

**TRAFFIC IMPACT REPORT**  
**LMR RUTHERFORD ESTATE WINERY**  
**IN NAPA VALLEY**

**January 13, 2014**

**Prepared for: LMR Rutherford Estate Winery**

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## **I. INTRODUCTION**

This report has been prepared at the request of the LMR Rutherford Estate Winery (LMR) applicant to determine if the proposed winery along the west side of State Route 29-128 (SR 29) will result in any significant circulation system impacts at the project entrance or along the state highway. Analysis has been provided for harvest Friday and Saturday PM peak hour traffic conditions for existing, year 2015 (first year of full project production) and year 2030 (general plan buildout) horizons.

## **II. SUMMARY OF FINDINGS**

### **A. “WITHOUT PROJECT” OPERATING CONDITIONS**

1. SR 29 at the project site now has similar two-way traffic volumes during the Saturday PM peak hour as during the Friday peak traffic hour (about 1,624 two-way vehicles versus 1,619 two-way vehicles in early December). Volumes during harvest are projected to be about 13 percent higher based upon Caltrans seasonal traffic count data.
2. The SR 29 two-lane highway now experiences unacceptable level of service (LOS E) in both directions during harvest Friday and Saturday peak traffic conditions.
3. By 2015, SR 29 will continue to experience unacceptable level of service (LOS E) in both directions during both the harvest Friday and Saturday PM peak traffic hours.
4. By 2030, expected operation of SR 29 will continue at unacceptable levels of service (LOS E) in both directions during both harvest Friday and Saturday PM peak traffic hours.

### **B. PROJECT IMPACTS**

1. The proposed project will eliminate employee and visitor traffic along SR 29 during peak weekday and weekend traffic periods to the maximum extent possible utilizing employee shift change hours outside peak commute periods and ending weekday visitor by appointment activities before 4:00 PM.
2. The project will result in 0 inbound and 0 outbound trips during the harvest Friday peak traffic hour along SR 29, with 0 inbound and about 5 outbound trips during the Saturday afternoon peak traffic hour. Project trips during the Saturday PM peak hour will be associated with visitors by appointment, and possibly could be from 0 to 5 vehicles either entering or leaving the site depending upon the specific appointment time.

3. Eighty-eight percent of all grapes will be grown on-site and transported to the Winery on internal roadways and not on public streets. Currently, 100 percent of all grapes grown on the project site are transported via SR 29 and Mee Lane for processing at a winery in St. Helena. These trips will be eliminated. In addition, grapes now being grown off site to the south of the project will access the new winery via SR 29 and not continue to the existing winery operation in St. Helena.
4. Project traffic during harvest will not produce any significant level of service impacts along SR 29 during either Friday or Saturday afternoon peak traffic conditions for the near term (year 2015) or long term (year 2030) analysis horizons.
5. Sight lines will be adequate at the project's proposed driveway connection to SR 29, and the continuous two-way left turn lane at the project entrance will provide the maximum safety for vehicles turning left into the site.

### **C. CONCLUSIONS & RECOMMENDATIONS**

The project will result in no significant off-site circulation system operational impacts nor any sight line impacts at the proposed project driveway connection to SR 29. Employees will have shift change hours outside the peak traffic periods to the maximum extent possible, visitor by appointment numbers will be low, and existing grape trucks now traveling from project vineyards to St. Helena will be removed from Mee Lane and/or SR 29. A left turn lane is already provided on the SR 29 southbound approach to the project entrance and the winery driveway connection will be designed to Caltrans standards. Therefore, no mitigation measures are required for these issues.

## **III. PROJECT LOCATION & DESCRIPTION**

The LMR Winery will be located on the east side of SR 29 about a half mile north of the Rutherford Road intersection (see **Figure 1**). A continuous two-way left turn lane is already provided on the southbound SR 29 approach to the project entrance, which will be opposite the entrance now serving the Grgich Hills Winery.

The proposed LMR Winery will have the following yearly production and visitor/special event levels.

- 100,000 gallons per year production.
- Bottling on-site.
- 88 percent of the grapes will be grown on-site, with 18 percent transported to the site (arriving from the south on SR 29).
- Tours and tasting by appointment only – 7 days per week from 11:00 AM to 3:45 PM on weekdays and from 11:00 AM to 4:30 PM on weekends. Maximum 50 visitors/day on weekdays, Saturdays, and Sundays.

- Food and wine pairing events – 24 times per year, maximum 35 visitors per event (between 11:00 AM and 2:00 PM or 6:30 and 10:00 PM on weekends).
- Marketing events – 6 per year, maximum 60 visitors per event (between 6:30 and 10:00 PM on weekends).
- Harvest Party – 2 times per year, maximum 100 visitors per event (between 10:00 AM and 8:00 PM).

## IV. EXISTING CIRCULATION SYSTEM OPERATION

### A. ANALYSIS LOCATIONS

The following locations have been evaluated in this study.

- SR 29/Project Entrance
- SR 29 in project vicinity

**Figure 2** presents approach geometrics and control at the project access intersection.

### B. VOLUMES

Friday 3:00 to 6:00 PM, Saturday 1:00 to 6:00 PM and Sunday 1:00 to 6:00 PM turn movement counts were conducted by Crane Transportation Group (CTG) in early December 2013 at the SR 29/Project Entrance/Grgich Hills Winery access intersection. The peak traffic hours were 4:00-5:00 PM on Friday, 3:30-4:30 PM on Saturday and 4:30-5:30 PM on Sunday. Resultant December 2013 peak hour counts are presented in **Figure 3**. Overall, two-way volumes along SR 29 at the project entrance were about the same during the Friday and Saturday PM peak hours (about 1,624 vehicles per hour [vph] on Saturday versus 1,619 vph on Friday). The Sunday SR 29 PM peak count (at 1,229 vehicles) was about 2.5 percent less than the Saturday PM count. Therefore, the higher time period, Saturday afternoon, was evaluated for weekend conditions. Based upon seasonal traffic count information from Caltrans and other Napa County jurisdictions, early December counts should be increased by about 13 percent to reflect peak harvest season volumes. Resultant 2013 harvest Friday and Saturday PM peak hour volumes are presented in **Figure 4**.

### C. ROADWAYS

SR 29 will provide the only access to the project site winery for visitors and employees. In the project vicinity it has two well-paved 12-foot travel lanes and 8-foot paved shoulders. A continuous turn lane is provided that now serves the Grgich Hills Winery entrance on the west side of the highway that will also serve the proposed LMR entrance. The posted speed limit is 50 miles per hour and the roadway is level and straight along the site frontage.

## **D. SR 29 OPERATION**

### **1. Analysis Methodology**

Operating conditions of two-lane rural highways are evaluated based upon methodology contained in the year 2010 *Highway Capacity Manual*. Inputs include peak hour volumes, speeds, lane and shoulder widths, grades and curvature as well as percent trucks, buses and RVs. Results are presented by direction as a level of service, volume-to-capacity ratio, average travel speed and percent time spent following (i.e. the percent time a driver is unable to pass a slower vehicle). For presentation purposes, level of service and speed are provided in this report.

### **2. Minimum Acceptable Operation**

The Napa County General Plan (Policy CIR-16) states 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 installation of more travel lanes than shown on the Circulation Map.

### **3. Existing Harvest Operation**

**Table 1** shows that currently both directions of SR 29 in the project area are operating at level of service (LOS E) during both the Friday and Saturday harvest PM peak traffic hours.

## **F. PLANNED IMPROVEMENTS**

There are no planned and funded improvements along SR 29 in the project area.<sup>1</sup>

## **V. FUTURE HORIZON CIRCULATION SYSTEM OPERATION WITHOUT THE PROJECT**

Project traffic impacts have been determined for near and long term horizons. The near term horizon reflects the first year that the project will be at full production. Based upon input from the project applicant, the expected first year of full production will be 2015. The long term horizon reflects the County's general plan buildout year, which is 2030. Future horizon year volumes have been determined based upon traffic modeling projections for the year 2030 from the County's General Plan Circulation Element. This document showed an approximate 70 percent growth in weekday PM peak hour traffic along SR 29 just north of Rutherford Road between the years 2000 and 2030. Projecting straight-line traffic growth for analysis purposes, this translated into about a 3.5 percent growth in SR 29 traffic from 2013 to the year 2015, and about a 29 percent growth in traffic from 2013 to 2030.

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<sup>1</sup> Mr. Paul Wilkinson, Napa County Public Works Department, December 2013.

Since traffic modeling projections were available for a weekday PM peak hour only and not for a Saturday peak hour, north and southbound Saturday volumes on SR 29 were both uniformly increased by the percentages above. However, due to the greater detail available for weekday volumes which showed a higher increase in southbound versus northbound traffic on SR 29, Friday PM peak hour volumes were adjusted directionally, with the guidance that the combined two-way volume percent increases should be as listed above.

#### **A. YEAR 2015 WITHOUT PROJECT EVALUATION**

##### **1. Volumes**

Year 2015 “Without Project” Friday and Saturday PM peak hour harvest volumes are presented in **Figure 5**.

##### **2. SR 29 Operation**

**Table 1** shows that in 2015 during the harvest season, “Without Project” operation of SR 29 in both directions in the project area would be at level of service E (LOS E) during both the Friday and Saturday PM peak traffic hours.

#### **B. YEAR 2030 WITHOUT PROJECT EVALUATION**

##### **1. Volumes**

Year 2030 “Without Project” Friday and Saturday PM peak hour harvest volumes are presented in **Figure 6**.

##### **2. SR 29 Operation**

**Table 1** shows that in 2030 during the harvest season, “Without Project” operation of SR 29 in both directions in the project area would be at level of service E (LOS E) during both the Friday and Saturday PM peak traffic hours.

## **VI. PROJECT IMPACTS**

#### **A. SIGNIFICANCE CRITERIA**

The following criteria were developed for recent traffic impact analyses in the County. These same criteria have been utilized in this study to determine the significance of impacts due to the project. An impact is considered to be significant if any of the following conditions are met.

- If SR 29 two-lane highway peak hour “Without Project” overall LOS A, B, C or D operation deteriorates to LOS E or F operation with the addition of project traffic, the impact is considered significant and would require mitigation.

- If SR 29 two-lane highway peak hour “Without Project” operation is already LOS E or F, an increase in traffic that would reduce the speed by more than 0.1 miles per hour due to the project is considered to be significant and would require mitigation.
- If sight lines at the project entrance do not meet stopping sight distance criteria as detailed in *A Policy on Geometric Design of Highways and Streets*, 2011, 6th Edition, by AASHTO.

## B. TRIP GENERATION

Friday and Saturday afternoon trip generation projections were developed with the assistance of the project applicant for all components of employee, visitor and grape delivery activities at the proposed LMR Winery (see worksheets in **Appendix**). Results are presented on an hourly basis in **Table 2** for Friday and Saturday afternoon conditions. As shown, no winery employee or visitor traffic would be expected on the local roadway network during harvest Friday PM peak hour conditions (4:00-5:00 PM). During a harvest Saturday afternoon peak traffic hour (3:30-4:30 PM), winery-related traffic on the local roadway system would be due to a small number of visitors leaving the winery.

Winery-related traffic expected on SR 29 during the Saturday PM peak traffic hour on SR 29 would be associated with visitors (by appointment) with a maximum of 50 visitors per day. A 10- to 12-person group would result in up to 5 entering or exiting vehicles at any given time. On a daily basis, there would only be 18 to 20 visitor vehicles entering and leaving the site. A portion of visitor traffic would be expected to already be on SR 29 and visiting other wineries.

Grapes being grown on project site vineyards are now shipped to a winery in St. Helena for processing via Mee Lane and SR 29. With the proposed project, all of these trips would be eliminated from Mee Lane and the state highway as they would be transported internally to the new LMR Winery. In addition, all grapes being grown off site that would come to the LMR Winery are now traveling from the south on SR 29 to the same St. Helena winery. These trips would also be eliminated from SR 29 to the north of the LMR Winery.

## C. TRIP DISTRIBUTION

The minor amount of project visitor traffic during the Saturday PM peak hour was distributed to SR 29 in a pattern reflective of distribution patterns at the Grgich Hills Winery access across SR 29 from the project entrance. The Friday and Saturday project traffic increments expected on SR 29 during the times of ambient PM peak hour traffic flow are presented in **Figure 7**, while Friday and Saturday “With Project” PM peak hour volumes for the years 2015 and 2030 are presented in **Figures 8 and 9**, respectively.

## D. PLANNED ROADWAY IMPROVEMENTS

The LMR Winery entrance driveway connection to SR 29 will be constructed to Caltrans standards.

## **E. YEAR 2015 SR 29 IMPACTS**

### **1. Level of Service**

**Table 1** shows that project traffic would produce no impacts along SR 29 during the year 2015 Friday or Saturday PM peak traffic hours. While Friday and Saturday peak hour level of service would remain E, project traffic would not change average travel speed by more than 0.1 mile per hour at any location along SR 29.

## **F. YEAR 2030 SR 29 IMPACTS**

### **1. Level of Service**

**Table 1** shows that project traffic would produce no impacts along SR 29 during the year 2030 Friday or Saturday PM peak traffic hours. While Friday and Saturday peak hour level of service would remain E, project traffic would not change average travel speed by more than 0.1 mile per hour at any location along SR 29.

## **G. SIGHT LINE ADEQUACY**

Sight lines would be acceptable for drivers turning from the project driveway to SR 29. Sight lines to the north and south would be greater than 1,000 feet. Based upon observed travel speeds along SR 29 adjacent to the project site of up to 50 to 55 miles per hour, the required stopping sight distance would be at most 495 feet.<sup>2</sup>

## **VII. CONCLUSIONS & RECOMMENDATIONS**

The project will result in no significant off-site circulation system operational impacts nor any sight line impacts at the proposed project driveway connection to SR 29. Employees will have shift change hours outside the peak traffic periods to the maximum extent possible, visitor by appointment numbers will be low, and existing grape trucks now traveling from project vineyards to St. Helena will be removed from Mee Lane and/or SR 29. A left turn lane is already provided on the SR 29 southbound approach to the project entrance and the winery driveway connection will be designed to Caltrans standards. Therefore, no mitigation measures are required for these issues.

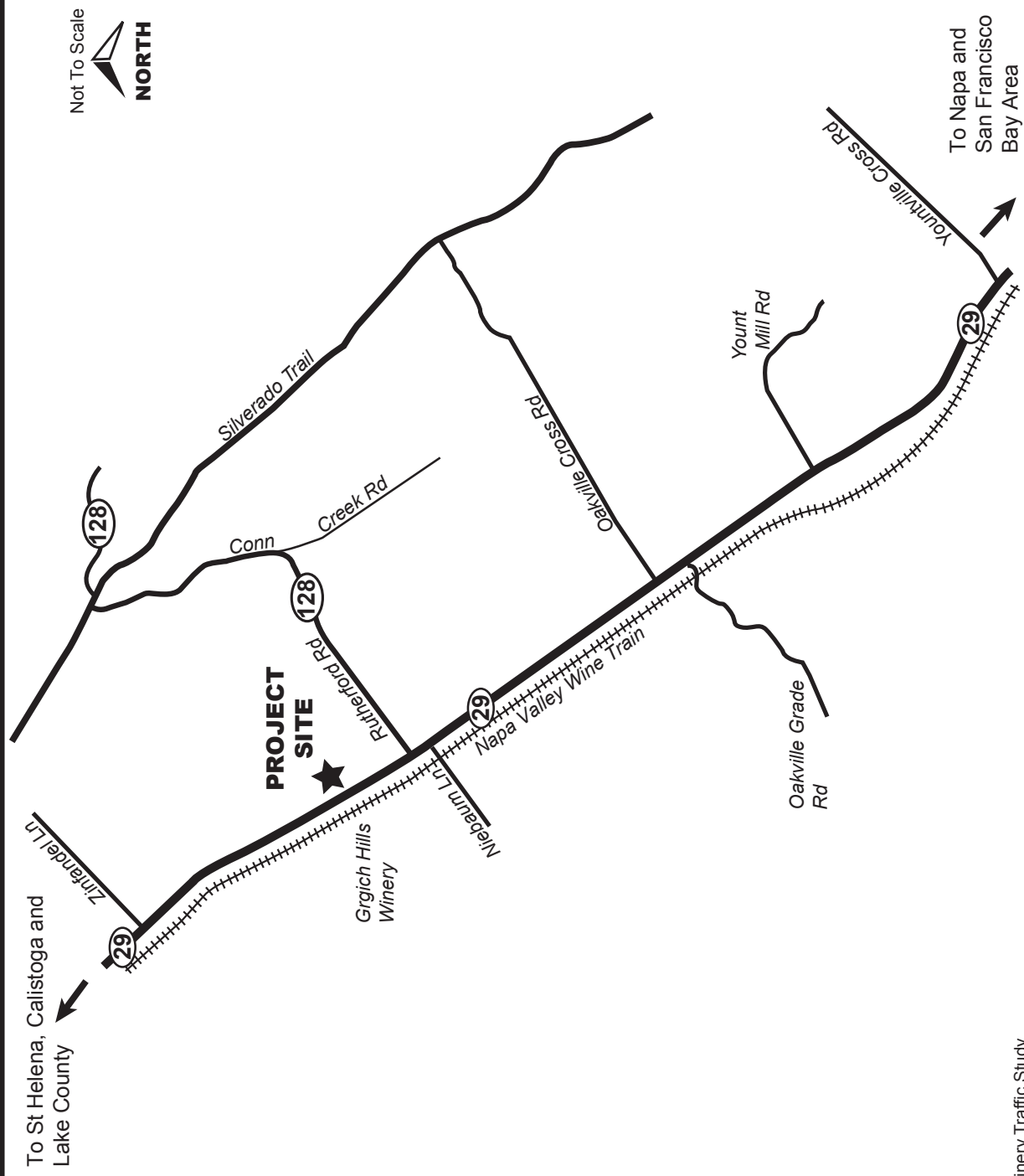
*This Report is intended for presentation and use in its entirety, together with all of its supporting exhibits, schedules, and appendices. Crane Transportation Group will have no liability for any use of the Report other than in its entirety, such as providing an excerpt to a third party or quoting a portion of the Report. If you provide a portion of the Report to a third party, you agree to hold CTG harmless against any liability to such third parties based upon their use of or reliance upon a less than complete version of the Report.*

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<sup>2</sup> A Policy on Geometric Design of Highways and Streets, 2011, AASHTO.

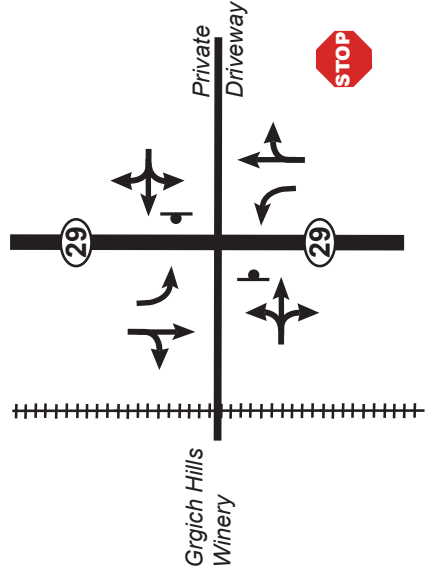



## Figures



LMR Rutherford Estate Winery Traffic Study

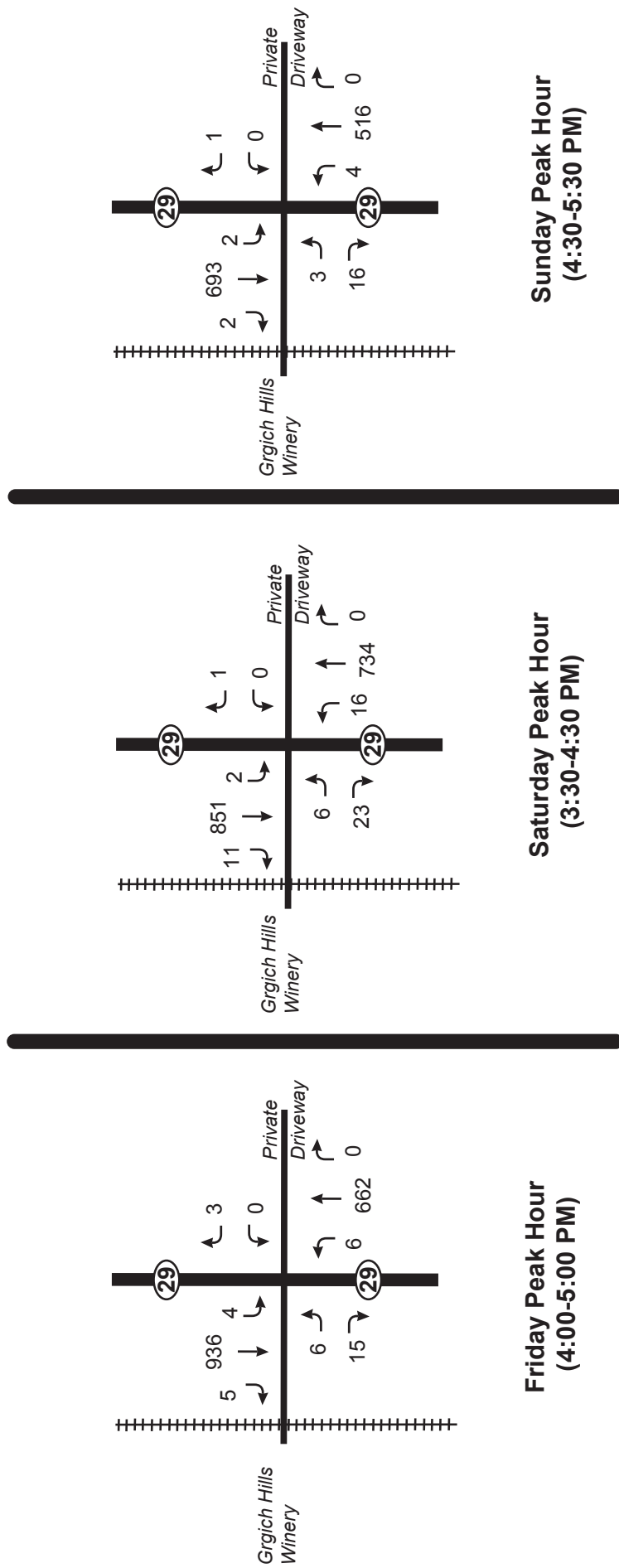
**Figure 1**  
**Area Map**

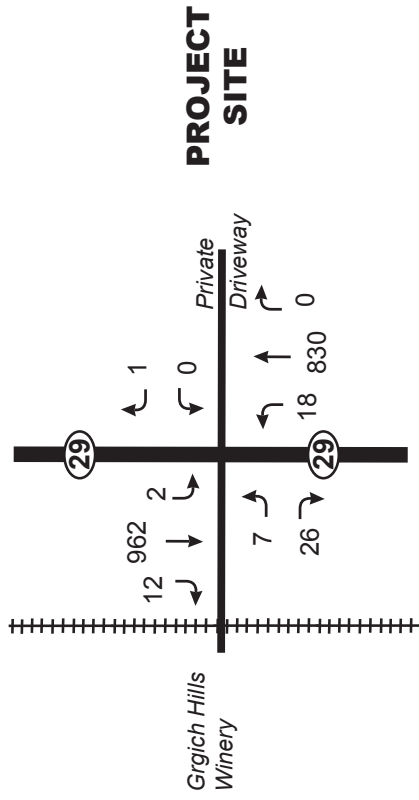
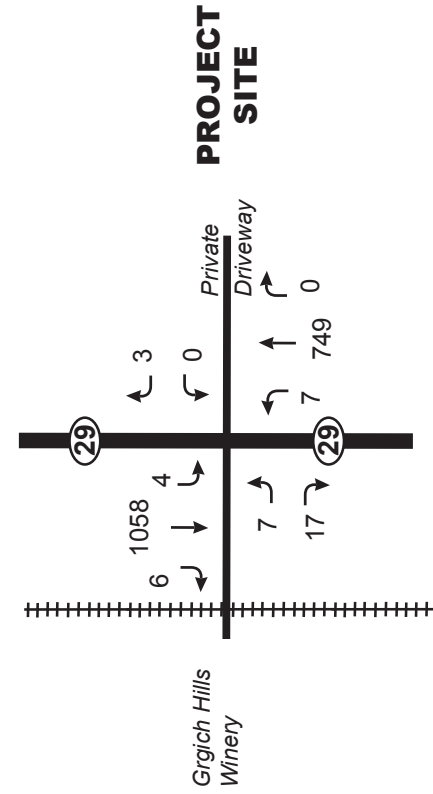


+++++ - Napa Wine Train  
 = Side Street Stop Sign Controlled Intersection

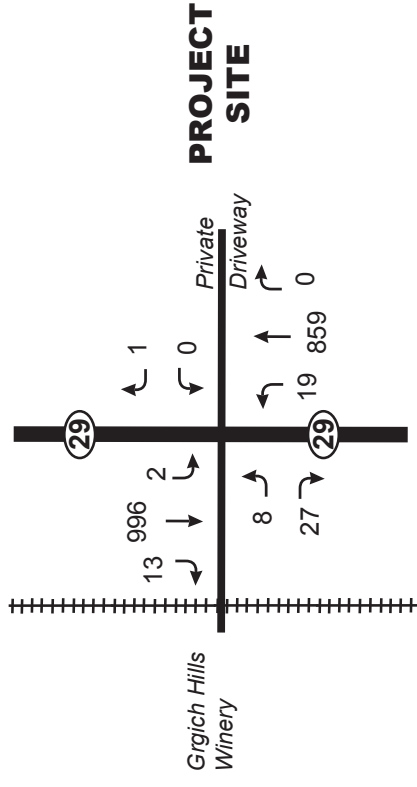
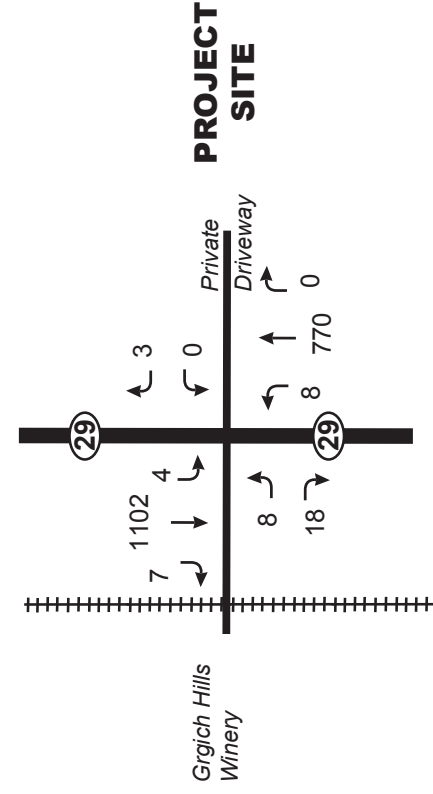
LMR Rutherford Estate Winery Traffic Study

**Figure 2**  
**Existing Lane Geometrics**  
**and Intersection Control**

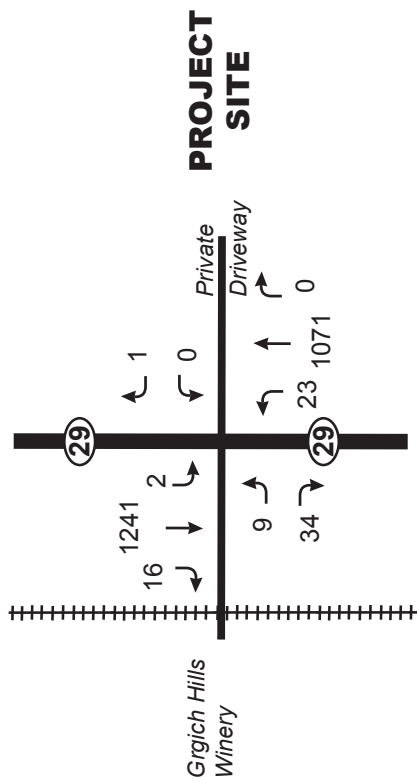
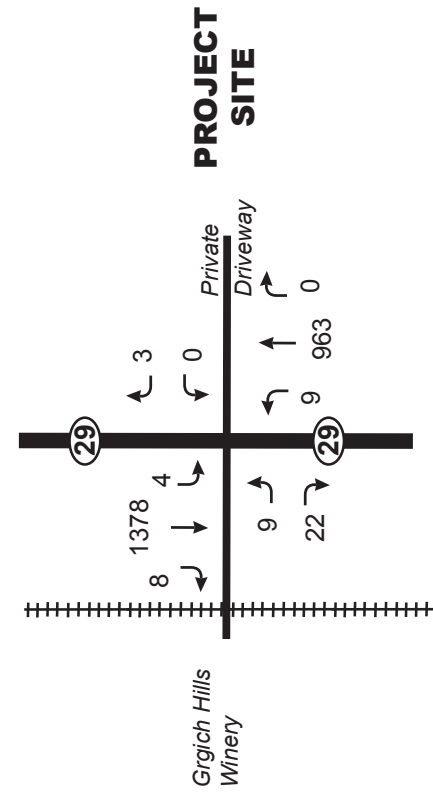


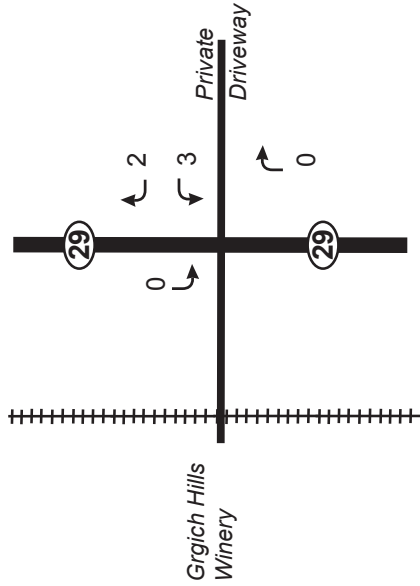
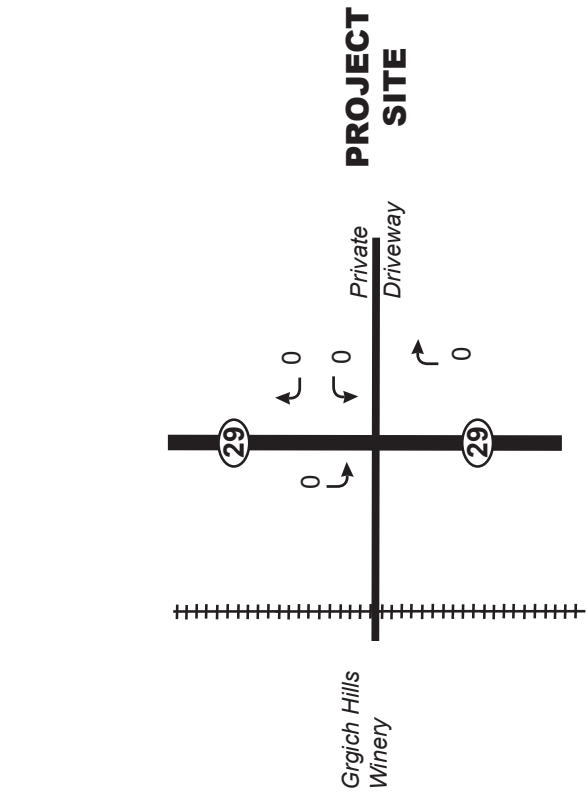


+++++ - Napa Wine Train



+++++ - Napa Wine Train

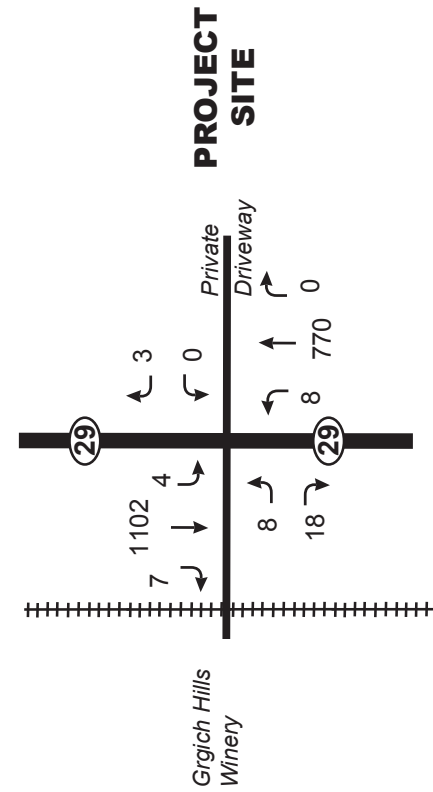




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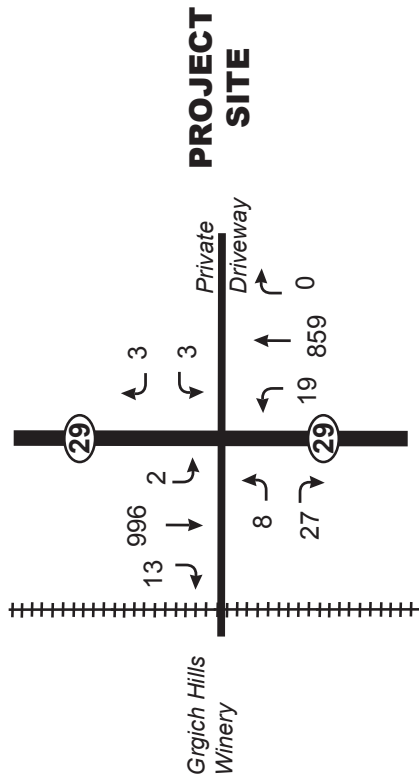
**Figure 7**  
**Friday and Saturday PM Peak Hour  
Project Increment**





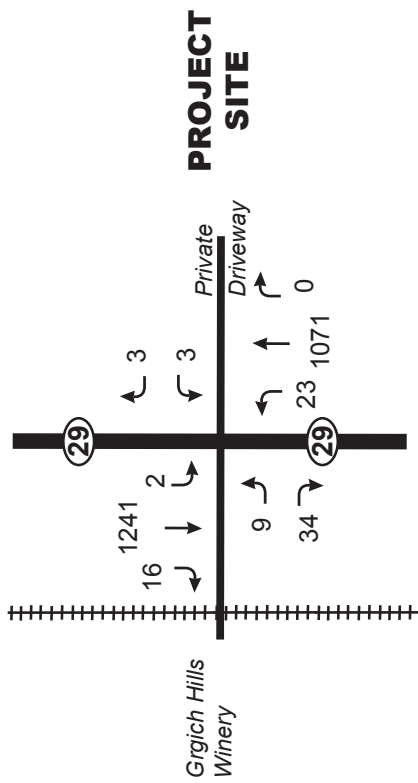
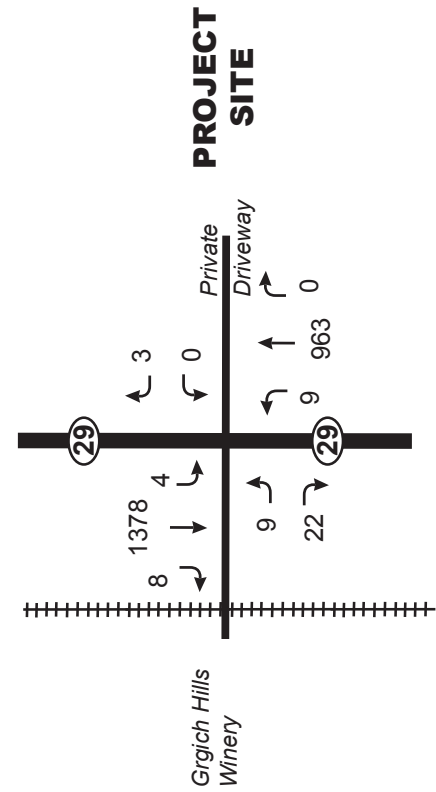
+++++ - Napa Wine Train

LMR Rutherford Estate Winery Traffic Study



**Figure 8**  
**2015 Friday and Saturday**  
**PM Peak Hour (With Project)**  
**Harvest Season Volumes**

Not To Scale



+++++++ - Napa Wine Train

LMR Rutherford Estate Winery Traffic Study



CRANE TRANSPORTATION GROUP

**Figure 9**  
**2030 Friday and Saturday**  
**PM Peak Hour (With Project)**  
**Harvest Season Volumes**

## Tables

Table 1

## 2-LANE HIGHWAY LEVEL OF SERVICE

### HARVEST FRIDAY PM PEAK HOUR

LOCATION	DIRECTION	EXISTING	YEAR 2015		YEAR 2030	
			W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
SR 29-128 just North of Project	NB	E-31.9 <sup>(1)</sup>	E-31.3	E-31.3	E-28.1	E-28.1
	SB	E-31.7 <sup>(1)</sup>	E-31.1	E-31.1	E-27.7	E-27.7
SR 29-128 just South of Project	NB	E-31.8 <sup>(1)</sup>	E-31.3	E-31.3	E-28.1	E-28.1
	SB	E-31.6 <sup>(1)</sup>	E-31.0	E-31.0	E-27.7	E-27.7

### HARVEST SATURDAY PM PEAK HOUR

LOCATION	DIRECTION	EXISTING	YEAR 2015		YEAR 2030	
			W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
SR 29-128 just North of Project	NB	E-31.5 <sup>(1)</sup>	E-31.0	E-30.9	E-27.9	E-27.9
	SB	E-31.4 <sup>(1)</sup>	E-30.9	E-30.8	E-27.7	E-27.7
SR 29-128 just South of Project	NB	E-31.3 <sup>(1)</sup>	E-30.8	E-30.8	E-27.6	E-27.6
	SB	E-31.2 <sup>(1)</sup>	E-30.7	E-30.7	E-27.4	E-27.4

<sup>(1)</sup> Level of service/average travel speed in miles per hour.

*Year 2010 Highway Capacity Manual analysis methodology.*

*Source: Crane Transportation Group*

Table 2

## PROJECT TRIP GENERATION LMR RUTHERFORD WINERY

### HARVEST FRIDAY

	TOTAL EMPL.	HOURS	TRIPS			
			4-5 PM**		5-6 PM	
			IN	OUT	IN	OUT
Admin Employees	3	8:45 AM- 3:45 PM	0	0	0	4
Production Employees – Full Time	3	6:45 AM- 3:45 PM	0	0	0	0
Production Employees – Part Time	3	7:00 AM- 6:30 PM	0	0	0	0
Tours/Tasting Employees	2	11:00 AM- 3:45 PM	0	0	0	0
Grape Delivery Trucks	1/day	Between 6:00 AM- Noon	0	0	0	0
Visitors	50 total = 20 vehicles*	11:00 AM- 3:45 PM	0	0	0	0
<b>TOTAL</b>			0	0	0	0

\* 2.6 visitors/vehicle average on weekdays per County data.

\*\* Afternoon peak traffic hour.

### HARVEST SATURDAY

	TOTAL EMPL.	HOURS	TRIPS									
			2-3 PM		3-4 PM		4-5 PM		5-6 PM		3:30-4:30 PM**	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees	0		0	0	0	0	0	0	0	0	0	0
Production Employees – Full Time	1	9:00 AM- 6:00 PM	0	0	0	0	0	0	0	0	0	0
Production Employees – Part Time	3	7:00 AM- 6:30 PM	0	0	0	0	0	0	0	0	0	0
Tours/Tasting Employees	2	10:00 AM- 4:30 PM	0	0	0	0	0	2	0	0	0	0
Grape Delivery Trucks	0		0	0	0	0	0	0	0	0	0	0
Visitors	50 total = 18 vehicles*	11:00 AM- 4:30 PM	4	0	5	4	0	5	0	0	0	5
<b>TOTAL</b>			4	0	5	4	0	7	0	0	0	5

\* 2.8 visitors/vehicle average on weekdays per County data.

\*\*Afternoon peak traffic hour.

Source: Crane Transportation Group

# Appendix

## Appendix

# LMR RUTHERFORD WINERY TRAFFIC GENERATION WORKSHEET

## Harvest Conditions

EXISTING CONDITIONS	POST-PROJECT CONDITIONS
<p><b>A. Full-time admin employees</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Full-time admin employees</b>  # on Weekdays <u>3</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday 8:45 AM to 3:45 PM  Saturday _____ to _____  Sunday _____ to _____</p>
<p><b>B. Full-time production employees</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Full-time production employees</b>  # on Weekdays <u>3</u>  # on Saturday <u>1</u>  # on Sunday <u>1</u>  Work hours:  Weekday 6:45 AM to 3:45 PM  Saturday 9:00 AM to 6:00 PM  Sunday 9:00 AM to 6:00 PM</p>
<p><b>C. Part-time production employees</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Part-time production employees</b>  # on Weekdays <u>3</u>  # on Saturday <u>3</u>  # on Sunday <u>3</u>  Work hours: <b><i>24-hour shift schedule; 2 always present</i></b>  Weekday 7:00 AM to 6:30 AM  Saturday 7:00 AM to 6:30 AM  Sunday 7:00 AM to 6:30 AM</p>
<p><b>D. Tours &amp; tasting employees</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Tours &amp; tasting employees</b>  # on Weekdays <u>2</u>  # on Saturday <u>2</u>  # on Sunday <u>2</u>  Work hours:  Weekday 11:00 AM to 3:45 PM  Saturday 11:00 AM to 4:30 PM  Sunday 11:00 AM to 4:30 PM</p>

# LMR RUTHERFORD WINERY TRAFFIC GENERATION WORKSHEET

## Harvest Conditions

EXISTING CONDITIONS	POST-PROJECT CONDITIONS
<p><b>E. Grape Delivery Trucks</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____  # days of grape delivery: _____</p>	<p><b>Grape Delivery Trucks</b>  # on Weekdays <u>1</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday 6:00 AM to 12:00 PM  Saturday _____ to _____  Sunday _____ to _____  # days of grape delivery: <u>4</u></p>
<p><b>F. Maximum tours/tasting visitors</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Maximum tours/tasting visitors</b>  # on Weekdays <u>50</u>  # on Saturday <u>50</u>  # on Sunday <u>50</u>  Work hours:  Weekday 11:00 AM to 3:45 PM  Saturday 11:00 AM to 4:30 PM  Sunday 11:00 AM to 4:30 PM</p>
<p><b>G. Other employees?</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Other employees?</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>
<p><b>H. Other trucks?</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>	<p><b>Other trucks?</b>  # on Weekdays <u>0</u>  # on Saturday <u>0</u>  # on Sunday <u>0</u>  Work hours:  Weekday _____ to _____  Saturday _____ to _____  Sunday _____ to _____</p>



# LMR RUTHERFORD WINERY TRAFFIC GENERATION WORKSHEET

## Harvest Conditions

Percent of grapes imported to the site coming from the north on SR 29 – 0%

Percent of grapes imported to the site coming from the south on SR 29 – 12%

Percent of grapes grown on site – 88%

## SPECIAL EVENTS DURING THE YEAR

Food & wine pairing –      # events/year: 24  
   # people/event: 35  
   typical hours: 11:00 AM to 2:00 PM or 6:30 to 10:00 PM

Harvest party –              # events/year: 2  
   # people/event: 100  
   typical hours: 10:00 AM to 8:00 PM

Marketing events –        # events/year: 6  
   # people/event: 60  
   typical hours: 6:30 to 10:00 PM

Parking for large events will either be on site in the vineyards or off site utilizing shuttle buses.

# **TECHNICAL APPENDIX**

## **Capacity Worksheets**

**Midblock LOS Existing**

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	North of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2030 with Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	975	veh/h
Opposing direction volume, Vo	1390	veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1019 pc/h	1453 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSD	28.1	mi/h
Percent Free Flow Speed, PFFS	58.6	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1020 pc/h	1454 pc/h
Base percent time-spent-following,(note-4) BPTSFd	82.3 %	
Adjustment for no-passing zones, fnp	11.7	
Percent time-spent-following, PTSFd	87.1 %	

---

Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.60	
Peak 15-min vehicle-miles of travel, VMT15	124	veh-mi
Peak-hour vehicle-miles of travel, VMT60	488	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	28.1	mi/h
Percent time-spent-following, PTSFd (from above)	87.1	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	994.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.01
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To North of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2030 with Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1082 veh/h  
Opposing direction volume, Vo 1259 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1150 pc/h	1338 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 0.8 mi/h  
Average travel speed, ATSD 27.9 mi/h  
Percent Free Flow Speed, PFFS 58.0 %

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1150 pc/h	1338 pc/h
Base percent time-spent-following,(note-4) BPTSFd	84.6 %	
Adjustment for no-passing zones, fnp	11.8	
Percent time-spent-following, PTSFd	90.1 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.68	
Peak 15-min vehicle-miles of travel, VMT15	141	veh-mi
Peak-hour vehicle-miles of travel, VMT60	541	veh-mi
Peak 15-min total travel time, TT15	5.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.9	mi/h
Percent time-spent-following, PTSFd (from above)	90.1	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---



Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1127.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.83
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Friday  
Highway SR29  
From/To North of Grgich Southbound  
Jurisdiction Napa Ca  
Analysis Year 2030 with Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1390 veh/h  
Opposing direction volume, Vo 975 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1453 pc/h	1019 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.1 mi/h  
Average travel speed, ATSD 27.7 mi/h  
Percent Free Flow Speed, PFFS 57.8 %

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1454 pc/h	1020 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.1 %	
Adjustment for no-passing zones, fnp	11.7	
Percent time-spent-following, PTSFd	94.0 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.85	
Peak 15-min vehicle-miles of travel, VMT15	177	veh-mi
Peak-hour vehicle-miles of travel, VMT60	695	veh-mi
Peak 15-min total travel time, TT15	6.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	94.0	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1418.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.19
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	North of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 with Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1259	veh/h
Opposing direction volume, Vo	1082	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1338 pc/h	1150 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	27.7	mi/h
Percent Free Flow Speed, PFFS	57.6	%

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1338 pc/h	1150 pc/h
Base percent time-spent-following,(note-4) BPTSFd	86.8 %	
Adjustment for no-passing zones, fnp	11.8	
Percent time-spent-following, PTSFd	93.1 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.79	
Peak 15-min vehicle-miles of travel, VMT15	164	veh-mi
Peak-hour vehicle-miles of travel, VMT60	630	veh-mi
Peak 15-min total travel time, TT15	5.9	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	93.1	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1311.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Friday  
Highway SR29  
From/To South of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2030 with Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.98	
Shoulder width	8.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 972 veh/h  
Opposing direction volume, Vo 1400 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1016 pc/h	1464 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 0.7 mi/h  
Average travel speed, ATSD 28.1 mi/h  
Percent Free Flow Speed, PFFS 58.5 %



---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1017 pc/h	1464 pc/h
Base percent time-spent-following, (note-4) BPTSFd	82.2 %	
Adjustment for no-passing zones, fnp	11.6	
Percent time-spent-following, PTSFd	87.0 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.60	
Peak 15-min vehicle-miles of travel, VMT15	124	veh-mi
Peak-hour vehicle-miles of travel, VMT60	486	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	28.1	mi/h
Percent time-spent-following, PTSFd (from above)	87.0	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	991.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.01
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	South of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2030 with Project
Description	LMR

---

Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1094	veh/h
Opposing direction volume, Vo	1276	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1163 pc/h	1356 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	0.8	mi/h
Average travel speed, ATSD	27.6	mi/h
Percent Free Flow Speed, PFFS	57.6	%

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1162 pc/h	1356 pc/h
Base percent time-spent-following,(note-4) BPTSFd	84.8 %	
Adjustment for no-passing zones, fnp	11.3	
Percent time-spent-following, PTSFd	90.0 %	

---

Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.68	
Peak 15-min vehicle-miles of travel, VMT15	142	veh-mi
Peak-hour vehicle-miles of travel, VMT60	547	veh-mi
Peak 15-min total travel time, TT15	5.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.6	mi/h
Percent time-spent-following, PTSFd (from above)	90.0	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1139.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.84
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 with Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1400	veh/h
Opposing direction volume, Vo	972	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1464 pc/h	1016 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
-----------------------	------	------

Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATSD	27.7	mi/h
Percent Free Flow Speed, PFFS	57.6	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1464 pc/h	1017 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.3 %	
Adjustment for no-passing zones, fnp	11.6	
Percent time-spent-following, PTSFd	94.1 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	179	veh-mi
Peak-hour vehicle-miles of travel, VMT60	700	veh-mi
Peak 15-min total travel time, TT15	6.5	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	94.1	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1428.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.19
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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



Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 with Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1276	veh/h
Opposing direction volume, Vo	1094	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1356 pc/h	1163 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	27.4	mi/h
Percent Free Flow Speed, PFFS	57.2	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1356 pc/h	1162 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.1 %	
Adjustment for no-passing zones, fnp	11.3	
Percent time-spent-following, PTSFd	93.2 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.80	
Peak 15-min vehicle-miles of travel, VMT15	166	veh-mi
Peak-hour vehicle-miles of travel, VMT60	638	veh-mi
Peak 15-min total travel time, TT15	6.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.4	mi/h
Percent time-spent-following, PTSFd (from above)	93.2	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

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Level of Service and Other Performance Measures with Passing Lane

---

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

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Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1329.2
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.92
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

## **Midblock LOS 2015 Without Project**

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Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	North of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2015 without Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	781	veh/h
Opposing direction volume, Vo	1113	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	834 pc/h	1188 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	31.3	mi/h
Percent Free Flow Speed, PFFS	65.2	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	834 pc/h	1188 pc/h
Base percent time-spent-following, (note-4) BPTSFd	75.0 %	
Adjustment for no-passing zones, fnp	17.2	
Percent time-spent-following, PTSFd	82.1 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	102	veh-mi
Peak-hour vehicle-miles of travel, VMT60	391	veh-mi
Peak 15-min total travel time, TT15	3.3	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.3	mi/h
Percent time-spent-following, PTSFd (from above)	82.1	
Level of service, LOSd (from above)	E	

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

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Level of Service and Other Performance Measures with Passing Lane

---

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	813.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	North of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2015 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.93
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	868	veh/h
Opposing direction volume, Vo	1011	veh/h

---

Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	952 pc/h	1109 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	31.0	mi/h
Percent Free Flow Speed, PFFS	64.5	%



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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	952 pc/h	1109 pc/h
Base percent time-spent-following,(note-4) BPTSFd	77.9 %	
Adjustment for no-passing zones, fnp	17.4	
Percent time-spent-following, PTSFd	85.9 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.56	
Peak 15-min vehicle-miles of travel, VMT15	117	veh-mi
Peak-hour vehicle-miles of travel, VMT60	434	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.0	mi/h
Percent time-spent-following, PTSFd (from above)	85.9	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	933.3
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.74
Bicycle LOS	B

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 downgrade 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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Friday  
Highway SR29  
From/To North of Grgich Southbound  
Jurisdiction Napa Ca  
Analysis Year 2015 without Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	8.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1113 veh/h  
Opposing direction volume, Vo 781 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1188 pc/h	834 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.2 mi/h  
Average travel speed, ATSD 31.1 mi/h  
Percent Free Flow Speed, PFFS 64.7 %

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1188 pc/h	834 pc/h
Base percent time-spent-following,(note-4) BPTSFd	81.1 %	
Adjustment for no-passing zones, fnp	17.2	
Percent time-spent-following, PTSFd	91.2 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	145	veh-mi
Peak-hour vehicle-miles of travel, VMT60	557	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h
Capacity from ATS, CdATS	1695	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1695	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.1	mi/h
Percent time-spent-following, PTSFd (from above)	91.2	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1159.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.09
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	North of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2015 without Project
Description LMR	

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.93
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1011	veh/h
Opposing direction volume, Vo	868	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1109 pc/h	952 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATSD	30.9	mi/h
Percent Free Flow Speed, PFFS	64.3	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1109 pc/h	952 pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.1 %	
Adjustment for no-passing zones, fnp	17.4	
Percent time-spent-following, PTSFd	89.5 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.65	
Peak 15-min vehicle-miles of travel, VMT15	136	veh-mi
Peak-hour vehicle-miles of travel, VMT60	506	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.9	mi/h
Percent time-spent-following, PTSFd (from above)	89.5	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1087.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.81
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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



Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Friday  
Highway SR29  
From/To South of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2015 without Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	8.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 778 veh/h  
Opposing direction volume, Vo 1120 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	830 pc/h	1195 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.0 mi/h  
Average travel speed, ATSD 31.3 mi/h  
Percent Free Flow Speed, PFFS 65.2 %

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	831 pc/h	1196 pc/h
Base percent time-spent-following,(note-4) BPTSFd	74.9 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	81.9 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	101	veh-mi
Peak-hour vehicle-miles of travel, VMT60	389	veh-mi
Peak 15-min total travel time, TT15	3.2	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.3	mi/h
Percent time-spent-following, PTSFd (from above)	81.9	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	810.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To South of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2015 without Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 878 veh/h  
Opposing direction volume, Vo 1023 veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	963 pc/h	1122 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.0 mi/h  
Average travel speed, ATSD 30.8 mi/h  
Percent Free Flow Speed, PFFS 64.1 %

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	963 pc/h	1122 pc/h
Base percent time-spent-following,(note-4) BPTSFd	78.3 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	86.2 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.57	
Peak 15-min vehicle-miles of travel, VMT15	118	veh-mi
Peak-hour vehicle-miles of travel, VMT60	439	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.8	mi/h
Percent time-spent-following, PTSFd (from above)	86.2	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	944.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.74
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2015 without Project
Description LMR	

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1120	veh/h
Opposing direction volume, Vo	778	veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1195 pc/h	830 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSD	31.0	mi/h
Percent Free Flow Speed, PFFS	64.7	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1196 pc/h	831 pc/h
Base percent time-spent-following,(note-4) BPTSFd	81.2 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	91.3 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	146	veh-mi
Peak-hour vehicle-miles of travel, VMT60	560	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h
Capacity from ATS, CdATS	1695	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1695	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.0	mi/h
Percent time-spent-following, PTSFd (from above)	91.3	
Level of service, LOSd (from above)	E	

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Average Travel Speed with Passing Lane

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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

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

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Level of Service and Other Performance Measures with Passing Lane

---

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

---

Bicycle Level of Service

---



Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1166.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.09
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To South of Grgich Southbound  
Jurisdiction Napa Ca  
Analysis Year 2015 without Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1023 veh/h  
Opposing direction volume, Vo 878 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1122 pc/h	963 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.1 mi/h  
Average travel speed, ATSD 30.7 mi/h  
Percent Free Flow Speed, PFFS 63.9 %

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1122 pc/h	963 pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.4 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	89.6 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.66	
Peak 15-min vehicle-miles of travel, VMT15	137	veh-mi
Peak-hour vehicle-miles of travel, VMT60	512	veh-mi
Peak 15-min total travel time, TT15	4.5	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.7	mi/h
Percent time-spent-following, PTSFd (from above)	89.6	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1100.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.82
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Friday  
Highway SR29  
From/To North of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2015 with Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	8.0	ft	% Trucks and buses	3	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 781 veh/h  
Opposing direction volume, Vo 1113 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	834 pc/h	1188 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.0 mi/h  
Average travel speed, ATSD 31.3 mi/h  
Percent Free Flow Speed, PFFS 65.2 %

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	834 pc/h	1188 pc/h
Base percent time-spent-following, (note-4) BPTSFd	75.0 %	
Adjustment for no-passing zones, fnp	17.2	
Percent time-spent-following, PTSFd	82.1 %	

---

Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	102	veh-mi
Peak-hour vehicle-miles of travel, VMT60	391	veh-mi
Peak 15-min total travel time, TT15	3.3	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.3	mi/h
Percent time-spent-following, PTSFd (from above)	82.1	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	813.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To North of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2015 with Project  
Description LMR

---

Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 869 veh/h  
Opposing direction volume, Vo 1011 veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	953 pc/h	1109 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.0 mi/h  
Average travel speed, ATSD 31.0 mi/h  
Percent Free Flow Speed, PFFS 64.5 %



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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	953 pc/h	1109 pc/h
Base percent time-spent-following,(note-4) BPTSFd	78.0 %	
Adjustment for no-passing zones, fnp	17.4	
Percent time-spent-following, PTSFd	86.0 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.56	
Peak 15-min vehicle-miles of travel, VMT15	117	veh-mi
Peak-hour vehicle-miles of travel, VMT60	435	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.0	mi/h
Percent time-spent-following, PTSFd (from above)	86.0	
Level of service, LOSd (from above)	E	

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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	%

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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	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	934.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.74
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	North of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2015 with Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1113	veh/h
Opposing direction volume, Vo	781	veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1188 pc/h	834 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSD	31.1	mi/h
Percent Free Flow Speed, PFFS	64.7	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1188 pc/h	834 pc/h
Base percent time-spent-following,(note-4) BPTSFd	81.1 %	
Adjustment for no-passing zones, fnp	17.2	
Percent time-spent-following, PTSFd	91.2 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	145	veh-mi
Peak-hour vehicle-miles of travel, VMT60	557	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h
Capacity from ATS, CdATS	1695	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1695	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.1	mi/h
Percent time-spent-following, PTSFd (from above)	91.2	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1159.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.09
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To North of Grgich Southbound  
Jurisdiction Napa Ca  
Analysis Year 2015 with Project  
Description LMR

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Input Data

---

Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1011 veh/h  
Opposing direction volume, Vo 869 veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1109 pc/h	953 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.1 mi/h  
Average travel speed, ATSD 30.9 mi/h  
Percent Free Flow Speed, PFFS 64.3 %

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1109 pc/h	953 pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.1 %	
Adjustment for no-passing zones, fnp	17.4	
Percent time-spent-following, PTSFd	89.5 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.65	
Peak 15-min vehicle-miles of travel, VMT15	136	veh-mi
Peak-hour vehicle-miles of travel, VMT60	506	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.9	mi/h
Percent time-spent-following, PTSFd (from above)	89.5	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

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Level of Service and Other Performance Measures with Passing Lane

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

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1087.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.81
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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



Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2015 with Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1120	veh/h
Opposing direction volume, Vo	778	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1195 pc/h	830 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
-----------------------	------	------

Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSD	31.0	mi/h
Percent Free Flow Speed, PFFS	64.7	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1196 pc/h	831 pc/h
Base percent time-spent-following,(note-4) BPTSFd	81.2 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	91.3 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.70	
Peak 15-min vehicle-miles of travel, VMT15	146	veh-mi
Peak-hour vehicle-miles of travel, VMT60	560	veh-mi
Peak 15-min total travel time, TT15	4.7	veh-h
Capacity from ATS, CdATS	1695	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1695	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.0	mi/h
Percent time-spent-following, PTSFd (from above)	91.3	
Level of service, LOSd (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, 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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1166.7
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.09
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2015 with Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	778	veh/h
Opposing direction volume, Vo	1120	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	830 pc/h	1195 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	31.3	mi/h
Percent Free Flow Speed, PFFS	65.2	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	831 pc/h	1196 pc/h
Base percent time-spent-following,(note-4) BPTSFd	74.9 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	81.9 %	

---

Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	101	veh-mi
Peak-hour vehicle-miles of travel, VMT60	389	veh-mi
Peak 15-min total travel time, TT15	3.2	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	31.3	mi/h
Percent time-spent-following, PTSFd (from above)	81.9	
Level of service, LOSd (from above)	E	

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

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Level of Service and Other Performance Measures with Passing Lane

---

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

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	810.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	South of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2015 with Project
Description	LMR

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Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.93
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	878	veh/h
Opposing direction volume, Vo	1024	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	963 pc/h	1124 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	30.8	mi/h
Percent Free Flow Speed, PFFS	64.1	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	963 pc/h	1123 pc/h
Base percent time-spent-following,(note-4) BPTSFd	78.3 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	86.2 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.57	
Peak 15-min vehicle-miles of travel, VMT15	118	veh-mi
Peak-hour vehicle-miles of travel, VMT60	439	veh-mi
Peak 15-min total travel time, TT15	3.8	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.8	mi/h
Percent time-spent-following, PTSFd (from above)	86.2	
Level of service, LOSd (from above)	E	

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

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Level of Service and Other Performance Measures with Passing Lane

---

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

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Bicycle Level of Service

---



Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	944.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.74
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To South of Grgich Southbound  
Jurisdiction Napa Ca  
Analysis Year 2015 with Project  
Description LMR

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Input Data

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Highway class	Class 1		Peak hour factor, PHF	0.93	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1024 veh/h  
Opposing direction volume, Vo 878 veh/h

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Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1124 pc/h	963 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 1.1 mi/h  
Average travel speed, ATSD 30.7 mi/h  
Percent Free Flow Speed, PFFS 63.9 %

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1123 pc/h	963 pc/h
Base percent time-spent-following,(note-4) BPTSFd	80.5 %	
Adjustment for no-passing zones, fnp	17.1	
Percent time-spent-following, PTSFd	89.7 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.66	
Peak 15-min vehicle-miles of travel, VMT15	138	veh-mi
Peak-hour vehicle-miles of travel, VMT60	512	veh-mi
Peak 15-min total travel time, TT15	4.5	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	30.7	mi/h
Percent time-spent-following, PTSFd (from above)	89.7	
Level of service, LOSd (from above)	E	

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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	%

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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	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

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Level of Service and Other Performance Measures with Passing Lane

---

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1101.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.82
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

## **Midblock LOS 2030 Without Project**

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Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	North of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	975	veh/h
Opposing direction volume, Vo	1390	veh/h

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Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1019 pc/h	1453 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSD	28.1	mi/h
Percent Free Flow Speed, PFFS	58.6	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1020 pc/h	1454 pc/h
Base percent time-spent-following,(note-4) BPTSFd	82.3 %	
Adjustment for no-passing zones, fnp	11.7	
Percent time-spent-following, PTSFd	87.1 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.60	
Peak 15-min vehicle-miles of travel, VMT15	124	veh-mi
Peak-hour vehicle-miles of travel, VMT60	488	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	28.1	mi/h
Percent time-spent-following, PTSFd (from above)	87.1	
Level of service, LOSd (from above)	E	

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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	%

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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	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

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Level of Service and Other Performance Measures with Passing Lane

---

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

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	994.9
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.01
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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



Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst DRR  
Agency/Co. CTG  
Date Performed 19/12/2013  
Analysis Time Period Harvest Saturday  
Highway SR29  
From/To North of Grgich Northbound  
Jurisdiction Napa Ca  
Analysis Year 2030 without Project  
Description LMR

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Input Data

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Highway class	Class 1		Peak hour factor, PHF	0.96	
Shoulder width	8.0	ft	% Trucks and buses	2	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	0.5	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length	-	mi	% No-passing zones	100	%
Up/down	-	%	Access point density	8	/mi

Analysis direction volume, Vd 1081 veh/h  
Opposing direction volume, Vo 1259 veh/h

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Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1149 pc/h	1338 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM - mi/h  
Observed total demand,(note-3) V - veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS 50.0 mi/h  
Adj. for lane and shoulder width,(note-3) fLS 0.0 mi/h  
Adj. for access point density,(note-3) fA 2.0 mi/h

Free-flow speed, FFSD 48.0 mi/h

Adjustment for no-passing zones, fnp 0.8 mi/h  
Average travel speed, ATSD 27.9 mi/h  
Percent Free Flow Speed, PFFS 58.1 %

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Percent Time-Spent-Following

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1149 pc/h	1338 pc/h
Base percent time-spent-following,(note-4) BPTSFd	84.6 %	
Adjustment for no-passing zones, fnp	11.8	
Percent time-spent-following, PTSFd	90.1 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.68	
Peak 15-min vehicle-miles of travel, VMT15	141	veh-mi
Peak-hour vehicle-miles of travel, VMT60	541	veh-mi
Peak 15-min total travel time, TT15	5.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.9	mi/h
Percent time-spent-following, PTSFd (from above)	90.1	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1126.0
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.83
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	North of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1390	veh/h
Opposing direction volume, Vo	975	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1453 pc/h	1019 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATSD	27.7	mi/h
Percent Free Flow Speed, PFFS	57.8	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1454 pc/h	1020 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.1 %	
Adjustment for no-passing zones, fnp	11.7	
Percent time-spent-following, PTSFd	94.0 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.85	
Peak 15-min vehicle-miles of travel, VMT15	177	veh-mi
Peak-hour vehicle-miles of travel, VMT60	695	veh-mi
Peak 15-min total travel time, TT15	6.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	94.0	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

---

Bicycle Level of Service

---

Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1418.4
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.19
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	North of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

---

Input Data

---

Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1259	veh/h
Opposing direction volume, Vo	1081	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1338 pc/h	1149 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	27.7	mi/h
Percent Free Flow Speed, PFFS	57.7	%

---

Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1338 pc/h	1149 pc/h
Base percent time-spent-following,(note-4) BPTSFd	86.8 %	
Adjustment for no-passing zones, fnp	11.8	
Percent time-spent-following, PTSFd	93.1 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.79	
Peak 15-min vehicle-miles of travel, VMT15	164	veh-mi
Peak-hour vehicle-miles of travel, VMT60	630	veh-mi
Peak 15-min total travel time, TT15	5.9	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

---

Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	93.1	
Level of service, LOSd (from above)	E	

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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 of passing lane for percent time-spent-following, Lde	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	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	E	
Peak 15-min total travel time, TT15	-	veh-h

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Bicycle Level of Service

---



Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1311.5
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	972	veh/h
Opposing direction volume, Vo	1400	veh/h

---

Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1016 pc/h	1464 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	0.7	mi/h
Average travel speed, ATSD	28.1	mi/h
Percent Free Flow Speed, PFFS	58.5	%

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Percent Time-Spent-Following

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor, (note-1) fg	1.00	1.00
Directional flow rate, (note-2) vi	1017 pc/h	1464 pc/h
Base percent time-spent-following, (note-4) BPTSFd	82.2 %	
Adjustment for no-passing zones, fnp	11.6	
Percent time-spent-following, PTSFd	87.0 %	

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Level of Service and Other Performance Measures

---

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.60	
Peak 15-min vehicle-miles of travel, VMT15	124	veh-mi
Peak-hour vehicle-miles of travel, VMT60	486	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	28.1	mi/h
Percent time-spent-following, PTSFd (from above)	87.0	
Level of service, LOSd (from above)	E	

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

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Level of Service and Other Performance Measures with Passing Lane

---

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	991.8
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.01
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	South of Grgich Northbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1094	veh/h
Opposing direction volume, Vo	1275	veh/h

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Average Travel Speed

---

Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1163 pc/h	1355 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	0.8	mi/h
Average travel speed, ATSD	27.6	mi/h
Percent Free Flow Speed, PFFS	57.6	%

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Percent Time-Spent-Following

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1162 pc/h	1355 pc/h
Base percent time-spent-following,(note-4) BPTSFd	84.8 %	
Adjustment for no-passing zones, fnp	11.4	
Percent time-spent-following, PTSFd	90.1 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.68	
Peak 15-min vehicle-miles of travel, VMT15	142	veh-mi
Peak-hour vehicle-miles of travel, VMT60	547	veh-mi
Peak 15-min total travel time, TT15	5.1	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

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Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.6	mi/h
Percent time-spent-following, PTSFd (from above)	90.1	
Level of service, LOSd (from above)	E	

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Average Travel Speed with Passing Lane

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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	%

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Percent Time-Spent-Following with Passing Lane

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

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Level of Service and Other Performance Measures with Passing Lane

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1139.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.84
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

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Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Friday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

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Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.98
Shoulder width	8.0 ft	% Trucks and buses	3 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1400	veh/h
Opposing direction volume, Vo	972	veh/h

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Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.976	0.976
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1464 pc/h	1016 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSd	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.1	mi/h
Average travel speed, ATSD	27.7	mi/h
Percent Free Flow Speed, PFFS	57.6	%



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Percent Time-Spent-Following

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.976	0.976
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1464 pc/h	1017 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.3 %	
Adjustment for no-passing zones, fnp	11.6	
Percent time-spent-following, PTSFd	94.1 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.86	
Peak 15-min vehicle-miles of travel, VMT15	179	veh-mi
Peak-hour vehicle-miles of travel, VMT60	700	veh-mi
Peak 15-min total travel time, TT15	6.5	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.7	mi/h
Percent time-spent-following, PTSFd (from above)	94.1	
Level of service, LOSd (from above)	E	

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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	%

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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	-	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	-	
Percent time-spent-following including passing lane, PTSFpl	-	%

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Level of Service and Other Performance Measures with Passing Lane

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1428.6
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	2.19
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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

Phone: Fax:  
E-Mail:

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Directional Two-Lane Highway Segment Analysis

---

Analyst	DRR
Agency/Co.	CTG
Date Performed	19/12/2013
Analysis Time Period	Harvest Saturday
Highway	SR29
From/To	South of Grgich Southbound
Jurisdiction	Napa Ca
Analysis Year	2030 without Project
Description	LMR

---

Input Data

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Highway class	Class 1	Peak hour factor, PHF	0.96
Shoulder width	8.0 ft	% Trucks and buses	2 %
Lane width	12.0 ft	% Trucks crawling	0.0 %
Segment length	0.5 mi	Truck crawl speed	0.0 mi/hr
Terrain type	Level	% Recreational vehicles	2 %
Grade: Length	- mi	% No-passing zones	100 %
Up/down	- %	Access point density	8 /mi

Analysis direction volume, Vd	1275	veh/h
Opposing direction volume, Vo	1094	veh/h

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Average Travel Speed

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adj. factor,(note-5) fHV	0.980	0.980
Grade adj. factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1355 pc/h	1163 pc/h

Free-Flow Speed from Field Measurement:

Field measured speed,(note-3) S FM	-	mi/h
Observed total demand,(note-3) V	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed,(note-3) BFFS	50.0	mi/h
Adj. for lane and shoulder width,(note-3) fLS	0.0	mi/h
Adj. for access point density,(note-3) fA	2.0	mi/h

Free-flow speed, FFSD	48.0	mi/h
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Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATSD	27.4	mi/h
Percent Free Flow Speed, PFFS	57.2	%

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Percent Time-Spent-Following

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Direction	Analysis(d)	Opposing (o)
PCE for trucks, ET	1.5*	1.5*
PCE for RVs, ER	1.5*	1.5*
Heavy-vehicle adjustment factor, fHV	0.980	0.980
Grade adjustment factor,(note-1) fg	1.00	1.00
Directional flow rate,(note-2) vi	1355 pc/h	1162 pc/h
Base percent time-spent-following,(note-4) BPTSFd	87.1 %	
Adjustment for no-passing zones, fnp	11.4	
Percent time-spent-following, PTSFd	93.2 %	

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Level of Service and Other Performance Measures

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Level of service, LOS	E	
Volume to capacity ratio, v/c	0.80	
Peak 15-min vehicle-miles of travel, VMT15	166	veh-mi
Peak-hour vehicle-miles of travel, VMT60	638	veh-mi
Peak 15-min total travel time, TT15	6.0	veh-h
Capacity from ATS, CdATS	1700	veh/h
Capacity from PTSF, CdPTSF	1700	veh/h
Directional Capacity	1700	veh/h

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Passing Lane Analysis

---

Total length of analysis segment, Lt	0.5	mi
Length of two-lane highway upstream of the passing lane, Lu	-	mi
Length of passing lane including tapers, Lpl	-	mi
Average travel speed, ATSD (from above)	27.4	mi/h
Percent time-spent-following, PTSFd (from above)	93.2	
Level of service, LOSd (from above)	E	

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Average Travel Speed with Passing Lane

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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	%

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Percent Time-Spent-Following with Passing Lane

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

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Level of Service and Other Performance Measures with Passing Lane

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

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Bicycle Level of Service

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Posted speed limit, Sp	50
Percent of segment with occupied on-highway parking	0
Pavement rating, P	3
Flow rate in outside lane, vOL	1328.1
Effective width of outside lane, We	28.00
Effective speed factor, St	4.62
Bicycle LOS Score, BLOS	1.91
Bicycle LOS	B

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 downgrade segments are treated as level terrain.
- 2. If  $v_i$  ( $v_d$  or  $v_o$ )  $\geq 1,700$  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.

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