

# Traffic Impact Study for the Silver Rose Winery and Resort Project



Prepared for the

City of Calistoga



Submitted by

**Whitlock & Weinberger Transportation, Inc.**

490 Mendocino Avenue  
Suite 201  
Santa Rosa, CA 95401

voice 707.542.9500

web [www.w-trans.com](http://www.w-trans.com)

475 14<sup>th</sup> Street  
Suite 290  
Oakland, CA 94612

voice 510.444.2600

February 14, 2012



## Table of Contents

---

	Page
Executive Summary .....	1
Transportation Setting.....	3
Operational Analysis.....	6
Access and Circulation.....	12
Alternative Modes .....	14
Parking.....	15
Conclusions and Recommendations .....	16
Study Participants and References.....	17
 Figures	
1 Lane Configurations and Traffic Volumes.....	4
2 Site Plan.....	7
 Tables	
1 Trip Generation Summary.....	9
 Appendix	
A Calculations	



## Executive Summary

---

The proposed Silver Rose Winery project to be located at 963 Silverado Trail in the City of Calistoga involves expansion including an increased number of visitor units as well as an increase in the winery's annual production and introduction of special events at both the winery and resort. There is an existing restaurant on the site which is not currently operational and will be replaced with a new restaurant which includes a culinary center for resort visitors.

The proposed project is expected to generate an average of 1,390 daily trips, including 127 trips during the p.m. peak hour and 157 during the weekend midday peak hour. Compared to the existing use, this translates to an additional 1,163 daily trips, with 97 trips added during the p.m. peak hour and 122 new trips during the weekend midday peak hour.

The intersection of Silverado Trail/Brannan Street was evaluated to determine potential need for a left-turn lane to accommodate current or future demand. The intersection is currently operating in a manner considered acceptable, with a collision rate that is slightly lower than the Statewide average for side-street stop-controlled tee intersections. While a left-turn lane is not warranted under existing or existing plus project volumes, under future volumes a left-turn lane will be warranted on Silverado Trail at Brannan Street. Since the project is expected to add 13.9 percent of the p.m. peak hour traffic that will contribute to the need for the turn pocket, its proportional share of the cost is estimated at \$85,857.

Site access as proposed via four driveways is expected to be adequate with incorporation of several recommendations. At the main driveway, Silverado Trail should be widened as necessary to extend the left-turn pocket easterly to the proposed new driveway location. Existing vegetation near the westerly driveway on Rosedale Road should be removed if necessary to achieve adequate sight lines.

Site circulation is expected to operate acceptably, though the applicant will either need to widen the emergency vehicle access route to 20 feet or obtain concurrence from the Fire Department that the proposed 14-foot path is adequate.

Facilities to serve alternative modes in the study area include bicycle lanes on Silverado Trail and intermittent sidewalks. While pathways are proposed that connect buildings within the site, pedestrian facilities need be provided within the project site such that nearby attractions are easily accessible by pedestrians. Similarly, bike racks should be provided at the restaurant, winery, and other public destinations to encourage bicycle access.

An analysis of the anticipated parking demand based on shared parking principles and temporal distribution of the demand indicates that the project will have a peak demand for 148 standard parking spaces in the shared supply (non-residential land uses); this is expected to occur between 7:00 and 8:00 p.m. on weekdays. The 153 standard parking spaces proposed are adequate to meet this anticipated peak demand.

## Introduction

---

### Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of the proposed Silver Rose Winery project to be located at 963 Silverado Trail in the City of Calistoga. The traffic study was completed in accordance with the criteria established by the City of Calistoga, and is consistent with standard traffic engineering techniques.

### Prelude

The purpose of a traffic impact study is to provide City 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 in order to mitigate these impacts to a level of insignificance as defined by the City's 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. Impacts relative to safety, including for pedestrians and bicyclists, are also addressed.

### Project Profile

The proposed project involves expansion from the existing 20 one-bedroom visitor units to 85 one-bedroom visitor units and 21 residences as well as an increase in the winery's annual production from 5,000 cases to 10,000 cases. In addition, special events are to be held at both the winery and resort; the winery proposes to host 30 special events annually and the resort is proposing to hold seven. The site includes a 160-seat restaurant, which is approved and built, but not currently operational. As part of the expansion a new 150-seat restaurant, which includes a culinary center for resort visitors, will also be constructed. The current spa facilities are proposed to be expanded to include 12 individual treatment rooms and fitness facilities with a total of 8,800 square feet. The existing two-bedroom manager's residence and four-bedroom single family dwelling will be eliminated.

Access to the project site would be via four driveways: two residential driveways, one resort driveway, and one driveway for goods loading and unloading. Two new driveways are proposed on Rosedale Road in place of the three that currently exist, and two new driveways are proposed on Silverado Trail in place of the one that currently exists.

## Transportation Setting

---

### Operational Analysis

#### Study Area and Periods

The study area consists of the intersection of Silverado Trail/Brannan Street. The need for a left-turn lane was evaluated based on new p.m. peak period counts obtained on November 16, 2011, between 4:00 and 6:00 p.m. as this time period would be expected to experience the highest number of left-turns associated with residents returning home at the end of the work day.

#### Study Intersections

The intersection of Silverado Trail and Brannan Street is a tee-intersection, stop-controlled on the terminating Brannan Street approach, with one lane in each direction on all approaches. The location of the study intersection and the existing lane configurations and controls are shown in Figure 1.

#### Study Roadway

Silverado Trail is a paved, two-lane arterial that runs generally east-west with one twelve-foot travel lane and one five-foot bike lane in each direction. The posted speed limit on Silverado Trail near the project site is 45 mph.

### 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 July 1, 2005 through June 30, 2010.

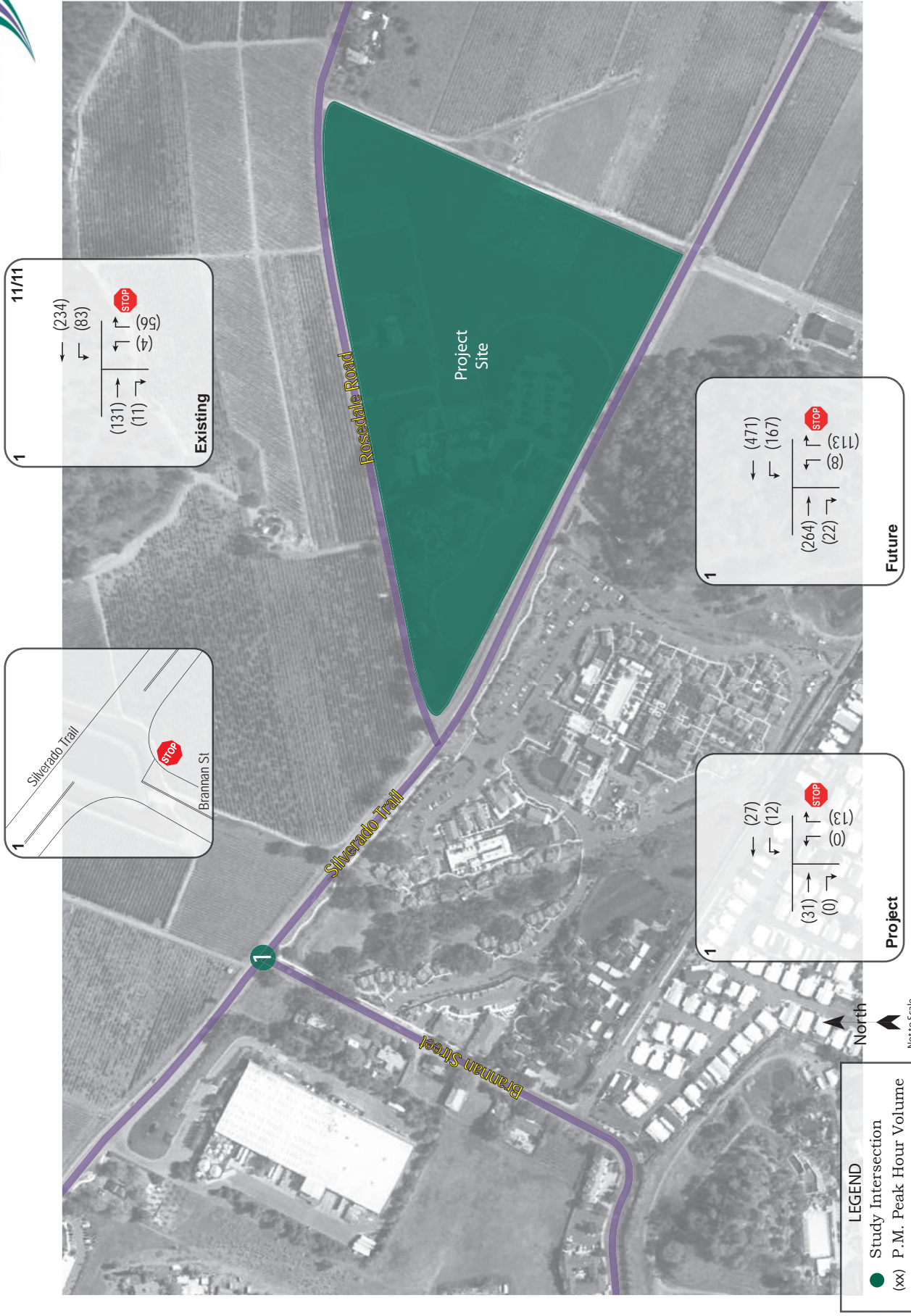
The calculated collision rate for the study intersection was compared to the average collision rate for similar facilities statewide, as indicated in *2007 Accident Data on California State Highways*, California Department of Transportation. The collision rate for the intersection of Silverado Trail and Brannan Street is 0.13 collisions per million vehicles entering (c/mve), which is below the statewide average collision rate of 0.13 c/mve. The spreadsheet indicating the collision rate calculation is provided in Appendix A.

### Alternative Modes

#### Pedestrian Facilities

Pedestrian facilities include sidewalks and curb ramps and various streetscape amenities such as landscaping between sidewalks and roadways. However, sidewalk gaps, obstacles, and barriers can be found on some or all of the roadways connecting to the project site. Existing gaps and obstacles along the connecting roadways impact convenient and continuous access for pedestrian and present safety concerns in those locations where appropriate pedestrian infrastructure would address potential conflict points.

- *Silverado Trail* – Continuous sidewalk coverage is provided on the south side of Silverado Trail between Brannan Street and approximately 600 feet east of Rosedale Road. Sidewalks are not provided on the north side of the street or elsewhere on Silverado Trail. Curb ramps are provided on the southeast corner of Silverado Trail and Brannan Street, but are not provided elsewhere. There are no crosswalks on this road segment, nor are there any street lights.





- *Brannan Street* – Continuous sidewalks are provided on the east side of Brannon Street along the entire stretch between Silverado Trail and SR 29 and on the west side of the street between Champagne North and SR 29. Sidewalks are not provided on the west side of the street between Silverado Trail and Champagne North. Curb ramps are provided along areas with sidewalks but there are no crosswalks. Lighting is provided by overhead street lights.
- *Rosedale Road* – No sidewalks or other pedestrian amenities are provided on Rosedale Road. In general, Rosedale Road is a narrow rural road that provides access to residences and vineyards on the north side of Silverado Trail. Sidewalk and street lights are generally not provided along this type of rural road.

### Bicycle Facilities

The *Highway Design Manual*, California Department of Transportation (Caltrans), 2006, 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, Class II bike lanes exist on Silverado Trail along the entire project frontage and connect to the west to Calistoga's Downtown via Class III bike routes on Lake Street and to the east to the City of Napa approximately 26 miles south on Silverado Trail. Bicyclists ride in the roadway and/or on sidewalks along all other streets within the project study area.

## Operational Analysis

---

### Project Description

The proposed project involves the expansion from the existing 20 one-bedroom visitor units to 85 one-bedroom visitor units and 21 residences as well as an increase in the winery's annual production from 5,000 cases to 10,000 cases. In addition, special events are to be held at both the winery and resort; the winery proposes to host 30 special events annually, while seven are proposed for the resort. The project includes use of an existing 160-seat restaurant, which is approved and built, but not currently operational. Further, a new 150-seat restaurant, which includes a culinary center for resort visitors, will also be constructed. The current spa facilities are proposed to be expanded to include 12 individual treatment rooms and fitness facilities with a total of 8,800 square feet. The existing two-bedroom manager's residence and four-bedroom single family dwelling will be eliminated.

The proposed project site plan is shown in Figure 2.

### Trip Generation

For purposes of estimating the number of trips that the existing, approved and proposed components of the Silver Rose Winery and Resort are generating, *Trip Generation*, 8<sup>th</sup> Edition, Institute of Transportation Engineers (ITE), 2008, was used. This publication is a standard reference used by jurisdictions throughout the country, and is based on actual trip generation studies performed at numerous locations in areas of various populations. Hotel (ITE LU #310) rates were used for both the existing one-bedroom visitor units and the proposed visitor units; this rate also accounts for anticipated special events to be held at the resort. The description for hotels, which follows, most closely describes the existing and proposed visitor units and this land use would account for the existing and proposed conference rooms and other visitor-serving facilities.

*"Hotels are places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (pool, fitness room) and/or other retail and service shops."*

The existing and proposed spa facilities were evaluated using rates for a Health Club (ITE LU #492). The existing two-bedroom manager's residence, four-bedroom single family dwelling, and the proposed 21 residences were evaluated based on rates for a Single Family Detached House (ITE LU #210), while the approved, yet unoccupied 160-seat restaurant and proposed 150-seat restaurant were both evaluated using rates for a Quality Restaurant (ITE LU #931).

While trips associated with the conference rooms were not evaluated separately but were assumed to exist as part of the hotel trip generation, trips for the spa facilities and restaurant, which are often also part of hotels, were conservatively estimated separately due to the relatively small size of the project. A deduction was then applied to account for internal capture, or trips to these uses associated with guests of the hotel. Internal capture rates of 15 and 50 percent were applied to the approved 160-seat restaurant and the proposed 150-seat restaurant respectively based on the approximate ratio between the number of existing (20) and proposed (85) visitor units and the number of seats in the restaurant. A 50 percent internal capture deduction was also applied to trips associated with the health club.

There are no standard trip generation rates for wineries; however, W-Trans has developed a spreadsheet that covers all aspects of operation and determines trips associated with activities such as arrival of materials (fruit, barrels, etc.), shipping of products, and disposal of pomace, as well as trips made by employees, visitors and special event guests. Using data supplied by the applicant, trip estimates for the Silver Rose Winery expansion were developed, including winery-related special events.



As proposed, the Silver Rose Winery will expand from a 5,000 case winery to 10,000 cases annually, with all other aspects of the winery expected to remain the same since the vineyard and the tasting room already exist. The applicant expects that any increase in daily visitors will be associated with guests of the resort, and a total of 30 annual special events will be added as part of the resort development. Wine production activities will include receiving and crushing fruit, fermenting, barrel aging, blending and bottling wine for storage off site. Currently, the winery has a total of four full-time employees for daily operations and four for the tasting room during typical weekday operation; after expansion, one additional employee will be hired for winery operations. Other traffic associated with the proposed project was assumed to include an average of 45 visitors per day (a maximum of 65 on peak days) based on current levels. With expanded operations it is expected that on average less than one truck trip per weekday will be generated by the project. Though it is anticipated that one truck would generate both an inbound and outbound trip at the site about once every six days, for a conservative analysis it was assumed that one truck trip would be made on a daily basis with current winery operations. It should be noted that truck trip activities include production-related traffic, the mobile bottling line, deliveries and pomace removal. During harvest season, two additional employees would be expected to generate six more daily trips.

It was assumed that 75 percent of employees would generate a trip during the p.m. peak hour and one trip per employee would be generated during the weekend midday peak for a lunch trip (half of the employees leaving and returning during the same hour). Data collected at a Sonoma County Winery was used to develop factors for winery tasting room trips made during both the p.m. and weekend midday peak hour. These winery driveway counts were collected one week every month for a year and indicate that 10 percent of the daily generated winery trips occur during the p.m. peak hour and 13 percent during the weekend midday peak.

The likely trip generation of the proposed project is shown in Table I, and includes an average of 1,390 daily trips, including 127 trips during the p.m. peak hour and 157 during the weekend midday peak hour. Compared to the existing use, the project would generate an additional 1,163 daily trips, with 97 during the p.m. peak hour and 122 new trips during the weekend midday peak hour. With the planned winery expansion it is expected that truck traffic will stay at virtually the same levels as before the expansion with less than one truck trip per weekday. The new trips generated by the winery will be associated with the expected increase in tasting visitors, which is also summarized in Table I.

**Table I  
Trip Generation Summary**

Land Use	Units	Daily		PM Peak Hour				Weekend MD Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
<b>Existing</b>											
Hotel	20 occ rm	8.92	120	0.70	14	7	7	0.87	17	9	8
Health Club	1.23 ksf	32.97	37	3.53	4	2	2	2.78	3	2	1
<i>Internal Capture</i>	<i>-50%</i>		<i>-18</i>	<i>-50%</i>	<i>-2</i>	<i>-1</i>	<i>-1</i>	<i>-50%</i>	<i>-2</i>	<i>-1</i>	<i>-1</i>
Single Family	2 du	9.57	19	1.01	2	1	1	0.94	2	1	1
Winery	5,000 cases										
<i>Employees</i>	<i>10*</i>	3	30	0.75	8	1	7	1.00	10	5	5
<i>Truck Traffic</i>	<i>n/a</i>	<i>n/a</i>	<i>&lt;1*</i>	0.00	0	0	0	0.00	0	0	0
<i>Tasting Room Visitors</i>	45	0.80	36	0.08	4	2	2	0.10	5	2	3
<b>Total Existing Trips</b>			<b>225</b>		<b>30</b>	<b>12</b>	<b>18</b>		<b>35</b>	<b>18</b>	<b>17</b>
<b>Approved Conditions</b>											
Restaurant	160 seats	2.86	458	0.26	42	28	14	0.33	53	31	22
<i>Internal Capture</i>	<i>-15%</i>		<i>-69</i>	<i>-15%</i>	<i>-6</i>	<i>-4</i>	<i>-2</i>	<i>-15%</i>	<i>-8</i>	<i>-5</i>	<i>-3</i>
<b>Total Approved Trips</b>			<b>389</b>		<b>36</b>	<b>24</b>	<b>12</b>		<b>45</b>	<b>26</b>	<b>19</b>
<b>Proposed</b>											
Hotel	85 occ rm	8.92	758	0.70	60	29	31	.87	74	37	37
Health Club	8.8 ksf	32.97	290	3.53	31	18	13	4.86	43	19	24
<i>Internal Capture</i>	<i>-50%</i>		<i>-145</i>	<i>-50%</i>	<i>-16</i>	<i>-9</i>	<i>-7</i>	<i>-50%</i>	<i>-21</i>	<i>-10</i>	<i>-11</i>
Single Family	21 du	9.57	201	1.01	21	13	8	0.94	20	10	10
Restaurant	150 seats	2.86	429	0.26	39	26	13	0.33	50	29	21
<i>Internal Capture</i>	<i>-50%</i>		<i>-215</i>	<i>-50%</i>	<i>-20</i>	<i>-13</i>	<i>-7</i>	<i>-50%</i>	<i>-25</i>	<i>-15</i>	<i>-10</i>
Winery	10,000 cases										
<i>Employees</i>	<i>11*</i>	3	33	0.75	8	1	7	1.00	11	5	6
<i>Truck Traffic</i>	<i>n/a</i>	<i>n/a</i>	<i>&lt;1**</i>	0.00	0	0	0	0.00	0	0	0
<i>Tasting Room Visitors</i>	48	0.80	38	0.08	4	2	2	0.10	5	2	3
<b>Total Proposed Project Trips</b>			<b>1,390</b>		<b>127</b>	<b>67</b>	<b>60</b>		<b>157</b>	<b>77</b>	<b>80</b>
Existing Trips			225		30	12	18		35	18	17
Existing plus Approved Trips			614		66	36	30		80	44	36
<b>Net New Project Trips</b>			<b>1,165</b>		<b>97</b>	<b>55</b>	<b>42</b>		<b>122</b>	<b>59</b>	<b>63</b>

Note: ksf = 1,000 square feet; du = dwelling units; occ rm=occupied rooms;  
\* Includes two vineyard workers\*\* Averaged to one daily truck trip per day

Note that while agricultural trips and event traffic are not shown in Table I, they are included in the Winery Trip Generation Form, as is harvest period information. While events add about 25 to 40 trips during a single hour before and after the event, once the 30 events proposed annually are averaged out

over the course of a year, they add only four trips to the daily volume, so have a minimal impact on daily operations. A copy of the Winery Trip Generation form is provided in Appendix A.

### **Trip Distribution**

The pattern used to allocate new project trips to the street network was based on data from traffic counts conducted on November 16, 2011. Project trips were distributed onto Silverado Trail with 65 percent traveling towards Calistoga, and of these trips, 30 percent were assumed to travel along Brannan Street. Based on this assumed distribution pattern, the project would be expected to add 12 left-turns from Silverado Trail to Brannon Street during the p.m. peak hour.

Few, if any, project generated trips would be expected to travel on Rosedale Road east of the project site. Though it is possible to use Rosedale Road and Pickett Road to access eastbound Silverado Trail, it was assumed that drivers would take the more direct route through the site to driveways on Silverado Trail, while westbound trips would be through the site or via the intersection of Rosedale Road and Silverado Trail.

### **Access Analysis**

#### Left-Turn Lane Warrants

The need for a left-turn lane on Silverado Trail at Brannan Street 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 in order to determine the need for a left-turn pocket based on safety issues. Based on our research and discussions with Caltrans staff, this methodology is consistent with the “Guidelines for Reconstruction of Intersections,” August 1985, which is referenced in Section 405.2, Left-turn Channelization, of Caltrans’ *Highway Design Manual*.

Since the intersection is under the County of Napa’s jurisdiction, the left-turn lane warrants used by the County were also considered, but since this standard is specifically noted as being for left-turns into a proposed use via private roads and driveways, it was determined that it was not applicable to this analysis of a public intersection.

Future traffic volumes were developed based on information on the level of growth expected in the area from the Napa County General Plan Update EIR. These estimates show an estimated 201 percent growth between 2011 and 2030. These high estimates of growth are primarily due to Silverado Trail’s nature as it being a parallel route to SR 29, a state highway with traffic volumes nearing its capacity. With this information along with data from traffic counts conducted on November 16, 2011, future traffic volumes were developed for use in further analyses.

Using the NCHRP methodology, under both existing and existing plus project conditions, a left-turn lane is not warranted on Silverado Trail at Brannan Street during the p.m. peak hour. However, under future volumes, which are assumed to include the project given the high increase expected, a left-turn lane will be warranted on Silverado Trail at Brannan Street during the p.m. peak hour. Even assuming a modest growth of 1.5 percent per year, this left-turn lane will be warranted in the future during the p.m. peak hour.

## Left-turn Lane Design Requirements

The design requirements for the left-turn lane on Silverado Trail were based on design criteria provided by the American Association of State Highway and Transportation Officials (AASHTO). The design of the lane consists of three components, the storage portion of the lane, the bay taper and the transition, which allows drivers to move laterally to outside the turn lane.

- **Storage Needs** – The estimated queue in the left-turn pocket is four vehicles, or 100 feet.
- **Deceleration** – Guidance for deceleration lengths is provided both in the Caltrans *Highway Design Manual* and AASHTO's *Geometric Design of Highways and Streets*. Deceleration distances for a 45 mph design speed are 375 feet and 340 feet respectively.

These Caltrans and AASHTO documents also provide guidance related to where deceleration can take place:

- *Highway Design Manual* (Section 405.3(2)c), Deceleration Lane Length: “Where partial deceleration is permitted on the through lane because of limited right-of-way or other constraints, average running speeds in Table 405.2B may be reduced 10 to 20 mph for a lower entry speed.”
- *Geometric Design of Highways and Streets*, Page 718, Deceleration Length: “On many urban facilities, it is not practical to provide full length of auxiliary lane for deceleration... Inclusion of the taper length as part of the deceleration distance for an auxiliary lane assumes that an approaching turning vehicle can decelerate comfortably up to 10 mph in a through lane before entering the auxiliary lane.”

It is appropriate to assume some deceleration in the through travel lane and in the taper. Under the majority of conditions, the westbound traffic is not stopped and there is no queue building for the westbound left-turn movement. The deceleration parameters suggested include a taper based on deceleration to 25 mph in the travel lane, with the remainder of the deceleration in the left-turn lane. A turn pocket length of 235 feet is needed together with the 60-foot bay taper. The total length of the section to be widened would depend on whether the road was widened to one side or both, though it was assumed that widening would be to both sides and that an 11-foot turn pocket would be adequate.

## Proportional Share

Based on these design parameters as well as the existing and projected future volumes, the project's proportional share was calculated. It was determined that the project will add 13.9 percent of the p.m. peak hour traffic that will contribute to the need for the turn pocket. Based on the design assumptions indicated above, the proportional share of the cost is estimated at \$85,857.

Copies of the spreadsheets detailing the turn lane warrant analysis, design criteria, and proportional share calculation are provided in Appendix A.

*Finding:* A left-turn lane is expected to be warranted on Silverado Trail at Brannan Street under projected Future volumes, without or with the project.

*Recommendation:* The project applicant should contribute a proportional share of 13.9 percent toward the cost of funding these future improvements, estimated as \$85,857.

## Access and Circulation

---

### Site Access

Access to the project will be provided via four driveways, including two each on Rosedale Road and Silverado Trail. As proposed, two new driveways will be constructed on Rosedale Road in place of the three existing driveways, and two new driveways are planned on Silverado Trail in place of a single existing driveway.

On Rosedale Road, the western driveway will serve as a commercial access to the loading and unloading dock as well as the back of house entry, whereas the driveway to the east will serve the residential units in the northern section of the site. On Silverado Trail, the driveway to the west will serve as the primary resort access and the eastern driveway will serve the residential units in the southern section of the site.

The driveways as proposed are to be approximately 20 feet wide at the access point, which is adequate to accommodate two vehicles side by side when exiting the site.

### Left-Turn Lane Analysis

There is an existing eastbound left-turn lane for the winery driveway on Silverado Trail. As proposed, the driveway will be moved slightly to the east where it will be used as the main resort access. To maintain adequate access to the site, it is recommended that the left-turn lane be adjusted as necessary to serve the new driveway.

*Finding:* The existing left-turn lane serving the project site should be retained.

*Recommendation:* Silverado Trail should be widened as necessary to extend the left-turn pocket easterly to the proposed new driveway location.

### Sight Distance

At unsignalized intersections, 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 must be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic to radically alter their speed. Sight distance should be measured from a 3.5-foot height at the location of the driver on the minor road to a 4.25-foot object height in the center of the approaching lane of the major road. Set-back for the driver on the crossroad shall be a minimum of 15 feet, measured from the edge of the traveled way.

Sight distances along Silverado Trail and Rosedale Road at the project driveways 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 either a private road or a driveway are based on stopping sight distance set according to approach travel speeds. For Silverado Trail, a road with a speed limit of 45 mph, the stopping sight distance for a private road or a rural driveway is 360 feet, while the minimum sight distance recommended for Rosedale Road is 150 feet based on a design speed of 25 mph.

Sight distances at the proposed driveway locations were evaluated based on existing conditions and the proposed driveway locations. Given the straight, flat alignment of Silverado Trail in the vicinity of the project site, sight lines are considerably greater than the 360 feet recommended, so are more than adequate. Similarly, the easterly driveway on Rosedale Road will have sight lines in excess of the



minimum recommended. Existing vegetation near the location of the westerly driveway restricts sight lines to less than 150 feet, so the landscaping plans for the project will need to take this into account, with removal of vegetation as necessary to achieve adequate sight lines.

*Finding:* Adequate lines of sight are available at the driveway locations on Silverado Trail and the easterly driveway on Rosedale Road, but not the westerly driveway on Rosedale Road.

*Recommendation:* To achieve or maintain adequate sight lines, the applicant should ensure that any existing vegetation or planned plantings near driveways is low-lying and that tree canopies are seven feet high or higher. Existing vegetation near the westerly driveway on Rosedale Road shall be removed if necessary to achieve adequate sight lines.

### Potential Conflicts

The potential for conflict with traffic entering and exiting the driveway to the Brian Arden Winery was also considered. The site's driveway on the north side of Silverado Trail is proposed to be located at least 100 feet west of the existing winery driveway, which is on the south side of the road. Given the direction of the offsets, even if there were a center turn lane, there would not be a conflict between drivers coming in opposite directions and using the center turn lane. The only potential for conflict would be between drivers exiting both sites simultaneously and making left-turns. Given the flat and straight alignment, as well as the relatively low volumes experienced on both driveways, the potential for there to be simultaneous outbound left-turns is fairly low, but even if they occur, there is plenty of visibility and they will be turning into opposing lanes, so there is little potential for conflict.

### On-Site Circulation

The site plan provided indicates that the proposed project includes a roadway forming a ring around the resort and connecting the underground parking lot to the main resort access. The eastern part of the roadway is proposed as a 20-foot wide fire access lane accessible by private automobile, while the western portion of the ring will be a 14-foot wide lane, designed for use by emergency vehicles, but primarily for use by hotel guests and home owners in golf carts, on bicycles or walking.

Although roadways 14 feet wide may be suitable for normal use by pedestrians, bicyclists, and golf carts, the applicant will need to obtain the approval from the Fire Department to designate this for use by emergency vehicles.

*Finding:* On-site circulation is expected to operate adequately, with multiple options for drivers to enter and exit the site. The 14-foot path proposed for emergency vehicle access does not meet the City's code, so will need to be approved by the Fire Department.

*Recommendation:* The applicant should either widen the emergency vehicle access route to 20 feet or obtain concurrence from the Fire Department that the proposed 14-foot path is adequate.

## Alternative Modes

---

### Alternative Modes

#### Pedestrian Facilities

Given the proximity of downtown Calistoga and other wineries and resorts near the site, it is reasonable to assume that some project patrons and employees will want to walk and/or bicycle to and from the Silver Rose Winery.

*Finding:* While pathways are proposed that connect buildings within the site, there do not appear to be pedestrian connections from the resort's guest rooms and main buildings to Silverado Trail where pedestrians can cross to the existing sidewalk on the southerly side of Silverado Trail.

*Recommendation:* It is recommended that pedestrian facilities be provided within the project site such that nearby attractions are easily accessible by pedestrians.

#### Bicycle Facilities

Existing bicycle facilities, including bike lanes on Silverado Trail, together with shared use of minor streets provide adequate access for bicyclists, though facilities are also needed for storage once the cyclist is on-site.

*Finding:* Adequate bicycle facilities exist to serve site patrons, but bike racks need to be provided for on-site storage.

*Recommendation:* Bike racks should be provided at the restaurant, winery, and other public destinations.

## Parking

---

The project site as proposed will provide a total of 153 standard parking spaces for the non-residents and 42 for residents. The non-residential parking is a shared parking lot for the hotel, winery, spa facilities and the restaurant, and includes 104 underground parking spaces beneath the hotel core and 49 surface parking spaces in the olive grove that runs parallel to Silverado Trail. These totals do not include the overflow parking spaces proposed in the olive grove.

City parking supply requirements are based on the City of Calistoga Municipal Code, Chapter 17.36: Off-Street Parking and Loading. Parking supply requirements for the residential portion of the project is two spaces per dwelling unit. With 42 standard parking spaces proposed for the 21 residential units, this requirement is met.

A parking supply analysis for the non-residential uses was conducted using the application of *Shared Parking*, Urban Land Institute (ULI).

### Shared Parking

The shared parking analysis methodology provides a systematic way to account for the temporal nature of peak parking demands of different land uses. It is reasonable to assume that different types of land uses achieve their peak parking demand at different times of the day. Parking demand information as a function of time was obtained from the *Parking Generation*, 4<sup>th</sup> Edition, ITE. Since there are no standard rates for wineries, parking accumulation data for wineries obtained for previous work was applied.

According to the City of Calistoga's Municipal Code, restaurants are required to supply one parking space per 100 square feet of floor space and spa/resorts need one parking space per 400 square feet of floor space. Since the project description includes only the number of seats for the restaurant, it was assumed to have a size of approximately 6,500 square feet, though the internal capture rate of 50 percent was again applied to account for resort guests. ITE *Parking Generation* rates were assumed for hotels, a land use with no set standard per the City of Calistoga's Municipal Code.

Based on the analysis performed, it is anticipated that the project will have a peak demand for 148 standard parking spaces in the supply shared among the non-residential land uses between 7:00 and 8:00 p.m. on weekdays. The 153 standard parking spaces proposed are adequate to meet this anticipated peak demand.

The parking demand and temporal distribution are indicated in a spreadsheet provided in Appendix A.

Consideration was also given to the parking demand which would occur during a special event during the evening. According to the project narrative, events are expected to be primarily of two varieties: weddings and meetings/corporate events. Attendance at the weddings is estimated to be approximately 75 to 100 guests and most of these guests are expected to also stay at the hotel, so they will be using the parking that is allocated to the hotel. Attendance at meetings or corporate events is expected to be 20 to 25 persons, and these events would typically occur during the daytime hours when the restaurant is closed, leaving substantial parking available for these events. If, however, the event extends into the evening hours which are the period of peak demand for parking, the supply could be accommodated by the seven parking spaces in excess of the projected peak, assuming that the event would limit the capacity for additional diners in the restaurant.

## Conclusions and Recommendations

---

### Conclusions

- The proposed project is expected to generate an average of 1,390 trips per day, with approximately 127 trips occurring in the p.m. peak hour and 157 trips occurring in the weekend midday peak hour.
- Under future volumes, a westbound left-turn lane will be warranted at Silverado Trail and Brannan Street without or with the project.
- Site access is expected to operate acceptably, though sight distance from the westerly driveway on Rosedale Road may be inadequate unless some existing landscaping is removed.
- Circulation through the site is expected to be adequate.
- The proposed project provides adequate facilities for alternative modes on-site, but does not appear to provide sufficient connections to pedestrians to nearby destinations.
- The parking supply as proposed is expected to be adequate to meet the peak parking demand of the project, even during special events that occur in the evening.

### Recommendations

- The project applicant should contribute a proportional share toward the future construction of a left-turn pocket on Silverado Trail at Brannan Street, estimated at 13.9 percent, or \$85,857.
- Existing vegetation to be removed and planned landscaping to be planted should be low-lying or clear to a height of seven feet to help achieve or maintain clear sight lines at driveways.
- Approval from the City Fire Department should be obtained if the 14 foot wide roadway is to be used for emergency vehicle access.
- Facilities supporting travel by alternative modes, including pathways to the road frontage and bicycle racks for bicycle parking, should be provided for those traveling to and from the project site by alternative modes.

## Study Participants and References

---

### Study Participants

Principal in Charge: Dalene J. Whitlock, PE, PTOE,  
Assistant Engineer: Sam Lam, EIT  
Technician/Graphics: Deborah J. Mizell  
Editing/Formatting: Angela McCoy

### References

*2007 Collision Data on California State Highways (road miles, travel, collisions, collision rates)*, California Department of Transportation, 2007  
*Calistoga Municipal Code*, Code Publishing Company, 2011  
*Highway Design Manual*, 6<sup>th</sup> Edition, California Department of Transportation, 2006  
*Intersection Channelization Design Guide*, National Cooperative Highway Research Program (NCHRP) Report No. 279, Transportation Research Board, 1985  
*Napa County General Plan*, County of Napa, 2009  
*Napa County Road and Street Standards*, County of Napa, August 9, 2011  
*Parking Generation*, 4<sup>th</sup> Edition, Institute of Transportation Engineers, 2010  
*A Policy on Geometric Design of Highways and Streets*, 6<sup>th</sup> Edition, American Association of State Highway and Transportation Officials, 2011  
*Shared Parking*, 2<sup>nd</sup> Edition, Urban Land Institute, 2005  
*Statewide Integrated Traffic Records System (SWITRS)*, California Highway Patrol, 2005-2010  
*Trip Generation*, 8<sup>th</sup> Edition, Institute of Transportation Engineers, 2008

CAL032





## Appendix A

---

### Calculations





**INTERSECTION COLLISION RATE CALCULATIONS**

**Silver Rose Winery and Resort**

**Intersection # 1:** Silverado Trail & Brannan Road  
**Date of Count:** Wednesday, November 16, 2011

**Number of Collisions:** 2  
**Number of Injuries:** 1  
**Number of Fatalities:** 0  
**ADT:** 8300  
**Start Date:** July 1, 2005  
**End Date:** June 30, 2010  
**Number of Years:** 5

**Intersection Type:** TEE  
**Control Type:** STOP & YIELD SIGNS  
**Area:** URBAN

$$\text{collision rate} = \frac{\text{NUMBER OF COLLISIONS} \times 1 \text{ MILLION}}{\text{ADT} \times 365 \text{ DAYS PER YEAR} \times \text{NUMBER OF YEARS}}$$

$$\text{collision rate} = \frac{2}{8,300} \times \frac{1,000,000}{365 \times 5}$$

	<b>Collision Rate</b>	<b>Fatality Rate</b>	<b>Injury Rate</b>
<b>Study Intersection</b>	<b>0.13 c/mve</b>	<b>0.0%</b>	<b>50.0%</b>
<b>Statewide Average*</b>	<b>0.14 c/mve</b>	<b>0.8%</b>	<b>42.4%</b>

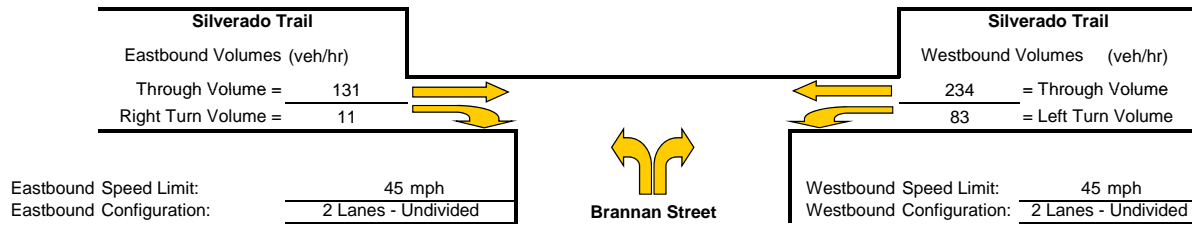
ADT = average daily total vehicles entering intersection  
 c/mve = collisions per million vehicles entering intersection  
 \* 2007 Collision Data on California State Highways, Caltrans

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Silverado Trail & Brannan Street  
 Study Scenario: PM Existing

Direction of Analysis Street: East/West

Cross Street Intersects: From the South



## Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**NOT WARRANTED - Less than 40 vehicles**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 142  
 If  $AV < Va$  then warrant is met -

**Right Turn Lane Warranted: NO**

## Eastbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

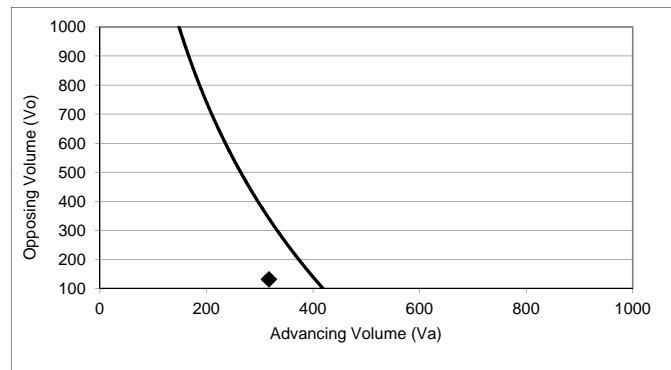
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 142  
 If  $AV < Va$  then warrant is met -

**Right Turn Taper Warranted: NO**

## Westbound Left Turn Lane Warrants

Percentage Left Turns %lt 26.2 %  
 Advancing Volume Threshold AV 404 veh/hr  
 If  $AV < Va$  then warrant is met



◆ Study Intersection  
 Two lane roadway warrant threshold for: 45 mph  
 Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

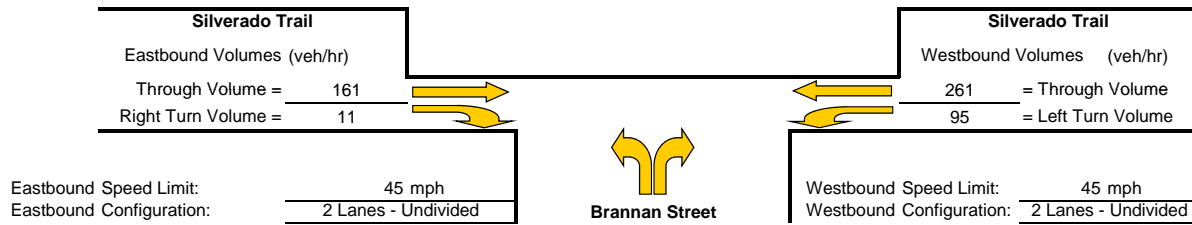
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink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

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Silverado Trail & Brannan Street  
 Study Scenario: PM Existing + Project

Direction of Analysis Street: East/West

Cross Street Intersects: From the South



## Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**NOT WARRANTED Less than 40 vehicles**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 172  
 If  $AV < Va$  then warrant is met -

**Right Turn Lane Warranted: NO**

## Eastbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

**NOT WARRANTED - Less than 20 vehicles**

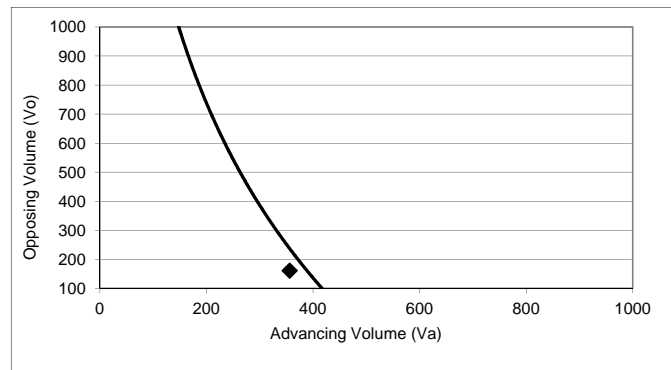
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold AV = -  
 Advancing Volume Va = 172  
 If  $AV < Va$  then warrant is met -

**Right Turn Taper Warranted: NO**

## Westbound Left Turn Lane Warrants

Percentage Left Turns %lt 26.7 %  
 Advancing Volume Threshold AV 388 veh/hr  
 If  $AV < Va$  then warrant is met



◆ Study Intersection  
 Two lane roadway warrant threshold for: 45 mph  
 Turn lane warranted if point falls to right of warrant threshold line

**Left Turn Lane Warranted: NO**

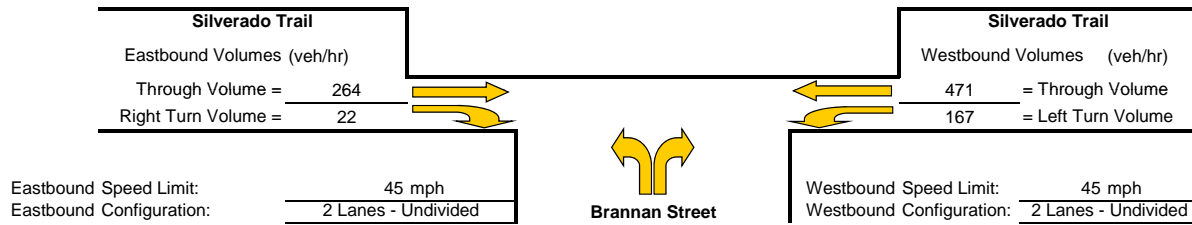
Methodology based on Washington State Transportation Center Research Report *Method For Prioritizing Intersection Improvements*, January 1997.  
 The right turn lane and taper analysis is based on work conducted by Cottrell in 1981.  
 The left turn lane analysis is based on work conducted by M.D. Harmelink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

# Turn Lane Warrant Analysis - Tee Intersections

Study Intersection: Silverado Trail & Brannan Street  
 Study Scenario: PM Future

Direction of Analysis Street: East/West

Cross Street Intersects: From the South



## Eastbound Right Turn Lane Warrants

1. Check for right turn volume criteria

**NOT WARRANTED Less than 40 vehicles**

2. Check advance volume threshold criteria for turn lane

Advancing Volume Threshold	AV =	-
Advancing Volume	Va =	286
If $AV < Va$ then warrant is met		

**Right Turn Lane Warranted: NO**

## Eastbound Right Turn Taper Warrants

(evaluate if right turn lane is unwarranted)

1. Check taper volume criteria

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

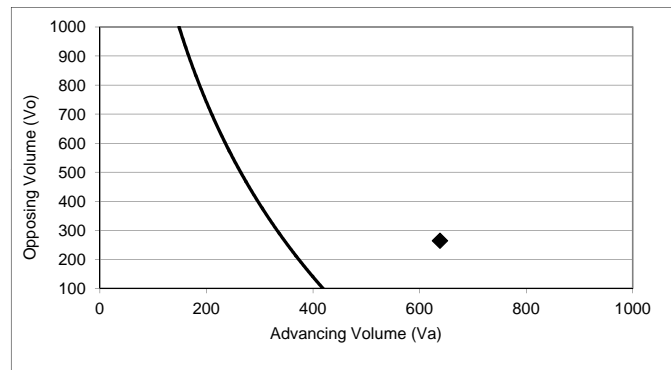
2. Check advance volume threshold criteria for taper

Advancing Volume Threshold	AV =	480
Advancing Volume	Va =	286
If $AV < Va$ then warrant is met		

**Right Turn Taper Warranted: NO**

## Westbound Left Turn Lane Warrants

Percentage Left Turns %lt	26.2 %
Advancing Volume Threshold AV	346 veh/hr
If $AV < Va$ then warrant is met	



◆ Study Intersection  
 Two lane roadway warrant threshold for: 45 mph  
 Turn lane warranted if point falls to right of warrant threshold line

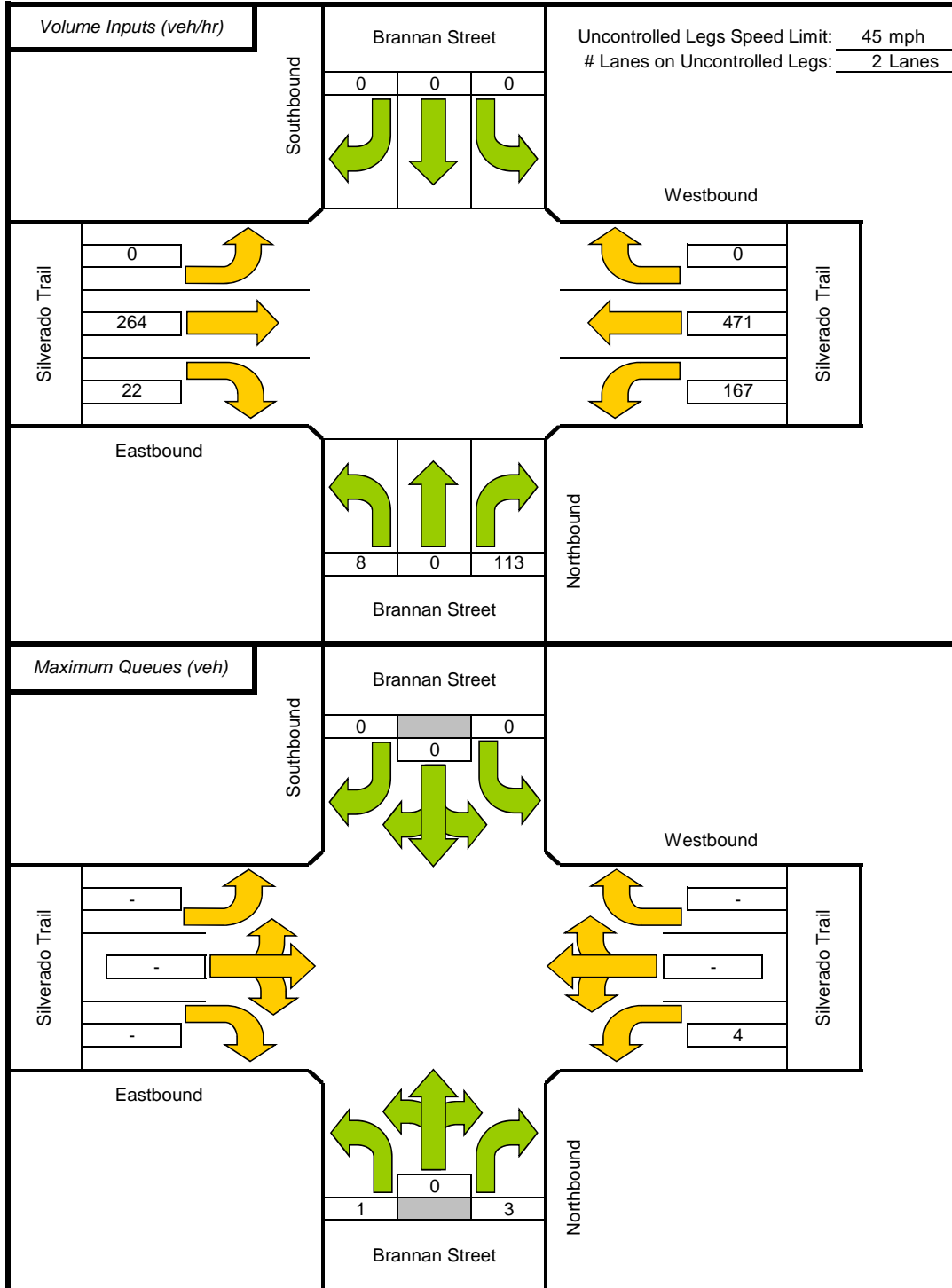
**Left Turn Lane Warranted: YES**

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.

## Maximum Queue Length Two-Way Stop-Controlled Intersections

Through Street: Silverado Trail  
Side Street: Brannan Street

Scenario: PM Future  
Stop Controlled Legs: North/South



Source: John T. Gard, ITE Journal, November 2001, "Estimating Maximum Queue Length at Unsignalized Intersections"

# Left Turn Channelization Dimensions

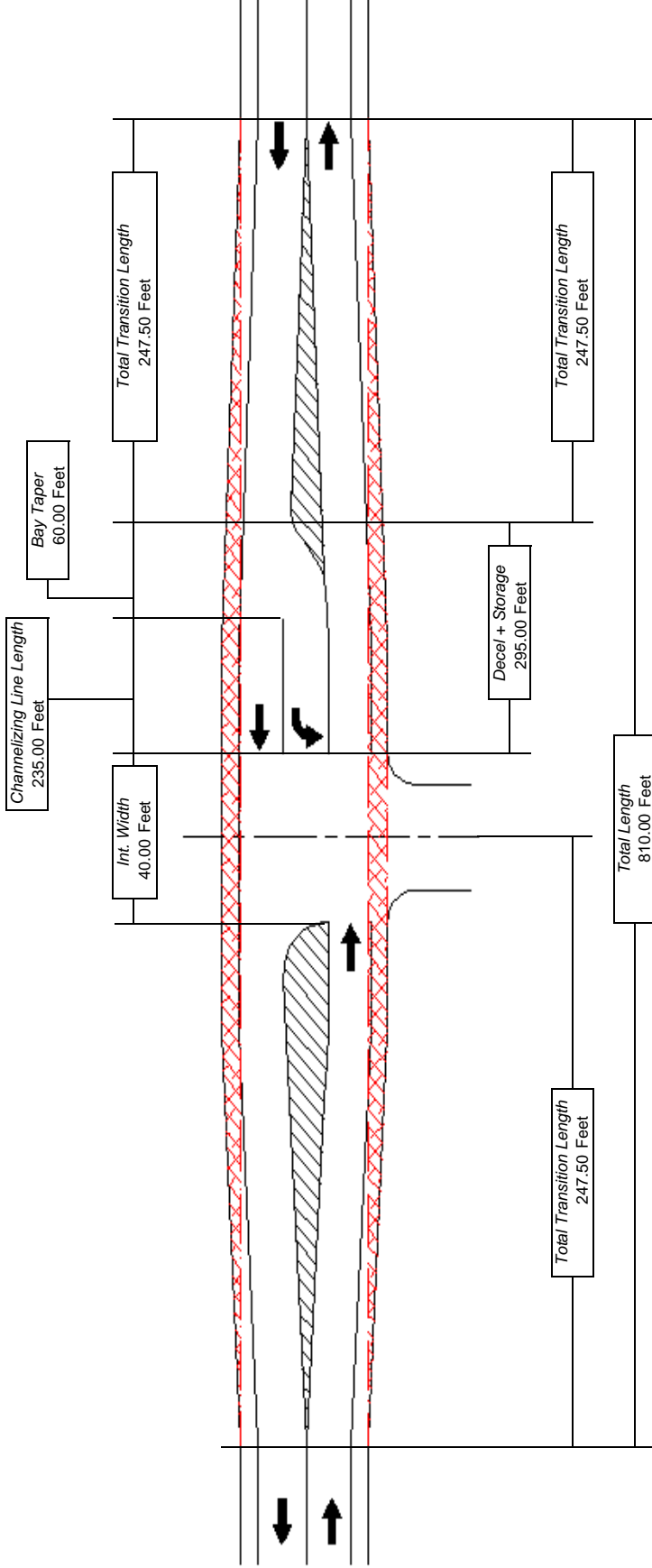
3 Leg Intersection - Widening on Both Sides for Rural, Semi-Rural and High Speed/Volume Urban Areas

Project Name: **Silver Rose Winery TIS**

Location: **City of Calistoga - Silverado Trail and Brannan Street**

Design Speed:	45 mph
Turn Pocket Width:	11.0 feet
Design Queue:	4 veh
Decelerate From:	25 mph
Intersection Width: (Stopline to Stopline)	40 feet
Bay Taper Length =	60 feet

Stacking Length =	100 feet
Deceleration =	195 feet
Transition =	248 feet
Total Length of Widening =	810 feet
Area Of Widening=	5624 sf



**Proportional Share Calculation  
Silver Rose Winery and Resort**

		<b>Total Volume Entering the Intersection of</b>	
		Silverado Trail/Brannan Street	
	<b>PM</b>		<b>PM</b>
		Existing	519
<b>Project Trips (T)</b>	73	Future Year	1045

**Calculation of Project Share**

$P = T / (TB - TE)$

where:

P = Equitable Share

T = Project trips during the affected peak hour

TB = Build-out volumes

TE = Existing volumes

T	73
TB	1045
TE	519
P	<b>13.9%</b>

Total Estimated Cost of Improvements      \$618,640

Equitable Share Contribution                      **\$85,857**

Equitable Share (per Caltrans "Guide for the Preparation of Traffic Impact Studies")

# Silver Rose Resort and Winery Parking Accumulation Analysis

## City of Calistoga, ITE, ULI and W-Trans Parking Rates

### Weekday Hourly Parking Demand Ratios

	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM
Restaurant	3.3	0	0.25	0.5	1	2	3	5	7	6	6	5	7	9	10	10	9	7	5
Hotel	85	1	0.96	0.9	0.87	0.82	0.77	0.77	0.75	0.73	0.7	0.71	0.7	0.74	0.75	0.79	0.85	0.87	0.97
Winery	9	0.07	0.34	0.59	0.84	0.95	0.95	0.95	1.00	1.00	0.95	0.45	0.25	0.18	0.18	0.11	0.07	0.05	0.07
Spa / Resort	8.8	1.14	1.14	1.14	1.48	2.91	2.74	2.39	2.68	2.17	2.34	3.48	4.79	5.19	5.70	2.85	0.00	0.00	0.00

### Weekday Parking Demand

	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM	9:00 PM	10:00 PM	11:00 PM	12:00 AM
Restaurant	3.3	0	1	2	7	10	16	23	20	20	16	23	29	33	33	33	29	23	16
Hotel	85	85	82	74	70	65	65	64	62	60	60	60	63	64	67	72	74	82	85
Winery	9	1	3	8	9	9	9	9	9	9	4	2	2	2	1	1	0	1	0
Spa/Resort	9	10	10	13	26	24	21	24	19	21	31	42	46	50	25	0	0	0	0
<b>Total</b>	<b>96</b>	<b>96</b>	<b>93</b>	<b>98</b>	<b>110</b>	<b>108</b>	<b>111</b>	<b>119</b>	<b>110</b>	<b>108</b>	<b>111</b>	<b>127</b>	<b>139</b>	<b>148</b>	<b>126</b>	<b>105</b>	<b>104</b>	<b>106</b>	<b>101</b>

**Maximum Demand: 148 spaces**