

Traffic Study



Traffic Impact Study for Sam Jasper Winery



Prepared for the County of Napa

Submitted by **W-Trans**

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- A Collision Rate Calculations
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Executive Summary

The Sam Jasper Winery project is a winery with a proposed 20,000 gallons of wine per year, ten employees, 25 daily visitors, and special events with up to 50 people. The project's anticipated trip generation includes 50 daily trips on average during a weekday, with 19 trips during the p.m. peak hour and 27 during the weekend midday peak hour.

The study area was established by the County and includes Silverado Trail abutting the project site, as well as between Oak Knoll Avenue to the north and Petra Drive and Soda Canyon Road to the south. Analysis indicates that the study segment is operating acceptably for some peak periods and unacceptably for other peak periods under Existing, Cumulative, and Future conditions both with and without project traffic added. The project volumes have a less-than-significant impact under all scenarios, including those where the study segment is operating unacceptably without project-added volumes, as the project-added volumes represent less than one percent of projected future volumes.

Vehicles will access the project via an existing driveway on Silverado Trail. A left-turn lane is warranted under Existing plus Project conditions, and is recommended as part of the project. Sight distance at the project driveway location for both entering and exiting drivers as well as for approaching drivers is adequate.

Although the project's traffic impacts are expected to be less-than-significant, the applicant should consider implementing a transportation demand management program to limit employee trips during peak traffic periods through shift changes, carpooling, and similar measures.



Introduction

Introduction

This report presents an analysis of the potential traffic impacts that would be associated with development of a proposed winery to be located at 4059 Silverado Trail in the County of Napa. The traffic study was completed in accordance with the criteria established by the County of Napa, and is consistent with standard traffic engineering techniques.

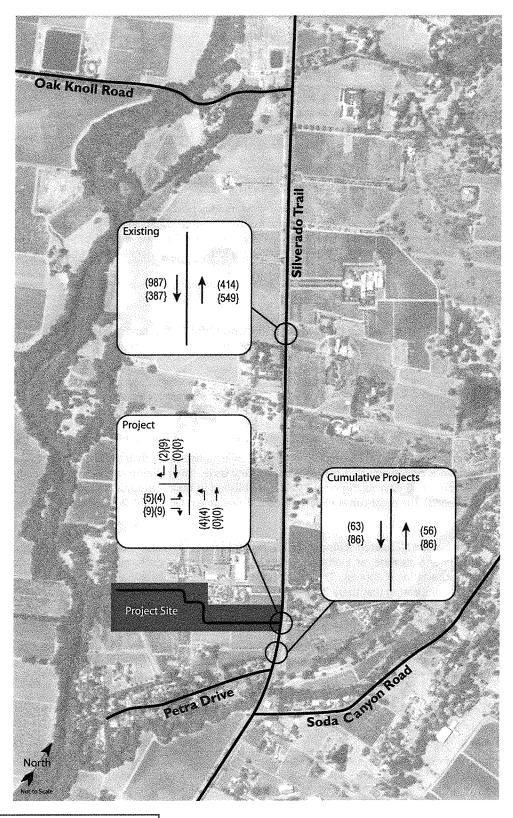
Prelude

The purpose of a traffic impact study is to provide 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 in order to mitigate these impacts to a level of insignificance as defined by the County'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 roadway segments.

Project Profile

The proposed project would include production of up to 20,000 gallons of wine annually and operation of a tasting room. Visitation to the tasting room would be by appointment-only and 23 special events per year are proposed. The project site is located at 4059 Silverado Trail, as shown in Figure 1.





LEGEND

(xx) P.M. Peak Hour Volume (xx) Weekend Midday Peak Hour Volume

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Transportation Setting

Operational Analysis

Study Area and Periods

The study area consists of the section of Silverado Trail providing access to the project site.

Operating conditions during the weekday p.m. and weekend midday peak periods were evaluated as these time periods reflect the highest traffic volumes areawide and for the proposed winery and tasting room. The 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 generally occurs between 11:00 a.m. and 1:00 p.m.

Study Roadway

Silverado Trail runs north-south through the study area, has one 12-foot travel lane in each direction, bike lanes, and a posted speed limit of 55 miles per hour (mph). Based on the *Napa County General Plan*, 2013, Silverado Trail is classified as a rural throughway.

The study area is shown in Figure 1.

Collision History

The collision history for the section of Silverado Trail one-half mile north and south of the project site was reviewed to determine any trends or patterns that may indicate a safety issue. The collision rate was 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 October 1, 2008, through September 30, 2013.

As presented in Table 1, the calculated collision rate for the study segment was compared to the average collision rate for similar facilities statewide, as indicated in 2012 Collision Data on California State Highways, California Department of Transportation (Caltrans). The calculated collision rate is substantially lower than the statewide average collision rate, indicating that there is unlikely to be a specific safety concern. It was noted that 10 of the 16 crashes involved southbound drivers, and of these, seven occurred during the evening peak period when the predominant commute pattern is southbound. The collision rate spreadsheet is provided in Appendix A.

Table 1 – Collision Rates for the	Study Segments		
Study Roadway Segments	Number of Collisions (2008-2013)	Calculated Collision Rate (c/mvm)	Statewide Average Collision Rate (c/mvm)
Silverado Trail near 4059	16	0.63	1.29

Note: c/mvm = collisions per million vehicles miles



Capacity Analysis

Roadway Segment Level of Service Methodology

The roadway segment Level of Service methodology found in Chapter 15, "Two-Lane Highways," of the *Highway Capacity Manual* is the basis of the automobile LOS analysis. The methodology considers traffic volumes, terrain, roadway cross-section, the proportion of heavy vehicles, and the availability of passing zones. The LOS criteria for two-lane highways differs depending on whether the highway is considered "Class I", "Class II", or "Class III". Class I highways are typically long-distance routes connecting major traffic generators or national highway networks where motorists expect to travel at high speeds. Motorists do not necessarily expect to travel at high speeds on Class II highways, which often function as scenic or recreational routes and typically serve shorter trips. Class III highways may be portions of Class I or Class II highways that pass through towns and communities and have a mix of local traffic and through traffic.

The measure of effectiveness by which Level of Service is determined on Class I and II highways is average travel speed (ATS) and percent time spent following (PTSF), or the proportion of time that drivers on the highway are limited in their speed by a driver in front of them. Class III highways are measured by percent of free-flow speed (PFFS), which represents the ability of vehicles to travel at or near the posted speed limit. Silverado Trail was defined as a Class II roadway for the purposes of this analysis. A summary of the ATS, PTSF, and PFFS breakpoints is shown in Table 2.

Table	Table 2 – Automobile Level of Service Criteria												
LOS	Class I Hi	ghways	Class III Highways										
	ATS (mi/h)	PTSF (%)	PTSF (%)	PFFS (%)									
Α	>55	≤35	≤40	>91.7									
В	>50-55	>35-50	>40-55	>83.3-91.7									
C	>45-50	>50-65	>55-70	>75.0-83.3									
D	>40-45	>65-80	>70-85	>66.7-75.0									
Ε	≤40	>80	≤85	≤66.7									

Notes: LOS = Level of Service; ATS = Average Travel Speed

PTSF = Percent Time Spent Following

PFFS = Percent of Free-Flow Speed

Reference: Highway Capacity Manual, Transportation Research Board, 2010

A point just south of the project driveway was chosen to represent segment volumes on Silverado Trail in the vicinity of the project site. Choosing a point just south of the project site captures more of the trips projected to be added to the roadway network due to Cumulative conditions and plus Project conditions because of the assumed trip distribution, resulting in a more conservative analysis.

Traffic Operation Standards

Policy CIR-13 in the *Napa County General Plan* states, "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 of the *Napa County General Plan* provides guidance for roadways, indicating that, "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. Silverado Trail is shown as a 2-lane Rural Collector on the Circulation Map (Figure CIR-1). A one-percent criteria for the threshold of significance is used for this analysis because it is well within the range of daily variation in traffic as well as the range of accuracy of travel demand forecast models and therefore not likely to be noticeable to drivers. While the traffic study relies on the County's LOS D standard, if operation falls below this threshold, an increase which is less than one-percent of cumulative volumes is considered less-than-significant.

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 does not include project-generated traffic volumes. Volume data was collected April 8 to April 12, 2015.

The existing traffic volumes on Silverado Trail are summarized in Table 3.

Table 3 – Existing Traffic Volume	15				
Study Segment	Wee	kday	Saturday		
	NB	SB	NB	SB	
Silverado Trail near 4059	414	987	549	387	

Notes: NB = Northbound; SB = Southbound

Roadway Segment Levels of Service

Under existing conditions, the roadway operates acceptably at LOS C or D or better northbound during both peak periods and southbound during the weekend midday peak period, but unacceptably at LOS E during the weekday p.m. peak hour in the southbound direction. A summary of the roadway segment level of service calculations is shown in Table 4, and copies of the Level of Service calculations are provided in Appendix B.

Table 4 – Existing Peak Hour I	Roadway S	egment	Levels of S	ervice					
Study Segment		Weekda	y PM Peak		Weekend Midday Peak				
	NB		SB		NB		SB		
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	
Silverado Trail near 4059	59.9%	С	89.7%	E	78.4%	D	63.1%	С	

Notes: NB = Northbound; SB = Southbound; PTSF = Percent Time Spent Following LOS = Level of Service; **Bold** text = deficient operation

Cumulative Conditions

Cumulative operating conditions were determined with trips generated by other approved and pending projects that would add traffic to the segment of Silverado Trail within four miles of Sam Jasper Winery added to existing volumes. As directed by County staff, the following projects were included to evaluate Cumulative Conditions.



- Krupp Winery 3150 Silverado Trail, approximately 0.6 miles south of the project site; new winery with an annual production of 50,000 gallons; six full-time employees and four part-time employees; maximum of 124 visitors per day; maximum of 125 guests at special events
- Melka Winery 2900 Silverado Trail, approximately 1.2 miles south of the project site; new winery with an annual production of 10,000 gallons; one full-time employee and one part-time employee; maximum of 7 visitors per day; maximum of 100 quests at special events
- Reynolds Winery 3720 Silverado Trail, approximately 0.4 miles south of the project site; use permit update
 to produce 20,000 additional gallons annually; 10 additional employees; maximum of 30 additional visitors
 per day; maximum of 125 guests at special events
- Davis Estates Winery 4060 Silverado Trail, approximately 0.1 miles north of the project site; use permit
 update to produce an additional 80,000 gallons annually; 10 additional employees; maximum of 190
 additional visitors per day; maximum of 200 guests at special events
- Mountain Peak Winery 3265 Soda Canyon Road, approximately 6.5 miles from the project site; new winery with an annual production of 100,000 gallons; 29 full-time employees and eight part-time employees; maximum of 80 visitors per day; maximum of 125 guests at special events (although this winery is more than four miles from the project site, it will add trips to the study segment via the lone connection to Soda Canyon Road)
- Stag's Leap Winery 5766 Silverado Trail, approximately 3.6 miles north of the project site; use permit update to have an additional 25 employees; maximum of 250 guests at special events
- Corona Winery 3165 Silverado Trail, approximately 0.4 miles south of the project site; new winery with an annual production of 100,000 gallons; 25 employees; maximum of 48 visitors per day; maximum of 125 guests at special events
- Beau Vigne Winery 4057 Silverado Trail, 300 feet south of the project site; use permit update to increase production to 14,000 gallons; three full-time employees and one part-time employee; maximum of 15 visitors per day; maximum of 30 guests at special events

The traffic volumes on the study segment under cumulative conditions are summarized in Table 5. Some visitors to Sam Jasper Winery would be expected to visit multiple wineries during their time in Napa Valley, including those wineries included in the list of approved projects.

Table 5 – Cumulative Traffic V	olumes				
Study Segment	Wee	kday	Saturday		
	NB	SB	NB	SB	
Silverado Trail near 4059	470	1,050	635	473	

Notes: NB = Northbound; SB = Southbound

Under cumulative conditions, Silverado Trail is expected to operate acceptably at LOS C or D northbound during both peak periods and southbound during the weekend midday peak period, but would continue to operate unacceptably at LOS E during the weekday p.m. peak hour in the southbound direction. These results are summarized in Table 6, and cumulative volumes are shown in Figure 1.



Table 6 – Cumulative Peak Hour Roadway Segment Levels of Service											
Study Segment		Weekda	y PM Peak		Weekend Midday Peak						
	NB		SB		NB		SB				
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS			
Silverado Trail near 4059	64.7%	С	90.7%	E	81.3%	D	68.7%	С			

Notes: NB = Northbound; SB = Southbound; PTSF = Percent Time Spent Following

LOS = Level of Service; **Bold** text = deficient operation

In keeping with Policies CIR-13 and CIR-16 of the Napa County General Plan, because it would require adding lanes to achieve a higher service level, the County would instead be expected to focus on improving access, especially at intersections of public roads, so no measures are recommended to achieve LOS D operation on Silverado Trail.

Future Conditions

Segment volumes for the horizon year of 2030 were obtained from the County's gravity demand model. Because the projected 2030 volumes for Silverado Trail near the project driveway are approximately equal to existing volumes from April 2015 and less than cumulative volumes, a growth factor of 2.15 was calculated based on 2010 and 2030 model volumes and applied to existing volumes to arrive at future volumes.

Table 7 shows the projected future traffic volumes on Silverado Trail near the project site achieved through application of the growth factor.

Table 7 – Future Traffic Volum	ies				
Study Segment	Wee	kday	Saturday		
	NB	SB	NB	SB	
Silverado Trail near 4059	890	2,122	1,180	832	

Notes: NB = Northbound; SB = Southbound

Under projected future volumes, the roadway study segment is expected to operate unacceptably at LOS E during the weekday p.m. peak in the southbound direction and during the weekend midday peak in the northbound direction and acceptably at LOS D during the weekday p.m. peak in the northbound direction and during the weekend midday peak in the southbound direction. As noted for Cumulative Conditions, capacity enhancements to achieve LOS D operation are not suggested. These results are summarized in Table 8.

Table 8 – Future Peak Hour R	oadway S	egment	Levels of	Service				
Study Segment	,	Neekday	/PM Peak		We	ekend N	Aidday Pe	ak ·
	NB		SB		N	В	SB	
	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
Silverado Trail near 4059	83.9%	D	100%	E	91.1%	E	82.2%	D

Notes: NB = Northbound; SB = Southbound; PTSF = Percent Time Spent Following LOS = Level of Service; **Bold** text = deficient operation



Project Description

The project consists of a 20,000 gallon winery with fewer than 10 employees, a maximum of 25 visitors per day, and 10 special events per year with 15 guests, 10 special events with 25 guests, and three special events with 50 guests. The proposed project site plan is shown in Figure 2.

Trip Generation

The anticipated trip generation for a proposed project is typically estimated using standard rates published by the Institute of Transportation Engineers (ITE) *in Trip Generation Manual*, 9th Edition, 2012. However, the publication contains no such information for a winery. Therefore, the County of Napa's Winery Traffic Information/Trip Generation Sheet was used to determine the anticipated traffic generated with the current staff as well as that would be generated by both production that is already permitted at the site and with the proposed tasting room. Copies of the worksheets are enclosed for reference.

Since the County of Napa's Winery Traffic Information/Trip Generation Sheet does not include guidance on inbound versus outbound trips, it was assumed that two-thirds of trip ends at the winery would be outbound during the weekday p.m. peak hour since most of the trips would be associated with employees and customers leaving at closure of the winery. For the Saturday midday peak hour it was assumed that inbound and outbound trip ends would be evenly split. The trip generation estimates for the proposed project are shown in Table 9 and the Trip Generation Sheet is included in Appendix C.

Table 9 – Trip Generation							
Trip Type	Daily	Week	day PN	Saturday Midday Peak			
	Trips	Trips	ln	Out	Trips	In	Out
Winery plus Tasting Room	50	19	6	13	27	13	14

Trip Distribution

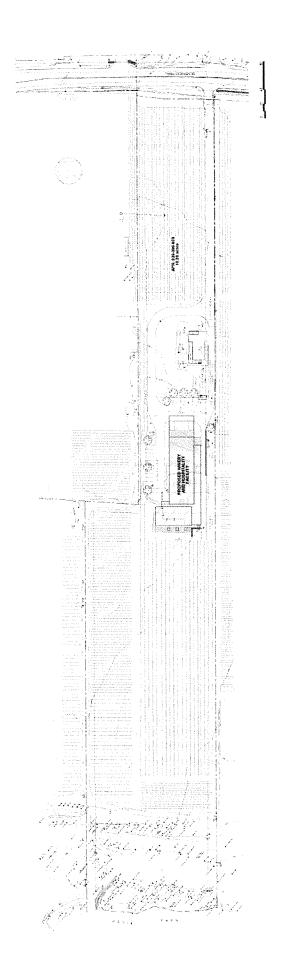
The pattern used to allocate new project trips to the street network was based on the directional split of the traffic volume during the p.m. peak period and weekend midday peak period. It was assumed 30 percent of projects trips would be to and from the north, while 70 percent of the project trips would be to and from the south.

Special Events

Three different sized wine marketing and agricultural promotion events are proposed as part of the project, including ten 15-person events, ten 25-person events, and three 50-person events. It was assumed that a maximum-sized 50-person event would require a staff of four in addition to any winery staff that would also assist with the event. Using an occupancy of 2.8 persons per vehicle for guests and solo occupancy for staff, a maximum-sized 50-person event would be expected to generate 44 trip ends at the driveway, including 22 inbound trips and 22 outbound trips. These events are proposed to take place between 11:00 a.m. to 10:00 p.m., with staff arriving an hour or more prior to the start of the event and leaving an hour or more after its conclusion. Guests would generate 18 trips for arrival and 18 for departure, with these trips generally occurring over an hour's time. Distributed evenly to the north and south, the maximum-sized special event would be expected to generate nine trips an hour on each of the segments of Silverado Trail to the north and south of the driveway. Given that these events are infrequent, are not part of typical daily operation, and often occur outside the peak period for traffic, together with the minimal increase in traffic associated with them, special event traffic was not included in the daily trip generation and resulting intersection operation analysis.



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Source: Hall & Bartley Architecture and Planning 3/15

Traffic Impact Study for Sam Jasper Winery

Figure 2 – Site Plan

Intersection Operation

Existing plus Project Conditions

The existing and existing plus project traffic volumes on this segment are summarized in Table 10.

	Existing	Conditions		Existing plus Project				
PM I	Peak	Weekend N	lidday Peak	PM I	Peak	Weekend Midday Peak		
NB	SB	NB	SB	NB	SB	NB	SB	
414	987	549	387	418	996	558	397	

Notes: NB = Northbound; SB = Southbound

Upon the addition of project-related traffic to the Existing volumes, the study segment is expected to continue to operate acceptably at LOS C or D northbound during both peak periods and unacceptably at LOS E during the weekday p.m. peak hour in the southbound direction during the weekday p.m. peak period. These results are summarized in Table 11. Project traffic volumes are shown in Figure 1.

Table 1	1 – B	kisting a	nd Ex	isting p	lus Pr	oject Pe	ak Ho	our Intei	sectio	on Level	s of Si	ervice o	n Silv	erado T	rail
**************************************	Existing Conditions							Existing plus Project							
	PM Peak Weekend Midday Peak						eak	PM Peak Weekend Midday				1idday F	Peak		
NE	3	SB	В		NB SB		3	NB		SB		NB		SB	
PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
59.9%	С	89.7%	E	78.4%	D	63.1%	С	60.2%	C	89.5%	E	77.9%	D	63.4%	C

Notes: NB = Northbound; SB = Southbound; PTSF = Percent Time Spent Following

LOS = Level of Service; **Bold** text = deficient operation

It is noted that the percent time spent following actually decreases in the southbound direction during the weekday p.m. peak hour and the northbound direction during the weekend midday peak period with project trips added. This result is counter-intuitive, but occurs occasionally when the flow is such that the added vehicles will theoretically have delays below the average, thereby reducing it. In practical terms, this result essentially indicates that the change would be imperceptible and drivers would not notice the minor increase in traffic.

Finding – The study segment is expected to continue operating at the same levels of service upon the addition of project-generated traffic to existing volumes. Because the project-added trips result in a reduction in the percent time spent following, or improved operation, the impact is considered less-than significant.

Cumulative plus Project Conditions

The cumulative and cumulative plus project traffic volumes on this segment are summarized in Table 12.



Table 12 - 0	Cumulative a	nd Cumulative	plus Project T	raffic Volun	nes near 405	9 Silverado Tra	ĭl .		
	Cumulati	ve Conditions		Cumulative plus Project					
PM	PM Peak Weekend Midday Peak		lidday Peak	PM	Peak	Weekend Midday Peak			
NB	SB	NB	SB	NB	SB	NB	SB		
470	1,050	635	473	475	1,059	644	483		

Notes: NB = Northbound; SB = Southbound

Upon the addition of project-related traffic to the Cumulative volumes, the study segment is expected to continue to operate unacceptably at LOS E in the southbound direction during the weekday p.m. peak hour. These results are summarized in Table 13. Cumulative traffic volumes are shown in Figure 1.

Table 1	3 – C	umulativ	re and	Cumul	ative	plus Pro	ject P	eak Ho	ur Int	ersectio	n LOS	on Silv	erado	Trail	
		Cumu	lative	Condit	ions					Cumul	ative	plus Pr	oject		
	PM	Peak		Week	end N	lidday F	Peak		PM	Peak		Week	end N	lidday F	eak
NE	3	SB	3	NE	3	SE	3	NE	3	SB	3	NE	3	SB	3
PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
64.7%	C	90.7%	E	81.3%	D	68.7%	C	65.0%	C	90.3%	E	81.9%	Đ	70.0%	С

Notes: LOS = Level of Service; PTSF = Percent Time Spent Following; **Bold** text = deficient operation

Finding – The study segment is expected to continue operating at the same levels of service upon the addition of project-generated traffic. Because the project-added trips translate to less than 1 percent of the total p.m. peak hour trips on Silverado Trail, the project's impact is considered less-than-significant.

Future plus Project Conditions

The future and future plus project traffic volumes on this segment are summarized in Table 14.

	Future (Conditions			Future p	lus Project		
PM	Peak	Weekend Mid		PM	Peak	Weekend M	eekend Midday Peak	
NB	SB	NB	SB	NB	SB	NB	SB	
890	2,122	1,180	832	894	2,131	1,189	842	

Notes: NB = Northbound; SB = Southbound

Upon the addition of project-related traffic to the Future volumes, the study segment is expected to continue operating unacceptably at LOS E during the weekday p.m. peak in the southbound direction and during the weekend midday peak in the northbound direction. These results are summarized in Table 15.



Table 1	5 - Fi	iture ar	rd Fut	ure plus	Proje	ct Peak	Hour	Interse	e ((0))	Levels	of Serv	ice on S	ilvera	do Trail	
		Fu	ture C	onditio	ns					Fut	ure pl	us Proje	ct		
	РМ	Peak		Week	end N	1idday F	eak		РМ	Peak		Week	end N	1idday F	Peak
NE	3	S	В	NE	3	SE	3	NE	3	SI	В	NE	3	SE	3
PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS	PTSF	LOS
83.9%	D	100%	E	91.1%	E	82.2%	D	84.0%	D	100%	E	91.1%	E	82.4%	D

Notes: LOS = Level of Service; PTSF = Percent Time Spent Following; **Bold** text = deficient operation

Finding – The study segment is expected to continue operating at the same levels of service upon the addition of project-generated traffic, with no change to the percent time spent following. Because the project-added trips do not change the measure of effectiveness and contribute less than 1 percent of the total projected future trips on Silverado Trail, the impact is considered less-than-significant.

Transportation Demand Management Program

Although the project is expected to have less-than-significant traffic impacts, to reduce the number of peak hour trips added to the roadway network and minimize impacts, the proposed project should consider promoting the use of carpooling as options for employees arriving at and leaving the project site.

Access and Circulation

Site Access

The project would be accessed via an existing driveway on Silverado Trail. The nearest driveway to the south is 280 feet away and the nearest driveway to the north is 250 feet away.

Sight Distance

At driveways a substantially clear line of sight should be maintained between the driver of a vehicle waiting on the driveway 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 driveway 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 driveway shall be a minimum of 15 feet, measured from the edge of the traveled way.

Sight distance along Silverado Trail at the project driveway was evaluated based on stopping sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The approach travel speed is used as the basis for determining the recommended sight distance. Additionally, the stopping sight distance needed for a following driver to stop if there is a vehicle waiting to turn into a side street or driveway is evaluated based on stopping sight distance criterion and the approach speed on the major street.

Sight distance at the project driveway was field measured. Although sight distance requirements are not technically applicable to urban driveways, the stopping sight distance criterion for private street intersections was applied for evaluation purposes. Based on a design speed of 55 mph, the minimum stopping sight distance needed is 500 feet. Sight distance to the north of the project driveway is 500 feet and sight distance to the south of the project driveway is to Soda Canyon Road, which is more than 900 feet away. Stopping sight distance exceeds 500 feet for a southbound driver following a vehicle that might slow or stop to turn left into the driveway.

Finding – Stopping sight distance at the project driveway is adequate to meet the applied criteria from the *Highway Design Manual* for both entering and exiting movements.

Access Analysis

Left-Turn Lane Warrants

The need for a left-turn lane on Silverado Trail at the project driveway was evaluated based on criteria contained in the *Napa County Road and Street Standards*, 2011. Based on the volumes obtained on Silverado Trail near the project driveway in April 2015, Silverado Trail has an average daily traffic (ADT) volume of 13,100 vehicles near the project driveway.

Using the County's criteria, for an average daily traffic volume of 13,120 vehicles on Silverado Trail, a left-turn lane is warranted if a project driveway has an ADT of 11 or more vehicles. The ADT at the project driveway is expected to be 50 trips daily. Based on these traffic levels, a left-turn lane is warranted at the project driveway. The left-turn lane warrant graph is provided in Appendix D.

Finding - A left turn lane is warranted at the project driveway and should be provided.



Conclusions and Recommendations

Conclusions

- The proposed project would be expected to generate an average of 50 daily trips, including 19 trips during the weekday p.m. peak hour and 27 trips during the weekend midday peak hour.
- A total of 23 special events are proposed, with the largest special event having 50 attendees and four employees; three such events are proposed annually. The remaining 20 events would have 15 to 25 attendees.
- Silverado Trail currently operates acceptably at LOS D or better northbound during both peak periods and southbound during the weekend midday peak period and unacceptably at LOS E in the southbound direction during the weekday p.m. peak hour.
- Acceptably LOS D or better operation on Silverado Trail is projected under Cumulative Conditions for the northbound direction during both peak periods and southbound during the weekend midday peak period. Unacceptable LOS E operation is projected in the southbound direction during the weekday p.m. peak hour.
- Under Future conditions, Silverado Trail is expected to operate unacceptably at LOS E during the weekday p.m. peak in the southbound direction and in the northbound direction during the weekend midday peak and acceptably at LOS D during the weekday p.m. peak in the northbound direction and in the southbound direction during the weekend midday peak.
- Because the project-added trips result in no change to the measures of effectiveness under most scenarios and contribute less than 1 percent of the total trips on Silverado Trail, the impact is considered less-thansignificant under Existing, Cumulative, and Future plus Project conditions.
- Sight distance at the project driveway is adequate to meet Highway Design Manual requirements in both directions as well as for following drivers.
- A left-turn lane is warranted on Silverado Trail at the project driveway.
- A Transportation Demand Management plan for the project is not currently proposed.

Recommendations

- A left-turn lane should be installed on Silverado Trail at the project driveway as part of the proposed project.
- The project applicant should consider developing a Transportation Demand Management plan for the project, including promoting carpooling for employees.



Study Participants and References

Study Participants

Principal in Charge

Dalene J. Whitlock, PE, PTOE

Assistant Engineer Technician/Graphics Editing/Formatting Lauren Davini, EIT Deborah J. Mizell Angela McCoy

References

2012 Collision Data on California State Highways, California Department of Transportation, 2012 Highway Capacity Manual, Transportation Research Board, 2010 Highway Design Manual, 6th Edition, California Department of Transportation, 2012 Napa County General Plan, County of Napa, 2013 Napa County Road and Street Standards, County of Napa, 2011 Statewide Integrated Traffic Records System (SWITRS), California Highway Patrol, 2008-2013 Trip Generation Manual, 9th Edition, Institute of Transportation Engineers, 2012

NAX091





Appendix A

Collision Rate Calculations

SEGMENT COLLISION RATE CALCULATIONS

Sam Jasper Winery

Location: 4059 Silverado Trail

Date of Count: Friday, April 10, 2015

ADT: 14,000

Number of Collisions: 16 Number of Injuries: 5 Number of Fatalities: 0

Start Date: October 1, 2008

End Date: September 30, 2013

Number of Years: 5

Highway Type: Conventional 2 lanes or less

Area: Urban Design Speed: >45

Segment Length: 1.0 miles
Direction: North/South

Number of Collisions x 1 Million

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

16 x 1,000,000 14,000 x 365 x 1 x 5

 Study Segment
 Collision Rate
 Fatality Rate
 Injury Rate

 Statewide Average*
 1.29 c/mvm
 1.0%
 31.3%

 41.2%
 1.0%
 41.2%

ADT = average daily traffic volume c/mvm = collisions per million vehicle miles * 2012 Collision Data on California State Highways, Caltrans

Appendix B

Intersection Level of Service Calculations

HCS 2010: Two-Lane Highways Release 6.70

bc/h

Percent Time-Spent-Following

(o)		mi mi mi/h	mi mi mi mi Lane
Opposing (1.0 1.0 1.0 1.00 1.000 1.000 1.000	veh-mi veh-mi veh-h veh/h veh/h	1.0 Lu 38.2 59.9 C	Ld - Ld - Lone O.0 O.0 - Lane Of - Lone Of - Lone Cot -
Direction PCE for trucks, ET PCE for RNs, ER 1.0 PCE for RNs, ER 1.0 Breavy-wehacle adjustment factor, fHV 1.000 Grade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Adjustment for nor-passing zones, fmp Rdjustment for nor-passing zones, fmp Percent time-spent-following, PTSEG 59.9	Level of Service and Other Performance Measures Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak-hour vehicle-miles of travel, VMT6 Peak 15-min total travel Capacity from AT2, CaAPS Capacity from PTSF, CAPSF Directional Capacity Passing Lane Analysis	lane,	highway within effective or average travel speed, Ide whateram of effective in for average travel speed, Ide seed, I passing lane, ATSpl iding passing lane, ATSpl iding passing lane, PFFSpl iding passing lane, PFFSpl in time-spent-following, Idwarstream of effective lengt wastream of effective lengt in passing lane following, Idwing, Ipl illowing, Ip
Direction PCE for trucks, PCE for RVs, ER Heavy-wehicle ac Grade adjustment Directional flow Base percent tim Percent time-spe	Level of service, LOS Volume to capacity ratio, volume to capacity ratio, veak 15-min vehicle-miles of Peak 15-min total travel ti Capacity from ATS, CGATS Capacity from PTSF, CGPTSF Directional Capacity	Total length of Length of two-l Length of passistances Average travel Percent time-sp Level of servic	Downstream length of two-lane length of two-lane length of two-lane length of two-lane highway de length of two-lane passing land Average travel speed, tpl Percent free flow speed includity from the passing lane for percentance of passing lane for percentance of two-lane highway de factor for the service and on Level of service including passing lane, land lane lane highway de lane lane highway de lane highway
alysis		F 0.95 % 0.0 % 0.0 % 100 % 100 % 100 % 150	Opposing (o) 2.0* 1.0 0.052 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0
Fax: Directional Two-Lane Highway Segment Analysis	Lauren Davini Napa County 9/8/15 Weekday PM Peak Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail 2015 Input Data	Peak hour factor, PHF 8 Trucks and buses 4 Trucks crawling Truck Crawl Speed 8 Recreational Vehicles Access point density veh/h	Speed .ysis(d) 1.0 1.0 1.0 1.00 458 pc/h 55.0 fLS 0.0 51.3 51.3 74.5
_Directional Two-Lar	Lauren Davini Napa County 9/8/15 riod Weekday FW Peak Silverado Trail 0.5mi N/o & S/o County of Napa 2015	ft ft mi mi %	E 1 6 13 C C
Phone: E-Mail:	Analyst Agency/Co. Date Performed Analysis Time Period Highway From/To Jurisdiction Analysis Year Description NB Existing	Highway class Class 2 Shoulder width 7.0 Lane width 12.0 Segment length 1.0 Terrain type Level Grade: Length Up/down - Analysis direction volume,	Direction PCE for trucks, ET PCE for RVs, ER Heavy-vehicle adj. factor, (no Grade adj. factor, (note-1) fg Directional flow rate (note-1) fg Directional flow rate (note-3) Observed total demand, (note-3) Observed total demand, (note-3) Base free-flow Speed, note-3) Adj. for lane and shoulder win Adj. for access point density Free-flow speed, FFSd Adjustment for no-passing zon Average travel speed, ATSd Percent Free Flow Speed, PFFS

mi mi mi/h

3 0 55	435.8 26.00 4.79 2.75
on-highway parking	9 54
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Flow rate in outside lane, vol Effective width of outside lane, We Effective speed factor, St Bicycle LoS Score, BLOS Bicycle LOS

- Notes:

 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific demograde segments are treated as level terrain.

 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

 3. For the analysis direction only and for v>200 veh/h.

 4. For the analysis direction only and for well, and specific downgrade.

 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

- * These items have been entered or edited to override calculated value

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Fax:	
Phone:	E-Mail:

Analysis
Segment
Highway
Two-Lane
Directional

Analyst Agency/Co. Agency/Co. Date Performed Analysis Time Period Highway From/To Jurisdiction Analysis Year Description SB Existing	Laure Napa 9/84 1 Weekd Silve 0.5mi Count 2015	Lauren Davini Napa County 9/8/15 9/8/15 9/8/15 9/8/20 0/5mi N/0 & S/ County of Napa 2015	lauren Davini Napa County Napa County 9/8/15 Weekday PM Peak Weekday PM Peak No S/0 4059 SilvTrail County of Napa 2015		
Highway Class 2	6		Peak hour factor, PHF	0.95	
Shoulder width	7.0	Į.	% Trucks and buses		g@
Lane width	12.0	f t		0.0	00
Segment length	1.0	mi		0.0	mi/hr
Terrain type	Level		hicles	2	60
Grade: Length		mi	% No-passing zones	100	00
Up/down	1	هن	Access point density	12	/mi
Analysis direction volume, Vd Opposing direction volume, Vo	olume,		987 veh/h 414 veh/h		

Speed
Travel
Average

Direction	Analysis (d)	(q)	Opposing (o)	
PCE for trucks, ET	2.0*		2.0*	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.952	2	0.952	
Grade adj. factor, (note-1) fg	1.00		1.00	
Directional flow rate, (note-2) vi	1091	pc/h	458 pc/h	ų.
Free-Flow Speed from Field Measurement:				
Field measured speed, (note-3) S FM		ı	mi/h	
Observed total demand, (note-3) V		1	veh/h	
Estimated Free-Flow Speed:				
Base free-flow speed, (note-3) BFFS		55.0	mi/h	
Adj. for lane and shoulder width, (note-3) fLS	3) fls	0.0	mi/h	
Adj. for access point density, (note-3) fA	ĒΆ	3.0	mi/h	
ree-ilow Speed, Frod		0.26	u/Tu	
Adjustment for no-passing zones, fnp		2.5	mi/h	
Average travel speed, ATSd		37.5	mi/h	
Percent Free Flow Speed, PFFS		72.1	go	

	Opposing (o) 1.0 1.00 1.00 1.000 1.000 436 pc/
Percent Ilme-spent-rollowing	Analysis (d) 1.0 1.0 1.0 1.00 ig 1.00 1.00 1.00 pc/h 1.00 1.00 1.00 1.00
I lesses	Direction PCE for trucks, ET PCE for KNS, ER Heavy-vehicle adjustment factor, fHV Carde adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG 74.4 Adjustment for no-passing zones, fnp 21.7

Level of Service and Other Performance Measures Adjustment for no-passing zones, fin Percent time-spent-following, PTSFd

pc/h

ы	0.61	260 veh-mi	987 veh-mi	6.9 veh-h	0 veh/h	1700 veh/h	1700 veh/h
Level of service, LOS	Volume to capacity ratio, v/c	Peak 15-min vehicle-miles of travel, VMT15	Peak-hour vehicle-miles of travel, VMT60	Peak 15-min total travel time, TT15	Capacity from ATS, CdATS	Capacity from PTSF, CdPTSF	Directional Capacity

Passing Lane Analysis Total length of analysis segment, Lt

mi mi mi mi/h 37.5 89.7 E ű Length of two-lane highway upstream of the passing lane, Length of passing lane including tapers, Lpl
versage travel speed, ATSd (from above)
Percent time-spent-following, PTSFd (from above)
Level of service, LOSG (from above)

Average Travel Speed with Passing Lane

mi mi 60 0.0 ŗ Downstream length of two-lane highway within effective length of passing lane for average travel speed, Ide Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl

ШŢ mi Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld - Adj: factor for the effect of passing lane on percent time-spent-following, fpl including passing lane, PTSFpl time-spent-following Percent

Percent Time-Spent-Following with Passing Lane

Level of Service and Other Performance Measures with Passing Lane

veh-h **K** 1 Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

Bicycle Level of Service

55 0 3 1038.9 26.00 4.79 3.19 Posted speed limit, Sp Percent of segment with occupied on-highway parking 3. ⊕ Flow rate in outside lane, vol.
Effective width of outside lane,
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS Pavement rating,

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific demograde segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 19-14 if some trucks operate at crawl speeds on a

* These items have been entered or edited to override calculated value

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pc/h

Opposing (o) 1.0 1.0 1.00 1.00 430 pc

Percent Time-Spent-Following	Direction PCE for trucks, ET 1.0 1.0 PCE for Wyb, ER 1.0 1.0 PCE for Wyb, ER 1.0 1.0 Grade adjustment factor, fHV Directional flow rate, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFG 78.4 %	Level of Service and Other Performance Measures Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak-hour vehicle-miles of travel, VMT60 Peak 15-min total travel time, TT15 Capacity from ATS, CdATS Capacity from ATS, CdATS Capacity from PTSF, CdPTSF Directional Capacity 1700 Veh/h Directional Capacity	Total length of analysis segment, it Length of two-lane highway upstream of the passing lane, Lu- Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above) D	Average Travel Speed with Passing Lane Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	Length of two-lane highway downstream or eigective length of the passing lane for average travel speed, Ld - Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl 0.0	Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde length of two-lane highway downstream of effective length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld langth of percent time-spent-following, fpl Percent time-spent-following, fpl lanchuding passing lane, PTSFpl	Level of Service and Other Performance Measures with Passin Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15 Bicycle Level of Service
HCS 2010: Two-Lane Highways Release 6.70	Phone: E-Mail: Directional Two-Lane Highway Segment Analysis	Analyst Lauren Davini Agency/Co. Napa County Date Performed 9/8/15 Analysis Time Period Weekend Midday Peak Highway Slaverador Trail From/To 0.5mi N/o & S/o 4059 SilvTrail Ourisdiction County of Napa Analysis Year 2015 Description NB Existing	Highway class Class 2 Peak hour factor, PHF 0.90 Shoulder width 12.0 ft % Trucks and buses 5 Segment length 1.0 mi Truck crawling 0.0 % Terrain type Level % Recreatingly vehicles 2 % Carde: Length - mi % No-passing 2 ones 100 % Access point density 15 /mi	Analysis direction volume, Vd 549 veh/h Opposing direction volume, Vo 387 veh/h Average Travel Speed	Direction PCE for trucks, ET 2.0* 2.0* 2.0* 2.0* 2.0* 2.0* 2.0* 2.0*	Free-Flow Speed from Field Measurement: Field measured speed, (note-3) S FM Observed total demand, (note-3) V Estimated Free-Flow Speed, Base free-Flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) fLS 0.0 mi/h Adj. for access point density, (note-3) fA 3.8 mi/h Free-flow speed, FFSd S1.3 mi/h	Adjustment for no-passing zones, fnp 2.5 mi/h Average travel speed, ATSd 40.3 mi/h Percent Free Flow Speed, PFFS 78.6 %

mi mi mi/h

veh-mi veh-mi veh-h veh/h veh/h

40.3 78.4 D

шŢ

Мį

Шį mį ince Measures with Passing Lane

55 0 3 610.0 26.00 4.79 2.92 Posted speed limit, Sp
Percent of segment with occupied on-highway parking Favement rating, P
Flow rate in outside lane, VOL
Effective width of outside lane, We
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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Phone: E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

Lauren Davini Napa County 9/8/15 Weekend Midday Peak Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail 2015 Jurisdiction Analysis Year Description SB Existing Analyst Agency/Co. Date Performed Analysis Time Period Highway From/To

Input Data

Highway class Class	2		Peak ho	our fa	Peak hour factor, PHF	PHF	06.0	
Shoulder width	7.0	ft	S Truck	ks and	% Trucks and buses		ഗ	0.0
Lane width		ft	% Truc	ks cra	awling		0.0	eso
Segment length		mi	Truck crawl speed	crawl	speed		0.0	mi/h
Terrain type	Level		% Recre	eation	% Recreational vehicles	icles	2	φÞ
Grade: Length		mi	% No-p	assind	% No-passing zones		100	00
Up/down	ı	60	Access	point	Access point density	τy	12	/mi
Analysis direction volume, Vd	volume, Vd		veh/h	'n				
Opposing direction volume, Vo	volume, Vo	549	veh/h	ج				
ON PRINCIPAL DESIGNATION OF STATE OF ST	A.	Average Travel Speed	Travel	Speed		***************************************		
Direction			Anal	Analvsis (d)	n	ô	posina	(0)
PCE for trucks, ET				2.0*		•	2.0*	
PCE for RVs, ER				1.0			1.0	
Heavy-vehicle adj. factor, (note-5) fHV	factor, (no	te-5) f		0.952			0.952	
Grade adj. ractor, (note-1) rg	nore-1) rg		•	7.00			7.00	
Directional flow rad	te, (note-2	\ v !		452	bc/h		641	pc/h
Free-Flow Speed from Field Measurement:	m Field Me	asureme	nt:					
Field measured speed, (note-3) S FM	d, (note-3)	SFM			1	mi/h		
Observed total demand, (note-3) V	nd, (note-3	> ^			ı	veh/h		
Estimated Free-Flow Speed:	Speed:							
Base free-flow speed, (note-3) BFFS	d, (note-3)	BFFS			55.0	mi/h		
Adj. for lane and shoulder width, (note-3) fLS	houlder wi	dth, (no	te-3)		0.0	mi/h		
Adj. for access point density, (note-3) fA	nt density	, (note-	3) fA	•	3.0	mi/h		
Free-flow speed, FFSd	Sd				52.0	mi/h		
Adjustment for no-passing zones, fnp	assing zon	es, fnp			1.8	mi/h		
Average travel speed, ATSd	d, ATSd				41.7	mi/h		
Percent Free Flow Speed, PFFS	peed, PFFS			~	80.3	010		

Percent Time-Spent-Following	nt-Following	THE REPORT OF THE PROPERTY OF
Direction PCE for trucks, ET PCE for trucks, ER PCE for RVS, ER PCE for 1.00 Directional flow rate, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, note-4) BPTSFG 48.1 Adjustment time-spent-following, PTSFG PSFC Adjustment for no-passing zones, fnp PSFC Adjustment for no-passing zones, fnp PSFC AGS	Analysis (d) 1.0 1.0 1.00 1.00 430 pc/h e-4) BPTSFA 48.1	Opposing (o) 1.0 1.0 1.00 1.00 1.00 1.00 1.00 1.00

Level of Service and Other Performance Measures

Level of service, LOS	U	
Volume to capacity ratio, v/c	0.25	
Peak 15-min vehicle-miles of travel, VMT15	108	veh-mi
Peak-hour vehicle-miles of travel, VMT60	387	veh-mi
Peak 15-min total travel time, TT15	2.6	veh-h
Capacity from ATS, CdATS	1692	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

Passing Lane Analysis

1.0 mi	ing lane, Lu - mi	- mi	41.7 mi/h (63.1	ر
Total length of analysis segment, Lt	Length of two-lane highway upstream of the passing lane, Lu	Length of passing lane including tapers, Lpl	Average travel speed, ATSd (from above) Percent time-spent-following, PTSFd (from above)	Level of service, LOSd (from above)

Average Travel Speed with Passing Lane

Level of Service and Other Performance Measures with Passing Lane

veh-h ĸι Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

Bicycle Level of Service

30 55	430.0 26.00 4.79 2.75	
/ parking		
on-highway	% Re	
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Flow rate in outside lane, vOL Effective width of outside lane, Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS	

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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pc/h

Opposing (0)
1.0
1.0
1.00
1.000
1.00

Percent Time-Spent-Following_

Direction PCE for trucks, ET 1.0 PCE for trucks, ER 1.0 PCE for Wes, ER Heavy-wehicle adjustment factor, fHV 0.000 Grade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG 53.8 Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFG 60.2 \$	Level of Service and Other Performance Measure. Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 110 veh Peak 15-min vehicle-miles of travel, VMT60 418 veh Peak 15-min total travel time, TT15 710 veh Capacity from ATS, CGATS Capacity from PTSF, CGATSF Directional Capacity	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)	Average Travel Speed with Passing Lane Downstream length of two-lane highway within effective Length of passing lane for average travel speed, Ide	Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld -Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl 0	Percent Time-Spent-Following with Passing Lane, Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld Adj. factor for the effect of passing lane on percent time-spent-following, fpl Percent time-spent-following,	including passing lane, PTSFpl Level of Service and Other Performance Measures with Pas Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15
Fax: Directional Two-Lane Highway Segment Analysis	Lauren Davini Napa County 9/6/11/ 9/6/11/ Silverado Txail 0.5mi N/o & S/o 4059 SilvTrail County of Napa 2015 Existing + Project Input Data	Class 2 Peak hour factor, PHF 0.95 7.0 ft % Trucks and buses 5 % 12.0 ft % Trucks crawling 0.0 % 1.0 mi Truck crawl speed 0.0 mi/hr Level % Recreational vehicles 2 % - mi % No-passing cones 100 % - Access point density 15 /mi	volume, Vd 418 veh/h volume, Vo 996 veh/h Average Travel Speed	e-5) fHV vi	nent: - - 55.0 e-3) fLS 0.0	Free-flow speed, FFSd Adjustment for no-passing zones, fnp 1.0 mi/h Average travel speed, ATSd 38.1 mi/h Percent Free Flow Speed, PFFS 74.3 %
Phone: E-Mail:	Analyst Agency/Co. Date Performed Date Performed Highway From/To Jurisdiction Analysis Year Description NB Exis	Highway class Cli Shoulder width Lane width Segment length Terrain type Grade: Length	Analysis direction volume, Opposing direction volume,	Direction PCE for trucks, ET PCE for RVs, ER Heavy-vehicle adj. factor, (not Grade adj. factor, (note-1) fg Directional flow rate, (note-2)	Free-Flow Speed from Field Measurer Field measured speed, (note-3) S FM Observed total demand, (note-3) V Estimated Free-Flow Speed: Base free-flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) Adj. for access point density, (note-3)	Free-flow speed, FFSd Adjustment for no-passing zon Average travel speed, ATSd Percent Free Flow Speed, PFFS

				mi mi mi/i		mi mi	g 0		mi	m	e e	ř,		
o' ⊅	Measures	veh-mi veh-mi veh-h veh/h veh/h		1.0 Lu _ 38.1 60.2	ne	ı ı Fğ	0.0	g Lane	ength e -	d b	1 3	with Passing	veh-h	
21.5	Performance M	C. 0.26 110 418 2.9 1700 1700	ysis	sing lane, e)	Passing Lane	n effective el speed, Lde fective travel speed,	TSpl , PFFSpl	ith Passin	ffective l	llowing, Ld		easures wi	ď I	Service
	other	1, VMT15 VMT60 5	Lane Analysis	of the passi ers, Lpl ve) (from above)	with	treel tr	ng lane, A	ollowing w	/ within e -spent-fol	n or errec e-spent-fo	fpl	formance M	ine, LOSpl	Q.
Adjustment for no-passing zones, inp Percent time-spent-following, PTSFd	Level of Service and	Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMTG Peak-hour vehicle-miles of travel, VMTGO Peak 15-min total travel time, TT15 Capacity from PTSF, CdATS Directional Capacity	Passing	Total length of analysis segment, it Length of two-lane highway upstream of the passing Length of passing lane including tapers, Lpl Percent travel speed, ATGG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)	Average Travel Speed	Downstream length of two-lane highway within effected length of passing lane for average travel speedength of two-lane highway downstream of effective length of the passing lane for average travel. Adi. Earth of the pessing lane for average travel.	on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl	Percent Time-Spent-Following with Passing	Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Ide	Length of two-lane highway downstream of effective length the passing passing ballowing. Ld	on percent time-spent-form time-spent-followin including passing lane,		Level of service including passing lane, Peak 15-min total travel time, TT15	Bicycle Level

55 0 3 4 0 0	24.79 4.79 2.76
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Figure and outside rane, you Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

- Notes:

 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific demograde segments are treated as level terrain.

 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

 3. For the analysis direction only and for v>200 veh/h.

 4. For the analysis direction only is some trucks operate at crawl speeds on a specific downgrade.

- * These items have been entered or edited to override calculated value

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Phone:	E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

	- 1	
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+::	ב ב ב ב	

Highway class Class	ss 2		Peak h	our f	Peak hour factor,	PHF	0.95		
Shoulder width	7.0	ft	% Truc	ks ar	Trucks and buses		Z,	مين	
Lane width	12.0	£t	% Truc	ks cr	Trucks crawling		0.0	60	
Segment length	1.0	mi	Truck	crawl	Truck crawl speed		0.0	mi/hr	
Terrain type	Level		% Recr	eatic	% Recreational vehicles	icles	5	60	
	1	mi	d-on %	assir	% No-passing zones	,,	100	00	
Up/down	1	90	Access	poir	Access point density	.ty	12	/mi	
Analysis direction volume, Opposing direction volume,	volume, volume,	Vd 996 Vo 418	veh/h veh/h	44					
		Average	Travel Speed	Spee	p				
Direction			Anal	Analysis(d)	g	do	Opposing	(0)	
PCE for trucks, ET				2.0*			2.0*		
PCE for RVs, ER	,			1.0			1.0		
Heavy-vehicle adj. factor, (note-5) fHV	tactor,	(note-5)		0.952			256.0		
Directional flow rate, (note-2) vi	ate, (note	-2) vi		1101	pc/h		462	pc/h	
Free-Flow Speed from Field Measurement:	om Field	Measurem	ent:						
Field measured speed, (note-3) S FM	ed, (note-	-3) S FM			1	mi/h			
Observed total demand, (note-3) V	and, (note	3-3) V			1	veh/h			
Estimated Free-Flow Speed:	w Speed:								
Base free-flow speed, (note-3)	ed, (note-	-3) BFFS	,		55.0	mi/h			
for	shoulder	width, (n	ote-3)	frs	0.0	mi/h			
Adj. for access point density, (note-3) fA	int densi	ty, (note	-3) £A		3.0	mi/h			
Free-flow speed, FFSd	FSd				52.0	mi/h			
Adjustment for no-passing zones,	passing z	ones, fnp	Ω,		2.5	mi/h			
Average travel speed, ATSd Percent Free Flow Speed, PFFS	ed, ATSd Speed, PE	S.			37.4	mi/h %			
		}				•			

Percent Time-Spent-Following

Opposing (o) 1.0 1.0
1.00 1.00 440 pc/h
Performance Measures
veh-mi veh-mi veh-h veeh/h veh/h
A
1.0 mi - mi 37.4 mi/h 89.5
m mi
0.0
Lane
mi
mí
gi.a.
Passing Lane
veh-h
sing zones, fipp 11.5 sing zones, fipp 11.6 sing zones, fipp 12.5 s. 11.6 sof travel, VMT15 12.6 s. 12.6 s. 13.6 s. 14.7 s. 15.6 s. 17.0 vel 18.0

20 cs	1048.4 26.00 4.79 3.20
on-highway parking	w.e
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Flow rate in outside lane, vOL Effective width of outside lane, Effective speed factor, St Bicycle LoS Score, BLOS Bicycle LoS

- Notes:

 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

 3. For the analysis direction only and for v>200 veh/h.

 4. For the analysis direction only.

 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.
- * These items have been entered or edited to override calculated value

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pc/h

Percent Time-Spent-Following

/od (0)		mi mi mi/h	m m mi	mi mi %	_ ane _
Opposing 1.0 1.0 1.00 1.00 1.00 441	veh-mi veh-h veh/h veh/h veh/h	1.0 Lu - 40.1 77.9 D	Ld	ngth of -	h Passing I
Direction PCE for trucks, ET 1.0 1.0 1.0 1.0 1.0 Grade adjustment factor, fHV 1.000 Grade adjustment factor, note-1) fg 1.00 Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG 77.9 Percent time-spent-following, PTSFG	Level of Service and Other Performance Measures. Level of service, LOS Volume to capacity ratio, v/c Volume to capacity ratio, v/c Volume to capacity ratio, v/c Peak L5-min vehicle-miles of travel, VMT60 Peak H5-min total travel time, TT15 Capacity from ATS, CdATS Capacity from ATS, CdATS Directional Capacity Passing Lane Analysis	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Avezage travel speed, ATSG (from above) Level of service, LOSG (from above) Average Travel Speed ATSG		Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld Adj. factor for the effect of passing lane on percent time-spent-following, fpl Percent time-spent-following passing lane including passing lane.	Level of Service and Other Performance Measures with Passing Lane Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15 Bicycle Level of Service
Direction PCE for t PCE for R Heavy-veh Grade veh Direction Base perc Adjustmen	Level or Volume Peak 15-Peak 15-Peak 15-Capacit Capacit Directi	Total le Length o Length o Average Percent Level o	Downstre Length Length Adj fac Average Percent	Downstre of F Length the Adj. fac Percent	Level or
lysis.		0.90 5.00% 0.0 mi/hr 25.2.% 15.7mi	Opposing (o) 2.0* 1.00 0.952 1.00 463 pc/h	mi/h veh/h mi/h mi/h mi/h	4.4
gment Ana	vTrail	ctor, PHF buses wling speed al vehicle zones density) pc/h		2.5 mi/h 40.1 mi/h 78.3 %
Fax: Directional Two-Lane Highway Segment Analysis	Lauren Davini Napa County 9/8/15 9/8/15 sriod Weekend Midday Peak Silverado Trail 0.5mi N/o & S/o 4059 Silverouty of Napa 2015 Existing + Project Input Data	Peak hour fac ft % Trucks and ft Trucks crawl s % Recreations mi % No-passing % Access point vd 558 veh/h	, w	Measurement: -3) S FM e-3) V -3) BFFS width,(note-3) fLS ity,(note-3) fA	duj 'sə
Phone: E-Mail:	Analyst Agency/Co. Date Ferformed Analysis Time Period Highway From/To Juxisdiction Analysis Year Description NB Exis	Highway class Class 2 Shoulder width 12.0 Lane width 12.0 Segment length 1.0 Terrain type Level Grade: Length - Up/down -	Opposing direction volume, Direction Expect For Fucks, ET PCE for RVs, ER Heavy-vehicle adj. factor, Grade adj. factor (note-1) Directional flow rate, (not	Free-Flow Speed from Fleld Field measured speed, (note Observed total demand, (not Estimated Free-Flow Speed: Base free-flow speed, (note Adj. for lane and shoulder Adj. for access point dens Free-flow speed, FFSd	Adjustment for no-passing zon Average travel speed, ATSd Percent Free Flow Speed, PFFS

mi mi mi/h

55 0 3 620.0 26.00 4.79 2.93 Posted speed limit, Sp
Percent of segment with occupied on-highway parking
Favement rating, P
Flow rate in outside lane, VOL
Effective width of outside lane, We
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is Note that the base conditions. For the purpose of grade adjustment, specific denngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis—the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only and for v>200 veh/h.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

Analyst Lauren Davini
Agency/Co.
Napa County
Jate Performed 9/8/15
Analysis Time Period Weekend Midday Peak
Highway Silverado Trail
From/To County of Napa
Analysis Year
Description SB Existing + Project

Input Data

0.90 5.00 % 0.00 mi/hr 2 % 100 % 12 /mi		Opposing (o) 2.0* 1.0 0.952 1.00 651 pc/h		
1. FF S.		oddo	mi/h veh/h mi/h mi/h	mi/h mi/h mi/h
Peak hour factor, PHF % Trucks and buses % Trucks crawling Truck crawl speed % Recreational vehicles % No-passing zones Access point density	veh/h veh/h vel Speed	Analysis (d) 2.0* 1.0 0.952 1.00 463 pc/h	fLS 0.0	1.8 41.6
ft % Truck mi Truck mi % No.	397 558 Frage Tra) fHV	Flow speed from Field Measurement: measured speed, (note-3) S FM ed total demand, (note-3) V ated Free-Flow Speed: free-flow speed, (note-3) BFFS for lane and shoulder width, (note-3) for access boint density (note-3)	duj 'səl
Class 2 7.0 12.0 1.0 Level	>>	r . factor, (nc , (note-1) fg rate, (note-2	rom Field Me eed, (note-3) and, (note-3 ow Speed: eed, (note-3) shoulder wi	FFSd -passing zon eed, ATSd cheed, pres
Highway class Cl. Shoulder width Lane width Segment length Terrain type Grade: Length Up/down	Analysis direction volume, Opposing direction volume,	Direction PCE for trucks, ET PCE for trucks, ER PCE for NYs, ER Heavy-vehicle adj, factor, (note-5) fHV Grade adj, factor, (note-1) fg Directional flow rate, (note-2) vi	Free-Flow speed from Field Measurement: Field measured speed, (note-3) S FW Observed total demand, (note-3) V Estimated Free-Flow Speed: Base free-flow speed, (note-3) BFFS Adi, for lane and shoulder width, (note- Adi, for access point dansity, (note-3)	

AND THE RESIDENCE OF THE PERSON OF THE PERSO	Opposing (o) 1.0 1.0 1.00 1.00 620 pc/h
Percent Time-Spent-Following	Direction PCE for trucks, ET 1.0 PCE for kNs, ER 1.0 Heavy-vehicle adjustment factor, fHV Crade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFd Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFd 63.4

Level of Service and Other Performance Measures

,,		
0.26		
110	veh-mi	
397	veh-mi	
9.	veh-h	
1692	veh/h	
1700	veh/h	
1700	veh/h	
C 0.26 110 397 2.6 1692 1700 1700	9 800	

Passing Lane Analysis

1.0 mi	mi mi	41.6 mi/h	63.4 C
Total length of analysis segment, Lt	Length of two-lane highway upstream of the passing lane, but Length of passing lane including tapers, Lpl	Average travel speed, ATSd (from above)	Percent time-spent-following, PTSFd (from above) Level of service, LOSd (from above)

Average Travel Speed with Passing Lane

mi	i m	ņė	A A STATE OF THE PROPERTY OF T	mí	mi		90
Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde Length of two-lane highway downstream of effective	length of the passing lane for average travel speed, Ld - Adj. factor for the effect of passing lane on average speed, fpl	Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl 0.0	Percent Time-Spent-Following with Passing Lane	Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	Adj. factor for the effect of passing lane on percent time-spent-following, fpl	Percent time-spent-following including passing lane, PTSFpl

Level of Service and Other Performance Measures with Passing Lane

	veh-h
A	ı
LOSpl	
Level of service including passing lane,	Peak 15-min total travel time, TT15
of service	15-min total
Level.	Peak

Bicycle Level of Service

55 0 0 441.1 26.00 4.79 C
parking
on-highway We
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P Effective rating, P Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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pc/h

Opposing (0) 1.0 1.0 1.000 1.00

Percent Time-Spent-Following

Percent time-spent-following, PTSFd	64.7	o A	
Level of Service and Other Perfo	Performance Measures	sarres	
Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak-15-bux vehicle-miles of travel, VMT60 Peak 15-min total travel time, TT15 Capacity from ATS, CdATS Directional Capacity	C.29 124 470 3.3 1700 1700	veh-mi veh-mi veh-h veh/h veh/h	
Passing Lane Analysi	S		
Total length of analysis segment, Lt Length of two-lane highway upstream of the passing Length of passing lane including tapers, Lpl Lerage travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)	lane,	1.0 Lu - 37.2 64.7	mi mi mi/h
Average Travel Speed with Pa	Passing Lane		
ne highway within for average travel	effective speed, Lde	ı	m,
Length of two-lane highway downstream of effective length of the passing lane for average travel Adj. factor for the effect of passing lane	speed,	Ld -	mi
on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl	ol FFSpl	0.0	90
Percent Time-Spent-Following with Passing	Passing	Lane	to the state of th
Downstream length of two-lane highway within effective length of passing languages. The spent of the length of the language of the language of the languages.	ctive len	ngth -	mi
pergraph of the feet of the fe	e lengtn wing, Ld	1	mi
n percent time-spent-following, in time-spent-following ncluding passing lane, PTSFpl		1 1	6.0
Level of Service and Other Performance Measures	ures with	Passing	Lane
Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15	K.	veh-h	
4 · · · · · · · · · · · · · · · · · · ·			

55 0 3 494.7 26.00 4.79 2.82 Posted speed limit, Sp
Percent of segment with occupied on-highway parking
Pavement rating, P
Plow rate in outside lane, VoL
Effective width of outside lane, We
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

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Phone: E-Mail:

Fax:

Analysis	
Segment	ilvTrail
lighway	4059 8
Directional Two-Lane Highway Segment Analysis	Lauren Davini Napa County 9/8/15 Weekday PM Peak Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail county of Napa 2015
Direc	Analyst Law Agency/Co. Nag Date Performed 9/6 Analysis Time Period Wer Highway SI. From/To Unisdiction Co. Analysis Year 20 Description SB Cumulative

0	ഗ	o	o	N	Ä	ä	
Peak hour factor, PHF	% Trucks and buses	% Trucks crawling	Truck crawl speed	% Recreational vehicles	% No-passing zones	Access point density	veh/h veh/h
	£t	£t	mi		mi	من	1 1050
							> >
s 2	7.0	12.0	1.0	Level	ı	ı	volume,
Highway class Class 2	Shoulder width	Lane width	Segment length	Terrain type	Grade: Length	Up/down	Analysis direction volume, Vd 1050 Opposing direction volume, Vo 470

Input Data_

% mi/hr % % /mi

0.95 5 0.0 2 100 12

Average Travel Speed

Analysis(d) Opposing (o)	•	1.0	O)		1161 pc/h 520 pc/h		- mi/h	- veh/h		_	fLS 0.0	A 3.0 mi/h	, in the state of			36.7 mi/h	
Direction	ET	PCE for RVs, ER	Heavy-vehicle adj. factor, (note-5) fHV	Grade adj. factor, (note-1) fg	Directional flow rate, (note-2) vi	Free-Flow Speed from Field Measurement:	Field measured speed, (note-3) S FM	Observed total demand, (note-3) V	Estimated Free-Flow Speed:	Base free-flow speed, (note-3) BFFS	Adj. for lane and shoulder width, (note-3)	Adj. for access point density, (note-3) fA	40000	rree-rrow speed, Frsa	Adjustment for no-passing zones, fnp	Average travel speed, ATSd	Percent Free Flow Speed, PFFS

Percent Tim	Percent Time-Spent-Following_		1
Direction	Analysis (d)	Opposing (p)	
PCE for trucks, ET	0.1	1.0	
PCE for RVs, ER	1.0	1.0	
Heavy-vehicle adjustment factor, fHV		1.000	
Grade adjustment factor, (note-1) fq	1,00	1.00	
Directional flow rate, (note-2) vi	1105 pc/h	495 pc/h	بے
Base percent time-spent-following, (note-4) BPTSFd 76.8	ote-4) BPTSFd 76.1	60	
Adjustment for no-passing zones, fnp			
Percent time-spent-following, PTSFd	7.06	000	

Level of Service and Other Performance Measures

ы	0.65		1050			1700 veh/h	
Level of service, LOS	Volume to capacity ratio, v/c	Peak 15-min vehicle-miles of travel, VMT15	Peak-hour vehicle-miles of travel, VMT60	Peak 15-min total travel time, TT15	Capacity from ATS, CdATS	Capacity from PTSF, CdPTSF	Directional Capacity

	1.0 mi mi 36.7 mi/h E	
Passing Lane Analysis	Total length of analysis segment, Lt Langth of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSd (from above) Percent time-spent-following, PTSFd (from above) Level of service, LOSG (from above) E	Average Travel Speed with Passing Lane

- mi	- mi	1	1	0.0	o.
	ą				Lan
Downstream length of two-lane highway within effective length of passing lane for average travel speed, Ide Landth of travel and industrian of travel and the second of a forth of the land of the second of a forth of the second of a fector in the second of the seco	length of the passing construction of attactive Adj. factor for the effect of passing lane	on average speed, fpl	Average travel speed including passing lane, ATSpl	Percent free flow speed including passing lane, PFFSpl	Percent Time-Spent-Following with Passing Lane

Level of Service and Other Performance Measures with Passing Lane

Æ	1
Lospl	
rvice including passing lane,	Peak 15-min total travel time, TT15

Bicycle Level of Service

5.5	or	1105.3	4.79	3.23 C
Posted speed limit, Sp	Percent of segment with occupied on-highway parking Pavement rating.	Flow rate in outside lane, vol. Refective width of outside lane we	Effective speed factor, St	Bicycle LOS Score, BLOS Bicycle LOS

Notes: 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain. 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the 10S is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only. 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

- * These items have been entered or edited to override calculated value

pc/h

Opposing (o)
1.0
1.0
1.00
1.000
526 pc

Percent Time-Spent-Following	Direction PCE for trucks, ET 1.0 PCE for No.2 PCE for No.	Level of Service and Other Performance Measures— Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 176 veh-mi Peak-hour vehicle-miles of travel, VMT60 635 veh-mi Peak 15-min total travel time, TT15 70 veh-mi Capacity from ATS, CAMTS 0 veh/h Capacity from PTSF, CAMTS 1710 veh/h Directional Capacity	Passing Lane Analysis Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSd (from above) Percent time-spent-following, PTSFd (from above) Level of service, LOSd (from above) Average Travel Speed with Passing Lane	
HCS 2010: Two-Lane Highways Release 6.70	Phone: E-Mail: Directional Two-Lane Highway Segment Analysis	Analyst Lauren Davini Agency/Co. Napa County Date Performed 9/8/15 Analysis Time Period Weekend Midday Peak Highway From/To County of S/0 4059 SilvTrail Jurisadiction County of Napa Analysis Year Description NB Cumulative	ft % 7 ft	direction volume, vo 033 direction volume, vo 473 rucks, ET No. EB Ticle add, factor, (note-5) fHV Ticle add, inote-1) fg Tactor, (note-1) fg Tactor, (note-3) sr Tree-Flow Speed, (note-3) sr Tree-Flow Speed; (note-3) BFES Tree-Flow Speed; (note-3) BFES Taces point density, (note-3) Typeed, from co-passing zones, fnp Tree-Flow Speed, PFES Tree-Flow Speed, PFES Tree-Flow Speed, PFES Tree-Flow Speed, PFES

mi mi mi/h

veh-mi veh-mi veh/h veh/h veh/h

39.1 81.3 D

щį mi ince Measures with Passing Lane

mi mi

0.0

55 0 3 705.6 26.00 4.79 3.00 Posted speed limit, Sp
Percent of segment with occupied on-highway parking bavement rating, P
Flow rate in outside lane, Wol.
Effective width of outside lane, We Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

Lauren Davini
Napa County
9/8/15
Weekend Midday Peak
Silverado Trail
0.5mi N/o & S/o 4059 SilvFrail
County of Napa
2015 Jurisdiction
Analysis Year
Description SB Cumulative Analyst Agency/Co. Date Performed Analysis Time Period Highway

Input Data

Highway class Class Shoulder width			hour nucks ar	Peak hour factor, Trucks and buses	PHF	0.90	50
Lane width	12.0 ft		ucks co	& Trucks crawling		0.0	e est
Segment length	1.0 mi		Truck crawl speed	L speed		0.0	mi/hr
Terrain type	Level	** Me	creation	% Recreational vehicles	icles	2	6.0
Grade: Length	- mi		-passir	% No-passing zones		100	60
Up/down	0.0		ss poir	Access point density	τy	12	/mi
Analysis direction volume, Opposing direction volume,	volume, Vd	473 v 635 v	veh/h veh/h				
	Ave	Average Trav	Travel Speed	, p			
Direction		An	Analvsis(d)	(g)	Ö	posina	(0)
PCE for trucks, ET			2.0*	5). L	2.0*	5
PCE for RVs, ER			1.0			1.0	
Heavy-vehicle adj. factor, (note-5) fHV	actor, (note	2-5) £HV	0.952	O.		0.952	
Grade adj. factor, (note-1) fg	ote-1) fg		1.00			1.00	
Directional flow rate, (note-2) vi	e, (note-2)	vi	552	bc/h		741	bc/h
Free-Flow Speed from Field Measurement	Field Meas	surement:					
Field measured speed, (note-3) S FM	(note-3) s	S EM		ı	mi/h		
Observed total demand, (note-3) V	i, (note-3)	Λ		1	veh/h		
	peed:						
	(note-3) E	SFFS		55.0	mi/h		
Adj. for lane and shoulder width, (note-3)	oulder widt	th, (note-3) frs	0.0	mi/h		
Adj. for access point density, (note-3) fA	density,	(note-3) f	æ	3.0	mi/h		
Free-flow speed, FFSd	24			52.0	mi/h		
Adiustment for no-massing zones	seing sones	fun		u.	4		
Average travel speed, ATSd	ATSd			40.5	mi/h		
Percent Free Flow Speed, PFFS	ed, PFFS			77.8	60		

Direction Direction ECE for trucks, ET CEC for trucks, ER Heavy-wehicle adjustment factor, fHV Heavy-wehicle adjustment factor, fHV Exade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFG Diversed time-spent-following, PTSFG Everl of Service, LOS Volume to capacity ratio, v/C Peak 15-min vehicle-miles of travel, VMTGO Peak 15-min total travel time, TT15 Capacity from ATS, CdATS Capacity from ATS, CdATSF Directional capacity Capacity from PTSF, CdATSF Directional capacity Directional capacity	Opposing (0) 1.0 1.0 1.00 1.00 1.00 706 pc/h % % veh-mi veh-h veh/h veh/h
Passing Lane Analysis	**************************************
Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu	1.0 mi Lu - mi

Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSFd (from above) Level of service, LOSG (from above)	1.0 - 40.5 68.7	mi mi mi/h
Average Travel Speed with Passing Lane		Annual and a service of
Downstream length of two-lane highway within effective		
Jength of passing lane for average travel speed, Ide	1	mi
Jength of the passing lane for average travel speed, Ld Adi. factor for the effect of passing lane		mj
on average speed, fol	1	
Average travel speed including passing lane, ATSpl	1	
Percent free flow speed including passing lane, PFFSpl	0.0	60
Percent Time-Spent-Following with Passing Lane	Je	

of passing lane for percent time-spent-following, Lde	1	mi
Length of two-lane highway downstream of effective length of		
the passing lane for percent time-spent-tollowing, ad add factor for the effect of passing lane	١.	Tur
on percent time-spent-following, fpl	1	
Percent time-spent-following		
including passing lane, PTSFpl	1	60

Level of Service and Other Performance

veh-h KΙ Bicycle Level of Service Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

55 0 3 325.6 26.00 4.79 C.85	
ed on-highway parking ', We	
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P Flow rate in outside lane, voL Effective width of outside lane, We Effective speed factor, St Bicycle 10S Score, BLOS	

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

pc/h

Percent Time-Spent-Following

mi mi mi mi/h

Bicycle Level of Service

55 0 3 500.0 26.00 4.79 2.82 Posted speed limit, Sp
Percent of segment with occupied on-highway parking pavement rating, Tating, Pavement rating, Pavement rating, Blactive in outside lane, Wo Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS Score, BLOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If v1 (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis Lauren Davini

Analyst

Napa County 9/8/15 Weekady PW Peak Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail Jurisdiction County of Nap Analysis Year 2015 Description SB Cumulative + Project Agency/Co. Date Performed Analysis Time Period Highway

Input Data

ee mi/hr ee/mi		(o) pc/h
0.95 0.0 0.0 2 100		Opposing (o) 1.0 1.0 1.00 1.00 1.00 1.00 1.00 1.00
PHF s inicles s ity		mi/ veh mi/ mi/
Peak hour factor, PHF % Trucks crawling Truck crawling Truck crawling 8 Recreational vehicles % No-passing zones Access point density	ğ	(d) pc/h
hour ficks aricks cricks crawl crawlineatic passir s poir	d 1059 veh/h o 475 veh/h Average Travel Speed	Analysis (d) 2.0* 1.0 0.952 1.00 1171 : : : : : : : : : : : : : : : : :
Peak Truck Truck No-	ve Trave	Ana fHV ent: oote-3}
ft ft % %	1059 475 verage	te-5) vi sasurem S FM) V BFFS dth,(n
	>>	(no) fg te-2 te-3 d Me e-3) te-3 r wiv
38 2 7.0 12.0 1.0 Level	volume	factor factor ute, (no m Fiel cd, (not and, (no v Speed ed, (not shoulde
Highway class Class 2 Shoulder width Lane width 1 Segment length LAErrain type Grade: Length -	Analysis direction volume, Opposing direction volume,	Direction PDE for trucks, ET PCE for RVs, ER Heavy-wehicle adj. factor, (note-5) fHV Grade adj. factor, (note-1) fg Grade adj. factor, (note-2) vi Free-Flow Speed from Field Measurement: Field measured speed, (note-3) s FM Observed total demand, (note-3) V Estimated Free-Flow Speed: Badj. for lane and shoulder width, (note-3) Adj. for lane and shoulder width, (note-3) Adj. for lane and shoulder width, (note-3)
ночоно	4 O	І Опижио гропичч

mi/h mi/h mi/h mi/h mi/h mi/h %

55.0 0.0 3.0 52.0

Adjustment for no-passing zones, fnp Average travel speed, ATSd Percent Free Flow Speed, PFFS

Free-flow speed, FFSd

Percent Time-Spent-Following

Direction Analysis DOR for trucks RT 1 0	(s(d)	Opposing	(0)
for RVS, ER (y-vehicle adjustment factor, fHV de adjustment factor, note-1) fg sctional flow rate, (note-2) vi e percent time-spent-following, (note-4) ustment for no-passing zones, fnp	1.0 1.000 1.000 1.00 1115 pc/h BPTSFd 76.6 90.3	1.00	pc/h
Level of Service and Other	Performance Measures	asures	
Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak-hour vehicle-miles of travel, VMT60 Reak 15-min total travel time, TT15 Capacity from ATS, CdATS Capacity from PTSF, CdATS Directional Capacity	E 0.66 279 1059 7.6 0 1700 1700	veh-mi veh-mi veh-h veh/h veh/h	
Passing Lane Analysi	alysis		-
Total length of analysis segment, lt Length of two-lane highway upstream of the passing Length of passing lane including tapers, Lpl Percage travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)	lane,	1.0 Lu - 36.6 90.3	mi mi mi/h
Average Travel Speed with	n Passing Lane	91	***************************************
Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Adj. Ractor for the effect of passing lane	ď ďe	r r	m, m,
on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl	ATSpl ne, PFFSpl	0.0	6/0
Percent Time-Spent-Following with Passing	with Passing	Lane	
Downstream length of two-lane highway within effective ler of passing lane to percent time-spen-following, Ide	effective le		mi
Longin of two raise ingines, consistent in reference femily to passing lane for percent time-spent-following, Adj. factor for the effect of passing lane	following, Ld	1	mi
on percent time-spent-following, fpl Percent time-spent-following including passing lane, PTSFpl		1 1	6.0
Level of Service and Other Performance Measures	Measures with	th Passing	Lane
Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15	P P	veh-h	

8 0 E	1114.7 26.00 4.79	3.23 C
parking		
on-highway	We	
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	rlow rate in outside lane, vol. Effective width of outside lane, We Effective speed factor, St	Bicycle LOS Score, BLOS Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

pc/h

Opposing (0)
1.0
1.0
1.000
1.000
337 pc

Percent Time-Spent-Following_

Directional Two-Lane Highway Segment Analysis Lauren Davini Napa County 9/8/15 10d Weekend Midday Peak \$11 versad Trail 0.5mi N/o & \$/0 4059 \$11vTrail 1.0	Grade adjustment factor, (note-1) fg 1.00 Directional flow rate, (note-2) vi 716 Dase percent time-spent-following, (note-4) BPTSFd Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFd
9 SilvTrail a Tractor, PHF 0.90 s and buses 5 crawling 0.0 ational vehicles 2 saing zones 100 point density 15 h	
r factor, PHF 0.90 and buses 5 crawling 0.0 tional vehicles 2 sing zones 100 oint density 15	Level of Service and Other Performance Measures. Level of Service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak 15-min total travel time, TT15 Capacity from ATS, CdATS Directional Capacity, COPTS Or Capacity from PTSF, CdATS Directional Capacity Directional Capacity Or Capacity from PTSF, CdATS Directional Capacity Or Veh/I
n/n n/n	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Average travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)
Average Travel Speed	Average Travel Speed with Passing Lane Downstream length of two-lane highway within effective length of passing lane for average travel speed, Ide
Analysis(d) Opposing (o) 2.0* 1.0 1.0 1.0 0.952 0.952 1.00 752 pc/h 564 pc/h	Length of two-lane highway downstream of effective length of the passing lane for average travel speed, id - Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl Operage travel speed including passing lane, PFFSpl
Free-Flow Speed from Field Measurement: Field measured speed, (note-3) S FM OSSERVED total demand, (note-3) V Estimated Free-Flow Speed, (note-3) BFFS Base Free-Flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) fLS Adj. for lane and shoulder width, (note-3) fLS Free-Flow speed, FFSd 51.3 mi/h	Downstream length of two-lane highway within effective length of passing tame species time-species. So passing lane for percent time-species. Longth of two-lane highway downstream of effective length of the passing lane for percent time-specificitive length of high factor for the effect of passing lane on percent time-specificallowing, fpl Percent time-specificallowing passing lane, PTSFpl
2.0 mi/h 39.0 mi/h 76.1 %	Level of Service and Other Performance Measures with Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15 Peak 5-min total travel time, TT15

mi mi mi/n

٥٠،١

veh-mi veh-m veh/h veh/h veh/h

39.0 81.9 D

mį Пį mi

0.0

mi

Measures with Passing Lane

55 0 3 715.6 26.00 4.79 3.01 Posted speed limit, Sp
Percent of segment with occupied on-highway parking
Pavement rating, P
Flow rate in outside lane, vol.
Effective width of outside lane, We
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Lauren Davini
Mapa County
9/8/15
Reekend Midday Peak
51.verado Trail
0.5mi N/o & S/o 4059 SilvTrail Jurisdiction County of Nap Analysis Year 2015 Description SB Cumulative + Project Analyst Agency/Co. Date Performed Analysis Time Period Highway From/To

Input Data

0.90 5 8 0.0 % 0.0 mi/hr 2 8 100 8 12 /mi		Opposing (o) 2.0* 1.0 0.952 1.00 752 pc/h	
PHF shicles			mi/h veh/h mi/h mi/h mi/h mi/h
Peak hour factor, PHF % Trucks and buses % Trucks crawling Truck crawling 8 Recreational vehicles % No-passing zones Access point density	e a	(d) 2 pc/h	55.0 0.0 3.0 52.0
chour cucks a cucks c ck craw ecreati	veh/h veh/h vel Spe	Analysis (d) 2.0* 1.0 0.952 1.00 564) fls
Peal % Truc Truc % Re % Re ACC	d 483 veh/h o 644 veh/h Average Travel Speed	fHV	W W S (note-3)
ft Ai mi %	Vd 48 Vo 64 Avera	(note-5 fg e-2) vi	Measur -3) S E e-3) V -3) BFE width,
5 2 7.0 12.0 1.0 Level	volume,	factor, note-1) te, (not	m Field d, (note nd, (not Speed: d, (note houlder nt dens
Highway class Shoulder width Lane width Segment length Terrain type Grade: Length Up/down	Analysis direction volume, Vd Opposing direction volume, Vo	Direction PCE for trucks, ET PCE for twys, ER Heavy-vehicle adj, factor, (note-5) Grade adj. factor, (note-1) fg Directional flow rate, (note-2) vi	Free-Flow Speed from Field Measurement: Field measured speed, (note-3) S FM Observed total demand, (note-3) V Estimated Free-Flow Speed: Base free-flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) Adj. for access point density, (note-3) fR Free-flow speed, FFSG

mi/h mi/h %

1.5 40.3 77.5

Adjustment for no-passing zones, inp Average travel speed, ATSd Percent Free Flow Speed, PFFS

Percent Time-Spent-Following	lowing		
Direction Analysis (d)	q)	Opposing (o)	
PCE for trucks, ET 1.0		1.0	
PCE for RVs, ER 1.0		1.0	
Heavy-vehicle adjustment factor, fHV 1.000		1.000	
Grade adjustment factor, (note-1) fg 1.00		1.00	
Directional flow rate, (note-2) vi 537	bc/h	716 pc/h	
Base percent time-spent-following, (note-4) BPTSFd 56.5	Fd 56.5	00	
Adjustment for no-passing zones, fnp	31.4		
Percent time-spent-following, PTSFd	70.0	olo	

Level of Service and Other Performance Measures

Level of service, LOS	ပ		
Volume to capacity ratio, v/c	0.32		
Peak 15-min vehicle-miles of travel, VMT15	134	veh-mi	
Peak-hour vehicle-miles of travel, VMT60	483	veh-mi	
Peak 15-min total travel time, TT15	3,3	veh-h	
Capacity from ATS, CdATS	1692	veh/h	
Capacity from PTSF, CdPTSF	1700	veh/h	
Directional Capacity	1700	veh/h	

Passing Lane Analysis_

Total length of analysis segment, Lt		1.0	mi	
Length of two-lane highway upstream of the passing lane, Lu	n n		mi	
Length of passing lane including tapers, Lpl	ı		mi	
Average travel speed, ATSd (from above)	4	40.3	mi/h	
Percent time-spent-following, PTSFd (from above)	7	70.0		
Level of service, LOSd (from above)	O			

Average Travel Speed with Passing Lane_

Length of two-lane highway downstream of effective speed. In	1	m i
Lengin of the passing fame for average traver spect, but Adj. factor for the effect of passing lane on average speed, fpl	1	1
Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl	0.0	g/9
Percent Time-Spent-Following with Passing Lane	ane	
Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	rh L	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	ı	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	i	
Percent time-spent-following including passing lane, PTSFpl	1	60

Level of Service and Other Performance Measures with Passing Lane

	veh-h	
ø	ı	
Level of service including passing lane, LOSpl	Peak 15-min total travel time, TT15	

Bicycle Level of Service

55 0 3 536.7 26.00	4.79 2.86 C
parking	
on-highway We	
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P Flow rate in outside lane, vOL Effective width of outside lane, We	Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

pc/h

1.0 1.000 1.00 2122

Opposing (o)

Percent Time-Spent-Following

Phone: E-Mail:	
	Percent time-spent-rollowing, Fisko Level of Service and Other Performance Measures
Agency/Co. Mapa County Date Performed 9/8/18 Analysis Time Period Weekday PM Peak Highway Silverado Trail Srom/To 0.5mi N/o & S/O 4059 SilvTrail Jurisdiction County of Napa Analysis Year 2015 Description NB Future Input Data	Level of service, LOS Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT60 Peak 15-min total travel time, TT15 Rapacity from ATS, CGATS Capacity from PTSF, CGPTSF Directional Capacity 1700 veh/h
	Passing Lane Analysis
Angaya Casas Class 2 Feat Mour Factor, PHF 1.00 Shoulder width 12.0 ft % Trucks and buses 5 % Lane width 12.0 ft % Trucks crawling 0.0 % Segment Length 1.0 mi Truck crawl speed 0.0 mi/hr Terrain type Level mi % No-passing zones 100 % Grade: Length - % Access point density 15 /mi	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSEG (from above) Level of service, LOSG (from above)
Analysis direction volume, Vd 890 veh/h Opposing direction volume, Vo 2122 veh/h	Average Travel Speed with Passing Lane
Average Travel Speed	Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde
Direction PCE for trucks, ET 2.0* 2.0* PCE for RVs, ER 1.0 Heavy-vehicle adj. factor, (note-5) fHV 0.552 Grade adj. factor, (note-1) fg 1.00 Directional flow rate. (note-2) vi 935	Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld - Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl 0.0
oment.	Percent Time-Spent-Following with Passing Lane_
Fled measured speed, (note-3) S FM - veh/h Fritzed total demand (note-3) V FM - veh/h	Downstream length of two-lane highway within effective length
Base free-flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) fLS 0.0 mi/h Adj. for access point density, (note-3) fA 3.8 mi/h	Length of two-lane highway gownstream or effective length of the passing lane for percent time-spent-following, Ld - Adj. factor for the effect of passing lane on percent time-spent-following, fpl
Free-flow speed, FFSd 51.3 mi/h	reicent cine-spent loling
Adjustment for no-passing zones, fnp 0.6 mi/h Average travel speed, ATSd 26.1 mi/h	Level of Service and Other Performance Measures with Passi
FFS	Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15
	Bicycle Level of Service

mi mi mi/h

veh-mi veh-mi veh-h veh/h veh/h

26.1 83.9

mi 'n and Other Performance Measures with Passing Lane

veh-h

щj mi

0.0

0.0

55 0 3 890.0 26.00 4.79 3.12 Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P Plow rate in outside lane, vol. Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS Score, BLOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only and for well specific dewngrade.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Fax:

Analysis	
way Segment)59 SilvTrail
	Lauren Davini Napa County 9/8/15 Weekday PM Peak Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail County of Napa
Direct	Analyst Agency/Co. Date Performed Analysis Time Period Highway From/To Jurisdiction Analysis Year Description SB Future

Input Data

Highway class Class 2 Shoulder width 12.0 ft % Trucks and buses 5 Lane width 12.0 ft % Trucks crawling 0.0 % Segment length 12.0 mi Trucks crawling 0.0 % Terrain type 1.0 mi % No-passing zones 1.00 % Grade: Length - % Access point density 12 / % Analysis direction volume, Vo 890 veh/h Opposing direction volume, Vo 890 veh/h Direction fire trucks, ET Average Travel Speed Direction direction cate, (note-5) ffW 0.952 Grade adj. factor, (note-1) ff 1.00 Directional flow rate, (note-2) vi 2.229 pc/h 935 Eree-Flow Speed from Field Measurement: Field measured speed, (note-3) SFM - weh/h Estimated Free-Flow Speed: Base free-Flow Speed (note-3) SFM - weh/h Base free-Flow Speed (note-3) BEFS Adj. for access point density, (note-3) ffA 3.0 mi/h Adj. for lane and shoulder width, (note-3) ffA 3.0 mi/h	% mi/hr % /mi		pc/h
Peak hour factor, PHF arucks and buses arrucks camewing Truck crawling Truck crawling Secretional vehicle Recreational vehicle No-passing zones Access point density veh/h age Travel Speed 2.0* o.0952	1.00 5.0 0.0 2 100 12		posing 1.0 0.952 1.00 935
1122 90 90 100 1122 90 1122 1122 1122 11	PHF s nicles tty		mi/ veh mi/ mi/
1122 90 90 100 1122 90 1122 1122 1122 11	actor, d buses awling speed nal vel g zones t densi	סי	
1122 90 90 100 1122 90 1122 1122 1122 11	hour ficks and icks critical crawling reations passing some second contractions of the	sh/h sh/h sh/s	1.052 2.0* 2.0* 0.952 1.00 2229 fLS
Highway class Class 2 Shoulder width 1.0 fft Lane width 1.0 fft Terrain length 1.0 mi Terrain type Grade: Length mi Up/down Analysis direction volume, Vd 890 Direction PCE for trucks, ET PCE for RNs, ER Heav-vehicle adj. factor, (note-5) Grade adj. factor, (note-2) Grade adj. factor, (note-2) Grade adj. factor, mote-1) fg Directional flow rate, (note-2) vi Free-Flow Speed from Field Measuren Field measured speed, (note-3) v Estimated Free-Flow Speed: Base free-Flow speed; Adj. for lane and shoulder width, (rote-3) der and shoulder width, (note-3) der access point density, (note-	Peak % Tru Truck % Rec % No-	ve Trave	Ana fHV nent: note-3)
Highway class Class 2 Shoulder width 12.0 Segment length 1.0.0 Ferrain type 1.0.0 Grade: Length 1.0 Opposing direction volume, Wo Opposing direction volume, Wo Coposing direction add. factor, Interior Free-Flow Speed from Field Me Field measured Speed from Field Me Field measured Speed from Field Me Estimated Free-Flow Speed: Mote-1 Coposity Speed: Base free-flow Speed: Mote-1 Coposity Speed: Madj. for lane and shoulder ward.	ft mi %	1 2122 5 890 Average	ote-5) y y y vi s s s s s s s s s s s s s
Highway class Class 2 Shoulder width Lane width 112 Segment length 1 Lerzin type Crade: Length – Up/down direction volu Opposing direction volu Opposing direction volu Cre for trucks, ET Heavy-vehicle adj. fact Grade adj. factor (not Directional flow rate, Field measured speed, (fobserved total demand, Estimated Free-Flow Speed, (fobserved total demand, Estimated Free-Flow Speed, (fobserved total demand, for lane and shoul Adj. for lane and shoul Adj. for lane and shoul Adj. for lane and shoul control of the speed, (for lane and shoul Adj. for lane and shoul Adj. for lane and shoul control of the speed, (for lane and shoul Adj. for lane and shoul Adj. for lane and shoul control of the speed of	.0 2.0 .0 evel	ume, Vo ume, Vo	cor, (nc e-1) fg (note-2) teld Me (note-3) note-3) lder wi
Highway class Shoulder width Lane width Segment Length Terrain type Grade: Length Opposing directic Opposing directic Opposing directic for trucks, ECE for RVS, ER Heavy-vehicle addraged add. Free-Flow Speed is Eximated Free-Flow Speed is Estimated		on volu	fact). fact, note rate, rate, from Firom Firom Speed, the Speed, t
Highway cl Shoulder waith Lane width Sament is Grade: Le Up Opposing d Opposing d Opposing d Direction PCE for tr PCE for tr For tr Free-Flow Free-Flo	C	irectio	ucks, I s, Each factod l flow Speed Speed cutal de tree-F. flow sg
Shours Sh	way cl lder w width ent le ain ty es: Le	ysis d sing d	for tr. for KV Y-vehi e adj. rtiona -Flow d meas rved t nated free- for 1
	High Shou. Lane Segm Terri Grade	Anal	Directory of the property of t

55.0 0.0 3.0 52.0

mi/h mi/h % mi/h

1.2 26.3 50.5

Adjustment for no-passing zones, fnp Average travel speed, ATSd Percent Free Flow Speed, PFFS

Free-flow speed, FFSd

	ē	pc/h
	Opposing (o) 1.0 1.0 1.00 1.00 1.00	
pent-Following	Analysis(d) 1.0 1.0 1.00 1.00	2122 pc/h -4) BPTSFd 93.5 % 14.3
Percent Time-Spent-Following	Direction PCE for trucks, ET PCE for RVs, ER Heavy-vehicle adjustment factor, fHV Cxade adjustment factor, fg	Directional flow rate, (note-2) vi 2122 pc/h Base percent time-spent-following, (note-4) BPTSFG 93.5 Adjustment for no-passing zones, fnp 119 Percent time-spent-following, PTSFG

sures			veh-mi	veh-mi	veh-h	veh/h	veh/h	veh/h
Performance Meas	Į14	1.25		2122	20.2	0	1700	1700
Level of Service and Other Performance Measures	Level of service, LOS	Volume to capacity ratio, v/c	Peak 15-min vehicle-miles of travel, VMT15	Peak-hour vehicle-miles of travel, VMT60	Peak 15-min total travel time, TT15	Capacity from ATS, CdATS	Capacity from PTSF, CdPTSF	Directional Capacity

Passing Lane Analysis

Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSG (from above)	1.0 - 26.3 100.0	mi mi mi/n	
			1
Downstream length of two-lane highway within effective			
length of passing lane for average travel speed, Lde	1	mi	
Length of two-lane highway downstream of effective			
length of the passing lane for average travel speed, Ld	ı	mi	
Adj. factor for the effect of passing lane			
on average speed, fpl	1		
Average travel speed including passing lane, ATSpl	ı		
Percent free flow speed including passing lane, PFFSpl	0.0	6.0	

		mi	mi				0/0	,	гапе
ane)th	1	1		1		ı		rassing
ing I	leng	Lide	, E					1	WIED
with Pass	effective	llowing,	ollowing,						Measures
Percent Time-Spent-Following with Passing Lane	Downstream length of two-lane highway within effective length	of passing lane for percent time-spent-following, Ide	the passing lane for percent time-spent-following, Ld	Adj. factor for the effect of passing lane	on percent time-spent-following, fpl		pl	9	nevel of setvice and other Ferrormance Measures with Fassing Lane
ime-Spe	lane hi	ercent	percent	of pa	-follow-	ing	including passing lane, PTSFpl	40	יי סרוובי
at Ti	[-OM1	or pe	for	ffect	ent-	Llowi	lane		3
Percer	th of t	lane fo	lane	the ei	time-sp	Percent time-spent-following	assing	,	2777100
	leng	ing	sing	for.	ent	ds-a	d bu	ų	วี
	ream	pass	e pas	actor	perc	t tin	cludi	(0.00)	יי עי
	Downst	o£ Tenath	th	Adj. f	on	Percen	in		

veh-h	
Æ I	ice
p1	Serv
ros	ο£
lane,	Level
passing ime, TT15	Bicycle Level of Service
Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15	
service in total	
15-m	
eve	

ა ი ა ა	2122.0 26.00 4.79 3.56 D
on-highway parking	ع چ
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Flow rate in outside lane, vOL Effective width of outside lane, Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

Notes: 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is note of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain. 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis—the LOS is F. 3. For the analysis direction only and for v>200 veh/h. 4. For the analysis direction only and for well-h. 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

- * These items have been entered or edited to override calculated value

pc/h

Percent Time-Spent-Following_

Direction PCE for trucks, ET 1.0 PCE for RVs, ER 1.0 PCE for SVs, ER 1.0 Read-adjustment factor, fHV Directional flow rate, (note-1) fg Base percent time-spent-following, (note-4) BPTSFG Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFG Percent time-spent-following, PTSFG	Level of service, LOS Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 295 veh-mi Peak-hour vehicle-miles of travel, VMT60 1180 veh-mi Peak-hour vehicle-miles of travel, VMT60 8.8 Capacity from ATS, CGATS Capacity from PTSF, CGATSF Directional Capacity	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu mi Length of passing lane including tapers, Lpl — mi Average travel speed, ATSG (from above) — min Percent time-spent-following, PTSFG (from above) — 91.1 Level of service, LOSG (from above) — E Average Travel Speed with Passing Lane	Downstream length of two-lane highway within effective length of passing lane for average travel speed, Ide Length of two-lane highway downstream of effective length of two-passing lane for average travel speed, Id - mi Adj. factor for the effect of passing lane on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl - Percent free flow speed including passing lane, PFFSpl -	Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Ide - Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Id - mi Adj. factor for the effect of passing lane on percent time-spent-following, fpl Percent time-spent-following including passing lane, PTSFpl	Level of Service and Other Performance Measures with Passing Lane Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15 Bicycle Level of Service
Directi	Analyst Habrach Davini Agancy/Co. Napa County Date Performed 9/8/15 Analysis Time Period Weekend Midday Peak Highway Silverado Trail From/To County of Napa Analysis Year Description NB Future Input Data	A A	Opposing direction volume, Vo 832 veh/h Average Travel Speed Direction PCE for trucks, ET 2.0* 2.0* 1.0 Heavy-vehicle adj. factor, (note-5) fHV 0.952 Grade adj. factor, (note-1) fg 1.00 Directional flow rate, (note-2) vi 1239 pc/h 874 pc/h	Free-Flow Speed from Field Measurement: Field measured speed, fnote-3) S FM - mi/h Observed total demand, (note-3) V - veh/h Estimated Free-Flow Speed: Base free-flow speed, (note-3) BFFS 55.0 mi/h Adj. for lane and shoulder width, (note-3) fLS 0.0 mi/h Free-flow speed, FFSd 51.3 mi/h	Adjustment for no-passing zones, fnp 1.2 mi/h Average travel speed, ATSd 33.6 mi/h Percent Free Flow Speed, PFFS 65.6 %

mi mi mi/h

55 0 3 1180.0 26.00 4.79 3.26 Posted speed limit, Sp
Percent of segment with occupied on-highway parking Pavement rating, PP PROW rate in outside lane, WOL Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

HCS 2010: Two-Lane Highways Release 6.70

Phone: E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

Lauren Davini
Napa County
9/8/15
8/8/15
Weekend Midday Peak
Silverado Trail
0.5mi N/o & S/o 4059 SilvTrail
2015 Jurisdiction Analysis Year Description SB Future Agency/Co. Date Performed Analysis Time Period Highway From/To Analyst

Input Data

Highway class Class	0	7.00	hour f	Deak hour factor, DHF	PHE	1 00		
e.	7.0	% Tru	cks an	Trucks and buses	:		6.0	
Lane width	12.0 ft	8 Tru	& Trucks crawling	awling		0.0	oa	
Segment length	1.0 mi	Truck	crawl	Truck crawl speed		0.0	mi/hr	
Terrain type	Level	3 Rec	reatio	nal vehi	icles	2	60	
Grade: Length	- mi	No-	passin	% No-passing zones		100	6.0	
Up/down	00	Acces	s poin	Access point density	۲y	12	/mi	
Analysis direction volume,	۸d		veh/h					
Opposing direction volume,	٥	1180 ve	veh/h					
	Ave	Average Trave	Travel Speed	g				- 1
Direction		Ana	Analysis(d)	ĝ	ô	posina	(0)	
PCE for trucks, ET			2.0*		•	2.0*		
PCE for RVs, ER			1.0			1.0		
Heavy-vehicle adj. factor, (note-5) fHV	actor, (note-	-5) fHV	0.952			0.952		
Grade adj. factor, (note-1) fg	ote-1) fg		1.00			1.00		
Directional flow rat	e, (note-2) t	ri	874	bc/h		1239	pc/h	
Free-Flow Speed from Field Measurement:	Field Meas	rement:						
Field measured speed, (note-3) S FM	, (note-3) S	FM		ı	mi/h			
Observed total demand, (note-3) V	d, (note-3) \	~		1	veh/h			
Estimated Free-Flow Speed:	Speed:							
Base free-flow speed, (note-3) BFFS	, (note-3) BI	FES		55.0	mi/h			
Adj. for lane and shoulder width, (note-3) fLS	oulder width	1, (note-3)		0.0	mi/h			
Adj. for access point density, (note-3)	t density, (r	note-3) fA		3.0	mi/h			
Free-flow speed, FFSd	ซ			52.0	mi/h			
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4				•	:			
Adjustment for no-passing zones, Average travel speed, ATSA Barrent from Flor same after	saing zones, , ATSd	ďuz		34.6	mi/h mi/h			
rercent tree trow speed, Firs	eed, Firs			0.00	مر			

•	FOLLOWING	
	pent-Fol	
	me-s	
	0	

Opposing (o) 1.0	1.000 1.00 h 1180 pc/h	75.0 % 17.4 % 82.2 %
Anal	fHV 1.000 fg 1.00 832 pc/h	fnp labersed 7 fnp labersed 7 fnp labersed 8
Direction PCE for trucks, ET PCE for RVs, ER	<pre>Heavy-vehicle adjustment factor, fHV Grade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi</pre>	Base percent time-spent-following, (note-4) BPTSEd 75.0 Adjustment for no-passing zones, fnp 17.4 Percent time-spent-following, PTSEd 82.2

Level of Service and Other Performance Measures_

Level of service, LOS	Ω		
Volume to capacity ratio, v/c	0.49		
Peak 15-min vehicle-miles of travel, VMT15	208	veh-mi	
Peak-hour vehicle-miles of travel, VMT60	832	veh-mi	
Peak 15-min total travel time, TT15	0.9	veh-h	
Capacity from ATS, CdATS	1700	veh/h	
Capacity from PTSF, CdPTSF	1700	veh/h	
Directional Capacity	1700	veh/h	

Passing Lane Analysis

1.0 mi	34.6 82.2 D
, Lu	
Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane	Length of passing lane including tapers, Lpl Average travel speed, ATSG (from above) Percent time-spent-following, PTSFG (from above) Level of service, LOSd (from above)

Average Travel Speed with Passing Lane

Downstream length of two-lane highway within effective
length of passing lane for average travel speed, Lde - mi
Length of two-lane highway downstream of effective
length of the passing lane for average travel speed, Ld - mi
Adj. factor for the effect of passing lane
on average speed, fpl
Average travel speed including passing lane, ATSpl
Percent free flow speed including passing lane, PFFSpl 0.0 %
Percent Time-Spent-Following with Passing Lane
Downstream length of two-lane highway within effective length

mį шŢ Lowinstream tengum of two-lame nignmay within effective length of passing lame for percent time-spent-following, ide length of two-lame highway downstream of effective length of the passing lane for percent time-spent-following, id 7 Adj. factor for the effect of passing lane on percent time-spent-following, fpl Percent time-spent-following plane including passing lane, PTSFpl

Level of Service and Other Performance Measures with Passing Lane

veh-h K 1 Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

Bicycle Level of Service

30 E	832.0	26.00	6/.6	3.08	U
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement ratind, P	, vol.	a lane, We			
Posted speed limit, Sp Percent of segment with oc Pavement rating, P	Flow rate in outside lane, vol	Effective width of outside lane, We	Effective speed factor, St	Bicycle LOS Score, BLOS	Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

* These items have been entered or edited to override calculated value

Percent Time-Spent-Following

PCE for PCE fo	Level of Volume Volume Peak 15-m Peak 15-m Peak 15-m Capacity Capacity Olivection	Total length of mi/hr Length of Length of Length of Length of Length of Length of Miles of Level of Level of	Downstrea	Length of Lang Adj. fact Adj. fact On av Average t Pc/h		Percent t included to the transfer of the tran
Si		0.95 0.0 % 0.0 mi/ 2 % 100 %		Opposing (o) 2.0* 1.0 0.952 1.00 2.356 p		
ent Analys	rail	or, PHF uses ing eed vehicles ones		op op/p	mi/h veh/h 0 mi/h mi/h mi/h	3 mi/h mi/h 7 mi/h 3 %
Fax: Directional Two-Lane Highway Segment Analysis	ini .y f Peak Trail 6 S/o 4059 SilvTrail Napa Input Data	Peak hour factor, PHF % Trucks and buses % Truck crawling Truck crawl speed % Recreational vehicles % No-passing zones Access point density	veh/h veh/h Travel Speed	Analysis (d) 2.0* 1.0 1.0 1.00 1.00 989	ent: - - - - - - - - - - - - - - - - - - -	51.3 0.6 48.3
onal Two-La	Lauren Davini Napa County 9/8/15 9/8/15 Weekday PM Peak Silverado Trail 0.5mi N/o 6 S/o County of Napa 2015 + Project Input	ft ft mi el mi	e, Vd 894 e, Vo 2131 Average	vi	ld Measurem te-3) S FM ote-3) V d: te-3) BFFS er width, (no	g zones, fnj Sd PFFS
Directi	Period Future +	class Class 2 width 12.0 thength 1.0 type Level Length -	direction volume,	Direction PCE for trucks, ET PCE for RNs, EF Heavy-vehicle adj. factor, (note-5) Grade adj. factor, inote-1) fg Directional flow rate, (note-2) vi	Free-Flow Speed from Field Measurement: Field measured speed, (note-3) S FM Observed total demand, (note-3) V Estimated Free-Flow Speed: Base free-Flow speed; Adj. for lane and shoulder width, (note-3) Adj. for lane spoint density, (note-3) FA	Free-flow speed, FFSd Adjustment for no-passing zones, fnp Average travel speed, ATSd Percent Free Flow Speed, PFFS
Phone: E-Mail:	Analyst Agency/Co. Date Performed Analysis Time Highway From/To Unrisdiction Analysis Year Description N	Highway class Shoulder width Lane width Segment length Terrain type Grade: Length	Analysis d Opposing d	Direction PCE for trucks, PCE for RVs, ER Heavy-vehicle ad Grade adj. fact, Directional floo	Free-Flow Spee Field measured Observed total Estimated Free- Base free-flow Adj. for lane a	Free-flow spee Adjustment for Average travel Percent Free F

Direction PCE for trucks, ET 1.0 1.0 PCE for RVS, ER 1.0 Beavy-wehicle adjustment factor, fHV 1.000 Grade adjustment factor, (note-1) fg 1.00 Base percent time-spent-following, (note-4) BPTSFG 81.1 Adjustment for no-passing zones, fnp Percent time-spent-following, PTSFG 85.3	Opposing 1.00 1.00 1.00 2.243	(o) pc/h
Level of Service and Other Performance Measures	Measures	Merritan de la company de la c
Level of service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT15 Peak: hour vehicle-miles of travel, VMT60 Peak: 15-min total travel time, TT15 Capacity from PTSF, CdATS Directional Capacity TO00	5 veh-mi veh-mi veh-h 0 veh/h 0 veh/h	
Passing Lane Analysis		- The state of the
Total length of analysis segment, it Length of two-lane highway upstream of the passing lane, Length of passing lane including tapers, Lpl Average travel speed, ATSd (from above) Percent Line-spent-following, PTSR (from above) Level of service, LOSd (from above)	1.0 6, Lu - 24.7 85.3	mi mi mi/h
Average Travel Speed with Passing	Lane	-
Downstream length of two-lane highway within effective length of passing lane for average travel speed, Liength of two-lane highway Ammetream of effective	re Lde	mi
length of the passing lane for average travel speed, Adj. factor for the effect of passing lane	Ľď	mi
on average spect, in the Average travels are Average travels become the force of th	0.0	go
Percent Time-Spent-Following with Passing	ing Lane	
Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde Length of two-lane highway downstream of effective length of	length Lde	mi
the passing lane for percent time-spent-following, Id Adj. factor for the effect of passing lane on percent time-spent-following, fpl		mí
Percent time-spent-following including passing lane, PTSFpl	ı	610
Level of Service and Other Performance Measures	with Passing	Lane
Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15	veh-h	

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.

3. For the analysis direction only and for v>200 veh/h.

4. For the analysis direction only.

5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

 \star These items have been entered or edited to override calculated value

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	lysis	
Fax:	Directional Two-Lane Highway Segment Analysis	4059 SilvTrail
	ional Two-Lane Hi	Lauren Davini Napa County 9/8/12 9/8/12 9/8/12 9/8/12 Silverado Trail 0.5mi N/o & S/o 4059 SilvTrail County of Napa + Project + Project
	Direct	eriod Future
Phone: E-Mail:		Analyst Lauren Dar Agency/Co. Date Performed Analysis Time Period Weekday Pl Highway Silverado From/To 0.5mi N/o Jurisdiction County of Analysis Year 2015 Bescription SB Future + Project

	p+0	ço	mi/hr	60	60	/mi		A CALLES AND A CAL
0.95	S	0.0	0.0	2	100	12		
Peak hour factor, PHF	% Trucks and buses	% Trucks crawling	Truck crawl speed	% Recreational vehicles	% No-passing zones	Access point density	veh/h veh/h	Average Travel Speed
	£t	ft	mi		mj	oo	Vd 2131 Vo 894	Average
18 2	7.0	12.0	1.0	Level	t	ı	volume,	
Highway class Class 2	Shoulder width	Lane width	Segment length	Terrain type	Grade: Length	Up/down	Analysis direction volume, Vd 2131 Opposing direction volume, Vo 894	

Input Data_

Direction Ana	Analysis (d)	g)	ddo	Opposing (o)	(0
PCE for trucks, ET	2.0*			2.0*	
PCE for RVs, ER	1.0			1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.952			0.952	
Grade adj. factor, (note-1) fg	1.00			1.00	
Directional flow rate, (note-2) vi	2356	bc/h		686	pc/h
Free-Flow Speed from Field Measurement:					
Field measured speed, (note-3) S FM		1	mi/h		
Observed total demand, (note-3) V		1	veh/h		
Estimated Free-Flow Speed:					
Base free-flow speed, (note-3) BFFS		55.0	mi/h		
Adj. for lane and shoulder width, (note-3) fLS	fls	0.0	mi/h		
Adj. for access point density, (note-3) fA		3.0	mi/h		
Free-flow speed, FFSd		52.0	mi/h		
Adjustment for no-passing zones, fnp		1.1	mi/h		
Average travel speed, ATSd		24.9	mi/h		
Percent Free Flow Speed, PFFS		47.9	0:0		

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Time-Spe	•
rcer	State of the State

A STATE OF S	•	-		
Direction	Analysis(d)		Opposing (o)	
PCE for trucks, ET	1.0		1.0	
PCE for RVs, ER	1.0		0.1	
Heavy-vehicle adjustment factor, fHV	1.000		1.000	
Grade adjustment factor, (note-1) fg	1.00		1.00	
Directional flow rate, (note-2) vi	2243 pc/h	:/h	941 pc/h	
Base percent time-spent-following, (note-4) BPTSFd 94.5	te-4) BPTSFd	94.5	, 0-0	
Adjustment for no-passing zones, fnp		14.3		
Percent time-spent-following, PTSFd		100.0 %	pic	

Level of Service and Other Performance Measures

لتا	1.32	561 veh-mi	2131 veh-mi	22.5 veh-h	0 veh/h	1700 veh/h	_
Level of service, LOS	Volume to capacity ratio, v/c	Peak 15-min vehicle-miles of travel, VMT15	Peak-hour vehicle-miles of travel, VMT60	Peak 15-min total travel time, TT15	Capacity from ATS, CdATS	Capacity from PTSF, CdPTSF	Directional Capacity

Passing Lane Analysis

		1
	mi	
	mi	
0.0	00	
		

щ. mi Percent Time-Spent-Following with Passing Lane Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld on percent time-spent-following, fpl Percent time-spent-following, fpl including passing lane, PTSFpl Level of Service and Other Performance Measures with Passing Lane

veh-h K I Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

Bicycle Level of Service

555	2243.2 26.00 4.79 3.58 D
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, P	Flow rate in outside lane, vol Effective width of outside lane, We Effective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

 $e=\pi^{e}=e$

- Notes:

 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific demograde segments are treated as level terrain.

 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis—the LOS is F.

 3. For the analysis direction only and for v>200 veh/h.

 4. For the analysis direction only and for well with analysis direction only.

 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.
- * These items have been entered or edited to override calculated value

pc/h

Percent Time-Spent-Following_

Direction Direction Direction Does for trucks, ET 1.0 Does for RVs, ER 1.0 Heavy-vehicle adjustment factor, fHV 1.000 Grade adjustment factor, (note-1) fg Directional flow rate, (note-2) vi Base percent time-spent-following, (note-4) BPTSFG Adjustment for no-passing zones, fmp Percent time-spent-following, PTSFG 91.1 %	Level of Service and Other Performance Measures Level of Service, LOS Volume to capacity ratio, v/c Peak 15-min vehicle-miles of travel, VMT60 Peak 15-min vehicle-miles of travel, VMT60 Peak 15-min total travel time, TT15 Capacity from ATS, CdATS Capacity from ATS, CdATS Capacity from PTS, CdATS Passing Lane Analysis	Total length of analysis segment, Lt Length of two-lane highway upstream of the passing lane, Lu - mi Length of passing lane including tapers, Lpl Average travel speed, ATSd (from above) Percent time-spent-following, PTSFd (from above) Level of service, LOSd (from above) Level of service, LOSd (from above) Level of service above)	y John Byon Lit	Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, ide - Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, id - mi Adj. factor for the effect of passing lane on percent time-spent-following, fpl - Percent time-spent-following, fpl - Percent time-spent-following including passing lane, PTSPpl - 8	Level of Service and Other Performance Measures with Passing Lane Level of service including passing lane, LOSpl A Peak 15-min total travel time, TT15 Bicycle Level of Service
Phone: E-Mail: Directional Two-Lane Highway Segment Analysis	Analyst Agency/Co. Agency/Co. Pate Performed 9/8/15 Analysis Time Period Reekend Midday Peak Analysis Time Period Reekend Midday Peak Highway From/To Outhy of Napa Analysis Year Description NB Future + Project Input Data	ft ft % 1 ft mi mi % Pcc	, u	Free-Flow Speed from Field Measurement: Field measured speed, (note-3) S FM - weh/h Cobserved total demand, (note-3) V - veh/h Estimated Free-Flow Speed: Base free-flow speed, (note-3) BFFS Adj. for lane and shoulder width, (note-3) fLS 0.0 mi/h Adj. for access point density, (note-3) fA 3.8 mi/h Free-flow speed, FFSd 51.3 mi/h	Adjustment for no-passing zones, fnp 1.2 mi/h Average travel speed, ATSd 33.5 mi/h Percent Free Flow Speed, PFFS 65.3 %

mi mi mi mi/h

55 0 3 1189.0 26.00 4.79 3.26 Posted speed limit, Sp
Percent of segment with occupied on-highway parking
Pavement rating, "
Flow rate in outside lane, vol.
Effective width of outside lane, We
Effective speed factor, St
Bicycle LOS Score, BLOS
Bicycle LOS

Notes:

1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LoS is F.

3. For the analysis direction only and for v>200 veh/h.

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HCS 2010: Two-Lane Highways Release 6.70

t. 13 0

Phone: E-Mail:

Directional Two-Lane Highway Segment Analysis

Fax:

Lauren Davini
Napa County
9/8/15
Weekend Midday Peak
Silverado Trail
0.5mi N/o & S/o 4059 SilvTrail
2015 Highway Silverado From/Yo 0.5mi N/o U.smi N/o Durisdiction County of Analysis Year 2015

Description SB Future + Project Agency/Co. Date Performed Analysis Time Period Analyst

Input Data

Highway class Class 2	155 2		Peak hour factor, PHF	1.00	
Shoulder width	7.0	ft	% Trucks and buses	'n	60
Lane width	12.0	ft	% Trucks crawling	0.0	00
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
	Level		& Recreational vehicles	2	00
Grade: Length	1	mi	% No-passing zones	100	0.0
Up/down	1	60	Access point density	12	/mi
Analysis direction volume, Vd Opposing direction volume, Vo	n volume,	Vd 842 Vo 1189	veh/h veh/h		

Speed	
Travel	
Average	

	Analysis (d)	(q)	ddO	Opposing (o)	(0
PCE for trucks, ET	2.0*		,	2.0*	
PCE for RVs, ER	1.0			1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.952	01		0.952	
Grade adj. factor, (note-1) fg	1.00			1.00	
Directional flow rate, (note-2) vi	884	bc/h		1249	pc/h
Free-Flow Speed from Field Measurement:					
Field measured speed, (note-3) S FM		1	mi/h		
Observed total demand, (note-3) V		ı	veh/h		
Estimated Free-Flow Speed:					
Base free-flow speed, (note-3) BFFS		55.0	mi/h		
Adj. for lane and shoulder width, (note-3) fLS	fls	0.0	mi/h		
Adj. for access point density, (note-3) fA		3.0	mi/h		
Free-flow speed, FFSd		52.0	mi/h		
Adjustment for no-passing zones, fnp		1.0	mi/h		
Average travel speed, ATSd		34.5	mi/h		
Percent Free Flow Speed, PFFS		66.3	0:0		

Measures
Performance
Other
and
Service
οţ
Level

D 0.50	211 veh-mi	842 veh-mi	6.1 veh-h		1700 veh/h	1700 veh/h
Level of service, LOS Volume to capacity ratio, v/c	Peak 15-min vehicle-miles of travel, VMT15	Peak-hour vehicle-miles of travel, VMT60	Peak 15-min total travel time, TT15	Capacity from ATS, CdATS	Capacity from PTSF, CdPTSF	Directional Capacity

Passing Lane Analysis_

mi	mi	** 0	Miles mine the second	mi	mi		olo.
1	1	0.0	ne l	۹.	1	1	1
Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld Adi, factor for the effect of passing lane	on average speed, fpl Average travel speed including passing lane, ATSpl Percent free flow speed including passing lane, PFFSpl	Percent Time-Spent-Following with Passing Lane	Downstream length of two-lane highway within effective length of passing lane for percent time-spent_following, Lde	Length of two-lane highway downstream of effective length or the passing lane for percent time-spent-following, Ld Ld fartor for the effect of passing lane	on percent time-spent-following, fpl	Percent time-spent-following including passing lane, PTSFpl

Level of Service and Other Performance Measures with Passing Lane

Service
of
Level
Bicycle
A THE PERSON NAMED IN COLUMN

veh-h

K I

Level of service including passing lane, LOSpl Peak 15-min total travel time, TT15

55 0 3 842.0 26.00 4.79 3.09
on-highway parking We
Posted speed limit, Sp Percent of segment with occupied on-highway parking Pavement rating, and the lane, vol. Effective width of outside lane, We Effective width of outside lane, Re Biffective speed factor, St Bicycle LOS Score, BLOS Bicycle LOS

- Notes:

 1. Note that the adjustment factor for level terrain is 1.00, as level terrain is one of the base conditions. For the purpose of grade adjustment, specific dewngrade segments are treated as level terrain.

 2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis—the LOS is F.

 3. For the analysis direction only and for v>200 veh/h.

 4. For the analysis direction only.

 5. Use alternative Exhibit 15-14 if some trucks operate at crawl speeds on a specific downgrade.

- * These items have been entered or edited to override calculated value

Appendix C

3 11 pc

Trip Generation Worksheet



	Winery	Traffic Information / Trip Genera	ation Sh	ieet	
чения в под	am Jasper	Winery Project Scenario	*		yaran da da da gaya ga garan da garan d
Traffic during a Typic	ai Weeko	day			
Number of FT employees:	10	x 3.05 one-way trips per employee	=	31	daily trip
Number of PT employees:	0	x 1.90 one-way trips per employee	=	0	daily trip
Average number of weekday visito	rs: <u>25</u>	/ 2.6 visitors per vehicle x 2 one-way trips	#	19	daily trip
Gallons of production:	20000 /	1,000 x .009 truck trips daily ⁸ x 2 one-way trips	=	0	daily trip:
		Total	=	50	daily trips
		Number of total weekday trips x .38	3 =	19	PM peak trips
Traffic during a Typic	al Saturd	lay			
Number of FT employees (on Satu	rdays):	10 × 3.05 one-way trips per employee	: =	31	daily trips
Number of PT employees (on Satu	ırdays):	0 × 1.90 one-way trips per employee	ı =	0	daily trips
Average number of weekend visito	rs:	25 / 2.8 visitors per vehicle x 2 one-way trips	=	18	daily trips
		Total	=	48	daily trips
		Number of total Saturday trips x .57	' =	27	PM peak trips
Traffic during a Crush	Saturda	y			
Number of FT employees (during	crush):	10 × 3.05 one-way trips per employee	=	31	daily trips
Number of PT employees (during	:rush):	0 x 1.90 one-way trips per employee	=	0	daily trips
Average number of weekend visitor	z:	25 / 2.8 visitors per vehicle x 2 one-way trips	=	18	daily trips
Gallons of production:	20000_/	1,000 x .009 truck trips daily x 2 one-way trips	=	0	daily trips
Avg. annual tons of grape on-haul:	150	x .11 truck trips daily ⁴ x 2 one-way trips	*	2	daily trips
		Total	=	51	daily trips
		Number of total Saturday trips x .57	=	29	PM peak trips
Largest Marketing Eve	nt- Addi	tional Traffic			
Number of event staff (largest eve	nt):	4 x 2 one-way trips per staff person	=	8	trips.
Number of visitors (largest event):_	50	/ 2.8 visitors per vehicle x 2 one-way trips	=	36	trips.
Number of special event truck trips	(largest event	:):x 2 one-way trips	=	4	trips.

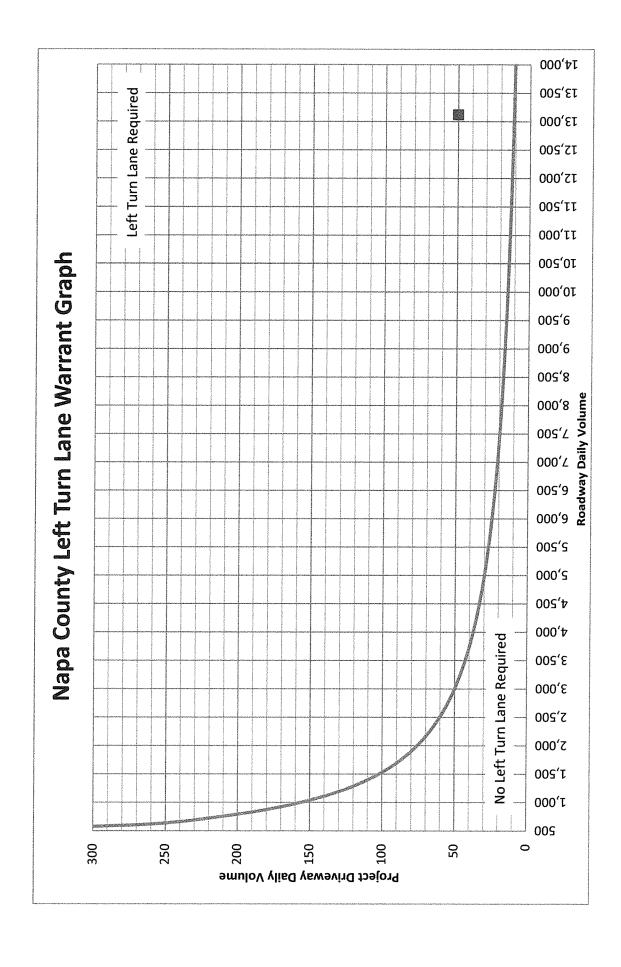
in the

³ Assumes 1.47 materials & supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see *Traffic Information* Sheet Addendum for reference).

Assumes 4 tons per trip / 36 crush days per year (see *Traffic Information Sheet Addendum* for reference).

Appendix D

Left-Turn Lane Warrant



~ 65 x