

Draft Transportation Impact Analysis
Gateway South

TRANSPORTATION



& PLANNING



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Draft Transportation Impact Analysis Gateway South

**Prepared For:
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EXECUTIVE SUMMARY

This report presents the results of the transportation impact analysis (TIA) conducted for the revised Gateway South project located at La Madrona Drive and Silverwood Drive in Scotts Valley, California. This report supplements the study prepared by Fehr & Peers in 2002.

In the earlier study, the Gateway South project was composed primarily of office space. The project as currently proposed includes a single retail use (i.e., a Free-Standing Discount Store) and no office space. The project site is currently vacant. The retail building would be located on the west side of La Madrona Drive bounded to the north by the Hilton Hotel and to the south by Silverwood Drive. Access to the site would be provided by two driveways on La Madrona Drive.

ANALYSIS SCENARIOS

Project impacts were estimated following the guidelines of the City of Scotts Valley and California Department of Transportation (Caltrans). The analysis focused on the operations of seven (7) key intersections during the weekday morning (AM) and evening (PM) peak hours for the following scenarios: Existing, Baseline, Project, Cumulative No Project (with and without the Mid-Town interchange), and Cumulative Plus Project Conditions (with and without the Mid-Town interchange).

Project impacts to SR 17 were also evaluated for the scenarios described above. The peak hour represents the single hour when traffic volumes are highest during the morning (7:00-9:00 AM) and evening (4:00-6:00 PM) peak periods.

PROJECT TRAFFIC

The amount of traffic generated by the proposed project was estimated based on trip generation data published by the Institute of Transportation Engineers (ITE). Standard ITE rates were applied to the square footage of the retail building to estimate trips. The trip generation estimates are presented in Table 8. The project as analyzed is estimated to generate approximately 9,075 net new weekday

daily trips, 136 weekday AM peak-hour trips, and 820 PM peak-hour trips.

INTERSECTION LEVELS OF SERVICE

Using existing count data and lane configurations, a list of approved and pending developments, traffic volumes factored using Association of Monterey Bay Area Governments (AMBAG) model forecasts, and project-generated trips, level of service (LOS) calculations were conducted for the seven study intersections using the SYNCHRO analysis program. SYNCHRO applies the methodology described in the *2000 Highway Capacity Manual* (Transportation Research Board) for signalized intersections. Unsignalized intersections were also evaluated using methodologies presented in the *2000 Highway Capacity Manual*. The results of the intersection LOS calculations are presented in Table ES-1.

As shown in Table ES-1, all of the signalized intersections are projected to operate at LOS D or better during both peak periods under Existing and Baseline conditions.

PROJECT IMPACTS AND PROPOSED IMPROVEMENTS

Impacts at intersections were identified based on the operating standards for the City of Scotts Valley and Caltrans. As specified in the City's Circulation Element (action CA-150), the City maintains a minimum level of service C for intersections except for the intersection of Mt. Hermon Road/Scotts Valley Drive where LOS D is considered acceptable. Caltrans strives to maintain operations at LOS E for the SR 17 corridor.

Intersections

A significant impact is identified for signalized intersections if the proposed project causes:

- Intersection operations to degrade from acceptable conditions (LOS D or better depending on location) under Baseline Conditions to unacceptable conditions (LOS E or F) under Project Conditions; or
- An increase of three seconds of delay per vehicle or more for intersections already

operating at unacceptable conditions (LOS D, E, or F depending on location).

For all unsignalized intersections, the project results in a significant impact if:

- The addition of project traffic causes operations to degrade from acceptable conditions (LOS C or better) under Baseline Conditions to unacceptable conditions (LOS D, E or F) under Project Conditions, and the *Manual of Uniform Traffic Control Devices* (MUTCD, 2003) Peak Hour Volume Warrant is satisfied; or
- Project traffic is added to an intersection already operating at unacceptable conditions (LOS D, E, or F) under Baseline Conditions; and
- The MUTCD Peak Hour Volume Warrant is satisfied.

Based on the criteria above, the project would not result in significant impacts at any of the study intersections under Project Conditions.

Cumulative Conditions, representing buildout of the City's General Plan, were evaluated both with and without the planned Mid-Town interchange. Without the Mid-Town interchange, the project would cause a significant impact at the intersection of Mt. Hermon Road/Scotts Valley Drive during the PM peak hour, since the addition of project traffic would worsen operations from LOS D to LOS E. This impact could be mitigated by the construction of the Mid-Town interchange, which would shift some traffic away from this intersection. With the new interchange, this intersection would operate acceptably at LOS D with the addition of project traffic. No other significant impacts were identified under Cumulative Conditions.

Pedestrian, Bicycle, and Transit

The number of pedestrians accessing the proposed project site is anticipated to be low because of the limited transit services in the immediate area of the project site and the few number of nearby homes along with few nearby retail facilities. Therefore, the current pedestrian facilities are considered adequate to accommodate pedestrian circulation. The existing

bicycle facilities should also provide adequate service to accommodate bicycles to and from the project site. The current transit service in Scotts Valley near the project site is limited and the number of new riders generated by the project will also be relatively low (estimated to be approximately 30 in the PM peak period). Therefore, the project would have a less-than-significant impact on the transit system.

Site Access, Circulation, and Parking

Site access to the project is considered adequate. Access will be provided via two driveways on La Madrona Drive, spaced approximately 480 feet apart. Drivers would enter the driveways, then would be able to turn into the lower level parking lot or could continue up the ramp to the upper level parking lot. The store's primary entrance is on the upper level, with access via a pedestrian-only entry bridge over the south driveway. This configuration, reduces the number of potential conflicts by separating the vehicle and pedestrian flows.

Internal circulation within the site is also adequate, with enough space for passenger vehicles to circulate and for trucks to access the delivery docks. To enter the south driveway from La Madrona Drive, trucks would have to make a wide turn and may encroach on the opposing lane of traffic. This is a common practice, and truck drivers will wait for an appropriate gap in traffic before making their turn.

The City's Municipal Code requires that parking be provided at a rate of 1 space per 250 square feet of floor area for sales area, and 1 space per 1000 square feet of stocking/storage area. The latest project description shows a sales floor area of 121,266 square feet, and 26,078 square feet of stocking area, which corresponds to 511 spaces required. The site plan shows 517 spaces, which is adequate to meet the City's requirements. This is also adequate to meet the average rate provided in ITE's *Parking Generation Manual* for a non-December peak. Under December peak conditions, there could be a shortage of approximately 239 spaces.

**TABLE ES-1
INTERSECTION LEVELS OF SERVICE SUMMARY**

Intersection	Peak Hour	Existing Conditions		Baseline Conditions		Project Conditions		Cumulative No Project Conditions ³		Cumulative Plus Project Conditions ³	
		Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
1. Scotts Valley Road / Bean Creek Road	AM	27.1	C	27.5	C	27.5	C	22.8 ⁴	C	22.9	C
	PM	14.4	B	14.7	B	14.7	B	14.3 ⁴	B	14.2	B
2. Mt. Hermon Road / Scotts Valley Drive	AM	46.0	D	48.6	D	49.3	D	40.4 ⁴	D	41.4	D
	PM	41.1	D	43.0	D	52.1	D	49.0 ⁴	D	58.4	E
3. Mt. Hermon Road / Glen Valley Road	AM	18.3	B	19.1	B	19.6	B	20.8	C	21.5	C
	PM	23.9	C	25.7	C	34.1	C	20.4 ⁴	C	24.8	C
4. Mt. Hermon Road / La Madrona Drive-SR 17 SB off-ramp	AM	32.3	C	39.3	D	40.7	D	58.8	E	66.8	E
	PM	31.6	C	42.0	D	54.7	D	60.0	E	79.4	E
5. La Madrona Drive / Alenitas Road	AM	11.4	B	12.0	B	14.9	B	11.7	B	13.7	B
	PM	12.0	B	14.2	B	140.5	F	14.4	B	108.6	F
6. La Madrona Drive / Silverwood Road	AM	9.3	A	9.3	A	9.4	A	9.5	A	9.5	A
	PM	9.9	A	10.0	A	10.1	B	10.2	B	10.4	B
7. Mt. Hermon Road / El Rancho Drive-SR 17 NB ramp	AM	22.4	C	23.1	C	23.9	C	31.0	D	32.3	D
	PM	23.2	C	24.5	C	28.9	D	34.9	D	42.1	E

Notes: ¹ Average control delay per vehicle in seconds. Delay and LOS at unsignalized intersections are for the worst-case movement.

² LOS = Level of service.

³ Without the Mid-Town interchange.

⁴ Operations under Cumulative No Project Conditions improved slightly over Baseline Conditions due to modifications to signal timing parameters under cumulative conditions (the benefit associated with modified signal timings under cumulative conditions is greater than the additional delay associated with additional traffic).

1. INTRODUCTION

This report presents the results of the transportation impact analysis (TIA) conducted for the revised Gateway South project located on the northwest corner of La Madrona Drive and Silverwood Drive in Scotts Valley, California. This report supplements the study prepared by Fehr & Peers in 2002.

In the earlier study, the Gateway South project was composed primarily of office space. The project as currently proposed includes an approximately 162,000 square feet (s.f.) retail store and no office space. The site location and surrounding roadway network are presented on **Figure 1**. A preliminary site plan is shown on **Figure 2**.

The purpose of this analysis is to identify the potential impacts of the proposed development on the adjacent transportation system. Project impacts were estimated following guidelines of the City of Scotts Valley and California Department of Transportation (Caltrans). The analysis focused on the operations of the following key intersections and the ramp junctions at one interchange within the study area.

Intersections

1. Scotts Valley Drive / Bean Creek Road
2. Mt. Hermon Road / Scotts Valley Drive
3. Mt. Hermon Road / Glen Valley Road
4. La Madrona Drive / Mt. Hermon Road-SR 17 SB off-ramp
5. La Madrona Drive / Altenitas Road
6. La Madrona Drive / Silverwood Road
7. Mt. Hermon Road / El Rancho Drive-SR 17 Northbound ramps

Freeway Ramp Junctions

1. SR 17 / Mt. Hermon Road interchange

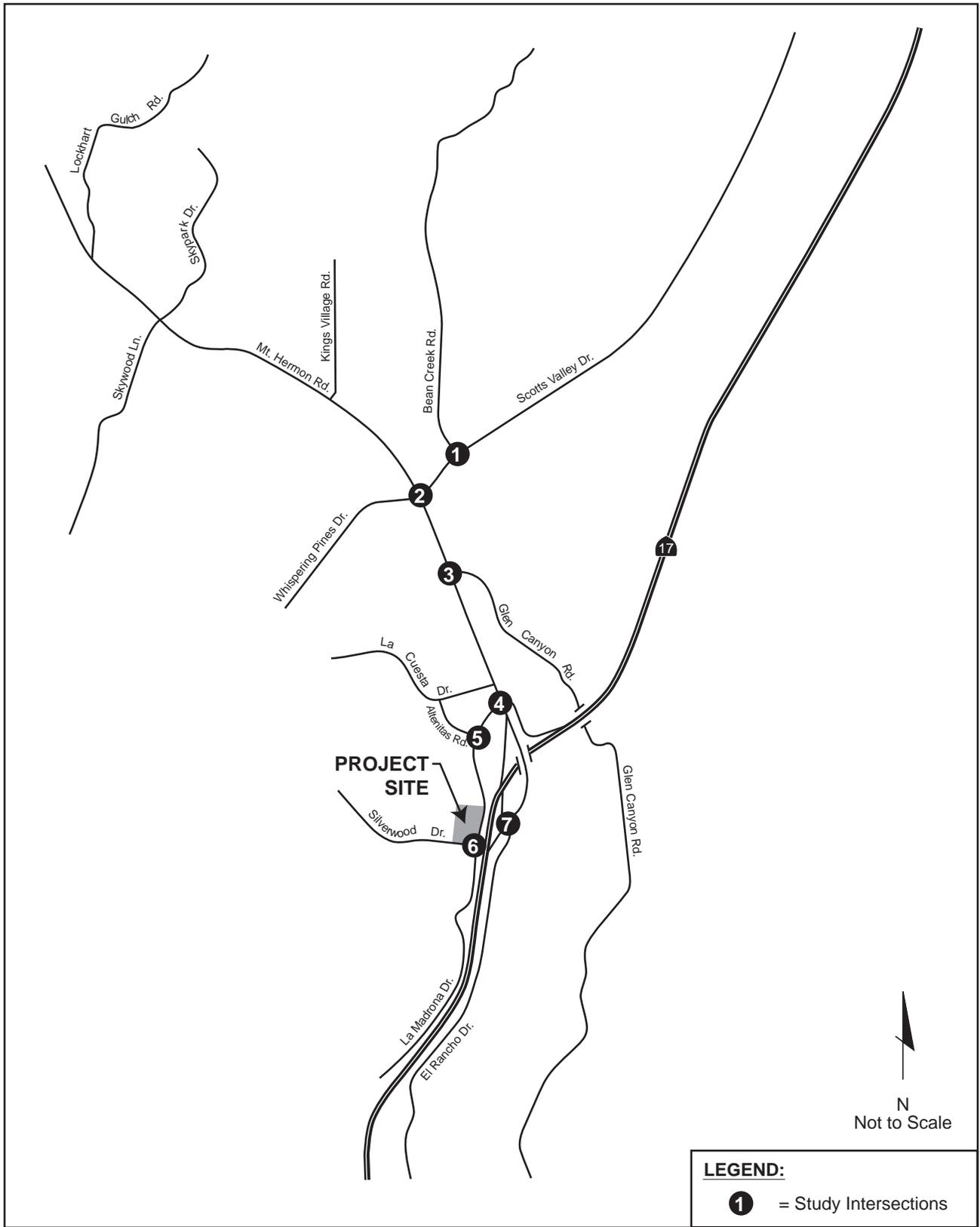
Operations of these key intersections were analyzed during the weekday morning (AM) and evening (PM) peak hour for baseline and cumulative scenarios. Cumulative scenarios represent far-term conditions at buildout of the Scotts Valley General Plan. The General Plan includes a new Mid-Town interchange on SR 17, which would alter traffic volumes and distribution patterns in the study area. This report examines cumulative conditions both with and without the new interchange. The following scenarios are evaluated:

Scenario 1: Existing Conditions. Existing volumes obtained from recent traffic counts.

Scenario 2: Baseline Conditions. Existing peak-hour volumes plus traffic from approved but not yet constructed developments in the study area.

Scenario 3: Baseline Plus Project Conditions. Baseline peak-hour traffic volumes plus traffic generated by the proposed project.

Scenario 4: Cumulative No Mid-Town Interchange No Project Conditions. Growth factored existing volumes plus traffic from approved and pending developments in the study area, without a new interchange on SR 17.



Scenario 5: Cumulative No Mid-Town Interchange Plus Project Conditions. Cumulative peak-hour traffic volumes plus traffic generated by the proposed project, without a new interchange on SR-17.

Scenario 6: Cumulative with Mid-Town Interchange No Project Conditions. Growth factored existing volumes plus traffic from approved and pending developments in the study area, including a new interchange on SR 17.

Scenario 7: Cumulative with Mid-Town Interchange Plus Project Conditions. Cumulative peak-hour traffic volumes plus traffic generated by the proposed project, including a new interchange on SR-17.

Project impacts to State Route (SR) 17 were also evaluated. Several other issues including project site access, on-site circulation, and parking are also addressed in this study.

The remainder of this report is divided into five chapters. Chapter 2 presents Existing Conditions in terms of the existing roadway configurations, circulation patterns, and operating conditions of the key intersections and freeway ramps. Operations under Baseline Conditions with traffic from approved but not yet constructed developments are discussed in Chapter 3. The transportation impacts of the proposed project are presented in Chapter 4, which also includes a discussion of site access, parking, and on-site circulation. Cumulative Conditions with and without traffic from the project are analyzed in Chapter 5.

2. EXISTING CONDITIONS

This chapter discusses the existing roadway network and operations of the study intersections and freeway segments. First, the existing transportation system within the study area is described. Then, the existing lane configurations and traffic volumes at the study intersections and on State Route (SR) 17 are discussed. Next, the operations of the study intersections and freeway facilities under Existing Conditions are presented, followed by a discussion of existing transit, bicycle, and pedestrian facilities.

EXISTING ROADWAY NETWORK

Regional access to the project site is provided by SR 17, SR 9, and Mt. Hermon Road. Local access to the site is provided by Mt. Hermon Road, Scotts Valley Drive, Glen Canyon Road, and La Madrona Drive. Detailed descriptions of the key roadway facilities are presented below.

SR 17 is a four- to eight-lane, north-south facility that extends between the Cities of Santa Cruz and San Jose. In the vicinity of the project site, SR 17 is a four-lane freeway with full-access interchanges at Mt. Hermon Road and Granite Creek Road.

SR 9 is a two-lane, generally north-south roadway between SR 17 in the Town of Los Gatos to SR 1 (Mission Street) in the City of Santa Cruz. SR 9 is located west of the project site and serves the communities of Boulder Creek, Ben Lomond, and Felton. Regional traffic using SR 9 can access the project site via Mt. Hermon Road.

Mt. Hermon Road is an arterial roadway extending between Graham Hill Road to the west and El Rancho Drive just east of SR 17. Near the project site, this street is oriented in a northwest to southeast direction and provides four travel lanes except for the two-lane overcrossing at SR 17. Between La Madrona Drive and Lockwood Lane, Mt. Hermon Road generally serves retail and commercial land uses.

Scotts Valley Drive is a four-lane, north-south arterial roadway extending between Mt. Hermon Road and Glenwood Drive. South of Mt. Hermon Road, Scotts Valley Drive becomes Whispering Pines Drive. Scotts Valley Drive is designated as a collector street north of Glenwood.

Glen Canyon Road is a two-lane north-south roadway that extends from Mt. Hermon Road to Branciforte Drive in Santa Cruz. Glen Canyon Road parallels SR 17 and serves as an alternate route between Scotts Valley and Santa Cruz for vehicles to bypass congestion on SR 17.

La Madrona Drive is generally a two-lane, north-south collector roadway extending between Mt. Hermon Road and El Rancho Drive to the south. La Madrona Drive also parallels SR 17 and provides access to Santa Cruz from Scotts Valley via Sims Road and Graham Hill Road. La Madrona Drive provides direct access to the project site.

EXISTING TRANSIT SERVICE

The Santa Cruz Metropolitan Transit District operates fixed route, commuter, and paratransit bus service in the City and County of Santa Cruz, as well as in the City of Scotts Valley. One express and three local routes operate in the vicinity of the project site: Routes 31, 32, 35/35A, and the SR 17 Express. Currently, no bus stops are located within 1000 feet of the project site. Detailed descriptions of existing transit service within the study area are presented below.

Route 31 operates between the Transit Centers in the Cities of Santa Cruz and Scotts Valley via SR 17 southbound. The Scotts Valley transit center is located on Kings Village Drive north of Mt. Hermon Road. This route operates during commute hours on weekdays between 7:00 am and 8:30 AM and 1:30 PM and 5:15 PM.

Route 31 operates on 30- to 60-minute headways during the week. This route does not provide direct access to Mt. Hermon Road near the La Madrona intersection.

Route 32 operates between the Transit Centers in Santa Cruz and Scotts Valley via SR 17 northbound. This route operates from 2:15 PM to 4:00 PM on approximately 40 minute headways. Route 32 does not provide direct access to the Mt. Hermon Road/La Madrona Drive intersection.

Routes 35/35A serve as a connection between Santa Cruz and Boulder Creek through the city of Scotts Valley. Weekday operation is provided from 6:00 AM to 12:00 AM with 30-minute headways. Weekend service is provided from 6:30 AM to 12:00 AM on 30- to 60-minute headways. Route 35 exits SR 17 at the Mt. Hermon Road interchange north of the project site. Route 35A exits SR 17 on the Granite Creek interchange.

SR 17 Express serves as a connection between Santa Cruz County and Santa Clara County with stops at the Scotts Valley Transit Center and on Mt. Hermon Road. SR 17 Express operates on weekdays between 4:30 AM and 11:30 PM with headways of 15 to 60 minutes. On weekends and holidays, twelve northbound and twelve southbound trips are provided between 6:45 AM and 11:40 PM.

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian facilities are comprised of sidewalks, crosswalks, and pedestrian signals. Near the site, sidewalks are provided on the west side of La Madrona Drive along the project frontage and in front of the Hilton Hotel extending north to Mt. Hermon Road. Crosswalks and pedestrian signal heads are provided at all of the signalized study intersections. Sidewalks are provided along Mt. Hermon Road near the project site. Between La Madrona Drive and Glen Canyon Road, the sidewalk on the south side of Mt. Hermon Road extends through the Torrey Oaks linear park, roughly paralleling Mt. Hermon Road.

Bicycle facilities are comprised of bike paths, lanes and routes. Bike paths are paved trails that are separated from roadways. Bike lanes are lanes on roadways designated for use by bicycles by striping, pavement legends, and signs. Bike routes are roadways that are designated for bicycle use by signs. In the vicinity of the site, a bike route is designated and bike lanes are striped on La Madrona Drive along the entire project frontage, but the bike lanes terminate just south of Silverwood Drive. Bike lanes are also provided in both directions on Mt. Hermon Road and on Scotts Valley Drive in the study area.

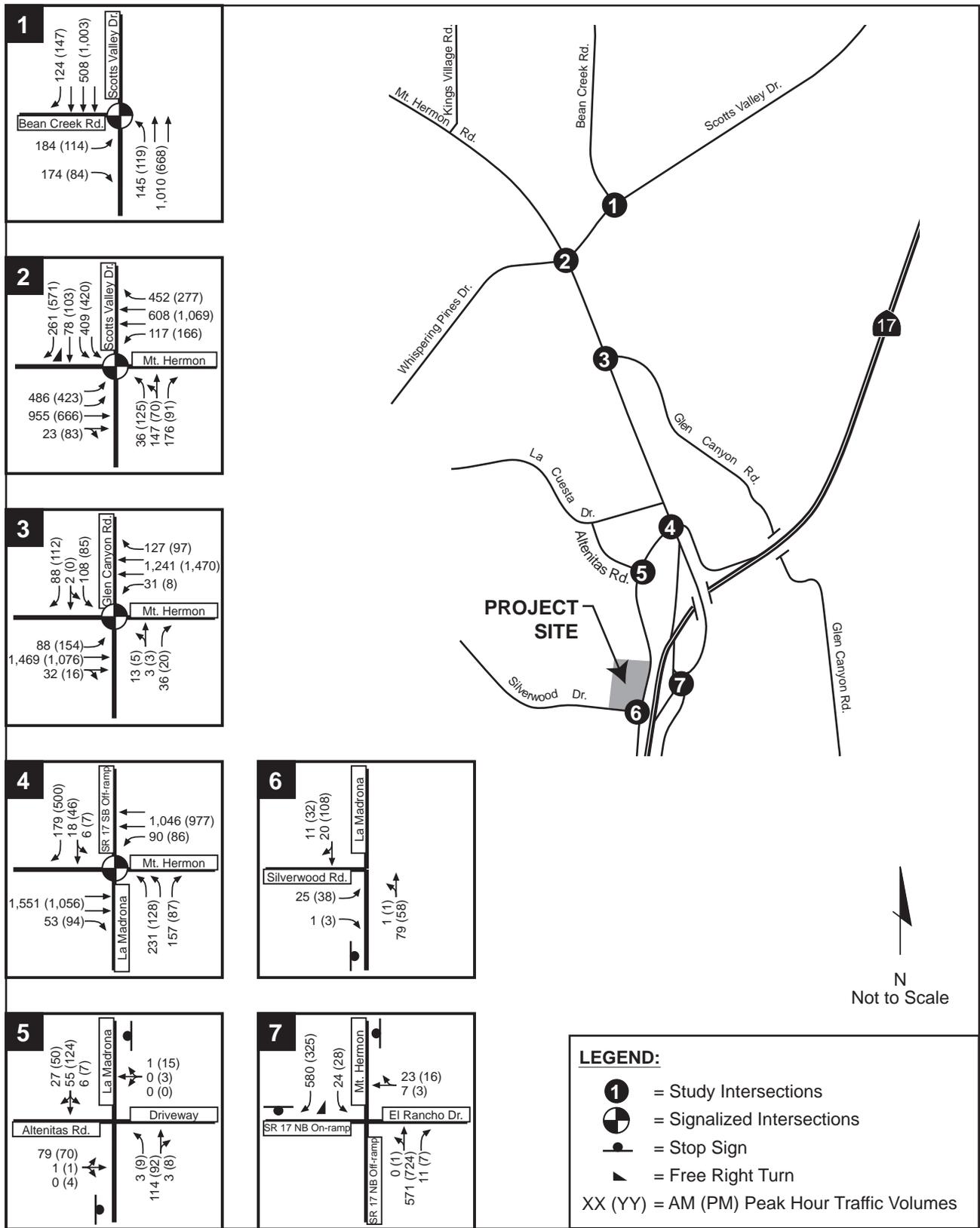
EXISTING TRAFFIC VOLUMES

Intersection and freeway ramp operations were evaluated during weekday AM and PM peak traffic conditions. Peak conditions on weekdays usually occur during the morning and evening commute hours from 7:00 AM to 9:00 am and from 4:00 PM to 6:00 PM, respectively.

Peak period traffic counts were conducted in July and August 2007 at the unsignalized study intersections during the weekday peak periods. Recent (less than 2 years old) traffic counts for the signalized study intersections were obtained from the City of Scotts Valley. The new peak hour counts are contained in Appendix A. The highest one-hour total or peak-hour traffic volume at each study intersection is shown on **Figure 3** for the weekday peak hours. Lane geometry and traffic controls are also shown on **Figure 3**.

INTERSECTION LEVEL OF SERVICE METHODS

The operations of the key intersections were evaluated using Level of Service (LOS) calculations. *Level of Service* is a qualitative description of a roadway's operation, ranging from LOS A, or free-flow conditions, to LOS F, or over-saturated conditions. LOS E represents conditions that are at capacity. According to the City of Scotts Valley General Plan (1994), the level of service goal for intersections is LOS C, except for the intersection of Mt. Hermon Road and Scotts Valley Drive where LOS D is considered acceptable.



Signalized Intersections

Two methodologies were used to evaluate the key study intersections: one for the signalized intersections and another for the unsignalized intersections. For signalized intersections, the LOS methodology described in Chapter 9 of the 2000 *Highway Capacity Manual* (HCM) published by the Transportation Research Board was applied. This methodology evaluates a signalized intersection's operations based on the average control delay, which was calculated using the SYNCHRO analysis software and was correlated to a level of service as shown in **Table 1**.

TABLE 1 SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS		
Level of Service	Description of Operations	Average Control Delay (sec / veh)
A	Insignificant Delays: No approach phase is fully utilized and no vehicle waits longer than one red indication.	≤ 10
B	Minimal Delays: An occasional approach phase is fully utilized. Drivers begin to feel restricted.	> 10 to 20
C	Acceptable Delays: Major approach phase may become fully utilized. Most drivers feel somewhat restricted.	> 20 to 35
D	Tolerable Delays: Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly, without excessive delays.	> 35 to 55
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long vehicle queues from upstream.	> 55 to 80
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Unsignalized Intersections

Unsignalized intersections with stop signs on the minor street approaches only were evaluated using the methodology presented in Chapter 10 of the 2000 update to the *Highway Capacity Manual*. Level of service is defined for the controlled movements at a two-way stop controlled intersection, not for the intersection as a whole. For stop sign controlled approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. **Table 2** presents the range of stopped delay that corresponds to each LOS designation.

TABLE 2 UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS USING AVERAGE CONTROL DELAY		
Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delays.	10.1 to 15.0
C	Average traffic delays.	15.1 to 25.0
D	Long traffic delays.	25.1 to 35.0
E	Very long traffic delays.	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded.	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

FREEWAY LEVEL OF SERVICE METHODOLOGY

Freeway ramp operations were also analyzed using LOS. Operations on SR 17 include merge/diverge junctions at ramps. Merge/diverge areas were analyzed using the methodology described in *2000 Highway Capacity Manual*, which calculates the density in passenger cars per lane mile per hour (pc/mi/hr). Operations were analyzed using the Highway Capacity Software (HCS+) package. The range of density for each level of service is presented in **Table 3**.

TABLE 3 DENSITY LEVEL OF SERVICE DEFINITIONS FOR MERGE/DIVERGE AREAS	
Level of Service	Maximum Density (passenger cars/mile/hour)
A	10
B	20
C	28
D	35
E	> 35
F	^a

^a Demand flow exceeds theoretical limits.

Source: *Highway Capacity Manual* (Special Report 209, Transportation Research Board, 1997).

According to Caltrans' *Transportation Concept Report for State Route 17 in District 5* (January 2006), Caltrans strives to maintain LOS E along the SR 17 corridor. Therefore, LOS E is considered the goal for freeway ramp operations for purposes of this study. Where freeway ramps intersect with a City street, Caltrans has jurisdiction over the intersection, so the LOS E standard applies. For these locations (such as the Mt. Hermon Drive / La Madrona Drive-SR 17 SB off-ramp intersection), impacts are discussed in the context of both City and Caltrans LOS standards. Specific criteria for project impacts are detailed in Chapter 4.

EXISTING LEVELS OF SERVICE

Intersections

The existing lane configurations and the peak-hour turning movement volumes on **Figure 3** were used to calculate the levels of service for each of the seven study intersections during the AM and PM peak periods. The results of the existing LOS analysis are presented in **Table 4** and the corresponding calculation sheets are contained in **Appendix B**.

TABLE 4 EXISTING INTERSECTION LEVELS OF SERVICE				
Intersection	Type of Control	Peak Hour	Delay ¹	LOS ²
1. Scotts Valley Drive / Bean Creek Road	Signal	AM	27.1	C
		PM	14.4	B
2. Mt. Hermon Road / Scotts Valley Drive	Signal	AM	46.0	D
		PM	41.1	D
3. Mt. Hermon Road / Glen Valley Road	Signal	AM	18.3	B
		PM	23.9	C
4. Mt. Hermon Road / La Madrona Drive-SR 17 SB off-ramp	Signal	AM	32.3	C
		PM	31.6	C
5. La Madrona Drive / Alenitas Road	Two-way Stop	AM	11.4	B
		PM	12.0	B
6. La Madrona Drive / Silverwood Road	Two-way Stop	AM	9.3	A
		PM	9.9	A
7. Mt. Hermon Road / El Rancho Drive-SR 17 NB ramp	Two-way Stop	AM	22.4	C
		PM	23.2	C

Notes: ¹Average control delay per vehicle in seconds. Delay and LOS at unsignalized intersections are for the worst-case movement.
² LOS = Level of service.
Unacceptable levels of service are indicated in **bold**.

The results indicate that all of the signalized and unsignalized intersections are operating at acceptable levels during both peak hours.

Freeway Ramp Junctions

Freeway ramp merge or diverge operations on SR 17 were evaluated at the Mt. Hermon Road interchange since this will be a primary access point for project-generated traffic. The analysis evaluates ramp operations where they connect with the mainline freeway, either as a merge or a diverge section. SR 17 has two travel lanes in each direction in the vicinity of the project. **Table 5** presents the existing freeway ramp junction merge/diverge levels of service. The freeway LOS calculation worksheets are included in **Appendix C**. All ramps operate acceptably at LOS D or better during the peak hours.

TABLE 5 EXISTING STATE ROUTE 17 RAMP JUNCTION LEVELS OF SERVICE			
Location and Direction	Peak Hour	Existing Conditions	
		Density ¹	LOS ²
Mt. Hermon Road Interchange			
Northbound Loop On-ramp	AM	23.9	C
	PM	19.9	B
Northbound Slip Off-ramp	AM	27.4	C
	PM	26.2	C
Southbound Slip On-ramp	AM	23.2	C
	PM	28.4	D
Southbound Slip Off-ramp	AM	17.9	B
	PM	28.5	D
Notes: ¹ Density = passenger cars per lane mile per hour (pc/mi/hr).			
² LOS = Level of service.			

FIELD OBSERVATIONS

In addition to calculating intersection LOS based on traffic volumes, field observations were conducted at all of the study intersections and on the freeway segments during the AM and PM peak hours. These observations were used to verify the calculated levels of service and to note unusual operating conditions.

Observations showed that most of the study intersections operate at an overall acceptable level during both peak hours and are consistent with the calculated LOS. Queues were observed for the through movements on Mt. Hermon Road during both peak hours, with the heaviest flow in the eastbound direction during the AM peak hour and westbound during the PM peak hour. Operations at the Mt. Hermon Road/Scotts Valley Drive intersection were acceptable during both peak hours. During the PM peak hour, westbound vehicles occasionally queued back to Glen Canyon Road. However, the queues typically cleared in one signal cycle. Although Mt. Hermon Road serves a significant volume of traffic, no substantial delays were observed during either peak hour, and traffic moved steadily between the freeway and Scotts Valley Drive.

The Mt. Hermon Road/La Madrona Drive-SR 17 Southbound off-ramp intersection operates at an acceptable level. During the PM peak hour, right-turns from the off-ramp onto Mt. Hermon Road were observed to queue around the corner of the off-ramp from the intersection. However, the existing phasing of the intersection provides an overlap phase that minimized delay for the queued vehicles. Additionally, the gaps provided by the through northbound vehicles on Mt. Hermon Road were long enough to allow some right-turns on red. Occasional

westbound queues were observed to spill back to the SR 17 overcrossing structure, but these queues generally cleared in one cycle.

During the peak periods, traffic on SR 17 at the Mt. Hermon Road interchange typically moves in a uniform progression and experiences minor congestion. The primary travel directions of the freeway are northbound in AM peak period and southbound in the PM peak period as Santa Cruz County residents commute to jobs in San Jose and other cities in the south Bay Area via SR 17.

3. BASELINE CONDITIONS

This chapter discusses Baseline Conditions, which includes the addition of traffic from approved (but not yet constructed) development. Baseline Conditions form the basis against which impacts of the proposed project are identified.

BASELINE TRAFFIC VOLUMES

The traffic volumes for Baseline Conditions were estimated by adding existing volumes and traffic estimates for approved (but not yet constructed) projects in the vicinity of the site. The City of Scotts Valley Planning Department staff provided the list of approved developments including: Tree Circus Commercial Center (12,000 s.f. of warehousing and office space), Quarry Site Mixed Use (94 single-family dwelling units and 31,500 s.f. of retail), and various other commercial and residential units throughout the City (see **Appendix E** for complete list).

Trips from each of the approved projects were estimated and assigned to the roadway network. ITE's *Trip Generation* (7th Edition, 2003) rates were used where available. For specialty retail land uses such as Scotts Valley Corners, Oak Creek Park Mixed Use, and Pinnacle Pass, San Diego Association of Governments (SanDAG) trip generation rates (2002) were used for the AM peak hour, and a 25% reduction during the PM peak hour was taken to account for pass-by and diverted link trips. These trips represent traffic from people already on the roadway network who visit a project site en route to another destination. Trip distribution patterns for each land use are shown on **Figure 5** in the next chapter. Approved project trips were added to existing traffic volumes and the resulting Baseline traffic volumes are shown on **Figure 4**.

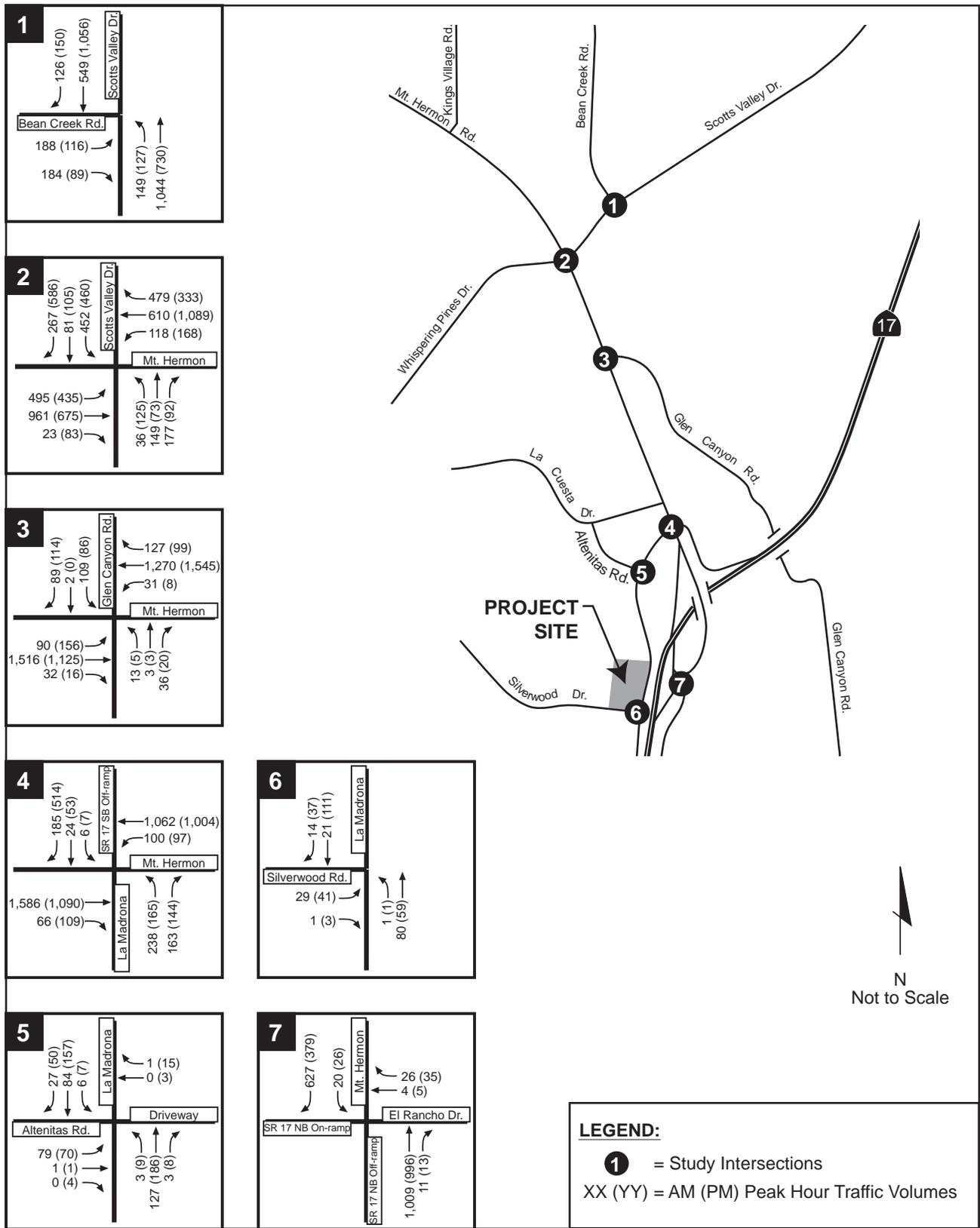
BASELINE ROADWAY IMPROVEMENTS

No planned or funded improvements to study locations were identified for this scenario, so the roadway network is assumed to be the same under Baseline Conditions as it is under Existing Conditions.

BASELINE INTERSECTION LEVELS OF SERVICE

Levels of service were calculated for all of the study intersections using the Baseline traffic volumes and the existing intersection lane configurations and traffic control devices. **Table 6** presents the LOS results under Baseline Conditions. The corresponding LOS calculation sheets are included in **Appendix B**.

Operations at the study intersection of Mt. Hermon Road/La Madrona Drive-SR 17 southbound off-ramp are projected to worsen from LOS C to LOS D during the both peak hours under Baseline Conditions. All of the remaining study intersections are projected to operate at the same levels of service with the addition of traffic from approved projects as calculated under Existing Conditions.



**TABLE 6
BASELINE INTERSECTION LEVELS OF SERVICE**

Intersection	Type of Control	Peak Hour	Delay ¹	LOS ²
1. Scotts Valley Drive / Bean Creek Road	Signal	AM	27.5	C
		PM	14.7	B
2. Mt. Hermon Road / Scotts Valley Drive	Signal	AM	48.6	D
		PM	43.0	D
3. Mt. Hermon Road / Glen Valley Road	Signal	AM	19.1	B
		PM	25.7	C
4. Mt. Hermon Road / La Madrona Drive-SR 17 SB off-ramp	Signal	AM	39.3	D
		PM	42.0	D
5. La Madrona Drive / Altemitas Road	Two-way stop	AM	12.0	B
		PM	14.2	B
6. La Madrona Drive / Silverwood Road	Two-way stop	AM	9.3	A
		PM	10.0	A
7. Mt. Hermon Road / El Rancho Drive-SR 17 NB ramp	Two-way stop	AM	23.1	C
		PM	24.5	C

Notes: ¹Average control delay per vehicle in seconds. Delay and LOS at unsignalized intersections are for the worst-case movement.
² LOS = Level of service.
Unacceptable levels of service are indicated in **bold**.

Freeway Ramp Junctions

Freeway ramp merge and diverge operations on SR 17 were evaluated at the Mt. Hermon Road interchange using the existing volumes plus traffic generated by the approved projects. **Table 7** presents the Baseline freeway merge/diverge levels of service. All of the freeway LOS calculation worksheets are included in **Appendix C**. All study locations will operate at the same LOS as under Existing Conditions, except the southbound slip on-ramp and slip off-ramp that are projected to degrade to LOS D during the PM peak hour.

**TABLE 7
BASELINE STATE ROUTE 17 MERGE AND DIVERGE LEVELS OF SERVICE**

Location and Direction	Peak Hour	Baseline Conditions	
		Density ¹	LOS ²
Mt. Hermon Road Interchange			
Northbound Loop On-ramp	AM	24.0	C
	PM	20.2	C
Northbound Slip Off-ramp	AM	27.7	C
	PM	26.5	C
Southbound Slip On-ramp	AM	23.4	C
	PM	28.9	D
Southbound Slip Off-ramp	AM	18.0	B
	PM	28.7	D

Notes: ¹ Density = passenger cars per lane mile per hour (pc/mi/hr).
² LOS = Level of service.

4. PROJECT CONDITIONS

The impacts of the proposed retail development on the surrounding roadway system are discussed in this chapter. First, the methods used to estimate the amount of traffic generated by the proposed project are described. Then, the distribution of project traffic to the surrounding roadway system is discussed. The operations of the study intersections and freeway ramps were analyzed under Project Conditions (Baseline volumes plus project-generated traffic) with level of service (LOS) calculations. Project impacts are then identified by comparing the LOS results under Project Conditions to those under Baseline Conditions.

Other issues addressed in this chapter include on-site circulation, parking, and site access.

DESCRIPTION OF PROPOSED PROJECT

The project as analyzed herein includes the development of a 162,000 s.f. retail store (analyzed as ITE land use code 815 Free-Standing Discount Store) with two levels of parking accessed by two driveways. After this analysis was completed, the proposed store size was reduced to 147,344 s.f. of floor area. Therefore, the analysis in this document is conservative. The parking analysis has been updated with the current store size. In 2002, the development of 136,000 s.f. of office space was approved for the site, but nothing was constructed, so the site is currently vacant.

Project Traffic Volumes

The amount of traffic associated with the proposed project was estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In the first step, the amounts of traffic are estimated on a daily basis and for each peak hour. In the second step, the directions the trips use to approach and depart the site are projected. The trips are assigned to specific street segments and intersection turning movements in the third step. The results of this process are described in the following sections.

Trip Generation

The amount of traffic generated by the proposed project was estimated based on trip generation data published by the Institute of Transportation Engineers (ITE), *Trip Generation*, 2003. ITE rates were applied to the square footage of the proposed retail space to estimate trips. The trip generation rates and estimates are presented in **Table 8**.

The proposed project is estimated to generate 9,075 daily, 136 AM peak hour (92 inbound and 44 outbound), and 820 PM (410 inbound and 410 outbound) peak hour trips. Some of the PM peak hour trips would be diverted linked trips, where a driver on Mt. Hermon Road or SR 17 will divert to the site and then will continue to their initial destination. These diverted link trips were added to the study intersections in the vicinity of the project, but would not result in net new traffic to the area's major travel routes. The diverted linked trips reduction was estimated based on the survey data presented in Chapter 5 of ITE's *Trip Generation Handbook*.

The project as proposed in 2002 was estimated to generate 2,385 daily, 252 AM peak hour, and 242 PM peak hour trips. The new project description will generate less than half the number of AM peak hour trips but more than three times the number of daily and PM peak hour trips.

**TABLE 8
PROJECT TRIP GENERATION**

Land Use	Size	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
<i>Rates</i>								
Free Standing Discount Store ¹	162 ksf ²	56.02	0.57	0.27	0.84	2.53	2.53	5.06
<i>Trips</i>								
	Trip Generation ¹	9,075	92	44	136	410	410	820
	<i>Diverted Link Trips</i> ³	-	-	-	-	(103)	(103)	(206)
	Net New External Trips ⁴	9,075	92	44	136	307	307	614
Notes: 1 ITE Land Use Code 815 2 ksf = thousand square feet 3 Trips attracted from traffic already on SR 17 and Mt. Hermon Road 4 Net new project trips assigned to external locations beyond the project vicinity Source: <i>Trip Generation</i> , 7 th Edition, ITE (2003) and Fehr & Peers, 2007								

Trip Distribution

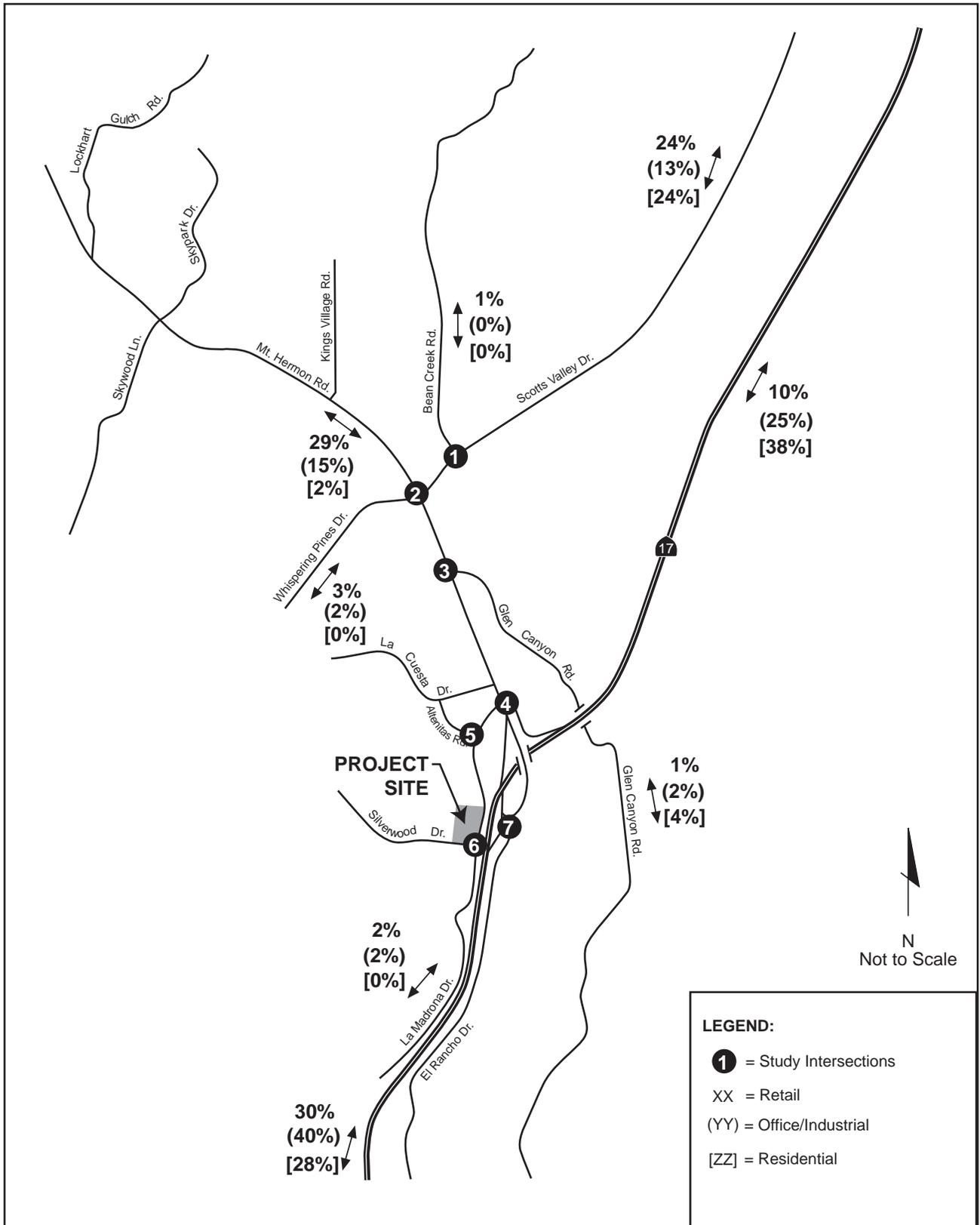
The project trip distribution defines the directions of approach and departure for project traffic. The distribution was prepared based on the existing travel patterns in the area, previous studies, the relative locations of complementary land uses, and the AMBAG model. **Figure 5** illustrates the major directions of approach and departure for project trips. Much of the project traffic would come from the communities to the west on Mt. Hermon Road and the residential areas of Scotts Valley. Approximately 30% would come from the south on SR 17 from Santa Cruz and adjacent communities, and about 10% would come from the north on SR 17.

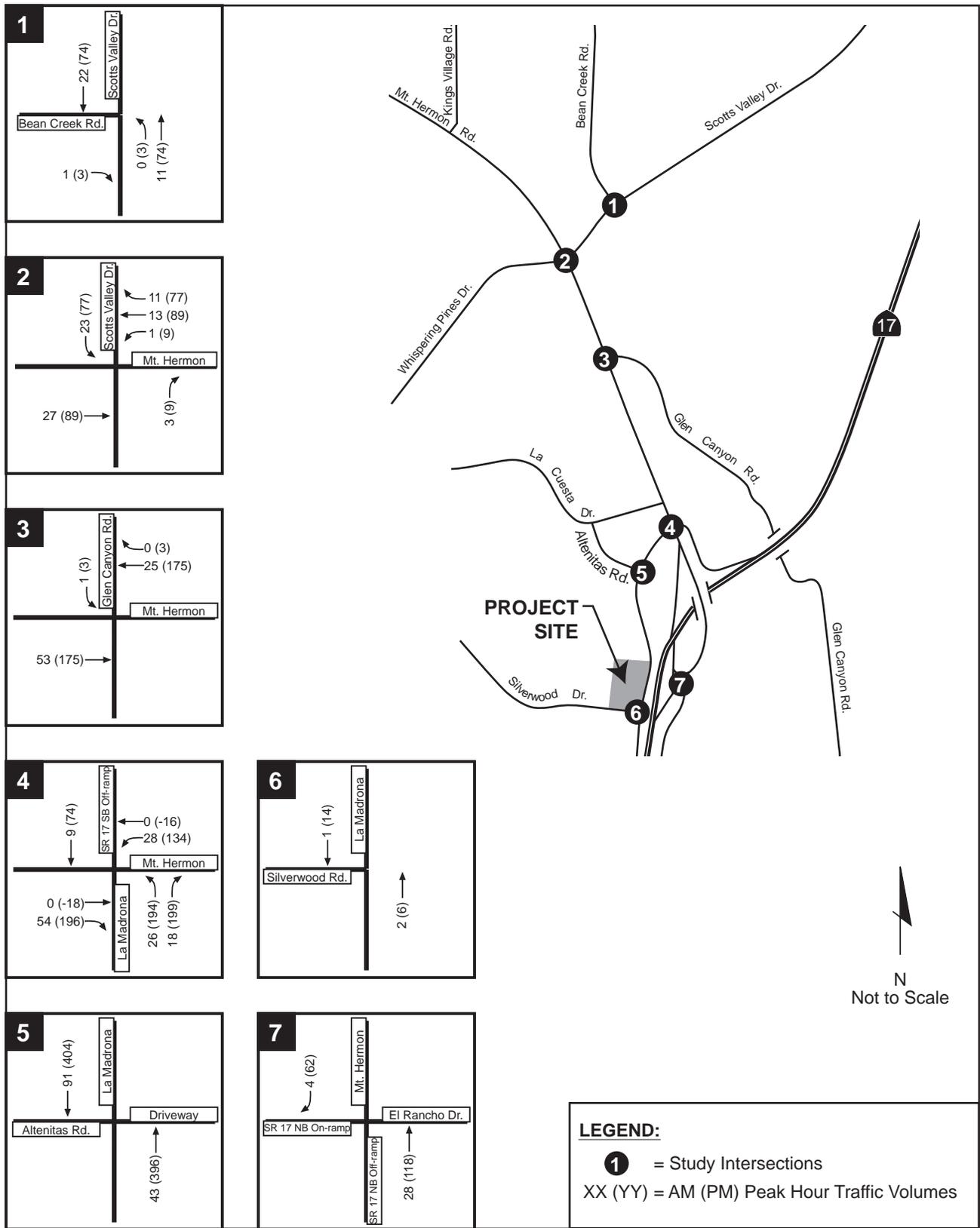
Trip Assignment

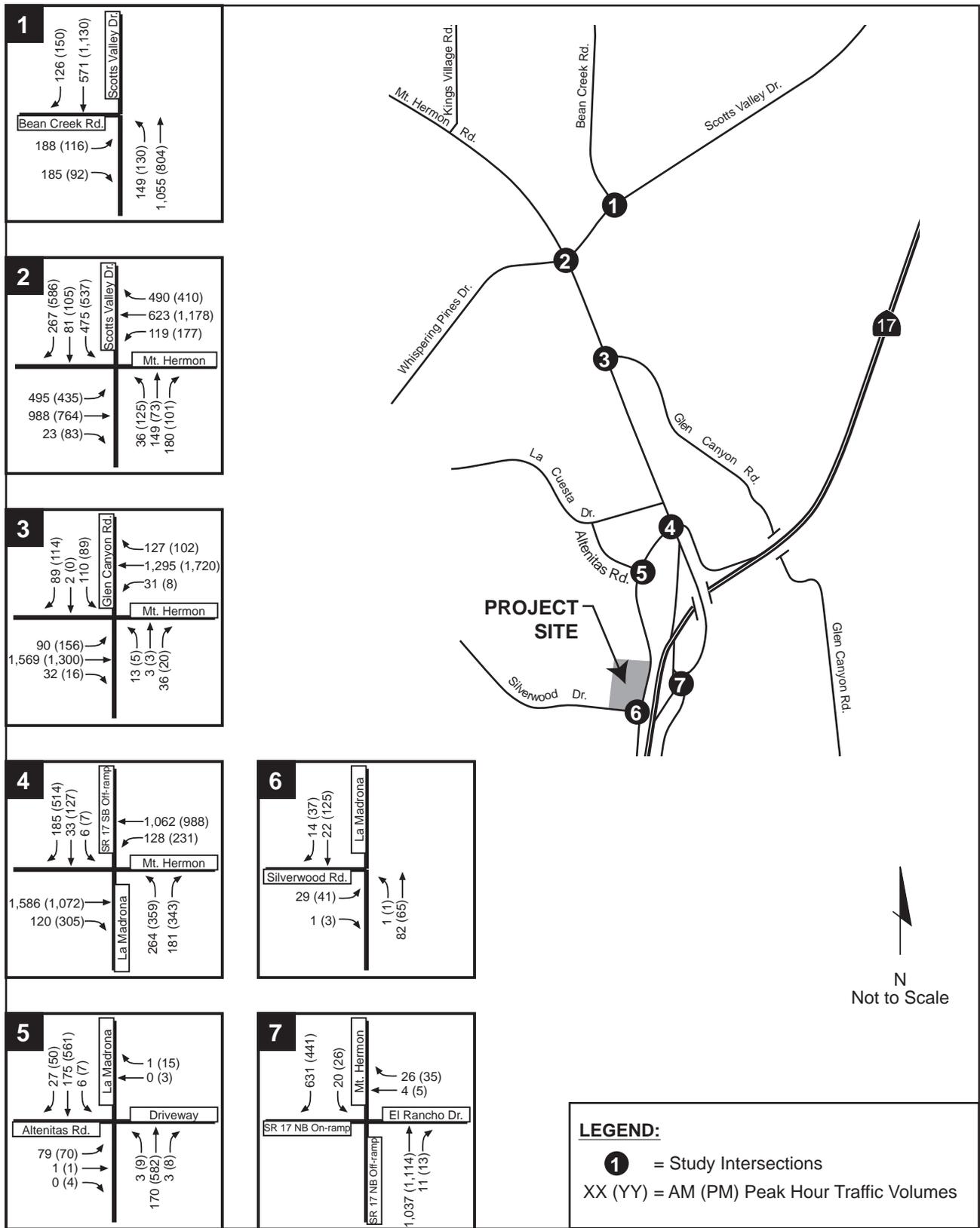
Trips generated by the proposed project were assigned to the roadway system based on the directions of approach and departure shown on **Figure 5**. Project-generated trips for both peak hours are shown on **Figure 6**. Project trips were added to Baseline traffic volumes to estimate total volumes under Project Conditions as shown on **Figure 7**.

PROJECT INTERSECTION LEVELS OF SERVICE

Intersection LOS calculations were conducted to evaluate intersection operations under Project Conditions. The results of the LOS analysis for both Baseline and Project Conditions are summarized in **Table 9**. The corresponding LOS calculation sheets are included in **Appendix B**.







**TABLE 9
BASELINE AND PROJECT INTERSECTION LEVELS OF SERVICE**

Intersection	Peak Hour	Baseline Conditions		Project Conditions	
		Delay ¹	LOS ²	Delay ¹	LOS ²
1. Scotts Valley Drive / Bean Creek Road	AM	27.5	C	27.5	C
	PM	14.7	B	14.7	B
2. Mt. Hermon Road / Scotts Valley Drive	AM	48.6	D	49.3	D
	PM	43.0	D	52.1	D
3. Mt. Hermon Road / Glen Valley Road	AM	19.1	B	19.6	B
	PM	25.7	C	34.1	C
4. Mt. Hermon Road / La Madrona Drive-SR 17 SB off-ramp	AM	39.3	D	40.7	D
	PM	42.0	D	54.7	D
5. La Madrona Drive / Alenitas Road	AM	12.0	B	14.9	B
	PM	14.2	B	140.5	F
6. La Madrona Drive / Silverwood Road	AM	9.3	A	9.4	A
	PM	10.0	A	10.1	B
7. Mt. Hermon Road / El Rancho Drive-SR 17 NB ramp	AM	23.1	C	23.9	C
	PM	24.5	C	28.9	D

Notes: ¹ Average control delay per vehicle in seconds. Delay and LOS at unsignalized intersections are for the worst-case movement.
² LOS = Level of service.
Project impacts highlighted in **bold text**.

The addition of project traffic is projected to degrade operations at the eastbound approach to La Madrona Drive/Alenitas Road intersection to LOS F under Project Conditions during the PM peak hour. The southbound approach to the Mt. Hermon Road/El Rancho Drive-SR 17 northbound ramps intersection is projected to degrade to LOS D during the PM peak hour.

Peak hour volume warrants were analyzed for both of the intersections for the PM peak hour under Project Conditions. A review of the *Manual on Uniform Traffic Control Devices* (MUTCD, 2003) traffic signal warrants shows that the peak hour signal warrants are not met (see Appendix D for calculation sheets)¹. Therefore, no impacts would occur under Project Conditions.

¹ The use of peak-hour signal warrants is intended to examine the general correlation between the planned level of future development and the need to install new traffic signals. The traffic analysis presented in this document estimates future development-generated traffic compared against a sub-set (peak-hour warrant) of the standard traffic signal warrants recommended in the Federal Highway Administration's *Manual on Uniform Traffic Control Devices* and associated State guidelines. This analysis should not serve as the only basis for deciding whether and when to install a signal. To reach such a decision, the full set of warrants should be investigated based on field-measured, rather than forecast, traffic data and a thorough study of traffic and roadway conditions by an experienced engineer. The decision to install a signal should not be based solely upon the warrants because signals can lead to certain types of collisions. The City of Scotts Valley/Caltrans should undertake regular monitoring of actual traffic conditions and accident data, and timely re-evaluation of the full set of warrants, in order to prioritize and program intersections for signalization.

PROJECT RAMP LEVELS OF SERVICE

Table 10 presents the freeway ramp junction levels of service for Baseline and Project Conditions. All ramps are projected to continue operating at the same level of service as under Baseline Conditions, so no significant impacts are identified.

TABLE 10 BASELINE AND PROJECT STATE ROUTE 17 MERGE AND DIVERGE LEVELS OF SERVICE					
Location and Direction	Peak Hour	Baseline Conditions		Project Conditions	
		Density ¹	LOS ²	Density ¹	LOS ²
Mt. Hermon Road Interchange					
Northbound Loop On-ramp	AM	24.0	C	24.0	C
	PM	20.2	C	20.5	C
Northbound Slip Off-ramp	AM	27.7	C	27.9	C
	PM	26.5	C	27.4	C
Southbound Slip On-ramp	AM	23.4	C	23.5	C
	PM	28.9	D	29.7	D
Southbound Slip Off-ramp	AM	18.0	B	18.0	B
	PM	28.7	D	29.0	D
Notes: ¹ Density = passenger cars per lane mile per hour (pc/mi/hr). ² LOS = Level of service.					

SITE ACCESS, CIRCULATION, AND PARKING

This section addresses site access and the on-site circulation system. The preliminary site plan showing the locations of project driveways and the internal circulation system is shown on **Figure 2**.

Site Access

Site access to the project is provided via two driveways on La Madrona Drive, spaced approximately 480 feet apart. Drivers would enter the driveways, then would be able to turn into the lower level parking lot or could continue up the ramp to the upper level parking lot. The store's primary entrance is on the upper level, with access via a pedestrian-only entry bridge over the south driveway. People parked on the lower level would use an elevator or the stairs to reach the upper level and enter the store. This configuration, with a pedestrian-only bridge to access the store, reduces the number of potential conflicts by separating the primary vehicle and pedestrian flows.

Due to the low existing and projected volumes on La Madrona Drive, the two side-street-stop controlled driveways would be adequate to serve the project's traffic. Sight distance from the proposed driveway entrances appears to be adequate as well; however, sight distance at the north driveway should be confirmed once the site's engineering design is prepared.

Pedestrians on La Madrona Drive could access the site via the stairs or elevators at the lower level parking lot, which are located within 120 feet of the street. The site plan does not show the location of bike racks. Bike racks should be located on the lower level as close to the elevators and stairs as possible.

The truck docks are located on the west side of the site, and trucks would enter the site via the south driveway, and exit via the north driveway. To enter the south driveway from La Madrona Drive, the trucks would have to make a wide turn and may temporarily encroach into the opposing lane. This is a common practice, and truck drivers will wait for an appropriate gap in traffic before making their turn. Given the relatively low traffic volumes and limited number of truck trips, no excessive delays are expected. Truck access as shown on the site plan is adequate.

Parking

According to the latest site plan (dated October 31, 2007), the project occupies a total of 147,344 s.f. of floor spaces, with 121,266 s.f. dedicated to sales areas and 26,078 square feet dedicated to stocking areas.

The City of Scotts Valley Municipal Code (Chapter 17.44.030) requires provision of one parking space for every 250 gross square feet of floor area for retail sales uses, and one parking space per 1,000 square feet of floor area for storage facilities combined with commercial uses. The site plan shows a total of 511 spaces.

Requirements from the Institute of Transportation Engineers *Parking Generation*, 3rd Edition (2004) were also compared to ensure adequate on-site parking supply. ITE parking ratios are derived from surveys of similar facilities, and represent the parking demand observed at suburban sites. The average ratios were increased by a 15% circulation factor to minimize vehicle circulation. ITE parking demand ratios are provided for both December and non-December peak parking periods. For retail uses, December peaks are associated with the holiday shopping season. **Table 11** presents a comparison between the City of Scotts Valley requirements and ITE for December and non-December peaks.

Source	Number of Units	Units	Required Supply		Required Supply	Provided Stalls	Supply Adequate (Y/N)?
			Spaces	Per Unit			
City of Scotts Valley Municipal Code- Sales Area	121,266	sf	1	250	485	491	Y
City of Scotts Valley Municipal Code- Stocking Area	26,078	sf	1	1000	26	26	Y
Total	147,344	sf			511	517	Y
<i>ITE Parking Generation¹</i>							
December Peak	147,344	sf	1	195	756	517	N
Non-December Peak	147,344	sf	1	316	466	517	Y
Notes: ¹ ITE parking ratios are calculated demand. Ratios were increased by a 15% circulation factor to represent supply to account for circulation requirements.							

Based on the City of Scotts Valley parking requirements, the proposed parking supply is considered adequate. ITE parking ratios for the non-December peak period also indicate a 51-space surplus. The non-December peak will provide sufficient parking throughout most of the year. The ITE parking ratios for the December peak indicate a 239-space deficit; however, driver tolerance for finding an available space is higher during this period. Without an additional parking supply, some shoppers would not be able to find a space on the site during the peak holiday shopping period. Given the limited parking in the surrounding area, the store operator should prepare a parking plan to require store employees to park off-site during the peak holiday shopping period. This may require a use

of a temporary shuttle service to transport employees or an agreement with adjacent property owners to provide available spaces.

The City's Municipal Code does not provide bicycle parking requirements, but it is standard practice to provide bicycle parking at a rate of 5% of the provided vehicle parking. This corresponds to parking for 26 bicycles which should be provided as close as possible to the lower level elevator/stair access next to the store entrance.

PEDESTRIAN, BICYCLE, AND TRANSIT

The existing sidewalks and bike lanes on La Madrona Drive and Mt. Hermon Road encourage the use of an alternative mode of transportation and are considered adequate. The current transit system does not service La Madrona Drive and only provides a limited number of bus routes on Mt. Hermon Road. In addition, no bus stops are provided in the vicinity of the project site on Mt. Hermon Road. The site plan should be designed to incorporate a future bus stop including bench, shelter or other amenities.

SIGNIFICANT IMPACT CRITERIA

Impacts at intersections were identified based on the operating standards for the City of Scotts Valley and Caltrans. As specified in the City's Circulation Element (action CA-150), the City maintains a minimum level of service C for intersections except for the intersection of Mt. Hermon Road/Scotts Valley Drive where LOS D is considered acceptable, while Caltrans strives to maintain operations at LOS E for the SR 17 corridor.

Intersections

A significant impact is identified for signalized intersections if the proposed project causes:

- Intersection operations to degrade from acceptable conditions (LOS D or better depending on location) under Baseline Conditions to unacceptable conditions (LOS E or F) under Project Conditions; or
- An increase of three seconds of delay per vehicle or more for intersections already operating at unacceptable conditions (LOS D, E, or F depending on location).

For all unsignalized intersections, the project results in a significant impact if:

- The addition of project traffic causes operations to degrade from acceptable conditions (LOS C or better) under Baseline Conditions to unacceptable conditions (LOS D, E or F) under Project Conditions, and the *Manual of Uniform Traffic Control Devices* (MUTCD, 2003) Peak Hour Volume Warrant is satisfied; or
- Project traffic is added to an intersection already operating at unacceptable conditions (LOS D, E, or F) under Baseline Conditions; and
- The MUTCD Peak Hour Volume Warrant is satisfied.

Based on the criteria above, the project would not result in significant impacts at any of the study intersections.

Freeway Ramp Junctions

The California Department of Transportation (Caltrans) has a goal of LOS C operations for state-maintained facilities, but maintains a LOS E minimum operating standard for the SR 17 corridor. Significant freeway impacts for this analysis were identified if the addition of project traffic is expected to degrade ramp junction operations from LOS E or better under Baseline Conditions to LOS F under Project Conditions, or if the project is expected to

add more than one percent of the freeway capacity to segments where a ramp operates at LOS F under Baseline Conditions.

All freeway ramp junctions are projected to continue operating at LOS E or better with the addition of project traffic; thus, no significant impacts are identified.

Pedestrian, Bicycle, and Transit

The number of pedestrians accessing the proposed project site is anticipated to be low because of the limited transit services in the immediate area of the project site and the limited number of nearby homes along with few nearby retail facilities. Therefore, the current pedestrian facilities are considered adequate to accommodate pedestrian circulation. The existing bicycle facilities should also provide adequate service to accommodate bicycles to and from the project site. The current transit system in Scotts Valley near the project site is limited and the project is expected to generate a limited number new riders on the transit system. A conservative estimate of five percent of vehicle trips was used to estimate the number of new riders at a maximum of 31 in the peak hour. Routes 35 and SR 17 Express provide service near the project site and operate on 15- to 30-minute headways; thus, no more than 5 riders are expected to utilize any given bus during the peak hour. Therefore, the project would have a less-than-significant impact on the transit system.

5. CUMULATIVE CONDITIONS

This chapter presents an analysis of Cumulative Conditions with and without the proposed project. Cumulative Conditions are defined as existing volumes factored to estimate future regional traffic growth plus volumes from approved and pending local developments. Cumulative Conditions were evaluated under two scenarios: with and without the proposed Mid-Town interchange in place.

CUMULATIVE TRAFFIC VOLUMES

Future increases in regional traffic were estimated using forecasts from the travel demand model maintained by the Association of Monterey Bay Area Governments (AMBAG). This model includes land use and the planned roadway network for Year 2000 and Year 2030 conditions. The AMBAG travel demand model showed a decrease in traffic from 2000 to 2030 along SR 17 during both the AM and PM peak hours. The arterial street segments showed a slight increase of approximately 0.5% to 0.6% growth for the AM and PM peak hours. However, to present a conservative analysis, an annual growth factor of 0.6% for 23 years (from 2007 to 2030) was used to increase traffic volumes along the regional facilities of SR 17, Mt. Hermon Road, and Scotts Valley Drive. The annual growth factor of 0.6% was also applied to La Madrona Drive because it continues to the City of Santa Cruz, paralleling SR 17.

In addition, traffic from the following pending developments was added under the Cumulative Condition scenarios including: Bethany College Expansion (30 apartment units), Town Center (150,000 s.f. retail, 250 town home/condominium dwelling units), Oak Creek Park Mixed Use (12,225 s.f. each of retail and office and 10 town home/condominium dwelling units), Granite Creek (18,450 s.f. of light industrial), and various small residential developments. The full list of pending projects is included in **Appendix E**. The traffic volumes associated with these developments were obtained from traffic reports prepared for the developments or estimated for this analysis using standard traffic engineering practice. ITE *Trip Generation* (7th Edition, 2003) rates were used where available. For specialty retail land uses, San Diego Association of Governments (SanDAG) trip generation rates (2002) were used for the AM peak hour, and a 25% reduction during the PM peak hour was taken to account for pass-by and diverted link trips. Because some of these developments may be included in the model forecasts, this approach is considered *conservative* and appropriate for environmental analysis purposes.

The traffic associated with the pending developments was added to growth factored existing volumes and volumes from approved projects to represent Cumulative No Project Conditions without the Mid-Town interchange as shown on **Figure 8**. Cumulative Plus Project is represented by Cumulative No Project volumes with project-generated traffic added as shown on **Figure 9**, and these volumes do not include the planned interchange.

Cumulative With Mid-Town Interchange Volumes

Cumulative Condition volumes were adjusted to reflect the changes to traffic patterns expected with the construction of the Mid-Town interchange. This interchange is included as a mid-term transportation improvement (action item CA 133) in the City's General Plan, and would be located between Mt. Hermon road and Granite Creek Road on SR 17, connecting El Pueblo Road to Green Hills Road. The interchange is not fully funded, but is evaluated here for informational purposes.

Construction of the Mid-Town interchange would shift some traffic away from the existing interchanges at Mt. Hermon Road and Granite Creek Road. The new freeway access would improve access to the homes and businesses on Scotts Valley Drive in the vicinity of Carbonero Way, and would also likely serve some regional traffic seeking to avoid congestion on Mt. Hermon Road. Some drivers who currently drive eastbound on Mt. Hermon Road to northbound SR 17 might instead turn left to northbound Scotts Valley Drive to access SR 17 via the Mid-Town interchange; however, the eastbound left-turn movement at the Mt. Hermon Road/Scotts Valley

Drive intersection is currently near capacity, making this route less desirable. Similarly, the reverse movements (southbound SR 17 to westbound Mt. Hermon Road) would also see a minor shift in traffic as some drivers exit at the new interchange. However, due to the fact that drivers on Mt. Hermon Road do not experience excessive delays (defined as having to wait through multiple cycles of a signal to clear an intersection), and that Scotts Valley Drive also experiences moderate congestion, the Mid-Town interchange is not expected to cause a substantial shift in travel patterns for regional traffic.

Local traffic, particularly traffic to and from Scotts Valley Drive, would be shifted away from the Mt. Hermon Road and Granite Creek Road interchanges to the new Mid-Town interchange.

CUMULATIVE INTERSECTION LEVELS OF SERVICE

Intersection levels of service were calculated for all of the study intersections using the traffic volumes on Figures 8-11. The resulting levels of service are presented in **Table 12**, and the corresponding LOS calculation sheets are included in **Appendix B**. Cumulative operations at several intersections improved slightly over Baseline Conditions due to modifications to signal timing parameters under cumulative conditions. Phase splits were modified slightly to account for the increased traffic volumes (i.e., the benefit associated with modified signal timings under cumulative conditions is greater than the additional delay associated with additional traffic).

As shown in **Table 12**, the addition of project trips would worsen operations at the Mt. Hermon Road/Scotts Valley Drive intersection from LOS D to LOS E in the PM peak hour if the Mid-Town interchange is not in place. Without additional improvements, this would result in a potentially significant impact; however, payment of the City's traffic impact fee towards the Midtown interchange would mitigate this impact. (see Cumulative Mitigation Measures below for additional discussion). With the Mid-Town interchange in place, this intersection would operate acceptably at LOS D under Cumulative Plus Project conditions.

During the PM peak period, the Mt. Hermon Road/La Madrona Drive-SR 17 SB off-ramp intersection would operate at LOS E both with and without the project without the Mid-Town Interchange, and would operate at LOS D both with and without the project with the Mid-Town Interchange. This is acceptable based on Caltrans' criteria for SR 17 and no significant impact is anticipated.

The stop sign-controlled movements at the intersections of La Madrona Drive/Altenitas Road and Mt. Hermon Road/El Rancho Drive-SR 17 NB ramp operate at LOS E or F, but do not meet the peak-hour signal warrant under Cumulative Plus Project conditions. Therefore, the project would not result in a significant impact at these locations under Cumulative Conditions. As with other unsignalized intersections, the City of Scotts Valley is expected to monitor intersection operations to determine if signalization is warranted.

CUMULATIVE MITIGATION MEASURES

The cumulative impact to the Mt. Hermon Road/ Scotts Valley Drive intersection would be mitigated to an acceptable level of service with the construction of the Mid-Town Interchange. The interchange would relieve some of the congestion at this intersection by providing an alternate route to drivers accessing Scotts Valley Drive between Mt. Hermon Road and Granite Creek Road. Contribution of traffic impact fees will mitigate the project's cumulative impact to the study intersections, as well as the City's local road network.

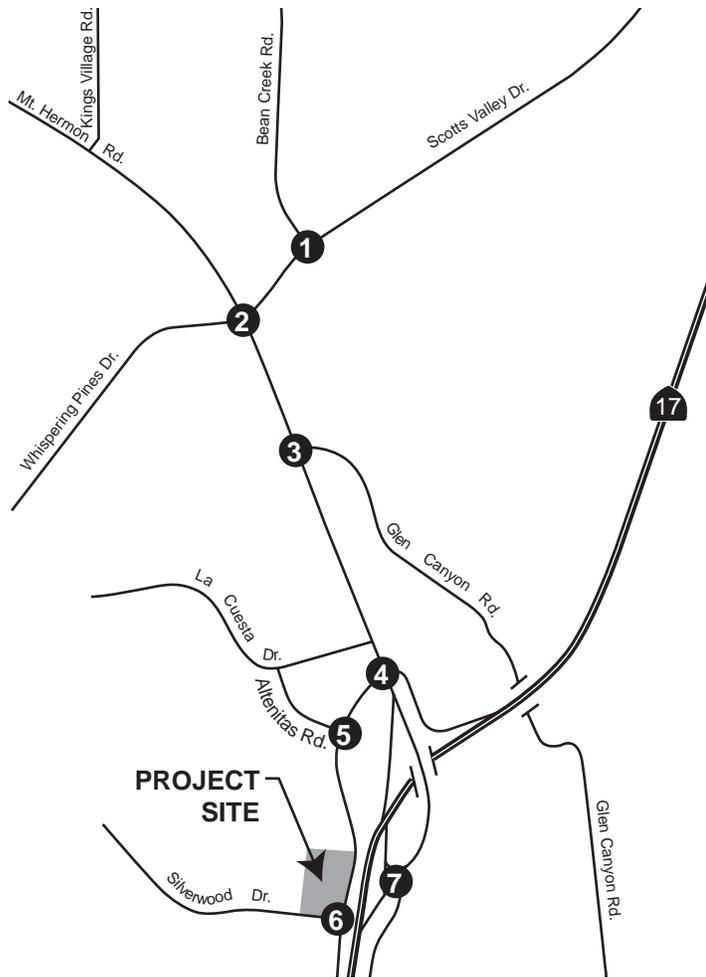
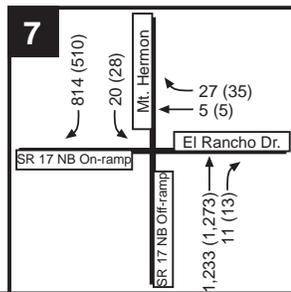
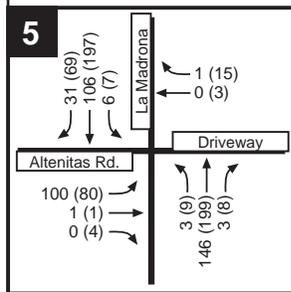
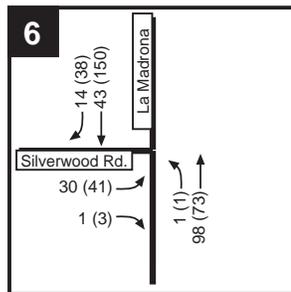
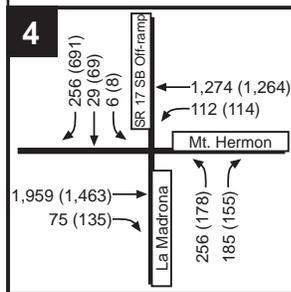
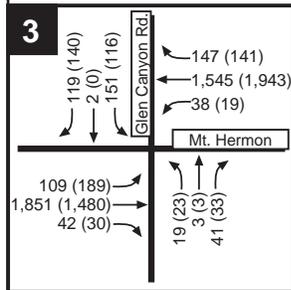
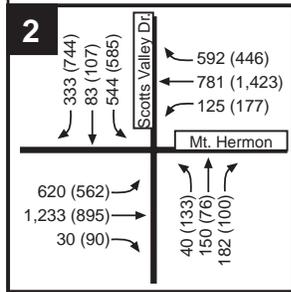
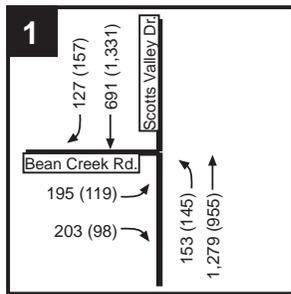
**TABLE 12
CUMULATIVE INTERSECTION LEVELS OF SERVICE**

Intersection	Peak Hour	Without Mid-Town Interchange				With Mid-Town Interchange			
		Cumulative No Project Conditions		Cumulative Plus Project Conditions		Cumulative No Project Conditions		Cumulative Plus Project Conditions	
		Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²	Delay ¹	LOS ²
1. Scotts Valley Drive / Bean Creek Road ³	AM	22.8	C	22.9	C	21.7	C	21.4	C
	PM	14.3	B	14.2	B	13.2	B	13.3	B
2. Mt. Hermon Road / Scotts Valley Drive ³	AM	40.4	D	41.4	D	33.4	C	35.6	D
	PM	49.0	D	58.4	E	45.9	D	54.2	D
3. Mt. Hermon Road / Glen Valley Road ³	AM	20.8	C	21.5	C	16.3	B	17.2	B
	PM	20.4	C	24.8	C	18.5	B	19.7	B
4. Mt. Hermon Road / La Madrona Drive-SR 17 SB off-ramp	AM	58.8	E	66.8	E	30.3	C	33.0	C
	PM	60.0	E	79.4	E	37.5	D	53.2	D
5. La Madrona Drive / Alenitas Road	AM	11.7	B	13.7	B	11.7	B	13.7	B
	PM	14.4	B	108.6	F	14.4	B	108.5	F
6. La Madrona Drive / Silverwood Road	AM	9.5	A	9.5	A	9.5	A	9.5	A
	PM	10.2	B	10.4	B	10.2	B	10.4	B
7. Mt. Hermon Road / El Rancho Drive-SR 17 NB ramp	AM	31.0	D	32.3	D	22.1	C	24.7	C
	PM	34.9	D	42.1	E	28.1	D	37.9	E

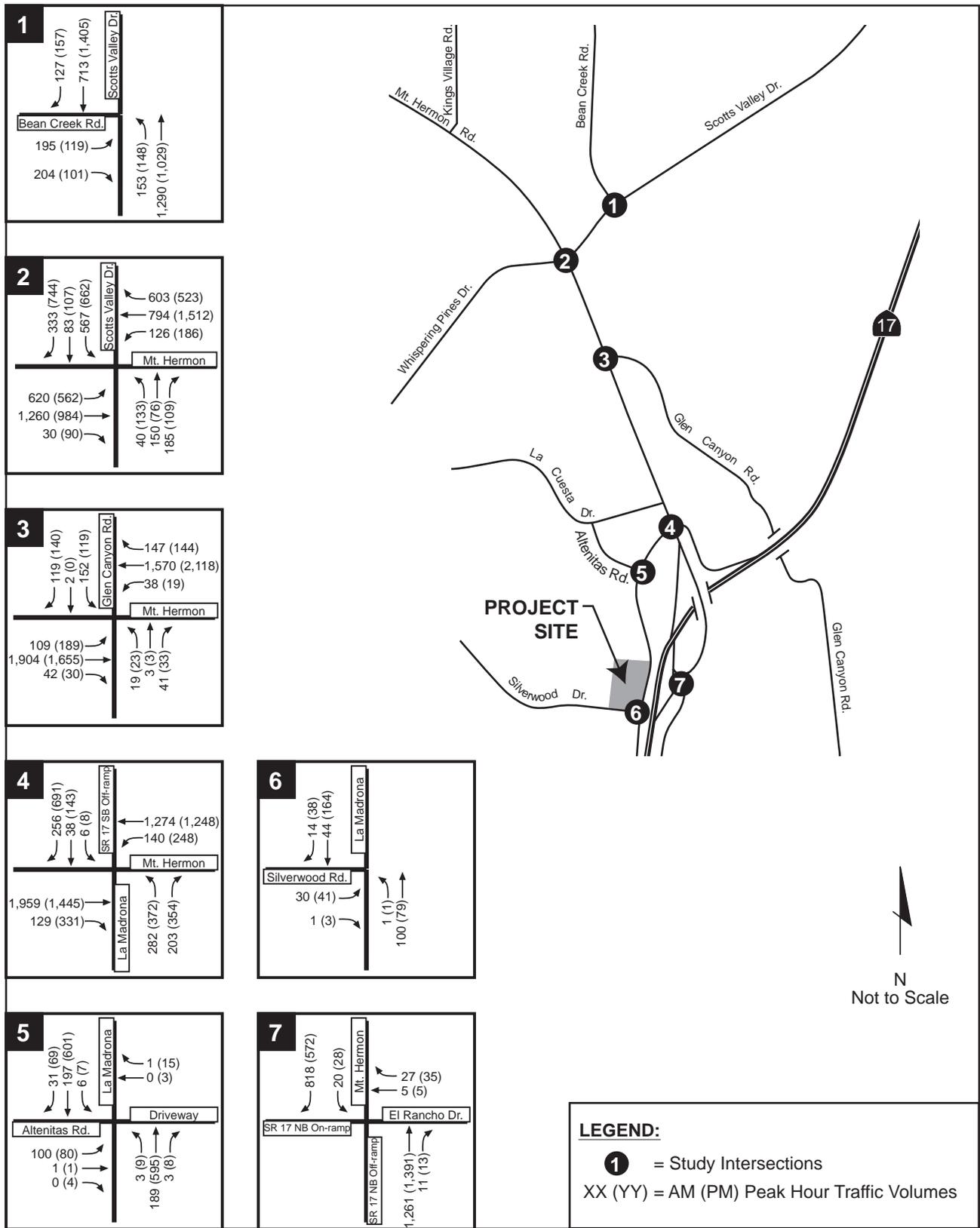
Notes: ¹ Average control delay per vehicle in seconds. Delay and LOS at unsignalized intersections are for the worst-case movement.

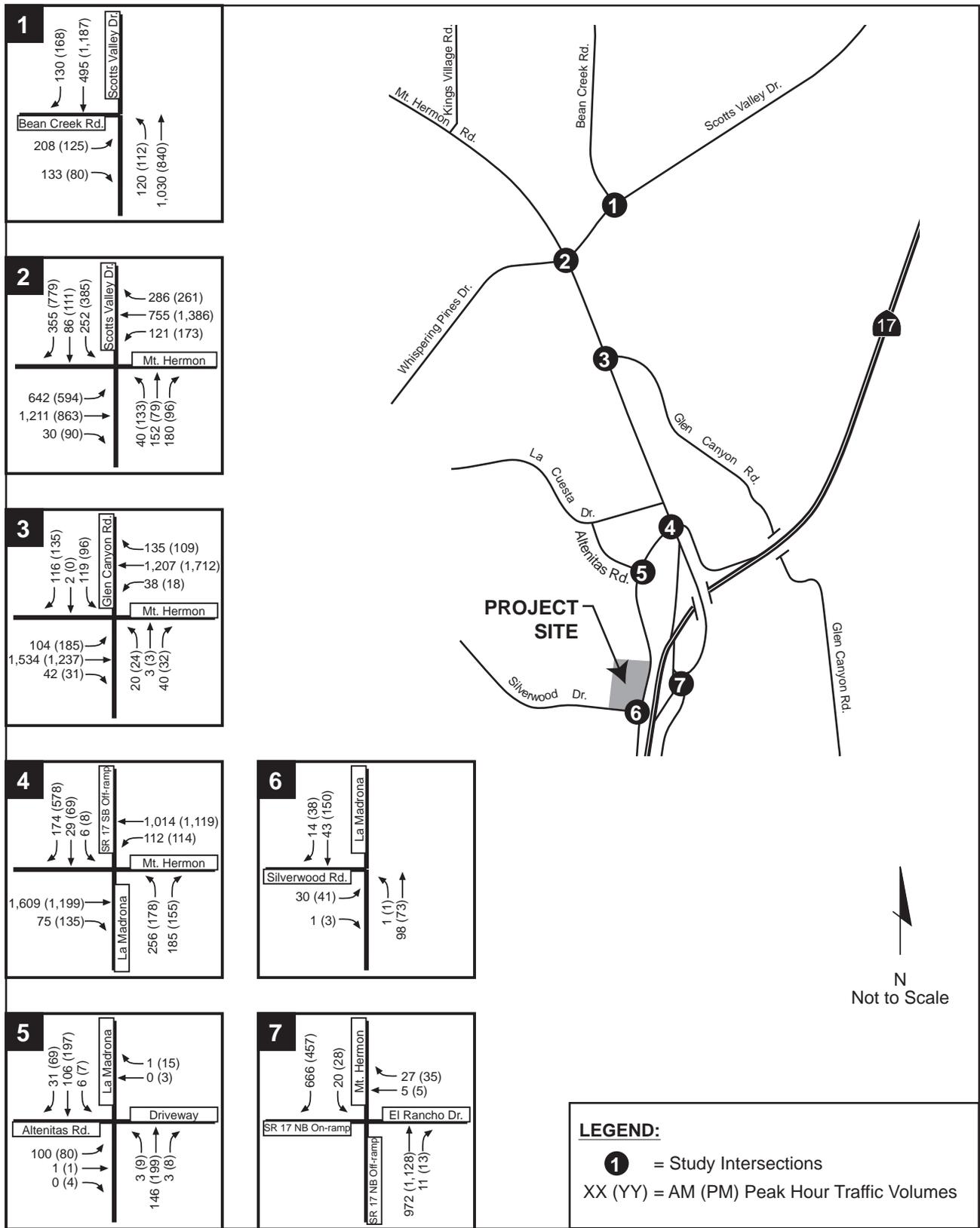
² LOS = Level of service.

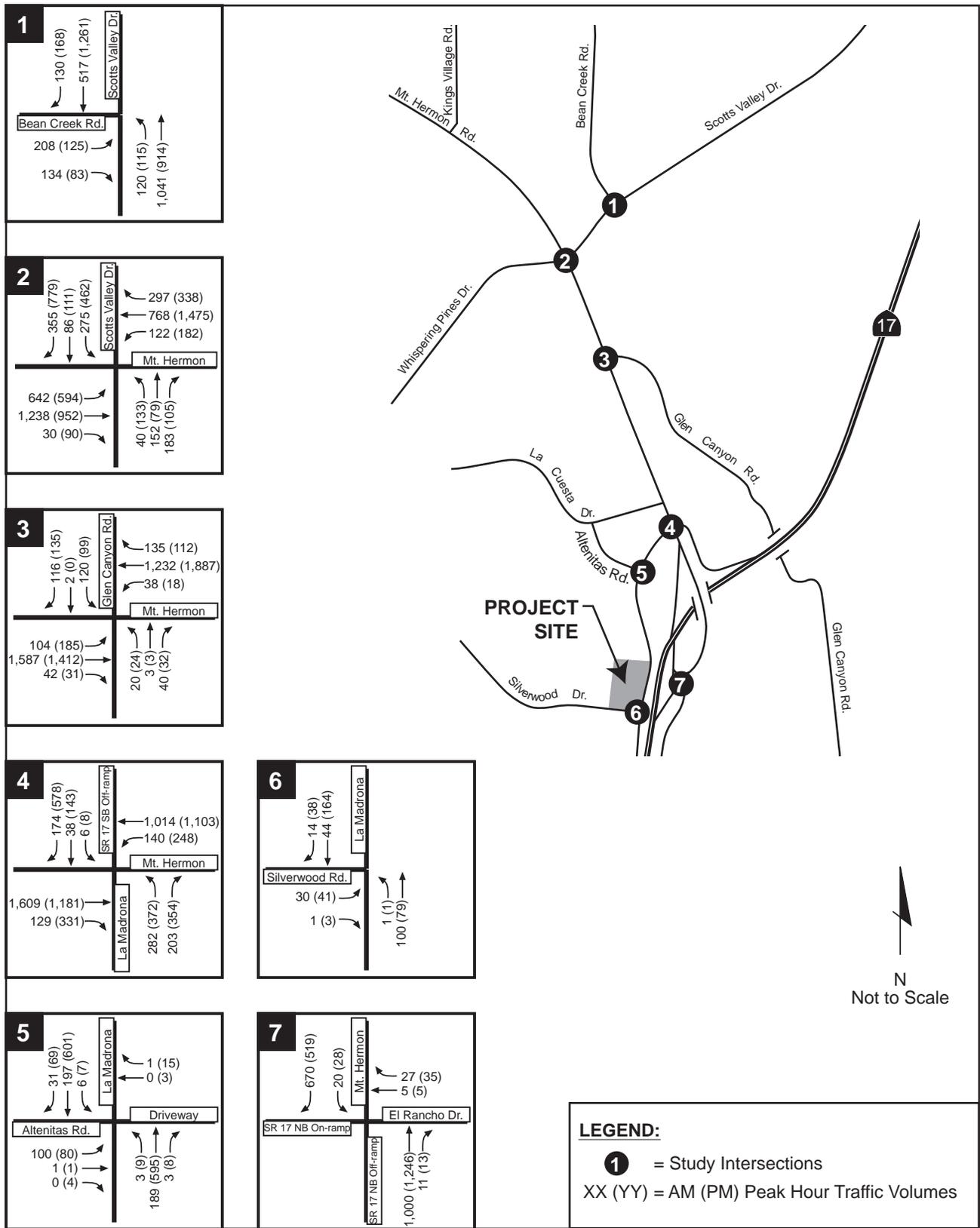
³ Operations under Cumulative No Project Conditions improved slightly over Baseline Conditions due to modifications to signal timing parameters under cumulative conditions (the benefit associated with modified signal timings under cumulative conditions is greater than the additional delay associated with additional traffic).



LEGEND:
1 = Study Intersections
 XX (YY) = AM (PM) Peak Hour Traffic Volumes







CUMULATIVE FREEWAY RAMP LEVELS OF SERVICE

Similar to the intersection volumes, SR 17 freeway volumes were growth factored by 0.6% annually based on AMBAG model forecasts, and traffic from approved and pending projects were assigned to the freeway. These volumes were used to analyze cumulative freeway operations. Two scenarios were analyzed, with and without the Mid-Town Interchange. **Table 13** presents the associated freeway ramp levels of service under both scenarios without and with the proposed project. All of the ramp junctions are projected to operate acceptably at LOS D or better under Cumulative Conditions.

TABLE 13 CUMULATIVE STATE ROUTE 17 MERGE AND DIVERGE LEVELS OF SERVICE									
Location and Direction	Peak Hour	Without Mid-Town Interchange				With Mid-Town Interchange			
		No Project Conditions		Project Conditions		No Project Conditions		Project Conditions	
		Density ¹	LOS ²	Density ¹	LOS ²	Density ¹	LOS ²	Density ¹	LOS ²
Mt. Hermon Interchange									
Northbound Loop On-ramp	AM	27.2	C	27.2	C	28.1	D	28.2	D
	PM	22.7	C	23.0	C	24.1	C	24.3	C
Northbound Slip Off-ramp	AM	31.6	D	31.8	D	31.6	D	31.8	D
	PM	30.6	D	31.4	D	30.6	D	31.4	D
Southbound Slip On-ramp	AM	26.5	C	26.6	C	26.6	C	26.7	C
	PM	33.1	D	33.9	D	33.3	D	34.0	D
Southbound Slip Off-ramp	AM	20.6	C	20.6	C	20.8	C	20.8	C
	PM	31.5	D	31.8	D	33.8	D	34.1	D

Notes: ¹ Density = passenger cars per lane mile per hour (pc/mi/hr).
² LOS = Level of service.