0.32	0.32
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project AM

Intersection #21:

Signal=Protect/Rights=Include
Base Vol: 140 2110*** 170
Lanes: 1 0 3 0 1

Base Vol: Lanes: Signal=Protect Rights=Include
10 1
0
950 2
0
670*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 1.185
Avg Crit Del (sec/veh): 147.1
Avg Delay (sec/veh): 91.6
LOS: F

Signal=Protect Rights=Include Lanes: Base Vol:
1 150
0
2 1040
0
2 340***

Lanes: 1 0 3 0 1
Base Vol: 260*** 280 180
Signal=Protect/Rights=Include

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	260	280	180	170	2110	140	10	950	670	340	1040	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	260	280	180	170	2110	140	10	950	670	340	1040	150
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	260	280	180	170	2110	140	10	950	603	340	1040	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	260	280	180	170	2110	140	10	950	603	340	1040	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	260	280	180	170	2110	140	10	950	603	340	1040	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	1600	4800	1600	1600	4800	1600	1600	3200	1600	3200	3200	1600
Capacity Analysis Module:												
Vol/Sat:	0.16	0.06	0.11	0.11	0.44	0.09	0.01	0.30	0.38	0.11	0.33	0.09
Crit Moves:	****				****				****	****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project PM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 0 240 190***
Lanes: 0 0 3 0 1

Signal=Split Rights=Include (West side)
Base Vol: 0, 0, 0
Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.571
Avg Crit Del (sec/veh): 20.9
Avg Delay (sec/veh): 18.8
LOS: A

Signal=Split Rights=Include (East side)
Lanes: 1, 0, 0, 0, 1
Base Vol: 250***, 0, 150

Lanes: 0 0 3 0 1
Base Vol: 0 940*** 240
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	940	240	190	240	0	0	0	0	150	0	250
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	940	240	190	240	0	0	0	0	150	0	250
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	940	240	190	240	0	0	0	0	150	0	250
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	940	240	190	240	0	0	0	0	150	0	250
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	940	240	190	240	0	0	0	0	150	0	250
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	1.00	3.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	4800	1600	1600	4800	0	0	0	0	1600	0	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.15	0.12	0.05	0.00	0.00	0.00	0.00	0.09	0.00	0.16
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project PM

Intersection #8: Soledad Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 560*** 900 230
Lanes: 1 0 3 0 1

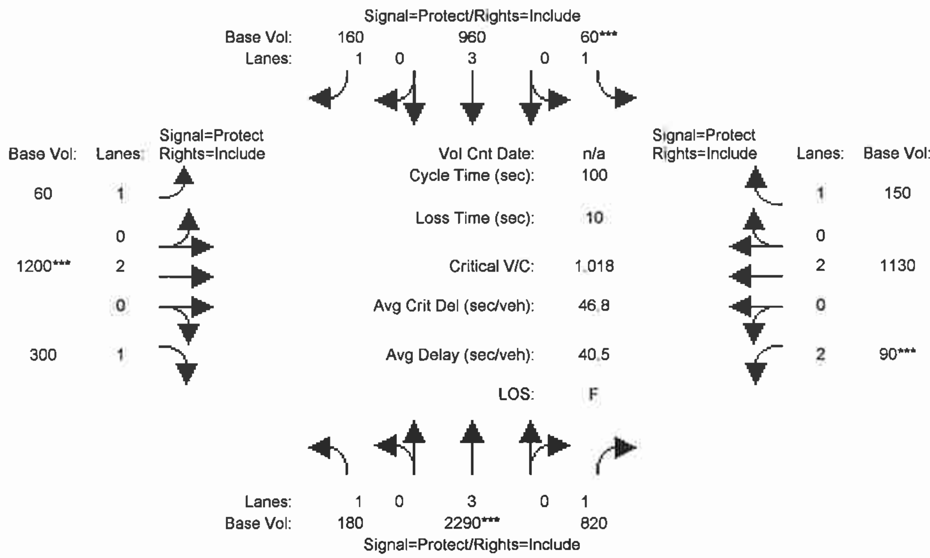
Base Vol:	Lanes:	Signal=Protect Rights=Include			Signal=Protect Rights=Include	Lanes:	Base Vol:
720***	2		Vol Cnt Date:	n/a		0	160
	0		Cycle Time (sec):	100		1	
1380	3		Loss Time (sec):	10		2	570***
	0		Critical V/C:	1.027		0	
590	1		Avg Crit Del (sec/veh):	66.8		2	200
			Avg Delay (sec/veh):	45.5			
			LOS:	F			

Lanes: 2 0 3 0 1
Base Vol: 640*** 1220 490
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Soledad Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	640	1220	490	230	900	560	720	1380	590	200	570	160
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	640	1220	490	230	900	560	720	1380	590	200	570	160
User Adj:	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	0.80	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	640	1220	490	230	900	560	720	1380	472	200	570	160
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	640	1220	490	230	900	560	720	1380	472	200	570	160
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	640	1220	490	230	900	560	720	1380	472	200	570	160
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	2.34	0.66
Final Sat.:	3200	4800	1600	1600	4800	1600	3200	4800	1600	3200	3748	1052
Capacity Analysis Module:												
Vol/Sat:	0.20	0.25	0.31	0.14	0.19	0.35	0.23	0.29	0.30	0.06	0.15	0.15
Crit Moves:	****					****	****				****	

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative No Project PM

Intersection #21:



Approach:	North Bound L	North Bound T	North Bound R	South Bound L	South Bound T	South Bound R	East Bound L	East Bound T	East Bound R	West Bound L	West Bound T	West Bound R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	180	2290	820	60	960	160	60	1200	300	90	1130	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	2290	820	60	960	160	60	1200	300	90	1130	150
User Adj:	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	2290	738	60	960	160	60	1200	300	90	1130	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	2290	738	60	960	160	60	1200	300	90	1130	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	180	2290	738	60	960	160	60	1200	300	90	1130	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	1600	4800	1600	1600	4800	1600	1600	3200	1600	3200	3200	1600
Capacity Analysis Module:												
Vol/Sat:	0.11	0.48	0.46	0.04	0.20	0.10	0.04	0.38	0.19	0.03	0.35	0.09
Crit Moves:		****		****				****		****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project AM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 0 1100 450***
Lanes: 0 0 3 0 1

West side — Signal=Split, Rights=Include
Base Vol: 0, 0, 0
Lanes: 0, 0, 0, 0, 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.563
Avg Crit Del (sec/veh): 18.5
Avg Delay (sec/veh): 14.2
LOS: A

East side — Signal=Split, Rights=Include
Lanes: 1, 0, 0, 0, 1
Base Vol: 140, 0, 180***

Lanes: 0 0 3 0 1
Base Vol: 0 300 110***
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	300	110	450	1100	0	0	0	0	180	0	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	300	110	450	1100	0	0	0	0	180	0	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	300	110	450	1100	0	0	0	0	180	0	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	300	110	450	1100	0	0	0	0	180	0	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	300	110	450	1100	0	0	0	0	180	0	140
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	1.00	3.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	4800	1600	1600	4800	0	0	0	0	1600	0	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.06	0.07	0.28	0.23	0.00	0.00	0.00	0.00	0.11	0.00	0.09
Crit Moves:			****	****						****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project AM

Intersection #8: Soledad Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 750*** 950 160
Lanes: 1 0 3 0 1

Signal=Protect Rights=Include (Eastbound)
Base Vol: | Lanes:
400 | 2
 | 0
910 | 3
 | 0
510*** | 1

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 1.133
Avg Crit Del (sec/veh): 120.1
Avg Delay (sec/veh): 67.7
LOS: F

Signal=Protect Rights=Include (Westbound)
Lanes: | Base Vol:
0 | 150
1 |
2 | 1380
0 |
2 | 740***

Lanes: 2 0 3 0 1
Base Vol: 400*** 670 100
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Soledad Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	400	670	100	160	950	750	400	910	510	740	1380	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	400	670	100	160	950	750	400	910	510	740	1380	150
User Adj:	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	0.80	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	400	670	100	160	950	675	400	910	408	740	1380	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	400	670	100	160	950	675	400	910	408	740	1380	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	400	670	100	160	950	675	400	910	408	740	1380	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	2.71	0.29
Final Sat.:	3200	4800	1600	1600	4800	1600	3200	4800	1600	3200	4329	471
Capacity Analysis Module:												
Vol/Sat:	0.13	0.14	0.06	0.10	0.20	0.42	0.13	0.19	0.26	0.23	0.32	0.32
Crit Moves:	****					****			****	****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project AM

Intersection #21:

Signal=Protect/Rights=Include

Base Vol: 130 2080*** 160
Lanes: 1 0 3 0 1

Signal=Protect
Rights=Include

Base Vol: Lanes:
10 1
0
920 2
0
690*** 1

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 1.200
Avg Crit Del (sec/veh): 158.5
Avg Delay (sec/veh): 97.3
LOS: F

Signal=Protect
Rights=Include

Lanes: Base Vol:
1 140
0
2 1030
0
2 330***

Lanes: 1 0 3 0 1
Base Vol: 280*** 280 190
Signal=Protect/Rights=Include

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	280	280	190	160	2080	130	10	920	690	330	1030	140
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	280	280	190	160	2080	130	10	920	690	330	1030	140
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	280	280	190	160	2080	130	10	920	621	330	1030	140
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	280	280	190	160	2080	130	10	920	621	330	1030	140
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	280	280	190	160	2080	130	10	920	621	330	1030	140
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	1600	4800	1600	1600	4800	1600	1600	3200	1600	3200	3200	1600
Capacity Analysis Module:												
Vol/Sat:	0.17	0.06	0.12	0.10	0.43	0.08	0.01	0.29	0.39	0.10	0.32	0.09
Crit Moves:	****				****				****	****		

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project PM

Intersection #1: Sand Canyon Road/Sierra Highway

Signal=Protect/Rights=Include
Base Vol: 0 230 190***
Lanes: 0 0 3 0 1

Signal=Split
Rights=Include
Base Vol: Lanes:
0 0
0
0 0
0
0 0

Vol Cnt Date: n/a
Cycle Time (sec): 100
Loss Time (sec): 10
Critical V/C: 0.592
Avg Crit Del (sec/veh): 21.5
Avg Delay (sec/veh): 19.4
LOS: A

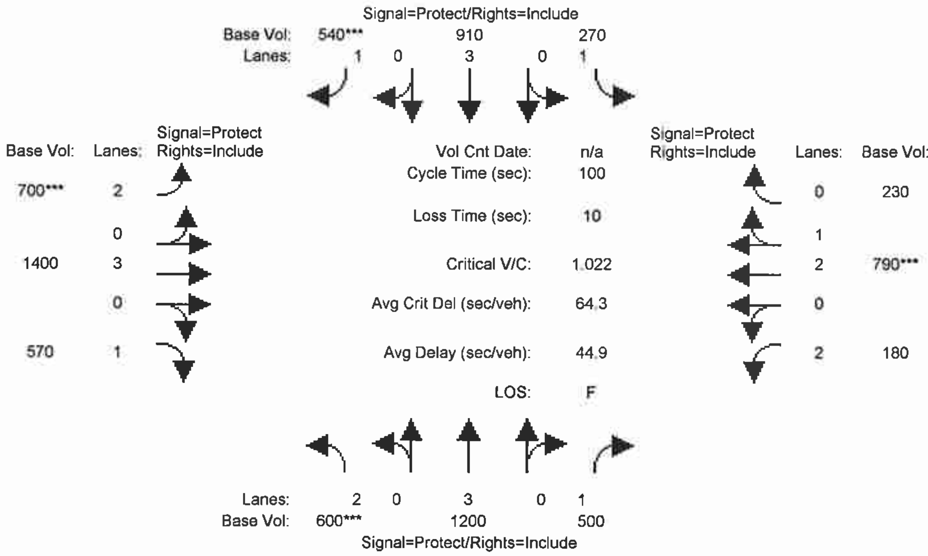
Signal=Split
Rights=Include
Lanes: Base Vol:
1 280***
0
0 0
0
1 150

Lanes: 0 0 3 0 1
Base Vol: 0 950*** 240
Signal=Protect/Rights=Include

Street Name:	Sierra Highway						Sand Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	0	950	240	190	230	0	0	0	0	150	0	280
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	950	240	190	230	0	0	0	0	150	0	280
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	950	240	190	230	0	0	0	0	150	0	280
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	950	240	190	230	0	0	0	0	150	0	280
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	0	950	240	190	230	0	0	0	0	150	0	280
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	0.00	3.00	1.00	1.00	3.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00
Final Sat.:	0	4800	1600	1600	4800	0	0	0	0	1600	0	1600
Capacity Analysis Module:												
Vol/Sat:	0.00	0.20	0.15	0.12	0.05	0.00	0.00	0.00	0.00	0.09	0.00	0.17
Crit Moves:		****		****								****

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project PM

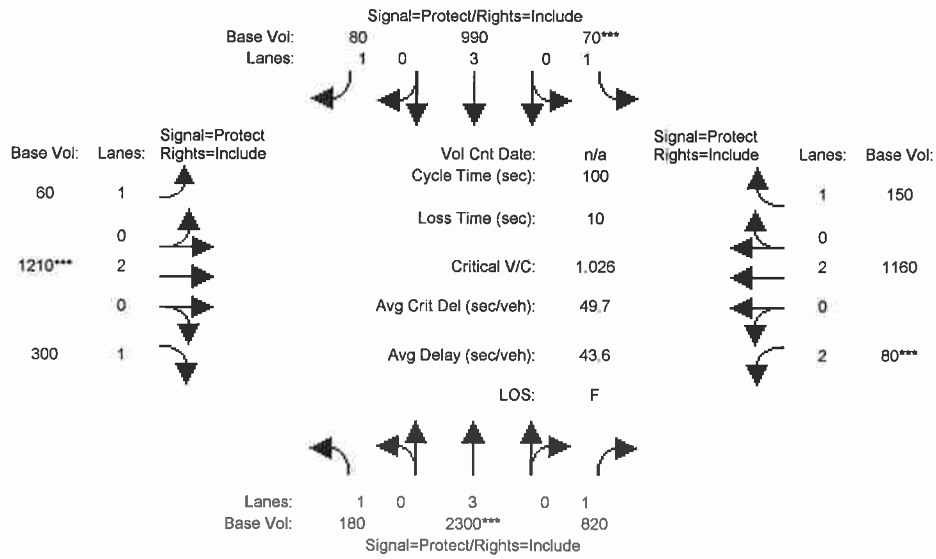
Intersection #8: Soledad Canyon Road/Sierra Highway



Street Name:	Sierra Highway						Soledad Canyon Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	600	1200	500	270	910	540	700	1400	570	180	790	230
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	600	1200	500	270	910	540	700	1400	570	180	790	230
User Adj:	1.00	1.00	1.00	1.00	1.00	0.90	1.00	1.00	0.80	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	600	1200	500	270	910	486	700	1400	456	180	790	230
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	600	1200	500	270	910	486	700	1400	456	180	790	230
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	600	1200	500	270	910	486	700	1400	456	180	790	230
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	2.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00	1.00	2.00	2.32	0.68
Final Sat.:	3200	4800	1600	1600	4800	1600	3200	4800	1600	3200	3718	1082
Capacity Analysis Module:												
Vol/Sat:	0.19	0.25	0.31	0.17	0.19	0.30	0.22	0.29	0.28	0.06	0.21	0.21
Crit Moves:	****					****	****				****	

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) (Base Volume Alternative)
Cumulative Plus Project PM

Intersection #21:



Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Volume Module:												
Base Vol:	180	2300	820	70	990	80	60	1210	300	80	1160	150
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	180	2300	820	70	990	80	60	1210	300	80	1160	150
User Adj:	1.00	1.00	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	180	2300	738	70	990	80	60	1210	300	80	1160	150
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	180	2300	738	70	990	80	60	1210	300	80	1160	150
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	180	2300	738	70	990	80	60	1210	300	80	1160	150
Saturation Flow Module:												
Sat/Lane:	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	3.00	1.00	1.00	3.00	1.00	1.00	2.00	1.00	2.00	2.00	1.00
Final Sat.:	1600	4800	1600	1600	4800	1600	1600	3200	1600	3200	3200	1600
Capacity Analysis Module:												
Vol/Sat:	0.11	0.48	0.46	0.04	0.21	0.05	0.04	0.38	0.19	0.03	0.36	0.09
Crit Moves:		****		****				****		****		

APPENDIX G:

VMT CALCULATIONS

HOUSEHOLD VMT ESTIMATE

Project: Vista Canyon - Proposed Project
Date: 7/20/2009

Inputs/Assumptions

Home-Based Trip Production Proportions by Trip Purpose (a)

	Total Proportion	Proportion to/from Home End
HBW	0.24	0.28
HBO	0.62	0.72
NHB	0.14	0.01

(a) Source: SCVCTDM Model Update and Validation Report (2005).

Project Dwelling Units

Total Units = 1,117

Weekday Daily Trip Ends (b,c)

	Trip Ends
Residential (HBW, HBO, and NHB generated from home location)	6,710
Residential (NHB trip associated with residents of home generated elsewhere on network)	1,092
	7,802

(b) These are gross vehicle trips (with reductions taken for walk and transit trips)

(c) ITE Trip Rate does not account for trips made by residents of the home once they leave the driveway. These are added here to account for the NHB trips of residents that occur elsewhere on the network.

Estimated Trip Lengths in miles (c)

	HBW	HBO	NHB
Internal to Internal (II)	0.25	0.25	0.25
Internal to External (IX)	20.00	6.00	6.00
NHB (that occur elsewhere on the network)	6.00		

(c) Based on OVOV land use element regarding journey to work data: about half of Santa Clarita residents work outside the City (principally to the south), which implies those trips have long HBW trip length. Avg travel time to work was 32 minutes from Census. According to model output, 58% of residential trips have an external trip end within 5 miles of project, indicating the HBO trip length is much less than HBW.

Residential II and IX trip percentages (d)

	HBW	HBO	NHB
II	15.0%	10.0%	20.00%
IX	85.0%	90.0%	80.00%
TOTAL	100%	100%	100%

(d) May be calculated using traffic model, trip generation worksheet, or regional data.

Part A - VMT from Home-Based Trips (Made by Project's Residents)

Internal/External Trip Ends by Type

	HBW	HBO
II	281	484
IX	1,592	4,354

Internal/External VMT by Type

	HBW	HBO
II	70	121
IX	31,833	26,122
	SUM =	**58,147**

Part B- VMT from NHB Trips That Occur Elsewhere on the Network (Made by Project's Residents)

NHB Trips = 1,092
NHB VMT = 6,554

Part C- VMT from NHB Trips Attracted to Residential (Made by non-Project Residents) (e)

HB Attraction Trips= 67.1
HB Attraction VMT= 402.6

(e) Examples include deliveries to a home, dropping off children in a carpool, etc. VMT calculation assumes NHB IX trip length.

Conclusion - Total VMT and VMT per HH

Total VMT = 65,103
VMT per HH = 58

Reasonableness Checks	
Internal Resid. Trip Percentage Based on II and IX percentages =	11%
Internalization from Traffic Study =	11%

Note: VMT estimate does not fully take into account effects of non-residential portion of the project.

HOUSEHOLD VMT ESTIMATE

Project: Draft OVOV Residential LU Designatior
Date: 4/21/2009

Inputs/Assumptions

Home-Based Trip Production Proportions by Trip Purpose (a)

	Total Proportion	Proportion to/from Home End
HBW	0.24	0.28
HBO	0.62	0.72
NHB	0.14	0.01

(a) Source: SCVCTDM Model Update and Validation Report (2005).

Project Dwelling Units

Total Units = 775

Weekday Daily Trip Ends (b,c)

	Trip Ends
Residential (HBW, HBO, and NHB generated from home location)	5,115
Residential (NHB trip associated with residents of home generated elsewhere on network)	833
	5,948

(b) These are gross vehicle trips (with reductions taken for walk and transit trips)

(c) ITE Trip Rate does not account for trips made by residents of the home once they leave the driveway. These are added here to account for the NHB trips of residents that occur elsewhere on the network.

Estimated Trip Lengths in miles (c)

	HBW	HBO	NHB
Internal to Internal (II)	0.25	0.25	0.25
Internal to External (IX)	20.00	6.00	6.00
NHB (that occur elsewhere on the network)	6.00		

(c) Based on OVOV land use element regarding journey to work data: about half of Santa Clarita residents work outside the City (principally to the south), which implies those trips have long HBW trip length. Avg travel time to work was 32 minutes from Census. According to model output, 58% of residential trips have an external trip end within 5 miles of project, indicating the HBO trip length is much less than HBW.

Residential II and IX trip percentages (d)

	HBW	HBO	NHB
II	0.0%	3.0%	20.00%
IX	100.0%	97.0%	80.00%
TOTAL	100%	100%	100%

(d) May be calculated using traffic model, trip generation worksheet, or regional data.

Part A - VMT from Home-Based Trips (Made by Project's Residents)

Internal/External Trip Ends by Type

	HBW	HBO
II	0	111
IX	1,427	3,577

Internal/External VMT by Type

	HBW	HBO
II	0	28
IX	28,549	21,462
	SUM =	**50,038**

Part B- VMT from NHB Trips That Occur Elsewhere on the Network (Made by Project's Residents)

NHB Trips = 833
NHB VMT = 4,996

Part C- VMT from NHB Trips Attracted to Residential (Made by non-Project Residents) (e)

HB Attraction Trips= 51.15
HB Attraction VMT= 306.9

(e) Examples include deliveries to a home, dropping off children in a carpool, etc. VMT calculation assumes NHB IX trip length.

Conclusion - Total VMT and VMT per HH

Total VMT = 55,341
VMT per HH = 71

APPENDIX H:

LOST CANYON ROAD SCHOOL ACCESS MEMO

Memorandum

Date:	November 21, 2008
To:	Glenn Adamick – Vista Canyon Ranch, LLC
From:	John Gard – Fehr & Peers
Subject:	*Lost Canyon Road Circulation Study* **RS08-2605**

This memorandum evaluates circulation on Lost Canyon Road in the vicinity of Sulphur Springs Community School and Pinecrest School in Santa Clarita, California. The purpose of our evaluation is three-fold:

- Describe existing circulation in the vicinity of the two schools.
- Estimate changes in travel patterns resulting from the construction of the Vista Canyon Ranch Project.
- Identify recommendations to improve circulation and access to the schools.

Existing Circulation

Sulphur Springs Community School

This is a public K-6 elementary school located on the south side of Lost Canyon Road west of Sand Canyon Road. Instruction begins at 8:45 a.m. and ends at 3:15 p.m. Parents have several options for picking up and dropping off students. They may enter the westerly driveway of the one-way only parking lot located in the front of the school to pick up or drop off students. Alternatively, they may parallel park on the south side of Lost Canyon Road or park diagonally in a gravel area on the north side and walk their students across Lost Canyon Road.

According to the Sulphur Springs School District, approximately 50 percent of the students attending this school come from residential areas north of State Route 14. Students are transported by school buses, which use an adjacent parking lot just east of the school for student loading/unloading. Very limited levels of student walking and bicycling to school were observed, which could be expected given the considerable distance between the school and the residents it serves.

Pinecrest School

This school is also located on Lost Canyon Road directly east of Sulphur Springs Community School. It is a private school offering education from preschool through middle school. Pinecrest School begins at 8:30 a.m. and ends at noon, with the afternoon session ending at 3:00 p.m. The school is served by a westerly inbound-only driveway and an easterly outbound-only driveway.

Lost Canyon Road
The segment of Lost Canyon Road west of Sand Canyon Road has one lane in each direction, with a posted speed limit of 30 miles per hour (mph). The speed limit is 25 mph when students are present. A continuous sidewalk is provided on the south side from Sand Canyon Road across the frontage of the two schools. Lost Canyon Road, currently terminates just west of La Veda Avenue, but would be extended further west with the Vista Canyon Ranch project.

Fehr and Peers conducted field observations in the vicinity of the two schools in September 2008. All trips accessing the two schools must pass through the Lost Canyon Road/Sand Canyon Road intersection. Vehicle queues on Lost Canyon Road approaching this intersection spill back a considerable distance, creating the following effects:

- Inbound and outbound traffic to the Pinecrest School driveway is blocked.
- The ability for vehicles to exit the Sulphur Springs Community School driveway after dropping off students is hindered.

Since exclusive left turn pockets are not provided on Lost Canyon Road, queued vehicles waiting to enter the two school driveways frequently block through vehicles on Lost Canyon Road, which can then spill back to Sand Canyon Road.

Discussions with several parents and staff at these schools indicate that congestion and queuing becomes worse at the Lost Canyon Road/Sand Canyon Road intersection during adverse weather conditions or when an incident occurs on State Route (SR) 14.

<u>Traffic Volumes</u>
Fehr and Peers conducted traffic counts at the Lost Canyon Road/Sand Canyon Road intersection on Wednesday, October 8th from 7-9 a.m. and from 2-4 p.m. The morning peak hour occurred from 8-9 a.m. and the afternoon peak hour occurred from 2-3 p.m. The segment of Lost Canyon Road west of Sand Canyon Road carried approximately 850 morning peak hour vehicles and 550 afternoon peak hour vehicles.

The analysis focused on morning peak hour operations since Lost Canyon Road was busiest during the morning peak hour. Through traffic on Sand Canyon Road was comparable during both the morning and afternoon peak hours. The observed peak hour factor (i.e., percentage of hourly traffic during the peak 15-minute period) was used in the analysis.

Figure 1 displays the existing morning peak hour turning movement volumes at the Lost Canyon Road/Sand Canyon Road intersection. The intersection currently operates at Level of Service (LOS) E during the peak 15-minutes of the morning peak hour.

FEHR & PEERS
TRANSPORTATION CONSULTANTS

Existing Plus Project Circulation

The Vista Canyon Ranch (VCR) project would be a mixed-use transit-oriented development located south of SR 14 and west of La Veda Avenue. It would extend Lost Canyon Road westerly into the project site and provide new street connections to Soledad Canyon Road (under SR 14) and Via Princessa (via Lost Canyon Road and/or Jakes Way).

The VCR project will change travel conditions on Lost Canyon Road. The following describes the major changes that are expected:

- Because the VCR project would construct new dwelling units within close proximity to Sulphur Springs School, it is expected that some students that currently go to this school will be relocated to a new school and be replaced by students that reside in VCR. This scenario is currently anticipated in the Draft School Agreement between the Vista Canyon applicant and the Sulphur Springs School District.
  Assumption: 30 percent of the Sulphur Springs Community School students will reside in VCR with 25 percent of those students walking/bicycling to school.[1]

- The extension of Lost Canyon Road through VCR will allow parents whose students currently attend Sulphur Springs School to access the school from the west, thereby avoiding the Sand Canyon Road/Lost Canyon Road intersection.
  Assumption: Of the remaining 70 percent of the Sulphur Springs Community School students, 25 percent are assumed to travel to/from the west to access the school. Also, 25 percent of Pinecrest School trips are assumed to travel to/from the west.[2]

- The VCR project includes land use that will generate new non-school-related trips. Although a Metrolink rail stop is planned at the site, new vehicle trips will be added to the external roadways. Some of these trips will use Lost Canyon Road to access Sand Canyon Road and SR 14.
  Assumption: VCR is assumed to add about 350 westbound trips and 160 eastbound (non-school-related) trips to Lost Canyon Road during the morning peak hour.[3]

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1 Based on expected student enrollment information provided by JSB Development.

2 Estimated using Sulphur Springs Union Elementary School District attendance boundary map.

3 This preliminary analysis assumed that the VCR project would consist of 800 condos/townhomes, 50 apartments, 600,000 square feet of office, and 150,000 square feet of general retail. Project-added trips to Lost Canyon Road were estimated using ITE trip generation rates with reasonable reductions for internalization and transit mode share. The trip generation estimate also considers vehicle trips to/from the new Metrolink Station. Future reports will describe the project's trip generation characteristics in detail.

We reassigned the existing morning peak hour traffic volumes as described above. New trips generated by VCR were assigned to Lost Canyon Road and Sand Canyon Road, and added to the redistributed existing volumes. Figure 1 shows the resulting "existing plus project" volumes.

As shown on Figure 1, separate "existing plus project" traffic forecasts were developed for the following scenarios:

- Scenario 1 (Traffic Signal) – assumes that a traffic signal is installed at the Lost Canyon Road/Sand Canyon Road intersection. The outbound-only school driveways on Lost Canyon Road would permit left- and right-turns.

- Scenario 2 (Roundabout) – assumes that a single-lane roundabout is installed at the Lost Canyon Road/Sand Canyon Road intersection. Because the roundabout would permit eastbound u-turns, the outbound-only school driveways on Lost Canyon Road were assumed to permit right-turns only.

Under Existing Plus Project Scenario 1 (Traffic Signal), Lost Canyon Road directly west of Sand Canyon Road is projected to carry approximately 1,050 vehicles during the morning peak hour. Implementation of a roundabout (scenario 2) would increase this volume to 1,310 vehicles (due to u-turns).

Both scenarios assume that Lost Canyon Road is restriped to include a center left-turn lane along the school frontages.

Traffic Operations

Table 1 summarizes the morning peak hour LOS and average delay at the Lost Canyon Road/Sand Canyon Road intersection (technical calculations are attached).

Due to right-of-way constraints, the existing lane configurations at the intersection were maintained for the traffic signal scenario. A southbound right-turn overlap arrow was assumed. By not having dedicated left-turn lanes, it was necessary to assume the east-west, and north-south approaches operate with split-phasing, which is rather inefficient.

**TABLE 1 –
MORNING PEAK HOUR OPERATIONS
AT LOST CANYON ROAD/SAND CANYON ROAD INTERSECTION**

Scenario	Average Delay[1]	Level of Service[2]
Existing Conditions – All-Way Stop	42	E
Existing Plus Project – Scenario 1 (Traffic Signal)	44	D
Existing Plus Project – Scenario 2 (Roundabout)	23	C

Note: [1]Average intersection delay is reported in seconds per vehicle.
[2]Level of Service is based on criteria from the Highway Capacity Manual 2000. All three scenarios modeled using SimTraffic micro-simulation model. Results are for peak 15-minute period.

Table 1 shows that the roundabout scenario operates at LOS C while the traffic signal scenario operates at LOS D during the morning peak hour.

Recommended Circulation and Access Improvements

The following summarizes our recommendations to improve circulation and access in the vicinity of these schools (see Figure 2):

- Install a single-lane roundabout at the Lost Canyon Road/Sand Canyon Road intersection.
- Restripe Lost Canyon Road along the two school frontages to include one lane in each direction with a center left-turn lane. On-street parallel parking along the south side of the roadway should be maintained.
- Restrict the outbound-only driveways at each school to right-turns to minimize conflicting turning movements. Motorists desiring to travel west on Lost Canyon Road from these driveways can make a u-turn at the roundabout.
- Post a sign in the narrow raised median that prohibits eastbound u-turns near the bus driveway.
- Consider permitting parents to park in the off-street lot just east of Sulphur Springs School to pick-up and drop-off students.

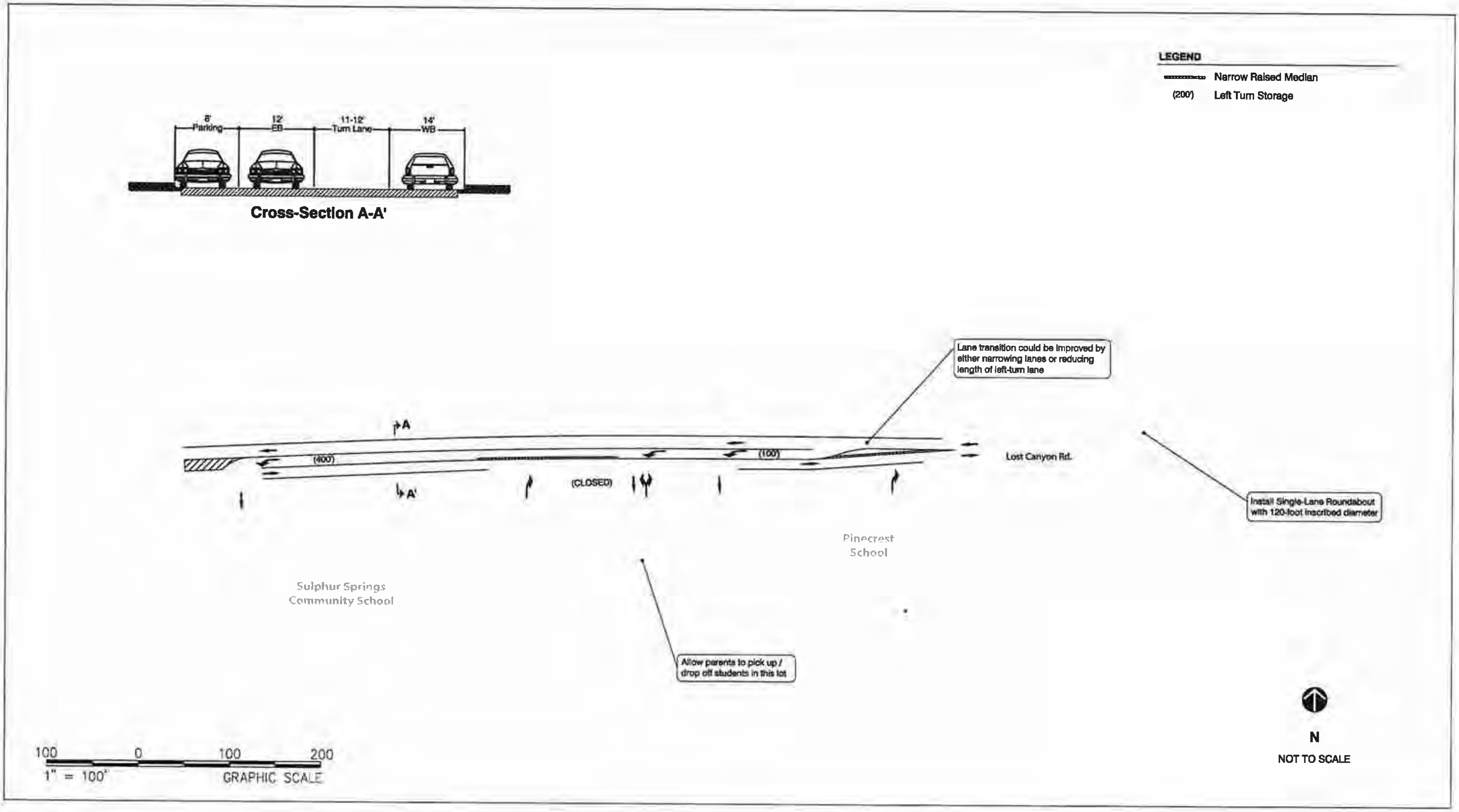
Figure 2 illustrates these recommendations including conceptual striping of the three-lane segment.

We understand that Alliance Land Planning and Engineering will be developing improvement drawings for Lost Canyon Road. We recommend that careful attention be given to the two- to three-lane transition directly west of the bridge over the wash. To increase the length of the transition (beyond what is shown on Figure 2), either a shorter left-turn lane to the Pinecrest School or reduced lane widths could be considered.

In August 2006, Roundabouts & Traffic Engineering (RTE) prepared a report entitled "*Roundabout Feasibility Report – Lost Canyon Road/Sand Canyon Road*". That study recommended a single-lane roundabout for the intersection and concluded that it would require a minor amount of additional right-of-way. A conceptual exhibit prepared by RTE of the roundabout is attached to this memo. RTE found that the roundabout could be designed to accommodate fire trucks and a WB-50 design truck.

We hope this information is helpful.

Attachments



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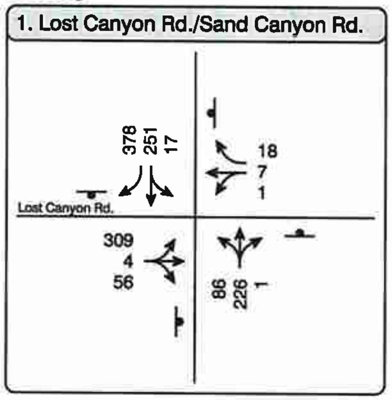
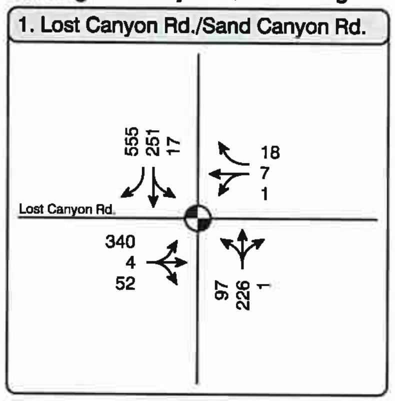
Nov 21, 2006 DAW

RECOMMENDATIONS
FIGURE 2

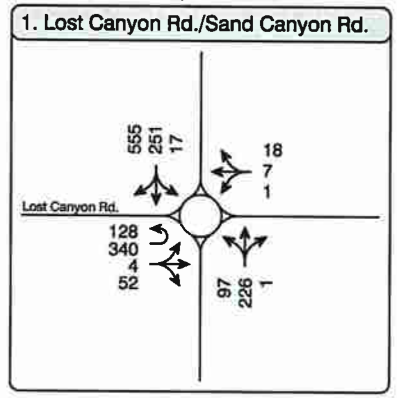
Existing Conditions



Existing Plus Project w/ Traffic Signal



Existing Plus Project w/ Roundabout



LEGEND

- Turn Lane
- XX Morning (7-8 a.m.) Peak Hour Traffic Volume
- Study Intersection
- Stop Sign
- Traffic Signal

Plus Project Assumptions:

1. 30% of the Sulphur Springs students assumed to reside in Vista Canyon Ranch.
2. Of the remaining 70% of the Sulphur Springs students, 25% assumed to travel from the west to access the school.
3. 25% of the Pinecrest vehicle trips assumed to travel from the west to access the school.
4. Vista Canyon Ranch assumed to generate 345 westbound trips and 155 eastbound trip on Lost Canyon Road.

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Oct 15, 2008 CEC
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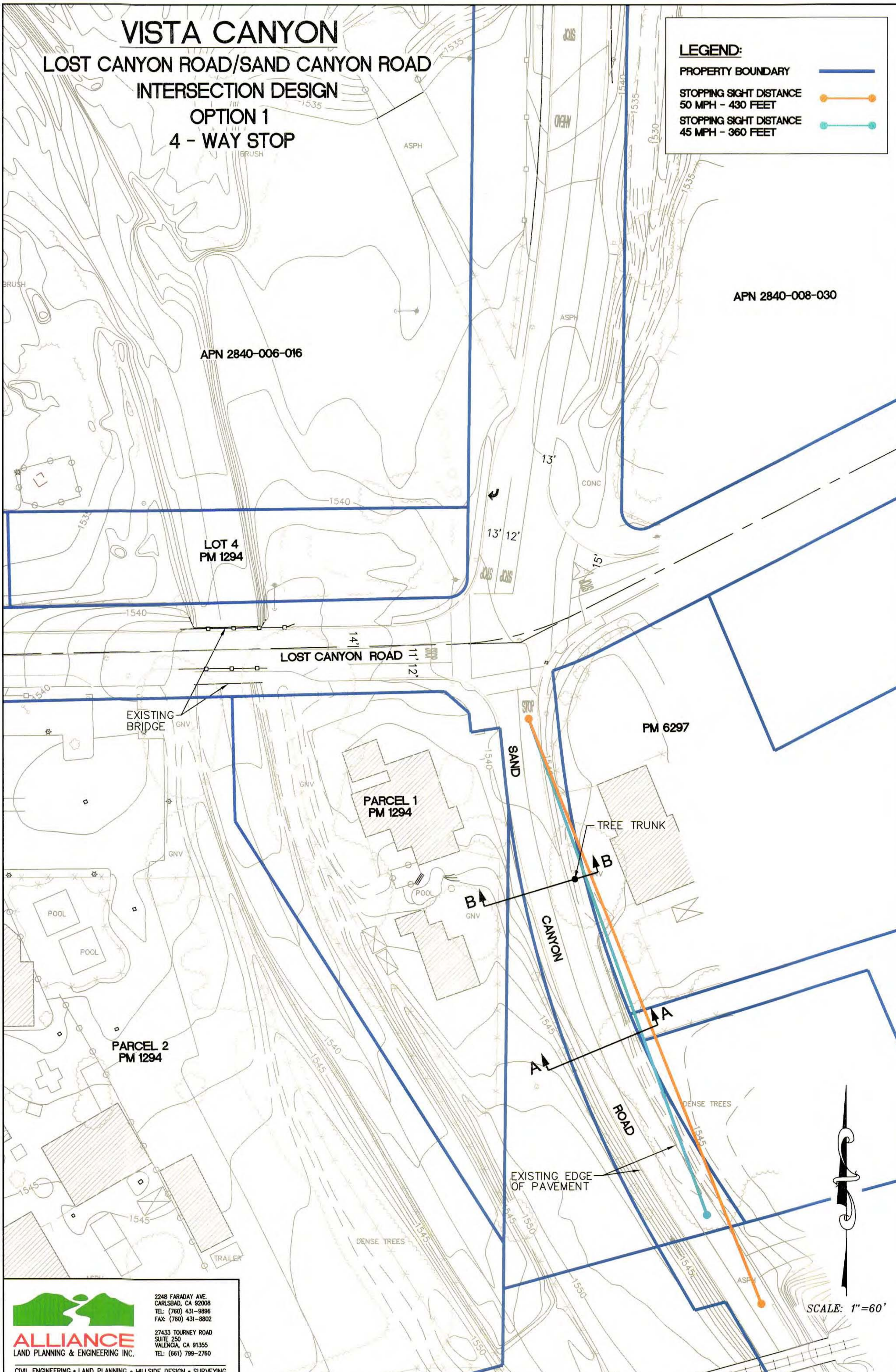
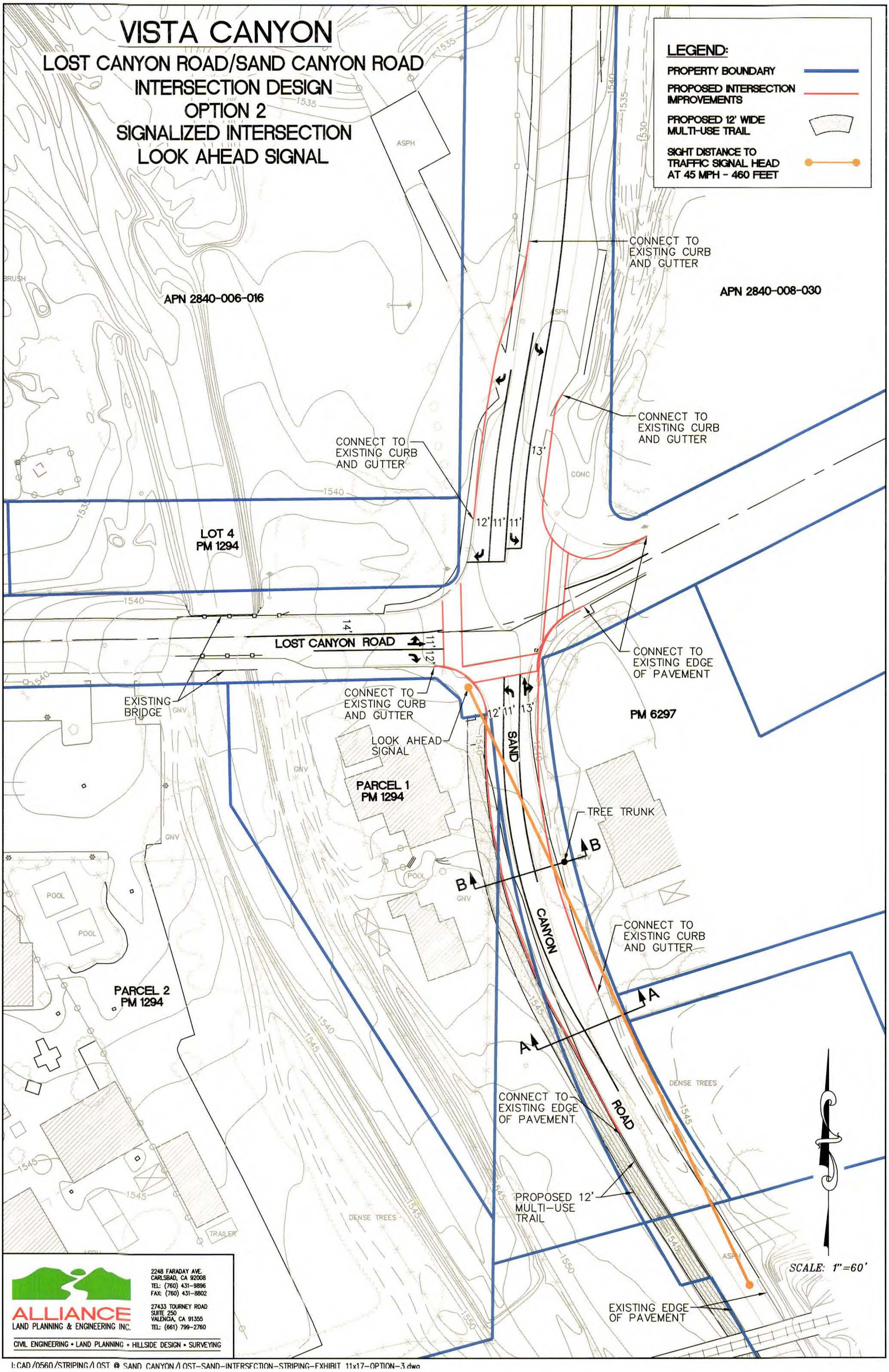
MORNING PEAK HOUR TRAFFIC VOLUMES

FIGURE 1


VISTA CANYON
LOST CANYON ROAD/SAND CANYON ROAD
INTERSECTION DESIGN
OPTION 1
4 - WAY STOP
LEGEND:
PROPERTY BOUNDARY
STOPPING SIGHT DISTANCE
50 MPH - 430 FEET
STOPPING SIGHT DISTANCE
45 MPH - 360 FEET
APN 2840-008-030
APN 2840-006-016
LOT 4
PM 1294
LOST CANYON ROAD
EXISTING
BRIDGE
PM 6297
SAND
CANYON
ROAD
PARCEL 1
PM 1294
TREE TRUNK
PARCEL 2
PM 1294
EXISTING EDGE
OF PAVEMENT
DENSE TREES
SCALE: 1"=60'
2248 FARADAY AVE.
CARLSBAD, CA 92008
TEL: (760) 431-9896
FAX: (760) 431-8802
27433 TOURNEY ROAD
SUITE 250
VALENCIA, CA 91355
TEL: (661) 799-2760
ALLIANCE
LAND PLANNING & ENGINEERING INC.
CIVIL ENGINEERING • LAND PLANNING • HILLSIDE DESIGN • SURVEYING



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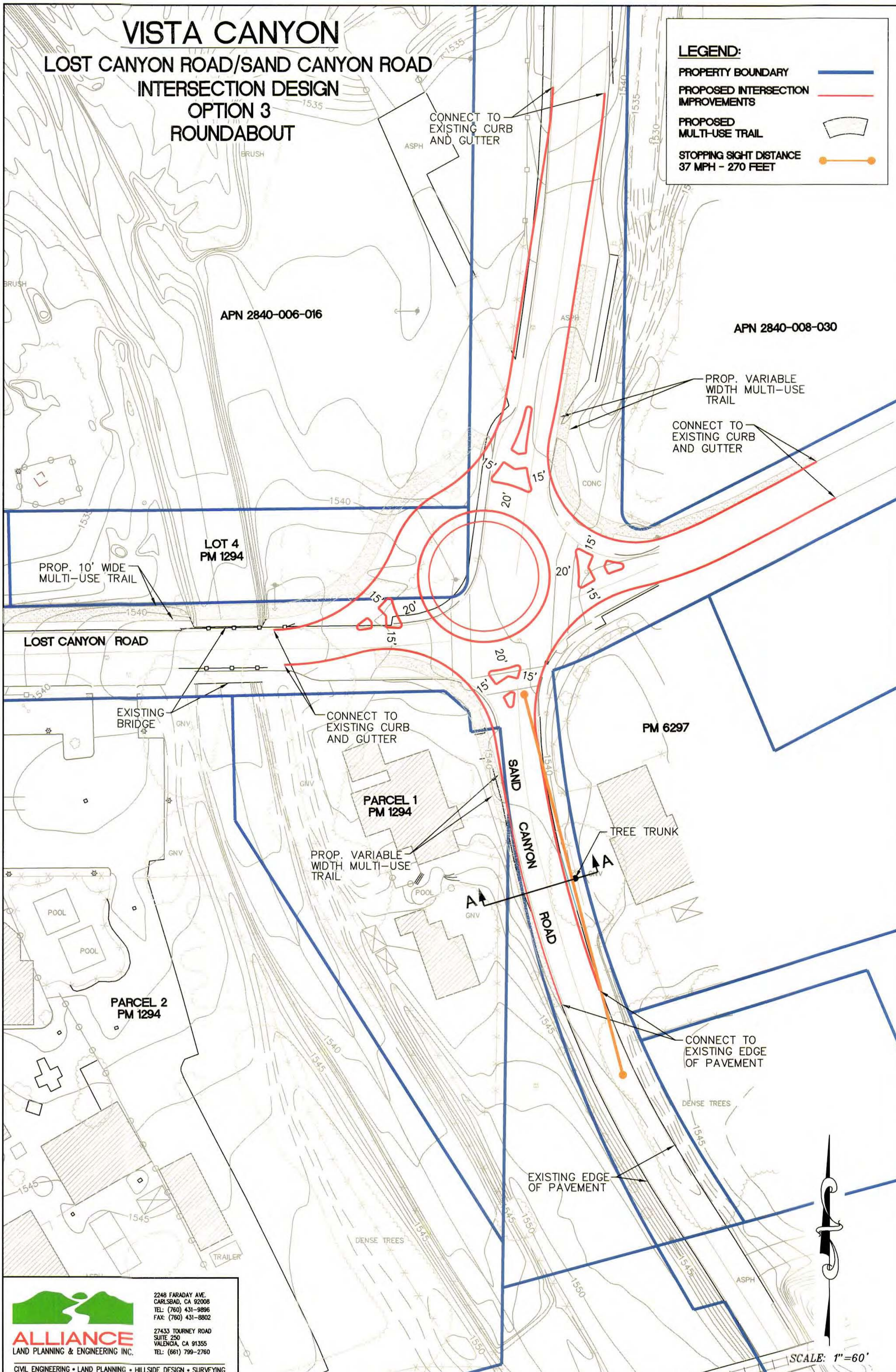

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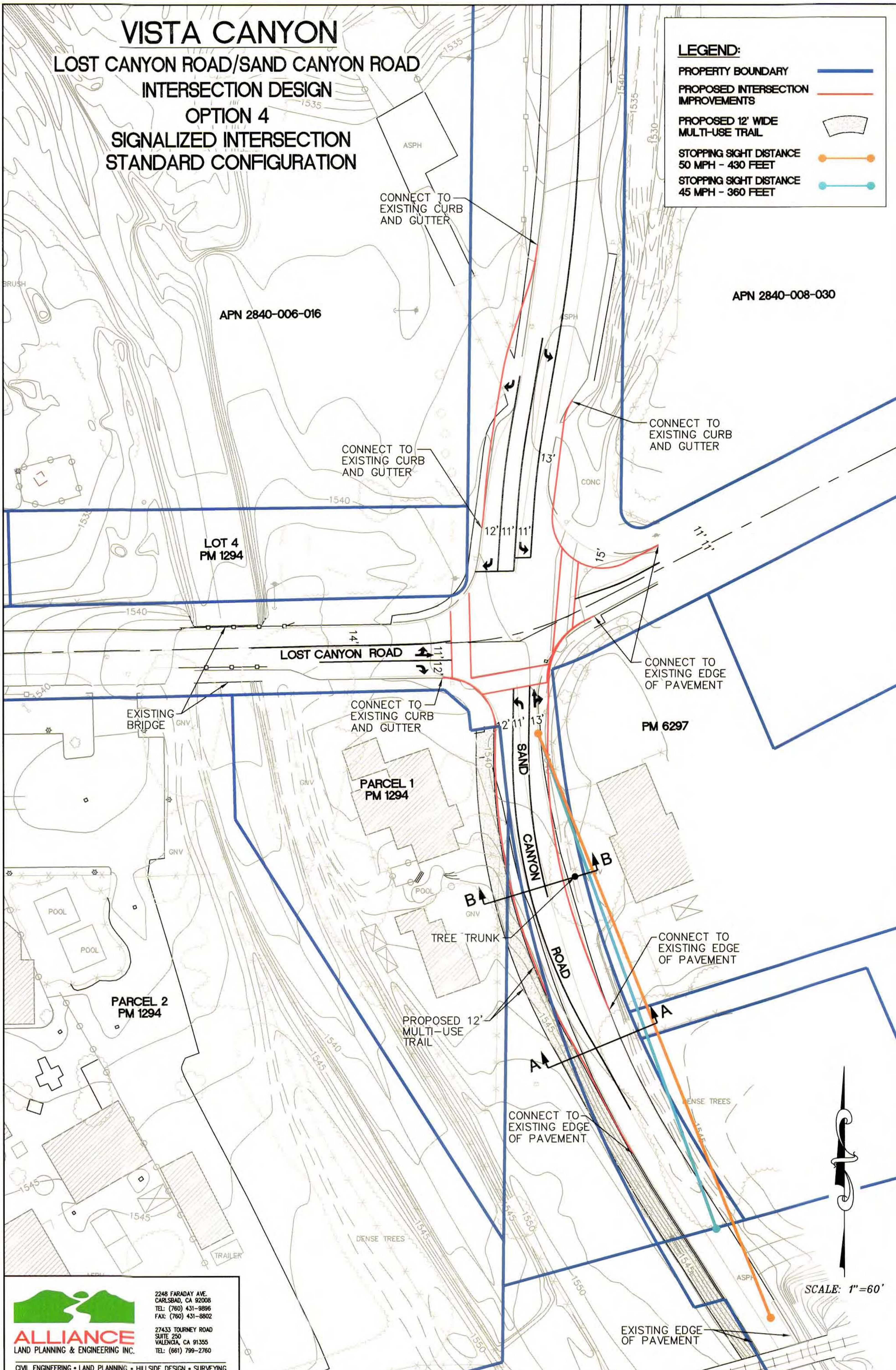

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