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## Traffic Impact Study



# Traffic Impact Study for the Chappellet Winery Use Permit Modification



Prepared for the County of Napa

Submitted by  
**W-Trans**

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**TRAFFIC ENGINEERING  
TRANSPORTATION PLANNING**  
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# Executive Summary

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The proposed project would update the current Use Permit for the Chappellet Winery to allow for an increase in visitation, employment, production, and marketing events. The project would be expected to result in an additional 60 daily trips on average during the harvest season, including seven new trips during the weekday p.m. peak hour and six new trips during the weekend midday peak hour; these trips represent the increase in traffic above current levels during the p.m. peak hour and above permitted levels during the weekend midday peak hour.

Analysis indicates that under Existing Conditions the study intersection of Silverado Trail/Sage Canyon Road (SR 128) is operating acceptably overall, but unacceptably at LOS F on the Sage Canyon Road approach during the weekday p.m. peak hour. Upon the addition of project-related traffic, the study intersection would continue operating acceptably overall, but with unacceptable delays on the minor street approach. The project would be responsible for an increase that represents less than 10 percent of the existing p.m. peak hour traffic volumes on the Sage Canyon Road approach, so the project's short-term impact would be considered *less-than-significant* under the County's criterion.

Under Baseline Conditions, which includes traffic associated with known winery projects in the study area that are approved or pending, the study intersection would continue to operate at the same levels of service as under Existing Conditions. The addition of project-related traffic volumes would drop operation from LOS C to LOS D overall during the p.m. peak hour and Sage Canyon Road approach would continue to operate at LOS F. Project traffic would still be responsible for less than 10 percent of the Baseline p.m. peak hour traffic volumes on the Sage Canyon Road approach, so the project's impact would still be considered *less-than-significant*.

Under the anticipated Future volumes, the study intersection would deteriorate to LOS F overall during the weekday p.m. peak hour. The project would add more than five percent of the anticipated growth on the Sage Canyon Road approach so would have a *significant* impact per County standards. To reduce this impact to *less-than-significant*, it is recommended that the winery adopt an operational program that does not generate more than 13 outbound trips within any one-hour period between 3:30 p.m. and 6:00 p.m. on weekdays. This can be accomplished by limiting tastings during the p.m. peak hour, modifying shifts to spread employee trips, rewarding carpooling, etc.

As proposed, no significant impacts were identified with events under Existing or Baseline Conditions; however, with the addition of volumes for a 160- and 200-person event to Future volumes, the Sage Canyon Road approach to Silverado Trail would deteriorate to LOS E and F, respectively, during the weekend midday peak hour, which would be considered *significant* since the approach would be expected to operate acceptably at LOS D without event traffic. To reduce this impact to *less-than-significant*, it is recommended that the winery schedule events with 160 or 200 persons to conclude after 4:30 p.m. on weekend days to avoid generating outbound trips during the midday peak hour.

Pedestrian and transit facilities are adequate to serve the project site given the location and anticipated demand; however, the project should provide a minimum of two bicycle parking spaces on-site given the relatively high use of the area by cyclists. Adequate sight distance is available on Sage Canyon Road to accommodate all turns into and out of the site.

A left-turn lane would be warranted on Sage Canyon Road at the project access point under the County's criterion but would not be warranted based on the peak hour methodology typically used by Caltrans. Because the project takes access from a state highway and the vast majority of turns into the site are right turns, not left turns, installation of a left-turn lane is not recommended.

# Introduction

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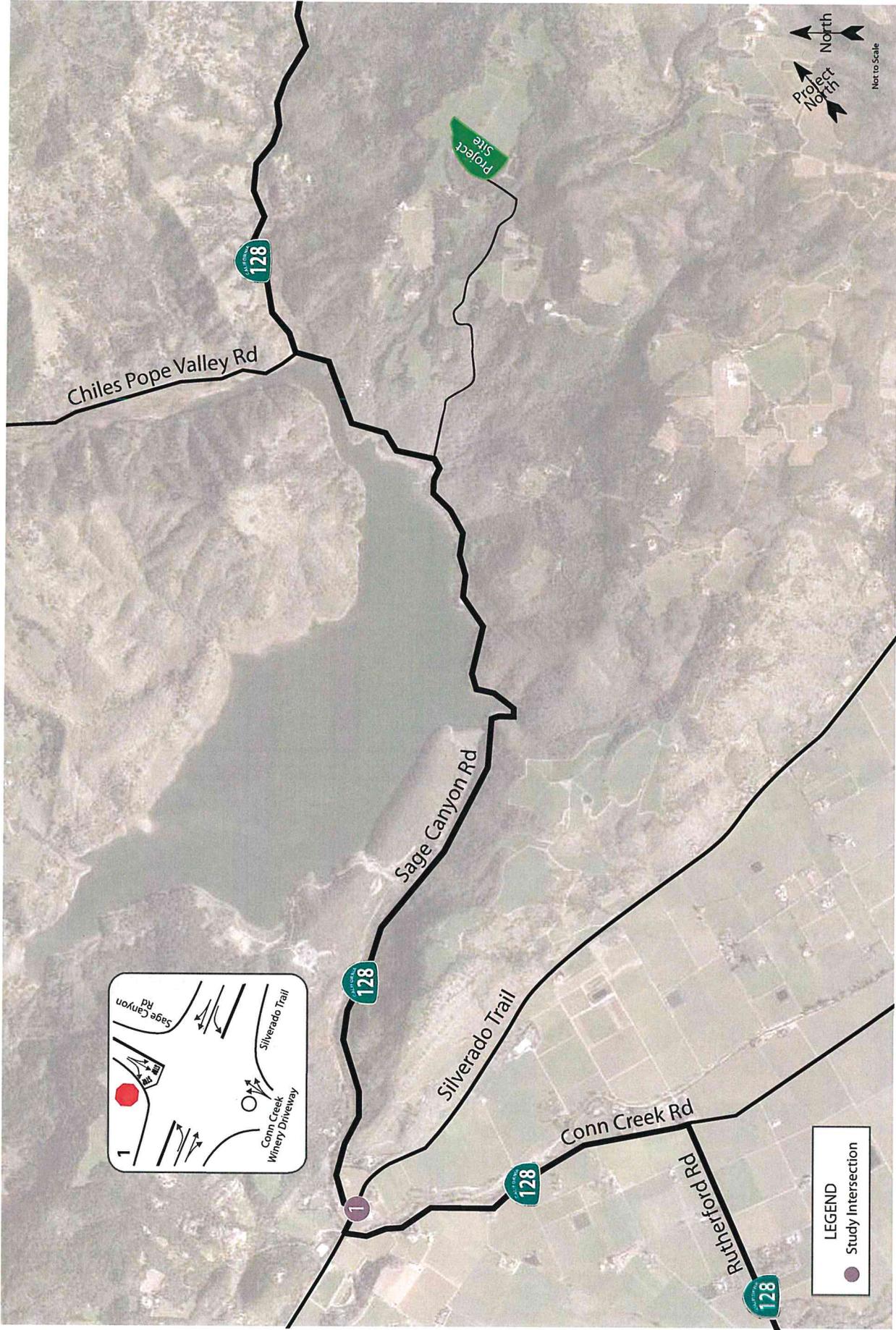
This report presents an analysis of the potential traffic impacts that would be associated with proposed modification of the Conditional Use Permit (CUP) for Chappellet Winery, which is located at 1581 Sage Canyon Road (SR 128) in the County of Napa. The traffic study was completed in accordance with the criteria established by the County of Napa, reflects a scope of work reviewed and approved by staff, and is consistent with standard traffic engineering techniques.

## Prelude

The purpose of a traffic impact study is to provide Napa County staff and policy makers with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required to mitigate these impacts to a level of insignificance as defined by the Napa's County General Plan or other policies. Vehicular traffic impacts are typically evaluated by determining the number of new trips that the proposed use would be expected to generate, distributing these trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to the proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections or roadway segments.

## Project Profile

The proposed project is an update to the current Conditional Use Permit, approved in August 2011, to allow a maximum of 95 daily visitors by appointment on both weekdays and weekend days; this is an increase of 55 visitors over the 40 daily visitors that are currently permitted. Additionally, the proposed permit would allow for an increase in production from 150,000 to 250,000 gallons per year and an increase in full-time employees from two to 15 for typical weekends as well as 24 to 25 full-time employees and three to five part-time employees on Saturdays during Harvest. The proposed marketing program would include ten annual events for 20 guests, six annual events for 80 guests, three annual events for 160 guests, and three annual events for 200 guests. An existing driveway from Sage Canyon Road would continue to provide access to the winery. The proposed project site is shown in Figure 1.



Traffic Impact Study for the Chappellet Winery Use Permit Modification  
**Figure 1 – Study Area and Existing Lane Configuration**

# Transportation Setting

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## Operational Analysis

### Study Area and Periods

The study area includes the intersection of Silverado Trail/Sage Canyon Road (SR 128), the segment of Sage Canyon Road between Silverado Trail and Chiles Pope Valley Road, and the project access point on Sage Canyon Road. Operating conditions during the weekday p.m. and weekend midday peak periods were evaluated as these time periods reflect the highest traffic volumes area wide and for the proposed project. The weekday evening peak hour occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion of the day during the homeward-bound commute, while the weekend midday peak occurs between 12:00 and 4:00 p.m. and generally reflects conditions when tasting rooms are busiest.

### Study Intersections

Silverado Trail runs on a skewed alignment in the study area and is oriented northwest-southeast. Because of this skewed alignment, for purposes of this evaluation Silverado Trail was assumed to run east-west and Sage Canyon Road was assumed to run north-south.

**Silverado Trail/Sage Canyon Road (SR 128)** is an unsignalized tee-intersection stop-controlled on the terminating southbound Sage Canyon Road approach. The south leg is a private driveway to Conn Creek Winery.

The location of the study intersection and the existing lane configuration and controls are shown in Figure 1.

### Study Roadway

**Sage Canyon Road (SR 128)** is a rural two-lane roadway that winds its way west-east, but north-south for evaluation purposes, from Berryessa Knoxville Road on the east to Silverado Trail on the west. The roadway is approximately 28 feet wide adjacent to the site and includes two 11-foot travel lanes marked with a double yellow centerline and edgelines. The roadway has posted speed limits that alternate between 40 and 45 miles per hour (mph). Based on traffic counts collected in October 2016 during harvest, the ADT adjacent to the site is approximately 2,725 on weekdays.

## Collision History

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is January 1, 2013 through December 31, 2017.

As presented in Table 1, the calculated collision rates for the study intersection was compared to the average collision rate for similar facilities statewide, as indicated in *2014 Collision Data on California State*

Highways, California Department of Transportation (Caltrans). The study intersection had a collision rate above the statewide average, which warranted further analysis. The collision rate calculations are provided in Appendix A.

**Table 1 – Collision Rates at the Study Intersection**

Study Intersection	Number of Collisions (2013-2017)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
Silverado Trail/Sage Canyon Rd	11	<b>0.41</b>	0.23

Note: c/mve = collisions per million vehicles entering; **bold text** = collision rate higher than the statewide average

Further review of the 11 individual collisions that occurred at Silverado Trail/Sage Canyon Road revealed that five were classified as broadsides, three were rear-ends, one was a head-on collision, and two involved a single vehicle. The causes for the collisions were attributed to right-of-way violations, unsafe speeds, following too closely, and driving under the influence. Two involved drivers turning left from Silverado Trail to Sage Canyon Road, two involved drivers turning off Sage Canyon Road and through traffic on Silverado Trail, and two were rear-end crashes involving drivers southbound on Silverado Trail. Three crashes had “unsafe speed” cited as the primary collision factor. Although the crash rate was above average, 27.3 percent of the crashes resulted in injuries, which is less than the statewide average of 40.4 percent for similar facilities. Broadside and rear-end crashes are common at intersections during periods of congestion since there is less of a gap between motorists. Given that there was not a specific trend and the injury rate was below-average, no remedial actions are suggested. It is, however, suggested that the safety record of this intersection be reviewed again in a year or two to see if the above-average crash rate was an anomaly or if there is a demonstrated safety concern.

The collision rate for the study segment of Sage Canyon Road between Silverado Trail and Chiles Pope Valley Road was also calculated and compared to the statewide average for similar facilities. As indicated in Table 2, this segment experienced an above-average collision rate of 2.23 collisions per million vehicle miles (c/mvm) versus an average rate statewide of 1.59 c/mvm.

**Table 2 – Collision Rates for the Study Segment**

Study Roadway Segment	Number of Collisions (2013-2017)	Calculated Collision Rate (c/mvm)	Statewide Average Collision Rate (c/mvm)
Sage Canyon Rd - Silverado Trail to Chiles Pope Valley Rd	34	<b>2.23</b>	1.59

Note: c/mvm = collisions per million vehicles miles; **bold text** = collision rate higher than the statewide average

Further review of the collisions reported on the segment of Sage Canyon Road between Silverado Trail and Chiles Pope Valley Road indicated that 18 of the 34 collisions were caused by improper turning or driving on the wrong side of the road, 10 collisions involved motorists driving at unsafe speeds, and five collisions were attributed to driving under the influence. It is noted that the percent of collisions resulting in injuries was 47.1 percent for the study period, compared to a 47.8 percent average Statewide. Because this is a rural, mountainous road with several vertical and horizontal curves requiring posted advisory

speeds of 25 miles per, it is recommended that the County increase enforcement in the area which could help to reduce the number of collisions attributed to unsafe speeds as well as improper turning and driving under the influence.

## Alternative Modes

### Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, pedestrian signal phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches, etc. As might be expected given the rural location of the project site, a connected pedestrian network is lacking, though such facilities would not be appropriate in this setting.

### Bicycle Facilities

The *Highway Design Manual*, Caltrans, 2012, classifies bikeways into three categories:

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.
- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway.

In the project area, a Class III bike route exists on Chiles Pope Valley Road, which is featured on the Napa Valley Bike Tours map, and there is a proposed Class II bike lane Sage Canyon Road. Table 3 summarizes the existing and planned bicycle facilities in the project vicinity, as contained in the *Napa County Bicycle Plan*, 2012.

Status Facility	Class	Length (miles)	Begin Point	End Point
<b>Existing</b> Chiles Pope Valley Rd	III	10.35	SR 128 (Sage Canyon Rd)	Pope Canyon Rd
<b>Planned</b> SR 128 (Sage Canyon Rd)	II	3.80	Silverado Trail	Chiles Pope Valley Rd

Source: *Napa County Bicycle Plan*, W-Trans, 2012

### Transit Facilities

Transit Services throughout Napa County are provided by Napa Valley Transit (VINE), though service is not provided on Sage Canyon Road so there are no VINE stops within one-quarter of a mile of the project site.

# Capacity Analysis

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## 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. A unit of measure that indicates a level of delay generally accompanies the LOS designation.

The study intersection was analyzed using the “Two-Way Stop-Controlled” intersection capacity methodology published in the *Highway Capacity Manual* (HCM), Transportation Research Board, 2010. 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 ranges of delay associated with the various levels of service are indicated in Table 4.

**Table 4 – Two-Way Stop-Controlled Intersection Level of Service Criteria**

LOS A	Delay of 0 to 10 seconds. Gaps in traffic are readily available for drivers exiting the minor street.
LOS 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.
LOS 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.
LOS 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.
LOS E	Delay of 35 to 50 seconds. Few acceptable gaps in traffic are available, and longer queues may form on the side street.
LOS 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.

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

## Traffic Operation Standards

### Napa County

In the Circulation Element of the *Napa County General Plan*, the following policies have been adopted:

- **Policy CIR-13** – *The County seeks to provide a roadway system that maintains current roadway capacities in most locations and is both safe and efficient in terms of providing local access.*
- **Policy CIR-16** – *The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map. SR 29 is shown as a 2-lane Rural Throughway on the Circulation Map (Figure CIR-1).*

- **Policy CIR-18** – *Traffic safety and adequate local access will be priorities on roadway segments and at signalized intersections where Level of Service D or better cannot be achieved. Therefore, proposed capital improvements and development projects in these areas shall be evaluated to determine their effect on safety or local access. Projects that improve safety, improve local access, or alleviate congestion will be prioritized.*

To provide a more quantitative method of adhering to the above standards, the County refers to *Guidelines for Interpretation of General Plan Circulation Policies on Significance Criteria* (Fehr & Peers, 2015). The document establishes thresholds of significance for road segments and different intersection control types. The memorandum states a project would cause a significant impact requiring mitigation if, for existing conditions:

- *A signalized intersection operates at LOS A, B, C, or D during the selected peak hours without Project trips, and the LOS deteriorates to LOS E or F with the addition of Project trips; or*
- *A signalized intersection operates at LOS E or F during the selected peak hours without Project trips, and the addition of Project trips increases the total entering volume by one percent or more.*
  - *Project Contribution % = Project Trips ÷ Existing Volumes*
- *An unsignalized intersection operates at LOS A, B, C, or D during the selected peak hours without Project trips, and the LOS deteriorates to LOS E or F with the addition of Project traffic; the peak hour traffic signal warrant criteria should also be evaluated and presented for informational purposes; or*
- *An unsignalized intersection operates at LOS E or F during the selected peak hours without Project trips, and the project contributes one percent or more of the total entering traffic for all-way stop-controlled intersections, or ten percent or more of the traffic on a side-street approach for side-street stop-controlled intersections; the peak hour traffic signal criteria should also be evaluated and presented for informational purposes. Both of those volumes are for the stop-controlled approaches only. Each stop-controlled approach that operates at LOS E or F should be analyzed individually*
  - *All-Way Stop-Controlled Intersections – The following equation should be used if the all-way stop-controlled intersection operates at LOS E or F without the Project:*
    - *Project Contribution % = Project Trips ÷ Existing Volumes*
  - *Side-Street Stop-Controlled Intersections – The following equation should be used if the side-street stop-controlled intersection operates at LOS E or F without the Project:*
    - *Project Contribution % = Project Trips ÷ Existing Volumes*
- *An arterial segment operates at LOS A, B, C or D during the selected peak hours without Project trips, and deteriorates to LOS E or F with the addition of Project trips; or*
- *An arterial segment operates at LOS E or F during the selected peak hours without Project trips, and the addition of Project trips increases the total segment volume by one percent or more. The following equation should be used if the arterial segment operates at LOS E or F without the Project:*
  - *Project Contribution % = Project Trips ÷ Existing Volumes*

Further, a project would cause a significant impact requiring mitigation if, for cumulative (future) conditions, the Project's volume is equal to, or greater than five percent of the difference between cumulative (future) and existing volumes.

- Cumulative Conditions – A Project's contribution to a cumulative condition would be calculated as the Project's percentage contribution to the total growth in traffic. This calculation applies to arterials, signalized intersections, and unsignalized intersections.
  - $Project\ Contribution\ \% = Project\ Trips \div (Cumulative\ Volumes - Existing\ Volumes)$

## Existing Conditions

The Existing Conditions scenario provides an evaluation of current operation based on existing traffic volumes during the weekday p.m. and weekend midday peak periods. This condition includes traffic associated with current Use Permit, but not the proposed levels. Volume data was collected in October 2017 during typical harvest season winery operations. It is noted that the counts were obtained at the end of the month after the wildfires. Peak hour factors (PHF's) were calculated based on the counts obtained and used in the levels of service calculations, unless the calculated PHF was less than 0.90 in which case 0.90 was used as a "floor." Heavy vehicle data was not collected so a heavy vehicle percentage of 5 percent was assumed for all scenarios.

## Intersection Levels of Service

Under Existing Conditions, the study intersection is operating acceptably at LOS C or better overall during both peak hours; however, the stop-controlled Sage Canyon approach to Silverado Trail is operating at LOS F during the weekday p.m. peak hour. The Existing traffic volumes are shown in Figure 2 and a summary of the intersection level of service calculations is contained in Table 5. Copies of the Level of Service calculations for all evaluated scenarios are provided in Appendix B.

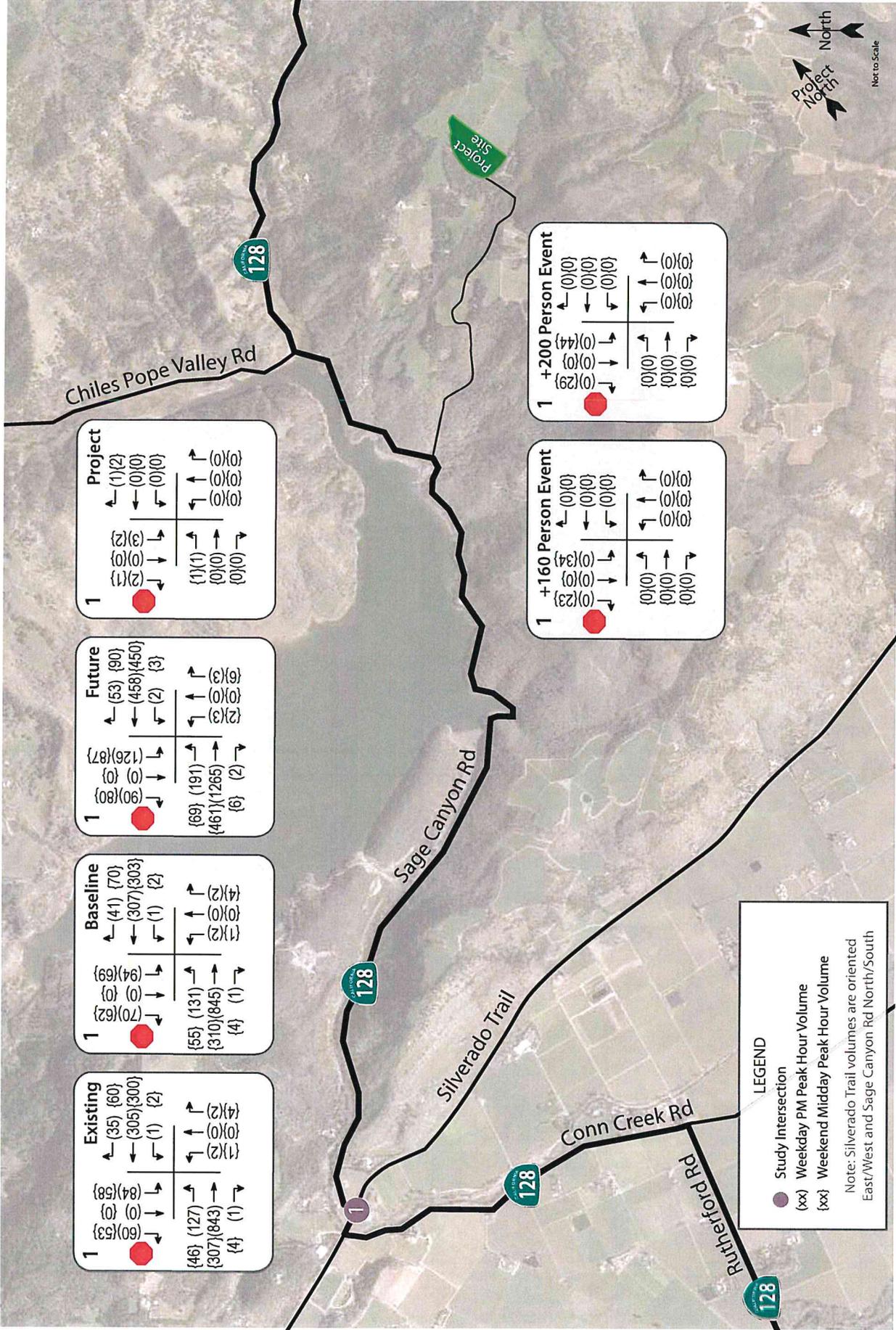
**Table 5 – Existing Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	15.0	C	2.7	A
<i>Southbound (Sage Canyon Rd) Approach</i>	<b>**</b>	<b>F</b>	<i>16.3</i>	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold** text = deficient operation

## Baseline Conditions

Baseline operating conditions were assessed to reflect the addition of traffic associated with known winery projects in the study area that are approved or pending and would potentially be operational within the next two to three years. The following projects were included in this scenario.



Traffic Impact Study for the Chappellet Winery Use Permit Modification  
**Figure 2 – Existing, Baseline, Future, Project, and Event Traffic Volumes**

- **Dakota Shy Winery** – A major Use Permit Modification to the existing winery located on the west side of Sage Canyon Road and on the east side of Silverado Trail; the project would increase production from 1,000 to 14,000 gallons annually and allow for tours and tastings by appointment only as well as two marketing events per year. As contained in the traffic study prepared by Crane Transportation Group, the project is expected to generate three trips during each of the weekday p.m. and weekend midday peak hours. The same trip distribution assumptions used in the traffic study for the project were used in this analysis which resulted in two and three new trips at Silverado Trail/Sage Canyon Road during the weekday evening and weekend midday peak hours, respectively.
- **Castlevale Winery** – A pending new winery, currently under review by the Public Works Department and Planning, Building, and Environmental Services (PBES) that would be located at 3450 Chiles Pope Valley Road approximately two miles southeast of Maxville Lake Winery. The project would include a winery with a maximum production of up to 30,000 gallons per year along with tasting room visitation and marketing events. As contained in the Winery Traffic Information/Trip Generation Sheet submitted with the application, the project is expected to generate eight trips during the weekday p.m. peak hour and ten trips during the weekend midday peak hour. A traffic impact study was not completed for the project, so due to the proximity to Maxville Lake Winery, the same trip distribution assumptions used in this analysis (detailed later in this report) were applied.
- **Norman Alumbaugh Winery** – An approved new winery to be located at 1996 Pope Canyon Road that would have a maximum production of 50,000 gallons annually, tasting room visitors, and marketing events. A traffic impact study was not prepared, but according to the Traffic Information form submitted with the application the project is expected to generate ten trips during the weekday p.m. peak hour and 35 trips during the weekend midday peak hour. Since trips originating from north of SR 128 would likely access the site via Deer Park Road and traffic coming from south of SR 128 would use Sage Canyon Road, a distribution of 50 percent via both Deer Park Road and Sage Canyon Road was applied.
- **Aloft Winery** – A pending new winery, currently under review by the Public Works Department and PBES that would be located at the end of Cold Springs Road in the community of Angwin. The project would include a winery with a maximum production of 50,000 gallons annually and allow for tasting room visitors and marketing events. As contained in the traffic study prepared by Crane Transportation Group, the project is expected to generate four trips during the weekday p.m. peak hour and two trips during the weekend midday peak hour. The same trip distribution assumptions used in the traffic study for the project were used in this analysis.
- **Diogenes Ridge Winery** – An approved new winery to be located on Brookside Drive in the community of Angwin that would have a maximum production of 30,000 gallons annually and allow for tours and tastings by appointment only as well as up to 41 marketing events per year. As contained in the Transportation/Traffic section of the Initial Study Checklist that was prepared for the project, the winery is expected to generate 13 trips during the weekday p.m. peak hour and 18 trips during the weekend midday peak hour. Due to the project's location on the east side of Howell Mountain Road it was assumed that approximately one-third of the trips would pass through Silverado Trail/Sage Canyon Road when traveling to/from the southern part of Napa Valley.
- **Maxville Lake Winery** – A major Use Permit Modification to the existing winery located on the west side of Chiles Pope Valley Road; the project as originally proposed would have increased production

from 59,000 to 240,000 gallons annually and allowed for increased visitation and employment. As contained in the traffic study prepared by W-Trans, the project was expected to generate 21 new trips during the weekday p.m. and 16 new trips during the weekend midday peak hour. The same trip distribution assumptions used in the traffic study for the project were used in this analysis. This project was approved by the Napa County Planning Commission, but with a production level of 165,000 gallons rather than 240,000; however, the trips for the originally proposed larger version of the project were applied in this analysis.

## Intersection Levels of Service

The anticipated traffic associated with these approved and pending projects was added to the volumes analyzed in the Existing Conditions scenario to determine Baseline (Existing plus Approved Projects) volumes. Under these conditions, the Sage Canyon Road approach to Silverado Trail/Sage Canyon Road would be expected to continue operating at LOS F during the p.m. peak hour, but the intersection would continue to operate acceptably overall. Baseline volumes are shown in Figure 2 and resulting intersection levels of service are summarized in Table 6.

Study Intersection <i>Approach</i>	Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	23.2	C	3.3	A
<i>Southbound (Sage Canyon Rd) Approach</i>	<b>**</b>	<b>F</b>	17.7	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold text** = deficient operation

## Future Conditions

Future volumes for the horizon year 2040 were calculated based on output from the *Napa Solano Travel Demand Model*, maintained by the Solano Transportation Authority (STA). Base year (2015) and Future (2040) segment volumes for the weekday p.m. peak period were used to calculate growth factors for the study intersection.

The growth factor projected by the model was adjusted to account for the two years of growth that occurred between the 2015 model volumes and the Existing counts collected in 2017; the count data was then multiplied by the growth factor to project likely Future weekday p.m. turning movement volumes at the study intersection. The same growth factor used for the weekday p.m. peak hour was used for the weekend midday peak hour as the model does not contain information for weekend days. It is noted that the model is projecting substantial increases in traffic volumes in the area resulting in a 20-year growth factor of 1.5 for Silverado Trail/Sage Canyon Road, a growth rate of about 2.2 percent per year.

## Intersection Levels of Service

As might be expected given the large increase in volumes projected by the model, the study intersection is expected to deteriorate to LOS F overall during the weekday p.m. peak hour; the delays calculated are well above 120 seconds and indicate that the theoretical results are unreliable. Future operating conditions are summarized in Table 7 and volumes are shown in Figure 2.

**Table 7 – Future Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	**	F	4.5	A
<i>Southbound (Sage Canyon Rd) Approach</i>	**	<i>F</i>	<i>29.2</i>	<i>D</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold** text = deficient operation

## Project Description

### Current Approved Permit

The current Use Permit for Chappellet Winery was approved in August 2011 and authorized the following activities:

- An average annual production of 150,000 gallons;
- A maximum of 40 visitors per day; and
- A marketing program consisting of four events per month for 40 guests, four events per year for 75 guests, and two events per year for 125 guests.

### Proposed Modification

The proposed project would include the following activities that affect daily trip generation:

- An increase in production from 150,000 to 250,000 gallons annually;
- An increase in maximum weekday and weekend visitation from 40 to 95;
- An increase in the number of employees during typical weekend operation from two full-time to 15 full-time;
- An increase in the number of employees on a Harvest Saturday from 24 full-time to 25 full-time and three to five part-time staff; and
- A marketing program consisting of ten annual events for 20 guests, six annual events for 80 guests, three annual events for 160 guests, and three annual events for 200 guests.

## Trip Generation

### Typical Operation

The County of Napa’s Winery Traffic Information/Trip Generation Sheet, updated in August 2019, was used to determine the anticipated trip generation for the existing, permitted, and proposed conditions. The form estimates the number of daily trips for weekdays and Saturdays during typical operation and harvest season based on the number of full- and part-time employees, maximum daily visitors, and production. The winery is currently operating below permitted levels during the weekday p.m. peak hour so the net new trips were calculated based on the actual operating levels, as opposed to those allowed under the current Use Permit to more accurately assess the number of new trips that would likely be generated with the proposed permit conditions. During the weekend midday peak hour, the winery is

operating above permitted conditions with regards to visitation and production so the net new trips were based on what is permitted by the current Use Permit to account for the existing non-compliant trips.

The Napa County trip generation form assigns 38 percent of weekday trips to the weekday p.m. peak hour and 57 percent of Saturday trips to the midday peak hour. However, recent updates to the County’s policy have provided alternatives to using these standard temporal distributions, which is Option A per the policy. The County now allows the use of standard ITE rates (Option B) or site-specific peak-hour data (Option C) to estimate the number of peak hour trips expected to be generated by a proposed project as a percent of the daily trips estimated using the County’s standard form. Because the winery is already in operation, it was determined that actual, site-specific data would provide the most accurate representation of the project’s potential peak hour trips so Option C was selected.

Chappellet Winery staff make an effort to schedule tastings so that few sessions end during the p.m. peak period, and as a result their tasting trips are generally concentrated during the afternoon hours. Based on actual site data, approximately 11 and 13 percent of the total daily trips occur during the peak hour of the generator on weekdays and weekend days, respectively. The peak hour for the site typically occurs between 3:00 p.m. and 4:00 p.m. on weekdays and between 1:30 p.m. and 2:30 p.m. on weekend days.

Although the peak hour for the site does not coincide with the weekday p.m. peak hour for adjacent street traffic, to provide a conservative estimate of the peak hour trip generation, the percentages for the peak hour of the generator were used to estimate the number of trips generated during both the weekday p.m. and weekend midday peak hours. The inbound versus outbound ratio for both peak hours was also reviewed based on the actual driveway counts, and it was determined that the site experiences a 20/80 split between inbound and outbound trips during the weekday p.m. peak hour and a 52/48 split during the weekend midday peak hour. Copies of the counts and a summary of how the ratios were determined and applied are provided in Appendix C.

Based on application of these assumptions, the proposed modification would be expected to generate a maximum of 180 trips on a weekday during harvest, with 20 trips occurring during the weekday evening peak hour and 22 trips during the weekend midday peak hour. As shown in Table 8, this would result in a net increase of 60 trips per weekday, including seven new trips during the weekday p.m. peak hour, and six new trips during the weekend midday peak hour. The Winery Traffic Information/Trip Generation sheets are contained in Appendix D.

<b>Condition</b>	<b>Weekday</b>	<b>Weekday PM Peak Hour</b>			<b>Weekend MD Peak Hour</b>		
	<b>Trips</b>	<b>Trips</b>	<b>In</b>	<b>Out</b>	<b>Trips</b>	<b>In</b>	<b>Out</b>
Permitted	136	15	3	12	16	8	8
Existing	120	13	3	10	21	11	10
Proposed	180	20	4	16	22	11	11
<b>Net New Trips</b>	<b>60</b>	<b>7</b>	<b>1</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>3</b>

## Marketing Events

In addition to daily and peak hour harvest operations, the anticipated trip generations for 160- and 200-person events were also estimated, as shown in Table 9. Using standard Napa County vehicle occupancy rates, a 160-person marketing event would be expected to generate a total of 152 trips, including 114 trips for visitors, 32 trips for employees, and six truck trips and a 200-person marketing event would be expected to generate a total of 191 trips, including 143 trips for visitors, 40 trips for employees, and eight truck trips. Events of this size would occur mostly on weekend days, and the few that may occur on weekdays would be scheduled to avoid generating trips during the p.m. peak hour. On weekend days, events would likely begin between noon and four p.m., so it was assumed that all guests would be leaving the project site at the end of an event to assess worst-case conditions on the Sage Canyon Road approach to Silverado Trail. Event employees would arrive outside of the arrival and departure hours of guests as they would be expected to be on-site for set-up and clean-up and are therefore not included in the peak hour totals; the same is true for trucks used for set-up and clean-up. It is noted that the tasting room would be closed, and no tastings scheduled during events with 160- or 200-persons.

Table 9 – Trip Generation for Events					
Event Size	Units	Total	MD Peak Hour		
Trip Generator		Trips	Trips	In	Out
<b>160-Person Event</b>					
Employees	16	32	-	-	-
Visitors	160	114	57	0	57
Trucks	3	6	-	-	-
<b>Total</b>		<b>152</b>	<b>57</b>	<b>0</b>	<b>57</b>
<b>200-Person Event</b>					
Employees	20	40	-	-	-
Visitors	200	143	73	0	73
Trucks	4	8	-	-	-
<b>Total</b>		<b>191</b>	<b>73</b>	<b>0</b>	<b>73</b>

## Trip Distribution

The pattern used to allocate new project trips to the roadway network was determined based familiarity with the area and surrounding region as well as likely origins and destinations for patrons of the project. Because the winery is located on the east side of the Napa Valley, it is likely that nearly all the project-related trips would occur via Silverado Trail and Sage Canyon Road west of the project site. In conjunction with the fact that only one study intersection is proposed, a distribution of 60 percent to the south and 40 percent to the north via Silverado Trail from Sage Canyon Road was applied.

## Intersection Operation

### Existing plus Project Conditions

Upon the addition of project-related traffic to Existing volumes, the minor street approach at Silverado Trail/Sage Canyon Road that operates at LOS F during the weekday evening peak hour under Existing Conditions would continue to do so. These results are summarized in Table 10 and Project traffic volumes are shown in Figure 2.

Study Intersection <i>Approach</i>	Existing Conditions				Existing plus Project			
	Weekday PM Peak		Weekend MD Peak		Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	15.0	C	2.7	A	17.7	C	2.8	A
<i>SB (Sage Canyon Rd) Approach</i>	<b>**</b>	<b>F</b>	16.3	C	<b>**</b>	<b>F</b>	16.5	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold** text = deficient operation

**Finding** – The study intersection would continue to operate at LOS A overall during the weekend midday peak hour and LOS C overall during the weekday evening peak hour. Because the stop-controlled approach is operating at LOS F during the weekday evening peak hour under Existing Conditions, the County’s criterion was applied; for existing LOS F operation, the impact is considered significant if the project generates 10 percent or more of the traffic on that approach. The existing p.m. peak hour volume on the Sage Canyon Road approach is 144 trips and the project would contribute six trips, which is less than 10 percent of the total side-street volume. This is therefore a *less-than-significant* impact.

### Baseline plus Project Conditions

With project-related traffic added to Baseline volumes, the study intersection would be expected to drop to LOS D overall during the p.m. peak hour and would continue to operate as LOS A overall during the weekend midday peak hour. These results are summarized in Table 11.

Study Intersection <i>Approach</i>	Baseline Conditions				Baseline plus Project			
	Weekday PM Peak		Weekend MD Peak		Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	23.2	C	3.3	A	26.1	D	3.3	A
<i>SB (Sage Canyon Rd) Approach</i>	<b>**</b>	<b>F</b>	17.7	C	<b>**</b>	<b>F</b>	17.9	C

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold** text = deficient operation

**Finding** – Although the Sage Canyon Road approach is operating at LOS F during weekday p.m. peak hour, the Baseline volumes on this approach would increase to 164 (from 144 under Existing volumes) and the project trips would remain at six so would still be less than the allowed 10 percent. The impact is therefore *less than significant*.

### Future plus Project Conditions

Upon the addition of project-generated traffic to the anticipated Future volumes, the study intersections would continue operating at the same levels of service as without the project. The Future plus Project operating conditions are summarized in Table 12.

**Table 12 – Future and Future plus Project Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	Future Conditions				Future plus Project			
	Weekday PM Peak		Weekend MD Peak		Weekday PM Peak		Weekend MD Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	**	F	4.5	A	**	F	4.7	A
<i>SB (Sage Canyon Rd) Approach</i>	**	<i>F</i>	29.2	<i>D</i>	**	<i>F</i>	30.0	<i>D</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; \*\* = delay greater than 120 seconds; **Bold text** = deficient operation

**Finding** – County standards state that a project would cause a significant impact requiring mitigation if, for Future Conditions, the project’s volume is equal to or greater than five percent of the difference between Existing and Future volumes. Since the study intersection is projected to operate at LOS F without project trips and the project would be responsible for approximately 8.3 percent of the anticipated growth on the Sage Canyon Road approach to Silverado Trail during the evening peak hour, this would be considered a cumulatively considerable impact.

**Recommendation** – To contribute less than five percent of the anticipated growth between Existing and Future volumes on the Sage Canyon Road approach to Silverado Trail, the project would need to generate three or fewer new outbound trips during the weekday p.m. peak hour. When added to the 10 outbound trips currently expected to be generated, this would translate to 13 allowable outbound trips without triggering a *significant* impact; therefore, as mitigation it is recommended that the project implement an operational program that generates no more than 13 outbound trips within any one-hour period between 3:30 p.m. and 6:00 p.m. on weekdays. Measures to achieve the limited increase in trips could include reduced visitation, a change in shift patterns to spread employee trips outside the peak period, rewarding employee carpooling, etc. No changes to visitation would be necessary on weekend days as the study intersection is expected to operate acceptably.

### Existing plus Marketing Event Conditions

Traffic associated with 160- and 200-person events were added to Existing volumes and evaluated during the weekend midday peak hour. It is noted that typical project traffic was not included in these scenarios as the tasting room would be closed and no tastings scheduled during events of this size. Marketing Event levels of service are summarized in Table 13 and traffic volumes are shown in Figure 2.

**Table 13 – Existing plus Marketing Event Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	MD Peak + 160 Guests		MD Peak + 200 Guests	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	4.0	A	4.4	A
<i>Southbound (Sage Canyon Rd) Approach</i>	<i>18.5</i>	<i>C</i>	<i>19.3</i>	<i>C</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*

**Finding** – The study intersection would be expected to operate acceptably during 160- and 200-person events during the weekend midday peak hour and the project’s impact would be considered *less than significant*.

### Baseline plus Marketing Event Conditions

Baseline plus Project plus Marketing Event Conditions are summarized in Table 14. The same assumptions used in the Existing plus Marketing Event Conditions scenario were applied.

**Table 14 – Baseline plus Marketing Event Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	MD Peak + 160 Guests		MD Peak + 200 Guests	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	4.7	A	5.2	A
<i>Southbound (Sage Canyon Rd) Approach</i>	<i>20.5</i>	<i>C</i>	<i>21.7</i>	<i>C</i>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*

**Finding** – Consistent with the Existing plus Marketing Event Conditions, no significant impacts were identified with 160-or 200-person events as the study intersection would continue to operate at LOS A overall and LOS C on the minor street approach during the weekend midday peak hour.

### Future plus Marketing Event Conditions

Upon the addition of event-related traffic to Future volumes, the study intersection would be expected to operate unacceptably on the side-street approach during both 160- and 200-person events. Future plus Marketing Event Conditions are summarized in Table 15.

**Table 15 – Future plus Marketing Event Peak Hour Intersection Levels of Service**

Study Intersection <i>Approach</i>	MD Peak + 160 Guests		MD Peak + 200 Guests	
	Delay	LOS	Delay	LOS
Silverado Trail/Sage Canyon Rd	8.7	A	11.6	B
<i>Southbound (Sage Canyon Rd) Approach</i>	<b>47.7</b>	<b>E</b>	<b>61.0</b>	<b>F</b>

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; Delay for side-street stop-controlled movements shown in *italics*; **Bold** text = deficient operation

**Finding** – The study intersection would be expected to operate acceptably overall during events; however, the Sage Canyon Road approach would be expected to deteriorate to LOS E during events with 160 persons and LOS F during events with 200 persons. This would be considered a *significant* impact per County standards.

**Recommendation** – Events with 160 and 200 persons should be scheduled to conclude after 4:30 p.m. on weekend days to avoid generating outbound trips during the midday peak period. This would reduce the project’s impact to *less than significant*.

# Alternative Modes

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## Pedestrian Facilities

Given the rural location, lack of existing facilities, and the nature of the project, pedestrian trips are not anticipated.

**Finding** – The lack of pedestrian facilities serving the project site on Sage Canyon Road is consistent with the surrounding area and acceptable for the type of land use.

## Bicycle Facilities

Although there are no existing bike facilities in the project vicinity, it is understood that cyclists use Sage Canyon Road for recreational purposes and to wine taste. Further, upon completion of the planned Class II bike lanes on Sage Canyon Road, the site would be more readily accessible via bicycle. Many cyclists like to travel in pairs so for this reason the site should provide at least two bicycle parking spaces near the tasting room.

**Finding** – Upon completion of the planned Class II bike lanes on Sage Canyon Road, the site would be more easily accessible to cyclists.

**Recommendation** – The project should provide a minimum of two bicycle parking spaces on site.

## Transit

The winery has been operating acceptably with the lack of transit facilities; the proposed expansion would not be expected to generate new transit demand.

**Finding** – The lack of transit facilities serving the project site is adequate for the demand.

# Access and Circulation

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## Site Access

The project site is accessed via a private roadway that winds its way east from Sage Canyon Road. As proposed, the private roadway would be widened to 20 feet in certain areas to accommodate two-way traffic. This improvement would have a beneficial impact on site access and circulation.

**Finding** – On-site circulation is expected to continue operating acceptably and access would be improved with the proposed widening of the private road.

## Sight Distance

At private roads and driveways, a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time should be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed, if feasible.

Sight distances along Sage Canyon Road at the existing driveway were evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches that are driveways are based on stopping sight distance, with approach travel speeds used as the basis for determining the recommended sight distance.

For the posted 40-mph speed limit, the recommended sight distance is 300 feet. Based on a review of field conditions, sight distance at the driveway extends more than 400 feet to the east and approximately 325 feet to the west, which is more than adequate for the posted speed limit. It should be noted that the driveway is situated near a horizontal curve with a posted advisory speed of 25 mph, so drivers would likely be traveling well below 40 mph adjacent to the access point.

Although Sage Canyon Road is generally curvy in the study area, the driveway is positioned such that adequate sight distance is available in both directions for drivers exiting the site and for following drivers to see and react to a westbound vehicle stopped to make a left-turn into the driveway.

**Finding** – Adequate sight distance is available at the project driveway to accommodate all turns.

## Access Analysis

### Left-Turn Lane Warrants

The County of Napa has a published policy that provides guidance on when a turn lane is needed based on the daily traffic volume projected to use the driveway as a function of roadway ADT (Average Daily Traffic). A left-turn lane meets warrants when the corresponding value plots above the curve indicated on the Left Turn Lane Warrant Graph from the *Napa County Road and Street Standards* and is unwarranted if the value plots below the curve. Based on the existing count data collected on Sage Canyon Road and the project driveway, a left-turn lane is warranted and would continue to be warranted with the addition of project-related traffic.

Although a left-turn lane would be warranted based on County of Napa standards, because the winery driveway is located on a state route under the jurisdiction of Caltrans, the need for a left-turn lane was evaluated based on criteria contained in the *Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985, as well as a more recent update of the methodology developed by the Washington State Department of Transportation. The NCHRP report references a methodology developed by M. D. Harmelink that includes equations that can be applied to expected or actual traffic volumes to determine the need for a left-turn pocket based on safety issues. Based on our discussions with Caltrans staff, it is understood this methodology is typically used to determine the potential need for a left-turn lane at a location on a state route.

Turning movement counts were collected at the project driveway in December 2018 on days when the tasting room was scheduled for nearly the maximum number of guests and revealed that approximately 94 and 88 percent of all trips are to or from the west during the weekday p.m. and weekend midday peak hours, respectively, meaning that only six and 12 percent of the total trips are from the east. Based on Future plus Project peak hour volumes and using the actual distribution of trips during each peak hour, a left-turn lane would not be warranted during either of the peak hours evaluated. Further, based on Future plus 200-person event volumes, which reflects worst-case conditions, a left-turn lane would still not be warranted. A copy of the traffic counts that were collected for the analysis are contained in Appendix C and the Napa County daily left-turn lane warrant graph and the peak hour analysis warrants that are typically used by Caltrans are included in Appendix E.

Additionally, the collision history for the project access point was reviewed for the same five years that the study segment of Sage Canyon Road was evaluated and it was determined that even though the study segment had an above-average collision rate, there were no collisions reported at the project access point indicating that left-turn movements are being facilitated safely.

**Finding** – A left-turn lane is warranted on Sage Canyon Road at the project driveway based on the County’s standards; however, it is unwarranted based on peak hour criteria typically used by Caltrans when directionality of entering traffic is taken into account.

**Recommendation** – Because the winery driveway is located on a state route and left-turn lane warrants would not be met under the criteria typically used by Caltrans, installation of a left-turn lane is not recommended. It should also be noted that most of the winery traffic approaches the site from the west and makes a right turn into the project driveway, not a left turn. The Napa County left-turn lane warrant methodology does not take directionality into consideration so can indicate need for a left-turn lane in this absence of a substantial volume of traffic that would use it. For these reasons and the fact that there have been no reported collisions at the project driveway in the last five years, it is recommended that the County consider granting a left-turn lane exemption for the proposed project.

# Transportation Demand Management

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Transportation Demand Management (TDM) measures aim to reduce single-occupancy vehicle trips during peak hours, parking demand, and total vehicle miles traveled (VMT) through use of alternative modes of transportation and more efficiently planned trips. Although VMT analysis is not required as part of the California Environmental Quality Act (CEQA) review process until July 2020, in recognition of the statewide goal to reduce VMT the applicant has included TDM measures as part of the project. Due to the project's rural location, the site does not have as many options to reduce VMT as one located in an urban environment, but the winery would have up to 25 full-time and five part-time employees on weekends during harvest as well as up to 95 daily visitors so there is potential to reduce vehicular trips and parking demand with implementation of a TDM program.

## Proposed TDM Program

The project's TDM Program would provide information, encouragement, and access to travel options to reduce the number of vehicle trips during peak hours and overall, thus reducing VMT. The following measures are proposed as part of the project and are consistent with the goals of Caltrans' *Smart Mobility 2010: A Call to Action for the New Decade*. It is recommended that the incentives offered as part of the program be available for the first two years of operation, after which the effectiveness of the program should be reevaluated and modified, if needed.

- **Carpool Incentives:** The project site would have up to 30 employees across all uses at peak times so there is an opportunity for employees to carpool to work, especially considering that the winery and tasting room would require some employees to work the same shift. Financial incentives can be an effective way to encourage employees to carpool to work. The applicant would provide an incentive of \$50 per month to employees who agree to carpool to work a minimum of 75 percent of the time. This program would be offered to the existing employees as well as new employees.
- **Guaranteed Ride Home:** One of the reasons that many employees do not carpool to work is the fear of being stranded should they need to leave in an emergency. Employees who carpool to work should be guaranteed a ride home in the case of an emergency or unique situation. As part of the V-Commute program offered by the Napa Valley Transportation Authority (NVTA), employees who carpool or commute via alternative modes are able to use a taxi, rental car, Lyft, Uber, or other means to get home in an emergency and are reimbursed for the full cost of the service. The program is available to all who work or attend college in Napa County and is free to join, but registration is required. As part of the project's TDM program, employees would be provided information about V-Commute and would be encouraged to register for the service.
- **Alternative Shift Schedules:** Chappellet Winery already makes an effort to schedule tastings such that few end during the p.m. peak hour, and as part of the TDM program, they would extend this practice to employees. The winery has a goal of scheduling five employees to end their work day at 3:15 p.m. and another five employees to end their work day at 6:00 p.m., which would move trips associated with ten employees outside the peak commute period.

## **VMT Reduction**

Based on the California Air Pollution Officers Association (CAPCOA) report Quantifying Greenhouse Gas Mitigation Measures, CAPCOA 2010, it is estimated that voluntary commute trip reduction measures with incentives to carpool can reduce a project's total VMT by about 1.0 to 6.2 percent. Although implementation of alternative shift schedules may not have as much of an impact on VMT reduction as carpooling, many employee trips would be moved to off-peak hours, which would be beneficial to peak hour operation of the surrounding roadways, thereby reducing congestion and the associated greenhouse gases.

# Conclusions and Recommendations

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## Conclusions

- The proposed project is expected to generate an average of 180 trips during a harvest weekday, with 20 trips occurring during the evening peak hour and 22 trips during the weekend midday peak hour.
- The study intersection of Silverado Trail/Sage Canyon Road is operating acceptably overall, but unacceptably at LOS F on the Sage Canyon approach during the weekday p.m. peak hour. Upon the addition of project-related traffic, the study intersection would continue operating acceptably overall with unacceptable delays on the minor street approach. The project would be responsible for an increase that represents less than 10 percent of the existing p.m. peak hour traffic volumes on the Sage Canyon Road approach, so the project's impact would be considered *less-than-significant* under the County's criterion.
- Upon the addition of traffic associated with approved or pending projects in the surrounding vicinity, the study intersection would be expected to continue operating acceptably overall at LOS C or better. The Sage Canyon Road approach to Silverado Trail would continue to operate unacceptably, but the project would add less than 10 percent of the Baseline volumes to the Sage Canyon Road approach, so the project's impact would be considered *less-than-significant*.
- Under the anticipated Future volumes, Silverado Trail/Sage Canyon Road would deteriorate to LOS F overall during the weekday p.m. peak hour. The project would add more than five percent of the anticipated growth on the Sage Canyon Road approach so would have a *significant* impact per County standards.
- With the addition of volumes for a 160- and 200-person event to Future volumes, the Sage Canyon Road approach to Silverado Trail would deteriorate to LOS E and F, respectively, during the weekend midday peak hour, which is considered a *significant* impact since the approach would be expected to operate acceptably at LOS D without event traffic.
- Pedestrian, bicycle, and transit facilities are adequate to serve the anticipated demand.
- Sight distance on Sage Canyon Road at the project driveways is adequate to accommodate all turns.
- A left-turn lane would be warranted on Sage Canyon Road at the project driveway under the County's criterion but would not be warranted based on the peak hour methodology generally used by Caltrans and therefore more appropriate for application to a location on a state highway.

## Recommendations

- Events with 160 and 200 persons should be scheduled to conclude after 4:30 p.m. on weekend days to avoid generating outbound trips during the midday peak hour.
- To reduce the cumulative impact identified on the Sage Canyon Road approach to Silverado Trail to *less-than-significant*, the project should implement an operational program that generates 13 or fewer outbound trips each hour between 3:30 p.m. and 6:00 p.m. on weekdays. The applicant should work with the County to determine the operational specifics of the mitigation.

- The project should provide at least two bicycle parking spaces near the tasting room.
- It is recommended that a left-turn lane not be required at the site's driveway based on application of the Caltrans methodology, which is most appropriate as the driveway is located on a state route.
- As proposed, the project should implement the TDM measures identified in this report, including carpool incentives, a guaranteed ride home program, and alternative shift times.

# Study Participants and References

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## Study Participants

<b>Principal in Charge</b>	Dalene J. Whitlock, PE, PTOE
<b>Assistant Engineers</b>	Cameron Nye, EIT, Kevin Rangel, EIT
<b>Graphics</b>	Katia Wolfe
<b>Editing/Formatting</b>	Alex Scrobonia
<b>Review</b>	Dalene J. Whitlock, PE, PTOE

## References

- 2014 Collision Data on California State Highways*, California Department of Transportation, 2017
- Alumbaugh Winery Conditional Use Permit Approval Letter*, County of Napa, 2007
- California Manual on Uniform Traffic Control Devices for Streets and Highways*, California Department of Transportation, 2014
- Castlevale Winery Use Permit Application*, County of Napa, 2009
- Diogenes Ridge Winery Initial Study Checklist*, County of Napa, 2010
- Guide for the Preparation of Traffic Impact Studies*, California Department of Transportation, 2002
- Guidelines for Interpretation of General Plan Circulation Policies on Significance Criteria*, Fehr & Peers, 2015
- Highway Capacity Manual*, Transportation Research Board, 2010
- Highway Design Manual*, 6<sup>th</sup> Edition, California Department of Transportation, 2012
- Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985
- Napa County Bicycle Plan*, W-Trans, 2012
- Napa County Code*, Municipal Code Corporation, 2017
- Napa County General Plan*, County of Napa, 2013
- Napa County Road and Street Standards*, County of Napa, 2016
- Statewide Integrated Traffic Records System (SWITRS)*, California Highway Patrol, 2013-2017
- Traffic Impact Report: Proposed Aloft Winery*, Crane Transportation Group, 2017
- Traffic Impact Report: Proposed Dakota Shy Winery*, Crane Transportation Group, 2015
- VINE Transit, <http://www.ridethevine.com>

NAX120-1



# Appendix A

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## Collision Rate Calculations



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**Intersection Collision Rate Calculations**

**Chappellet Winery TIS**

**Intersection # 1:** Silverado Trail & Sage Canyon Road (SR 128)

**Number of Collisions:** 11  
**Number of Injuries:** 3  
**Number of Fatalities:** 0  
**ADT:** 14600  
**Start Date:** January 1, 2013  
**End Date:** December 31, 2017  
**Number of Years:** 5

**Intersection Type:** Four-Legged  
**Control Type:** Stop & Yield Controls  
**Area:** Rural

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

$$\text{collision rate} = \frac{11}{14,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.41 c/mve	0.0%	27.3%
Statewide Average*	0.23 c/mve	2.0%	40.4%

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

**SEGMENT COLLISION RATE CALCULATIONS**

**Chappellet Winery TIS**

Location: Sage Canyon Rd - Silverado Trail to Chiles Pope Valle

ADT: 2,200

Number of Collisions: 34

Number of Injuries: 16

Number of Fatalities: 0

Start Date: January 1, 2013

End Date: December 31, 2017

Number of Years: 5

Highway Type: Conventional 2 lanes or less

Area: Rural

Design Speed: ≤55

Terrain: Mountain

Segment Length: 3.8 miles

Direction: East/West

Number of Collisions x 1 Million

ADT x 365 Days per Year x Segment Length x Number of Years

$$\frac{34}{2,200 \times 365 \times 3.8 \times 5} \times 1,000,000$$

	Collision Rate	Fatality Rate	Injury Rate
Study Segment	2.23 c/mvm	0.0%	47.1%
Statewide Average*	1.59 c/mvm	2.2%	47.8%

ADT = average daily traffic volume

c/mvm = collisions per million vehicle miles

\* 2013 Collision Data on California State Highways, Caltrans

# Appendix B

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## Intersection Level of Service Calculations



Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
 Analysis Method: HCM 2010  
 Analysis Period: 15 minutes  
 Delay (sec / veh): 159.1  
 Level Of Service: F  
 Volume to Capacity (v/c): 0.979

Intersection Setup

Name	Divergency		Sage Canyon Rd		Silverado Trail		Silverado Trail	
	Northbound	Southbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Approach	+		+		+		+	
Lane Configuration	T		T		T		T	
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0
Pocket Length [ft]	104.00	69.00	104.00	170.00	69.00	104.00	104.00	69.00
Speed [mph]	15.00		40.00		55.00		55.00	
Grade [%]	0.00		0.00		0.00		0.00	
Crosswalk	No		No		No		No	

Volumes

Name	Divergency		Sage Canyon Rd		Silverado Trail		Silverado Trail	
	Northbound	Southbound	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
Base Volume Input [veh/h]	2	0	2	84	0	60	127	843
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diversed Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	2	84	0	60	127	843
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	1	22	0	16	33	222
Total Analysis Volume [veh/h]	2	0	2	86	0	63	134	897
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	Yes	Yes		
Storage Area [veh]	0	2			
Two-Stage Gap Acceptance	No	No			
Number of Storage Spaces in Median	0	0			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.01	0.98	0.00	0.09	0.11	0.01	0.01	0.00	0.00	
d_M, Delay for Movement [s/veh]	51.69	40.00	16.55	159.08	102.70	124.22	8.43	6.00	6.00	9.60	9.60	
Movement LOS	F	E	C	F	F	F	A	A	A	A	A	
95th-Percentile Queue Length [veh/m]	0.10	0.10	0.10	7.82	7.82	7.82	0.38	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft/m]	2.42	2.42	2.42	195.39	195.39	195.39	9.54	0.00	0.00	0.10	0.00	
d_A, Approach Delay [s/veh]	34.22		2.42		144.54		1.10		0.03		0.03	
Approach LOS	D		D		F		A		A		A	
d_L, Intersection Delay [s/veh]	15.04		15.04		15.04		15.04		15.04		15.04	
Intersection LOS	F		F		F		F		F		F	

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
 Analysis Method: HCM 2010  
 Analysis Period: 15 minutes  
 Delay (sec / veh): 19.9  
 Level Of Service: C  
 Volume to Capacity (v/c): 0.229

Intersection Setup

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail	
	Northbound		Southbound		Eastbound		Westbound	
Approach	+		+		+		+	
Lane Configuration	12.00 12.00		12.00 12.00		12.00 12.00		12.00 12.00	
Turning Movement	0 0		0 0		0 0		0 0	
Lane Width [ft]	12.00 12.00		12.00 12.00		12.00 12.00		12.00 12.00	
No. of Lanes in Pocket	0 0		0 0		0 0		0 0	
Pocket Length [ft]	0.00 0.00		0.00 0.00		0.00 0.00		0.00 0.00	
Speed [mph]	15.00		40.00		55.00		55.00	
Grade [%]	0.00		0.00		0.00		0.00	
Crosswalk	No		No		No		No	

Volumes

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound		Southbound		Eastbound		Westbound					
Base Volume Input [veh/h]	1	0	4	58	0	53	46	307	4	2	300	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	4	58	0	53	46	307	4	2	300	60
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	16	0	15	13	85	1	1	83	17
Total Analysis Volume [veh/h]	1	0	4	64	0	59	51	341	4	2	333	67
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	Yes			
Storage Area [veh]	0	2			
Two-Stage Gap Acceptance	No	No			
Number of Storage Spaces in Median	0	0			

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00		0.01		0.23		0.09		0.04		0.00		0.00		0.00	
	19.72		12.26		10.27		19.85		12.33		8.30		0.00		0.00	
d_M, Delay for Movement [s/veh]	C		B		C		B		A		A		A		A	
Movement LOS	C		B		C		B		A		A		A		A	
95th-Percentile Queue Length [veh/h]	0.03		0.03		0.88		0.88		0.14		0.00		0.01		0.00	
95th-Percentile Queue Length [ft]	0.75		0.75		0.75		21.89		21.89		3.50		0.13		0.00	
d_A, Approach Delay [s/veh]	12.16						16.25		1.07						0.04	
Approach LOS	B						C		A						A	
d_L, Intersection Delay [s/veh]									2.70							
Intersection LOS									C							

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Two-way stop  
HCM 2010  
15 minutes  
Control Type: 218.3  
Level Of Service: F  
Analysis Method: F  
Volume to Capacity (v/c): 1.132

Intersection Setup

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration									
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0	1	0	0
Pocket Length [ft]	157.00	157.00	157.00	157.00	170.00	157.00	110.00	102.00	107.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail				
	Northbound		Southbound		Eastbound		Westbound				
Base Volume Input [veh/h]	2	0	2	0	70	131	845	1	307	41	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	2	0	2	94	0	70	131	845	1	307	41
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	0	1	25	0	18	34	222	0	81	11
Total Analysis Volume [veh/h]	2	0	2	98	0	74	138	889	1	323	43
Pedestrian Volume [ped/h]	0		0		0		0		0		

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes	Yes		
Storage Area [veh]	0	0	2	2	0	0
Two-Stage Gap Acceptance	No	No	No	No		
Number of Storage Spaces in Median	0	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	E		F		A	
	0.03	0.00	0.01	1.13	0.00	0.11
d_M, Delay for Movement [s/veh]	54.57	41.63	16.67	218.28	319.20	182.32
Movement LOS	F	E	C	F	F	F
95th-Percentile Queue Length [veh/h]	0.10	0.10	0.10	10.11	10.11	10.11
95th-Percentile Queue Length [ft/m]	2.53	2.53	2.53	252.87	252.87	252.87
d_A, Approach Delay [s/veh]	35.62		202.80		1.14	
Approach LOS	E		F		A	
d_L, Intersection Delay [s/veh]					23.17	
Intersection LOS					F	

Intersection Level Of Service Report  
Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes  
Delay (sec / veh): 21.6  
Level Of Service: C  
Volume to Capacity (V/C): 0.292

Intersection Setup

Name	Diveyway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Line Configuration	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Lane Width [ft]	0	0	0	0	0	0	0	0	0
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	0	0	0	0	0	0	0	0	0
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveyway				Sage Canyon Rd				Silverado Trail				
	1	0	4	4	69	0	62	55	310	4	2	303	70
Base Volume Input [veh/h]	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0
Base Volume Adjustment Factor	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Heavy Vehicles Percentage [%]	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor	0	0	0	0	0	0	0	0	0	0	0	0	0
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	4	69	0	62	55	310	4	2	303	70	
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	0	0	1	19	0	17	15	66	1	1	84	19	
Total Analysis Volume [veh/h]	1	0	4	77	0	69	61	344	4	2	337	78	
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0	

Intersection Settings

Priority Scheme	Flared Lane	Stop	Stop	Free
Storage Area [veh]	2	No	Yes	Free
Two-Stage Gap Acceptance	No	No	No	Free
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	0.29	0.00	0.10	0.05	0.00	0.00	0.00	0.00	0.00
d.M.Delay for Movement [s/veh]	21.01	18.25	10.28	21.59	30.05	13.36	8.37	0.00	0.00	0.00	0.00	0.00
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh/m]	0.03	0.03	0.03	1.20	1.20	1.20	0.17	0.00	0.00	0.01	0.00	0.00
95th-Percentile Queue Length [ft/m]	0.77	0.77	0.77	30.10	30.10	30.10	4.28	0.00	0.00	0.13	0.00	0.00
d.A. Approach Delay [s/veh]	12.43			17.70			1.25			A		
Approach LOS	B			C			A			A		
d.L. Intersection Delay [s/veh]	3.25											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes  
Delay (sec/veh): 1,770.6  
Level Of Service: F  
Volume to Capacity (v/c): 4.299

Intersection Setup

Name	Driveway			Sage Canyon Rd			Silverado Trail			Silverado Trail		
	Northbound			Southbound			Eastbound			Westbound		
Approach	+			+			+			+		
Lane Configuration	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Lane Width [ft]	0	0	0	0	0	0	0	0	0	0	0	0
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	0	0	0	0	0	0	0	0	0	0	0	0
Speed [mph]	15.00	15.00	15.00	40.00	40.00	40.00	55.00	55.00	55.00	55.00	55.00	55.00
Grade [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosswalk	No	No	No	No	No	No	No	No	No	No	No	No

Volumes

Name	Driveway			Sage Canyon Rd			Silverado Trail			Silverado Trail		
	0	2	84	0	60	127	843	1	1	305	35	
Base Volume Input [veh/h]	2	0	2	0	60	127	843	1	1	305	35	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Growth Factor	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Diversed Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	3	0	126	0	60	191	1265	2	2	458	53	
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Total 15-Minute Volume [veh/h]	1	0	32	0	23	48	316	1	1	115	13	
Total Analysis Volume [veh/h]	3	0	126	0	60	191	1265	2	2	458	53	
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes	Yes	Free	Free
Storage Area [veh]	0	0	2	0	0	0
Two-Stage Gap Acceptance	No	No	No	No	0	0
Number of Storage Spaces in Median	0	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C Ratio	0.13	0.00	0.01	4.30	0.16	0.18	0.01	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	172.97	114.83	36.57	1770.56	1653.99	9.24	6.09	0.05	11.71	0.05	0.00	0.00
Movement LOS	F	F	E	F	F	F	A	A	A	B	A	A
95th-Percentile Queue Length [veh]	0.46	0.46	0.46	24.27	24.27	0.67	0.00	0.00	0.01	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	11.38	11.38	11.38	606.74	606.74	16.79	0.00	0.00	0.28	0.00	0.00	0.00
d_A, Approach Delay [s/veh]		104.77				172.99				1.21		
Approach LOS		F				F				A		
d_J, Intersection Delay [s/veh]						170.71						
Intersection LOS						F						



Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes  
Delay (sec / veh): 179.7  
Level Of Service: F  
Volume to Capacity (v/c): 1.035

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound	Southbound	Left	Right	Left	Right	Left	Right	
Approach	+		+		+		+		
Lane Configuration	+		+		+		+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	170.00	100.00	110.00	100.00	100.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound	Southbound	Left	Right	Left	Right	Left	Right				
Base Volume Input [veh/h]	2	0	2	84	0	60	127	843	1	1	305	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	2	0	0	0	0	0	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	2	88	0	62	127	843	1	1	305	36
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	1	23	0	16	33	222	0	0	80	9
Total Analysis Volume [veh/h]	2	0	2	93	0	65	134	887	1	1	321	38
Pedestrian Volume [ped/h]	0											

Intersection Settings

Priority Scheme	Flared Lane	Storage Area [veh]	Two-Stage Gap Acceptance	Number of Storage Spaces in Median	Stop	Stop	Stop	Free	Free
No	0	2	No	0	No	Yes	0	0	0

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	VIC, Movement V/C Ratio	0.03		0.00		0.01		1.04		0.00		0.09		0.11		0.01		0.00		0.00	
		F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
52.16	0.03	16.56	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66	179.66
0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43	2.43
c_L, Approach Delay [s/veh]		34.36		D		F		F		165.30		F		1.11		A		0.03		A	
d_L, Intersection Delay [s/veh]		17.74		F		A		A		17.74		F		A		A		0.03		A	
Intersection LOS		D		F		A		A		17.74		F		A		A		0.03		A	

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes

Intersection Level of Service Report  
Intersection 1: Silverado Trail/Sage Canyon Rd  
Delay (sec / veh): 20.1  
Level of Service: C  
Volume to Capacity (v/c): 0.241

Intersection Setup

Name	Approach	Diverging		Sage Canyon Rd		Silverado Trail		Silverado Trail	
		Northbound	Southbound	Left	Thru	Right	Left	Thru	Right
Lane Configuration		+	+	+	+	+	+	+	+
Turning Movement		Left	Thru	Right	Left	Thru	Right	Left	Thru
Lane Width [ft]		12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket		0	0	0	1	0	0	1	0
Pocket Length [ft]		0.00	0.00	0.00	170.00	0.00	0.00	110.00	0.00
Speed [mph]		15.00	40.00	55.00	55.00	55.00	55.00	55.00	55.00
Grade [%]		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crosswalk		No	No	No	No	No	No	No	No

Volumes

Name	Diverging		Sage Canyon Rd		Silverado Trail		Silverado Trail	
	1	0	4	58	0	53	46	307
Base Volume Input [veh/h]	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Base Volume Adjustment Factor	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Heavy Vehicles Percentage [%]	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Growth Factor	0	0	0	0	0	0	0	0
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0
Diverged Trips [veh/h]	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	17	0	15	13	85
Total Analysis Volume [veh/h]	1	0	4	67	0	60	52	341
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free
Planned Lane	No	Yes	Yes	Free
Storage Area [veh]	0	0	2	0
Two-Stage Gap-Acceptance	No	No	No	0
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00		0.01		0.00		0.09		0.05		0.00	
	d_M, Delay for Movement [s/veh]	19.84	17.96	10.27	20.10	18.24	12.52	8.31	1.05	0.01	0.02	0.00
Movement LOS	C	C	B	C	C	B	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	0.93	0.93	0.93	0.14	0.00	0.00	0.00	0.01	0.00
95th-Percentile Queue Length [Mn]	0.75	0.75	0.75	23.37	23.37	23.37	3.58	0.00	0.00	0.13	0.00	0.00
d_A, Approach Delay [s/veh]	12.18											
Approach LOS	B											
d_J, Intersection Delay [s/veh]	2.79											
Intersection LOS	C											

Intersection Level of Service Report

Two-way stop  
HCM 2010  
15 minutes  
Control Type: 237.9  
Analysis Method: F  
Analysis Period: 1.179  
Intersection 1: Silverado Trail/Sage Canyon Rd  
Delay (sec/veh):  
Level of Service:  
Volume to Capacity (v/c):

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration									
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0	1	0	0
Pocket Length [ft]	22.00	22.00	22.00	170.00	22.00	110.00	22.00	22.00	22.00
Speed [mph]	15.00		40.00		55.00		55.00		0.00
Grade [%]	0.00		0.00		0.00		0.00		0.00
Crosswalk	No		No		No		No		0.00

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound		Southbound		Eastbound		Westbound					
Base Volume Input [veh/h]	2	0	2	94	0	70	131	845	1	1	307	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	2	0	0	0	0	0	1
Diversed Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	2	98	0	72	131	845	1	1	307	42
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	1	26	0	19	34	222	0	0	81	11
Total Analysis Volume [veh/h]	2	0	2	103	0	76	138	889	1	1	323	44
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Planned Lane	No	No	Yes	Free	Free
Storage Area [veh]	0	0	2	0	0
Two-Stage Gap Acceptance	No	No	No	0	0
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C Ratio	0.03	0.00	0.01	1.18	0.00	0.11	0.12	0.01	0.00	0.00	0.00	0.00	0.00	
d_M, Delay for Movement [s/veh]	54.87	0.00	16.68	237.86	239.27	201.87	8.47	0.00	0.00	0.00	0.00	0.00	0.00	
Movement LOS	F	E	C	F	F	F	A	A	A	A	A	A	A	
95th-Percentile Queue Length [veh/m]	0.10	0.10	0.10	10.82	10.82	10.82	0.40	0.00	0.00	0.00	0.00	0.00	0.00	
95th-Percentile Queue Length [ft]	2.55	2.55	2.55	270.39	270.39	270.39	9.85	0.00	0.00	0.00	0.00	0.00	0.00	
d_A, Approach Delay [s/veh]	35.77			222.59			1.14		0.03		0.03		0.03	
d_J, Intersection Delay [s/veh]	E			F			A		A		A		A	
Intersection LOS	E			F			A		A		A		A	

Intersection Level of Service Report

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes  
Intersection 1: Silverado Trail/Sage Canyon Rd  
Delay (sec / veh): 21.18  
Level of Service: C  
Volume to Capacity (V/C): 0.301

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound	Southbound	Southbound	Eastbound	Westbound	Westbound	Westbound		
Approach	+		+		+		+		
Lane Configuration	+		+		+		+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	1	0
Pocket Length [ft]	0.00	0.00	0.00	170.00	0.00	110.00	0.00	0.00	0.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound	Southbound	Southbound	Eastbound	Westbound	Westbound	Westbound					
Base Volume Input [veh/h]	1	0	4	69	0	82	55	310	4	2	303	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	2	0	1	1	0	0	0	0	2
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	4	71	0	83	56	310	4	2	303	72
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	20	0	18	16	86	1	1	84	20
Total Analysis Volume [veh/h]	1	0	4	79	0	70	62	344	4	2	337	80
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes		
Storage Area [veh]	0	0	2	0	0
Two-Stage Gap Acceptance	No	No	No		
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	0.30	0.11	0.06	0.02	0.02	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	21.14	10.29	10.29	21.83	13.53	8.38	8.02	8.02	8.02	8.02	8.02	8.02
Movement LOS	C	C	B	C	B	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	1.26	1.26	0.17	0.00	0.00	0.01	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	0.78	0.78	0.78	31.40	31.40	4.36	0.00	0.00	0.13	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	12.46			17.83			1.27			0.04		
Approach LOS	B			C			A			A		
d_L, Intersection Delay [s/veh]	3.33											
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
 Analysis Method: HCM 2010  
 Analysis Period: 15 minutes  
 Delay (sec / veh): 1,825.5  
 Level Of Service: F  
 Volume to Capacity (V/C): 4.439

Intersection Setup

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Lane Configuration	+		+		+		+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	150.00	150.00	150.00	150.00	170.00	150.00	110.00	150.00	150.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Driveway			Sage Canyon Rd			Silverado Trail			Silverado Trail		
	2	0	2	84	0	60	127	843	1	1	305	35
Base Volume Input [veh/h]	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Base Volume Adjustment Factor	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Heavy Vehicles Percentage [%]	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Growth Factor	0	0	0	0	0	0	0	0	0	0	0	0
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	4	0	2	0	0	0	0	0	1
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	0	3	130	0	92	191	1285	2	2	458	54
Peak Hour Factor	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Other Adjustment Factor	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total 15-Minute Volume [veh/h]	1	0	1	33	0	23	48	316	1	1	115	14
Total Analysis Volume [veh/h]	3	0	3	130	0	92	191	1285	2	2	458	54
Pedestrian Volume [ped/h]												

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Planned Lane	No				
Storage Area [veh]	0				
Two-Stage Gap-Acceptance	No				
Number of Storage Spaces in Median	0				

Movement, Approach, & Intersection Results

V/C Ratio	0.13	0.00	0.01	4.44	0.00	0.16	0.18	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	174.21	1635.53	36.75	1635.53	1718.84	9.25	1718.84	9.25	0.00	11.71	0.00	0.00
Movement LOS	F	F	E	F	F	A	F	A	A	B	A	A
95th-Percentile Queue Length [veh]	0.46	0.46	0.46	25.04	25.04	0.67	25.04	0.67	0.00	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	11.45	11.45	11.45	625.88	625.88	16.60	625.88	16.60	0.00	0.28	0.00	0.00
d_A, Approach Delay [s/veh]		105.48			1787.17			1.21				0.05
Approach LOS		F			F			A				A
d_I, Intersection Delay [s/veh]					181.44			F				
Intersection LOS					F							

Intersection Level Of Service Report

Control Type: HCM 2010  
Analysis Method: 15 minutes  
Analysis Period:  
Delay (sec / veh): 36.9  
Level Of Service: E  
Volume to Capacity (V/C): 0.516

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail	
	Northbound	Southbound	Left	Thru	Right	Left	Thru	Right
Approach	+		+		+		+	
Lane Configuration	T		T		T		T	
Turning Movement	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Lane Width [ft]	0	0	0	0	0	0	0	0
No. of Lanes in Pocket	0	0	0	0	0	0	0	0
Pocket Length [ft]	0	0	0	0	0	0	0	0
Speed [mph]	15.00	40.00	55.00		55.00		55.00	
Grade [%]	0.00	0.00	0.00		0.00		0.00	
Crosswalk	No	No	No		No		No	

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	1	4	58	0	53	46	307	4	
Base Volume Input [veh/h]	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Growth Factor	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	
Diversified Trips [veh/h]	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	2	0	6	89	0	81	70	461	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	2	22	0	20	18	115	2
Total Analysis Volume [veh/h]	2	0	6	89	0	81	70	461	6
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes	Free	Free
Storage Area [veh]	0	0	2	0	0
Two-Stage Gap-Acceptance	No	No	No	0	0
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C Ratio	0.01	0.00	0.01	0.52	0.00	0.14	0.07	0.01	0.00	0.00	0.00	0.00
d_M, Delay (for Movement) [s/veh]	30.83	25.10	11.35	36.93	24.91	22.41	8.82	16.09	0.05	8.35	0.05	0.05
Movement LOS	D	D	B	E	C	C	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.07	0.07	0.07	2.80	2.80	2.80	0.22	0.00	0.00	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	1.87	1.87	1.87	70.05	70.05	70.05	5.56	0.00	0.00	0.21	0.00	0.00
d_A, Approach Delay [s/veh]	16.22			30.01			1.15			0.05		
Approach LOS	C			D			A			A		
d_J, Intersection Delay [s/veh]	4.66			4.66			E			E		
Intersection LOS	E			E			E			E		



Intersection Level Of Service Report

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes  
Intersection 1: Silverado Trail/Sage Canyon Rd  
Delay (sec / veh): 24.2  
Level Of Service: C  
Volume to Capacity (v/c): 0.432

Intersection Setup

Name	Diverging		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Lane Width [ft]	0	0	0	0	0	0	0	0	0
No. of Lanes in Pocket	0	0	0	1	1	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	110.00	100.00	100.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diverging		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound		Southbound		Eastbound		Westbound					
Base Volume Input [veh/h]	1	0	4	69	0	62	55	310	4	2	303	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	34	0	23	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverged Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	4	103	0	85	55	310	4	2	303	70
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	29	0	24	15	86	1	1	84	19
Total Analysis Volume [veh/h]	1	0	4	114	0	94	61	344	4	2	337	78
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes	No	No
Storage Area [veh]	0	0	2	0	0
Two-Stage Gap-Acceptance	No	No	No	No	No
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00		0.00		0.14		0.05		0.00		0.00	
	d_M, Delay for Movement [s/veh]	22.04	15.70	10.30	24.22	15.99	8.37	15.99	8.02	8.02	8.02	8.02
Movement LOS	C	C	B	C	C	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.03	0.03	0.03	2.15	2.15	0.17	0.17	0.00	0.01	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	0.80	0.80	0.80	53.70	53.70	4.28	4.28	0.00	0.13	0.13	0.00	0.00
d_A, Approach Delay [s/veh]	12.64		20.50		C		1.25		0.04		0.04	
Approach LOS	B		C		A		A		A		A	
d_L, Intersection Delay [s/veh]	4.67		C		C		C		C		C	
Intersection LOS	C											

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Control Type: Two-way stop  
 Analysis Method: HCM 2010  
 Analysis Period: 15 minutes  
 Delay (sec / veh): 54.4  
 Level Of Service: F  
 Volume to Capacity (v/c): 0.697

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Turning Movement	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Lane Width [ft]	0	0	0	0	0	0	0	0	0
No. of Lanes in Pocket	2	2	2	2	2	2	2	2	2
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed (mph)	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	1	4	58	0	53	46	307	4	
Base Volume Input [veh/h]	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
Base Volume Adjustment Factor	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Heavy Vehicles Percentage [%]	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	
Growth Factor	0	0	0	0	0	0	0	0	
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	
Other Volume [veh/h]	0	0	0	0	0	0	0	0	
Total Hourly Volume [veh/h]	2	0	6	121	0	103	69	461	6
Peak Hour Factor	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
Other Adjustment Factor	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	1,000.00	
Total 15-Minute Volume [veh/h]	1	0	2	30	0	26	17	115	2
Total Analysis Volume [veh/h]	2	0	6	121	0	103	69	461	6
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes	Free	Free
Storage Area [veh]	0	0	2	0	0
Two-Stage Gap Acceptance	No	No	No	0	0
Number of Storage Spaces in Median	0	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.01	0.70	0.00	0.18	0.07	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	32.37	25.04	11.37	54.36	39.85	8.81	0.00	0.00	0.00	8.35	0.00
Movement LOS	D	D	B	F	E	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.08	0.04	0.08	5.60	0.22	0.00	0.00	0.00	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	1.93	0.98	1.93	140.03	5.47	0.00	0.00	0.00	0.21	0.00	0.00
c_A, Approach Delay [s/veh]	16.62		47.73		1.13		A		A		0.05
d_L, Intersection Delay [s/veh]	C		E		8.74		F		A		
Intersection LOS	C		E		8.74		F		A		

Control Type: Two-way stop  
Analysis Method: HCM 2010  
Analysis Period: 15 minutes

Intersection Level of Service Report  
Intersection 1: Silverado Trail/Sage Canyon Rd

Delay (sec / veh): 22.6  
Level of Service: C  
Volume to Capacity (v/c): 0.404

Intersection Setup

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration	+		+		+		+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	1	0	1	0	0
Pocket Length [ft]	302.00	302.00	302.00	170.00	170.00	110.00	110.00	102.00	102.00
Speed [mph]	15.00		40.00		55.00		55.00		0.00
Grade [%]	0.00		0.00		0.00		0.00		0.00
Crosswalk	No		No		No		No		0.00

Volumes

Name	Driveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound		Southbound		Eastbound		Westbound					
Base Volume Input [veh/h]	1	0	4	58	0	53	46	307	4	2	300	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	44	0	29	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	4	102	0	82	46	307	4	2	300	60
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	1	28	0	23	13	85	1	1	83	17
Total Analysis Volume [veh/h]	1	0	4	113	0	91	51	341	4	2	333	67
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No	No	Yes		
Storage Area [veh]	0	0	2		
Two-Stage Gap Acceptance	No	No	No		
Number of Storage Spaces in Median	0	0	0		

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	10.27	22.63	0.40	0.00	0.14	0.04	0.04	0.04	0.00	0.00	0.00	0.00	
d_M Delay for Movement [s/veh]	20.92	17.46	10.27	22.63	22.63	0.40	0.00	15.11	8.30	8.30	0.00	8.01	8.01	0.00	0.00	
Movement LOS	C	C	B	C	C	C	C	C	A	A	A	A	A	A	A	
95th-Percentile Queue Length [veh]	0.03	0.01	0.03	1.94	1.94	0.03	0.00	1.54	0.14	0.14	0.00	0.01	0.01	0.00	0.00	
95th-Percentile Queue Length [ft]	0.77	0.77	0.77	48.38	48.38	0.77	0.00	48.38	3.50	3.50	0.00	0.13	0.13	0.00	0.00	
d_A, Approach Delay [s/veh]	12.40		19.27		19.27		1.07		1.07		1.07		1.07		0.04	
Approach LOS	B		C		C		A		A		A		A		A	
d_L, Intersection Delay [s/veh]	4.40		4.40		4.40		C		C		C		C		C	
Intersection LOS	C		C		C		C		C		C		C		C	

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Two-way stop  
 Control Type: Delay (sec / veh): 25.4  
 Analysis Method: HCM 2010 Level Of Service: D  
 Analysis Period: 15 minutes Volume to Capacity (V/C): 0.478

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound	Southbound	Left	Right	Left	Right	Left	Right	
Approach	+		+		+		+		
Lane Configuration	T		T		T		T		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	1	0
Pocket Length [ft]	102.00	102.00	102.00	102.00	170.00	102.00	110.00	102.00	102.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound	Southbound	Left	Right	Left	Right	Left	Right				
Base Volume Input [veh/h]	1	0	4	62	55	310	4	2	303	70		
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Heavy Vehicle Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00		
Growth Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0		
Site-Generated Trips [veh/h]	0	0	0	44	0	29	0	0	0	0		
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0		
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0		
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0		
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0		
Total Hourly Volume [veh/h]	1	0	4	113	0	81	55	310	4	2	303	70
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
Total 15-Minute Volume [veh/h]	0	0	1	31	0	25	15	86	1	1	84	19
Total Analysis Volume [veh/h]	1	0	4	126	0	101	61	344	4	2	337	78
Pedestrian Volume [ped/h]	0											

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free
Flared Lane	No	No	Yes	Free
Storage Area [veh]	0	0	2	0
Two-Stage Gap Acceptance	No	No	No	0
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.01	0.01	0.15	0.05	0.05	0.05	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	22.35	15.70	10.30	25.38	17.16	8.37	17.16	8.37	8.02	8.02	8.02	8.02
Movement LOS	C	C	B	D	C	A	C	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.03	0.03	0.03	2.54	2.54	0.17	0.00	0.00	0.01	0.01	0.00	0.00
95th-Percentile Queue Length [ft]	0.80	0.80	0.80	63.40	63.40	4.28	0.00	0.00	0.13	0.13	0.00	0.00
d_A, Approach Delay [s/veh]	12.71											
Approach LOS	B											
d_L, Intersection Delay [s/veh]	21.72											
Intersection LOS	C											
Intersection Delay [s/veh]	5.22											
Intersection LOS	D											

Intersection Level Of Service Report

Intersection 1: Silverado Trail/Sage Canyon Rd

Two-way stop  
HCM 2010  
15 minutes  
Control Type: 67.6  
Analysis Method: Level Of Service: F  
Analysis Period: Volume to Capacity (V/C): 0.755

Intersection Setup

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail		
	Northbound		Southbound		Eastbound		Westbound		
Approach	+		+		+		+		
Lane Configuration	+		+		+		+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	0
Pocket Length [ft]	0.00	0.00	0.00	170.00	0.00	0.00	110.00	0.00	0.00
Speed [mph]	15.00		40.00		55.00		55.00		
Grade [%]	0.00		0.00		0.00		0.00		
Crosswalk	No		No		No		No		

Volumes

Name	Diveway		Sage Canyon Rd		Silverado Trail		Silverado Trail					
	Northbound		Southbound		Eastbound		Westbound					
Base Volume Input [veh/h]	1	0	4	58	0	53	46	307	4	2	300	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Growth Factor	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	44	0	29	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	6	131	0	109	69	461	6	3	450	90
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	2	33	0	27	17	115	2	1	113	23
Total Analysis Volume [veh/h]	2	0	6	131	0	109	69	461	6	3	450	90
Pedestrian Volume [ped/h]	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Settings

Priority Scheme	Stop	Stop	Stop	Free	Free
Flared Lane	No				
Storage Area [veh]	0				
Two-Stage Gap-Acceptance	No				
Number of Storage Spaces in Median	0				

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.00	0.01	0.75	0.00	0.19	0.07	0.01	0.01	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	32.86	35.05	11.38	67.57	35.47	53.16	8.81	6.08	6.08	8.35	6.08	6.08	6.08
Movement LOS	D	D	B	F	F	F	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh/m]	0.08	0.07	0.08	7.05	7.05	7.05	0.22	0.00	0.00	0.01	0.00	0.00	0.00
95th-Percentile Queue Length [ft/m]	1.85	1.85	1.95	176.25	176.25	176.25	5.47	0.00	0.00	0.21	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	16.75			61.03			1.13			0.05			
Approach LOS	C			F			A			A			
d_J, Intersection Delay [s/veh]				11.62			F			A			
Intersection LOS				F			A			A			

# Appendix C

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## Traffic Count Data





**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Wednesday  
Date: 10/12/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	1,420	1,306	2,726		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			0	2	2	12:00			11	16	27
0:15			4	1	5	12:15			15	20	35
0:30			2	1	3	12:30			16	25	41
0:45			1	7	8	12:45			23	65	88
1:00			0	7	7	13:00			17	19	36
1:15			2	4	6	13:15			29	30	59
1:30			1	2	3	13:30			17	13	30
1:45			0	3	3	13:45			18	81	99
2:00			1	3	4	14:00			20	14	34
2:15			3	0	3	14:15			20	25	45
2:30			2	2	4	14:30			17	16	33
2:45			1	7	8	14:45			37	94	131
3:00			5	0	5	15:00			22	21	43
3:15			2	2	4	15:15			31	22	53
3:30			8	1	9	15:30			42	39	81
3:45			0	15	15	15:45			35	130	165
4:00			0	0	0	16:00			37	24	61
4:15			2	3	5	16:15			35	32	67
4:30			3	9	12	16:30			25	32	57
4:45			4	9	13	16:45			28	125	153
5:00			4	2	6	17:00			26	22	48
5:15			6	2	8	17:15			28	32	60
5:30			11	12	23	17:30			25	28	53
5:45			7	28	35	17:45			34	113	147
6:00			18	6	24	18:00			30	16	46
6:15			28	17	45	18:15			25	21	46
6:30			31	20	51	18:30			12	16	28
6:45			40	117	157	18:45			15	82	97
7:00			28	21	49	19:00			12	11	23
7:15			16	17	33	19:15			15	10	25
7:30			13	27	40	19:30			13	10	23
7:45			20	77	97	19:45			9	49	58
8:00			20	20	40	20:00			6	8	14
8:15			23	23	46	20:15			10	4	14
8:30			24	17	41	20:30			7	2	9
8:45			32	99	131	20:45			7	30	37
9:00			28	15	43	21:00			8	1	9
9:15			22	16	38	21:15			7	4	11
9:30			16	18	34	21:30			6	8	14
9:45			16	82	98	21:45			5	26	31
10:00			15	10	25	22:00			4	5	9
10:15			17	26	43	22:15			5	6	11
10:30			32	22	54	22:30			3	3	6
10:45			19	83	102	22:45			2	14	16
11:00			20	17	37	23:00			1	2	3
11:15			21	22	43	23:15			3	8	11
11:30			19	21	40	23:30			2	1	3
11:45			15	75	90	23:45			3	9	12
<b>TOTALS</b>			602	570	1172	<b>TOTALS</b>			818	736	1554
<b>SPLIT %</b>			51.4%	48.6%	43.0%	<b>SPLIT %</b>			52.6%	47.4%	57.0%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	1,420	1,306	2,726		
AM Peak Hour			6:15	7:30	6:15	PM Peak Hour			15:30	15:30	15:30
AM Pk Volume			127	117	210	PM Pk Volume			149	125	274
Pk Hr Factor			0.794	0.622	0.808	Pk Hr Factor			0.887	0.801	0.846
7 - 9 Volume	0	0	176	193	369	4 - 6 Volume	0	0	238	210	448
7 - 9 Peak Hour			8:00	7:30	7:45	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume	0	0	99	117	194	4 - 6 Pk Volume	0	0	125	105	230
Pk Hr Factor	0.000	0.000	0.773	0.622	0.724	Pk Hr Factor	0.000	0.000	0.845	0.820	0.858

**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Thursday  
Date: 10/13/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	1,363	1,344	2,707					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
0:00			1	0	1	12:00			22	18	40			
0:15			1	3	4	12:15			12	20	32			
0:30			0	1	1	12:30			19	19	38			
0:45			1	3	4	12:45			24	77	17	74	41	151
1:00			2	1	3	13:00			17	37	54			
1:15			1	4	5	13:15			16	23	39			
1:30			0	0	0	13:30			22	29	51			
1:45			1	4	5	13:45			17	72	25	114	42	186
2:00			3	0	3	14:00			21	23	44			
2:15			1	6	7	14:15			21	26	47			
2:30			5	3	8	14:30			16	23	39			
2:45			6	15	21	14:45			17	75	26	98	43	173
3:00			8	2	10	15:00			28	30	58			
3:15			8	4	12	15:15			27	29	56			
3:30			13	1	14	15:30			20	23	43			
3:45			1	30	31	15:45			44	119	34	116	78	235
4:00			3	1	4	16:00			38	25	63			
4:15			1	3	4	16:15			23	24	47			
4:30			3	3	6	16:30			23	24	47			
4:45			1	8	9	16:45			36	120	26	99	62	219
5:00			6	3	9	17:00			39	29	68			
5:15			5	5	10	17:15			18	39	57			
5:30			11	6	17	17:30			24	15	39			
5:45			13	35	48	17:45			17	98	32	115	49	213
6:00			16	18	34	18:00			29	12	41			
6:15			33	10	43	18:15			19	20	39			
6:30			44	21	65	18:30			20	20	40			
6:45			42	135	177	18:45			17	85	15	67	32	152
7:00			22	23	45	19:00			15	10	25			
7:15			18	31	49	19:15			8	11	19			
7:30			12	28	40	19:30			5	9	14			
7:45			11	63	74	19:45			7	35	6	36	13	71
8:00			21	31	52	20:00			9	7	16			
8:15			18	23	41	20:15			8	3	11			
8:30			24	23	47	20:30			2	4	6			
8:45			35	98	133	20:45			8	27	4	18	12	45
9:00			15	23	38	21:00			5	11	16			
9:15			20	18	38	21:15			2	7	9			
9:30			18	16	34	21:30			6	3	9			
9:45			19	72	91	21:45			2	15	10	31	12	46
10:00			16	13	29	22:00			7	1	8			
10:15			17	11	28	22:15			3	2	5			
10:30			22	5	27	22:30			4	3	7			
10:45			23	78	101	22:45			0	14	5	11	5	25
11:00			12	24	36	23:00			1	4	5			
11:15			21	21	42	23:15			2	1	3			
11:30			14	24	38	23:30			6	2	8			
11:45			28	75	103	23:45			1	10	1	8	2	18
<b>TOTALS</b>			616	557	1173	<b>TOTALS</b>			747	787	1534			
<b>SPLIT %</b>			52.5%	47.5%	43.3%	<b>SPLIT %</b>			48.7%	51.3%	56.7%			

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	1,363	1,344	2,707

AM Peak Hour	6:15	7:15	6:30	PM Peak Hour	15:15	16:30	15:15			
AM Pk Volume	141	120	223	PM Pk Volume	129	118	240			
Pk Hr Factor	0.801	0.968	0.858	Pk Hr Factor	0.733	0.756	0.769			
7 - 9 Volume	161	211	372	4 - 6 Volume	218	214	432			
7 - 9 Peak Hour	8:00	7:15	8:00	4 - 6 Peak Hour	16:15	16:30	16:30			
7 - 9 Pk Volume	98	120	197	4 - 6 Pk Volume	121	118	234			
Pk Hr Factor	0.000	0.000	0.700	0.968	0.864	0.000	0.000	0.776	0.756	0.860



Prepared by NDS/ATD

**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Saturday  
Date: 10/15/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	834	826	1,660		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			2	0	2	12:00			16	27	43
0:15			1	1	2	12:15			17	11	28
0:30			1	0	1	12:30			12	20	32
0:45			0	4	0	12:45		17	62	16	74
1:00			0	1	1	13:00			17	29	46
1:15			2	2	4	13:15			16	25	41
1:30			2	1	3	13:30			19	22	41
1:45			3	7	0	13:45		18	70	21	97
2:00			1	1	2	14:00			17	20	37
2:15			0	1	1	14:15			24	17	41
2:30			0	1	1	14:30			13	27	40
2:45			0	1	0	14:45		22	76	13	77
3:00			0	1	1	15:00			12	25	37
3:15			0	1	1	15:15			11	15	26
3:30			0	0	0	15:30			16	15	31
3:45			1	1	0	15:45		25	64	13	68
4:00			3	0	3	16:00			16	20	36
4:15			1	1	2	16:15			19	14	33
4:30			0	2	2	16:30			16	26	42
4:45			0	4	0	16:45		16	67	21	81
5:00			2	1	3	17:00			16	25	41
5:15			1	0	1	17:15			16	14	30
5:30			2	2	4	17:30			8	8	16
5:45			4	9	1	17:45		6	46	22	69
6:00			2	5	7	18:00			12	6	18
6:15			6	3	9	18:15			9	6	15
6:30			13	2	15	18:30			7	3	10
6:45			18	39	7	18:45		6	34	7	22
7:00			13	6	19	19:00			8	4	12
7:15			8	4	12	19:15			4	5	9
7:30			6	3	9	19:30			9	7	16
7:45			13	40	7	19:45		7	28	10	26
8:00			9	4	13	20:00			5	4	9
8:15			10	9	19	20:15			5	5	10
8:30			16	12	28	20:30			4	4	8
8:45			14	49	9	20:45		3	17	3	16
9:00			14	18	32	21:00			1	2	3
9:15			11	9	20	21:15			1	0	1
9:30			10	14	24	21:30			6	2	8
9:45			15	50	9	21:45		5	13	3	7
10:00			16	12	28	22:00			6	2	8
10:15			15	13	28	22:15			1	2	3
10:30			19	16	35	22:30			2	2	4
10:45			16	66	20	22:45		5	14	0	6
11:00			11	15	26	23:00			6	3	9
11:15			15	16	31	23:15			2	0	2
11:30			18	19	37	23:30			3	1	4
11:45			17	61	28	23:45		1	12	2	6
<b>TOTALS</b>			331	277	608	<b>TOTALS</b>			503	549	1052
<b>SPLIT %</b>			54.4%	45.6%	36.6%	<b>SPLIT %</b>			47.8%	52.2%	63.4%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	834	826	1,660

AM Peak Hour	11:30	11:15	11:15	PM Peak Hour	13:30	13:00	13:00
AM Pk Volume	68	90	156	PM Pk Volume	78	97	167
Pk Hr Factor	0.944	0.804	0.867	Pk Hr Factor	0.813	0.836	0.908
7 - 9 Volume	89	54	143	4 - 6 Volume	113	150	263
7 - 9 Peak Hour	8:00	8:00	8:00	4 - 6 Peak Hour	16:00	16:15	16:15
7 - 9 Pk Volume	49	34	83	4 - 6 Pk Volume	67	86	153
Pk Hr Factor	0.550	0.400	0.741	Pk Hr Factor	0.400	0.400	0.911

Prepared by NDS/ATD

**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Sunday  
Date: 10/16/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	544	650	1,194					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
0:00			0	1	1	12:00			11	14	25			
0:15			1	6	7	12:15			12	11	23			
0:30			1	0	1	12:30			12	16	28			
0:45			0	2	1	12:45		8	15	50	12	53	27	103
1:00			0	0	0	13:00			12	15	27			
1:15			3	0	3	13:15			13	17	30			
1:30			1	1	2	13:30			11	22	33			
1:45			1	5	0	13:45		1	22	58	9	63	31	121
2:00			1	1	2	14:00			11	17	28			
2:15			0	0	0	14:15			17	16	33			
2:30			0	0	0	14:30			8	12	20			
2:45			0	1	1	14:45		2	12	48	10	55	22	103
3:00			0	0	0	15:00			13	23	36			
3:15			1	0	1	15:15			10	13	23			
3:30			0	0	0	15:30			12	9	21			
3:45			0	1	0	15:45		1	9	44	8	53	17	97
4:00			0	0	0	16:00			11	19	30			
4:15			0	1	1	16:15			8	9	17			
4:30			0	0	0	16:30			15	23	38			
4:45			0	4	5	16:45		5	5	39	15	66	20	105
5:00			1	1	2	17:00			14	12	26			
5:15			1	2	3	17:15			4	18	22			
5:30			0	3	3	17:30			10	18	28			
5:45			2	4	0	17:45		6	8	36	11	59	19	95
6:00			0	2	2	18:00			6	9	15			
6:15			0	3	3	18:15			8	5	13			
6:30			5	1	6	18:30			5	14	19			
6:45			10	15	5	18:45		8	8	27	6	34	14	61
7:00			8	3	11	19:00			4	4	8			
7:15			3	4	7	19:15			9	5	14			
7:30			7	5	12	19:30			2	9	11			
7:45			7	25	7	19:45		3	3	18	0	18	3	36
8:00			5	5	10	20:00			2	4	6			
8:15			11	5	16	20:15			9	2	11			
8:30			4	14	18	20:30			5	0	5			
8:45			4	24	5	20:45		3	3	19	0	6	3	25
9:00			8	9	17	21:00			3	2	5			
9:15			8	7	15	21:15			3	1	4			
9:30			4	8	12	21:30			1	3	4			
9:45			7	27	8	21:45		2	2	9	0	6	2	15
10:00			9	11	20	22:00			2	4	6			
10:15			7	13	20	22:15			0	2	2			
10:30			11	17	28	22:30			1	0	1			
10:45			11	38	17	22:45		1	1	4	0	6	1	10
11:00			8	15	23	23:00			0	0	0			
11:15			11	13	24	23:15			0	0	0			
11:30			13	17	30	23:30			1	0	1			
11:45			16	48	15	23:45		1	1	2	0	1	2	
<b>TOTALS</b>			190	231	421	<b>TOTALS</b>			354	419	773			
<b>SPLIT %</b>			45.1%	54.9%	35.3%	<b>SPLIT %</b>			45.8%	54.2%	64.7%			

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	544	650	1,194

AM Peak Hour	11:30	10:15	11:15	PM Peak Hour	13:30	16:30	13:30	
AM Pk Volume	52	62	110	PM Pk Volume	61	68	125	
Pk Hr Factor	0.813	0.912	0.887	Pk Hr Factor	0.693	0.739	0.947	
7 - 9 Volume	49	48	97	4 - 6 Volume	75	125	200	
7 - 9 Peak Hour	7:30	7:45	7:45	4 - 6 Peak Hour	16:15	16:30	16:30	
7 - 9 Pk Volume	30	31	58	4 - 6 Pk Volume	42	68	106	
Pk Hr Factor	0.000	0.000	0.682	0.554	0.806	0.700	0.739	0.697

**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Monday  
Date: 10/17/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB		WB	Total				
					0	0	1,103	1,123	2,226					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
0:00			0	0	0	12:00			16	20	36			
0:15			0	0	0	12:15			13	26	39			
0:30			0	0	0	12:30			8	18	26			
0:45			0	0	0	12:45		17	54	17	81	34	135	
1:00			2	0	2	13:00			9	20	29			
1:15			2	0	2	13:15			13	17	30			
1:30			1	0	1	13:30			21	13	34			
1:45			1	6	2	2	13:45		26	69	24	74	50	143
2:00			0	0	0	14:00			17	19	36			
2:15			0	2	2	14:15			21	17	38			
2:30			0	0	0	14:30			17	13	30			
2:45			1	1	1	3	14:45		17	72	20	69	37	141
3:00			0	0	0	15:00			23	23	46			
3:15			0	0	0	15:15			20	23	43			
3:30			1	1	2	15:30			29	39	68			
3:45			0	1	0	1	15:45		43	115	46	131	89	246
4:00			0	0	0	16:00			32	39	71			
4:15			0	1	1	16:15			20	39	59			
4:30			1	1	2	16:30			21	46	67			
4:45			0	1	0	2	16:45		21	94	32	156	53	250
5:00			2	4	6	17:00			25	25	50			
5:15			1	0	1	17:15			31	19	50			
5:30			2	6	8	17:30			26	19	45			
5:45			8	13	8	18	17:45		17	99	9	72	26	171
6:00			15	6	21	18:00			12	15	27			
6:15			23	16	39	18:15			10	9	19			
6:30			46	17	63	18:30			13	13	26			
6:45			44	128	15	54	18:45		5	40	7	44	12	84
7:00			24	22	46	19:00			8	7	15			
7:15			9	18	27	19:15			4	12	16			
7:30			12	24	36	19:30			4	4	8			
7:45			15	60	33	97	19:45		6	22	8	31	14	53
8:00			10	23	33	20:00			5	5	10			
8:15			17	17	34	20:15			4	7	11			
8:30			18	16	34	20:30			2	3	5			
8:45			30	75	16	72	20:45		3	14	2	17	5	31
9:00			22	8	30	21:00			2	0	2			
9:15			16	16	32	21:15			4	0	4			
9:30			14	16	30	21:30			0	0	0			
9:45			18	70	14	54	21:45		1	7	0	1	7	
10:00			19	23	42	22:00			3	0	3			
10:15			20	18	38	22:15			1	1	2			
10:30			22	14	36	22:30			3	1	4			
10:45			19	80	18	73	22:45		0	7	0	2	0	9
11:00			16	11	27	23:00			1	0	1			
11:15			14	21	35	23:15			1	0	1			
11:30			23	18	41	23:30			2	1	3			
11:45			18	71	18	68	23:45		0	4	1	2	1	6
<b>TOTALS</b>			506	444	950	<b>TOTALS</b>			597	679	1276			
<b>SPLIT %</b>			53.3%	46.7%	42.7%	<b>SPLIT %</b>			46.8%	53.2%	57.3%			

DAILY TOTALS					NB	SB	EB		WB	Total		
					0	0	1,103	1,123	2,226			
AM Peak Hour			6:15	7:15	6:15	PM Peak Hour			15:15	15:45	15:30	
AM Pk Volume			137	98	207	PM Pk Volume			124	170	287	
Pk Hr Factor			0.745	0.742	0.821	Pk Hr Factor			0.721	0.924	0.806	
7 - 9 Volume			135	169	304	4 - 6 Volume			193	228	421	
7 - 9 Peak Hour			8:00	7:15	7:00	4 - 6 Peak Hour			16:45	16:00	16:00	
7 - 9 Pk Volume			75	98	157	4 - 6 Pk Volume			103	156	250	
Pk Hr Factor			0.000	0.000	0.625	0.742	0.818	0.000	0.000	0.831	0.848	0.880

Prepared by NDS/ATD

**VOLUME**

Sage Canyon Rd W/O Long Ranch Rd

Day: Tuesday  
Date: 10/18/2016

City: Napa County  
Project #: CA16\_7758\_001

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	1,261	1,223	2,484		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
0:00			0	0	0	12:00			8	31	39
0:15			0	0	0	12:15			19	19	38
0:30			1	0	1	12:30			13	24	37
0:45			1	2	3	12:45			19	59	78
1:00			1	0	1	13:00			11	13	24
1:15			2	0	2	13:15			9	17	26
1:30			2	1	3	13:30			18	12	30
1:45			1	6	7	13:45			17	55	72
2:00			0	0	0	14:00			26	13	39
2:15			0	2	2	14:15			19	16	35
2:30			0	0	0	14:30			25	21	46
2:45			0	0	0	14:45			25	95	120
3:00			0	0	0	15:00			17	19	36
3:15			2	0	2	15:15			30	21	51
3:30			1	0	1	15:30			28	41	69
3:45			1	4	5	15:45			40	115	155
4:00			0	0	0	16:00			26	33	59
4:15			0	1	1	16:15			43	34	77
4:30			0	1	1	16:30			31	50	81
4:45			0	4	4	16:45			19	119	138
5:00			3	1	4	17:00			25	20	45
5:15			7	5	12	17:15			27	31	58
5:30			5	4	9	17:30			37	15	52
5:45			6	21	27	17:45			21	110	131
6:00			21	8	29	18:00			23	13	36
6:15			32	16	48	18:15			14	13	27
6:30			47	11	58	18:30			17	11	28
6:45			47	147	194	18:45			9	63	72
7:00			29	20	49	19:00			11	11	22
7:15			20	33	53	19:15			5	8	13
7:30			16	32	48	19:30			7	7	14
7:45			22	87	109	19:45			7	30	37
8:00			19	22	41	20:00			4	2	6
8:15			19	21	40	20:15			2	1	3
8:30			30	24	54	20:30			8	3	11
8:45			26	94	120	20:45			3	17	20
9:00			20	14	34	21:00			2	2	4
9:15			28	14	42	21:15			1	11	12
9:30			21	11	32	21:30			2	4	6
9:45			31	100	131	21:45			2	7	9
10:00			20	19	39	22:00			2	1	3
10:15			12	12	24	22:15			2	2	4
10:30			16	18	34	22:30			4	0	4
10:45			10	58	68	22:45			2	10	12
11:00			16	31	47	23:00			2	1	3
11:15			17	16	33	23:15			0	1	1
11:30			14	20	34	23:30			0	1	1
11:45			13	60	73	23:45			0	2	2
<b>TOTALS</b>			579	503	1082	<b>TOTALS</b>			682	720	1402
<b>SPLIT %</b>			53.5%	46.5%	43.6%	<b>SPLIT %</b>			48.6%	51.4%	56.4%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	1,261	1,223	2,484		
AM Peak Hour			6:15	7:15	6:30	PM Peak Hour			15:45	15:45	15:45
AM Pk Volume			155	121	228	PM Pk Volume			140	166	306
Pk Hr Factor			0.824	0.890	0.838	Pk Hr Factor			0.814	0.830	0.860
7 - 9 Volume			181	207	388	4 - 6 Volume			229	228	457
7 - 9 Peak Hour			8:00	7:15	7:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume			94	121	206	4 - 6 Pk Volume			119	146	265
Pk Hr Factor			0.800	0.890	0.920	Pk Hr Factor			0.692	0.730	0.818

**VOLUME**  
Dwy E/O Sage Canyon Rd

Day: Wednesday  
Date: 10/12/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS						NB	SB	EB	WB	Total	
						0	0	144	143	287	
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			0	4	4
00:15			0	0	0	12:15			0	0	0
00:30			0	0	0	12:30			4	0	4
00:45			0	0	0	12:45			6	10	16
01:00			0	0	0	13:00			1	2	3
01:15			0	0	0	13:15			3	7	10
01:30			0	0	0	13:30			2	1	3
01:45			0	0	0	13:45			0	6	6
02:00			0	0	0	14:00			1	0	1
02:15			0	0	0	14:15			2	2	4
02:30			0	0	0	14:30			3	1	4
02:45			0	0	0	14:45			2	8	10
03:00			0	0	0	15:00			2	6	8
03:15			0	0	0	15:15			1	4	5
03:30			0	0	0	15:30			2	7	9
03:45			0	0	0	15:45			0	5	5
04:00			0	0	0	16:00			1	3	4
04:15			0	0	0	16:15			1	11	12
04:30			3	0	3	16:30			1	3	4
04:45			1	4	5	16:45			0	3	3
05:00			2	0	2	17:00			0	3	3
05:15			1	0	1	17:15			0	2	2
05:30			2	0	2	17:30			0	3	3
05:45			5	10	15	17:45			0	5	5
06:00			4	0	4	18:00			0	1	1
06:15			4	0	4	18:15			1	1	2
06:30			2	0	2	18:30			0	4	4
06:45			15	25	40	18:45			0	1	1
07:00			7	2	9	19:00			0	1	1
07:15			3	2	5	19:15			0	0	0
07:30			2	2	4	19:30			0	3	3
07:45			1	13	14	19:45			1	1	2
08:00			3	0	3	20:00			0	3	3
08:15			5	3	8	20:15			0	2	2
08:30			8	1	9	20:30			0	0	0
08:45			9	25	34	20:45			0	4	4
09:00			2	0	2	21:00			1	0	1
09:15			4	3	7	21:15			0	1	1
09:30			1	1	2	21:30			1	0	1
09:45			6	13	19	21:45			0	2	2
10:00			2	2	4	22:00			0	0	0
10:15			2	1	3	22:15			0	0	0
10:30			2	0	2	22:30			0	0	0
10:45			3	9	12	22:45			0	1	1
11:00			2	6	8	23:00			0	0	0
11:15			2	2	4	23:15			0	0	0
11:30			2	5	7	23:30			0	0	0
11:45			3	9	12	23:45			0	0	0
<b>TOTALS</b>			<b>108</b>	<b>36</b>	<b>144</b>	<b>TOTALS</b>			<b>36</b>	<b>107</b>	<b>143</b>
<b>SPLIT %</b>			<b>75.0%</b>	<b>25.0%</b>	<b>50.2%</b>	<b>SPLIT %</b>			<b>25.2%</b>	<b>74.8%</b>	<b>49.8%</b>

DAILY TOTALS						NB	SB	EB	WB	Total	
						0	0	144	143	287	
AM Peak Hour			06:15	11:00	06:45	PM Peak Hour			12:30	15:30	15:30
AM Pk Volume			28	16	34	PM Pk Volume			14	28	32
Pk Hr Factor			0.467	0.667	0.531	Pk Hr Factor			0.583	0.636	0.667
7 - 9 Volume			38	10	48	4 - 6 Volume			3	32	35
7 - 9 Peak Hour			08:00	07:00	08:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume			25	6	29	4 - 6 Pk Volume			3	19	22
Pk Hr Factor			0.694	0.750	0.806	Pk Hr Factor			0.750	0.432	0.458

Prepared by NDS/ATD

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Thursday  
Date: 10/13/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total					
					0	0	183	189	372					
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL			
00:00			0	0	0	12:00			3	4	7			
00:15			0	0	0	12:15			2	1	3			
00:30			0	0	0	12:30			3	1	4			
00:45			0	0	0	12:45			1	9	1	7	2	16
01:00			0	0	0	13:00			4	6	10			
01:15			0	0	0	13:15			2	0	2			
01:30			0	0	0	13:30			1	3	4			
01:45			0	0	0	13:45			5	12	5	14	10	26
02:00			0	0	0	14:00			5	4	9			
02:15			0	0	0	14:15			7	6	13			
02:30			0	0	0	14:30			0	4	4			
02:45			0	0	0	14:45			2	14	7	21	9	35
03:00			0	0	0	15:00			1	9	10			
03:15			0	0	0	15:15			1	5	6			
03:30			0	0	0	15:30			0	4	4			
03:45			0	0	0	15:45			0	2	5	23	5	25
04:00			0	0	0	16:00			3	9	12			
04:15			0	0	0	16:15			0	4	4			
04:30			0	0	0	16:30			1	2	3			
04:45			0	1	1	16:45			2	6	5	20	7	26
05:00			3	0	3	17:00			2	8	10			
05:15			1	0	1	17:15			0	8	8			
05:30			1	0	1	17:30			1	3	4			
05:45			5	10	5	17:45			0	3	4	23	4	26
06:00			4	1	5	18:00			1	6	7			
06:15			8	1	9	18:15			1	1	2			
06:30			8	0	8	18:30			1	3	4			
06:45			9	29	2	18:45			0	3	3	13	3	16
07:00			15	2	17	19:00			0	1	1			
07:15			6	1	7	19:15			0	1	1			
07:30			1	1	2	19:30			0	0	0			
07:45			4	26	4	19:45			0	0	2	0	2	
08:00			1	3	4	20:00			0	4	4			
08:15			8	0	8	20:15			1	0	1			
08:30			8	0	8	20:30			0	2	2			
08:45			12	29	4	20:45			0	1	0	6	0	7
09:00			2	1	3	21:00			0	0	0			
09:15			4	3	7	21:15			0	0	0			
09:30			2	2	4	21:30			1	1	2			
09:45			6	14	1	21:45			0	1	7	8	7	9
10:00			3	2	5	22:00			0	0	0			
10:15			4	2	6	22:15			2	0	2			
10:30			5	3	8	22:30			0	0	0			
10:45			2	14	6	22:45			0	2	1	1	1	3
11:00			1	2	3	23:00			0	2	2			
11:15			5	1	6	23:15			0	0	0			
11:30			0	4	4	23:30			0	0	0			
11:45			2	8	2	23:45			0	0	2	0	2	
<b>TOTALS</b>			130	49	179	<b>TOTALS</b>			53	140	193			
<b>SPLIT %</b>			72.6%	27.4%	48.1%	<b>SPLIT %</b>			27.5%	72.5%	51.9%			

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	183	189	372		
AM Peak Hour			06:15	10:00	06:15	PM Peak Hour			13:30	14:15	13:30
AM Pk Volume			40	13	45	PM Pk Volume			18	26	36
Pk Hr Factor			0.667	0.542	0.662	Pk Hr Factor			0.643	0.722	0.692
7 - 9 Volume			55	15	70	4 - 6 Volume			9	43	52
7 - 9 Peak Hour			08:00	07:15	08:00	4 - 6 Peak Hour			16:00	16:45	16:45
7 - 9 Pk Volume			29	9	36	4 - 6 Pk Volume			6	24	29
Pk Hr Factor			0.670	0.603	0.604	Pk Hr Factor			0.500	0.750	0.725

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Friday  
Date: 10/14/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	140	142	282		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			3	3	6
00:15			0	0	0	12:15			3	3	6
00:30			0	0	0	12:30			1	6	7
00:45			0	0	0	12:45			3	10	16
01:00			0	0	0	13:00			1	2	3
01:15			0	0	0	13:15			0	3	3
01:30			0	0	0	13:30			4	6	10
01:45			0	0	0	13:45			2	7	13
02:00			0	0	0	14:00			2	1	3
02:15			0	0	0	14:15			2	2	4
02:30			0	0	0	14:30			1	2	3
02:45			0	0	0	14:45			0	5	8
03:00			0	0	0	15:00			0	0	0
03:15			0	0	0	15:15			3	2	5
03:30			0	0	0	15:30			1	9	10
03:45			0	0	0	15:45			0	4	6
04:00			0	0	0	16:00			2	4	6
04:15			0	0	0	16:15			2	5	7
04:30			0	0	0	16:30			0	3	3
04:45			0	0	0	16:45			0	4	2
05:00			0	0	0	17:00			5	8	13
05:15			0	0	0	17:15			1	8	9
05:30			0	0	0	17:30			0	7	7
05:45			0	0	0	17:45			0	6	1
06:00			0	0	0	18:00			0	1	1
06:15			1	0	1	18:15			0	4	4
06:30			5	0	5	18:30			0	1	1
06:45			14	20	1	18:45			0	2	8
07:00			9	1	10	19:00			0	0	0
07:15			4	2	6	19:15			0	0	0
07:30			1	0	1	19:30			1	2	3
07:45			2	16	1	19:45			0	1	2
08:00			3	0	3	20:00			1	2	3
08:15			2	1	3	20:15			0	1	1
08:30			11	0	11	20:30			1	2	3
08:45			9	25	0	20:45			0	2	0
09:00			5	2	7	21:00			0	0	0
09:15			2	1	3	21:15			0	0	0
09:30			5	2	7	21:30			0	2	2
09:45			4	16	0	21:45			0	1	3
10:00			4	1	5	22:00			1	2	3
10:15			3	2	5	22:15			0	0	0
10:30			0	3	3	22:30			1	0	1
10:45			2	9	1	22:45			0	2	0
11:00			3	2	5	23:00			0	0	0
11:15			3	2	5	23:15			0	0	0
11:30			2	0	2	23:30			0	0	0
11:45			5	13	6	23:45			0	0	0
<b>TOTALS</b>			99	28	127	<b>TOTALS</b>			41	114	155
<b>SPLIT %</b>			78.0%	22.0%	45.0%	<b>SPLIT %</b>			26.5%	73.5%	55.0%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	140	142	282
AM Peak Hour	06:30	11:45	06:30	PM Peak Hour	12:00	16:45	16:45		
AM Pk Volume	32	18	36	PM Pk Volume	10	25	31		
Pk Hr Factor	0.571	0.750	0.600	Pk Hr Factor	0.833	0.781	0.596		
7 - 9 Volume	41	5	46	4 - 6 Volume	10	38	48		
7 - 9 Peak Hour	08:00	07:00	08:00	4 - 6 Peak Hour	16:15	16:45	16:45		
7 - 9 Pk Volume	25	4	26	4 - 6 Pk Volume	7	25	31		
Pk Hr Factor	0.000	0.000	0.568	Pk Hr Factor	0.000	0.000	0.350	0.781	0.596

Prepared by NDS/ATD

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Saturday  
Date: 10/15/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	89	83	172		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			2	3	5
00:15			0	0	0	12:15			0	1	1
00:30			0	0	0	12:30			1	1	2
00:45			0	0	0	12:45			2	5	2
01:00			0	0	0	13:00			1	1	2
01:15			0	0	0	13:15			3	2	5
01:30			0	0	0	13:30			1	2	3
01:45			0	0	0	13:45			4	9	5
02:00			0	0	0	14:00			4	2	6
02:15			0	0	0	14:15			5	5	10
02:30			0	0	0	14:30			1	1	2
02:45			0	0	0	14:45			1	11	4
03:00			0	0	0	15:00			1	1	2
03:15			0	0	0	15:15			0	0	0
03:30			0	0	0	15:30			1	2	3
03:45			0	0	0	15:45			1	3	6
04:00			0	0	0	16:00			1	2	3
04:15			0	0	0	16:15			1	4	5
04:30			0	0	0	16:30			0	7	7
04:45			0	0	0	16:45			0	2	0
05:00			0	0	0	17:00			0	7	7
05:15			0	0	0	17:15			0	0	0
05:30			0	0	0	17:30			0	0	0
05:45			1	1	1	17:45			0	0	7
06:00			0	0	0	18:00			0	0	0
06:15			0	0	0	18:15			1	1	2
06:30			4	1	5	18:30			1	0	1
06:45			4	8	4	18:45			0	2	2
07:00			4	1	5	19:00			1	0	1
07:15			0	0	0	19:15			0	1	1
07:30			0	1	1	19:30			0	2	2
07:45			6	10	7	19:45			0	1	3
08:00			0	0	0	20:00			0	1	1
08:15			3	0	3	20:15			0	2	2
08:30			4	0	4	20:30			0	0	0
08:45			3	10	3	20:45			0	0	3
09:00			1	4	5	21:00			0	0	0
09:15			0	0	0	21:15			0	0	0
09:30			3	1	4	21:30			0	0	0
09:45			6	10	6	21:45			1	1	1
10:00			2	0	2	22:00			1	0	1
10:15			2	1	3	22:15			0	0	0
10:30			1	0	1	22:30			1	0	1
10:45			1	6	1	22:45			0	2	0
11:00			2	1	3	23:00			0	0	0
11:15			0	3	3	23:15			0	0	0
11:30			2	5	7	23:30			0	0	0
11:45			4	8	6	23:45			0	0	0
<b>TOTALS</b>			53	21	74	<b>TOTALS</b>			36	62	98
<b>SPLIT %</b>			71.6%	28.4%	43.0%	<b>SPLIT %</b>			36.7%	63.3%	57.0%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	89	83	172

AM Peak Hour	07:45	11:15	11:15	PM Peak Hour	13:30	15:45	13:30
AM Pk Volume	13	13	21	PM Pk Volume	14	18	24
Pk Hr Factor	0.542	0.650	0.750	Pk Hr Factor	0.700	0.643	0.600
7 - 9 Volume	20	3	23	4 - 6 Volume	2	20	22
7 - 9 Peak Hour	07:45	07:00	07:45	4 - 6 Peak Hour	16:00	16:15	16:15
7 - 9 Pk Volume	13	3	14	4 - 6 Pk Volume	2	18	19
Pk Hr Factor	0.542	0.750	0.500	Pk Hr Factor	0.500	0.643	0.679

Prepared by NDS/ATD

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Sunday  
Date: 10/16/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	62	62	124		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			2	0	2
00:15			0	0	0	12:15			1	0	1
00:30			0	0	0	12:30			0	4	4
00:45			0	0	0	12:45			0	3	3
01:00			0	0	0	13:00			2	0	2
01:15			0	0	0	13:15			1	1	2
01:30			0	0	0	13:30			1	5	6
01:45			0	0	0	13:45			2	6	8
02:00			0	0	0	14:00			3	3	6
02:15			0	0	0	14:15			2	0	2
02:30			0	0	0	14:30			3	2	5
02:45			0	0	0	14:45			3	11	14
03:00			0	0	0	15:00			1	2	3
03:15			0	0	0	15:15			0	0	0
03:30			0	0	0	15:30			1	1	2
03:45			0	0	0	15:45			0	2	2
04:00			0	0	0	16:00			0	1	1
04:15			0	0	0	16:15			0	3	3
04:30			0	0	0	16:30			2	4	6
04:45			0	0	0	16:45			0	2	2
05:00			0	0	0	17:00			0	0	0
05:15			0	0	0	17:15			0	2	2
05:30			0	0	0	17:30			0	6	6
05:45			0	0	0	17:45			0	2	2
06:00			0	0	0	18:00			0	1	1
06:15			0	0	0	18:15			0	0	0
06:30			0	0	0	18:30			0	4	4
06:45			0	0	0	18:45			0	1	1
07:00			3	2	5	19:00			0	0	0
07:15			0	0	0	19:15			1	0	1
07:30			3	1	4	19:30			0	2	2
07:45			2	8	10	19:45			0	1	1
08:00			1	2	3	20:00			0	0	0
08:15			3	0	3	20:15			1	0	1
08:30			4	1	5	20:30			0	0	0
08:45			1	9	10	20:45			0	1	1
09:00			1	0	1	21:00			1	0	1
09:15			1	0	1	21:15			0	0	0
09:30			1	1	2	21:30			0	0	0
09:45			4	7	11	21:45			0	1	1
10:00			0	1	1	22:00			0	0	0
10:15			0	1	1	22:15			0	0	0
10:30			2	0	2	22:30			0	0	0
10:45			2	4	6	22:45			0	0	0
11:00			0	1	1	23:00			0	0	0
11:15			1	0	1	23:15			0	0	0
11:30			3	1	4	23:30			0	0	0
11:45			3	7	10	23:45			0	0	0
<b>TOTALS</b>			35	16	51	<b>TOTALS</b>			27	46	73
<b>SPLIT %</b>			68.6%	31.4%	41.1%	<b>SPLIT %</b>			37.0%	63.0%	58.9%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	62	62	124		
AM Peak Hour			07:45	11:45	07:45	PM Peak Hour			14:00	17:15	13:15
AM Pk Volume			10	7	13	PM Pk Volume			11	11	16
Pk Hr Factor			0.625	0.438	0.650	Pk Hr Factor			0.917	0.458	0.667
7 - 9 Volume			17	6	23	4 - 6 Volume			2	18	20
7 - 9 Peak Hour			07:45	07:00	07:45	4 - 6 Peak Hour			16:00	17:00	16:00
7 - 9 Pk Volume			10	3	13	4 - 6 Pk Volume			2	10	10
Pk Hr Factor			0.625	0.375	0.650	Pk Hr Factor			0.250	0.417	0.417

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Monday  
Date: 10/17/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	154	155	309		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			4	0	4
00:15			0	0	0	12:15			0	4	4
00:30			0	0	0	12:30			2	2	4
00:45			0	0	0	12:45			3	9	12
01:00			0	0	0	13:00			0	4	4
01:15			0	0	0	13:15			3	5	8
01:30			0	0	0	13:30			5	4	9
01:45			0	0	0	13:45			4	12	16
02:00			0	0	0	14:00			4	2	6
02:15			0	0	0	14:15			3	2	5
02:30			0	0	0	14:30			1	2	3
02:45			0	0	0	14:45			3	11	14
03:00			0	0	0	15:00			4	3	7
03:15			0	0	0	15:15			0	5	5
03:30			0	0	0	15:30			0	9	9
03:45			0	0	0	15:45			1	5	6
04:00			0	0	0	16:00			2	10	12
04:15			0	0	0	16:15			1	11	12
04:30			0	0	0	16:30			1	4	5
04:45			0	0	0	16:45			2	6	8
05:00			0	0	0	17:00			2	8	10
05:15			0	0	0	17:15			1	3	4
05:30			0	0	0	17:30			1	2	3
05:45			1	1	2	17:45			0	4	4
06:00			0	0	0	18:00			0	1	1
06:15			3	1	4	18:15			0	4	4
06:30			10	0	10	18:30			1	3	4
06:45			12	25	37	18:45			0	1	1
07:00			7	1	8	19:00			0	1	1
07:15			3	2	5	19:15			0	1	1
07:30			3	0	3	19:30			1	0	1
07:45			4	17	21	19:45			2	3	5
08:00			2	0	2	20:00			0	0	0
08:15			3	0	3	20:15			0	2	2
08:30			4	0	4	20:30			1	2	3
08:45			8	17	25	20:45			0	1	1
09:00			7	1	8	21:00			0	0	0
09:15			2	5	7	21:15			0	0	0
09:30			6	1	7	21:30			0	0	0
09:45			3	18	21	21:45			0	0	0
10:00			2	1	3	22:00			0	0	0
10:15			5	3	8	22:15			0	0	0
10:30			2	2	4	22:30			0	0	0
10:45			1	10	11	22:45			0	0	0
11:00			4	2	6	23:00			0	0	0
11:15			1	2	3	23:15			0	0	0
11:30			6	2	8	23:30			0	0	0
11:45			3	14	17	23:45			0	0	0
<b>TOTALS</b>			102	35	137	<b>TOTALS</b>			52	120	172
<b>SPLIT %</b>			74.5%	25.5%	44.3%	<b>SPLIT %</b>			30.2%	69.8%	55.7%

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	154	155	309		
AM Peak Hour			06:15	10:15	06:30	PM Peak Hour			13:15	15:30	15:30
AM Pk Volume			32	12	36	PM Pk Volume			16	38	42
Pk Hr Factor			0.667	0.600	0.692	Pk Hr Factor			0.800	0.864	0.875
7 - 9 Volume			34	5	39	4 - 6 Volume			10	47	57
7 - 9 Peak Hour			07:00	07:00	07:00	4 - 6 Peak Hour			16:00	16:00	16:00
7 - 9 Pk Volume			17	4	21	4 - 6 Pk Volume			6	30	36
Pk Hr Factor			0.607	0.500	0.656	Pk Hr Factor			0.750	0.682	0.750

Prepared by NDS/ATD

**VOLUME**

Dwy E/O Sage Canyon Rd

Day: Tuesday  
Date: 10/18/2016

City: Napa County  
Project #: CA16\_7758\_002

DAILY TOTALS					NB	SB	EB	WB	Total		
					0	0	176	177	353		
AM Period	NB	SB	EB	WB	TOTAL	PM Period	NB	SB	EB	WB	TOTAL
00:00			0	0	0	12:00			2	6	8
00:15			0	0	0	12:15			5	4	9
00:30			0	0	0	12:30			2	3	5
00:45			0	0	0	12:45			0	9	3
01:00			0	0	0	13:00			1	1	2
01:15			0	0	0	13:15			2	9	11
01:30			0	0	0	13:30			5	3	8
01:45			0	0	0	13:45			1	9	4
02:00			0	0	0	14:00			7	1	8
02:15			0	0	0	14:15			3	2	5
02:30			0	0	0	14:30			7	3	10
02:45			0	0	0	14:45			3	20	6
03:00			0	0	0	15:00			2	5	7
03:15			0	0	0	15:15			3	5	8
03:30			0	0	0	15:30			0	10	10
03:45			0	0	0	15:45			3	8	6
04:00			0	0	0	16:00			0	7	7
04:15			0	0	0	16:15			0	7	7
04:30			0	0	0	16:30			1	12	13
04:45			0	0	0	16:45			1	2	4
05:00			0	0	0	17:00			0	5	5
05:15			0	0	0	17:15			0	3	3
05:30			0	0	0	17:30			8	4	12
05:45			0	0	0	17:45			2	10	1
06:00			2	0	2	18:00			1	6	7
06:15			4	0	4	18:15			0	3	3
06:30			12	1	13	18:30			0	5	5
06:45			13	31	2	3	18:45		1	2	1
07:00			7	2	9	19:00			0	1	1
07:15			2	0	2	19:15			1	2	3
07:30			2	0	2	19:30			0	1	1
07:45			2	13	1	3	19:45		0	1	2
08:00			5	0	5	20:00			0	0	0
08:15			4	0	4	20:15			1	0	1
08:30			11	0	11	20:30			2	0	2
08:45			5	25	1	1	20:45		0	3	0
09:00			1	0	1	21:00			0	4	4
09:15			5	1	6	21:15			0	5	5
09:30			3	2	5	21:30			0	4	4
09:45			9	18	0	3	21:45		0	2	15
10:00			8	2	10	22:00			0	0	0
10:15			2	1	3	22:15			0	0	0
10:30			0	0	0	22:30			0	0	0
10:45			0	10	1	4	22:45		0	0	0
11:00			5	1	6	23:00			0	0	0
11:15			1	1	2	23:15			0	0	0
11:30			5	4	9	23:30			0	0	0
11:45			4	15	7	13	23:45		0	0	0
TOTALS			112	27	139	TOTALS			64	150	214
SPLIT %			80.6%	19.4%	39.4%	SPLIT %			29.9%	70.1%	60.6%

DAILY TOTALS					NB	SB	EB	WB	Total
					0	0	176	177	353
AM Peak Hour	06:15	11:30	06:15	PM Peak Hour	14:00	15:45	15:45		
AM Pk Volume	36	21	41	PM Pk Volume	20	32	36		
Pk Hr Factor	0.692	0.750	0.683	Pk Hr Factor	0.714	0.667	0.692		
7 - 9 Volume	38	4	42	4 - 6 Volume	12	43	55		
7 - 9 Peak Hour	08:00	07:00	08:00	4 - 6 Peak Hour	17:00	16:00	16:00		
7 - 9 Pk Volume	25	3	26	4 - 6 Pk Volume	10	30	32		
Pk Hr Factor	0.000	0.000	0.568	Pk Hr Factor	0.000	0.000	0.313	0.625	0.615

**Chappellet Winery  
Driveway Count Summary**

Weekday - Peak Hour of Generator						
Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Monday	10/17/2016	3:30-4:30	4	38	309	13.59%
Tuesday	10/18/2016	3:45-4:45	4	32	353	10.20%
Wednesday	10/12/2016	3:30-4:30	4	28	287	11.15%
Thursday	10/13/2016	1:30-2:30	18	18	372	9.68%
Friday	10/14/2016	4:45-5:45	6	25	282	10.99%
<b>Average</b>			7	28	321	<b>11.12%</b>
			20%	80%		

Weekend - Peak Hour of Generator						
Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	10/15/2016	1:30-2:30	14	10	172	13.95%
Sunday	10/16/2016	1:15-2:15	7	9	124	12.90%
<b>Average</b>			11	10	148	<b>13.43%</b>
			52%	48%		

Weekly - Peak Hour of Generator						
Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	10/15/2016	1:30-2:30	14	10	172	13.95%
Sunday	10/16/2016	1:15-2:15	7	9	124	12.90%
Monday	10/17/2016	3:30-4:30	4	38	309	13.59%
Tuesday	10/18/2016	3:45-4:45	4	32	353	10.20%
Wednesday	10/12/2016	3:30-4:30	4	28	287	11.15%
Thursday	10/13/2016	1:30-2:30	18	18	372	9.68%
Friday	10/14/2016	4:45-5:45	6	25	282	10.99%
<b>Average</b>			8	23	271	<b>11.78%</b>
			26%	74%		

Weekday - PM Peak Hour (4-6 PM)						
Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Monday	10/17/2016	4:00-5:00	6	30	309	11.65%
Tuesday	10/18/2016	4:00-5:00	2	30	353	9.07%
Wednesday	10/12/2016	4:00-5:00	3	19	287	7.67%
Thursday	10/13/2016	4:45-5:45	5	24	372	7.80%
Friday	10/14/2016	4:45-5:45	6	25	282	10.99%
<b>Average</b>			4	26	321	<b>9.44%</b>
			13%	87%		

Weekend - Midday Peak Hour (2-4 PM)						
Day	Date	Peak Hour	Peak Hour Vol		Daily Vol	Peak Hour % of Daily
			In	Out		
Saturday	10/15/2016	2:00-3:00	11	11	172	12.79%
Sunday	10/16/2016	2:00-3:00	11	5	124	12.90%
<b>Average</b>			11	8	148	<b>12.85%</b>
			58%	42%		

# National Data & Surveying Services Intersection Turning Movement Count

Location: Sage Canyon Rd & Chappellet Winery  
 City: St Helena  
 Control:

Project ID: 18-08674-001  
 Date: 2018-12-27

## Total

NS/EW Streets:	Sage Canyon Rd						Sage Canyon Rd						Chappellet Winery						TOTAL
	NORTHBOUND			SOUTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			TOTAL			
PM	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR		WU	TOTAL	
4:00 PM	0	23	0	0	0	0	0	0	0	0	0	0	9	0	0	0	44		
4:15 PM	0	29	1	0	0	19	0	0	0	0	0	0	2	0	0	0	51		
4:30 PM	0	25	1	0	0	18	0	0	0	0	0	0	1	0	1	0	46		
4:45 PM	0	38	0	0	0	10	0	0	0	0	0	0	2	0	0	0	50		
5:00 PM	0	22	0	0	0	12	0	0	0	0	0	0	3	0	0	0	37		
5:15 PM	0	24	0	0	0	5	0	0	0	0	0	0	5	0	0	0	34		
5:30 PM	0	27	0	0	0	10	0	0	0	0	0	0	6	0	1	0	44		
5:45 PM	0	19	1	0	0	12	0	0	0	0	0	0	0	0	0	0	32		
<b>TOTAL VOLUMES :</b>	0	207	3	0	0	98	0	0	0	0	0	0	28	0	2	0	338		
<b>APPROACH %'s :</b>	0.00%	98.57%	1.43%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	93.33%	0.00%	6.67%	0.00%			
<b>PEAK HR :</b>	04:00 PM - 05:00 PM																		
<b>PEAK HR VOL :</b>	0	115	2	0	0	59	0	0	0	0	0	0	14	0	1	0	191		
<b>PEAK HR FACTOR :</b>	0.000	0.757	0.500	0.000	0.000	0.776	0.000	0.000	0.000	0.000	0.000	0.000	0.389	0.000	0.250	0.000	0.936		
		0.770				0.776							0.417						

# National Data & Surveying Services

## Intersection Turning Movement Count

**Location:** Sage Canyon Rd & Chappellet Winery  
**City:** St Helena  
**Control:**

**Project ID:** 18-08674-001  
**Date:** 12/15/2018

### Total

NS/EW Streets:	Sage Canyon Rd				Sage Canyon Rd				Chappellet Winery				Chappellet Winery					
	NORTHBOUND		SOUTHBOUND		EASTBOUND		WESTBOUND		EASTBOUND		WESTBOUND		EASTBOUND		WESTBOUND			
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL	
1:00 PM	0	10	1	0	0	12	0	0	0	0	0	0	3	0	0	0	0	26
1:15 PM	0	10	0	0	0	13	0	0	0	0	0	0	4	0	0	0	0	27
1:30 PM	0	12	5	0	1	12	0	0	0	0	0	0	1	0	1	0	0	32
1:45 PM	0	10	5	0	1	16	0	0	0	0	0	0	2	0	0	0	0	34
2:00 PM	0	7	1	0	0	17	0	0	0	0	0	0	2	0	0	0	0	27
2:15 PM	0	12	2	0	0	16	0	0	0	0	0	0	3	0	0	0	0	33
2:30 PM	0	10	1	0	1	16	0	0	0	0	0	0	0	0	0	0	0	28
2:45 PM	0	14	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	36
<b>TOTAL VOLUMES :</b>	0	85	15	0	3	124	0	0	0	0	0	0	15	0	1	0	0	243
<b>APPROACH %'s :</b>	0.00%	85.00%	15.00%	0.00%	2.36%	97.64%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	93.75%	0.00%	6.25%	0.00%	0.00%	
<b>PEAK HR :</b>	0	41	13	0	2	61	0	0	0	0	0	0	8	0	1	0	0	126
<b>PEAK HR VOL :</b>	0.000	0.854	0.650	0.000	0.500	0.897	0.000	0.000	0.000	0.000	0.000	0.000	0.667	0.000	0.250	0.000	0.000	0.926
<b>PEAK HR FACTOR :</b>		0.794				0.926								0.750				0.926



# Appendix D

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## Winery Traffic Information/Trip Generation Forms



## Existing Conditions Winery Traffic Information / Trip Generation

***Determine Winery Daily Trips. Complete Sections A through H below to determine your winery project's estimated baseline daily and peak hour trips.***

### Section A. Maximum Daily Weekday Traffic (Friday, non-harvest season)

1. Total number of FT employees<sup>1</sup>: 24 x 3.05 one-way trips per employee = 73 daily trips
2. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
3. Maximum weekday visitors<sup>1</sup>: 40 / 2.6 visitors per vehicle x 2 one-way trips = 31 daily trips
4. Gallons of production: 194,100 / 1,000 x 0.009 daily truck trips<sup>2</sup> x 2 one-way trips = 3 daily trips
5. TOTAL = 107 daily trips

### Section B. Maximum Daily Weekday Traffic (Friday, harvest season)

6. Total number of FT employees<sup>1</sup>: 24 x 3.05 one-way trips per employee = 73 daily trips
7. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
8. Maximum weekday visitors<sup>1</sup>: 40 / 2.6 visitors per vehicle x 2 one-way trips = 31 daily trips
9. Gallons of production: 194,100 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 3 daily trips
10. Avg. annual tons of grape on-haul: 900 / 144 truck trips x 2 one-way trips = 13 daily trips
11. TOTAL = 120 daily trips

### Section C. Maximum Daily Weekend Traffic (Saturday, non-harvest season)

12. Total number of FT Sat. employees<sup>1</sup>: 8 x 3.05 one-way trips per employee = 24 daily trips
13. Total number of PT Sat. employees<sup>1</sup>: 2 x 1.90 one-way trips per employee = 4 daily trips
14. Maximum Saturday visitors<sup>1</sup>: 80 / 2.8 visitors per vehicle x 2 one-way trips = 57 daily trips
15. TOTAL = 85 daily trips

### Section D. Maximum Daily Weekend Traffic (Saturday, harvest season)

16. Total number of FT Sat. employees<sup>1</sup>: 25 x 3.05 one-way trips per employee = 76 daily trips
17. Total number of PT Sat. employees<sup>1</sup>: 5 x 1.90 one-way trips per employee = 10 daily trips
18. Maximum Saturday visitors<sup>1</sup>: 80 / 2.8 visitors per vehicle x 2 one-way trips = 57 daily trips
19. Gallons of production: 194,100 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 3 daily trips
20. Avg. annual tons of grape on-haul: 900 / 144 truck trips x 2 one-way trips = 13 daily trips
21. TOTAL = 159 daily trips

### Section E. PM Peak Hour Trip Generation (Friday, non-harvest season)

$$(\text{Sum of daily trips from Sec. A, lines 3 and 4}) \times 0.38 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{12} \text{ PM peak trips}$$

107 \* 0.11

### Section F. PM Peak Hour Trip Generation (Friday, harvest season)

$$(\text{Sum of daily trips, Sec. B, lines 8, 9, 10}) \times 0.38 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{13} \text{ PM peak trips}$$

120 \* 0.11

### Section G. PM Peak Hour Trip Generation (Saturday, non-harvest season)

$$(\text{Daily trips from Sec. C, line 14}) \times 0.57 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{11} \text{ PM peak trips}$$

85 \* 0.13

### Section H. PM Peak Hour Trip Generation (Saturday, harvest season)

$$(\text{Sum of daily trips Sec. D, lines 18, 19, 20}) \times 0.57 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{21} \text{ PM peak trips}$$

159 \* 0.13

<sup>1</sup> The number of weekday visitors shall include guests of the largest of any event that is proposed to occur two or more times in a month, on average. Full-time and part-time employees that staff such events shall also be included in the employee numbers.

<sup>2</sup> Assumes 1.47 materials and supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see Traffic Information Sheet Addendum for reference.)

## Proposed Project Winery Traffic Information / Trip Generation

***Determine Winery Daily Trips. Complete Sections I through L below to determine your winery project's estimated future daily and peak hour trips.***

### Section I. Maximum Daily Weekday Traffic (Friday, non-harvest season)

1. Total number of FT employees<sup>1</sup>: 30 x 3.05 one-way trips per employee = 92 daily trips
2. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
3. Maximum weekday visitors<sup>3</sup>: 95 / 2.6 visitors per vehicle x 2 one-way trips = 73 daily trips
4. Gallons of production: 250,000 / 1,000 x 0.009 daily truck trips<sup>4</sup> x 2 one-way trips = 5 daily trips
5. TOTAL = 170 daily trips

### Section J. Maximum Daily Weekday Traffic (Friday, harvest season)

6. Total number of FT employees<sup>1</sup>: 30 x 3.05 one-way trips per employee = 92 daily trips
7. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
8. Maximum weekday visitors<sup>1</sup>: 95 / 2.6 visitors per vehicle x 2 one-way trips = 73 daily trips
9. Gallons of production: 250,000 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 5 daily trips
10. Avg. annual tons of grape on-haul: 750 / 144 truck trips x 2 one-way trips = 10 daily trips
11. TOTAL = 180 daily trips

### Section K. Maximum Daily Weekend Traffic (Saturday, non-harvest season)

12. Total number of FT Sat. employees<sup>1</sup>: 15 x 3.05 one-way trips per employee = 46 daily trips
13. Total number of PT Sat. employees<sup>1</sup>: 2 x 1.90 one-way trips per employee = 4 daily trips
14. Maximum Saturday visitors<sup>1</sup>: 95 / 2.8 visitors per vehicle x 2 one-way trips = 68 daily trips
15. TOTAL = 118 daily trips

### Section L. Maximum Daily Weekend Traffic (Saturday, harvest season)

16. Total number of FT Sat. employees<sup>1</sup>: 25 x 3.05 one-way trips per employee = 76 daily trips
17. Total number of PT Sat. employees<sup>1</sup>: 5 x 1.90 one-way trips per employee = 10 daily trips
18. Maximum Saturday visitors<sup>1</sup>: 95 / 2.8 visitors per vehicle x 2 one-way trips = 68 daily trips
19. Gallons of production: 250,000 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 5 daily trips
20. Avg. annual tons of grape on-haul: 750 / 144 truck trips x 2 one-way trips = 10 daily trips
21. TOTAL = 169 daily trips

***Determine Winery Peak Hour Trips. If the number of daily trips on either Section I, line 5, or Section K, line 15, is greater than 20, or Public Works Director determines that other circumstances such as access safety or other potential network impacts warrant further analysis, then the potential transportation impacts of your project must be evaluated in a transportation impact study (TIS) prepared in accordance with Napa County Public Works TIS Guidelines. Follow the direction outlined in Transportation Impact Study Analysis, below. If the number of daily trips on either line 5 or line 15 is equal to or less than 20, complete Sections M through P below to determine your project's estimated peak hour trips. In lieu of completing Sections M through P, you may opt to prepare a project-specific transportation***

<sup>3</sup> The number of weekday visitors shall include guests of the largest of any event that is proposed to occur two or more times in a month, on average. Full-time and part-time employees that staff such events shall also be included in the employee numbers.

<sup>4</sup> Assumes 1.47 materials and supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see Traffic Information Sheet Addendum for reference.)

## Proposed Project Winery Traffic Information / Trip Generation

*impact analysis if you anticipate the number of peak hour trips from your proposal is different from that estimated here.* USE OPTION C, SITE SPECIFIC DATA.

### Section M. PM Peak Hour Trip Generation (Friday, non-harvest season)

$$\text{(Sum of daily trips from Sec. I, lines 3 and 4) x 0.38 + (No. of FTE) + (No. of PTE / 2)} = \underline{19} \text{ PM peak trips}$$

$170 * 0.11$

### Section N. PM Peak Hour Trip Generation (Friday, harvest season)

$$\text{(Sum of daily trips from Sec. J, lines 8, 9, 10) x 0.38 + (No. of FTE) + (No. of PTE / 2)} = \underline{20} \text{ PM peak trips}$$

$180 * 0.11$

### Section O. PM Peak Hour Trip Generation (Saturday, non-harvest season)

$$\text{(Daily trips from Sec. K, line 14) x 0.57 + (No. of FTE) + (No. of PTE / 2)} = \underline{15} \text{ PM peak trips}$$

$118 * .13$

### Section P. PM Peak Hour Trip Generation (Saturday, harvest season)

$$\text{(Sum of daily trips, Sec. L, lines 18, 19, 20) x 0.57 + (No. of FTE) + (No. of PTE / 2)} = \underline{22} \text{ PM peak trips}$$

$169 * .13$

***Transportation Impact Study Analysis.*** *If the number of daily trips on either Section I, line 5, or Section K, line 15, is greater than 20, then the potential transportation impacts of your project must be evaluated in a traffic impact study (TIS) prepared in accordance with Napa County Public Works TIS Guidelines. Existing trip counts on the transportation network should be collected during the harvest season (August 16 – October 31). If collected outside of the harvest season, during the months of November through February, counts shall be adjusted upward by 15 percent to estimate harvest season network volumes. If collected during the weeks between March 1 and August 15, counts shall be adjusted upward by seven percent.*

*For peak hour analysis in the TIS, the County will allow any one of the following methodologies:*

- a) *Use the peak hour factors in Sections E through H, above, to estimate the peak hour trips generated by the project. To determine the potential peak hour impacts of the project, apply the harvest season estimated peak hour project trips (Sections F and H for the existing condition, and Sections N and P for the proposed project) to roadway volumes during the hour between 3:00 p.m. and 4:00 p.m. on Fridays and Saturdays; or*
- b) *Use peak hour trip counts as projected using the Institute for Transportation Engineers' (ITE) peak hour factors for winery land uses from the most current version of ITE Trip Generation. To determine the potential peak hour impacts of the project, apply the estimated peak hour project trips from ITE to roadway volumes during the hour between 4:00 p.m. and 5:00 p.m. on a Friday and 1:45 p.m. and 2:45 p.m. on a Saturday; or*
- ✓ c) *Conduct a site-specific analysis informed by actual trip counts at the driveway of the project (for winery use permit modifications) or at the driveway of a project with comparable operating characteristics to that proposed (for new winery use permits). To determine the potential peak hour impacts of the project, apply the site-specific peak hour of generator to the peak hour of the network on a Friday and the peak hour of the roadway on a Saturday, based on the assembled trip count data.*

## Permitted Conditions Winery Traffic Information / Trip Generation

***Determine Winery Daily Trips. Complete Sections A through H below to determine your winery project's estimated baseline daily and peak hour trips.***

### Section A. Maximum Daily Weekday Traffic (Friday, non-harvest season)

1. Total number of FT employees<sup>1</sup>: 30 x 3.05 one-way trips per employee = 92 daily trips
2. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
3. Maximum weekday visitors<sup>1</sup>: 40 / 2.6 visitors per vehicle x 2 one-way trips = 31 daily trips
4. Gallons of production: 150,000 / 1,000 x 0.009 daily truck trips<sup>2</sup> x 2 one-way trips = 3 daily trips
5. TOTAL = 126 daily trips

### Section B. Maximum Daily Weekday Traffic (Friday, harvest season)

6. Total number of FT employees<sup>1</sup>: 30 x 3.05 one-way trips per employee = 92 daily trips
7. Total number of PT employees<sup>1</sup>: 0 x 1.90 one-way trips per employee = 0 daily trips
8. Maximum weekday visitors<sup>1</sup>: 40 / 2.6 visitors per vehicle x 2 one-way trips = 31 daily trips
9. Gallons of production: 150,000 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 3 daily trips
10. Avg. annual tons of grape on-haul: 709 / 144 truck trips x 2 one-way trips = 10 daily trips
11. TOTAL = 136 daily trips

### Section C. Maximum Daily Weekend Traffic (Saturday, non-harvest season)

12. Total number of FT Sat. employees<sup>1</sup>: 2 x 3.05 one-way trips per employee = 6 daily trips
13. Total number of PT Sat. employees<sup>1</sup>: 3 x 1.90 one-way trips per employee = 6 daily trips
14. Maximum Saturday visitors<sup>1</sup>: 24 / 2.8 visitors per vehicle x 2 one-way trips = 17 daily trips
15. TOTAL = 29 daily trips

### Section D. Maximum Daily Weekend Traffic (Saturday, harvest season)

16. Total number of FT Sat. employees<sup>1</sup>: 24 x 3.05 one-way trips per employee = 73 daily trips
17. Total number of PT Sat. employees<sup>1</sup>: 3 x 1.90 one-way trips per employee = 6 daily trips
18. Maximum Saturday visitors<sup>1</sup>: 40 / 2.8 visitors per vehicle x 2 one-way trips = 29 daily trips
19. Gallons of production: 150,000 / 1,000 x 0.009 daily truck trips x 2 one-way trips = 3 daily trips
20. Avg. annual tons of grape on-haul: 709 / 144 truck trips x 2 one-way trips = 10 daily trips
21. TOTAL = 121 daily trips

### Section E. PM Peak Hour Trip Generation (Friday, non-harvest season)

$$(\text{Sum of daily trips from Sec. A, lines 3 and 4}) \times 0.38 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{14} \text{ PM peak trips}$$

$$126 * 0.11$$

### Section F. PM Peak Hour Trip Generation (Friday, harvest season)

$$(\text{Sum of daily trips, Sec. B, lines 8, 9, 10}) \times 0.38 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{15} \text{ PM peak trips}$$

$$136 * 0.11$$

### Section G. PM Peak Hour Trip Generation (Saturday, non-harvest season)

$$(\text{Daily trips from Sec. C, line 14}) \times 0.57 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{4} \text{ PM peak trips}$$

$$29 * 0.13$$

### Section H. PM Peak Hour Trip Generation (Saturday, harvest season)

$$(\text{Sum of daily trips Sec. D, lines 18, 19, 20}) \times 0.57 + (\text{No. of FTE}) + (\text{No. of PTE} / 2) = \underline{16} \text{ PM peak trips}$$

$$121 * 0.13$$

<sup>1</sup> The number of weekday visitors shall include guests of the largest of any event that is proposed to occur two or more times in a month, on average. Full-time and part-time employees that staff such events shall also be included in the employee numbers.

<sup>2</sup> Assumes 1.47 materials and supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see Traffic Information Sheet Addendum for reference.)

# Appendix E

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## Left-Turn Lane Warrants

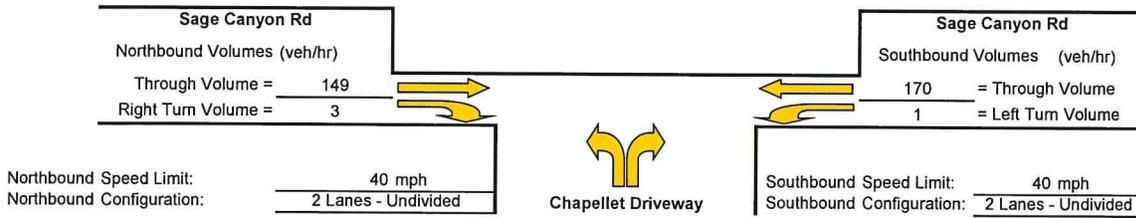


# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Sage Canyon Rd/Chapellet Winery Access  
 Study Scenario: PM Existing + Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



## Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**Thresholds not met, continue to next step**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = 1027.6  
 Advancing Volume Va = 152  
 If AV < Va then warrant is met No

**Right Turn Lane Warranted: NO**

## Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 152  
 If AV < Va then warrant is met -

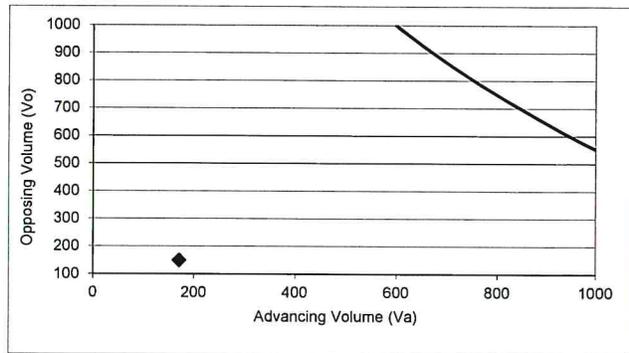
**Right Turn Taper Warranted: NO**

## Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.6 %

Advancing Volume Threshold AV 1592 veh/hr

If AV < Va then warrant is met



◆ Study Intersection  
 Two lane roadway warrant threshold for: 40 mph  
 Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

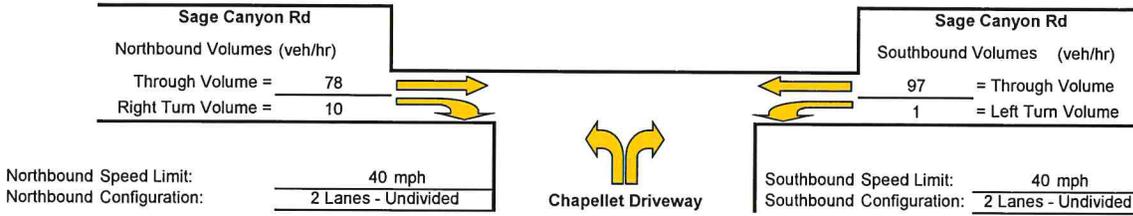
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Sage Canyon Rd/Chapellet Winery Access  
 Study Scenario: Wknd MD Existing + Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



## Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV = 975.1
Advancing Volume	Va = 88
If AV < Va then warrant is met	
	No

Right Turn Lane Warranted: NO

## Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV = -
Advancing Volume	Va = 88
If AV < Va then warrant is met	
	-

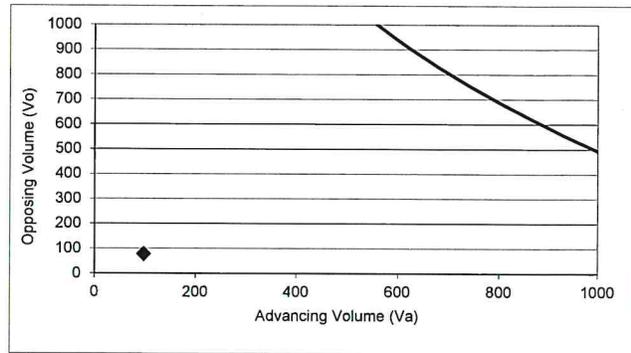
Right Turn Taper Warranted: NO

## Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 1.0 %

Advancing Volume Threshold AV 1613 veh/hr

If AV < Va then warrant is met



◆ Study Intersection  
 — Two lane roadway warrant threshold for: 40 mph  
 Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

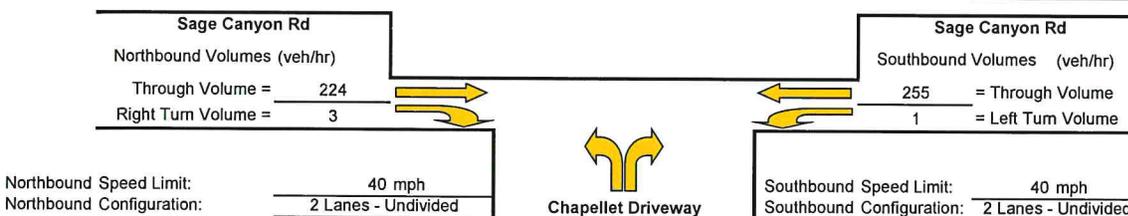
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Sage Canyon Rd/Chapellet Winery Access  
 Study Scenario: PM Future + Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



## Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	1027.6
Advancing Volume	Va =	226.5
If $AV < Va$ then warrant is met		No

Right Turn Lane Warranted: NO

## Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	226.5
If $AV < Va$ then warrant is met		-

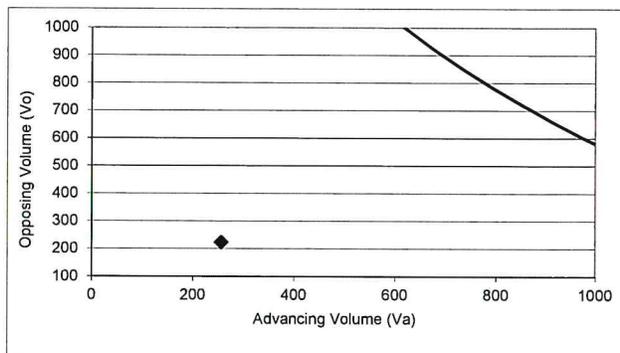
Right Turn Taper Warranted: NO

## Southbound Left Turn Lane Warrants

Percentage Left Turns %lt 0.4 %

Advancing Volume Threshold AV 1508 veh/hr

If  $AV < Va$  then warrant is met



◆ Study Intersection  
 Two lane roadway warrant threshold for: 40 mph  
 Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

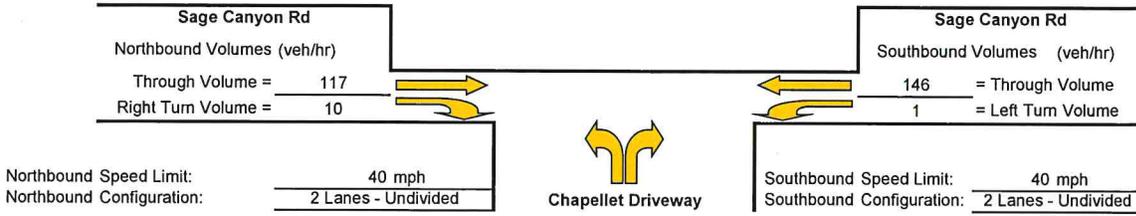
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Sage Canyon Rd/Chapellet Winery Access  
 Study Scenario: Wknd MD Future + Project

Direction of Analysis Street: North/South

Cross Street Intersects: From the East



## Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	975.1
Advancing Volume	Va =	127
If $AV < Va$ then warrant is met		No

Right Turn Lane Warranted: NO

## Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

NOT WARRANTED - Less than 20 vehicles

2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	127
If $AV < Va$ then warrant is met		-

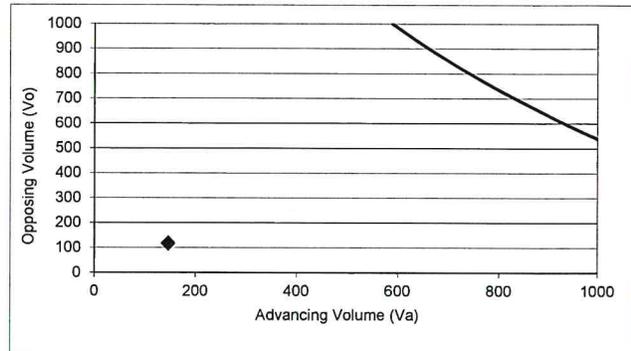
Right Turn Taper Warranted: NO

## Southbound Left Turn Lane Warrants

Percentage Left Turns %lt                      0.7 %

Advancing Volume Threshold AV                      1626 veh/hr

If  $AV < Va$  then warrant is met



◆ Study Intersection

Two lane roadway warrant threshold for: 40 mph

Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: NO

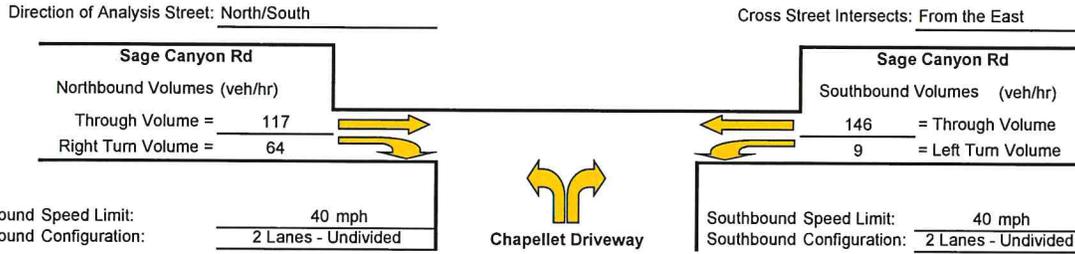
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.

The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.

The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Sage Canyon Rd/Chapellet Winery Access  
 Study Scenario: Wknd MD Future + 200-Person Event



### Northbound Right Turn Lane Warrants

1. Check for right turn volume criteria

Thresholds not met, continue to next step

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	570
Advancing Volume	Va =	181
If $AV < Va$ then warrant is met		

Right Turn Lane Warranted: **NO**

### Northbound Right Turn Taper Warrants (evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

Thresholds not met, continue to next step

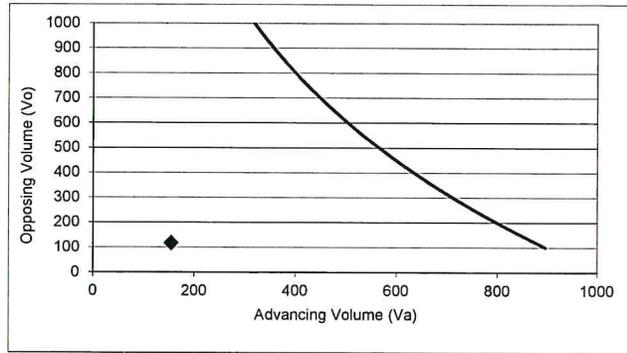
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	260
Advancing Volume	Va =	181
If $AV < Va$ then warrant is met		

Right Turn Taper Warranted: **NO**

### Southbound Left Turn Lane Warrants

Percentage Left Turns %lt	5.8 %
Advancing Volume Threshold AV	879 veh/hr
If $AV < Va$ then warrant is met	



◆ Study Intersection  
 Two lane roadway warrant threshold for: 40 mph  
 Turn lane warranted if point falls to right of warrant threshold line

Left Turn Lane Warranted: **NO**

Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink in 1967, and modified by Kikuchi and Chakroborty in 1991.

