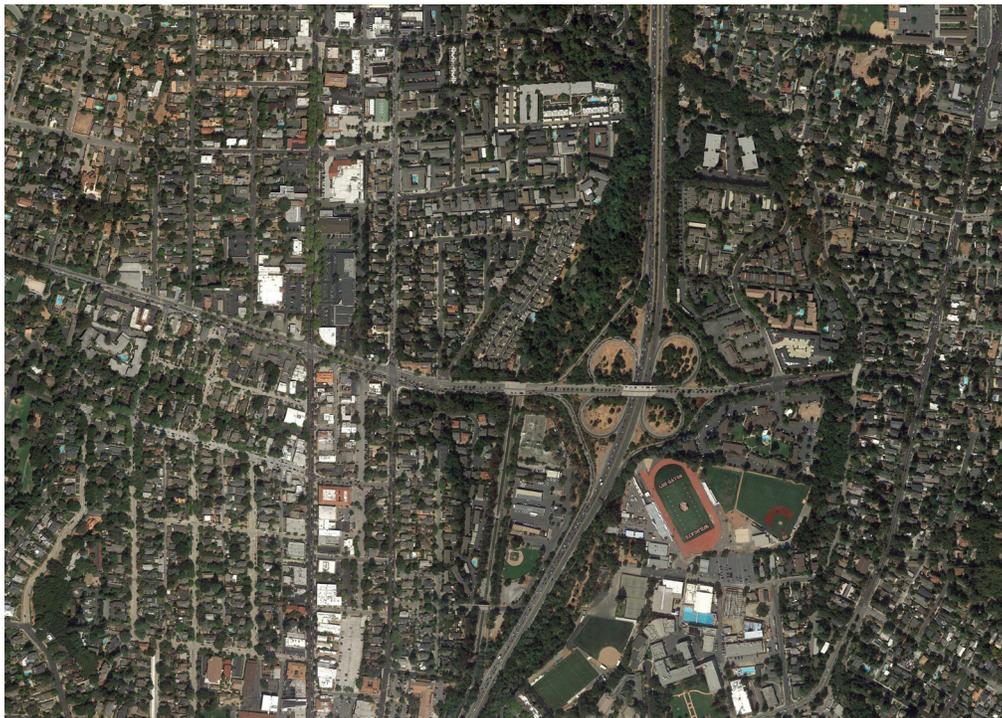




State Route 9 Safety and Traffic Operations Analysis



Prepared for the Town of Los Gatos

Submitted by
W-Trans

November 28, 2018

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Executive Summary

Within the Town of Los Gatos safety is paramount for all roadway users including motorists, cyclists, and pedestrians. State highways transect the southern boundaries of Town, including State Routes 17 and 9. The issue of safety along State Route 9 (SR 9) has increasingly become a concern as residents have asked for safety enhancements in various public meetings such as recent meetings held while developing the Town's safe routes to school plan, and a recent pedestrian fatality has created a strong push for public safety improvements.

This report recommends improvements along SR 9 which include infrastructure improvements that directly address pedestrian safety, and design features that promote driver-awareness of pedestrians and bicycles. The goal of the project is to upgrade streets to encourage safe vehicles speeds and enhance safety for all modes of travel.

For this report, safety for all roadway users was analyzed along the segment of Los Gatos-Saratoga Road (a large part of which is designated as State Route 9) between the western-most Town limits and Los Gatos Boulevard. During the most recent five-year study period a total of 93 collisions were reported along the approximately one-mile section of SR 9 and Los Gatos-Saratoga Road which provides regional access to various locations within Santa Clara County. Further, it should be noted that vehicle-only collisions associated with the interchange SR 17/SR 9 were not analyzed as their exact location is difficult to determine due to the State Wide Integrated Traffic Records System reporting method.

The intersection located at SR 9/Massol Avenue has received significant attention from residents, Town staff, and local stakeholders. The intersection is an unsignalized tee intersection near the west Town limit with a pedestrian-activated flashing beacon to alert motorists of the presence of pedestrians crossing SR 9. A total of sixteen collisions were reported between January 1, 2013 and December 31, 2017, half of which consisted of injuries to one or more parties involved. Additionally, half of these collisions involved cyclists at the intersection, while one involved a pedestrian who was fatally struck by a vehicle on September 1, 2017. The fatal collision occurred at approximately 6:30 a.m. when a pedestrian using the western crosswalk was struck by an eastbound traveling vehicle.

Of the eight intersections analyzed for this report, five included either collision rates, injury rates, or fatality rates higher than the average of similar intersections statewide. Most notably the intersection at Massol Avenue exhibited collision, injury, and fatality rates higher than statewide averages for similar facilities. A total of 28 collisions were reported at the signalized intersection of SR 9/Santa Cruz Avenue between January 1, 2013 and December 31, 2017. Similarly, injury rates were calculated to be higher than average at intersections along the corridor: specifically at Massol Avenue, Tait Avenue, Monterey Avenue, and Alberto way. As a result, Town Staff has requested that W-Trans develop a list of specific recommendations with the goal of improving safety along the corridor for all roadway users, and specifically at the intersection at Massol Avenue.

Recommended safety and operational improvements along the corridor were developed in response to collision data provided by the Town of Los Gatos, the California Highway Patrol, as well as field visits. Evaluation methods included industry-standard traffic engineering practices such as collision analysis, speed surveys, and signal warrant analysis, etc. Reported collisions involving cyclists and pedestrians occurred more often compared to similar facilities statewide, thus higher than average collision and injury rates were recorded at various locations along the corridor, specifically at conflict points, and the Massol Avenue intersection.

Recommendations at the intersection of SR 9/Santa Cruz Avenue include removing the channelized right-turn lane, installing green bike paint, and continental crosswalks. Recommendations associated with the intersection at SR 9/University Avenue include updating the current bicycles facilities to consist of green paint at conflict points. Safety at the western interchanges of SR 9/SR 17 could be enhanced by trimming of foliage which obstructs the view of motorists. Similarly, foliage could be trimmed to enhance safety in addition to the

installation of 'crosswalk ahead' signs on the eastern SR 9/SR 17 interchange ramps. Recommendations at the intersection of SR 9/Alberto Way include trimming foliage and installing radar speed feedback signs along SR 9, in addition to installing a curb ramp at the southeast corner. Safety improvements recommended for the intersection located at Los Gatos Boulevard consist of installing yield markings, crosswalk warning signs, and removing the channelized right-turns. Table ES-1 below provides a summary comparison of each alternative recommendation as it relates to the expected benefits.

Table ES-1 – Qualitative Comparison of Alternatives of Traffic Signal Network Measures of Effectiveness

Alternative	Safety Enhancement	Use* Acceptance	Highway 9 Traffic Impact*	Neighborhood Access	Cut-Through Traffic Impact	Cost
Existing Conditions	N/A	Easy	N/A	N/A	N/A	N/A
RRFB (Alt. #1)	Medium	Easy	Low	No	No	Low
HAWK (Alt #2)	High	Moderate	Medium	No	No	Medium
Traffic Signal (Alt #3)	High	Easy	High	Yes	Yes	High

Note: * = Use Acceptance refers to ease of comprehension for the driver; Highway 9 Traffic Impact refers to an increase in delay, stops, congestion as a result of implementation of intersection control alternatives

Based on an analysis of signal warrants and pedestrian crossing treatments as recommended by the Federal Highway Administration, safety for pedestrians could be enhanced by upgrading traffic control at the unsignalized tee intersection at Massol Avenue. As stated above three alternatives were considered as upgrades to the existing flashing beacon, including upgrading the existing beacon to a Rapid Rectangular Flashing Beacons with enhanced roadway signage, a pedestrian hybrid beacon, or a traffic signal. Of the three alternatives, it was determined that a pedestrian hybrid beacon, also known as a HAWK, may be most appropriate for the intersection.

Recommendations for State Route 9 Corridor Study will help shift the focus away from motor vehicles to a more balanced approach of incorporating all roadway users, with more attention directed to the safety of those most vulnerable, pedestrians and cyclists. Safety and operations along the corridor could be improved by implementing the following recommendations:

- Update the crosswalk control on the west leg of the SR 9/Massol Avenue intersection with one of three options, along with other complementary improvements
 - Upgrade the existing flasher to a rectangular rapid flashing beacon (RRFB)
 - Upgrade the existing flasher to a pedestrian hybrid beacon, also known as a HAWK
 - Upgrade the existing flasher to a traffic signal which would also control the intersection
- Install green bike lane markings at conflict points
- Provide Continental crosswalk markings at intersections
- Remove channelized right-turn lanes as a long-term improvement
- Trim foliage along the corridor
- Provide bicycle facility improvements to enhance connectivity

A summary of the costs associated with recommended safety improvements are provided below in Table ES-2.

Table ES-2 – Summary of Cost Estimates

SR 9/Massol Avenue				
Intersection Improvement Detail	Improvement Type			
	Alternative 1	Alternative 2	Alternative 3	
Intersection Control	RRFB \$219,490	HAWK \$476,400	Signal \$721,900	
Speed Reduction	Raised Median Beacons \$146,480	Raised Median Beacons \$72,200	Raised Median Beacons \$72,200	
Bike and Ped Improvements Install Green Bike Lanes Reconstruct Channelized Right-turn	\$54,680	\$213,200	\$213,200	
Intersection TOTAL	\$421,030	\$761,800	\$1,007,300	
SR 9/Santa Cruz Avenue				
HSIP Improvement	Cost	Non-HSIP Improvement	Cost	Total
Near-to-Mid Term				
Install Green Bike Lanes	\$36,600	Install/Paint Traffic Bars	\$3,300	\$46,500
Install Continental Crosswalks	\$15,200			\$20,700
Long Term				
Remove Channelized Right-turns	\$615,000	-		\$615,000
Intersection TOTAL	\$666,800		\$3,300	\$670,100
SR 9/University Avenue				
HSIP Improvement	Cost	Non-HSIP Improvement	Cost	Total
Install Green Bike Lanes	\$13,800	-		\$13,800
Intersection TOTAL	\$13,800			\$13,800
SR 9/SR 17 Interchange				
HSIP Improvement	Cost	Non-HSIP Improvement	Cost	Total
Foliage Trimming	\$4,700	-		\$4,700
Install Crosswalk Ahead Signs	\$1,500	-		\$1,500
Intersection TOTAL	\$6,200			\$6,200
SR 9/Alberto Way				
HSIP Improvement	Cost	Non-HSIP Improvement	Cost	Total
Foliage Trimming	\$2,300	Install Curb Ramp	\$7,700	\$10,000
		Install Radar Speed Sign	\$46,100	\$46,100

Intersection TOTAL	\$2,300	\$53,800	\$56,100
SR 9/Los Gatos Boulevard			
HSIP Improvement	Cost	Non-HSIP Improvement	Cost
			Total
Near-to-Mid Term			
Install Yield Markings	\$300	-	\$300
Install Warning Signs	\$3,600		\$3,600
Long Term			
Remove Channelized Right-turns	\$800,600	-	\$800,600
Intersection TOTAL	\$804,500		\$804,500

Introduction

This report presents an analysis of safety and traffic operations of the Los Gatos-Saratoga Road corridor from Los Gatos Boulevard to the western Town limits. The western portion of that corridor, between the Town limit and SR 17, is designated SR 9. The safety and traffic operations analysis was completed in accordance with the criteria established by the Town of Los Gatos and the California Department of Transportation and is consistent with standard traffic engineering techniques.

Prelude

The purpose of this safety and traffic operations analysis is to provide the Town Los Gatos staff and policy makers with data they can use to make an informed decision regarding the potential safety and traffic operations impacts along State Route 9 between Massol Avenue and Los Gatos Boulevard. SR 9 is maintained and operated by Caltrans. The Town has received input from residents and stakeholders regarding safety along the corridor, specifically citing issues with speed, collisions, and visibility. Recommendations at key locations along the corridor have been identified based on data collected during field observations, review of collision data, analysis of traffic operations, and data provided by local agencies.

Project Setting

Project Location

Between the west Town limits and State Route 17 (SR 17), Los Gatos-Saratoga Road is a section of State Route 9 (SR 9). The full length of SR 9 extends from State Route 1 in Santa Cruz to SR 17 in Los Gatos. The majority of SR 9 has a north-south alignment, even though the portion studied for this report has an east-west alignment. East of SR 17, Los Gatos-Saratoga Road is a City street that ends at a “T” intersection with Los Gatos Boulevard.

The roadway segment has four travel lanes with a raised median between SR 17 and Tait Avenue, reduced to two lanes at the west and east ends. Left turns are permitted onto side streets when there are breaks in the median. The roadway segment between Tait Avenue and Montgomery Street is a three-lane arterial with one lane in each direction plus a two-way center left-turn lane. The roadway provides access to SR 17 via on-ramps and off-ramps in a cloverleaf interchange. Land uses along the corridor are comprised of residential neighborhoods and commercial buildings.

The study area includes the following intersections:

1. SR 9/Massol Avenue
2. SR 9/San Benito Avenue
3. SR 9/Tait Avenue
4. SR 9/Monterey Avenue
5. SR 9/Santa Cruz Avenue
6. SR 9/University Avenue
7. Los Gatos-Saratoga Road/Alberto Way
8. Los Gatos-Saratoga Road/Los Gatos Boulevard

Safety and operating conditions during the a.m. and p.m. peak periods were evaluated to capture the potential impacts for the proposed recommendations and to present a thorough description of traffic flow on the local transportation network. The morning peak hour occurs between 7:00 and 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward-bound commute. Traffic volumes were collected for the study intersections during spring when school was in session. The unadjusted, raw, traffic count data are provided in Appendix A.

Study Intersections

The tee intersection located at SR 9/Massol Avenue includes stop control on the northbound approach on Massol Avenue. Pedestrian activated flashing beacons are present at the intersection, facing eastbound and westbound vehicles. Class II bike lanes are present along SR 9 as well as a yellow “ladder” crosswalk on the west leg. The speed limit on Massol Avenue is 25 miles per hour (mph) and on SR 9 is 35 mph.

The tee intersection of SR 9/San Benito Avenue has two-way stop-control on the minor approach (southbound San Benito Avenue) in addition to Class II bike lanes on SR 9. San Benito is closed to through traffic as there is a traffic barricade approximately 70 feet north of the intersection. The posted speed limit on San Benito Avenue is 25 mph.

The intersection of SR 9/Tait Avenue also includes stop controls on the minor approach (northbound Tait Avenue). Similarly, the intersection of SR 9/Monterey Avenue is a tee intersection with stop control on the minor street (southbound Monterey Avenue). The posted speed limit on both Tait Avenue and Monterey Avenue is 25 mph.

The intersection of SR 9/Santa Cruz Avenue is a four-legged signalized intersection including channelized right turns at all approaches, also known as “free” right turns. The intersection includes standard (parallel stripes) crosswalks on all four legs in addition to diagonal crosswalks connecting the pedestrian refuge islands to the street corners. Curb ramps, pedestrian signal heads and push buttons are present for all crossings excluding the right-turn lanes. The posted speed limit on Santa Cruz Avenue is typically 25 mph, but decreases to 15 mph about one block south of SR 9.

The intersection of SR 9/University Avenue is also a four-legged signalized intersection. Standard crosswalks are present on all four legs in addition to pedestrian signal heads, push buttons, and curb ramps at each corner. The posted speed limit on University Avenue is also 25 mph.

The intersection at Los Gatos-Saratoga Road/Alberto Way is a signalized four-legged intersection including a signalized driveway providing access to the Los Gatos Inn. The intersection includes crosswalks at the north and east legs, as well as push buttons located at the southeast, northeast, and northwest corners. Curb ramps are located only at the northwest and northeast corners.

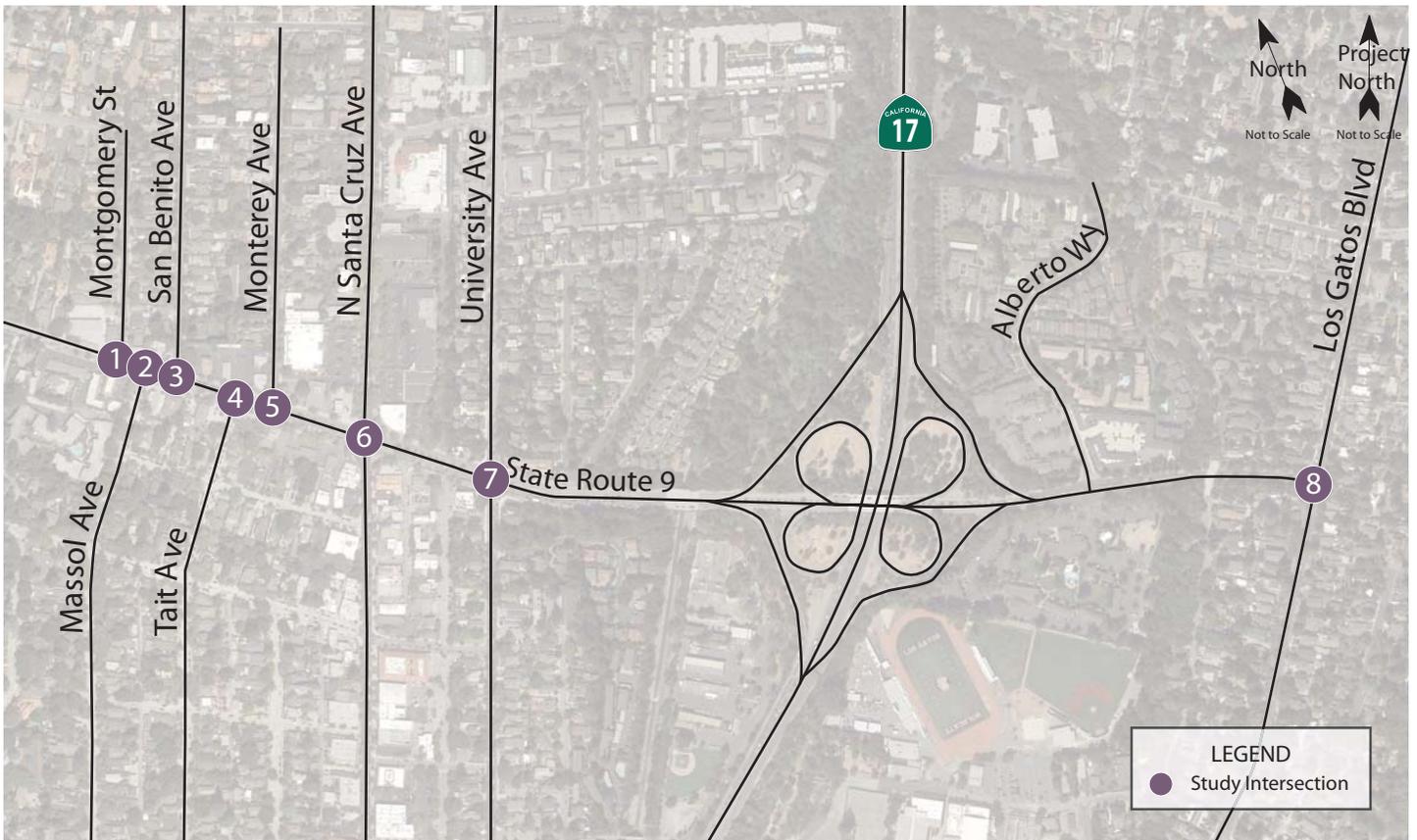
The intersection of Los Gatos Boulevard/Los Gatos-Saratoga Road is a signalized tee intersection. Channelized right-turn lanes are present for the southbound and eastbound right turns. Standard crosswalks are present across the south and west legs. Additionally, standard crosswalks provide access from the northwest and southwest corners to the channelized pedestrian refuge islands. The posted speed limit on Los Gatos-Saratoga Road is currently 35 mph within the Town limits.

The locations of the study intersections and the existing lane configurations and controls are shown in Figure 1.

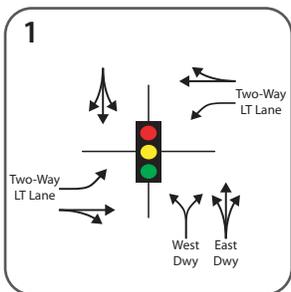
Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate any safety issues. Collision rates were calculated based on records available from the California Highway Patrol as published in the Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 01, 2013 through December 2017. For the purposes of this study, collisions associated with the SR 17/SR 9 interchanges were omitted. The specific location of reported collisions associated with the interchanges could not be determined with accuracy due to the reporting method of the SWITRS database.

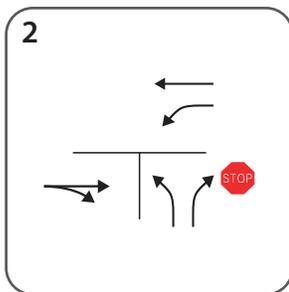
As presented in Table 1, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2014 Collision Data on California State Highways*, California Department of Transportation (Caltrans).



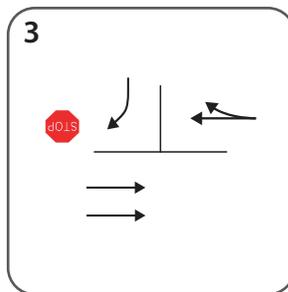
State Route 9 & AGPC Dwys/Montgomery St



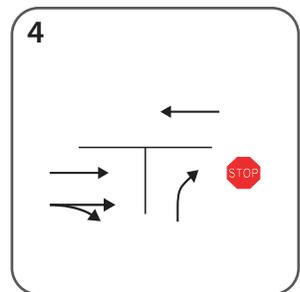
State Route 9 & Massol Ave



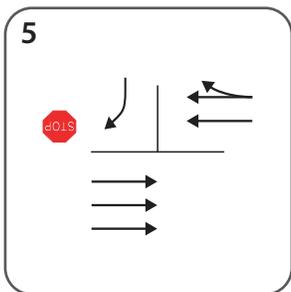
State Route 9 & San Benito Ave



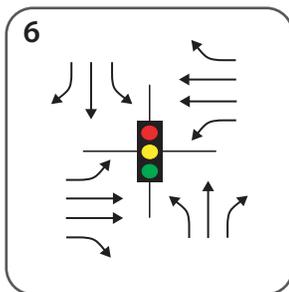
State Route 9 & Tait Ave



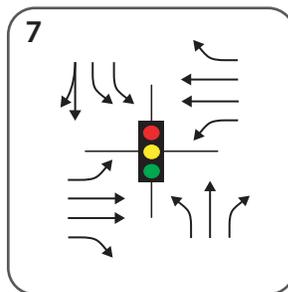
State Route 9 & Monterey Ave



State Route 9 & N Santa Cruz Ave



State Route 9 & University Ave



State Route 9 & Los Gatos Blvd

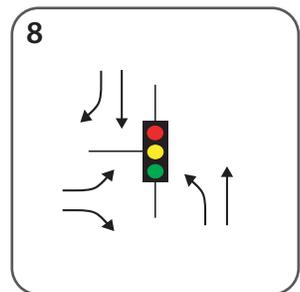


Table 1 – Collision Rates at Study Intersections

Study Intersection	Number of Collisions (2013-2017)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)	Injury Rate	Statewide Average Injury Rate
1. SR 9 (SR 12)/Massol Ave (TWSC)	16*	0.43	0.14	50.0%	38.0%
2. SR 9/San Benito Ave (TWSC)	1	0.03	0.14	0.00%	38.0%
3. SR 9/Tait Ave (TWSC)**	3	0.08	0.14	66.7%	38.0%
4. SR 9/Monterey Ave (TWSC)**	1	0.03	0.14	100%	38.0%
5. SR 9/Santa Cruz Ave (SIG)	28	0.51	0.43	32.1%	37.9%
6. SR 9/University Ave (SIG)	24	0.41	0.43	37.5%	37.9%
7. SR 9/Alberto Wy (SIG)	10	0.29	0.43	40.0%	37.9%
8. Los Gatos Blvd/SR 9 (SIG)	9	0.20	0.27	22.2%	37.3%

Note: c/mvm = collisions per million vehicles miles; * = fatal collision occurred at intersection; **/Gray = Limited Data and subject to change; **Bold** = collision rate above statewide average; SIG = Signalized Intersection; TWSC = Two-way Stop Control

A total of 16 collisions were reported at the intersection of SR 9/Massol Avenue. Of the reported collisions, half included one or more parties involved sustaining injuries. The injury rate was calculated to be 12 percent higher than the statewide average for similar facilities. Additionally, a fatality occurred at the intersection on September 1, 2017. Reported collisions associated with the tee intersection primarily consisted of broadside collisions. It should also be noted that eight collisions involving bicycles and motor vehicles were reported at the intersection during the five-year study period.

Three collisions were reported at the intersection of SR 9/Tait Avenue including broadside, vehicle-pedestrian, and rear-end collisions. Trends of note at this intersection concern the degree of injury as two of the three reported collisions included severe injuries to one of more parties involved.

A total of 28 collisions were reported at the four-legged signalized intersection at SR 9/Santa Cruz Avenue. The collision rate for the intersection was calculated to be nearly twice that of the statewide average at similar facilities. Of the 28 reported collisions, nine involved injuries to one or more parties. Predominate collision types reported at the intersection included broadside, rear-end, and sideswipe collisions. It should also be noted that while the calculated collision rate was significantly higher than the statewide average, the injury rate was calculated to be approximately ten percent less than that of similar facilities statewide. Of the 28 reported collisions 20 incidents resulted in property damage only, in addition to four incidences of visible injury resulting from the collisions, and five collisions resulting in complaints of pain.

The intersection at University Avenue had a total of 24 reported collisions. Of these, nine resulted in injuries to one or more parties involved. The most common collision types included rear-end, broadside, and sideswipe collisions. The most prevalent primary collision factor was unsafe vehicle speed.

Ten collisions were reported at the signalized intersection of Alberto Way during the five-year study period, four of which caused injuries to one or more parties involved. The most common collision factors reported included unsafe speed (6), and traffic signals (3). It should be noted that the calculated injury rate associated with this intersection is slightly above the statewide average injury rate of similar facilities.

Nine collisions were reported at the signalized tee intersection located at Los Gatos Boulevard. Two collisions consisted of injuries to one or more parties involved while the most common collision types included rear-end (4), hit object (2), and broadside (2) collisions.

It should also be noted that a total of 13 bicycle-involved collisions were reported along the corridor during the five-year study period. Of the 13 reported collisions, eight occurred at the intersection at Massol Avenue, three at Santa Cruz Avenue, and one each at San Benito and Tait Avenues. The collision rate calculations are provided in Appendix B.

Intersection Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. Each Level of Service ranking can also be described in terms of delay to the average vehicle as described in Appendix C.

The study intersections were analyzed using methodologies published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2010. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle.

The Levels of Service for the intersections with side street stop controls, or those which are unsignalized and have one or two approaches stop controlled, were analyzed using the “Two-Way Stop-Controlled” intersection capacity method from the HCM. This methodology determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. Results are presented for individual movements together with the weighted overall average delay for the intersection.

The study intersections that are currently controlled by a traffic signal including Alberto Way and Los Gatos Boulevard were evaluated using the signalized methodology from the HCM. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology. For purposes of this study, delays were calculated using signal timing obtained from the California Department of Transportation (Caltrans).

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. A unit of measure that indicates a level of delay generally accompanies the LOS designation. The ranges of delay associated with the various levels of service are indicated in Appendix C.

The intersections located at University Avenue and Santa Cruz Avenue were evaluated using the signalized intersection methodology published in the *Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority, Congestion Management Program, 2015. This methodology is based on the signalized methodology published in the *Highway Capacity Manual (HCM)*, Transportation Research Board, 2010, which has been modified for use in Santa Clara County. This methodology is based on factors including traffic volumes, green time for each movement, phasing, whether the signals are coordinated or not, truck traffic, and pedestrian activity. Average stopped delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology.

Traffic Operation Standards

The Town of Los Gatos has adopted level of service standards in addition to the Santa Clara County VTA standards. Los Gatos-Saratoga Road is designated as a Highway in the Town’s General Plan (*Los Gatos 2020 General Plan*,

Transportation Element, 2010). The VTA guidelines are included in the *Transportation Impact Analysis Guidelines* (October 2014).

For local intersections not a part of the CMP network, a traffic impact is considered significant if:

- The addition of project-generated traffic causes operation of an intersection to deteriorate from an acceptable level of service (LOS D or better) to LOS E or LOS F

For intersections in the CMP network, a traffic impact is considered significant if:

- The addition of project-generated traffic causes operation of an intersection to deteriorate from an acceptable level of service (LOS E or better) to LOS F, or
- For intersections operating at LOS F under background or cumulative conditions, the project condition increases the average control delay for critical movements by four seconds or more and project traffic increases the critical volume-to-capacity (v/c)¹ ratio by 0.01 or more.

There is no level of service standard for unsignalized intersections with stop control on the minor street only. It is fairly typical for this type of intersection to have a poor LOS on the minor street approaches, but also typical for the overall intersection LOS to be acceptable because the major street approaches have no control delay and operate at LOS A. LOS results presented in this report are for information and for explanation of the overall corridor operations, and are not intended to lead to recommendations for operational improvements.

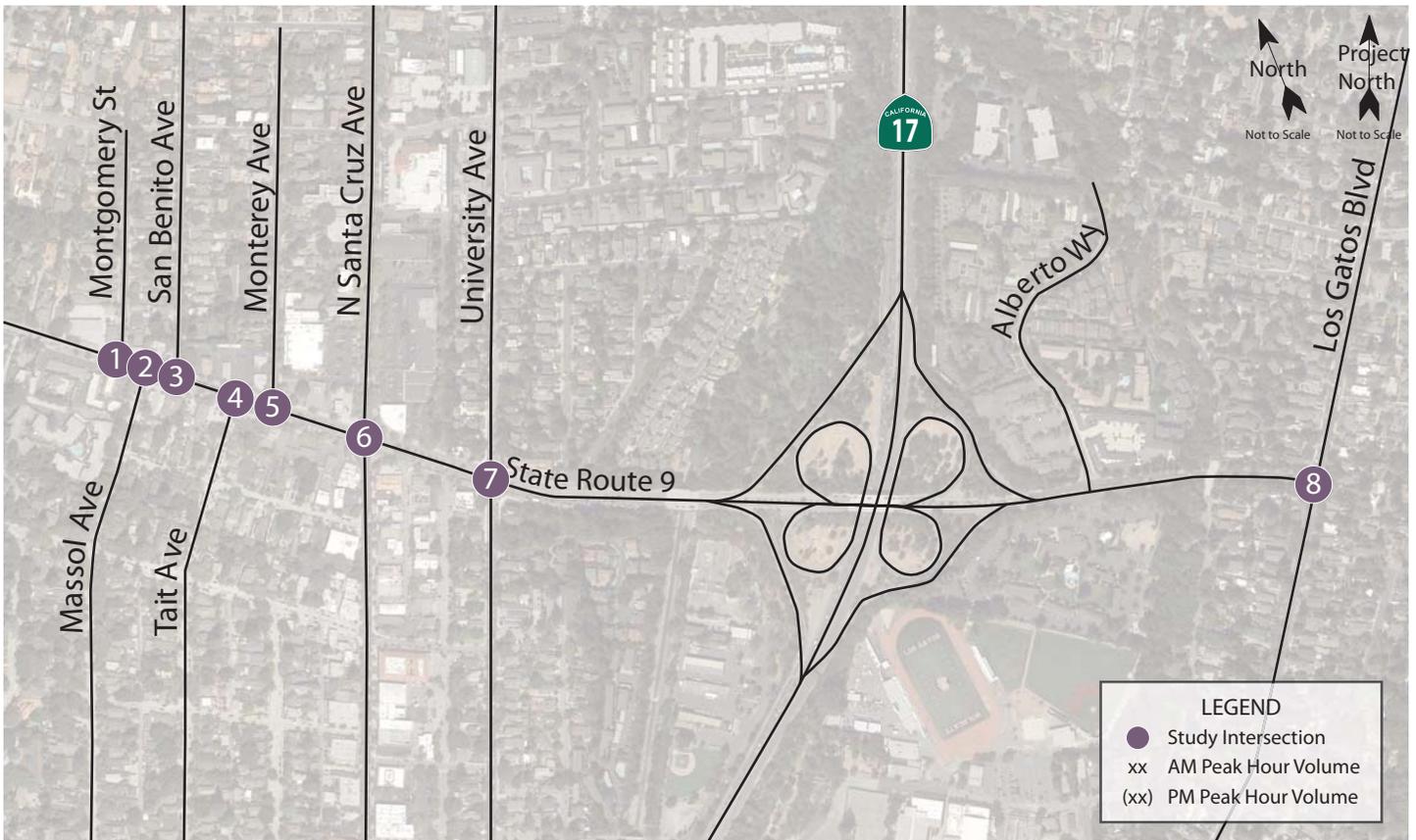
Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the a.m. and p.m. peak periods. Traffic volume data was collected in May 2018 while local schools were in session.

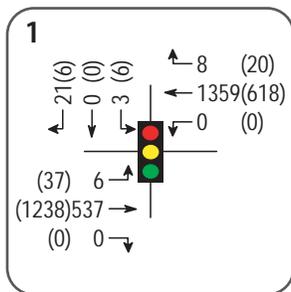
Intersection Levels of Service

Under existing conditions, all intersections operate acceptably during the a.m. and p.m. peak periods. The existing traffic volumes and lane configurations are shown in Figure 2. Because traffic counts were collected on different days, the volumes in Figure 2 reflect adjustments made to the raw count data (see Appendix 1) so the volume leaving one intersection would match the volume arriving at the subsequent intersection. A summary of the existing intersection level of service calculations is contained in Table 2, and copies of the Level of Service calculations are provided in Appendix D.

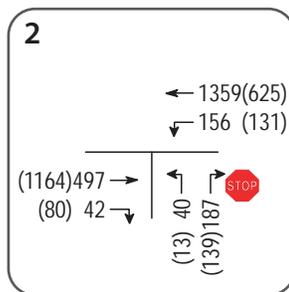
¹ Volume-to-Capacity (v/c) is a measure that reflects the mobility and quality of travel within a roadway facility. It compares the number of vehicle using the roadway to the theoretical capacity of that facility. For example, a v/c of 1.00 indicates the facility is operating at its theoretical capacity.



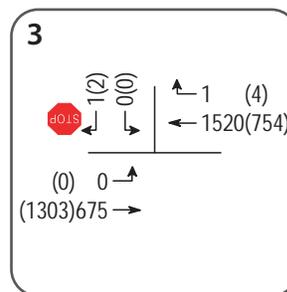
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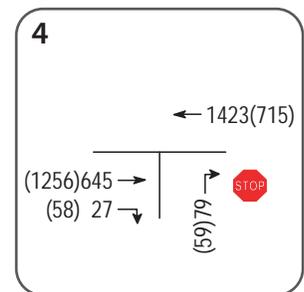
State Route 9 & Massol Ave



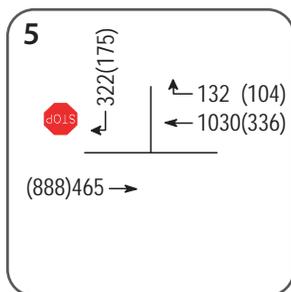
State Route 9 & San Benito Ave



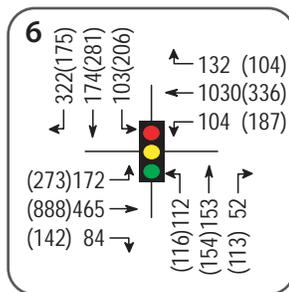
State Route 9 & Tait Ave



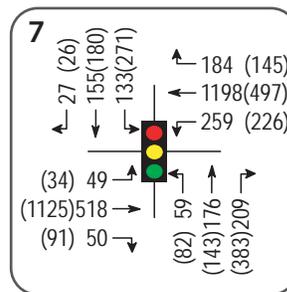
State Route 9 & Monterey Ave



State Route 9 & N Santa Cruz Ave



State Route 9 & University Ave



State Route 9 & Los Gatos Blvd

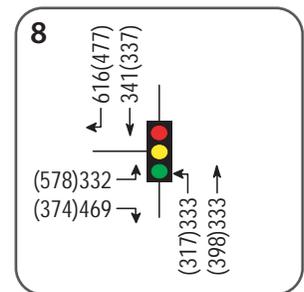


Table 2 – Existing Peak Hour Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. SR 9/Massol Ave <i>Northbound Approach</i>	51.8	F	48.6	E
2. SR 9/San Benito Ave <i>Southbound Approach</i>	117.1	F	14.4	B
3. SR 9/Tait Ave <i>Northbound Approach</i>	11.1	B	14.4	B
4. SR 9/Monterey Ave <i>Southbound Approach</i>	11.0	B	10.0	A
5. SR 9/Santa Cruz Ave*	39.5	D	33.2	C
6. SR 9/University Ave*	26.3	C	27.2	C
7. SR 9/Alberto Wy	11.6	B	13.2	B
8. Los Gatos Blvd/SR 9	32.3	C	25.6	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; * = Congestion Management Plan Intersection; Results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Measures of Effectiveness

Performance Index is typically incorporated as a method to compare project alternatives to one another, and it was applied in this study to compare recommendation outcomes. A performance index is calculated for each alternative by combining multiple measures of effectiveness into a single score which allows practitioners to compare and contrast alternatives more easily. Measures of effectiveness can include control delay, the number of vehicle stops, fuel consumption, queue lengths, and operating costs. For the purposes of this study, the Performance Index takes the total delay into account in combination with the number of vehicle stops over the course of an hour along the corridor. A low performance index is good, and indicates a corridor with higher vehicle through put. For example, if the signalization of an intersection increases the calculated performance index of a corridor, the stop delay caused by the new signal would be the cause of the increase.

Under Existing Conditions, the network has a performance index of 135.2 during the a.m. peak hour and 178 during the p.m. peak hour. A summary of the network measures of effectiveness is shown in Table 3. Measures of effectiveness reports from Synchro are provided in Appendix E.

Table 3– Existing Network Measures of Effectiveness

Measure of Effectiveness	AM Peak	PM Peak
Total Delay (Hours)	117	114
Stops (Total Number of Stops)	6,598	8,086
Average Speed (mph)	13	14
Total Travel Time (Hours)	197	198
Distance Traveled (Miles)	2,625	2,751
Unserviced Vehicles (Total Number)	0	0
Performance Index	135.2	136.5

Notes: mph = Miles per Hour; Performance Index = $[(D * 1) + (St * 10)]/3600$ where D = Total Delay (in seconds) and St = Stops

Traffic Signal Warrants

A signal warrant analysis was performed to determine potential need for a traffic signal at the intersection of SR 9/Massol Avenue.

Chapter 4C of the *California Manual on Uniform Traffic Control Devices* (CA-MUTCD) provides guidance on when a traffic signal should be considered. There are nine different warrants, or criteria, presented, as follows:

- Warrant 1, Eight-Hour Vehicular Volume
- Warrant 2, Four-Hour Vehicular Volume
- Warrant 3, Peak Hour Volume
- Warrant 4, Pedestrian Volume
- Warrant 5, School Crossing
- Warrant 6, Coordinated Signal System
- Warrant 7, Crash Experience
- Warrant 8, Roadway Network
- Warrant 9, Intersection Near a Grade Crossing

Warrant 3, which is often the first warrant to be met, has a unique comment in the description that this signal warrant shall be applied only in unusual cases with unusually high and short traffic peaks from adjacent land uses, such as manufacturing plants. It is also used as a test at unsignalized intersections to further explore whether signalization of the intersection is warranted.

Under the Peak Hour Warrant the need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same one hour (any four consecutive 15-minute periods) of an average day:
 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: four vehicle-hours for a one-lane approach; or five vehicle-hours for a two-lane approach, and
 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes, and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for one hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Based on the peak hour volumes collected at the intersection, Warrant 3 was met during the a.m. peak hour only. Satisfaction of only one warrant justifies the installation of a traffic signal but is not considered a mandate. For this location where the crosswalk is slightly removed from the intersection, it also justifies installation of a pedestrian hybrid beacon, also known as a HAWK, but again is not a mandate. Traffic Signal Warrant worksheets are provided in Appendix F. None of the other warrants are met.

In addition to Warrant 3, the Pedestrian Crossing Treatment Worksheet provided in *Transit Cooperative Research Program Report 112 – National Cooperative Highway Research Program Report 562* was utilized to assess pedestrian safety at the unsignalized crossing. The worksheet provides guidelines which can be used to select pedestrian crossing treatments based on quantitative measures including pedestrian volumes, vehicular traffic volumes, and walking speeds. Based upon the requirements of the worksheet, 20 pedestrians must use a crosswalk during the peak hour. While a maximum of 18 pedestrians were counted in the crosswalk during the a.m. peak period, it should be noted that this crosswalk is situated between several commercial businesses. Two additional pedestrians using the crosswalk during the a.m. peak period could easily occur.

As a result, NCHRP Report 562 recommends implementing a HAWK based on average daily traffic, observed pedestrian volumes, as well as the intersection crossing width. The number of vehicles entering an intersection plays an important role in determining the vehicular gap associated with a roadway segment. Vehicular gap can be described as the headway in seconds between consecutive vehicles traveling along a segment in the same direction. The NCHRP Pedestrian Crossing Treatment Worksheet is provided in Appendix G.

Safety Recommendations and Outcomes

With the intent of improving safety for all roadway users along the corridor including pedestrians, cyclists, and motorists, recommendations for improvements have been developed for several specific locations. The safety improvements are based on observed conditions in conjunction with data provided by the Town of Los Gatos and Caltrans. As reported above, the data analyzed during the formulation of safety-related alternatives include speed survey data, intersection turning movement counts, collision history, pedestrian counts, as well as site visits during peak periods. In addition, qualitative data was also considered, including anecdotal reports from community members, Town Staff, and local news reports. Speed survey data collected for this report show a generally good compliance with posted speed limits with one exception: eastbound vehicle speeds near the west Town limits are higher than posted limits, likely due to the downhill grade of eastbound SR 9 and the higher posted speed limit west of the Town limits.

Cost estimates for the recommended improvements include construction as well as design, mobilization, traffic control, construction management, administrative, and detour costs. Additionally, a contingency of 20 percent was included in the calculation to allow for miscellaneous and minor items of work typically not identified in planning-level studies.

State Route 9 from Town Limits to Massol Avenue

Safety could be enhanced by adding design elements intended to slow travel speeds. These include the construction of a raised median along SR 9 adjacent to 331 Los Gatos Saratoga Road for a distance of

approximately 100 feet. The raised median should be accompanied by upgrading the existing speed feedback signs for motorists traveling eastbound to reduce vehicle speeds when entering Los Gatos Town limits, and approaching the crosswalk located at Massol Avenue.

State Route 9/Massol Avenue

Recommended safety improvements to be implemented at the tee intersection located at SR 9/Massol Avenue include intersection control, speed reduction, and bicycle facilities. Traffic signal Warrant 3 (peak hour) was met during the a.m. peak period based on vehicle volumes. As a result of both the signal warrant being met and the enhanced pedestrian crossing guidance provided by NCHRP Report 562, three intersection control alternatives were developed. Additional measures such as the elimination of the channelized right turn, speed reduction markings, updated bicycle facilities and an optional raised crosswalk are also recommended, but implementation can occur at a later date than the intersection control devices.

Intersection Control

Alternative #1 - Install a Rectangular Rapid Flashing Beacon

Pedestrian volumes observed at the intersection were slightly lower than the volumes needed to recommend a pedestrian crossing treatment as provided by NCHRP Report 562. Guidance provided in the report expresses that 20 pedestrians warrant the implementation of an enhanced pedestrian crossing at an intersection or midblock crossing. The marginally low pedestrian volumes observed accessing the crosswalk at Massol Avenue (18) could however be a result of various factors including weather, time of day, seasonal travel patterns, and perceived safety. The apparent danger associated with the intersection in conjunction with the recent pedestrian fatality could also have reduced pedestrian volumes observed at the intersection, thus skewing the overall count. For this reason, the counted pedestrian volume of 18 was rounded up to 20 and used as input to the NCHRP Report 562 Pedestrian Crossing Treatment Worksheet.

Assuming 20 pedestrians cross SR 9 during the a.m. peak hour, the Pedestrian Crossing evaluation in NCHRP Report 562 recommends an active control device based on the posted speed limit, crossing distance, and the vehicular volume entering the intersection. The output recommends a Rectangular Rapid Flashing Beacon (RRFB) only if driver compliance with the warning device is expected to be high. However, since the recent pedestrian fatality occurred when the driver had the sun in his eyes, it is not possible to make a finding that driver compliance is high, even though this driver may typically be very attentive to pedestrian right-of-way.

Safety could be improved at the intersection by replacing the existing flashing beacons with RRFBs approved by the Federal Highway Administration and Caltrans. Motorists are more likely to reduce travel speeds upon viewing the flashing lights atop of the yellow rectangular signs which can be activated by pedestrians and cyclists crossing SR 9. The implementation of RRFBs would be expected to improve safety for pedestrians and cyclists while resulting in little to no delay for vehicles traveling along SR 9 compared to the existing beacons.

On Highway 9 between Massol and the Saratoga Avenue intersections, there are currently three RRFB's installed. This treatment will provide consistency for the drivers thus it is a traffic control that most of them can expect as they travel along Highway 9.

Long-Term Addition #1 - Removal of Northbound Channelized Right Turn

Addition #1 consists of eliminating the channelized northbound right-turn lane and removing the on-street parking space on Massol Avenue at the southeast corner of the intersection to increase safety for all roadway users. Removal of a channelized right turn is a common safety improvement as implementation has the potential to reduce the number of conflict points, pedestrian crossing distance, and vehicle speeds, and was also recommended by the Town's Bicycle and Pedestrian Advisory Commission in a memo dated October 31, 2016.

Further study would be required so this suggestion is not included in the list of improvements to be made as part of this study, other than as a long term concept. This addition applies to all Alternatives. Upgrading the existing flashing beacon to an RRFB and eliminating the northbound channelized right turn would result in the corridor operating with a performance index of 150.5 during the a.m. peak hour and 130.6 during the p.m. peak hour. A summary of the network measures of effectiveness is shown in Table 4. Measure of effectiveness reports from Synchro are provided in Appendix E and the recommended measures are shown graphically in Figure 3.

Table 4 – Removal of Northbound Channelized Right-Turn Network Measures of Effectiveness

Measure of Effectiveness	AM Peak	PM Peak
Total Delay (Hours)	130	110
Stops (Total Number of Stops)	7,227	7,310
Average Speed (mph)	13	14
Total Travel Time (Hours)	223	195
Distance Traveled (Miles)	2,931	2,751
Unserviced Vehicles (Total Number)	0	0
Performance Index	150.5	130.6

Notes: mph = Miles per Hour; Performance Index = $[(D * 1) + (St * 10)]/3600$ where D = Total Delay (in seconds) and St = Stops

Alternative #2 - Install a Pedestrian Hybrid Beacon (HAWK)

This alternative includes recommendations described above except that instead of RRFBs, installation of a HAWK is included. A HAWK is also recommended by NCHRP Report 562 when driver compliance with a more inexpensive control device such as the RRFB could be low. Speed reduction markings are also recommended on SR 9 in each direction, separate from intersection control. The pedestrian hybrid beacon would only control eastbound and westbound traffic and pedestrian traffic crossing SR 9. Additionally, the hybrid beacon would provide safety benefits equal to that of a traffic signal.

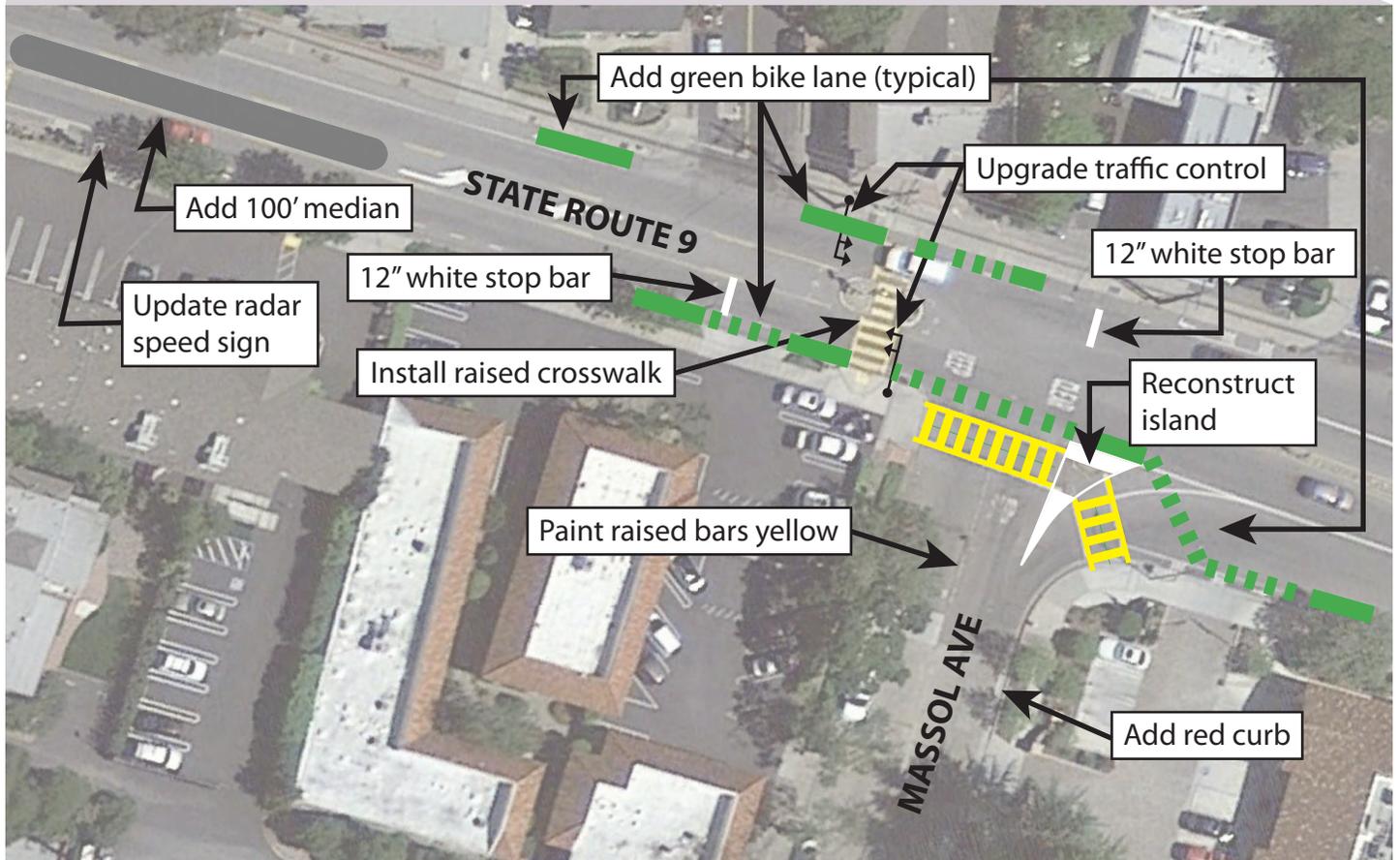
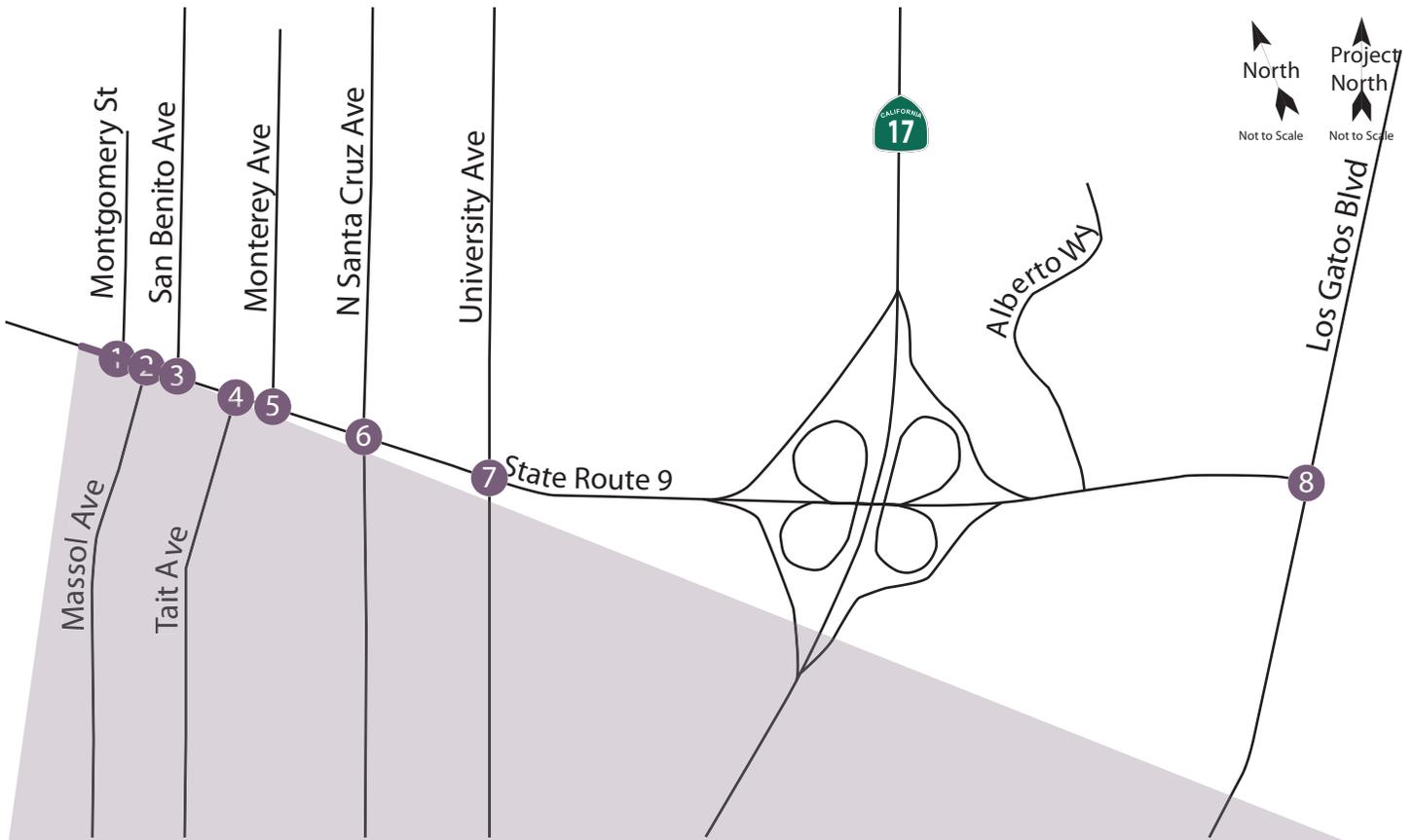
It should be noted that a beacon would have an advantage for through traffic on SR 9 as it would only activate for pedestrians using the crossing. It would not change travel times for vehicles on Massol Avenue, except for a slight reduction in delay for left-turning vehicles, as drivers could take advantage of any pedestrian actuations and start their left-turn move sooner than with no traffic control of SR 9 traffic. Constructing a HAWK at the intersection would include mast arms which include more flashing displays than the existing beacon, and position them directly in the line of sight of drivers.

Additionally, sidewalk along the north side of SR 9 adjacent to the existing commercial businesses should be reconstructed to comply with Town and State standards. Although the current geometry and existing right of way would allow for the implementation of a HAWK at the intersection, the potential to acquire right-of-way for the installation of pedestrian signal hardware and sidewalk reconstruction is a constraint

The corridor would operate with a performance index of 158.5 during the a.m. peak period and 141.0 during the p.m. peak period. A summary of the network measures of effectiveness is show in Appendix E and Table 5. Measure of effectiveness reports from Synchro are enclosed.

Long-Term Alternative #2 - Removal of Northbound Channelized Right Turn

Similar to Alternative #1, removal of the northbound channelized right-turn is recommended to enhance safety at the intersections for all roadway users.



State Route 9 Safety and Traffic Operations Analysis
Figure 3 – State Route 9/Massol Ave Recommendations

Table 5 – Implementation of HAWK Network Measures of Effectiveness

Measure of Effectiveness	Existing Conditions		Implementation of HAWK	
	AM Peak	PM Peak	AM Peak	PM Peak
Total Delay (Hours)	117	114	137	116
Stops (Total Number of Stops)	6,598	8,086	7,897	9,157
Average Speed (mph)	13	14	13	14
Total Travel Time (Hours)	197	198	229	201
Distance Traveled (Miles)	2,625	2,751	2,931	2,785
Unserviced Vehicles (Total Number)	0	0	0	0
Performance Index	135.2	136.5	158.5	141.0

Notes: mph = Miles per Hour; Performance Index = $[(D * 1) + (St * 10)]/3600$ where D = Total Delay (in seconds) and St = Stops

Alternative #3 - Install a Traffic Signal

This alternative includes implementation of recommendations from previous paragraphs such as speed reduction marking and bicycle facilities, but installation of a traffic signal controlling the full intersection instead of the HAWK. Speed reduction markings are also recommended on SR 9 in each direction. A traffic signal would include the crosswalk and the Massol Avenue intersection, where the morning peak hour traffic volume includes 45 left turns. The average delay, according to the traffic model built by W-Trans for this project, is 215 seconds for the average vehicle corresponding to LOS F conditions. However, pedestrian and vehicle volumes are only high enough in the morning peak hour to justify a signal installation. In contrast, in the evening peak the northbound left-turn volume is only 13 vehicles per hour with a delay of 26 seconds (LOS D).

A traffic signal at the intersection could result in increased northbound left-turn traffic volumes on Massol Avenue, as the delays for making the left-turn movement would be considerably lower with a traffic signal. It could also result in increased southbound traffic, as completing the westbound left turn from SR 9 would be easier with a protected arrow. The cost of a signal is significantly higher than other alternative largely due to the hardware associated with mast arms and signal poles.

Additionally, the sidewalk along the north side of the intersection would need to be reconstructed adjacent to the existing commercial businesses to accommodate for traffic signal hardware. This work would include reconfiguring or possibly removing the drive-through in front of the business, which may present a significant design challenge to minimize right of way issues.

Implementation of a traffic signal would result in the corridor operating with a performance index of 187.8 during the a.m. peak period and 147.1 during the p.m. peak period. A summary of the network measures of effectiveness associated with installation of a traffic signal is provided in Appendix E and Table 6.

Long-Term Alternative #3 - Removal of Northbound Channelized Right Turn

As recommended for Alternatives #1 and #2, removing the northbound channelized right-turn is also recommended when signaling the intersection. The removal of the channelized turn is expected to increase safety for all roadway users including, pedestrians, cyclists, and motorists.

Table 6 – Implementation of Traffic Signal Network Measures of Effectiveness

Measure of Effectiveness	Existing Conditions		Implementation of Traffic Signal	
	AM Peak	PM Peak	AM Peak	PM Peak
Total Delay (Hours)	117	114	164	125
Stops (Total Number of Stops)	6,598	8,086	8,621	7,961
Average Speed (mph)	13	14	11	14
Total Travel Time (Hours)	197	198	256	214
Distance Traveled (Miles)	2,625	2,751	2,931	2,923
Unserviced Vehicles (Total Number)	0	0	0	0
Performance Index	135.2	136.5	187.8	147.1

Notes: mph = Miles per Hour; Performance Index = $[(D * 1) + (St * 10)]/3600$
 where D = Total Delay (in seconds) and St = Stops

Alternative Comparison

Each alternative as well as existing conditions was compared based on qualitative measures such as relative cost, expected safety enhancement, pedestrian delay, traffic delay, etc. Implementation of RRFBs is expected to enhance safety as compared to existing conditions while still exhibiting a relatively high delay for users of the of the intersection and a low impact on vehicle traveling along the corridor. It should also be noted costs associated with implementing RRFBs at the intersection are expected to be low when compared to a HAWK and traffic signal.

Implementation of a HAWK is expected to provide increased pedestrian and cyclist safety enhancements as compared to existing conditions or implementation of RRFBs. While safety and delay are expected to improve, the delay for vehicles traveling along the corridor and costs are both expected to increase with the implementation of a HAWK. Installation of a traffic signal is expected to provide the highest safety improvement and the lowest pedestrian delay as compared to the other alternatives.

Conversely, a traffic signal is expected to cause notably increased delays for vehicles traveling along the corridor and the expected costs associated with implementation are the highest of any alternative. Further, installation of a traffic signal has the potential to increase traffic volumes on Massol Avenue. The current lack of intersection control can create significant delay for northbound left-turning vehicles during peak periods. Installation of a traffic signal would provide a phase specific for the movement, thus reducing the delay. A technical comparison of each alternative including SIMTRAFFIC output is provided in Appendix H.

Corridor Travel Time

Corridor travel time runs were analyzed via the SIMTRAFFIC software within the Synchro Application.

Microsimulations based on existing and proposed roadway geometry as well as turning movement count data during the a.m. and pm. peak hours provided average travel time and vehicle speed along the corridor. Appendix H provides summaries of modeled travel time and average speed from the microsimulation model, and the modeled travel time and average speed along the corridor with the proposed signalization alternatives at Massol Avenue. Further any proposed recommendations which have the potential to negatively impact vehicle traffic traveling on SR 9 would require additional detailed evaluation and approval from Caltrans. It should be noted that the signal timing provided by Caltrans at signalized intersections along the corridor was retained and incorporated in the simulation, thus signal timing was not optimized for the corridor. SIMTRAFFIC reports from Synchro are provided in Appendix H.

Speed Reduction

The following safety improvements are recommended as they designed to encourage motorists to travel at safe speeds, particularly eastbound motorists near the west Town limits:

- Add speed reduction markings on SR 9 in the eastbound direction approaching the crosswalk (improves safety by reducing travel speeds)
- Replace the existing radar speed feedback sign facing eastbound traffic with a new sign with 18-inch numbers (improves safety by reducing eastbound travel speeds)
- Install a raised median near the west Town limits

The speed reduction markings and improved radar speed-sign have the potential to enhance pedestrian safety by slowing travel speeds and providing an audible noise warning to pedestrians when the tires of an approaching vehicle strike the transverse stripes, but would not provide the same level of benefit as the traffic signal or hybrid beacon. Additionally, implementation of this safety measure would not result in a notable change in travel time for vehicles along the corridor. A raised crosswalk could reduce vehicle speeds at the intersection as it not level with the existing roadway.

Bicycle Facilities

Safety could be enhanced by installing green bike lanes on SR 9 at the intersection and conflict points to increase driver-awareness of bicycle activity. Upgrades from existing bike infrastructure to create a less stressful bicycle network should be implemented where feasible. The driveway located on the southeast corner that currently provides direct access to SR 9 should be modified to reduce the number of vehicle-bicycle and vehicle-pedestrian conflicts associated bicyclists traveling eastbound and drivers making northbound right turns from the driveway onto SR 9.

It is important to note that raised crosswalks can often become safety hazards for cyclists traveling at high speeds. Cyclists traveling in the eastbound direction on SR 9 would be traveling downhill and therefore have the potential to reach speeds of 30 miles per hour. A vertical speed reduction measure such as a raised crosswalk has the potential to cause cyclists to lose control of his or her bicycle at the point of contact. For this reason, design elements which take into account the presence of cyclists traveling at high speeds should be incorporated into a raised crosswalk as a precautionary measure to eliminate a potential hazard to cyclists.

State Route 9/Santa Cruz Avenue

Recommended safety measures for the intersection located at Santa Cruz Avenue include implementing green bike lanes at conflict points on SR 9. Additionally, the following improvements are recommended to enhance safety at the intersection:

- Update the standard crosswalks to continental crosswalk striping (creates a more pedestrian-friendly atmosphere).
- Paint yield lines at all channelized right-turn approaches (creates a more pedestrian-friendly atmosphere).
- Restore a set of approximately 20 traffic bars along the north median to prevent vehicles from making left turns in and out of the shopping center east of the roadway. The traffic bars should be painted yellow as well as replaced as a portion appear to be damaged (addresses a maintenance issue).

It should be noted that removing the channelized right turns at the north and south approaches has the potential to enhance safety at the intersection. Like the channelized right turn at Massol Avenue, removal reduces conflict points, shortens pedestrian crossing distances, and reduces vehicle speeds. Recommended measures are shown in Figure 4.

State Route 9/University Avenue

Safety improvements recommended for the intersection at University Avenue include implementing green bike lanes at conflict points on the northern side of SR 9. Specifically, green markings should be applied to the northwest corner as well as the northeast corner to the intersection of close by Wraight Avenue. These measures are shown in Figure 4.

State Route 9/State Route 17 Interchange

Short-term recommended safety improvements for the SR 9/SR 17 interchange include trimming foliage with the intention of improving sight distance of pedestrians using the crosswalks. Additionally, implementation of “Crosswalk Ahead” signs prior to the ramps along the north side of SR 9 are recommended to improve pedestrian safety. Measures are shown in Figure 5.

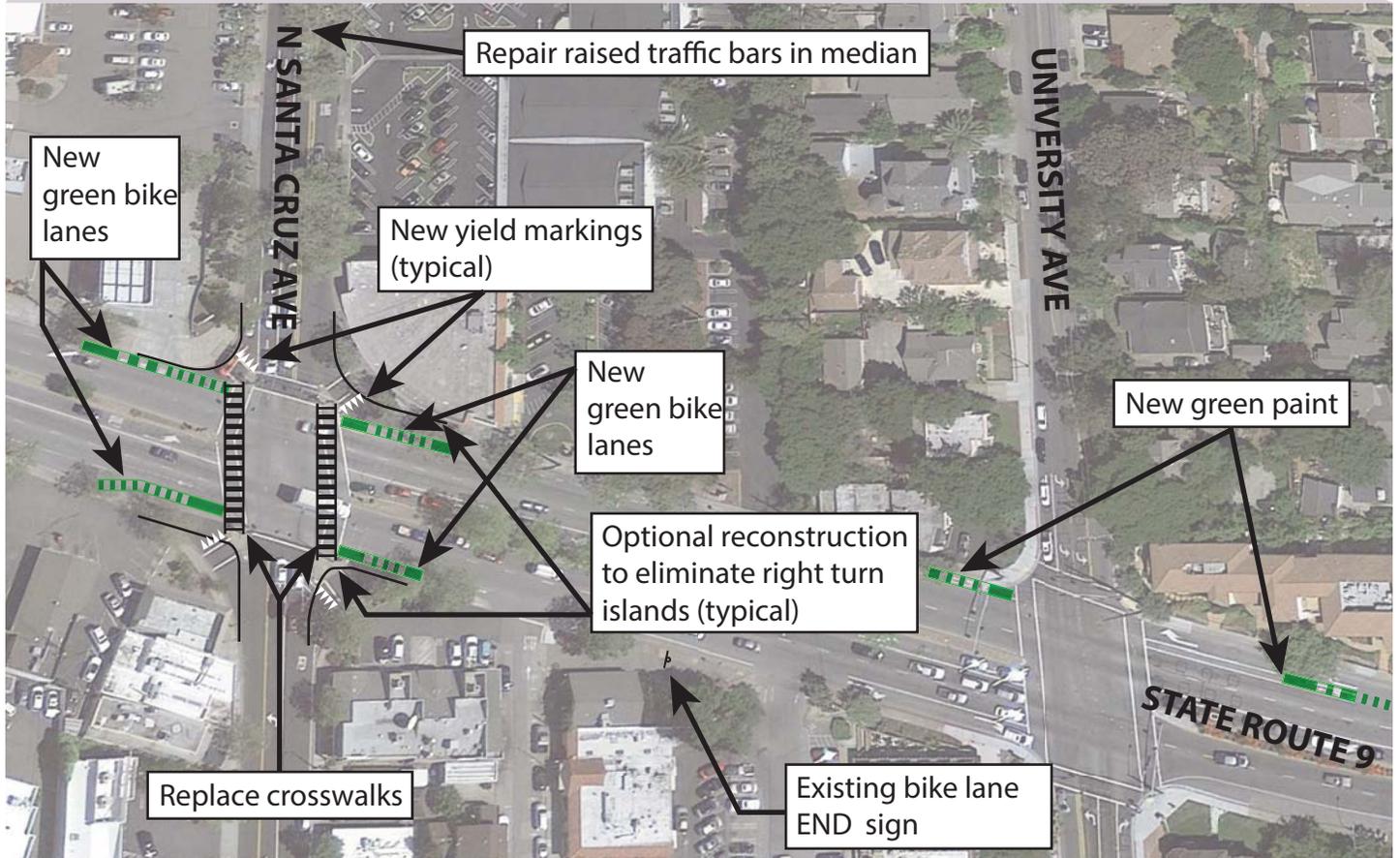
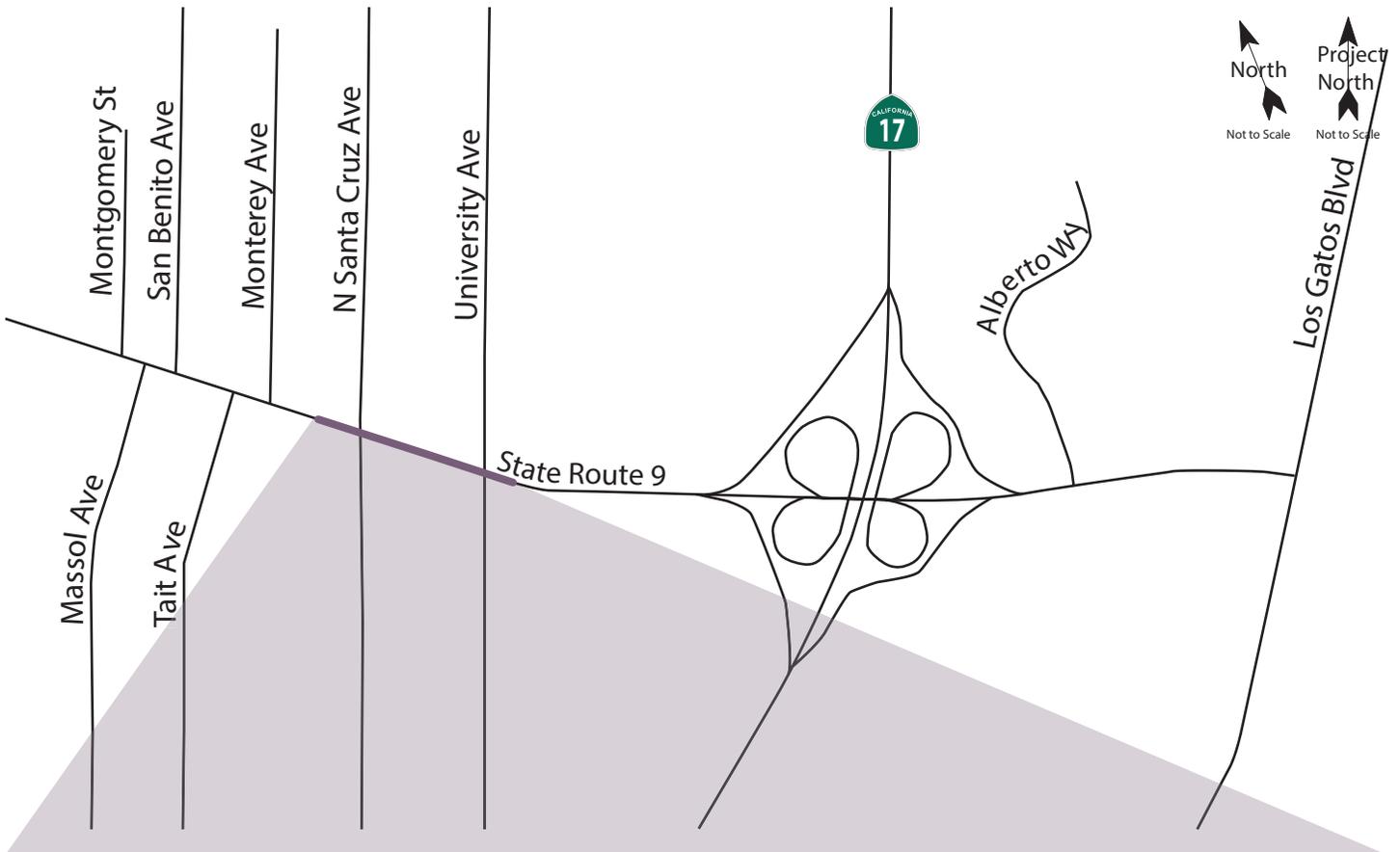
Long term recommendations include reconstruction of the interchange as provided through the Measure B program. Gaps in bicycle facilities along SR 9 should be should be addressed as the can deter cyclists from using the roadway. As stated earlier the focus of this study is to ensure that all modes of travel along the corridor are taken into account especially those most vulnerable with respect to safety. Implementing roadway modifications including continuous striped bike lanes with green markings at conflict points will promote higher bicycle volumes, higher driver awareness of bicyclists, and reduced numbers of collisions involving bicyclists along the corridor.

Los Gatos-Saratoga Road/Alberto Way

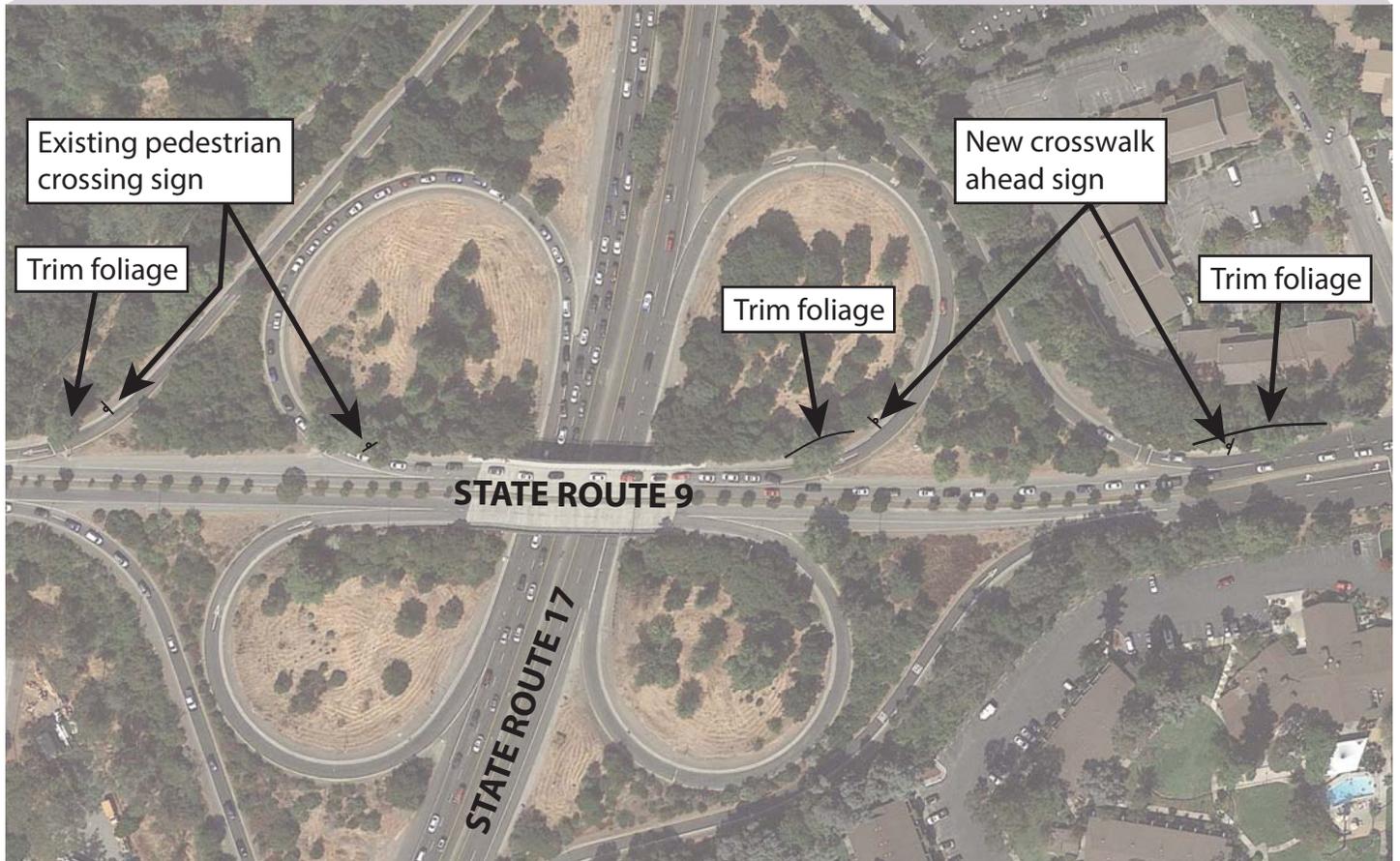
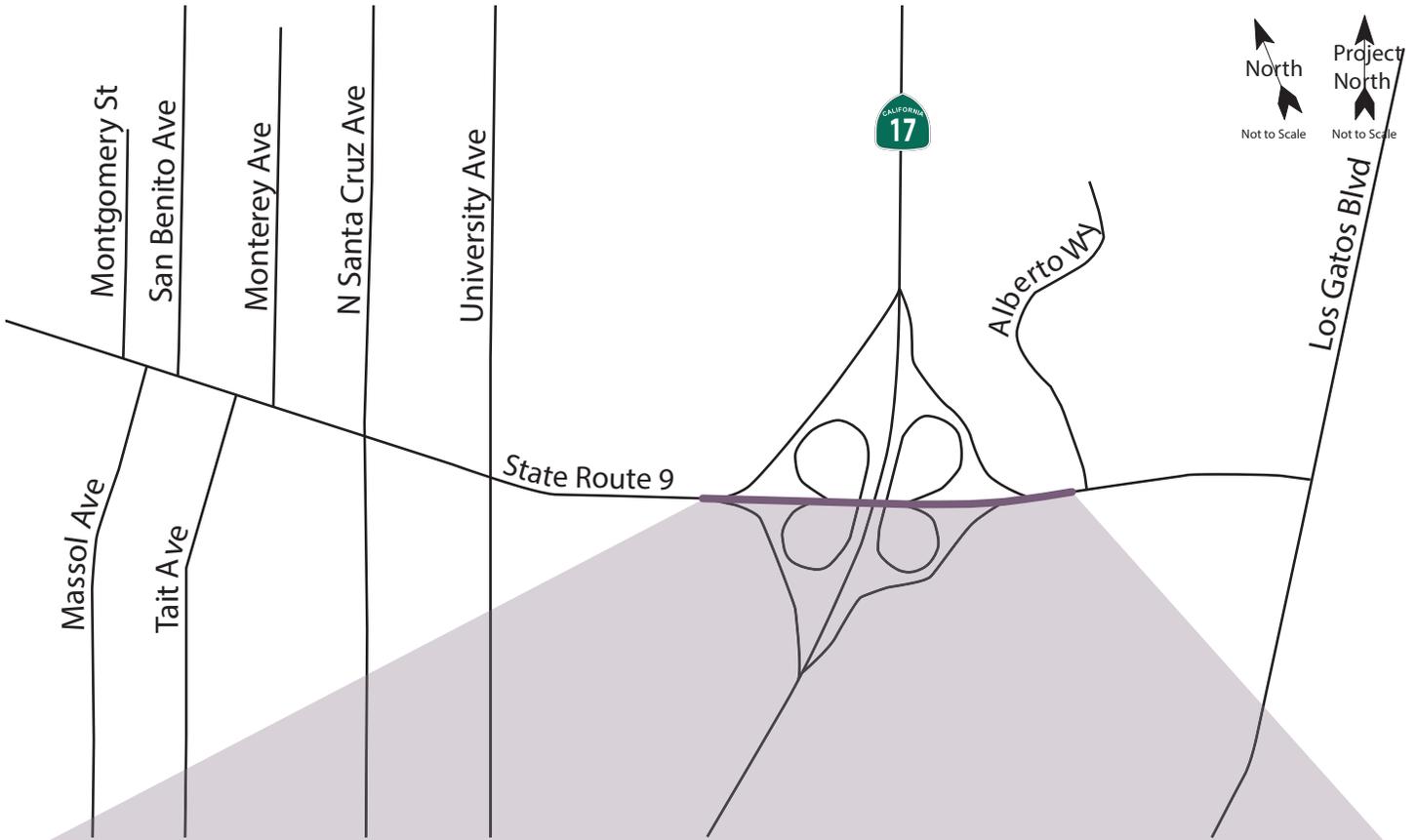
Safety at the intersection of Los Gatos-Saratoga Road/Alberto Way could potentially be improved via the implementation of a curb ramp at the southeast corner. Additionally, foliage should be trimmed along SR 9 approximately 200 feet west of the intersection for eastbound traveling vehicles exiting the northbound SR 17 off-ramp. Radar speed signs should be implemented on SR 9 approximately 350 feet west of the intersection for eastbound traveling vehicles, and 200 feet east of the intersection in the median for westbound traveling vehicles. These safety measures are shown in Figure 6.

Los Gatos-Saratoga Road/Los Gatos Boulevard

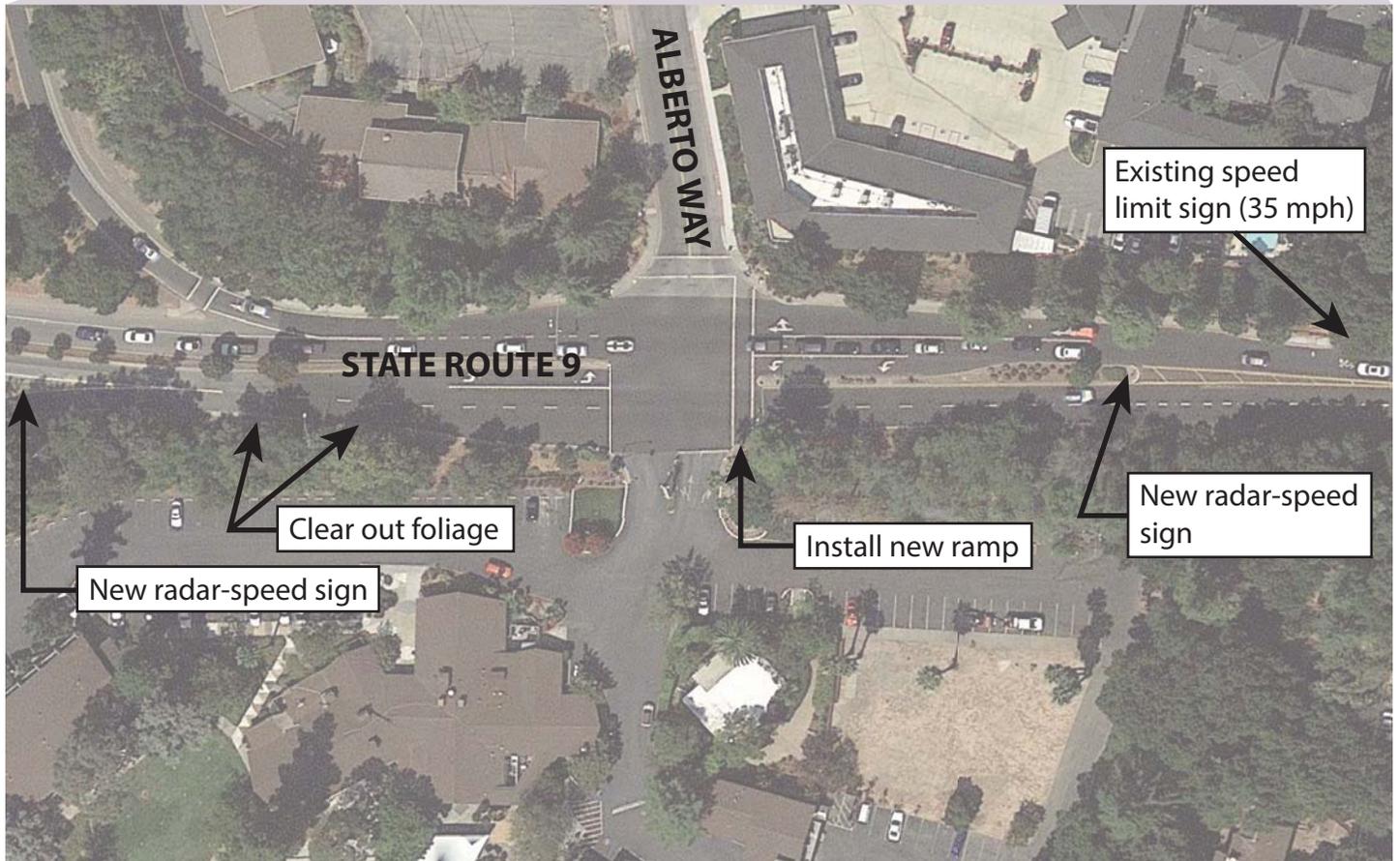
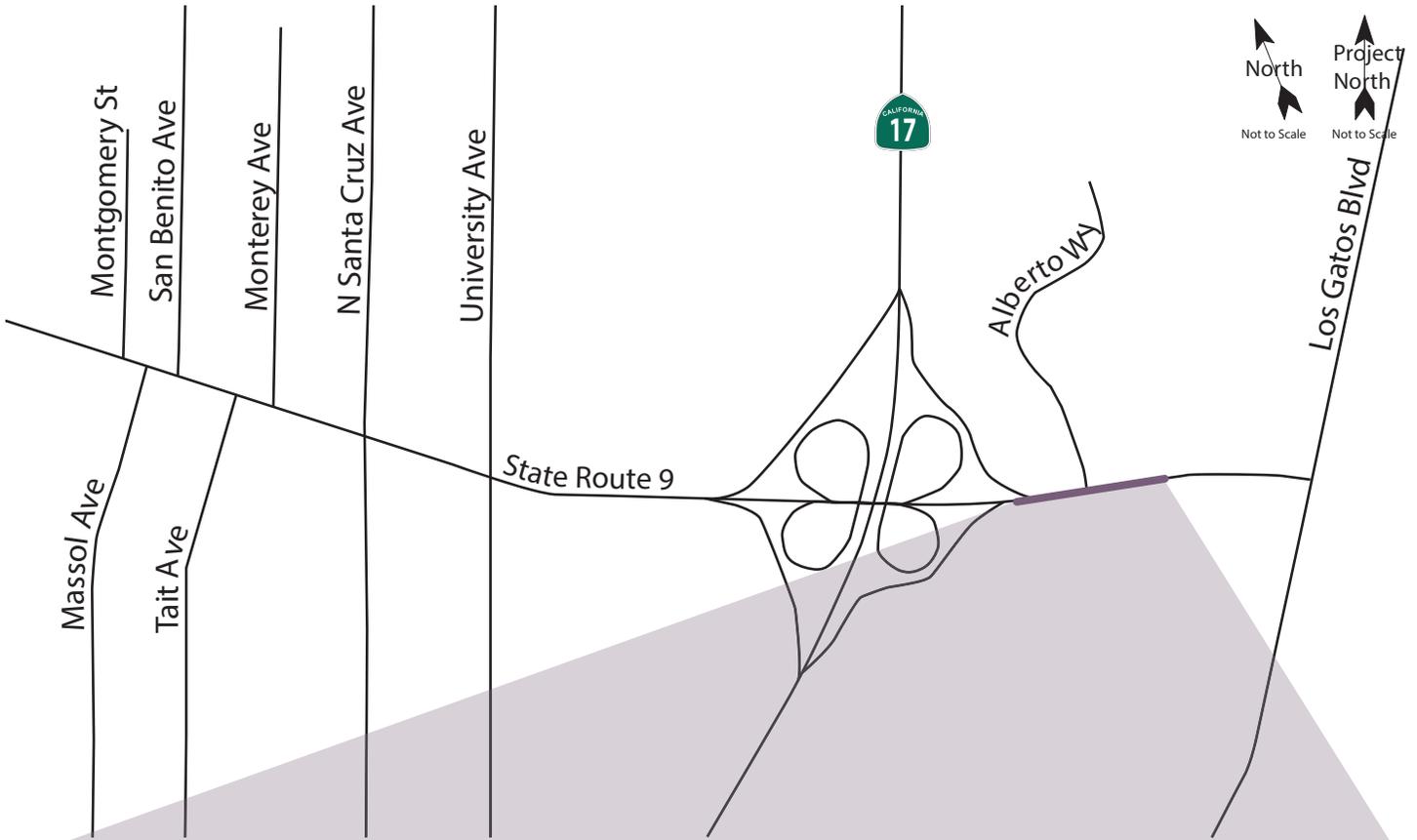
Safety improvements recommended for the intersection of Los Gatos-Saratoga Road/Los Gatos Boulevard include installing yield markings prior to both channelized right turns. Additionally, yield and crosswalk warning signs should be implemented at the northwest and southwest corners for vehicles entering the channelized lanes. Removing the channelized right turns is also recommended to improve safety. The recommended safety measures are shown in Figure 7.



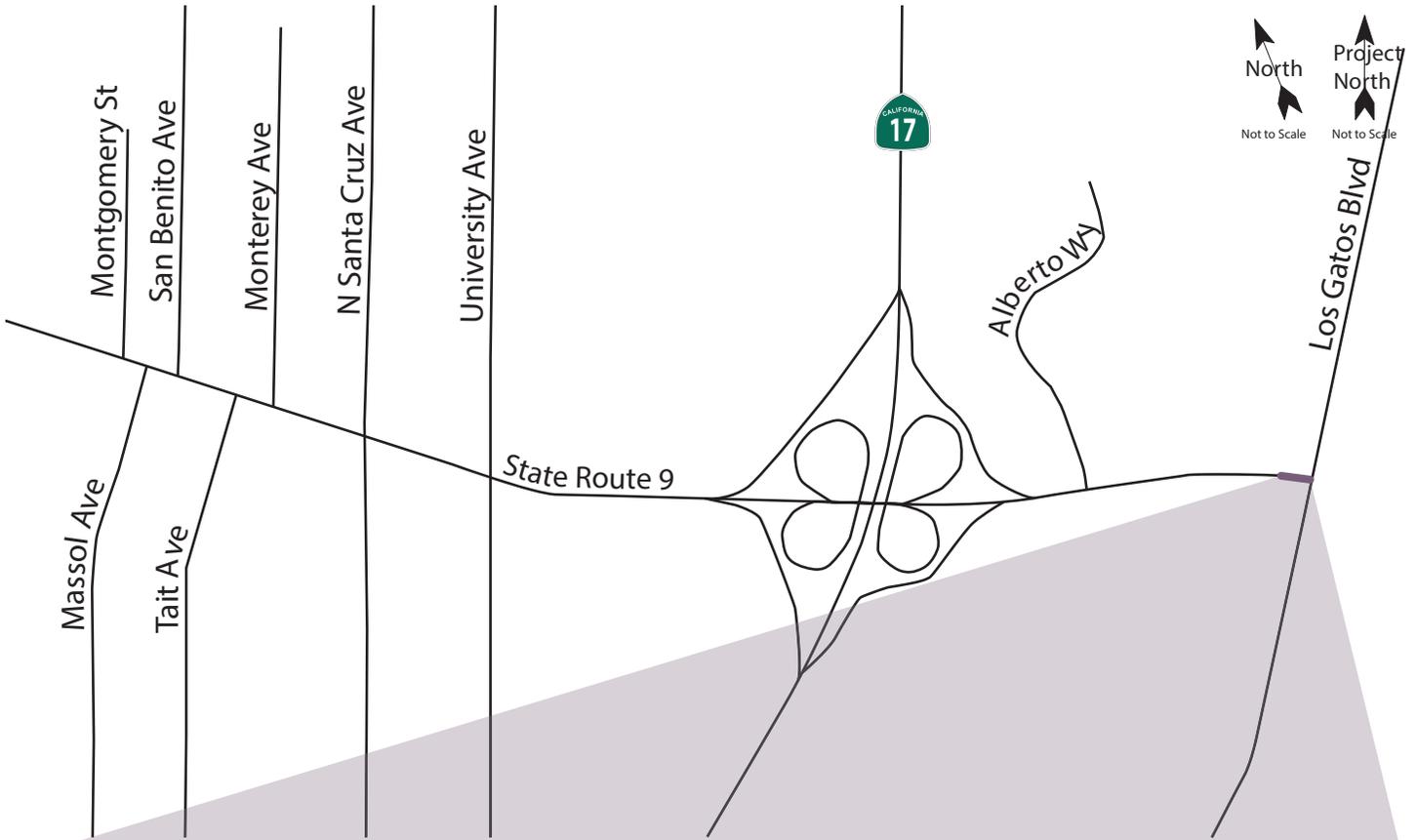
State Route 9 Safety and Traffic Operations Analysis
Figure 4 – State Route 9/Santa Cruz Ave Recommendations Without Right Turn Lane Reconstruction



State Route 9 Safety and Traffic Operations Analysis
Figure 5 – State Route 9/State Route 17 Ramps Recommendations



State Route 9 Safety and Traffic Operations Analysis
Figure 6 – State Route 9/Alberto Way Recommendations



Bicycle Lanes near State Route 17

Bicycle facilities along Los Gatos-Saratoga Road between Alberto Way and Los Gatos Boulevard are only in place between Los Gatos Boulevard and the Bella Vista Avenue overcrossing. Various opportunities and constraints related to bicycle access are present along this segment of the corridor. Upgrades from existing bike infrastructure to lower stress infrastructure should be implemented as feasible and timely.

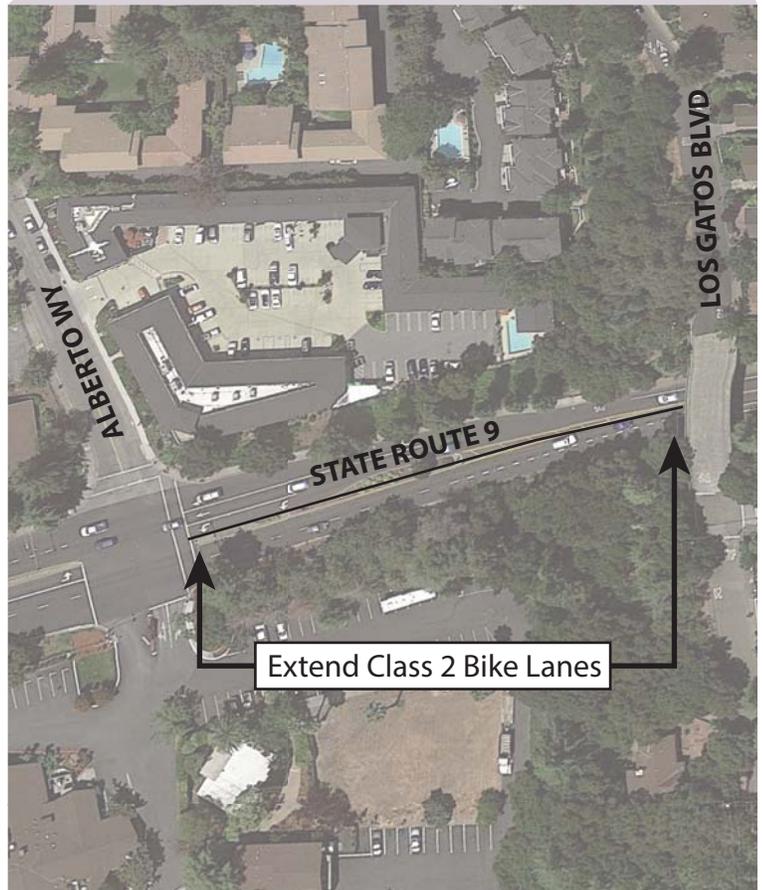
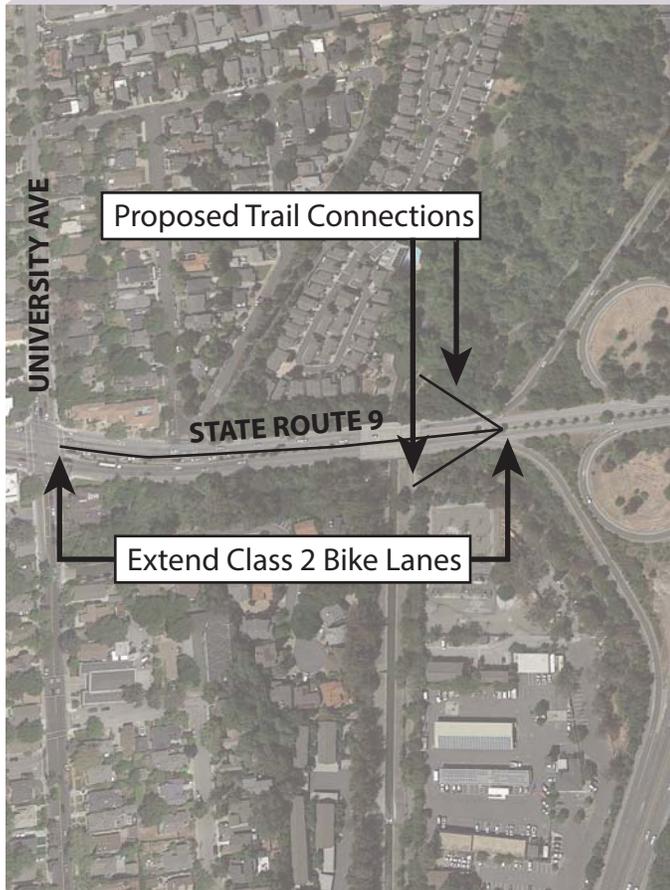
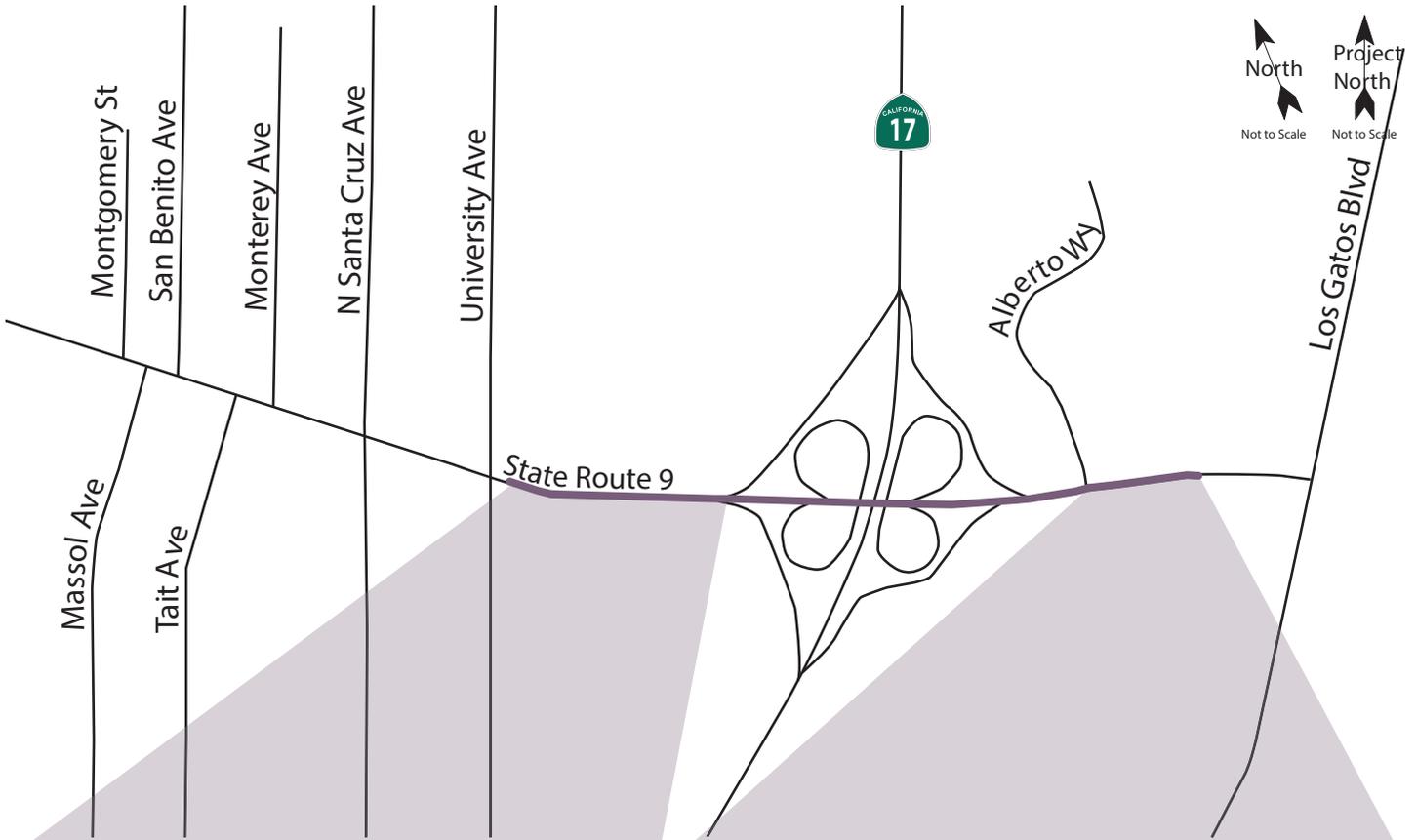
There is an opportunity to extend the existing Class II bike lanes, including green paint from Bella Vista Avenue to Alberto Way, to enhance safety for cyclists while simultaneously making motorists more aware of the potential presence of cyclists. Implementing bike lanes along the westbound portion of the segment would include reducing the vehicle lane widths from 12 feet to 11 feet and reducing the width of the 12-foot raised median by six feet and removing it completely alongside the westbound left-turn lane. Additionally, it should be noted that it may be possible to implement a bicycle connection between Los Gatos High School and intersection at Alberto Way in the future, provided that the Los Gatos Lodge dedicates right-of-way for a Class I Bike Path between Los Gatos-Saratoga Road and the campus vicinity. Implementation of this portion of bike lanes should be timed to occur with installation of a bike path through the Los Gatos Lodge property or with the interchange portion described below.

Constraints on the corridor can be described in the context of Level of Traffic Stress, a common classification method used to provide ratings for roadway sections to indicate the stress imposed on cyclists (*Level of Traffic Stress*, Northern University, 2017). Ratings for level of traffic stress along the studied segment of Los Gatos-Saratoga Road west of Alberto Way generally consist of Level of Traffic 4 which involves interaction with higher speed traffic or close proximity to high speed traffic. This high level of traffic stress the roadway imposes on cyclists is evident along Los Gatos-Saratoga Road between Alberto Way and the interchange which provides access SR 17. In addition to the merges associated with SR 17, the lane drop east of the intersection at Alberto Way also creates potentially stressful conditions for cyclists. This constraint is imposing enough to classify installation of bike lanes west of Alberto Way as a long-term recommendation, to be completed only as the interchange is reconstructed. Bike lane recommendations are shown in Figure 8.

Measure B includes funding to reconstruct this interchange, and installation of Class 2 bike lanes through the interchange is included in the Town's Bicycle and Pedestrian Master Plan (April 2017) as a Phase 1 project, to be completed in about five years. Upgrading bicycle facilities along the corridor to incorporate streets designed to affect driver behavior will ultimately encourage safe vehicle speeds and driver awareness of bicyclists.

On the west side of the interchange, the Town has received "One Bay Area" Grant funding to design a connection between the Los Gatos Creek bicycle trail and Los Gatos-Saratoga Road (SR 9). There is one proposed connection on the north side of SR 9 where a dirt path currently exists. It would allow cyclists as well as pedestrians using the trail to ride to westbound SR 9 toward downtown Los Gatos. A second proposed connection on the south side of SR 9 would mirror the connection on the north side. This connection would be solely for bicyclists riding eastbound along SR 9 to reach the Los Gatos Creek trail.

Adequate pavement width currently exists between these two proposed trail connections and University Avenue to create a Class 2 bike lane with new striping. Making the needed connection is recommended, and the timing of the installation is recommended to match the installation of the bike trail connector ramps.



Conclusions and Recommendations

Conclusions & Recommendations

- A review of collisions rates along SR 9 within Town limits has revealed that collision rates are higher than the average rates observed at similar facilities statewide.
- Safety could be enhanced with implementation of various countermeasures at conflict points and intersections along the corridor.
- The intersection of SR 9/Massol Avenue exhibited collision, injury, and fatality rates higher than that of similar facilities statewide.
- Recommendations to improve safety at the intersection of SR 9/Massol Avenue include upgrading the traffic control device for the west crosswalk in one of three ways, adding a raised median near the west Town limit for speed control, and adding green markings in bike lanes. The RRFB is expected to introduce less delay along the corridor during both the a.m. and p.m. peak periods compared to the HAWK and traffic signal alternatives.
- Green bike lanes should be implemented along the corridor at conflict points adjacent to intersections, especially those with channelized right-turn pockets.

Study Participants and References

Study Participants

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Task Manager	Steve Fitzsimons, PE, TE
Traffic Engineer	Smadar Boardman, PE
Assistant Engineer	Nick Bleich, EIT
Assistant Planner	Andre Huff
Graphics	Hannah Yung-Boxdell, Alex Scrobonia
Editing/Formatting	Hannah Yung-Boxdell
Report Review	Dalene J. Whitlock, PE, PTOE

References

- 2014 Collision Data on California State Highways*, California Department of Transportation, 2017
- California Manual on Uniform Traffic Control Devices for Streets and Highways*, California Department of Transportation, 2014
- Google Earth, <http://earth.google.com/>
- Highway Capacity Manual*, Transportation Research Board, 2010
- Level of Traffic Stress, Northern University, 2017
- Los Gatos 2020 General Plan*, Transportation Element, 2010
- Santa Clara Valley Transportation Authority, <http://www.vta.org/>
- Statewide Integrated Traffic Records System (SWITRS)*, California Highway Patrol, 2012-2017
- Town of Los Gatos General Plan, 2020*
- Traffic Level of Service Analysis Guidelines*, Santa Clara County Transportation Authority, Congestion Management Program, 2015
- Transportation Impact Analysis Guidelines, Santa Clara Valley Transportation Authority, 2014

LGA004-4



Appendix A

Traffic Counts - Unadjusted

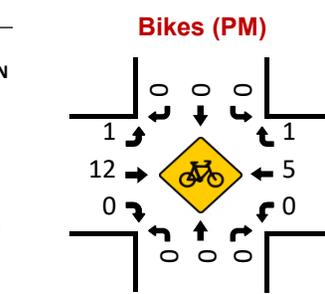
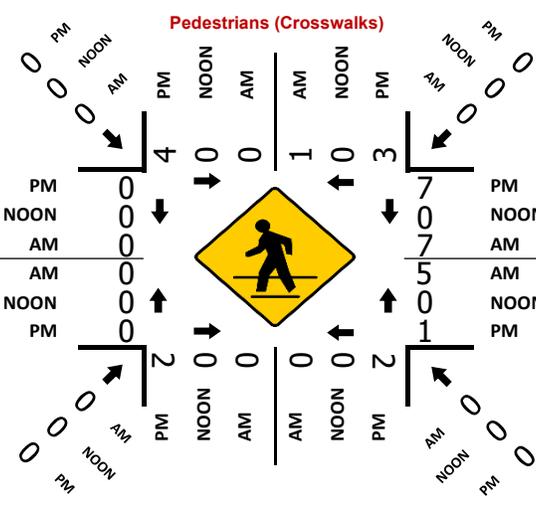
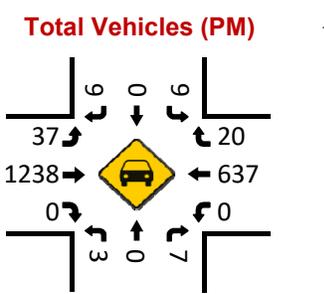
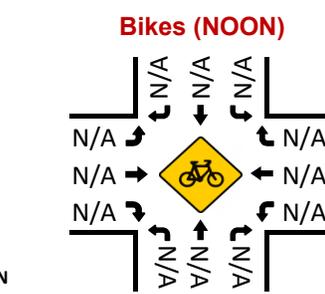
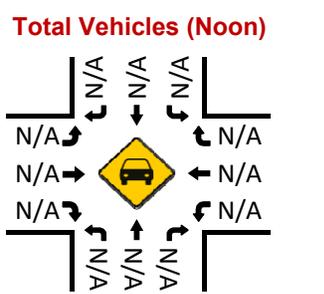
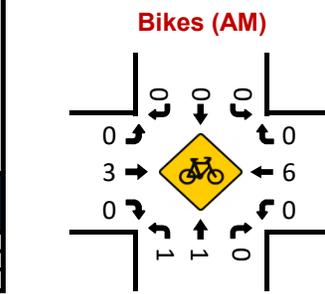
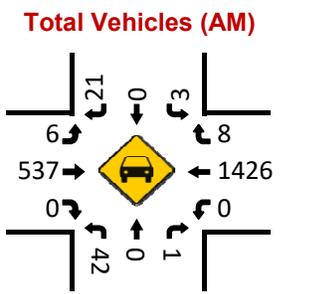
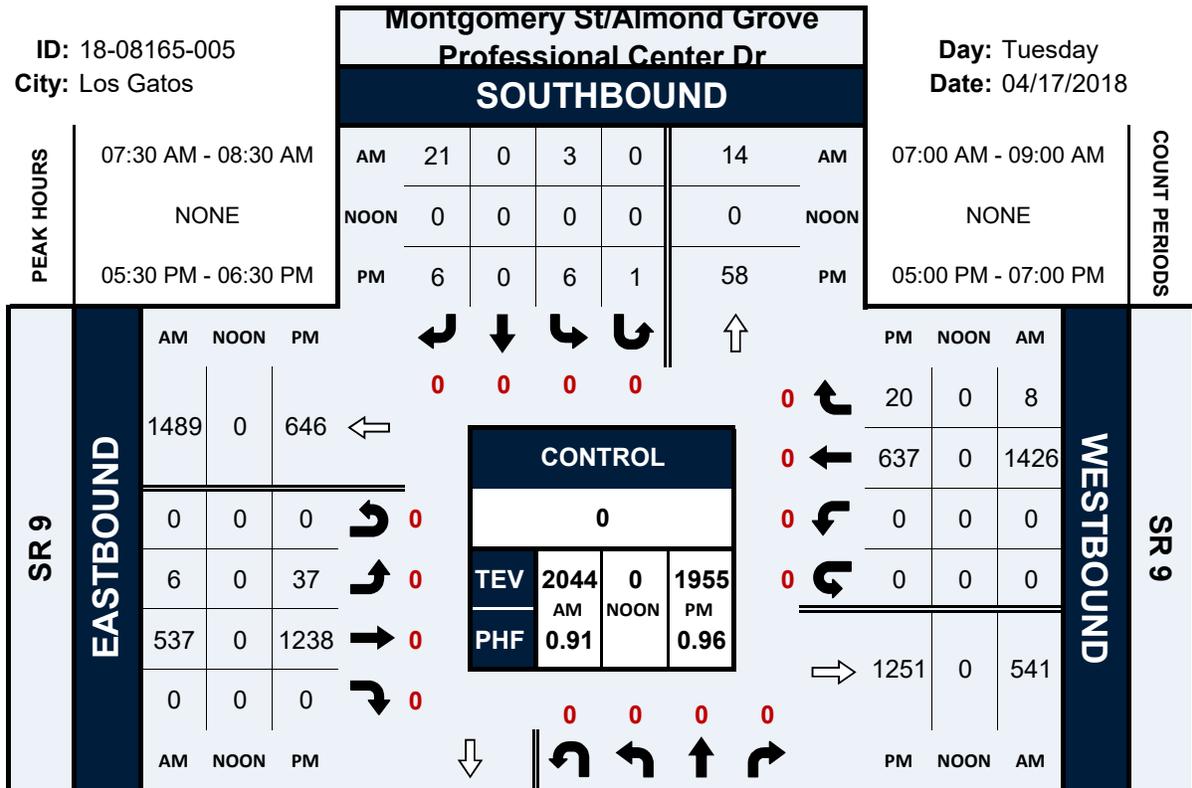


Montgomery St/Almond Grove Professional Center Dr & SR 9

Peak Hour Turning Movement Count

ID: 18-08165-005
City: Los Gatos

Day: Tuesday
Date: 04/17/2018

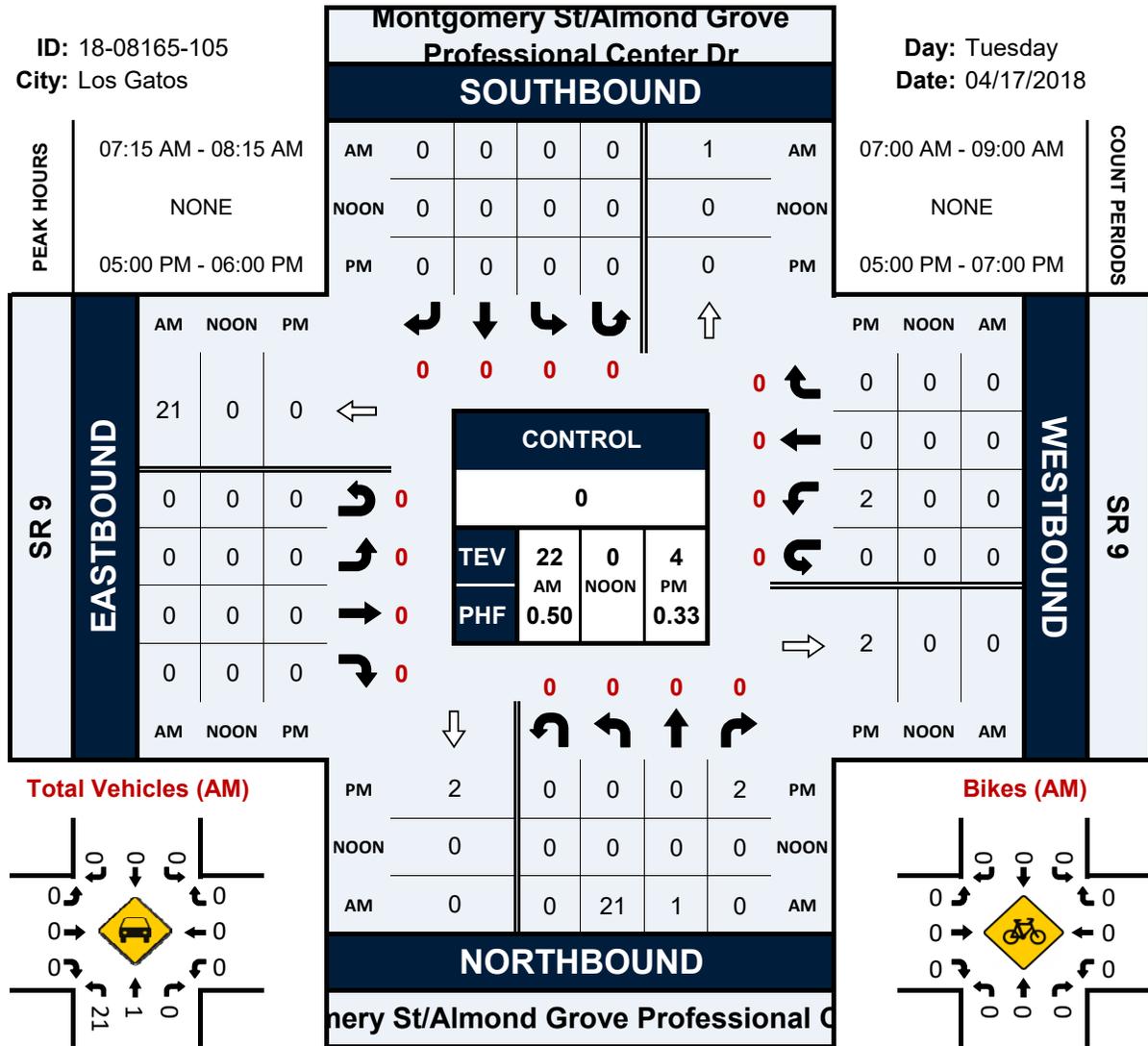


Montgomery St/Almond Grove Professional Center Dr & SR 9

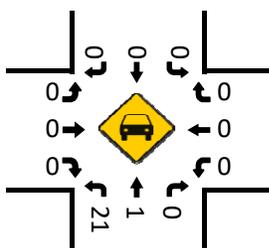
Peak Hour Turning Movement Count

ID: 18-08165-105
City: Los Gatos

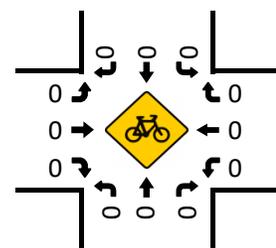
Day: Tuesday
Date: 04/17/2018



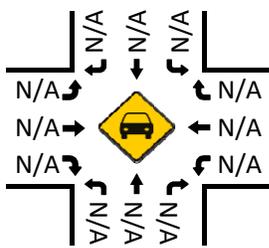
Total Vehicles (AM)



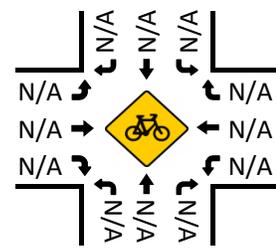
Bikes (AM)



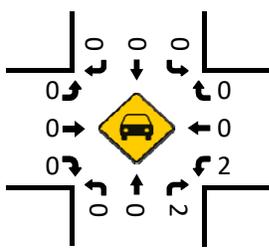
Total Vehicles (Noon)



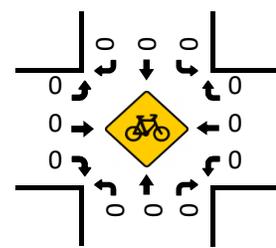
Bikes (NOON)



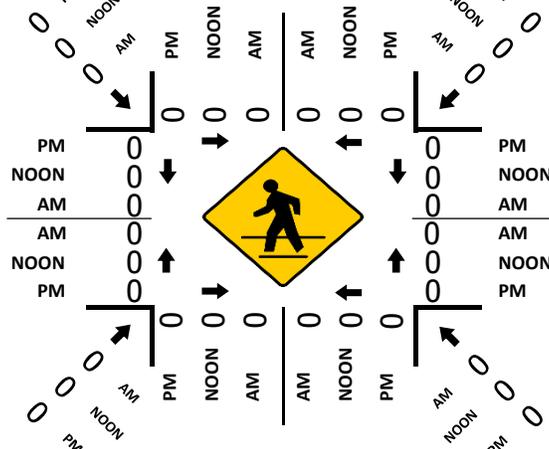
Total Vehicles (PM)



Bikes (PM)



Pedestrians (Crosswalks)





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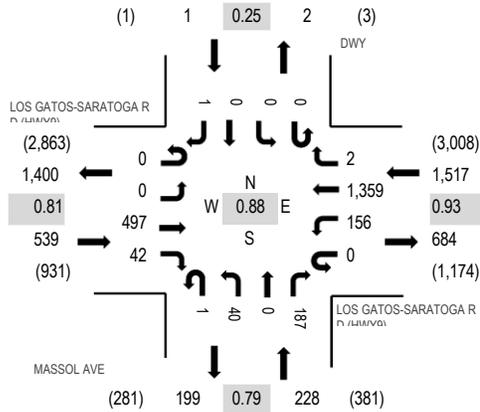
Location: 3 MASSOL AVE & LOS GATOS-SARATOGA RD (HWY9) AM

Date and Start Time: Tuesday, January 30, 2018

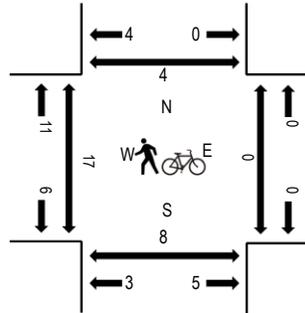
Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				MASSOL AVE Northbound				DWY Southbound				Total	Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North	
	7:00 AM	0	0	59	3	0	4	361	0	0	0	4	0	22	0	0			0	0	453	2,134	2
7:15 AM	0	0	79	4	0	18	379	0	0	0	10	0	31	0	0	0	0	521	2,228	4	0	0	3
7:30 AM	0	0	96	7	0	9	361	0	0	0	14	0	26	0	0	0	0	513	2,264	7	0	5	1
7:45 AM	0	0	146	21	0	62	354	0	0	0	10	0	54	0	0	0	0	647	2,285	4	0	3	0
8:00 AM	0	0	115	4	0	29	326	0	1	15	0	56	0	0	0	1	547	2,187	3	0	0	4	
8:15 AM	0	0	120	12	0	43	329	1	0	10	0	42	0	0	0	0	557		3	0	1	0	
8:30 AM	0	0	116	5	0	22	350	1	0	5	0	35	0	0	0	0	534		4	0	1	0	
8:45 AM	0	0	137	7	1	30	327	1	0	7	0	39	0	0	0	0	549		4	0	2	0	

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	1	3	0	0	0	0	0	0	0	0	0	5
Lights	0	0	490	39	0	148	1,332	2	1	40	0	185	0	0	0	1	2,238
Mediums	0	0	6	3	0	7	24	0	0	0	0	2	0	0	0	0	42
Total	0	0	497	42	0	156	1,359	2	1	40	0	187	0	0	0	1	2,285



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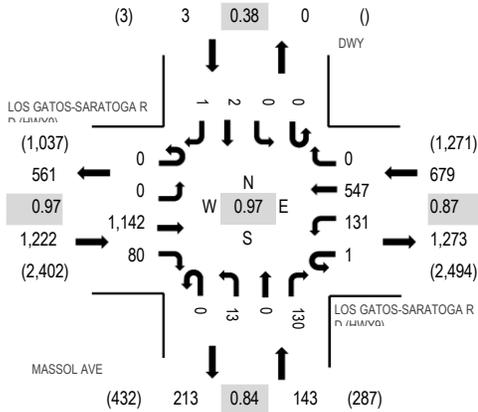
Location: 3 MASSOL AVE & LOS GATOS-SARATOGA RD (HWY9) PM

Date and Start Time: Tuesday, January 30, 2018

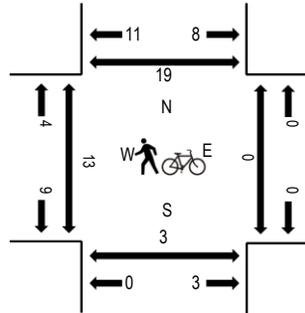
Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				MASSOL AVE Northbound			DWC Southbound				Total	Rolling Hour	Pedestrian Crossings				
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	U-Turn	Left	Thru	Right			West	East	South	North	
	4:00 PM	0	0	258	21	0	31	100	0	0	6	0	36	0	0			0	0	452	1,972	5
4:15 PM	0	0	280	21	0	41	125	0	0	2	0	29	0	0	0	0	498	2,046	1	0	1	2
4:30 PM	0	0	283	19	1	37	125	0	0	4	0	41	0	0	0	0	510	2,047	3	0	1	2
4:45 PM	0	0	286	29	0	28	134	0	0	4	0	30	0	0	0	1	512	2,017	4	0	1	3
5:00 PM	0	0	274	15	0	39	160	0	0	4	0	32	0	0	2	0	526	1,991	1	0	0	6
5:15 PM	0	0	299	17	0	27	128	0	0	1	0	27	0	0	0	0	499		5	0	1	7
5:30 PM	0	0	289	22	0	26	115	0	0	5	0	23	0	0	0	0	480		0	0	3	3
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Peak Rolling Hour Flow Rates

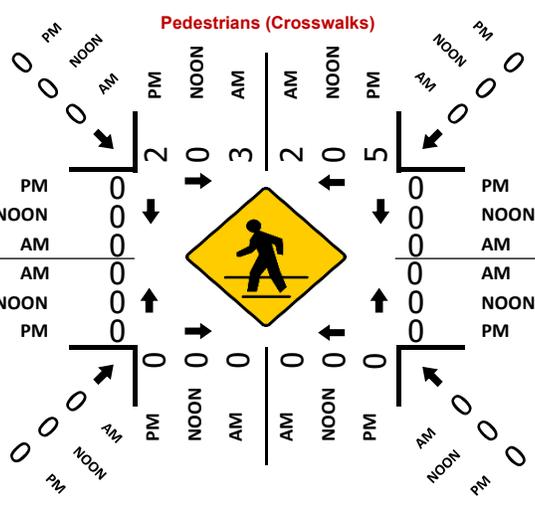
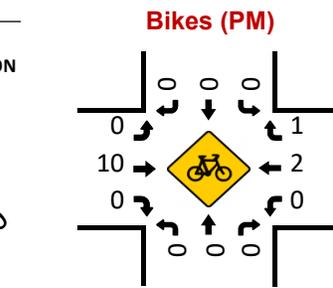
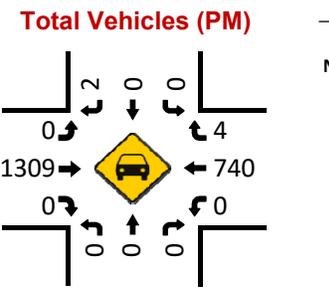
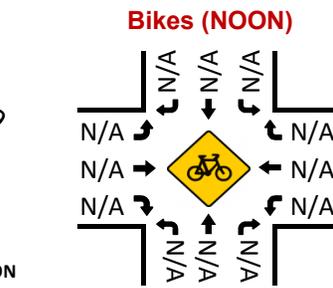
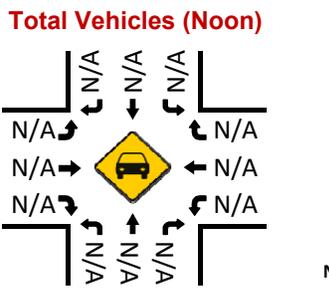
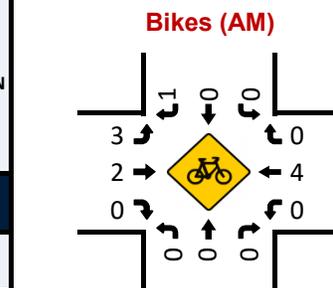
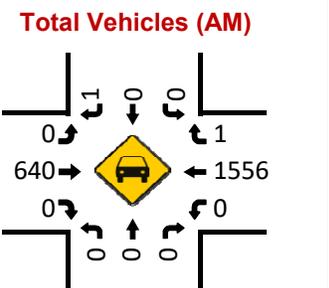
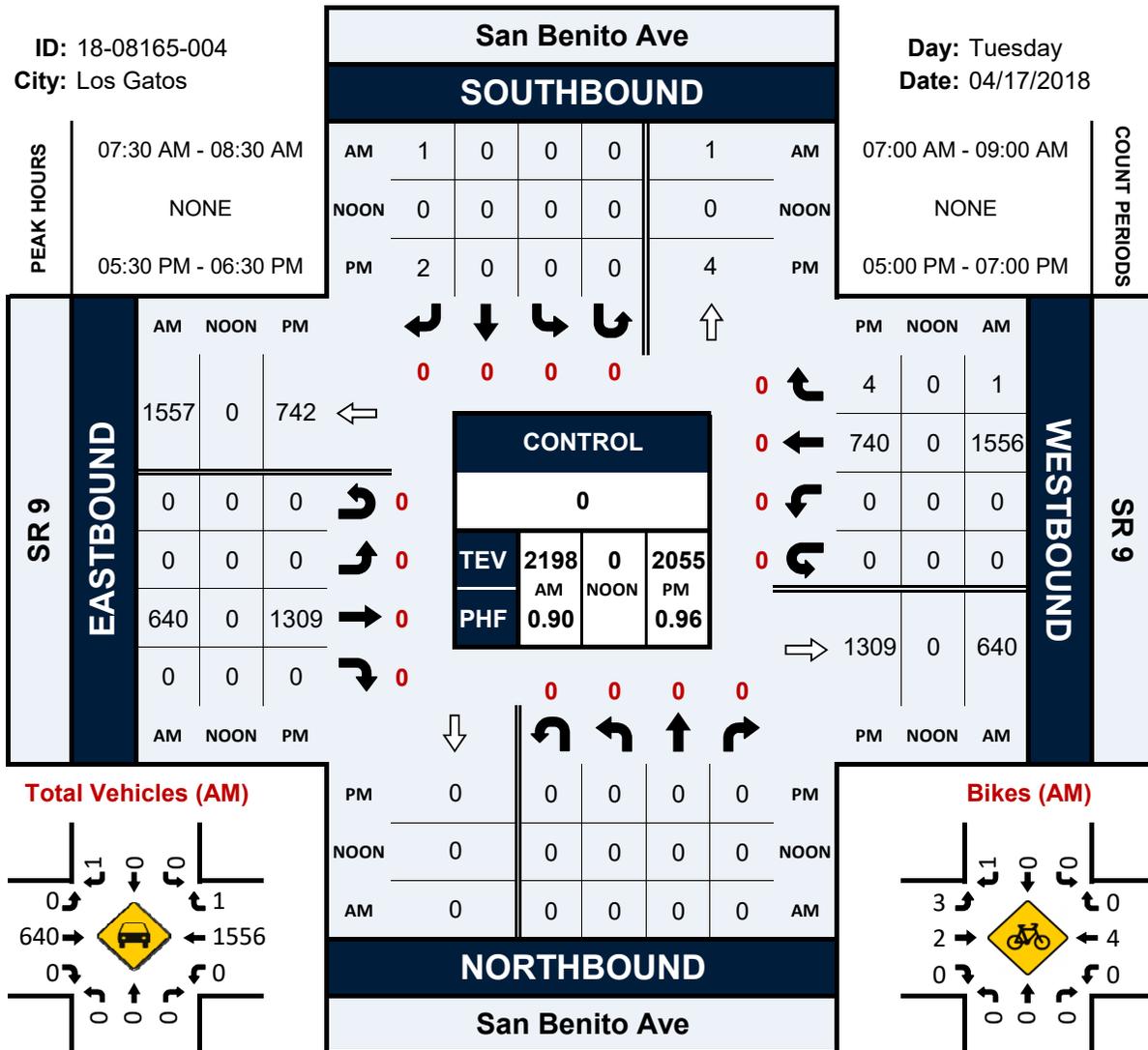
Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total					
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right						
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					0
Lights	0	0	1,138	80	1	130	541	0	0	13	0	130	0	0	2	1	2,036					2,036
Mediums	0	0	4	0	0	1	6	0	0	0	0	0	0	0	0	0	11					11
Total	0	0	1,142	80	1	131	547	0	0	13	0	130	0	0	2	1	2,047					2,047

San Benito Ave & SR 9

Peak Hour Turning Movement Count

ID: 18-08165-004
City: Los Gatos

Day: Tuesday
Date: 04/17/2018

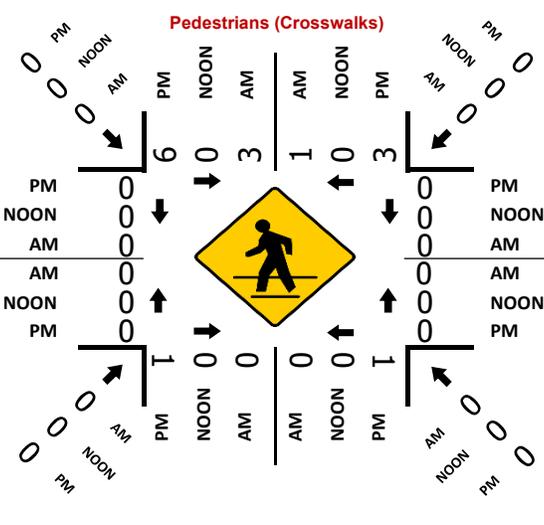
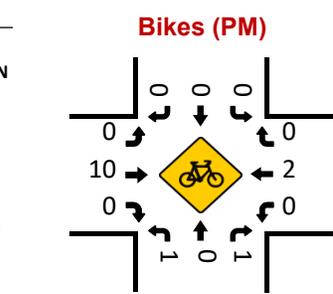
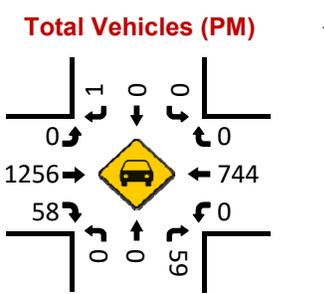
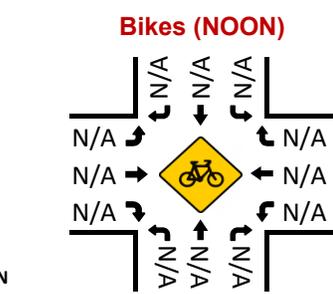
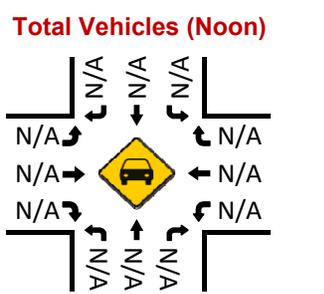
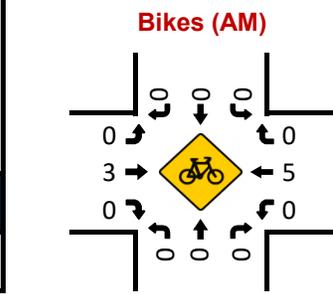
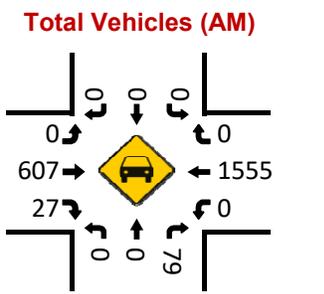
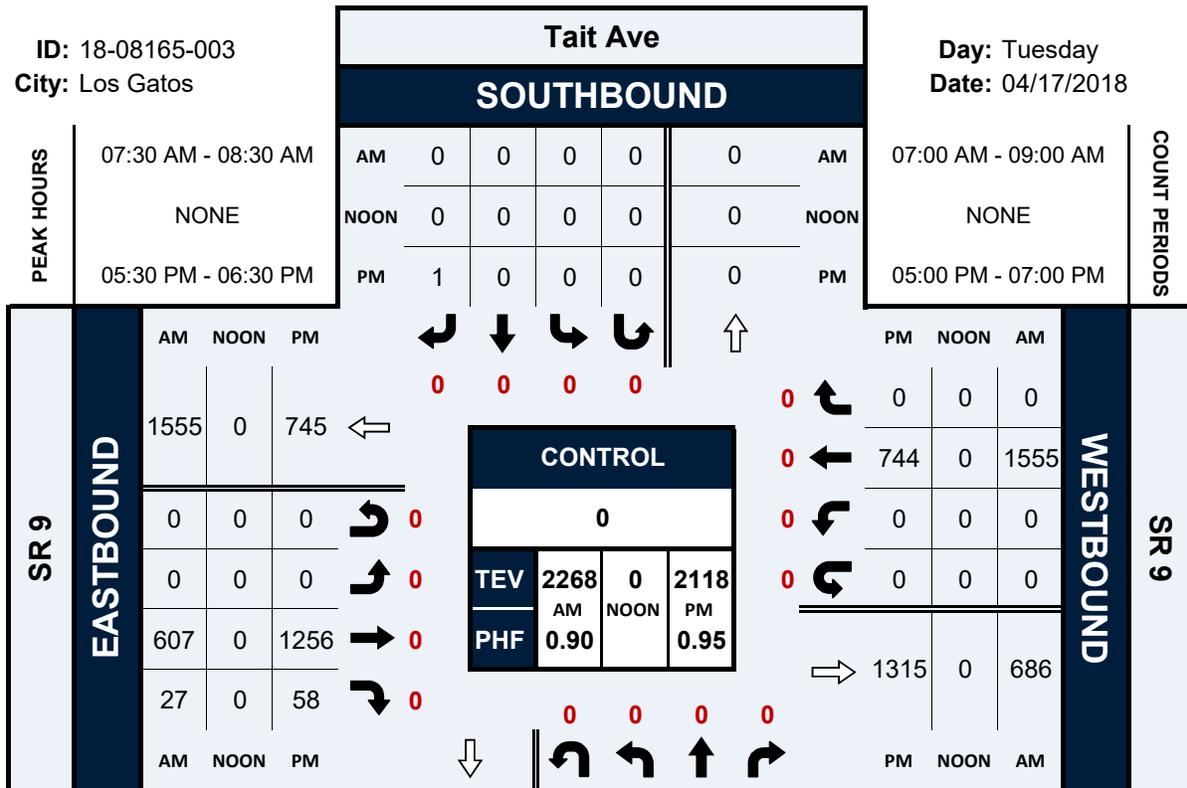


Tait Ave & SR 9

Peak Hour Turning Movement Count

ID: 18-08165-003
City: Los Gatos

Day: Tuesday
Date: 04/17/2018

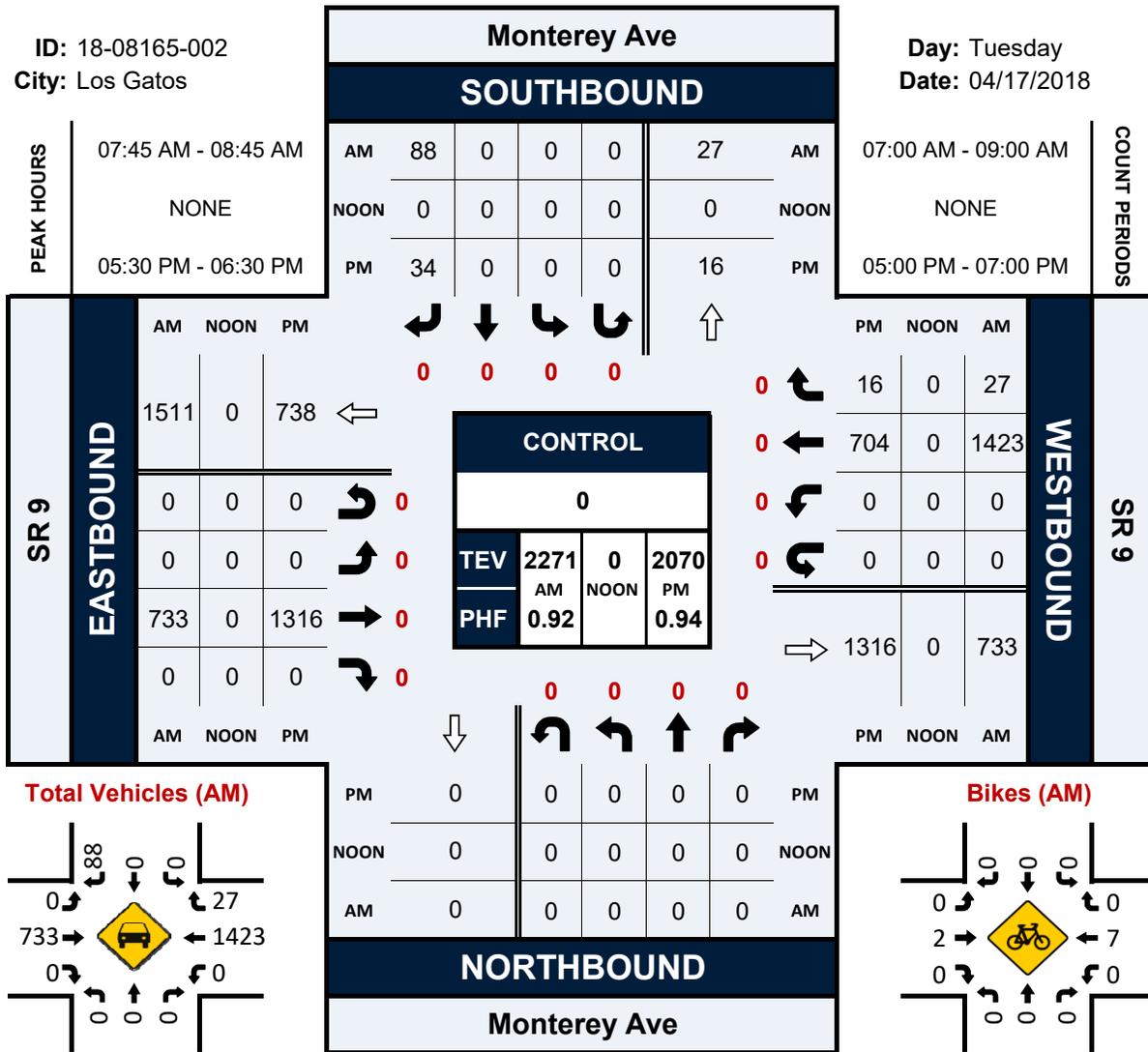


Monterey Ave & SR 9

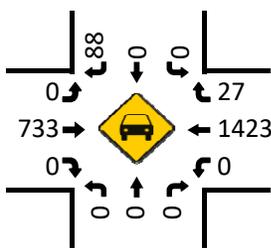
Peak Hour Turning Movement Count

ID: 18-08165-002
City: Los Gatos

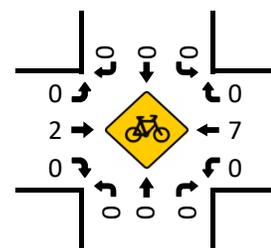
Day: Tuesday
Date: 04/17/2018



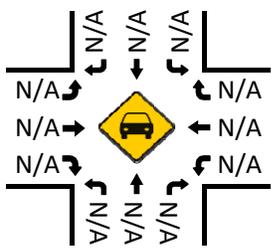
Total Vehicles (AM)



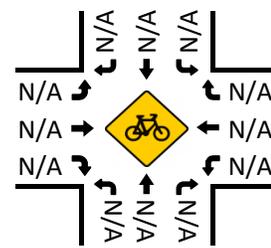
Bikes (AM)



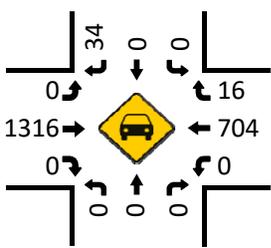
Total Vehicles (Noon)



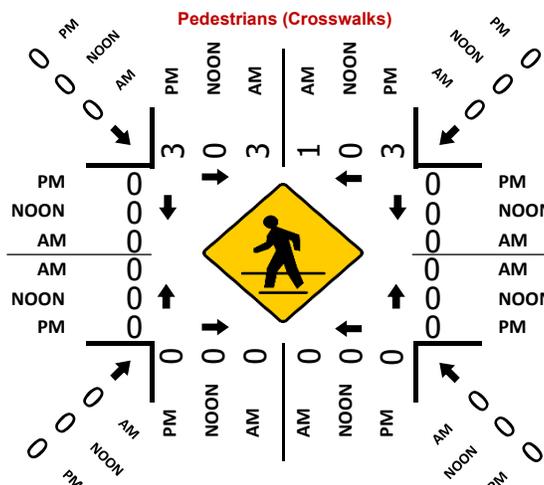
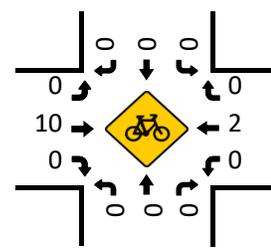
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)





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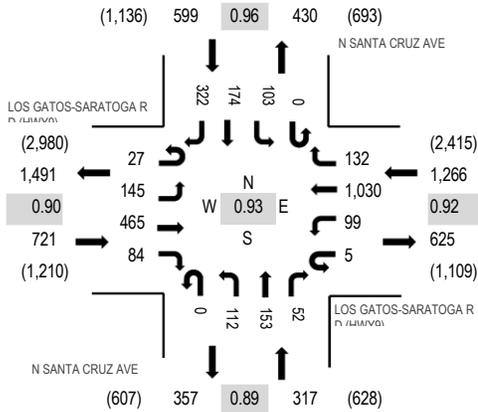
Location: 2 N SANTA CRUZ AVE & LOS GATOS-SARATOGA RD (HWY9) AM

Date and Start Time: Tuesday, January 30, 2018

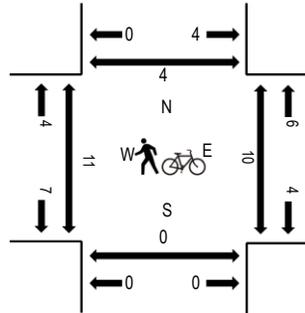
Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				N SANTA CRUZ AVE Northbound				N SANTA CRUZ AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
	7:00 AM	3	18	49	10	1	12	228	16	0	54	28	7	0	16	30			75	547	2,519	3
7:15 AM	3	17	85	10	2	20	288	14	0	35	26	14	0	23	29	80	646	2,749	0	0	0	0
7:30 AM	4	28	75	11	0	11	244	19	0	32	17	16	0	25	35	77	594	2,819	1	2	0	0
7:45 AM	10	28	136	25	1	21	255	22	0	22	42	15	0	21	57	77	732	2,903	4	3	0	0
8:00 AM	8	44	122	26	3	19	262	42	0	31	44	18	0	29	52	77	777	2,870	1	4	0	0
8:15 AM	1	36	111	22	1	26	240	30	0	34	46	13	0	25	39	92	716		2	1	0	0
8:30 AM	8	37	96	11	0	33	273	38	0	25	21	6	0	28	26	76	678		2	1	0	1
8:45 AM	0	22	132	22	1	19	254	20	0	33	38	11	0	27	41	79	699		3	2	2	0

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	2	5	2	0	0	0	0	0	0	0	1	11
Lights	27	140	457	84	5	95	999	127	0	108	152	52	0	102	169	319	2,836
Mediums	0	5	7	0	0	2	26	3	0	4	1	0	0	1	5	2	56
Total	27	145	465	84	5	99	1,030	132	0	112	153	52	0	103	174	322	2,903



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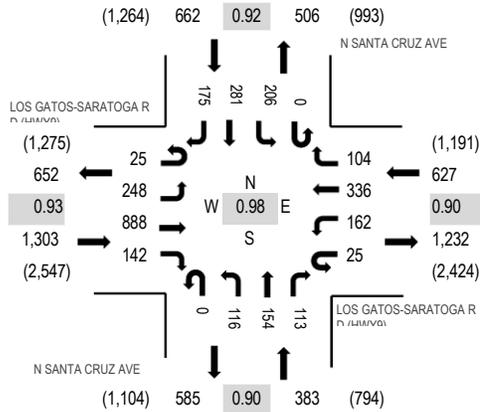
Location: 2 N SANTA CRUZ AVE & LOS GATOS-SARATOGA RD (HWY9) PM

Date and Start Time: Tuesday, January 30, 2018

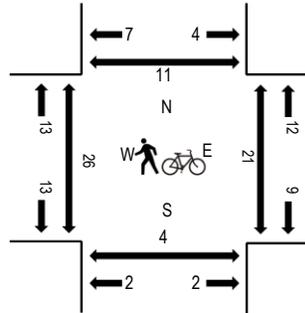
Peak Hour: 04:45 PM - 05:45 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				N SANTA CRUZ AVE Northbound				N SANTA CRUZ AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
	4:00 PM	5	43	231	25	6	29	70	40	0	29	40	41	0	32	66			40	697	2,880	5
4:15 PM	4	52	222	34	8	37	75	23	0	40	38	24	0	51	74	52	734	2,945	5	6	1	1
4:30 PM	7	53	203	48	4	22	63	36	0	39	53	25	0	40	71	44	708	2,967	6	12	2	5
4:45 PM	7	55	222	51	9	35	78	31	0	28	38	25	0	48	64	50	741	2,975	3	7	0	1
5:00 PM	4	70	249	28	5	30	94	24	0	33	37	30	0	45	64	49	762	2,916	10	7	1	6
5:15 PM	6	58	207	35	6	48	92	28	0	29	39	29	0	57	86	36	756		4	2	2	2
5:30 PM	8	65	210	28	5	49	72	21	0	26	40	29	0	56	67	40	716		7	3	1	1
5:45 PM	8	44	233	32	4	26	90	31	0	19	34	29	0	39	55	38	682		3	4	0	1

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	1	2	0	0	0	1	1	0	0	1	0	0	0	0	0	6
Lights	25	245	880	141	25	162	334	100	0	116	152	113	0	205	279	172	2,949
Mediums	0	2	6	1	0	0	1	3	0	0	1	0	0	1	2	3	20
Total	25	248	888	142	25	162	336	104	0	116	154	113	0	206	281	175	2,975



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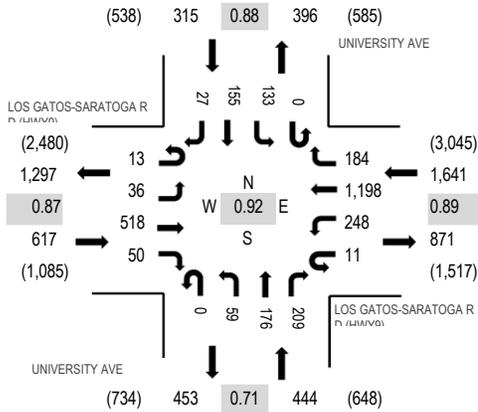
Location: 1 UNIVERSITY AVE & LOS GATOS-SARATOGA RD (HWY9) AM

Date and Start Time: Tuesday, January 30, 2018

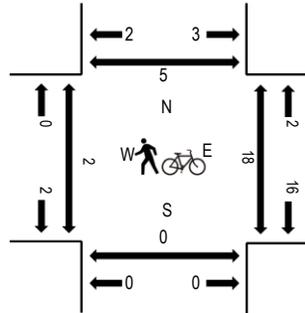
Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				UNIVERSITY AVE Northbound				UNIVERSITY AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
	7:00 AM	0	2	66	7	4	41	265	22	0	14	7	18	0	12	7			4	469	2,357	2
7:15 AM	0	1	107	5	3	39	312	20	0	9	14	24	0	35	17	4	590	2,712	1	1	0	0
7:30 AM	4	3	90	9	1	23	256	25	0	14	19	33	0	40	35	3	555	2,839	0	3	0	0
7:45 AM	1	8	151	17	3	42	282	40	0	13	38	57	0	30	52	9	743	3,017	0	9	0	1
8:00 AM	6	13	138	16	3	62	283	60	0	18	71	69	0	33	48	4	824	2,959	0	3	0	0
8:15 AM	2	12	110	10	2	67	290	41	0	21	50	46	0	27	31	8	717		0	5	0	1
8:30 AM	4	3	119	7	3	77	343	43	0	7	17	37	0	43	24	6	733		0	1	0	0
8:45 AM	2	2	153	17	3	55	276	59	0	12	15	25	0	32	26	8	685		0	2	0	1

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	7	0	0	0	0	0	0	2	0	0	9
Lights	13	36	509	49	11	239	1,163	183	0	56	174	204	0	124	153	26	2,940
Mediums	0	0	9	1	0	9	28	1	0	3	2	5	0	7	2	1	68
Total	13	36	518	50	11	248	1,198	184	0	59	176	209	0	133	155	27	3,017



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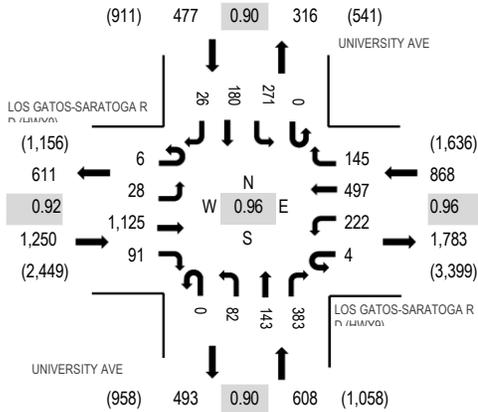
Location: 1 UNIVERSITY AVE & LOS GATOS-SARATOGA RD (HWY9) PM

Date and Start Time: Tuesday, January 30, 2018

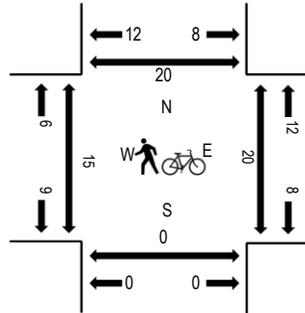
Peak Hour: 05:00 PM - 06:00 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



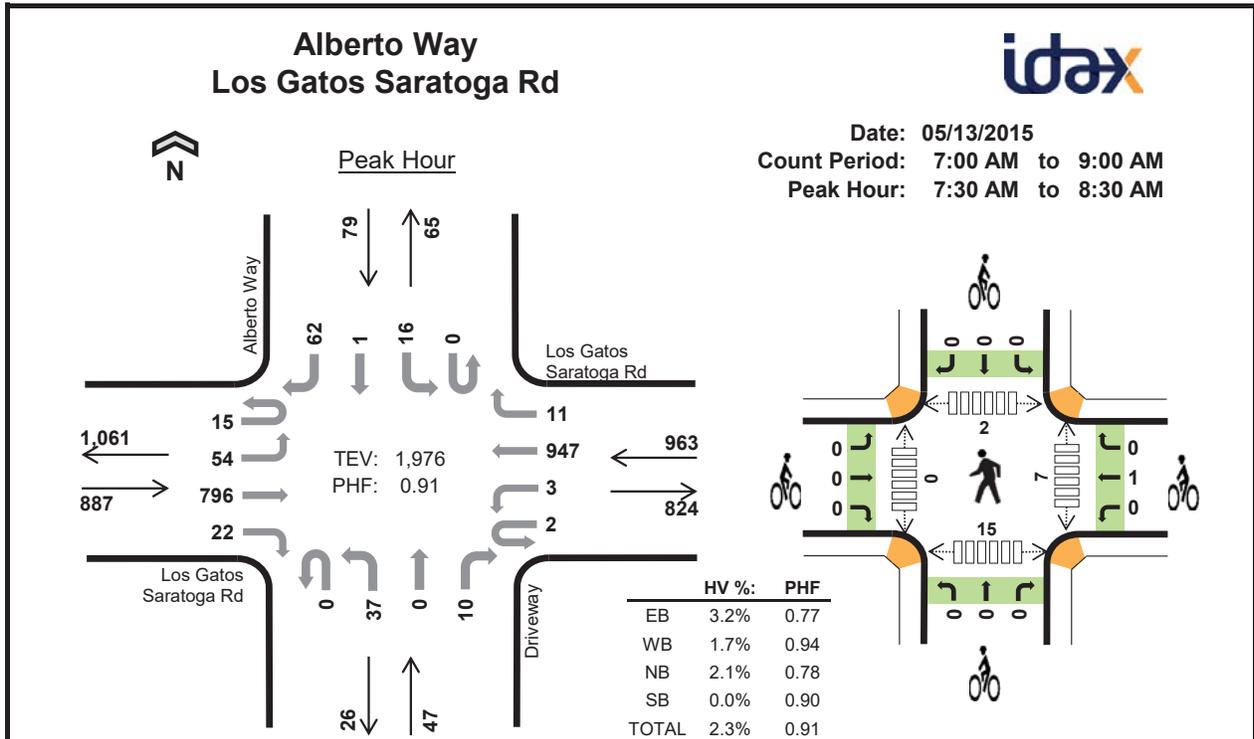
Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	LOS GATOS-SARATOGA RD (HWY9) Eastbound				LOS GATOS-SARATOGA RD (HWY9) Westbound				UNIVERSITY AVE Northbound				UNIVERSITY AVE Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
	4:00 PM	0	8	302	19	1	43	115	22	0	16	20	82	0	45	44			14	731	2,851	1
4:15 PM	0	7	270	23	0	59	117	21	0	15	23	73	0	67	44	12	731	2,956	1	4	0	3
4:30 PM	2	10	247	17	3	65	103	23	0	18	25	73	0	61	49	4	700	3,040	5	6	0	6
4:45 PM	1	8	265	20	5	52	109	30	0	12	28	65	0	57	30	7	689	3,109	3	5	0	3
5:00 PM	0	7	308	22	0	52	122	28	0	19	44	106	0	76	44	8	836	3,203	4	3	0	3
5:15 PM	3	6	259	26	2	44	141	39	0	23	45	95	0	63	63	6	815		1	6	0	4
5:30 PM	0	6	257	17	1	71	111	41	0	23	29	94	0	70	43	6	769		5	5	0	9
5:45 PM	3	9	301	26	1	55	123	37	0	17	25	88	0	62	30	6	783		5	5	0	4

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Lights	6	28	1,116	91	4	222	493	144	0	81	142	382	0	271	180	25	3,185
Mediums	0	0	8	0	0	0	3	1	0	1	1	1	0	0	0	1	16
Total	6	28	1,125	91	4	222	497	145	0	82	143	383	0	271	180	26	3,203



Two-Hour Count Summaries

Interval Start	Los Gatos Saratoga Rd				Los Gatos Saratoga Rd				Driveway				Alberto Way				15-min Total	Rolling One Hour	
	Eastbound				Westbound				Northbound				Southbound						
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT			
7:00 AM	1	5	124	15	0	5	153	1	0	10	0	3	0	3	0	9	329	0	
7:15 AM	0	10	167	13	1	4	204	0	0	3	0	5	0	6	0	14	427	0	
7:30 AM	4	9	270	4	1	0	222	2	0	11	0	1	0	4	0	12	540	0	
7:45 AM	2	12	219	10	0	2	242	3	0	12	0	3	0	3	0	19	527	1,823	
8:00 AM	7	13	150	7	1	0	229	4	0	4	0	2	0	4	1	17	439	1,933	
8:15 AM	2	20	157	1	0	1	254	2	0	10	0	4	0	5	0	14	470	1,976	
8:30 AM	2	20	138	6	0	0	214	8	0	25	0	4	0	4	1	25	447	1,883	
8:45 AM	2	16	197	3	0	3	227	7	0	15	1	4	0	4	0	14	493	1,849	
Count Total	20	105	1,422	59	3	15	1,745	27	0	90	1	26	0	33	2	124	3,672	0	
Peak Hour	All	15	54	796	22	2	3	947	11	0	37	0	10	0	16	1	62	1,976	0
	HV	0	0	27	1	0	0	16	0	0	1	0	0	0	0	0	0	45	0
	HV%	0%	0%	3%	5%	0%	0%	2%	0%	-	3%	-	0%	-	0%	0%	0%	2%	0

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
7:00 AM	4	3	0	0	7	0	0	0	0	0	0	0	0	3	3
7:15 AM	2	6	1	0	9	1	0	0	0	1	0	0	0	2	2
7:30 AM	3	4	0	0	7	0	0	0	0	0	3	0	1	2	6
7:45 AM	14	1	0	0	15	0	1	0	0	1	3	0	1	7	11
8:00 AM	2	5	1	0	8	0	0	0	0	0	0	0	0	4	4
8:15 AM	9	6	0	0	15	0	0	0	0	0	1	0	0	2	3
8:30 AM	9	5	0	0	14	0	0	0	0	0	0	0	0	4	4
8:45 AM	15	8	0	0	23	0	0	0	0	0	1	0	1	7	9
Count Total	58	38	2	0	98	1	1	0	0	2	8	0	3	31	42
Peak Hour	28	16	1	0	45	0	1	0	0	1	7	0	2	15	24

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Los Gatos Saratoga Rd				Los Gatos Saratoga Rd				Driveway				Alberto Way				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
7:00 AM	0	0	4	0	0	0	3	0	0	0	0	0	0	0	0	7	0	
7:15 AM	0	0	2	0	0	0	6	0	0	0	0	1	0	0	0	9	0	
7:30 AM	0	0	3	0	0	0	4	0	0	0	0	0	0	0	0	7	0	
7:45 AM	0	0	14	0	0	0	1	0	0	0	0	0	0	0	0	15	38	
8:00 AM	0	0	1	1	0	0	5	0	0	1	0	0	0	0	0	8	39	
8:15 AM	0	0	9	0	0	0	6	0	0	0	0	0	0	0	0	15	45	
8:30 AM	0	1	8	0	0	0	5	0	0	0	0	0	0	0	0	14	52	
8:45 AM	0	1	14	0	0	0	8	0	0	0	0	0	0	0	0	23	60	
Count Total	0	2	55	1	0	0	38	0	0	1	0	1	0	0	0	98	0	
Peak Hour	0	0	27	1	0	0	16	0	0	1	0	0	0	0	0	45	0	
Two-Hour Count Summaries - Bikes																		
Interval Start	Los Gatos Saratoga Rd			Los Gatos Saratoga Rd			Driveway			Alberto Way			15-min Total	Rolling One Hour				
	Eastbound			Westbound			Northbound			Southbound								
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT						
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	2		
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2		
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Count Total	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	0		
Peak Hour	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0		
Note: U-Turn volumes for bikes are included in Left-Turn, if any.																		

Two-Hour Count Summaries - Heavy Vehicles																		
Interval Start	Los Gatos Saratoga Rd				Los Gatos Saratoga Rd				Driveway				Alberto Way				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
4:00 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
4:15 PM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	1	0	0	0	2	0	0	0	0	0	0	1	0	0	4	8
5:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	8
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
5:30 PM	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	3	9
5:45 PM	0	0	2	0	0	0	3	1	0	0	0	0	0	0	0	0	6	11
Count Total	0	0	7	1	0	0	8	2	0	0	0	0	0	1	0	0	19	0
Peak Hour	0	0	4	1	0	0	5	1	0	0	0	0	0	0	0	0	11	0

Two-Hour Count Summaries - Bikes														
Interval Start	Los Gatos Saratoga Rd			Los Gatos Saratoga Rd			Driveway			Alberto Way			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Count Total	0	0	0	0	0	1	0	0	0	0	0	1	2	0
Peak Hour	0	0	0	0	0	0	0	0	0	0	0	1	1	0

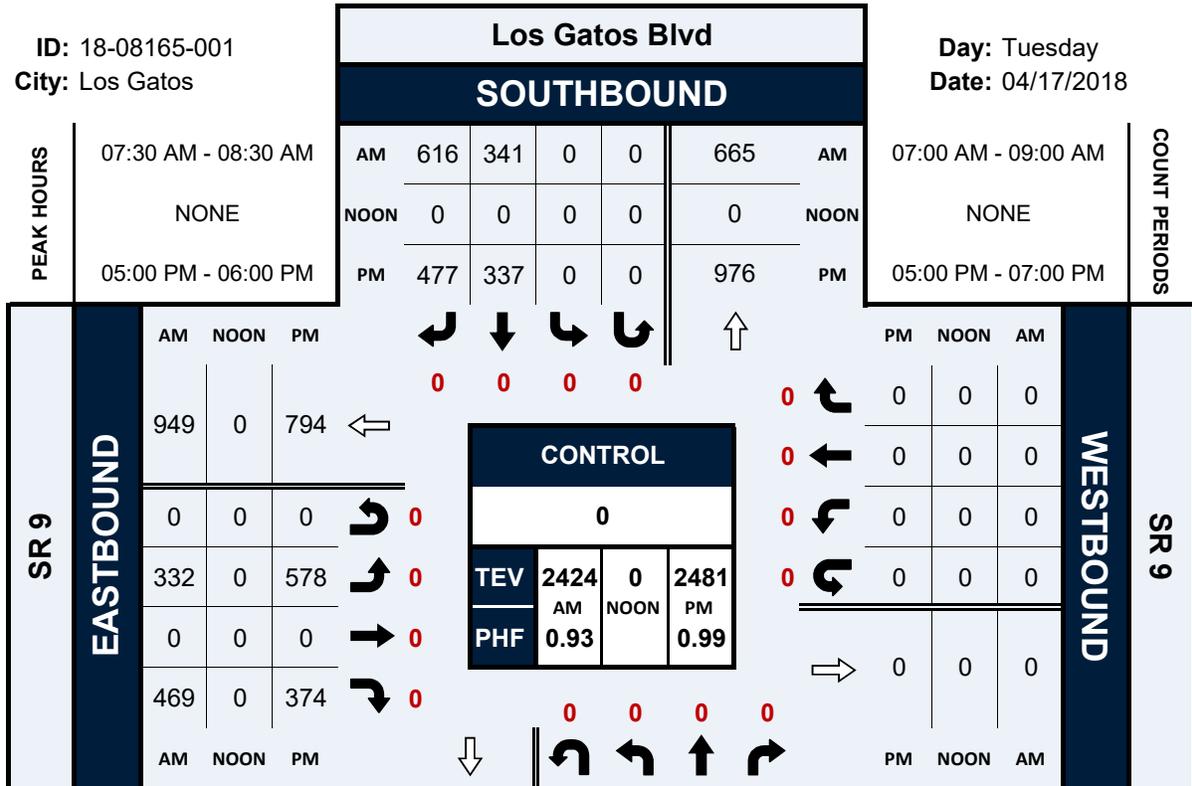
Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Los Gatos Blvd & SR 9

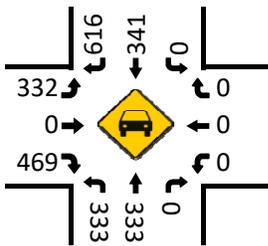
Peak Hour Turning Movement Count

ID: 18-08165-001
City: Los Gatos

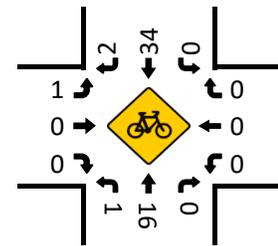
Day: Tuesday
Date: 04/17/2018



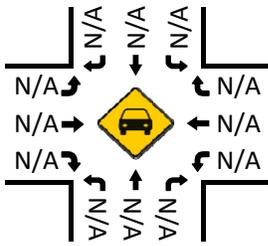
Total Vehicles (AM)



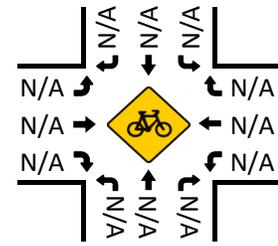
Bikes (AM)



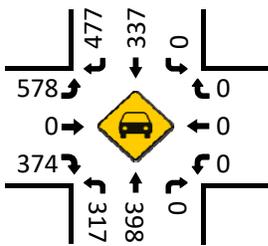
Total Vehicles (Noon)



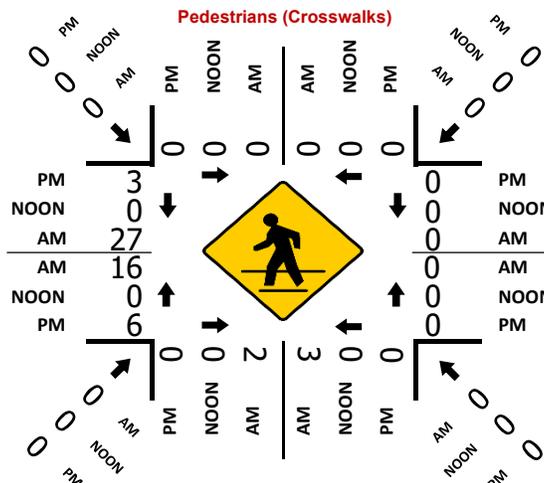
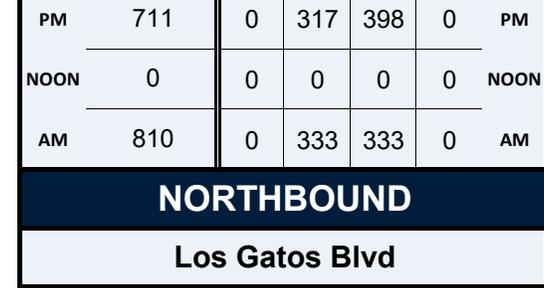
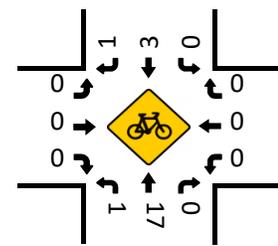
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



Appendix B

Collision Rate Calculations

Intersection Collision Rate Calculations

SR 9 Corridor Safety Study

Intersection # 1: SR 9 & Massol Avenue
Date of Count: Tuesday, January 30, 2018

Number of Collisions: 16
Number of Injuries: 8
Number of Fatalities: 1
ADT: 20400
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{16}{20,400} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.43 c/mve	6.3%	50.0%
Statewide Average*	0.14 c/mve	0.7%	38.0%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Intersection # 2: SR 9 & San Benito Avenue
Date of Count: Tuesday, January 30, 2018

Number of Collisions: 1
Number of Injuries: 0
Number of Fatalities: 0
ADT: 20600
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{1}{20,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.03 c/mve	0.0%	0.0%
Statewide Average*	0.14 c/mve	0.7%	38.0%

ADT = average daily total vehicles entering intersection
 c/mve = collisions per million vehicles entering intersection
 * 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculaions

SR 9 Corridor Safety Study

Intersection # 3: SR 9 & Tait Avenue
Date of Count: Tuesday, April 17, 2018

Number of Collisions: 3
Number of Injuries: 2
Number of Fatalities: 0
ADT: 21200
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{3}{21,200} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.08 c/mve	0.0%	66.7%
Statewide Average*	0.14 c/mve	0.7%	38.0%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 4: SR 9 & Monterey Avenue
Date of Count: Tuesday, January 30, 2018

Number of Collisions: 1
Number of Injuries: 1
Number of Fatalities: 0
ADT: 20700
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Tee
Control Type: Stop & Yield Controls
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{1}{20,700} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.03 c/mve	0.0%	100.0%
Statewide Average*	0.14 c/mve	0.7%	38.0%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculations

SR 9 Corridor Safety Study

Intersection # 5: SR 9 & Santa Cruz Avenue

Date of Count: Tuesday, January 30, 2018

Number of Collisions: 28
Number of Injuries: 9
Number of Fatalities: 0
ADT: 29800
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{28}{29,800} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.51 c/mve	0.0%	32.1%
Statewide Average*	0.43 c/mve	0.4%	37.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 6: SR 9 & University Avenue

Date of Count: Tuesday, January 30, 2018

Number of Collisions: 24
Number of Injuries: 9
Number of Fatalities: 0
ADT: 32000
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{24}{32,000} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.41 c/mve	0.0%	37.5%
Statewide Average*	0.43 c/mve	0.4%	37.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection Collision Rate Calculations

SR 9 Corridor Safety Study

Intersection # 7: SR 9 & Alberto Way
Date of Count: Wednesday, May 13, 2015

Number of Collisions: 10
Number of Injuries: 4
Number of Fatalities: 0
ADT: 18600
Start Date: January 1, 2013
End Date: December 31, 2017
Number of Years: 5

Intersection Type: Four-Legged
Control Type: Signals
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{10}{18,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.29 c/mve	0.0%	40.0%
Statewide Average*	0.43 c/mve	0.4%	37.9%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Intersection # 8: Los Gatos Boulevard & SR 9
Date of Count: Tuesday, April 17, 2018

Number of Collisions: 9
Number of Injuries: 2
Number of Fatalities: 0
ADT: 24300
Start Date: January 1, 2013
End Date:
Number of Years: 5

Intersection Type: Tee
Control Type: Signals
Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{9}{24,300} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.20 c/mve	0.0%	22.2%
Statewide Average*	0.27 c/mve	0.6%	37.3%

ADT = average daily total vehicles entering intersection
c/mve = collisions per million vehicles entering intersection
* 2013 Collision Data on California State Highways, Caltrans

Appendix C

Level of Service Definition Tables



Table 8- Intersection Level of Service Criteria

LOS	Two-Way Stop-Controlled	Signalized
A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.	Delay of 0 to 10 seconds. Most vehicles arrive during the green phase, so do not stop at all.
B	Delay of 10 to 15 seconds. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street.	Delay of 10 to 20 seconds. More vehicles stop than with LOS A, but many drivers still do not have to stop.
C	Delay of 15 to 25 seconds. Acceptable gaps in traffic are less frequent, and drivers may approach while another vehicle is already waiting to exit the side street.	Delay of 20 to 35 seconds. The number of vehicles stopping is significant, although many still pass through without stopping.
D	Delay of 25 to 35 seconds. There are fewer acceptable gaps in traffic, and drivers may enter a queue of one or two vehicles on the side street.	Delay of 35 to 55 seconds. The influence of congestion is noticeable, and most vehicles must stop.
E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.	Delay of 55 to 80 seconds. Most, if not all, vehicles must stop and drivers consider the delay excessive.
F	Delay of more than 50 seconds. Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues.	Delay of more than 80 seconds. Vehicles may wait through more than one cycle to clear the intersection.

Reference: *Highway Capacity Manual*, Transportation Research Board, 2010

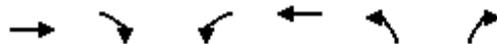
Appendix D

Intersection Level of Service Calculations

HCM Unsignalized Intersection Capacity Analysis

2: Massol Avenue & State Route 9

05/15/2018



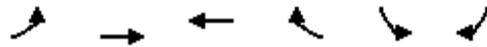
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (veh/h)	497	42	156	1359	40	187
Future Volume (Veh/h)	497	42	156	1359	40	187
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	565	48	177	1544	45	213
Pedestrians	17				8	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	2				1	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)	868					
pX, platoon unblocked					0.69	
vC, conflicting volume			621		2512	597
vC1, stage 1 conf vol					597	
vC2, stage 2 conf vol					1915	
vCu, unblocked vol			621		2977	597
tC, single (s)			4.1		*6.5	*6.2
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.5	3.3
p0 queue free %			81		13	57
cM capacity (veh/h)			952		52	501
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	613	177	1544	45	213	
Volume Left	0	177	0	45	0	
Volume Right	48	0	0	0	213	
cSH	1700	952	1700	52	501	
Volume to Capacity	0.36	0.19	0.91	0.87	0.43	
Queue Length 95th (ft)	0	17	0	93	52	
Control Delay (s)	0.0	9.6	0.0	214.5	17.4	
Lane LOS	A		F		C	
Approach Delay (s)	0.0	1.0	51.8			
Approach LOS					F	
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			81.5%		ICU Level of Service	D
Analysis Period (min)	15					

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: State Route 9 & San Benito Avenue

05/15/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑			↑
Traffic Volume (veh/h)	0	675	1520	1	0	1
Future Volume (Veh/h)	0	675	1520	1	0	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	750	1689	1	0	1
Pedestrians					5	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					0	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			752			
pX, platoon unblocked	0.42				0.42	0.42
vC, conflicting volume	1695				2070	1694
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1967				2863	1965
tC, single (s)	4.1				6.8	*6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	97
cM capacity (veh/h)	121				6	33

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	375	375	1690	1
Volume Left	0	0	0	0
Volume Right	0	0	1	1
cSH	1700	1700	1700	33
Volume to Capacity	0.22	0.22	0.99	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	117.1
Lane LOS				F
Approach Delay (s)	0.0		0.0	117.1
Approach LOS				F

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		90.1%	ICU Level of Service E
Analysis Period (min)		15	

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

4: Tait Avenue/Monterey Avenue & State Route 9

05/15/2018

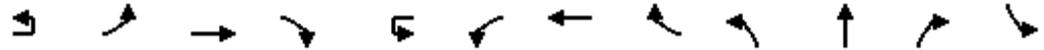


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑				↑			↑
Traffic Volume (veh/h)	0	645	27	0	1423	27	0	0	79	0	0	88
Future Volume (Veh/h)	0	645	27	0	1423	27	0	0	79	0	0	88
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	0.90	0.92	0.92	0.92
Hourly flow rate (vph)	0	717	30	0	1547	29	0	0	88	0	0	96
Pedestrians												4
Lane Width (ft)												12.0
Walking Speed (ft/s)												3.5
Percent Blockage												0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					578							
pX, platoon unblocked	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	1580			747			1602	2312	374	2012	2312	792
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1163			747			1191	2110	374	1722	2111	144
tC, single (s)	4.1			4.1			7.5	6.5	*6.2	7.5	6.5	*6.2
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			100	100	87	100	100	86
cM capacity (veh/h)	459			857			95	39	674	38	39	696
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	478	269	1031	545	88	96						
Volume Left	0	0	0	0	0	0						
Volume Right	0	30	0	29	88	96						
cSH	1700	1700	1700	1700	674	696						
Volume to Capacity	0.28	0.16	0.61	0.32	0.13	0.14						
Queue Length 95th (ft)	0	0	0	0	11	12						
Control Delay (s)	0.0	0.0	0.0	0.0	11.1	11.0						
Lane LOS					B	B						
Approach Delay (s)	0.0		0.0		11.1	11.0						
Approach LOS					B	B						
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			52.3%		ICU Level of Service				A			
Analysis Period (min)			15									

* User Entered Value

HCM Signalized Intersection Capacity Analysis
 5: Santa Cruz Avenue/Santa Cruz Avenue & State Route 9

05/15/2018



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	27	145	465	84	5	99	1030	132	112	153	52	103
Future Volume (vph)	27	145	465	84	5	99	1030	132	112	153	52	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6	4.6			4.6	4.6		4.2	4.2		4.2
Lane Util. Factor		1.00	0.95			1.00	0.95		1.00	1.00		1.00
Frbp, ped/bikes		1.00	1.00			1.00	0.99		1.00	0.99		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.98			1.00	0.98		1.00	0.96		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	3446			1770	3461		1770	1772		1770
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	3446			1770	3461		1770	1772		1770
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	29	156	500	90	5	106	1108	142	120	165	56	111
RTOR Reduction (vph)	0	0	4	0	0	0	4	0	0	5	0	0
Lane Group Flow (vph)	0	185	586	0	0	111	1246	0	120	216	0	111
Confl. Peds. (#/hr)								4			10	
Confl. Bikes (#/hr)				4				4			4	
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Prot	NA		Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases												
Actuated Green, G (s)		30.4	154.0			17.8	141.4		19.1	32.8		17.8
Effective Green, g (s)		30.4	154.0			17.8	141.4		19.1	32.8		17.8
Actuated g/C Ratio		0.13	0.64			0.07	0.59		0.08	0.14		0.07
Clearance Time (s)		4.6	4.6			4.6	4.6		4.2	4.2		4.2
Vehicle Extension (s)		0.2	0.2			0.2	0.2		0.2	0.2		0.2
Lane Grp Cap (vph)		224	2211			131	2039		140	242		131
v/s Ratio Prot		c0.10	0.17			c0.06	c0.36		c0.07	c0.12		0.06
v/s Ratio Perm												
v/c Ratio		0.83	0.27			0.85	0.61		0.86	0.89		0.85
Uniform Delay, d1		102.2	18.6			109.8	31.7		109.1	101.9		109.8
Progression Factor		1.00	1.00			0.90	0.65		1.00	1.00		1.00
Incremental Delay, d2		20.4	0.3			32.1	1.2		36.1	30.3		35.7
Delay (s)		122.7	18.9			131.2	21.6		145.2	132.2		145.5
Level of Service		F	B			F	C		F	F		F
Approach Delay (s)			43.6				30.6			136.7		
Approach LOS			D				C			F		
Intersection Summary												
HCM 2000 Control Delay			63.3			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			240.0			Sum of lost time (s)				17.6		
Intersection Capacity Utilization			88.7%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 5: Santa Cruz Avenue/Santa Cruz Avenue & State Route 9

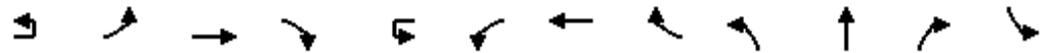
05/15/2018



Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	174	322
Future Volume (vph)	174	322
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.2	4.2
Lane Util. Factor	1.00	1.00
Frbp, ped/bikes	1.00	0.95
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1863	1510
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1863	1510
Peak-hour factor, PHF	0.93	0.93
Adj. Flow (vph)	187	346
RTOR Reduction (vph)	0	202
Lane Group Flow (vph)	187	144
Confl. Peds. (#/hr)		11
Confl. Bikes (#/hr)		4
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	31.5	31.5
Effective Green, g (s)	31.5	31.5
Actuated g/C Ratio	0.13	0.13
Clearance Time (s)	4.2	4.2
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	244	198
v/s Ratio Prot	0.10	
v/s Ratio Perm		0.10
v/c Ratio	0.77	0.73
Uniform Delay, d1	100.7	100.1
Progression Factor	1.00	1.00
Incremental Delay, d2	12.1	10.6
Delay (s)	112.8	110.7
Level of Service	F	F
Approach Delay (s)	117.3	
Approach LOS	F	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 6: University Avenue/Univerity Avenue & State Route 9

05/15/2018



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕	↗		↔	↕	↗	↖	↑	↗	↖
Traffic Volume (vph)	13	36	518	50	11	248	1198	184	59	176	209	133
Future Volume (vph)	13	36	518	50	11	248	1198	184	59	176	209	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.1	5.1	5.1		5.1	5.1	5.1	4.7	4.7	4.7	4.7
Lane Util. Factor		1.00	0.95	1.00		1.00	0.95	1.00	1.00	1.00	1.00	0.97
Frbp, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.95	1.00	1.00	0.94	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
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		1770	3539	1548		1770	3539	1511	1770	1863	1494	3433
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		1770	3539	1548		1770	3539	1511	1770	1863	1494	3433
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	39	563	54	12	270	1302	200	64	191	227	145
RTOR Reduction (vph)	0	0	0	23	0	0	0	26	0	0	157	0
Lane Group Flow (vph)	0	53	563	31	0	282	1302	174	64	191	70	145
Confl. Peds. (#/hr)								5			18	
Confl. Bikes (#/hr)				4				4			4	
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases				2				6			8	
Actuated Green, G (s)		10.9	136.3	136.3		41.7	167.1	167.1	13.9	28.3	28.3	14.1
Effective Green, g (s)		10.9	136.3	136.3		41.7	167.1	167.1	13.9	28.3	28.3	14.1
Actuated g/C Ratio		0.05	0.57	0.57		0.17	0.70	0.70	0.06	0.12	0.12	0.06
Clearance Time (s)		5.1	5.1	5.1		5.1	5.1	5.1	4.7	4.7	4.7	4.7
Vehicle Extension (s)		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2
Lane Grp Cap (vph)		80	2009	879		307	2464	1052	102	219	176	201
v/s Ratio Prot		0.03	0.16			c0.16	c0.37		0.04	0.10		c0.04
v/s Ratio Perm				0.02				0.12				0.05
v/c Ratio		0.66	0.28	0.03		0.92	0.53	0.17	0.63	0.87	0.40	0.72
Uniform Delay, d1		112.7	26.6	22.9		97.5	17.5	12.5	110.5	104.1	98.0	111.0
Progression Factor		0.97	0.85	1.07		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		14.2	0.3	0.1		30.3	0.8	0.3	8.4	28.7	0.5	10.3
Delay (s)		123.7	23.1	24.5		127.8	18.3	12.8	118.9	132.7	98.5	121.3
Level of Service		F	C	C		F	B	B	F	F	F	F
Approach Delay (s)			31.1				35.0			114.8		
Approach LOS			C				D			F		
Intersection Summary												
HCM 2000 Control Delay			56.1				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			240.0				Sum of lost time (s)			19.6		
Intersection Capacity Utilization			85.6%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 6: University Avenue/Univerity Avenue & State Route 9

05/15/2018



Movement	SBT	SBR
Lane Configurations	↑	
Traffic Volume (vph)	155	27
Future Volume (vph)	155	27
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.7	
Lane Util. Factor	1.00	
Frbp, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	1815	
Flt Permitted	1.00	
Satd. Flow (perm)	1815	
Peak-hour factor, PHF	0.92	0.92
Adj. Flow (vph)	168	29
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	194	0
Confl. Peds. (#/hr)		2
Confl. Bikes (#/hr)		4
Turn Type	NA	
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	28.5	
Effective Green, g (s)	28.5	
Actuated g/C Ratio	0.12	
Clearance Time (s)	4.7	
Vehicle Extension (s)	0.2	
Lane Grp Cap (vph)	215	
v/s Ratio Prot	c0.11	
v/s Ratio Perm		
v/c Ratio	0.90	
Uniform Delay, d1	104.4	
Progression Factor	1.00	
Incremental Delay, d2	35.5	
Delay (s)	139.9	
Level of Service	F	
Approach Delay (s)	132.0	
Approach LOS	F	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

7: Alberto Way & State Route 9

05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗			↖	↗		↕		
Traffic Volume (vph)	69	796	22	5	947	11	37	1	10	16	1	62	
Future Volume (vph)	69	796	22	5	947	11	37	1	10	16	1	62	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00		
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Frt	1.00	1.00		1.00	1.00			1.00	0.85		0.89		
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.99		
Satd. Flow (prot)	1770	3522		1770	3532			1776	1556		1625		
Flt Permitted	0.95	1.00		0.95	1.00			0.74	1.00		0.95		
Satd. Flow (perm)	1770	3522		1770	3532			1371	1556		1560		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	75	865	24	5	1029	12	40	1	11	17	1	67	
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	9	0	52	0	
Lane Group Flow (vph)	75	887	0	5	1040	0	0	41	2	0	33	0	
Confl. Peds. (#/hr)			4			4			4			4	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	7	4		3	8			2				6	
Permitted Phases							2		2	6			
Actuated Green, G (s)	11.1	48.9		1.1	38.9			18.5	18.5		18.5		
Effective Green, g (s)	11.1	48.9		1.1	38.9			18.5	18.5		18.5		
Actuated g/C Ratio	0.14	0.60		0.01	0.47			0.23	0.23		0.23		
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0		
Lane Grp Cap (vph)	239	2100		23	1675			309	351		351		
v/s Ratio Prot	0.04	c0.25		0.00	c0.29								
v/s Ratio Perm								c0.03	0.00		0.02		
v/c Ratio	0.31	0.42		0.22	0.62			0.13	0.01		0.09		
Uniform Delay, d1	32.0	8.9		40.0	16.1			25.3	24.6		25.1		
Progression Factor	1.00	1.00		1.20	0.54			1.00	1.00		1.00		
Incremental Delay, d2	0.8	0.6		2.9	1.1			0.9	0.0		0.5		
Delay (s)	32.8	9.6		51.0	9.8			26.2	24.7		25.7		
Level of Service	C	A		D	A			C	C		C		
Approach Delay (s)		11.4			10.0			25.9			25.7		
Approach LOS		B			B			C			C		
Intersection Summary													
HCM 2000 Control Delay			11.6									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47										
Actuated Cycle Length (s)			82.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			64.0%									ICU Level of Service	B
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

8: Los Gatos Blvd & State Route 9

05/15/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	332	469	333	333	341	616
Future Volume (vph)	332	469	333	333	341	616
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.88	1.00	1.00	1.00	0.84
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1398	1770	1863	1863	1336
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1398	1770	1863	1863	1336
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	361	510	362	362	371	670
RTOR Reduction (vph)	0	369	0	0	0	453
Lane Group Flow (vph)	361	141	362	362	371	217
Confl. Peds. (#/hr)		43				43
Confl. Bikes (#/hr)		1				36
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	22.7	22.7	21.1	50.3	24.7	24.7
Effective Green, g (s)	22.7	22.7	21.1	50.3	24.7	24.7
Actuated g/C Ratio	0.28	0.28	0.26	0.61	0.30	0.30
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	489	387	455	1142	561	402
v/s Ratio Prot	c0.20		c0.20	0.19	c0.20	
v/s Ratio Perm		0.10				0.16
v/c Ratio	0.74	0.36	0.80	0.32	0.66	0.54
Uniform Delay, d1	26.9	23.9	28.4	7.6	25.0	23.9
Progression Factor	0.73	2.13	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	2.5	9.3	0.7	6.0	5.1
Delay (s)	28.6	53.4	37.7	8.3	31.0	29.0
Level of Service	C	D	D	A	C	C
Approach Delay (s)	43.1			23.0	29.8	
Approach LOS	D			C	C	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Massol Avenue & State Route 9

05/15/2018



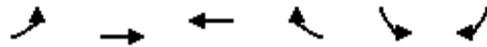
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩		↩	↩	↩	↩
Traffic Volume (veh/h)	1164	80	131	625	13	139
Future Volume (Veh/h)	1164	80	131	625	13	139
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	1200	82	135	644	13	143
Pedestrians	13				3	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	3.5				3.5	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type	TWLTL			None		
Median storage (veh)	2					
Upstream signal (ft)	868					
pX, platoon unblocked					0.91	
vC, conflicting volume			1285		2171 1244	
vC1, stage 1 conf vol					1244	
vC2, stage 2 conf vol					927	
vCu, unblocked vol			1285		2240 1244	
tC, single (s)			4.1		*6.5 *6.2	
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.5 3.3	
p0 queue free %			75		93 33	
cM capacity (veh/h)			538		183 213	
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	
Volume Total	1282	135	644	13	143	
Volume Left	0	135	0	13	0	
Volume Right	82	0	0	0	143	
cSH	1700	538	1700	183	213	
Volume to Capacity	0.75	0.25	0.38	0.07	0.67	
Queue Length 95th (ft)	0	25	0	6	104	
Control Delay (s)	0.0	13.9	0.0	26.1	50.6	
Lane LOS	B		D		F	
Approach Delay (s)	0.0	2.4	48.6			
Approach LOS	E					
Intersection Summary						
Average Delay	4.3					
Intersection Capacity Utilization	86.7%		ICU Level of Service			E
Analysis Period (min)	15					

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: State Route 9 & San Benito Avenue

05/15/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↵			↵
Traffic Volume (veh/h)	0	1303	754	4	0	2
Future Volume (Veh/h)	0	1303	754	4	0	2
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1357	785	4	0	2
Pedestrians					7	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.5	
Percent Blockage					1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)			752			
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	796				1472	794
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	710				1469	708
tC, single (s)	4.1				6.8	*6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	99
cM capacity (veh/h)	783				105	386
Direction, Lane #	EB 1	EB 2	WB 1	SB 1		
Volume Total	678	678	789	2		
Volume Left	0	0	0	0		
Volume Right	0	0	4	2		
cSH	1700	1700	1700	386		
Volume to Capacity	0.40	0.40	0.46	0.01		
Queue Length 95th (ft)	0	0	0	0		
Control Delay (s)	0.0	0.0	0.0	14.4		
Lane LOS				B		
Approach Delay (s)	0.0		0.0	14.4		
Approach LOS				B		
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			49.9%		ICU Level of Service	A
Analysis Period (min)			15			

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

4: Tait Avenue/Monterey Avenue & State Route 9

05/15/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑				↑			↑
Traffic Volume (veh/h)	0	1256	58	0	715	16	0	0	59	0	0	34
Future Volume (Veh/h)	0	1256	58	0	715	16	0	0	59	0	0	34
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.94	0.94	0.94	0.95	0.95	0.95	0.94	0.94	0.94
Hourly flow rate (vph)	0	1322	61	0	761	17	0	0	62	0	0	36
Pedestrians								2			6	
Lane Width (ft)								12.0			12.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					578							
pX, platoon unblocked	0.94						0.94	0.94		0.94	0.94	0.94
vC, conflicting volume	784			1385			1771	2138	694	1498	2160	395
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	644			1385			1694	2084	694	1404	2108	231
tC, single (s)	4.1			4.1			7.5	6.5	*6.2	7.5	6.5	*6.2
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			100	100	86	100	100	95
cM capacity (veh/h)	876			489			54	49	444	80	47	757
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	881	502	507	271	62	36						
Volume Left	0	0	0	0	0	0						
Volume Right	0	61	0	17	62	36						
cSH	1700	1700	1700	1700	444	757						
Volume to Capacity	0.52	0.30	0.30	0.16	0.14	0.05						
Queue Length 95th (ft)	0	0	0	0	12	4						
Control Delay (s)	0.0	0.0	0.0	0.0	14.4	10.0						
Lane LOS					B	A						
Approach Delay (s)	0.0		0.0		14.4	10.0						
Approach LOS					B	A						
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			46.9%		ICU Level of Service				A			
Analysis Period (min)			15									

* User Entered Value

HCM Signalized Intersection Capacity Analysis

5: Santa Cruz Avenue/Santa Cruz Avenue & State Route 9

05/15/2018



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations		↔	↕			↔	↕		↔	↕		↔
Traffic Volume (vph)	25	248	888	142	25	162	336	104	116	154	113	206
Future Volume (vph)	25	248	888	142	25	162	336	104	116	154	113	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6	4.6			4.6	4.6		4.2	4.2		4.2
Lane Util. Factor		1.00	0.95			1.00	0.95		1.00	1.00		1.00
Frbp, ped/bikes		1.00	0.99			1.00	0.98		1.00	0.98		1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00		1.00	1.00		1.00
Frt		1.00	0.98			1.00	0.96		1.00	0.94		1.00
Flt Protected		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (prot)		1770	3448			1770	3361		1770	1707		1770
Flt Permitted		0.95	1.00			0.95	1.00		0.95	1.00		0.95
Satd. Flow (perm)		1770	3448			1770	3361		1770	1707		1770
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	26	253	906	145	26	165	343	106	118	157	115	210
RTOR Reduction (vph)	0	0	7	0	0	0	15	0	0	18	0	0
Lane Group Flow (vph)	0	279	1044	0	0	191	434	0	118	254	0	210
Confl. Peds. (#/hr)				4				11			21	
Confl. Bikes (#/hr)				4				4			4	
Turn Type	Prot	Prot	NA		Prot	Prot	NA		Prot	NA		Prot
Protected Phases	5	5	2		1	1	6		3	8		7
Permitted Phases												
Actuated Green, G (s)		27.5	73.2			19.0	64.7		14.3	25.5		20.7
Effective Green, g (s)		27.5	73.2			19.0	64.7		14.3	25.5		20.7
Actuated g/C Ratio		0.18	0.47			0.12	0.41		0.09	0.16		0.13
Clearance Time (s)		4.6	4.6			4.6	4.6		4.2	4.2		4.2
Vehicle Extension (s)		0.2	0.2			0.2	0.2		0.2	0.2		0.2
Lane Grp Cap (vph)		312	1617			215	1393		162	279		234
v/s Ratio Prot		c0.16	c0.30			0.11	0.13		0.07	c0.15		c0.12
v/s Ratio Perm												
v/c Ratio		0.89	0.65			0.89	0.31		0.73	0.91		0.90
Uniform Delay, d1		62.8	31.5			67.5	30.7		69.0	64.1		66.6
Progression Factor		1.00	1.00			1.13	0.73		1.00	1.00		1.00
Incremental Delay, d2		25.5	2.0			31.3	0.6		12.9	31.3		31.9
Delay (s)		88.3	33.5			107.3	22.9		81.9	95.4		98.5
Level of Service		F	C			F	C		F	F		F
Approach Delay (s)			45.0				48.1			91.3		
Approach LOS			D				D			F		
Intersection Summary												
HCM 2000 Control Delay			57.6				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			156.0				Sum of lost time (s)			17.6		
Intersection Capacity Utilization			85.2%				ICU Level of Service			E		
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Santa Cruz Avenuea/Santa Cruz Avenue & State Route 9

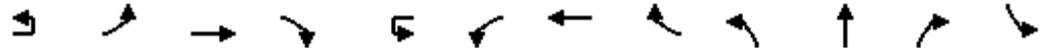
05/15/2018



Movement	SBT	SBR
Lane Configurations	↑	↗
Traffic Volume (vph)	281	175
Future Volume (vph)	281	175
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.2	4.2
Lane Util. Factor	1.00	1.00
Frbp, ped/bikes	1.00	0.94
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	1.00	1.00
Satd. Flow (prot)	1863	1491
Flt Permitted	1.00	1.00
Satd. Flow (perm)	1863	1491
Peak-hour factor, PHF	0.98	0.98
Adj. Flow (vph)	287	179
RTOR Reduction (vph)	0	142
Lane Group Flow (vph)	287	37
Confl. Peds. (#/hr)		26
Confl. Bikes (#/hr)		4
Turn Type	NA	Perm
Protected Phases	4	
Permitted Phases		4
Actuated Green, G (s)	31.9	31.9
Effective Green, g (s)	31.9	31.9
Actuated g/C Ratio	0.20	0.20
Clearance Time (s)	4.2	4.2
Vehicle Extension (s)	0.2	0.2
Lane Grp Cap (vph)	380	304
v/s Ratio Prot	0.15	
v/s Ratio Perm		0.02
v/c Ratio	0.76	0.12
Uniform Delay, d1	58.4	50.6
Progression Factor	1.00	1.00
Incremental Delay, d2	7.4	0.1
Delay (s)	65.8	50.7
Level of Service	E	D
Approach Delay (s)	71.9	
Approach LOS	E	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 6: University Avenue/Univerity Avenue & State Route 9

05/15/2018



Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	
Lane Configurations													
Traffic Volume (vph)	6	28	1125	91	4	222	497	145	82	143	383	271	
Future Volume (vph)	6	28	1125	91	4	222	497	145	82	143	383	271	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.1	5.1	5.1		5.1	5.1	5.1	4.7	4.7	4.7	4.7	
Lane Util. Factor		1.00	0.95	1.00		1.00	0.95	1.00	1.00	1.00	1.00	0.97	
Frbp, ped/bikes		1.00	1.00	0.98		1.00	1.00	0.92	1.00	1.00	0.95	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	
Frt		1.00	1.00	0.85		1.00	1.00	0.85	1.00	1.00	0.85	1.00	
Flt Protected		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Satd. Flow (prot)		1770	3539	1547		1770	3539	1451	1770	1863	1512	3433	
Flt Permitted		0.95	1.00	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Satd. Flow (perm)		1770	3539	1547		1770	3539	1451	1770	1863	1512	3433	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	6	29	1172	95	4	231	518	151	85	149	399	282	
RTOR Reduction (vph)	0	0	0	42	0	0	0	61	0	0	249	0	
Lane Group Flow (vph)	0	35	1172	53	0	235	518	90	85	149	150	282	
Confl. Peds. (#/hr)								20			20		
Confl. Bikes (#/hr)				4				4			4		
Turn Type	Prot	Prot	NA	Perm	Prot	Prot	NA	Perm	Prot	NA	Perm	Prot	
Protected Phases	5	5	2		1	1	6		3	8		7	
Permitted Phases				2				6			8		
Actuated Green, G (s)		7.2	74.7	74.7		25.9	93.4	93.4	13.4	21.2	21.2	14.6	
Effective Green, g (s)		7.2	74.7	74.7		25.9	93.4	93.4	13.4	21.2	21.2	14.6	
Actuated g/C Ratio		0.05	0.48	0.48		0.17	0.60	0.60	0.09	0.14	0.14	0.09	
Clearance Time (s)		5.1	5.1	5.1		5.1	5.1	5.1	4.7	4.7	4.7	4.7	
Vehicle Extension (s)		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	
Lane Grp Cap (vph)		81	1694	740		293	2118	868	152	253	205	321	
v/s Ratio Prot		0.02	c0.33			c0.13	0.15		0.05	0.08		c0.08	
v/s Ratio Perm				0.03				0.06			0.10		
v/c Ratio		0.43	0.69	0.07		0.80	0.24	0.10	0.56	0.59	0.73	0.88	
Uniform Delay, d1		72.4	31.7	21.9		62.6	14.7	13.4	68.5	63.3	64.7	69.8	
Progression Factor		1.40	0.65	0.32		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.0	1.8	0.1		13.8	0.3	0.2	2.5	2.3	11.0	22.1	
Delay (s)		102.6	22.4	7.2		76.4	15.0	13.6	71.0	65.6	75.7	91.9	
Level of Service		F	C	A		E	B	B	E	E	E	F	
Approach Delay (s)			23.5			30.7			72.7				
Approach LOS			C			C			E				
Intersection Summary													
HCM 2000 Control Delay			44.3		HCM 2000 Level of Service					D			
HCM 2000 Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			156.0		Sum of lost time (s)					19.6			
Intersection Capacity Utilization			97.7%		ICU Level of Service					F			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 6: University Avenue/Univerity Avenue & State Route 9

05/15/2018



Movement	SBT	SBR
Lane Configurations	↑	
Traffic Volume (vph)	180	26
Future Volume (vph)	180	26
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	4.7	
Lane Util. Factor	1.00	
Frbp, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.98	
Flt Protected	1.00	
Satd. Flow (prot)	1819	
Flt Permitted	1.00	
Satd. Flow (perm)	1819	
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	188	27
RTOR Reduction (vph)	3	0
Lane Group Flow (vph)	212	0
Confl. Peds. (#/hr)		15
Confl. Bikes (#/hr)		4
Turn Type	NA	
Protected Phases	4	
Permitted Phases		
Actuated Green, G (s)	22.4	
Effective Green, g (s)	22.4	
Actuated g/C Ratio	0.14	
Clearance Time (s)	4.7	
Vehicle Extension (s)	0.2	
Lane Grp Cap (vph)	261	
v/s Ratio Prot	c0.12	
v/s Ratio Perm		
v/c Ratio	0.81	
Uniform Delay, d1	64.7	
Progression Factor	1.00	
Incremental Delay, d2	16.3	
Delay (s)	81.0	
Level of Service	F	
Approach Delay (s)	87.2	
Approach LOS	F	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

7: Alberto Way & State Route 9

05/15/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		 			 						 		
Traffic Volume (vph)	68	895	34	19	765	23	15	0	11	32	0	71	
Future Volume (vph)	68	895	34	19	765	23	15	0	11	32	0	71	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5		4.5	4.5			4.5	4.5		4.5		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00		
Frbp, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99		
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00		
Frt	1.00	0.99		1.00	1.00			1.00	0.85		0.91		
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.98		
Satd. Flow (prot)	1770	3516		1770	3521			1770	1556		1644		
Flt Permitted	0.95	1.00		0.95	1.00			0.70	1.00		0.92		
Satd. Flow (perm)	1770	3516		1770	3521			1299	1556		1533		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	74	973	37	21	832	25	16	0	12	35	0	77	
RTOR Reduction (vph)	0	3	0	0	3	0	0	0	9	0	83	0	
Lane Group Flow (vph)	74	1007	0	21	854	0	0	16	3	0	29	0	
Confl. Peds. (#/hr)			4			4			4			4	
Turn Type	Prot	NA		Prot	NA		Perm	NA	Perm	Perm	NA		
Protected Phases	7	4		3	8			2				6	
Permitted Phases							2		2	6			
Actuated Green, G (s)	11.0	43.8		2.2	35.0			20.5	20.5			20.5	
Effective Green, g (s)	11.0	43.8		2.2	35.0			20.5	20.5			20.5	
Actuated g/C Ratio	0.14	0.55		0.03	0.44			0.26	0.26			0.26	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5	4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0			3.0	
Lane Grp Cap (vph)	243	1925		48	1540			332	398			392	
v/s Ratio Prot	0.04	c0.29		0.01	c0.24								
v/s Ratio Perm								0.01	0.00			c0.02	
v/c Ratio	0.30	0.52		0.44	0.55			0.05	0.01			0.07	
Uniform Delay, d1	31.1	11.5		38.3	16.7			22.4	22.2			22.5	
Progression Factor	1.00	1.00		1.18	0.54			1.00	1.00			1.00	
Incremental Delay, d2	0.7	1.0		4.6	1.1			0.3	0.0			0.4	
Delay (s)	31.8	12.5		49.9	10.0			22.7	22.2			22.9	
Level of Service	C	B		D	B			C	C			C	
Approach Delay (s)		13.8			11.0			22.5				22.9	
Approach LOS		B			B			C				C	
Intersection Summary													
HCM 2000 Control Delay			13.2									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.42										
Actuated Cycle Length (s)			80.0									Sum of lost time (s)	13.5
Intersection Capacity Utilization			67.1%									ICU Level of Service	C
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

8: Los Gatos Blvd & State Route 9

05/15/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	578	374	317	398	337	477
Future Volume (vph)	578	374	317	398	337	477
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.96	1.00	1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1521	1770	1863	1863	1511
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1521	1770	1863	1863	1511
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	584	378	320	402	340	482
RTOR Reduction (vph)	0	234	0	0	0	371
Lane Group Flow (vph)	584	144	320	402	340	111
Confl. Peds. (#/hr)		9				9
Confl. Bikes (#/hr)						4
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	30.5	30.5	17.5	40.5	18.5	18.5
Effective Green, g (s)	30.5	30.5	17.5	40.5	18.5	18.5
Actuated g/C Ratio	0.38	0.38	0.22	0.51	0.23	0.23
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	674	579	387	943	430	349
v/s Ratio Prot	c0.33		c0.18	0.22	c0.18	
v/s Ratio Perm		0.09				0.07
v/c Ratio	0.87	0.25	0.83	0.43	0.79	0.32
Uniform Delay, d1	22.9	16.9	29.8	12.4	28.9	25.5
Progression Factor	0.55	0.25	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.8	0.9	13.5	1.4	13.8	2.4
Delay (s)	25.4	5.2	43.3	13.8	42.7	27.9
Level of Service	C	A	D	B	D	C
Approach Delay (s)	17.5			26.9	34.0	
Approach LOS	B			C	C	
Intersection Summary						
HCM 2000 Control Delay			25.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.83			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	13.5
Intersection Capacity Utilization			78.6%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Appendix E

Synchro Measures of Effectiveness

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	11	9	10
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	11	9	10
Total Delay (hr)	22	31	52
Stops / Veh	0.22	0.20	0.21
Stops (#)	1610	2422	4032
Average Speed (mph)	18	18	18
Total Travel Time (hr)	44	64	108
Distance Traveled (mi)	779	1121	1901
Fuel Consumed (gal)	58	83	141
Fuel Economy (mpg)	13.5	13.4	13.5
CO Emissions (kg)	4.04	5.83	9.87
NOx Emissions (kg)	0.79	1.13	1.92
VOC Emissions (kg)	0.94	1.35	2.29
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	69	89	158
Performance Index	26.1	37.2	63.3

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	17
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	17
Total Delay (hr)	117
Stops / Veh	0.26
Stops (#)	6598
Average Speed (mph)	13
Total Travel Time (hr)	197
Distance Traveled (mi)	2625
Fuel Consumed (gal)	228
Fuel Economy (mpg)	11.5
CO Emissions (kg)	15.95
NOx Emissions (kg)	3.10
VOC Emissions (kg)	3.70
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	158
Performance Index	135.2

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	11	15	13
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	12	15	14
Total Delay (hr)	24	49	73
Stops / Veh	0.25	0.31	0.29
Stops (#)	1806	3700	5506
Average Speed (mph)	17	14	15
Total Travel Time (hr)	46	82	128
Distance Traveled (mi)	781	1121	1902
Fuel Consumed (gal)	61	105	166
Fuel Economy (mpg)	12.9	10.7	11.5
CO Emissions (kg)	4.24	7.35	11.60
NOx Emissions (kg)	0.83	1.43	2.26
VOC Emissions (kg)	0.98	1.70	2.69
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	105	147	252
Performance Index	28.5	59.4	87.9

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	19
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	20
Total Delay (hr)	137
Stops / Veh	0.31
Stops (#)	7897
Average Speed (mph)	13
Total Travel Time (hr)	229
Distance Traveled (mi)	2931
Fuel Consumed (gal)	265
Fuel Economy (mpg)	11.0
CO Emissions (kg)	18.55
NOx Emissions (kg)	3.61
VOC Emissions (kg)	4.30
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	252
Performance Index	158.5

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	11	14	13
Queue Delay / Veh (s/v)	0	3	2
Total Delay / Veh (s/v)	11	17	15
Total Delay (hr)	23	55	78
Stops / Veh	0.24	0.31	0.28
Stops (#)	1767	3656	5423
Average Speed (mph)	17	13	14
Total Travel Time (hr)	46	88	134
Distance Traveled (mi)	781	1121	1902
Fuel Consumed (gal)	60	109	169
Fuel Economy (mpg)	13.0	10.3	11.2
CO Emissions (kg)	4.21	7.64	11.85
NOx Emissions (kg)	0.82	1.49	2.30
VOC Emissions (kg)	0.98	1.77	2.75
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	100	142	242
Performance Index	28.1	65.1	93.3

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	19
Queue Delay / Veh (s/v)	1
Total Delay / Veh (s/v)	20
Total Delay (hr)	142
Stops / Veh	0.31
Stops (#)	7806
Average Speed (mph)	13
Total Travel Time (hr)	234
Distance Traveled (mi)	2931
Fuel Consumed (gal)	269
Fuel Economy (mpg)	10.9
CO Emissions (kg)	18.79
NOx Emissions (kg)	3.66
VOC Emissions (kg)	4.35
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	242
Performance Index	163.8

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	12	16	15
Queue Delay / Veh (s/v)	0	5	3
Total Delay / Veh (s/v)	12	21	18
Total Delay (hr)	24	71	94
Stops / Veh	0.25	0.36	0.32
Stops (#)	1831	4329	6160
Average Speed (mph)	17	11	13
Total Travel Time (hr)	46	104	150
Distance Traveled (mi)	781	1121	1902
Fuel Consumed (gal)	61	125	186
Fuel Economy (mpg)	12.8	8.9	10.2
CO Emissions (kg)	4.27	8.76	13.02
NOx Emissions (kg)	0.83	1.70	2.53
VOC Emissions (kg)	0.99	2.03	3.02
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	107	140	247
Performance Index	28.8	82.6	111.3

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	21
Queue Delay / Veh (s/v)	3
Total Delay / Veh (s/v)	23
Total Delay (hr)	164
Stops / Veh	0.34
Stops (#)	8621
Average Speed (mph)	11
Total Travel Time (hr)	256
Distance Traveled (mi)	2931
Fuel Consumed (gal)	290
Fuel Economy (mpg)	10.1
CO Emissions (kg)	20.29
NOx Emissions (kg)	3.95
VOC Emissions (kg)	4.70
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	247
Performance Index	187.8

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	11	10	11
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	11	10	11
Total Delay (hr)	23	34	57
Stops / Veh	0.24	0.24	0.24
Stops (#)	1730	2848	4578
Average Speed (mph)	17	17	17
Total Travel Time (hr)	46	68	113
Distance Traveled (mi)	781	1121	1902
Fuel Consumed (gal)	60	89	149
Fuel Economy (mpg)	13.1	12.5	12.7
CO Emissions (kg)	4.18	6.25	10.43
NOx Emissions (kg)	0.81	1.22	2.03
VOC Emissions (kg)	0.97	1.45	2.42
Unserved Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	87	126	213
Performance Index	27.9	42.2	70.1

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	19
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	19
Total Delay (hr)	130
Stops / Veh	0.29
Stops (#)	7227
Average Speed (mph)	13
Total Travel Time (hr)	223
Distance Traveled (mi)	2931
Fuel Consumed (gal)	256
Fuel Economy (mpg)	11.4
CO Emissions (kg)	17.92
NOx Emissions (kg)	3.49
VOC Emissions (kg)	4.15
Unserved Vehicles (#)	0
Vehicles in dilemma zone (#)	213
Performance Index	150.5

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	11	10	11
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	11	10	11
Total Delay (hr)	41	19	60
Stops / Veh	0.29	0.24	0.27
Stops (#)	3897	1617	5514
Average Speed (mph)	17	17	17
Total Travel Time (hr)	82	39	121
Distance Traveled (mi)	1415	673	2089
Fuel Consumed (gal)	113	52	165
Fuel Economy (mpg)	12.5	13.0	12.6
CO Emissions (kg)	7.93	3.63	11.56
NOx Emissions (kg)	1.54	0.71	2.25
VOC Emissions (kg)	1.84	0.84	2.68
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	121	57	178
Performance Index	51.7	23.9	75.6

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	16
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	16
Total Delay (hr)	114
Stops / Veh	0.32
Stops (#)	8086
Average Speed (mph)	14
Total Travel Time (hr)	198
Distance Traveled (mi)	2751
Fuel Consumed (gal)	243
Fuel Economy (mpg)	11.3
CO Emissions (kg)	16.96
NOx Emissions (kg)	3.30
VOC Emissions (kg)	3.93
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	178
Performance Index	136.5

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	8	10	9
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	8	10	9
Total Delay (hr)	32	21	53
Stops / Veh	0.22	0.43	0.29
Stops (#)	3216	3195	6411
Average Speed (mph)	20	16	18
Total Travel Time (hr)	73	42	115
Distance Traveled (mi)	1438	685	2122
Fuel Consumed (gal)	102	63	165
Fuel Economy (mpg)	14.0	10.9	12.9
CO Emissions (kg)	7.16	4.38	11.54
NOx Emissions (kg)	1.39	0.85	2.25
VOC Emissions (kg)	1.66	1.02	2.67
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	122	60	182
Performance Index	40.6	30.4	70.9

Network Totals

Number of Intersections	11
Control Delay / Veh (s/v)	15
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	15
Total Delay (hr)	116
Stops / Veh	0.34
Stops (#)	9157
Average Speed (mph)	14
Total Travel Time (hr)	201
Distance Traveled (mi)	2785
Fuel Consumed (gal)	249
Fuel Economy (mpg)	11.2
CO Emissions (kg)	17.43
NOx Emissions (kg)	3.39
VOC Emissions (kg)	4.04
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	182
Performance Index	141.0

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	9	10	10
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	9	10	10
Total Delay (hr)	35	19	54
Stops / Veh	0.26	0.19	0.23
Stops (#)	3403	1309	4712
Average Speed (mph)	21	17	20
Total Travel Time (hr)	91	39	129
Distance Traveled (mi)	1950	673	2624
Fuel Consumed (gal)	126	49	175
Fuel Economy (mpg)	15.5	13.6	15.0
CO Emissions (kg)	8.78	3.45	12.23
NOx Emissions (kg)	1.71	0.67	2.38
VOC Emissions (kg)	2.03	0.80	2.83
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	160	49	209
Performance Index	44.2	22.4	66.6

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	16
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	16
Total Delay (hr)	110
Stops / Veh	0.29
Stops (#)	7349
Average Speed (mph)	16
Total Travel Time (hr)	210
Distance Traveled (mi)	3286
Fuel Consumed (gal)	255
Fuel Economy (mpg)	12.9
CO Emissions (kg)	17.80
NOx Emissions (kg)	3.46
VOC Emissions (kg)	4.13
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	209
Performance Index	130.5

State Route 9

Direction	EB	WB	All
Control Delay / Veh (s/v)	9	10	10
Queue Delay / Veh (s/v)	0	0	0
Total Delay / Veh (s/v)	9	10	10
Total Delay (hr)	34	19	54
Stops / Veh	0.21	0.26	0.23
Stops (#)	2816	1737	4553
Average Speed (mph)	19	17	18
Total Travel Time (hr)	75	39	114
Distance Traveled (mi)	1415	673	2089
Fuel Consumed (gal)	100	53	153
Fuel Economy (mpg)	14.1	12.8	13.6
CO Emissions (kg)	7.02	3.68	10.70
NOx Emissions (kg)	1.37	0.72	2.08
VOC Emissions (kg)	1.63	0.85	2.48
Unserviced Vehicles (#)	0	0	0
Vehicles in dilemma zone (#)	119	57	176
Performance Index	42.0	24.3	66.3

Network Totals

Number of Intersections	10
Control Delay / Veh (s/v)	16
Queue Delay / Veh (s/v)	0
Total Delay / Veh (s/v)	16
Total Delay (hr)	110
Stops / Veh	0.29
Stops (#)	7310
Average Speed (mph)	14
Total Travel Time (hr)	195
Distance Traveled (mi)	2751
Fuel Consumed (gal)	233
Fuel Economy (mpg)	11.8
CO Emissions (kg)	16.30
NOx Emissions (kg)	3.17
VOC Emissions (kg)	3.78
Unserviced Vehicles (#)	0
Vehicles in dilemma zone (#)	176
Performance Index	130.6

Appendix F

Signal Warrant Analysis



Warrant 1: Eight-Hour Vehicular Volume

State Route 9 & Massol Avenue

Los Gatos

Project Name: Highway 9 Corridor Study

Intersection: 1

Scenario: AM Existing

Date of Count: Tuesday, January 30, 2018

	<u>Major Street</u>	<u>Minor Street</u>
Street Name:	State Route 9	Massol Avenue
Direction:	E-W	N-S
Number of Lanes:	2	2
Approach Speed:	35	25
Community with population < 10,000?	<u>No</u>	

WARRANT MET?

No

Condition A — Minimum Vehicle Volume:
 Condition B — Interruption of Continuous Traffic:
 Combination of Conditions A & B:

Warrant Met	Num. Hrs Met	8th Highest Hr	
		Major	Minor
No	1	N/A	N/A
No	2	N/A	N/A
No			

Table 4C-1 of MUTCD. Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more ..	1	600	480	420	336	150	120	105	84
2 or more	2 or more ..	600	480	420	336	200	160	140	112
1	2 or more ..	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more ..	1	900	720	630	504	75	60	53	42
2 or more ..	2 or more ..	900	720	630	504	100	80	70	56
1	2 or more ..	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume.

^b Used for combination of Conditions A and B after adequate trial of other remedial measures.

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.



Warrant 2: Four-Hour Vehicular Volume

State Route 9 & Massol Avenue
Los Gatos

Project Name: Highway 9 Corridor Study

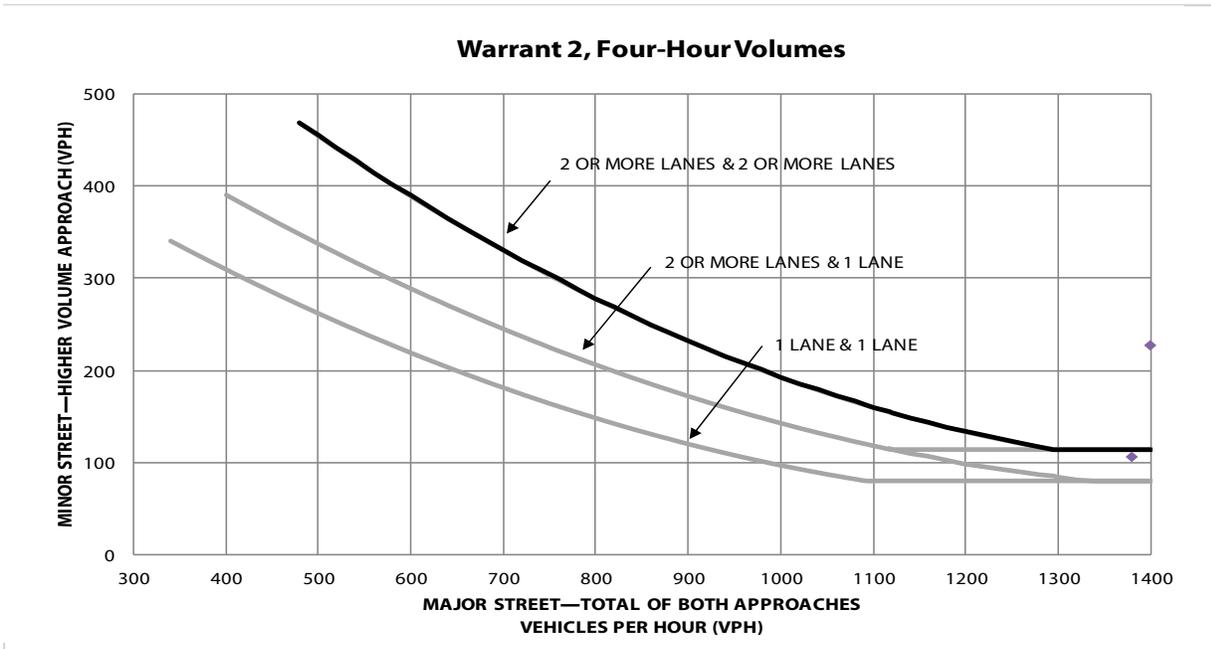
Intersection: 1
Scenario: AM Existing
Date of Count: 1/30/2018

	<u>Major Street</u>	<u>Minor Street</u>
Street Name:	State Route 9	Massol Avenue
Direction:	E-W	N-S
Number of Lanes:	2	2
Approach Speed:	35	25

Community with population < 10,000? No

WARRANT MET? No

Hour	Both Approaches	Highest Approach
	Major Street	Minor Street
1	2056	227
2	1380	107
3	—	—
4	—	—



Warrant 3: Peak-Hour Volumes and Delay

State Route 9 & Massol Avenue
Los Gatos

Project Name: Highway 9 Corridor Study

Intersection: 1

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	State Route 9	Massol Avenue
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	35	25

Population less than 10,000? No
Date of Count: Tuesday, January 30, 2018
Scenario: AM Existing

Warrant 3 Met?: Met when either Condition A or B is met	Yes
Condition A: Met when conditions A1, A2, and A3 are met	<u>Not Met</u>
Condition A1	<u>Not Met</u>

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 3.27 vehicle-hours

Condition A2	<u>Met</u>
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The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 227 vph

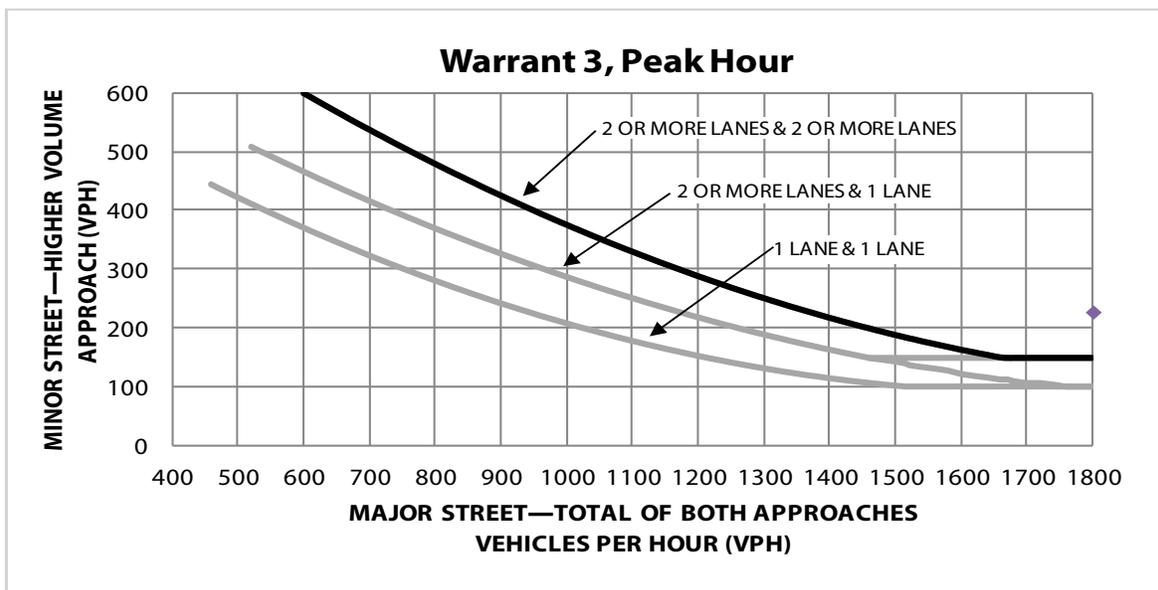
Condition A3	<u>Met</u>
--------------	------------

The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 2283 vph

Condition B	<u>Met</u>
-------------	------------

The plotted point falls above the curve



Warrant 1: Eight-Hour Vehicular Volume

State Route 9 & Massol Avenue

Los Gatos

Project Name: Highway 9 Corridor Study

Intersection: 1

Scenario: PM Existing

Date of Count: Tuesday, January 30, 2018

	<u>Major Street</u>	<u>Minor Street</u>
Street Name:	State Route 9	Massol Avenue
Direction:	E-W	N-S
Number of Lanes:	2	2
Approach Speed:	35	25
Community with population < 10,000?	<u>No</u>	

WARRANT MET?

No

Condition A — Minimum Vehicle Volume:
 Condition B — Interruption of Continuous Traffic:
 Combination of Conditions A & B:

Warrant Met	Num. Hrs Met	8th Highest Hr	
		Major	Minor
No	0	N/A	N/A
No	2	N/A	N/A
No			

Table 4C-1 of MUTCD. Warrant 1, Eight-Hour Vehicular Volume

Condition A - Minimum Vehicular Volume									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	500	400	350	280	150	120	105	84
2 or more ..	1	600	480	420	336	150	120	105	84
2 or more	2 or more ..	600	480	420	336	200	160	140	112
1	2 or more ..	500	400	350	280	200	160	140	112

Condition B - Interruption of Continuous Traffic									
Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100% ^a	80% ^b	70% ^c	56% ^d	100% ^a	80% ^b	70% ^c	56% ^d
1	1	750	600	525	420	75	60	53	42
2 or more ..	1	900	720	630	504	75	60	53	42
2 or more ..	2 or more ..	900	720	630	504	100	80	70	56
1	2 or more ..	750	600	525	420	100	80	70	56

^a Basic minimum hourly volume.

^b Used for combination of Conditions A and B after adequate trial of other remedial measures.

^c May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.



Warrant 2: Four-Hour Vehicular Volume

State Route 9 & Massol Avenue
Los Gatos

Project Name: Highway 9 Corridor Study

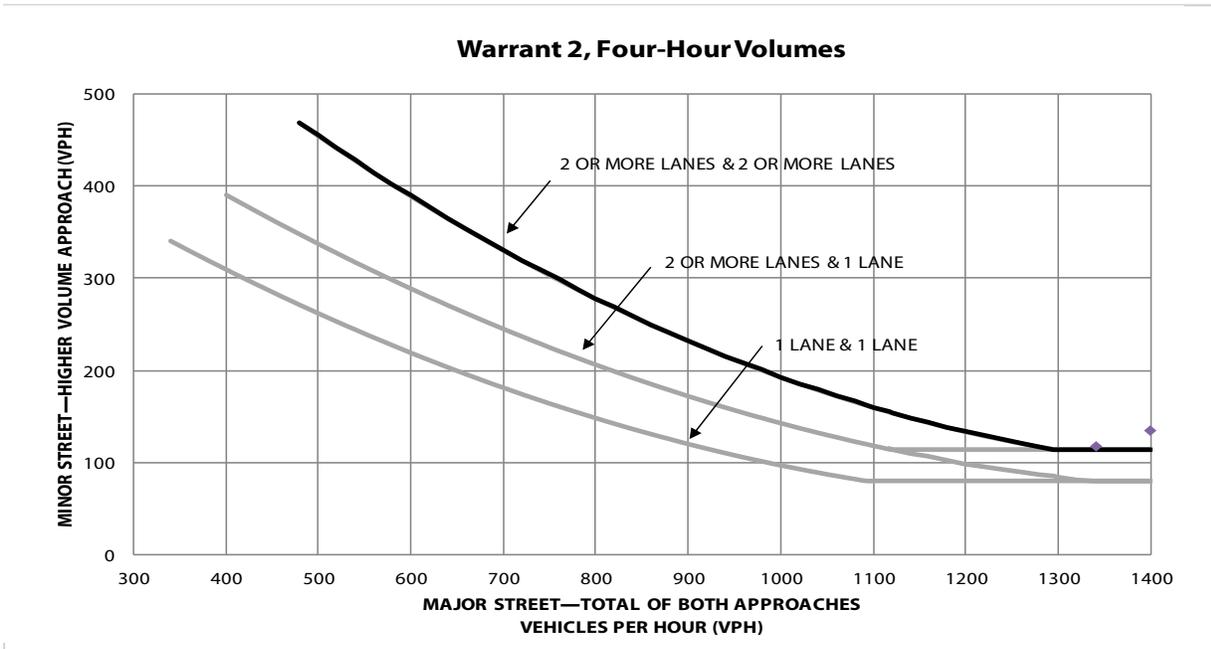
Intersection: 1
Scenario: PM Existing
Date of Count: 1/30/2018

	<u>Major Street</u>	<u>Minor Street</u>
Street Name:	State Route 9	Massol Avenue
Direction:	E-W	N-S
Number of Lanes:	2	2
Approach Speed:	35	25

Community with population < 10,000? No

WARRANT MET? No

Hour	Both Approaches	Highest Approach
	Major Street	Minor Street
1	1854	135
2	1341	118
3	—	—
4	—	—



Warrant 3: Peak-Hour Volumes and Delay

State Route 9 & Massol Avenue
Los Gatos

Project Name: Highway 9 Corridor Study

Intersection: 1

	<u>Major Street</u>	<u>Minor Street</u>
Street Name	State Route 9	Massol Avenue
Direction	E-W	N-S
Number of Lanes	2	2
Approach Speed	35	25

Population less than 10,000? No
Date of Count: Tuesday, January 30, 2018
Scenario: PM Existing

Warrant 3 Met?: Met when either Condition A or B is met	No
Condition A: Met when conditions A1, A2, and A3 are met	<u>Not Met</u>
Condition A1	<u>Not Met</u>

The total delay experienced by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for a one lane approach, or five vehicle-hours for a two-lane approach

Minor Approach Delay: 1.93 vehicle-hours

Condition A2	<u>Not Met</u>
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The volume on the same minor street approach (one direction only) equals or exceeds 100 vph for one moving lane of traffic of 150 vph for two moving lanes

Minor Approach Volume: 143 vph

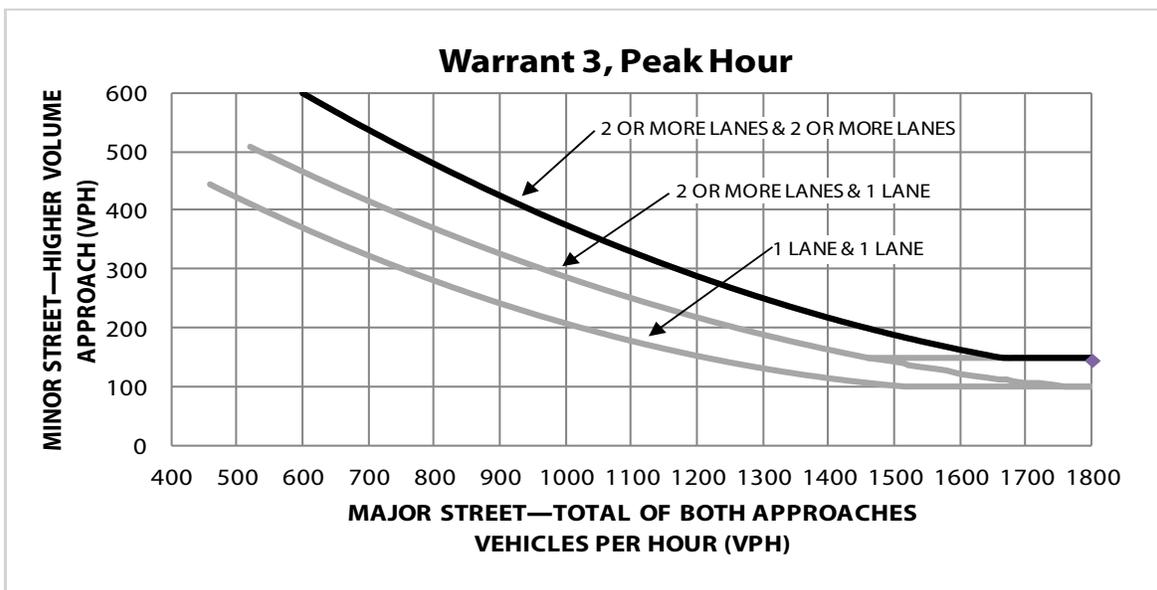
Condition A3	<u>Met</u>
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The total entering volume serviced during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches

Total Entering Volume: 2043 vph

Condition B	<u>Not Met</u>
-------------	----------------

The plotted point falls above the curve



Appendix G

NCHRP Pedestrian Crossing Treatment Worksheet



TCRP Report 112 - NCHRP Report 562 - Pedestrian Crossing Treatment Worksheet

Worksheet 1: Peak-Hour, 35 MPH or Less

Analyst and Site Information

Analyst: _____ Major Street: State Route 9
 Analysis Date: _____ Minor Street or Location: Massol Avenue
 Data Collection Date: _____ Peak Hour: _____

Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street):
 a) Worksheet 1 - 35 mph or less
 b) Worksheet 2- exceeds 35 mph, communities with less than 10,000, or where major transit stop exists

Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?

2a Peak-hour pedestrian volume (ped/h), vp **2a** 20
 o If 2a ≥ 20 ped/h, then go to Step 3.
 o If 2a < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.

Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?

3a Major road volume, total of both approaches during peak hour (veh/h), V maj-s **3a** 1896

3b o Minimum signal warrant volume for peak hour (use 3a for Vmaj-s), SC **3b** 112.84
 • SC = 0.00021 Vmaj-s² - 0.74072 Vmaj-s + 734.125/0.75 OR
 • [(0.00021 3a² - 0.74072 3a + 734.125)/0.75]

3c o If 3b < 133, then enter 133. If 3b ≥ 133, then enter 3b. **3c** 133

3d o If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce 3c by up to 50 percent; otherwise enter 3c. **3d** 133
 o If 2a ≥ 3d, then the warrant has been met and a traffic signal should be considered if not within 300 ft of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.

Step 4: Estimate pedestrian delay.

4a Pedestrian crossing distance, curb to curb (ft), L **4a** 32

4b Pedestrian walking speed (ft.s), Sp **4b** 3.5

4c Pedestrian start-up time and end clearance time (s), ts **4c** 7

4d o Critical gap required for crossing pedestrian (s), tc = (L/Sp) + ts OR [(4a/4b) + 4c] **4d** 16.14

4e Major road volume, total of both approaches or approach being crossed if median refuge island is present during peak hour (veh.h), Vmaj-d **4e** 1896

4f o Major road flow rate (veh/s), v = Vmaj-d/3600 OR [4e/3600] **4f** 0.53

4g o Average pedestrian delay (s/person), dp = (e^{tc} - v tc - 1) / v OR [(e^{4d x 4d} - 4f x 4d - 1) / 4f] **4g** 9331.59

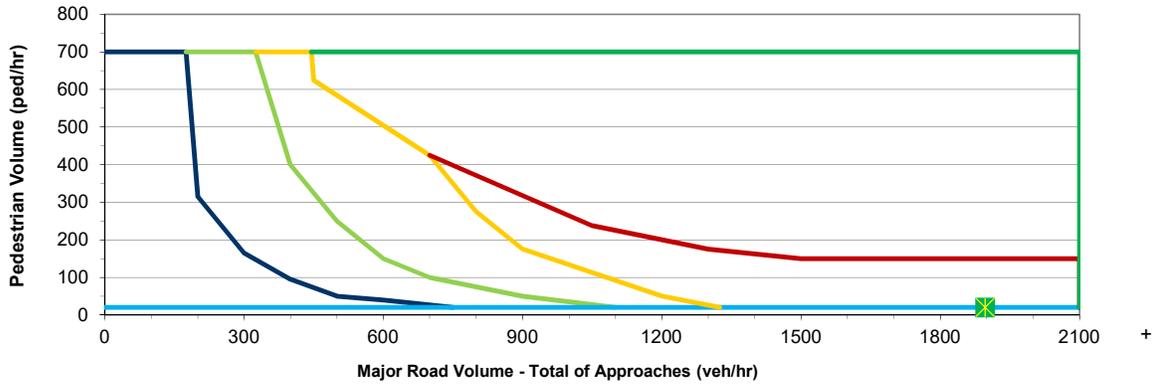
4h o Total pedestrian delay (h), Dp = (dp x Vp) / 3600 OR [(4g x 2a) / 3600] **4h** 51.84
 (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment - assumes 05 compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.

Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.

5a Expected motorist compliance at pedestrian crossings in region, Comp = high or low **5a** HIGH

Total Pedestrian Delay Dp (4h) and Comp (5a)	Treatment Category (see Descriptions of Sample Treatments for examples)
Dp ≥ 21.3h (Comp = high or low) OR 5.3h ≤ Dp < 21.3 h and Comp = low	USE RED
1.3h ≤ Dp < 21.3h and Comp = high or low OR 5.3 ≤ Dp < 21.3 h and Comp = high	DO NOT USE ACTIVE OR ENHANCED
Dp < 1.3 h (Comp = high or low)	DO NOT USE CROSSWALK

Roadway Configuration: 50' Wide, <35 mph, Vped = 3.5 ft/s



LEGEND
X Study Intersection
Signal
Enhanced-High Visibility/Active when Present
Red
Enhanced-High Visibility/Active when Present (if high compliance expected) OR Red (if low compliance expected)
Striped Crosswalk
No Treatment

DESCRIPTIONS OF TREATMENT TYPE		
RED	ENHANCED-HIGH VISIBILITY/ACTIVE WHEN PRESENT	
	Active When Present	Enhanced/High Visibility
<ul style="list-style-type: none"> • Midblock Signal • Half Signal • HAWK 	<ul style="list-style-type: none"> • In Roadway Warning Lights • Passive/Pushbutton Flashing Beacons • Pedestrian Crossing Flags • Rapid Rectangular Flashing Beacons 	<ul style="list-style-type: none"> • In-Street Crossing Signs • High Visibility Signs/Markings • Pedestrian Refuge Islands • Raised Crosswalks • Curb Extensions • Advanced Signage • Advanced Stop/Yield Lines • Constant Flashing Yellow Beacons

Appendix H

SIMTRAFFIC Corridor Functionality Analysis

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 11 Speed	Run 11 Delay
Montgomery Street	1	1.6	14.4	0.1	34	36	1.1
Massol Avenue	2	0.6	2.4	0.0	29	30	0.5
San Benito Avenue	3	0.3	2.7	0.0	29	29	0.3
Tait Avenue	4	0.7	4.8	0.0	25	24	0.9
Santa Cruz Avenuea	5	17.6	28.2	0.1	14	14	18.3
University Avenue	6	22.0	30.6	0.1	10	11	21.8
SB SR 17 Ramps	101	6.6	25.5	0.2	27	27	6.6
NB SR 17 Ramps	102	1.7	18.4	0.2	35	36	1.5
Alberto Way	7	7.1	13.3	0.1	17	17	7.4
Los Gatos Blvd	8	24.3	41.9	0.2	14	14	23.1
Total		82.4	182.2	1.0	20	20	81.4

Arterial Level of Service: EB State Route 9

Cross Street	Run 12 Speed	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 16 Speed
Montgomery Street	36	1.0	35	1.2	36	1.2	35
Massol Avenue	29	0.6	30	0.5	30	0.5	30
San Benito Avenue	29	0.3	30	0.2	30	0.2	30
Tait Avenue	25	0.6	25	0.6	25	0.7	25
Santa Cruz Avenuea	15	15.2	13	19.2	14	18.1	15
University Avenue	10	23.7	10	22.1	11	20.3	10
SB SR 17 Ramps	27	6.4	27	6.4	28	5.5	26
NB SR 17 Ramps	35	1.6	34	1.8	36	1.3	34
Alberto Way	17	6.8	17	7.0	18	6.7	18
Los Gatos Blvd	14	22.7	12	29.0	13	26.6	13
Total	20	78.9	19	88.1	20	81.2	20

Arterial Level of Service: EB State Route 9

Cross Street	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 20 Speed	Run 20 Delay
Montgomery Street	1.2	34	1.6	36	1.1	35	1.3
Massol Avenue	0.5	29	0.6	30	0.5	25	1.0
San Benito Avenue	0.2	29	0.3	29	0.3	29	0.3
Tait Avenue	0.6	25	0.6	24	0.7	25	0.7
Santa Cruz Avenuea	15.6	13	19.0	14	17.7	15	15.0
University Avenue	23.6	9	25.8	11	22.0	11	20.9
SB SR 17 Ramps	7.4	27	6.8	27	6.6	28	6.2
NB SR 17 Ramps	1.9	34	1.8	35	1.9	34	1.9
Alberto Way	6.4	17	7.0	17	7.1	16	7.8
Los Gatos Blvd	25.6	15	21.6	15	20.8	14	24.8
Total	83.1	20	85.1	20	78.8	20	79.9

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 11 Speed	Run 11 Delay
Alberto Way	7	23.7	41.2	0.2	14	14	24.8
NB SR 17 Ramps	102	2.4	8.5	0.1	27	27	2.4
SB SR 17 Ramps	101	2.8	19.4	0.2	33	33	2.6
Univerity Avenue	6	24.7	43.1	0.2	16	16	25.7
Santa Cruz Avenue	5	12.3	21.2	0.1	15	16	11.6
Monterey Avenue	4	33.1	43.8	0.1	9	9	32.5
San Benito Avenue	3	4.8	10.1	0.0	12	12	4.6
Massol Avenue	2	1.3	3.8	0.0	21	21	1.1
Montgomery Street	1	0.6	2.5	0.0	28	29	0.5
Total		105.7	193.7	0.9	16	16	105.7

Arterial Level of Service: WB State Route 9

Cross Street	Run 12 Speed	Run 12 Delay	Run 13 Speed	Run 13 Delay	Run 14 Speed	Run 14 Delay	Run 16 Speed
Alberto Way	14	24.5	14	24.1	14	23.8	14
NB SR 17 Ramps	26	2.6	27	2.4	27	2.3	26
SB SR 17 Ramps	32	3.1	34	2.1	34	2.5	33
Univerity Avenue	15	27.5	16	26.1	16	25.8	18
Santa Cruz Avenue	15	11.8	16	10.9	16	11.4	13
Monterey Avenue	9	34.3	10	28.8	9	30.9	9
San Benito Avenue	12	4.8	12	4.6	12	4.5	12
Massol Avenue	21	1.3	21	1.1	22	1.0	21
Montgomery Street	28	0.6	29	0.5	29	0.5	28
Total	16	110.5	17	100.7	16	102.7	16

Arterial Level of Service: WB State Route 9

Cross Street	Run 16 Delay	Run 17 Speed	Run 17 Delay	Run 18 Speed	Run 18 Delay	Run 20 Speed	Run 20 Delay
Alberto Way	24.9	14	22.4	14	22.2	13	25.4
NB SR 17 Ramps	2.5	27	2.2	27	2.3	26	2.6
SB SR 17 Ramps	2.8	33	2.7	33	2.8	33	2.8
Univerity Avenue	20.0	17	23.6	16	23.7	17	23.4
Santa Cruz Avenue	15.3	15	13.0	15	12.8	15	12.7
Monterey Avenue	35.1	9	31.5	9	35.4	9	32.9
San Benito Avenue	4.8	12	4.6	12	4.8	11	5.4
Massol Avenue	1.3	21	1.1	21	1.2	18	1.8
Montgomery Street	0.6	29	0.5	28	0.6	26	0.8
Total	107.2	16	101.5	16	105.9	16	107.8

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 32 Speed	Run 32 Delay
Montgomery Street	1	6.3	22.1	0.1	25	26	5.2
Massol Avenue	2	1.5	3.5	0.0	20	20	1.6
San Benito Avenue	3	0.9	3.5	0.0	23	22	1.0
Tait Avenue	4	1.0	5.2	0.0	23	22	1.1
Santa Cruz Avenuea	5	45.3	56.5	0.1	7	6	51.1
University Avenue	6	35.4	44.5	0.1	7	7	38.7
SB SR 17 Ramps	101	18.2	38.0	0.2	18	17	20.2
NB SR 17 Ramps	102	6.5	24.1	0.2	27	27	6.1
Alberto Way	7	9.5	16.2	0.1	14	13	10.2
Los Gatos Blvd	8	29.4	47.4	0.2	12	14	24.6
Total		154.2	261.1	1.0	14	14	159.8

Arterial Level of Service: EB State Route 9

Cross Street	Run 34 Speed	Run 34 Delay	Run 35 Speed	Run 35 Delay	Run 36 Speed	Run 36 Delay	Run 38 Speed
Montgomery Street	26	5.0	27	5.0	22	8.9	27
Massol Avenue	21	1.3	21	1.4	19	1.7	21
San Benito Avenue	24	0.7	23	0.8	22	1.0	23
Tait Avenue	24	0.8	23	1.0	23	1.0	22
Santa Cruz Avenuea	8	36.1	7	46.1	7	47.9	7
University Avenue	9	25.6	7	38.8	7	39.2	7
SB SR 17 Ramps	19	16.5	18	18.6	17	21.1	19
NB SR 17 Ramps	27	5.8	26	7.3	25	8.2	28
Alberto Way	14	9.1	14	9.8	14	9.0	15
Los Gatos Blvd	11	32.7	13	24.9	11	34.3	13
Total	15	133.7	14	153.7	13	172.5	14

Arterial Level of Service: EB State Route 9

Cross Street	Run 38 Delay	Run 41 Speed	Run 41 Delay	Run 42 Speed	Run 42 Delay	Run 43 Speed	Run 43 Delay
Montgomery Street	4.9	24	6.5	27	4.6	19	11.7
Massol Avenue	1.4	20	1.6	22	1.3	16	2.4
San Benito Avenue	0.8	23	0.9	24	0.7	21	1.2
Tait Avenue	1.1	24	0.8	24	0.8	21	1.5
Santa Cruz Avenuea	47.0	8	36.6	6	50.3	7	43.9
University Avenue	37.0	8	32.8	6	41.7	8	31.4
SB SR 17 Ramps	17.2	18	19.0	18	18.2	19	16.2
NB SR 17 Ramps	5.6	26	7.4	27	6.0	27	5.8
Alberto Way	8.4	14	10.0	14	9.6	13	10.4
Los Gatos Blvd	25.9	12	28.2	12	31.6	12	29.7
Total	149.3	15	143.8	13	164.8	14	154.2

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 32 Speed	Run 32 Delay
Alberto Way	7	23.9	42.1	0.2	14	14	23.9
NB SR 17 Ramps	102	1.5	7.9	0.1	29	28	1.6
SB SR 17 Ramps	101	1.6	19.3	0.2	33	33	1.9
Univerity Avenue	6	20.3	39.8	0.2	17	18	19.5
Santa Cruz Avenue	5	24.7	33.9	0.1	9	9	25.6
Monterey Avenue	4	12.3	23.5	0.1	17	29	2.9
San Benito Avenue	3	8.7	14.7	0.0	8	9	7.2
Massol Avenue	2	1.8	4.5	0.0	17	17	2.0
Montgomery Street	1	0.5	2.5	0.0	28	27	0.5
Total		95.3	188.3	0.9	17	18	85.2

Arterial Level of Service: WB State Route 9

Cross Street	Run 34 Speed	Run 34 Delay	Run 35 Speed	Run 35 Delay	Run 36 Speed	Run 36 Delay	Run 38 Speed
Alberto Way	14	22.7	13	26.1	14	22.2	14
NB SR 17 Ramps	29	1.5	28	1.6	29	1.4	29
SB SR 17 Ramps	33	1.4	33	1.6	33	1.9	34
Univerity Avenue	17	21.4	18	18.3	17	20.4	18
Santa Cruz Avenue	11	20.6	9	24.7	10	22.6	10
Monterey Avenue	23	6.7	11	23.8	14	17.9	20
San Benito Avenue	9	7.6	6	15.0	7	10.4	8
Massol Avenue	18	1.7	15	2.6	16	2.2	16
Montgomery Street	28	0.5	25	0.7	27	0.5	27
Total	18	84.0	15	114.5	16	99.5	17

Arterial Level of Service: WB State Route 9

Cross Street	Run 38 Delay	Run 41 Speed	Run 41 Delay	Run 42 Speed	Run 42 Delay	Run 43 Speed	Run 43 Delay
Alberto Way	22.5	13	25.1	13	25.3	14	23.7
NB SR 17 Ramps	1.4	28	1.6	29	1.5	29	1.5
SB SR 17 Ramps	1.3	32	2.1	34	1.4	33	1.9
Univerity Avenue	19.7	16	25.1	18	19.9	18	19.1
Santa Cruz Avenue	24.0	10	24.1	10	21.4	9	28.5
Monterey Avenue	9.1	29	2.8	31	2.2	13	20.2
San Benito Avenue	9.3	13	3.8	13	3.9	6	15.1
Massol Avenue	2.2	19	1.4	20	1.2	16	2.1
Montgomery Street	0.6	28	0.5	29	0.4	28	0.4
Total	90.0	17	86.6	18	77.2	15	112.7

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Montgomery Street	1	1.7	14.6	0.1	34	34	1.6
Massol Avenue	2	0.9	2.6	0.0	26	26	0.8
San Benito Avenue	3	0.4	2.8	0.0	28	28	0.4
Tait Avenue	4	0.2	4.6	0.0	26	26	0.2
Santa Cruz Avenuea	5	15.8	26.3	0.1	15	14	18.3
University Avenue	6	21.9	30.5	0.1	11	9	25.2
SB SR 17 Ramps	101	6.6	25.5	0.2	27	27	6.4
NB SR 17 Ramps	102	1.7	18.4	0.2	35	35	1.5
Alberto Way	7	10.5	16.6	0.1	14	15	9.4
Los Gatos Blvd	8	33.4	50.8	0.2	11	12	31.5
Total		93.2	192.7	1.0	19	18	95.5

Arterial Level of Service: EB State Route 9

Cross Street	Run 55 Speed	Run 55 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Montgomery Street	34	2.0	34	1.7	34	1.6	33
Massol Avenue	26	0.8	26	0.9	26	0.9	24
San Benito Avenue	28	0.4	28	0.4	28	0.4	27
Tait Avenue	26	0.3	26	0.2	26	0.2	26
Santa Cruz Avenuea	15	15.8	15	14.8	15	15.3	14
University Avenue	11	19.8	11	21.9	12	19.3	11
SB SR 17 Ramps	27	6.6	27	6.7	27	6.8	28
NB SR 17 Ramps	35	1.8	35	1.7	35	1.7	35
Alberto Way	14	9.8	13	11.0	13	11.0	14
Los Gatos Blvd	11	34.5	11	35.4	12	31.9	11
Total	19	91.8	19	94.7	19	89.1	19

Arterial Level of Service: EB State Route 9

Cross Street	Run 59 Delay	Run 60 Speed	Run 60 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay
Montgomery Street	2.0	34	2.0	33	2.2	35	1.2
Massol Avenue	1.1	25	1.0	26	0.8	27	0.7
San Benito Avenue	0.5	27	0.5	28	0.4	28	0.4
Tait Avenue	0.3	26	0.2	26	0.2	26	0.2
Santa Cruz Avenuea	16.6	16	14.0	15	15.5	15	16.2
University Avenue	21.2	10	23.0	10	23.6	10	22.6
SB SR 17 Ramps	6.1	27	7.3	29	5.5	26	7.4
NB SR 17 Ramps	1.7	34	2.0	36	1.6	35	1.8
Alberto Way	10.4	13	11.1	15	9.5	13	10.7
Los Gatos Blvd	33.0	11	37.2	12	31.7	11	33.0
Total	92.7	18	98.4	19	91.0	19	94.3

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Alberto Way	7	30.2	47.7	0.2	12	12	31.5
NB SR 17 Ramps	102	3.3	9.4	0.1	24	24	3.3
SB SR 17 Ramps	101	2.8	19.5	0.2	33	33	2.4
Univerity Avenue	6	24.7	43.1	0.2	16	17	22.2
Santa Cruz Avenue	5	17.6	26.5	0.1	12	12	17.3
Monterey Avenue	4	30.9	41.6	0.1	9	10	30.7
San Benito Avenue	3	5.8	11.1	0.0	11	11	5.8
Massol Avenue	2	1.7	4.0	0.0	20	20	1.6
Montgomery Street	1	0.8	2.9	0.0	23	23	0.8
Total		117.8	205.8	0.9	15	15	115.5

Arterial Level of Service: WB State Route 9

Cross Street	Run 55 Speed	Run 55 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Alberto Way	13	26.8	12	31.7	12	32.1	13
NB SR 17 Ramps	24	3.3	24	3.4	24	3.4	25
SB SR 17 Ramps	33	2.5	33	3.0	33	2.9	32
Univerity Avenue	17	23.0	16	24.2	17	21.3	17
Santa Cruz Avenue	13	16.1	12	16.8	12	16.8	14
Monterey Avenue	9	33.1	10	28.2	10	30.0	10
San Benito Avenue	10	6.1	11	5.6	11	5.4	10
Massol Avenue	20	1.7	20	1.6	20	1.6	18
Montgomery Street	23	0.8	23	0.8	22	0.9	23
Total	15	113.3	15	115.6	15	114.4	16

Arterial Level of Service: WB State Route 9

Cross Street	Run 59 Delay	Run 60 Speed	Run 60 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay
Alberto Way	26.1	13	26.8	12	30.0	12	30.9
NB SR 17 Ramps	3.2	25	3.1	24	3.2	25	3.1
SB SR 17 Ramps	3.3	33	2.5	33	2.8	32	3.0
Univerity Avenue	23.3	16	26.4	14	30.4	15	27.2
Santa Cruz Avenue	14.5	13	14.9	8	31.2	13	16.5
Monterey Avenue	27.1	10	28.7	8	37.2	9	34.3
San Benito Avenue	6.1	10	6.7	11	5.6	11	5.9
Massol Avenue	2.1	17	2.3	21	1.5	20	1.7
Montgomery Street	0.9	21	1.0	23	0.8	22	0.9
Total	106.6	16	112.5	14	142.8	15	123.5

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 17 Speed	Run 17 Delay
Montgomery Street	1	6.9	25.6	0.1	24	28	4.0
Massol Avenue	2	1.8	3.7	0.0	19	22	1.2
San Benito Avenue	3	1.0	3.5	0.0	22	24	0.7
Tait Avenue	4	0.9	5.2	0.0	23	25	0.4
Santa Cruz Avenuea	5	43.3	54.4	0.1	7	9	33.1
University Avenue	6	32.0	41.0	0.1	8	10	22.9
SB SR 17 Ramps	101	18.3	38.0	0.2	18	19	16.0
NB SR 17 Ramps	102	6.7	24.2	0.2	26	27	6.2
Alberto Way	7	9.7	16.4	0.1	14	14	9.9
Los Gatos Blvd	8	29.4	47.5	0.2	12	11	33.0
Total		149.9	259.6	1.0	14	16	127.6

Arterial Level of Service: EB State Route 9

Cross Street	Run 19 Speed	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed
Montgomery Street	25	6.1	26	5.8	25	5.9	24
Massol Avenue	19	1.7	20	1.5	19	1.7	18
San Benito Avenue	23	0.9	23	0.8	22	0.9	19
Tait Avenue	25	0.5	25	0.5	25	0.5	17
Santa Cruz Avenuea	8	35.3	8	38.9	7	45.9	5
University Avenue	8	29.9	8	31.1	7	37.9	6
SB SR 17 Ramps	19	17.8	19	17.1	17	21.5	18
NB SR 17 Ramps	27	6.3	27	6.3	25	8.1	27
Alberto Way	14	9.1	13	10.4	13	10.6	14
Los Gatos Blvd	12	29.5	11	32.4	12	28.2	13
Total	15	137.1	15	144.8	14	161.2	13

Arterial Level of Service: EB State Route 9

Cross Street	Run 22 Delay	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay
Montgomery Street	7.0	28	3.8	25	5.9	27	4.5
Massol Avenue	2.0	21	1.5	21	1.4	21	1.4
San Benito Avenue	1.5	24	0.7	23	0.8	23	0.8
Tait Avenue	2.5	25	0.4	25	0.5	25	0.4
Santa Cruz Avenuea	65.0	9	34.8	8	37.5	8	36.1
University Avenue	40.6	10	24.8	8	32.8	9	28.2
SB SR 17 Ramps	18.4	18	18.6	18	19.1	18	17.8
NB SR 17 Ramps	6.4	27	6.6	26	6.9	26	7.3
Alberto Way	9.4	15	9.0	14	10.1	14	9.5
Los Gatos Blvd	27.1	12	28.2	11	34.6	13	27.6
Total	179.9	16	128.3	14	149.7	15	133.7

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 17 Speed	Run 17 Delay
Alberto Way	7	22.5	40.8	0.2	14	15	21.4
NB SR 17 Ramps	102	1.5	8.0	0.1	29	29	1.4
SB SR 17 Ramps	101	1.6	19.3	0.2	33	34	1.3
Univerity Avenue	6	22.0	41.5	0.2	17	18	19.0
Santa Cruz Avenue	5	26.7	35.8	0.1	9	10	21.5
Monterey Avenue	4	20.3	33.7	0.1	13	10	29.6
San Benito Avenue	3	12.0	18.3	0.0	7	7	12.8
Massol Avenue	2	2.6	5.1	0.0	16	17	2.1
Montgomery Street	1	0.6	2.9	0.0	24	25	0.5
Total		109.8	205.2	0.9	15	16	109.5

Arterial Level of Service: WB State Route 9

Cross Street	Run 19 Speed	Run 19 Delay	Run 20 Speed	Run 20 Delay	Run 21 Speed	Run 21 Delay	Run 22 Speed
Alberto Way	15	20.7	15	21.5	14	22.5	15
NB SR 17 Ramps	29	1.4	29	1.3	28	1.7	29
SB SR 17 Ramps	33	1.9	34	1.2	33	1.9	33
Univerity Avenue	17	21.8	17	22.2	14	28.7	16
Santa Cruz Avenue	10	21.5	10	23.4	9	25.0	10
Monterey Avenue	24	5.9	14	18.0	10	27.7	9
San Benito Avenue	8	10.2	7	12.2	5	16.1	5
Massol Avenue	14	3.0	17	2.3	14	3.3	15
Montgomery Street	24	0.6	25	0.5	22	0.8	23
Total	17	87.1	16	102.6	14	127.6	14

Arterial Level of Service: WB State Route 9

Cross Street	Run 22 Delay	Run 23 Speed	Run 23 Delay	Run 24 Speed	Run 24 Delay	Run 25 Speed	Run 25 Delay
Alberto Way	21.4	14	24.1	14	24.3	13	25.4
NB SR 17 Ramps	1.3	28	1.5	28	1.7	28	1.8
SB SR 17 Ramps	1.6	33	1.7	33	1.7	33	1.6
Univerity Avenue	23.2	17	20.3	18	18.0	18	19.7
Santa Cruz Avenue	21.6	10	21.9	9	26.4	9	25.3
Monterey Avenue	35.4	31	2.1	22	7.4	30	2.7
San Benito Avenue	18.6	13	4.0	9	7.4	12	4.2
Massol Avenue	3.0	22	1.2	19	1.6	19	1.6
Montgomery Street	0.8	26	0.4	25	0.5	25	0.5
Total	126.9	18	77.2	17	89.1	18	82.7

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Montgomery Street	1	3.7	16.5	0.1	30	31	3.1
Massol Avenue	2	1.8	3.5	0.0	19	20	1.6
San Benito Avenue	3	0.8	3.3	0.0	24	25	0.8
Tait Avenue	4	0.3	4.6	0.0	26	26	0.3
Santa Cruz Avenuea	5	16.4	26.9	0.1	15	14	16.7
University Avenue	6	23.1	31.7	0.1	10	11	21.3
SB SR 17 Ramps	101	6.8	25.8	0.2	27	27	6.3
NB SR 17 Ramps	102	1.9	18.4	0.2	35	35	2.0
Alberto Way	7	10.6	16.8	0.1	14	13	11.2
Los Gatos Blvd	8	33.8	51.2	0.2	11	11	32.6
Total		99.1	198.7	1.0	18	18	96.0

Arterial Level of Service: EB State Route 9

Cross Street	Run 56 Speed	Run 56 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Montgomery Street	30	3.8	30	3.5	29	4.1	30
Massol Avenue	19	1.9	19	1.9	18	2.0	21
San Benito Avenue	25	0.7	24	0.9	23	0.9	25
Tait Avenue	26	0.3	26	0.3	25	0.3	26
Santa Cruz Avenuea	13	18.9	14	17.5	14	16.9	14
University Avenue	10	22.8	9	26.6	12	18.1	9
SB SR 17 Ramps	28	6.4	25	8.8	29	5.2	25
NB SR 17 Ramps	35	1.9	35	2.0	35	1.9	35
Alberto Way	12	12.1	15	9.5	13	11.8	15
Los Gatos Blvd	12	32.1	12	32.4	11	34.1	12
Total	18	100.9	18	103.4	18	95.3	18

Arterial Level of Service: EB State Route 9

Cross Street	Run 59 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay	Run 63 Speed	Run 63 Delay
Montgomery Street	3.5	29	4.3	30	3.9	30	3.8
Massol Avenue	1.4	18	2.0	19	1.9	19	1.8
San Benito Avenue	0.6	24	0.9	24	0.8	24	0.9
Tait Avenue	0.2	26	0.3	26	0.3	25	0.3
Santa Cruz Avenuea	18.1	17	13.2	16	14.5	15	15.7
University Avenue	28.4	10	24.3	11	19.8	11	20.8
SB SR 17 Ramps	8.6	26	7.5	28	6.1	29	5.2
NB SR 17 Ramps	1.6	34	2.2	36	1.4	34	1.9
Alberto Way	9.5	14	10.4	13	11.4	14	10.1
Los Gatos Blvd	31.5	11	34.7	11	36.6	11	33.3
Total	103.4	18	99.7	18	96.7	19	93.7

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Alberto Way	7	32.9	50.4	0.2	11	12	32.4
NB SR 17 Ramps	102	3.3	9.4	0.1	24	24	3.3
SB SR 17 Ramps	101	2.7	19.5	0.2	33	33	2.6
Univerity Avenue	6	24.3	42.8	0.2	16	19	18.8
Santa Cruz Avenue	5	20.2	29.0	0.1	11	12	17.9
Monterey Avenue	4	40.8	51.4	0.1	8	8	37.8
San Benito Avenue	3	7.8	13.1	0.0	9	10	6.9
Massol Avenue	2	2.8	5.1	0.0	16	17	2.4
Montgomery Street	1	1.4	3.5	0.0	19	20	1.2
Total		136.2	224.2	0.9	14	15	123.2

Arterial Level of Service: WB State Route 9

Cross Street	Run 56 Speed	Run 56 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Alberto Way	12	31.0	12	32.5	13	27.9	12
NB SR 17 Ramps	24	3.2	24	3.5	24	3.3	24
SB SR 17 Ramps	33	2.8	33	2.6	33	2.6	32
Univerity Avenue	15	26.6	16	24.2	17	22.7	16
Santa Cruz Avenue	11	21.0	12	17.6	12	18.6	12
Monterey Avenue	8	37.4	8	36.9	8	38.7	7
San Benito Avenue	9	8.1	9	8.6	9	7.9	9
Massol Avenue	15	2.8	15	3.0	15	2.8	15
Montgomery Street	19	1.4	18	1.6	20	1.3	19
Total	14	134.3	14	130.5	15	125.7	14

Arterial Level of Service: WB State Route 9

Cross Street	Run 59 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay	Run 63 Speed	Run 63 Delay
Alberto Way	29.0	8	55.5	12	31.3	11	34.1
NB SR 17 Ramps	3.2	24	3.4	25	3.1	24	3.5
SB SR 17 Ramps	3.1	33	2.8	33	2.4	33	2.7
Univerity Avenue	24.2	17	23.6	17	22.9	16	25.5
Santa Cruz Avenue	18.3	12	16.9	10	24.0	12	17.3
Monterey Avenue	43.9	8	36.2	7	46.0	8	40.6
San Benito Avenue	8.1	9	7.7	9	7.9	9	7.4
Massol Avenue	2.8	15	2.9	15	2.9	16	2.7
Montgomery Street	1.4	20	1.3	20	1.3	19	1.5
Total	134.0	13	150.5	14	141.8	14	135.2

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 47 Speed	Run 47 Delay
Montgomery Street	1	11.9	28.3	0.1	19	15	18.5
HAWK	9	2.6	4.9	0.0	15	13	3.2
Massol Avenue	2	1.2	2.6	0.0	24	20	1.7
San Benito Avenue	3	1.1	3.7	0.0	21	17	2.1
Tait Avenue	4	1.1	5.4	0.0	22	15	3.9
Santa Cruz Avenuea	5	50.6	61.9	0.1	6	4	90.0
University Avenue	6	36.0	45.0	0.1	7	6	45.8
SB SR 17 Ramps	101	20.2	39.9	0.2	17	15	25.2
NB SR 17 Ramps	102	7.9	25.5	0.2	25	20	13.9
Alberto Way	7	4.6	11.2	0.1	20	18	6.0
Los Gatos Blvd	8	29.1	47.3	0.2	12	11	33.9
Total		166.2	275.9	1.0	13	10	244.2

Arterial Level of Service: EB State Route 9

Cross Street	Run 48 Speed	Run 48 Delay	Run 50 Speed	Run 50 Delay	Run 52 Speed	Run 52 Delay	Run 54 Speed
Montgomery Street	21	10.1	18	13.6	18	13.4	20
HAWK	15	2.4	14	2.7	14	3.0	15
Massol Avenue	24	1.2	25	1.1	23	1.3	24
San Benito Avenue	21	1.1	22	0.9	21	1.2	22
Tait Avenue	23	1.0	25	0.6	23	0.8	23
Santa Cruz Avenuea	6	53.5	8	36.3	7	48.2	6
University Avenue	7	35.1	9	25.8	7	36.5	6
SB SR 17 Ramps	18	19.8	19	16.7	15	27.3	18
NB SR 17 Ramps	26	6.5	28	5.5	22	11.0	26
Alberto Way	22	3.8	20	4.7	20	4.7	20
Los Gatos Blvd	13	25.8	12	31.6	13	24.9	12
Total	14	160.2	15	139.5	13	172.4	13

Arterial Level of Service: EB State Route 9

Cross Street	Run 54 Delay	Run 55 Speed	Run 55 Delay	Run 56 Speed	Run 56 Delay	Run 58 Speed	Run 58 Delay
Montgomery Street	10.9	21	10.3	20	10.6	22	8.4
HAWK	2.5	15	2.5	15	2.4	16	2.1
Massol Avenue	1.1	24	1.2	25	1.0	26	1.0
San Benito Avenue	1.0	21	1.1	23	0.9	23	0.8
Tait Avenue	0.9	20	1.6	24	0.6	25	0.5
Santa Cruz Avenuea	53.4	5	65.0	7	46.1	8	35.8
University Avenue	40.9	7	38.0	7	37.1	8	31.7
SB SR 17 Ramps	19.3	18	19.0	18	18.9	19	17.4
NB SR 17 Ramps	7.1	26	7.2	26	6.7	27	6.4
Alberto Way	4.6	22	3.6	21	4.0	20	4.5
Los Gatos Blvd	28.2	13	25.9	10	41.0	13	26.2
Total	169.9	13	175.5	13	169.4	15	134.8

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 47 Speed	Run 47 Delay
Alberto Way	7	10.2	28.4	0.2	20	21	9.2
NB SR 17 Ramps	102	0.9	7.4	0.1	31	30	1.0
SB SR 17 Ramps	101	1.6	19.3	0.2	33	33	1.6
Univerity Avenue	6	18.6	38.2	0.2	18	16	22.5
Santa Cruz Avenue	5	27.6	37.0	0.1	9	4	68.1
Monterey Avenue	4	31.5	48.9	0.1	9	3	111.5
San Benito Avenue	3	17.5	23.8	0.0	5	3	35.0
Massol Avenue	2	4.2	6.7	0.0	12	9	6.6
HAWK	9	1.5	3.8	0.0	16	16	1.6
Montgomery Street	1	0.7	2.5	0.0	29	26	1.0
Total		114.3	216.1	0.9	15	9	258.0

Arterial Level of Service: WB State Route 9

Cross Street	Run 48 Speed	Run 48 Delay	Run 50 Speed	Run 50 Delay	Run 52 Speed	Run 52 Delay	Run 54 Speed
Alberto Way	21	10.4	20	11.0	22	8.0	20
NB SR 17 Ramps	31	0.9	31	0.9	32	0.6	31
SB SR 17 Ramps	33	1.5	33	1.6	34	1.3	33
Univerity Avenue	18	19.3	19	17.7	18	19.6	18
Santa Cruz Avenue	10	22.4	10	23.8	10	23.7	10
Monterey Avenue	14	18.3	22	7.2	10	29.2	10
San Benito Avenue	5	20.3	7	10.8	4	24.4	5
Massol Avenue	11	4.5	12	4.0	9	6.4	13
HAWK	16	1.5	15	1.7	15	1.8	16
Montgomery Street	28	0.7	28	0.7	28	0.8	28
Total	16	99.9	18	79.4	15	115.9	16

Arterial Level of Service: WB State Route 9

Cross Street	Run 54 Delay	Run 55 Speed	Run 55 Delay	Run 56 Speed	Run 56 Delay	Run 58 Speed	Run 58 Delay
Alberto Way	10.1	21	9.1	21	9.8	19	11.4
NB SR 17 Ramps	1.0	30	1.0	31	0.9	30	1.0
SB SR 17 Ramps	2.0	34	1.1	33	1.6	33	1.4
Univerity Avenue	18.1	20	15.3	18	19.7	18	19.4
Santa Cruz Avenue	21.9	10	22.0	7	38.2	12	18.3
Monterey Avenue	28.5	17	13.2	5	61.3	13	20.6
San Benito Avenue	18.1	6	14.7	5	19.1	6	13.1
Massol Avenue	3.8	13	3.7	12	4.4	14	3.1
HAWK	1.5	17	1.3	16	1.4	17	1.2
Montgomery Street	0.7	30	0.6	29	0.7	30	0.6
Total	105.7	18	82.0	13	157.0	17	90.1

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Montgomery Street	1	6.8	19.6	0.1	25	25	6.6
Massol Avenue	2	1.6	3.3	0.0	20	19	1.8
San Benito Avenue	3	0.6	3.1	0.0	26	26	0.6
Tait Avenue	4	0.5	4.9	0.0	24	26	0.2
Santa Cruz Avenuea	5	17.0	27.6	0.1	14	17	12.2
University Avenue	6	23.5	32.1	0.1	10	10	24.6
SB SR 17 Ramps	101	6.7	25.7	0.2	27	27	6.7
NB SR 17 Ramps	102	1.7	18.3	0.2	35	35	1.7
Alberto Way	7	10.4	16.6	0.1	14	14	10.0
Los Gatos Blvd	8	33.4	50.7	0.2	11	11	33.5
Total		102.2	201.8	1.0	18	18	98.0

Arterial Level of Service: EB State Route 9

Cross Street	Run 55 Speed	Run 55 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Montgomery Street	26	6.1	25	6.7	26	5.7	25
Massol Avenue	23	1.2	20	1.7	17	2.2	20
San Benito Avenue	27	0.5	26	0.6	23	1.0	26
Tait Avenue	26	0.3	26	0.3	16	2.9	26
Santa Cruz Avenuea	18	11.9	16	14.0	6	52.3	16
University Avenue	11	21.2	11	21.1	7	35.5	9
SB SR 17 Ramps	26	7.5	27	6.8	27	6.2	26
NB SR 17 Ramps	35	1.7	34	1.8	35	1.8	35
Alberto Way	14	10.6	14	10.2	13	11.4	14
Los Gatos Blvd	11	37.2	12	32.0	11	35.0	12
Total	18	98.2	19	95.1	14	154.0	18

Arterial Level of Service: EB State Route 9

Cross Street	Run 59 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay	Run 63 Speed	Run 63 Delay
Montgomery Street	7.0	25	6.7	25	7.0	26	5.9
Massol Avenue	1.7	22	1.4	21	1.4	23	1.1
San Benito Avenue	0.6	26	0.6	26	0.6	28	0.4
Tait Avenue	0.3	26	0.2	26	0.3	26	0.3
Santa Cruz Avenuea	14.7	18	11.1	17	13.2	15	15.9
University Avenue	26.3	12	19.2	12	18.7	9	26.2
SB SR 17 Ramps	8.2	27	7.2	29	5.2	28	6.2
NB SR 17 Ramps	1.7	36	1.6	35	1.5	35	1.5
Alberto Way	9.7	14	9.9	14	9.9	13	11.2
Los Gatos Blvd	31.6	11	34.0	12	32.1	12	29.3
Total	101.6	19	91.9	19	89.9	18	98.0

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 54 Speed	Run 54 Delay
Alberto Way	7	34.4	51.8	0.2	11	13	27.1
NB SR 17 Ramps	102	4.6	10.7	0.1	21	25	3.1
SB SR 17 Ramps	101	15.3	31.9	0.2	20	33	2.8
Univerity Avenue	6	52.4	70.6	0.2	10	13	35.1
Santa Cruz Avenue	5	47.0	55.8	0.1	6	7	40.4
Monterey Avenue	4	54.8	65.3	0.1	6	6	57.2
San Benito Avenue	3	10.4	15.7	0.0	8	8	10.2
Massol Avenue	2	3.9	6.2	0.0	13	13	3.7
Montgomery Street	1	1.3	3.4	0.0	20	20	1.3
Total		224.1	311.4	0.9	10	12	180.9

Arterial Level of Service: WB State Route 9

Cross Street	Run 55 Speed	Run 55 Delay	Run 57 Speed	Run 57 Delay	Run 58 Speed	Run 58 Delay	Run 59 Speed
Alberto Way	13	28.4	11	33.0	12	28.6	12
NB SR 17 Ramps	25	3.1	24	3.5	25	3.2	24
SB SR 17 Ramps	33	2.7	34	2.4	30	4.1	22
Univerity Avenue	17	23.3	15	29.2	7	76.4	8
Santa Cruz Avenue	8	29.7	6	44.2	5	61.6	5
Monterey Avenue	6	53.0	6	52.5	6	53.7	6
San Benito Avenue	8	10.3	8	10.0	8	10.3	8
Massol Avenue	13	3.9	13	3.7	13	3.7	13
Montgomery Street	19	1.4	19	1.4	20	1.2	20
Total	13	155.9	12	179.8	9	242.8	10

Arterial Level of Service: WB State Route 9

Cross Street	Run 59 Delay	Run 61 Speed	Run 61 Delay	Run 62 Speed	Run 62 Delay	Run 63 Speed	Run 63 Delay
Alberto Way	28.8	13	28.6	13	26.4	6	78.8
NB SR 17 Ramps	3.3	25	3.0	24	3.3	10	17.4
SB SR 17 Ramps	13.1	14	28.9	33	2.9	6	89.0
Univerity Avenue	67.4	6	101.8	16	24.8	5	110.0
Santa Cruz Avenue	52.7	4	76.4	8	33.0	4	68.3
Monterey Avenue	55.7	5	64.9	7	48.5	6	59.9
San Benito Avenue	9.9	7	12.2	8	9.7	7	11.9
Massol Avenue	3.7	11	4.6	13	3.8	11	4.7
Montgomery Street	1.3	20	1.2	21	1.2	19	1.4
Total	235.9	8	321.7	13	153.5	6	441.4

Arterial Level of Service: EB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 36 Speed	Run 36 Delay
Montgomery Street	1	31.6	89.7	0.6	23	25	23.5
Massol Avenue	2	2.2	4.1	0.0	17	17	2.1
San Benito Avenue	3	2.4	6.6	0.0	20	21	2.0
Tait Avenue	4	0.8	3.5	0.0	20	22	0.5
Santa Cruz Avenuea	5	39.3	50.5	0.1	8	8	37.8
University Avenue	6	30.0	39.1	0.1	8	8	29.0
SB SR 17 Ramps	101	19.3	39.1	0.2	18	17	21.4
NB SR 17 Ramps	102	7.1	24.6	0.2	26	25	8.1
Alberto Way	7	4.8	11.5	0.1	20	21	4.2
Los Gatos Blvd	8	30.5	48.6	0.2	12	11	33.1
Total		167.9	317.3	1.4	16	17	161.6

Arterial Level of Service: EB State Route 9

Cross Street	Run 37 Speed	Run 37 Delay	Run 39 Speed	Run 39 Delay	Run 42 Speed	Run 42 Delay	Run 43 Speed
Montgomery Street	14	91.3	27	20.2	25	24.3	23
Massol Avenue	13	3.6	18	2.1	17	2.1	18
San Benito Avenue	13	5.6	21	2.0	20	2.1	21
Tait Avenue	12	3.0	22	0.5	22	0.5	21
Santa Cruz Avenuea	6	56.5	9	34.9	10	28.5	8
University Avenue	7	35.2	9	27.8	10	22.2	8
SB SR 17 Ramps	18	19.1	18	19.0	18	18.0	18
NB SR 17 Ramps	26	7.2	26	7.3	27	6.6	26
Alberto Way	19	5.0	18	5.9	19	5.2	21
Los Gatos Blvd	13	26.9	9	45.9	14	23.8	10
Total	13	253.4	16	165.5	18	133.4	16

Arterial Level of Service: EB State Route 9

Cross Street	Run 43 Delay	Run 45 Speed	Run 45 Delay	Run 46 Speed	Run 46 Delay	Run 47 Speed	Run 47 Delay
Montgomery Street	30.7	25	24.7	26	22.4	24	25.9
Massol Avenue	2.0	17	2.2	19	1.7	18	2.0
San Benito Avenue	2.0	21	2.0	21	1.8	21	2.0
Tait Avenue	0.6	22	0.5	22	0.6	21	0.6
Santa Cruz Avenuea	39.1	9	33.3	8	37.0	8	39.8
University Avenue	29.6	8	30.9	9	26.5	8	33.7
SB SR 17 Ramps	19.6	17	21.2	18	17.7	17	21.7
NB SR 17 Ramps	7.4	25	8.2	27	6.8	26	7.4
Alberto Way	3.9	21	4.1	20	4.8	19	5.5
Los Gatos Blvd	37.3	13	26.0	13	25.4	13	27.8
Total	172.3	17	153.0	18	144.5	16	166.3

Arterial Level of Service: WB State Route 9

Cross Street	Node	Delay (s/veh)	Travel time (s)	Dist (mi)	Arterial Speed	Run 36 Speed	Run 36 Delay
Alberto Way	7	9.4	27.8	0.2	21	20	10.1
NB SR 17 Ramps	102	0.8	7.3	0.1	31	32	0.7
SB SR 17 Ramps	101	1.4	19.1	0.2	33	34	1.0
Univerity Avenue	6	20.4	39.6	0.2	18	17	21.0
Santa Cruz Avenue	5	28.5	37.8	0.1	8	9	25.4
Monterey Avenue	4	24.8	43.9	0.1	11	10	29.3
San Benito Avenue	3	10.0	13.9	0.0	5	4	12.4
Massol Avenue	2	4.9	9.0	0.0	14	13	5.7
Montgomery Street	1	0.6	2.9	0.0	24	24	0.6
Total		100.9	201.5	0.9	16	16	106.4

Arterial Level of Service: WB State Route 9

Cross Street	Run 37 Speed	Run 37 Delay	Run 39 Speed	Run 39 Delay	Run 42 Speed	Run 42 Delay	Run 43 Speed
Alberto Way	21	8.6	21	9.4	20	9.8	21
NB SR 17 Ramps	31	0.8	31	0.9	31	0.8	31
SB SR 17 Ramps	34	1.4	32	2.0	34	1.4	34
Univerity Avenue	18	20.4	18	19.1	17	20.3	18
Santa Cruz Avenue	5	57.7	9	25.9	9	25.2	9
Monterey Avenue	4	89.8	15	16.3	14	17.5	9
San Benito Avenue	3	20.7	5	10.5	5	8.8	4
Massol Avenue	10	8.3	16	4.2	15	4.8	13
Montgomery Street	22	0.9	23	0.7	25	0.4	22
Total	10	208.4	17	89.2	17	88.9	16

Arterial Level of Service: WB State Route 9

Cross Street	Run 43 Delay	Run 45 Speed	Run 45 Delay	Run 46 Speed	Run 46 Delay	Run 47 Speed	Run 47 Delay
Alberto Way	8.6	20	10.0	21	9.4	21	9.3
NB SR 17 Ramps	0.8	31	0.9	30	1.0	31	0.9
SB SR 17 Ramps	1.2	34	1.1	34	1.5	33	1.8
Univerity Avenue	20.0	18	19.6	17	21.9	17	21.0
Santa Cruz Avenue	26.6	9	24.7	9	25.0	10	21.2
Monterey Avenue	32.8	16	13.6	17	12.7	19	10.6
San Benito Avenue	12.2	6	7.5	6	7.4	8	5.0
Massol Avenue	6.0	16	3.9	15	4.8	20	2.5
Montgomery Street	0.9	25	0.5	25	0.5	25	0.5
Total	109.1	18	81.9	18	84.2	19	72.7

Table 9 – AM Peak Hour Travel Time

Direction of Travel	SIMTRAFFIC - Existing		SIMTRAFFIC – Alt. 1 - RRFB		SIMTRAFFIC – Alt 2. - HAWK		SIMTRAFFIC – Alt 3. - Traffic Signal	
	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed
EB Montgomery Street – Los Gatos Boulevard	3:02	20	3:13	19	3:20	18	3:22	18
WB Montgomery Street – Los Gatos Boulevard	3:14	16	3:26	15	4:07	13	5:11	10

Notes: Travel Time is measured in minutes: seconds; Average Speed is measured in miles per hour (mph)

Table 10 – PM Peak Hour Travel Time

Direction of Travel	SIMTRAFFIC - Existing		SIMTRAFFIC – Alt. 1 - RRFB		SIMTRAFFIC – Alt 2. - HAWK		SIMTRAFFIC – Alt 3. - Traffic Signal	
	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed	Average Travel Time	Average Speed
EB Montgomery Street – Los Gatos Boulevard	4:21	14	4:20	14	4:36	13	5:17	11
WB Montgomery Street – Los Gatos Boulevard	3:08	17	3:25	15	3:36	15	3:22	16

Notes: Travel Time is measured in minutes: seconds; Average Speed is measured in miles per hour (mph)