

George W. Nickelson, P.E.

Traffic Engineering • Transportation Planning

May 13, 2008

Mr. Eric Sims
702 Sanitarium Road
Deer Park, CA 94576

Subject: *Traffic Analysis for a Proposed Gamble Family Winery at Lincoln Ranch-
Located at #7554 St. Helena Highway South in Napa County (Post Mile 30.15 +/-)*

Dear Mr. Sims:

This report summarizes a focused traffic analysis for the proposed Gamble Family Winery at Lincoln Ranch in Napa County (see Figure 1 for site location map). This study reflects our discussions regarding the project characteristics, field reviews/traffic counts at the site access and analyses of project traffic effects.

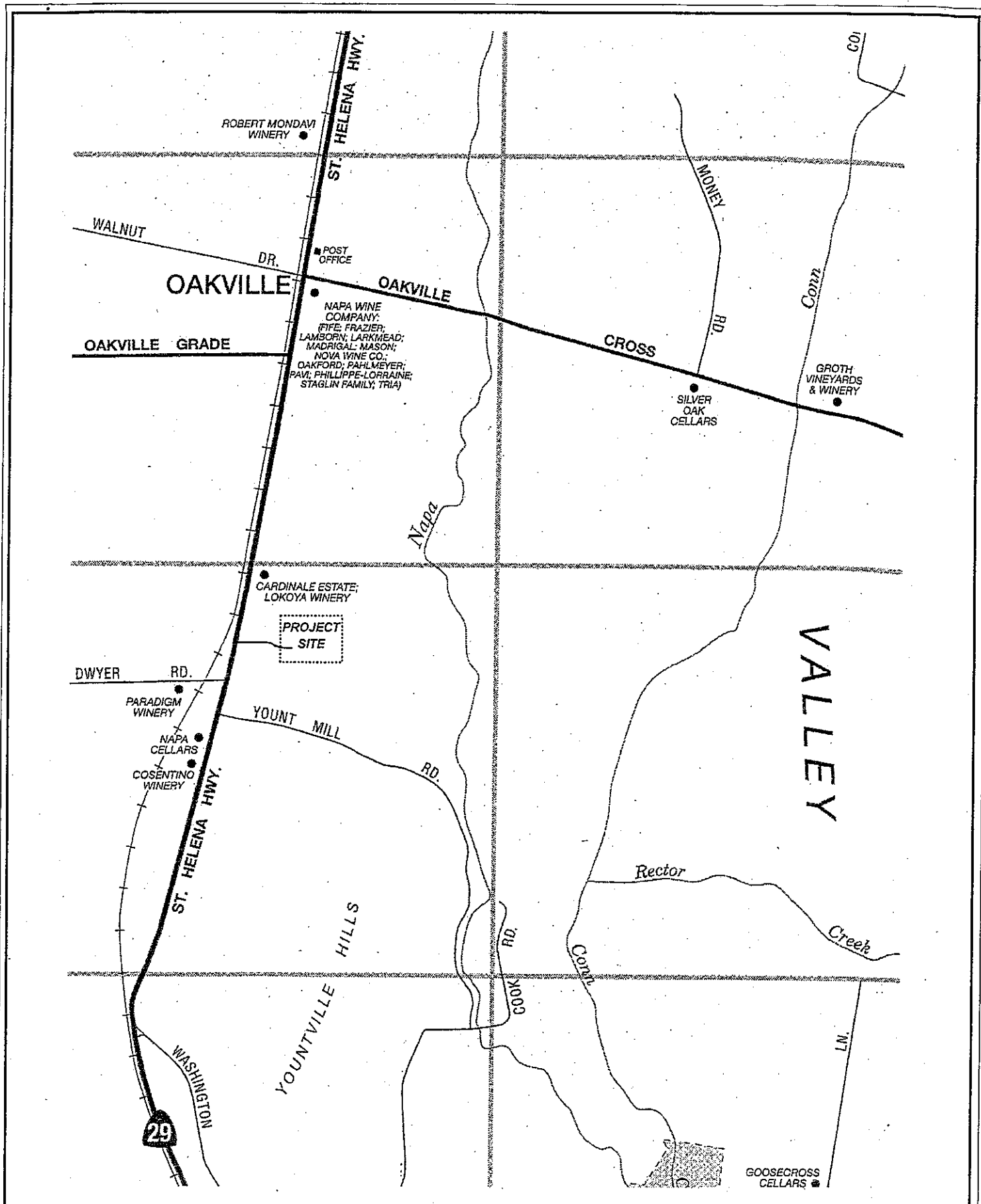
As outlined in the report, the project's trips would add minimally (about 0.3%) to traffic flows on SR 29. Sight distance would be ample at the driveway, and the combination of traffic volumes on SR 29 and traffic volumes in/out of the proposed winery would warrant a left-turn lane on SR 29. Volumes would be well below the thresholds at which a right-turn lane would be needed. We do note that the site driveway would need to meet County standards for width, and the width at SR 29 should accommodate inbound and outbound truck turn paths.

I trust that this report responds to your needs. Please review this information and call me with any questions or comments.

Sincerely,

A handwritten signature in cursive script that reads "George Nickelson". The signature is written in dark ink and is positioned below the word "Sincerely,".

George W. Nickelson, P.E.



Project Site Location



1. Existing Traffic Conditions

a. Traffic Operations

State Route 29 (SR 29) provides the primary north-south Napa County access and is essentially a two-lane rural road in the area of the proposed winery. Based on Caltrans records, SR 29 has a current average daily traffic volume (south of Oakville Grade Road) of 25,500 vehicles and a daily volume during a peak month of 28,000 vehicles.⁽¹⁾ Based on Caltrans count data, the peak hour volumes would be expected to be about 7-8% of the daily total or about 1,800-2,000 peak hour vehicles on a typical day.

As a part of this study, traffic counts were conducted on SR 29 at the proposed winery's access intersection during a weekday PM peak commute period (4-6 PM) and the Saturday afternoon peak period (1-3 PM).⁽²⁾ (Winery visitor activity is expected to be highest during a Saturday afternoon.) These counts indicate that both the weekday PM peak hour flows and Saturday afternoon peak hour flows are about 1,600-1,700 vehicles. The counted weekday peak hour volumes are somewhat lower than the expected typical day peak hour flow based on Caltrans data. To simulate "typical" conditions as indicated by Caltrans data, the volumes counted as a part of this analysis were increased by 15%. These volumes reflect an operation that would be categorized as in the Level of Service (LOS) "E" range.

At the winery site access intersection, SR 29 has two travel lanes, paved shoulders and a standard double yellow centerline. South of the site access there is a left turn lane on SR 29 at Dwyer Road. To the north, a two-way-left-turn-lane (TWLTL) is located at the access for the Cardinale Winery.

The winery site currently has one residence (there is a second off-site residence that gains access via the site driveway) and an active vineyard. The existing residence traffic activity is low, and typical daily employment and activity associated with the site's vineyard are also very low. It is noted that other vineyard parcels have access to the project's driveway. Although activity at these vineyards is typically very low, there were seven outbound vineyard worker vehicles counted during the weekday PM peak hour. This higher spring season vineyard activity has been reflected in the traffic report, representing a "worst case" conservative analysis.

b. Vehicle Speeds and Sight Distance on SR 29

The primary issues for access design are the vehicle visibility and operation relative to vehicles traveling on SR 29 and vehicles turning in/out of the winery access. The required vehicle visibility or "corner sight distance" is a function of the travel speeds on SR 29. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the driver of an approaching vehicle in the right lane of the main highway."⁽³⁾ Based on radar surveys conducted as a part of this study, the "critical" vehicle speed (85% of all surveyed vehicles travel at or below the critical speed) along SR 29 at the proposed winery were observed to be about 53-54 miles per hour (mph) during both the weekday PM peak period and the Saturday afternoon peak period.⁽⁴⁾ Based on Caltrans design standards, these vehicle speeds require a sight distance of about 500 feet, measured along the travel lanes on SR 29.⁽⁵⁾

2. Traffic Effects of the Proposed Winery

a. Project Description

The proposed project would involve a new winery with a maximum annual production of 50,000 gallons.⁽⁶⁾ About 7% of the fruit (3,300 gallons of production) would be harvested on-site and the remaining 93% would be delivered from other vineyards. A total of 300 weekly visitors (by appointment only) are expected with about 30 persons on a typical weekday and about 75 persons on a typical Saturday or Sunday. On weekdays, the winery site would include those employees working in administration and production for the winery and vineyard. As a result, weekday employment is expected to be slightly higher at eight persons with five persons on site on a Saturday. There would be a total of ten persons on-site during the harvest season. Table 1 outlines the winery's expected daily traffic generation on a typical weekday, a typical Saturday and a day during the harvest season.

b. Changes in Traffic Operations

As outlined in Table 1, the winery would generate 43 daily trips on a weekday, 68 daily trips on a Saturday and 82 daily trips during the 8-week harvest season. Even if it were conservatively assumed that 20% of the trips occur during the peak hours, this would amount to 9 trips during the weekday PM peak hour and 14 trips during the Saturday afternoon peak hour. The weekday and Saturday peak hour volumes (with the project trips) are outlined in Figure 2.

When distributed north and south on SR 29, the project trips would add about 0.3% to the existing peak hour volumes. This change in traffic would not be measurable within typical daily fluctuations in traffic flows. Assuming a two-way-left-turn-lane (TWLTL) would be installed in SR 29 (see discussion below) at the proposed project driveway, the outbound project traffic would operate at LOS "C" during both the weekday and Saturday peak hours (LOS definitions and calculations are attached as appendices)

c. Site Access Design Issues

The site's driveway is adjacent to SR 29 at a point where no left turn lane exists. As shown on Figure 2, the driveway would have 2 inbound left-turns during a weekday PM peak hour and 3 inbound left turns during a Saturday afternoon peak hour.

Warrants for left turn lanes are based on the traffic volumes on the main road and the left turn volumes into the site. Although the left turn volumes are very low, left turn lane warrants used by Caltrans indicate that the high background traffic flows result in a left turn lane being warranted (warrant graph is attached as an appendix).⁽⁷⁾ Based on Caltrans design standards, only one vehicle would be expected to queue at any given time, but Caltrans recommends a minimum 50 foot left-turn storage lane.

The winery access intersection is located on a straight section of SR 29. Field observations indicate sight distances to the north and south are well in excess of the 500 feet needed for the measured vehicle speeds. The projected volumes in/out of the site driveway are well below minimum

thresholds at which right-turn lanes (deceleration and acceleration) would be required.⁽⁸⁾

The project driveway would need to meet the Napa County standards (18 feet of pavement plus a 2-foot shoulder for two-way traffic flow). At its intersection with SR 29, the driveway design should also accommodate turn paths for inbound and outbound right-turns by trucks.

3. Summary and Conclusions

The following conclusions reflect the traffic analysis:

- The project's trips would add minimally (about 0.3%) to traffic flows on SR 29;
- Sight distance on SR 29 would be ample at the site driveway;
- The peak hour driveway volumes would warrant a left-turn lane in SR 29;
- Driveway volumes would be well below the thresholds at which a right-turn lane would be needed; and
- The site driveway would need to meet County standards for width - the width at SR 29 should accommodate inbound and outbound truck turn paths.

References:

- (1) Caltrans website, traffic volumes for SR 29 based on 2006 count data.
- (2) George W. Nickelson, P.E., traffic counts, field measurements and speed surveys on Saturday March 29, 2008 and Tuesday April 1, 2008..
- (3) Caltrans, *Highway Design Manual – Fifth Edition*, July 1, 2004.
- (4) George W. Nickelson, P.E., *ibid*...
- (5) Caltrans, *ibid*...
- (6) Production, employee and visitor data provided by Mr. Eric Sims, project representative, April 3, 2008.
- (7) Caltrans, *Guidelines for Reconstruction of Intersections*, August 1985.
- (8) Transportation Research Board, *Report 279 – Intersection Channelization Design Guide*, 1985.

TABLE 1
DAILY TRIP GENERATION FOR
THE PROPOSED GAMBLE FAMILY WINERY
AT LINCOLN RANCH

Daily Traffic During a Typical Weekday:

• 30 visitors/2.6 per vehicle x 2 one-way trips	=	23 daily trips
• 8 employees x 2 one-way trips per employee	=	16 daily trips
• 2 trucks x 2 one-way trips per truck ⁽¹⁾	=	<u>4 daily trips</u>
		43 daily trips

Daily Traffic During a Typical Saturday:

• 75 visitors/2.8 per vehicle x 2 one-way trips	=	54 daily trips
• 5 employees x 2 one-way trips per employee	=	10 daily trips
• 2 trucks x 2 one-way trips per truck ⁽¹⁾	=	<u>4 daily trips</u>
		68 daily trips

Daily Traffic During Harvest Season (8 weeks):

• 75 visitors/2.8 per vehicle x 2 one-way trips	=	54 daily trips
• 10 employees x 2 one-way trips per employee	=	20 daily trips
• 4 trucks x 2 one-way trips per truck ⁽²⁾	=	<u>8 daily trips</u>
		82 daily trips

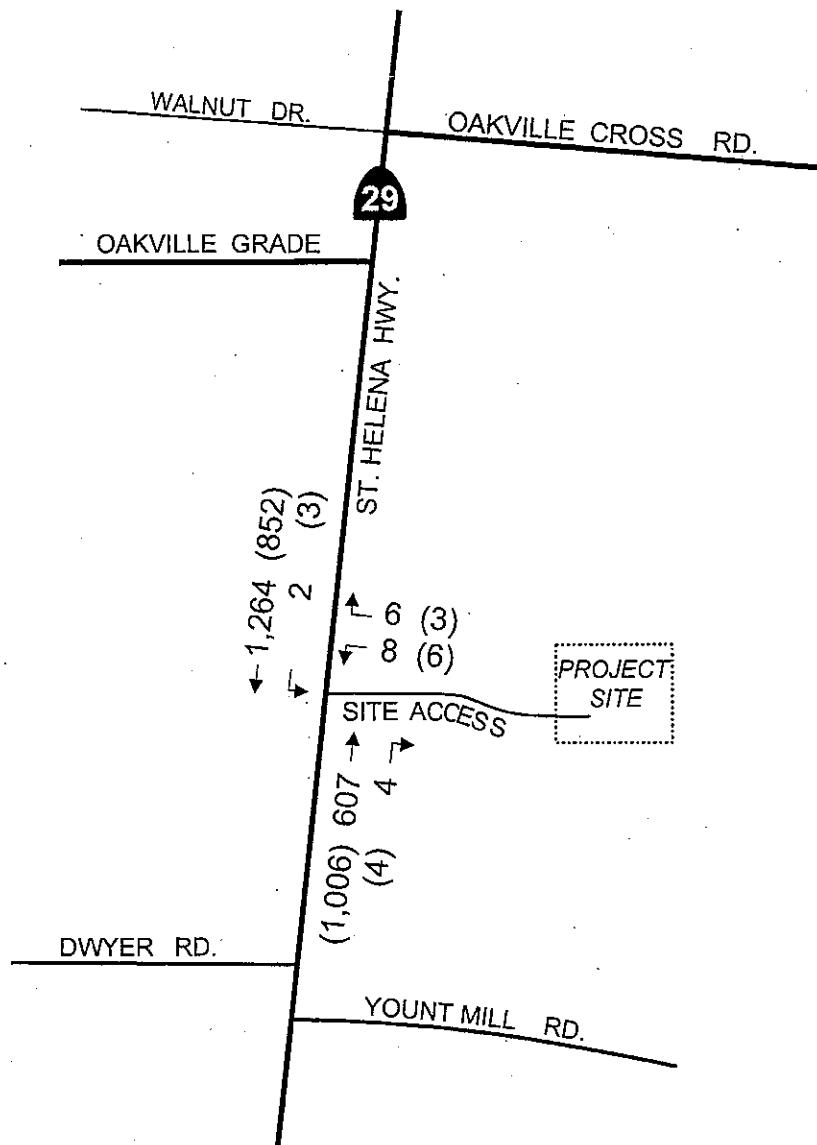
- (1) During the 44-week non-harvest season, a maximum of 2 daily trucks would be generated related to routine deliveries associated with the winery production (50,000 gallons/2.38 gallons per case = 21,008 cases).

• 21,008 cases/2,310 cases per truck	=	9 glass delivery trucks
• 21,008 cases/1,232 cases per truck	=	17 wine shipment trucks
• 10 miscellaneous weekly deliveries	=	<u>450 miscellaneous trucks</u>
		476 annual trucks

476 trucks/44 weeks = 11 weekly trucks or 1-2 trucks per day.

- (2) During the 8-week harvest season, a maximum of 2 daily grape delivery trucks would be generated, calculated as follows:

- 46,700 gallons/165 gallons per ton = 283 tons of off-site grapes
- 283 tons of off-site grapes/10 tons per truck/8 weeks = 4 trucks/week or a maximum of one truck per day; and
- pick-up of empty bins = one truck per day



MAP NOT TO SCALE

Existing+Project Peak Hour Volumes At Project Driveway.
Weekday P.M. Peak Hour & (Saturday Mid-day Peak Hour)



APPENDICES

- Level of Service Definitions
- Level of Service Calculations
 - Radar Surveys
- Left Turn Lane Warrants

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE	SIGNALIZED INTERSECTIONS	UNSIGNALIZED INTERSECTIONS*
"A"	Uncongested operations, all queues clear in a single-signal cycle. (Average stopped delay less than 10 seconds per vehicle; V/C less than or = 0.60).	Little or no delay. (Average delay of ≤ 10 seconds)
"B"	Uncongested operations, all queues clear in a single cycle. (Average delay of 10-20 seconds; V/C=0.61-0.70).	Short traffic delays. (Average delay of >10 and ≤ 15 secs.)
"C"	Light congestion, occasional backups on critical approaches. (Average delay of 20-35 seconds; V/C=0.71-0.80).	Average traffic delay. (Average delay of >15 and ≤ 25 secs.)
"D"	Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed. (Average delay of 35-55 seconds; V/C=0.81-0.90).	Long traffic delays for some approaches. (Average delay of >25 and ≤ 35 secs.)
"E"	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es). (Average delay of 55-80 seconds; V/C=0.91-1.00).	Very long traffic delays for some approaches. (Average delay of >35 and ≤ 50 secs.)
"F"	Total breakdown, stop-and-go operation. (Average delay in excess of 80 seconds; V/C of 1.01 or greater).	Extreme traffic delays for some approaches (intersection may be blocked by external causes--delays >50 seconds).

* Level of Service refers to delays encountered by certain stop sign controlled approaches. Other approaches may operate with little delay.

Source: Transportation Research Board, Highway Capacity Manual, 2000.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst GWN
 Agency or Company GWN
 Analysis Period/Year Ex.+Prj. WkdyPM
 Comment Weekday PM Existing + Project Peak Hour Conditions

Site Information

Jurisdiction/Date Napa 4/10/2008
 Major Street Hwy. 29
 Minor Street Project Access (7554)

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	T			TR						LR		
Lane 2	L											
Lane 3												
Lane 4												
Lane 5												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	2	1264			607	4				8		6
PHF	0.90	0.90			0.90	0.90				0.90		0.90
Percent of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	2	1404			674	4				9		7
Flare storage (# of vehs)												
Median storage (# of vehs)										2		
Signal upstream of Movement 2												
Length of study period (h)	0.25											

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	LR	16	263	0.061	0	19.6	C	19.6 C
	2								
	3								
SB		①	2	909	0.002	0	9.0	A	
NB		④							

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst GWN
 Agency or Company GWN
 Analysis Period/Year Ex.+Prj. Wkend
 Comment Weekend Existing + Project Peak Hour Conditions

Site Information

Jurisdiction/Date Napa 4/9/2008
 Major Street Hwy. 29
 Minor Street Project Access (7554)

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	T			TR						LR		
Lane 2	L											
Lane 3												
Lane 4												
Lane 5												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	3	852			1006	4				6		3
PHF	0.90	0.90			0.90	0.90				0.90		0.90
Percent of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	3	947			1118	4				7		3
Flare storage (# of vehs)												
Median storage (# of vehs)										2		
Signal upstream of Movement 2												
Length of study period (h)	0.25											

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	LR	10	237	0.042	0	20.9	C	20.9
	2								C
	3								
SB	①		3	619	0.005	0	10.8	B	
NB	④								

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Hwy. 29 at Project Access (#7554)

DATE: 3/29/08 *SAT.* TIME START: 12:30 pm TIME END: 2:00 pm WEATHER: Clear ROAD TYPE: 2 lanes
 DIRECTION: NB SPEED LIMIT: 55 mph OBSERVER: gwn CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
37	1	1.0	1*
38	1	2.0	1**
39	1	3.0	1***
40	1	4.0	1****
41	0	4.0	1****
42	2	6.0	1****5*
43	4	10.0	1****5****1
44	5	15.0	1****5****1****5
45	7	22.0	1****5****1****5****2**
46	8	30.0	1****5****1****5****2****5****3
47	7	37.0	1****5****1****5****2****5****3****5**
48	14	51.0	1****5****1****5****2****5****3****5****4****5****5*
49	7	58.0	1****5****1****5****2****5****3****5****4****5****5****5***
50	8	66.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5*
51	5	71.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7*
52	2	73.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7***
53	7	80.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8
54	3	83.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8***
55	8	91.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9*
56	5	96.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5*
57	3	99.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
58	1	100.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100

100

AVERAGE SPEED = 48.9
 50th PERCENTILE = 47.9
 65th PERCENTILE = 54.2
 90th PERCENTILE = 54.8
 95th PERCENTILE = 55.8

PACE = 44 - 53
 % IN PACE = 70
 VEHICLES IN PACE = 70

SAMPLE VARIANCE = 20.98943
 STANDARD DEVIATION = 4.581422
 RANGE 1*5 = 65
 RANGE 2*5 = 97
 RANGE 3*5 = 100

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Hwy. 29 at Project Access (#7554)

DATE: 3/30/08 Sat. TIME START: 12:30 pm TIME END: 2:00 pm WEATHER: Clear ROAD TYPE: 2 lanes
 DIRECTION: SB SPEED LIMIT: 55 mph OBSERVER: gwn CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
39	1	1.0	1*
40	0	1.0	1*
41	0	1.0	1*
42	1	2.0	1**
43	5	7.0	1****5**
44	2	9.0	1****5****
45	7	16.0	1****5****1****5*
46	2	18.0	1****5****1****5****
47	6	24.0	1****5****1****5****2****
48	11	35.0	1****5****1****5****2****5****3****5
49	12	47.0	1****5****1****5****2****5****3****5****4****5**
50	11	58.0	1****5****1****5****2****5****3****5****4****5****5****5***
51	6	64.0	1****5****1****5****2****5****3****5****4****5****5****5****6****
52	10	74.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****
53	10	84.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****
54	6	90.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9
55	3	93.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****
56	0	93.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****
57	3	96.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5*
58	3	99.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
59	0	99.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
60	1	100.0	1****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0

AVERAGE SPEED = 49.8
 50th PERCENTILE = 49.2
 85th PERCENTILE = 53.1
 90th PERCENTILE = 54
 95th PERCENTILE = 56.6

PACE = 45 - 54
 % IN PACE = 81
 VEHICLES IN PACE = 81

SAMPLE VARIANCE = 15.79593
 STANDARD DEVIATION = 3.974409
 RANGE 1*S = 68
 RANGE 2*S = 95
 RANGE 3*S = 100

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Hwy. 29 at Project Access (#7554)

DATE: 4/1/08 Tue TIME START: 3:30 pm TIME END: 6:00 pm WEATHER: Clear ROAD TYPE: 2 lanes
 DIRECTION: NB SPEED LIMIT: 55 mph OBSERVER: gwn CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100
43	2	2.0	!*
44	2	4.0	!***
45	6	10.0	!***5****1
46	7	17.0	!***5****1***5**
47	6	23.0	!***5****1***5****2***
48	10	33.0	!***5****1***5****2****5****3***
49	14	47.0	!***5****1***5****2****5****3****5****4****5**
50	12	59.0	!***5****1***5****2****5****3****5****4****5****5****5***
51	9	68.0	!***5****1***5****2****5****3****5****4****5****5****6****5***
52	7	75.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5
53	10	85.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5
54	5	90.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
55	5	95.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
56	0	95.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
57	2	97.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
58	1	98.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
59	0	98.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
60	1	99.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
61	1	100.0	!***5****1***5****2****5****3****5****4****5****5****6****5****7****5****8****5****9****5
			0-----10-----20-----30-----40-----50-----60-----70-----80-----90-----100

100

AVERAGE SPEED = 50
 50th PERCENTILE = 49.2
 85th PERCENTILE = 53
 90th PERCENTILE = 54
 95th PERCENTILE = 55

PACE = 45 - 54
 % IN PACE = 86
 VEHICLES IN PACE = 86

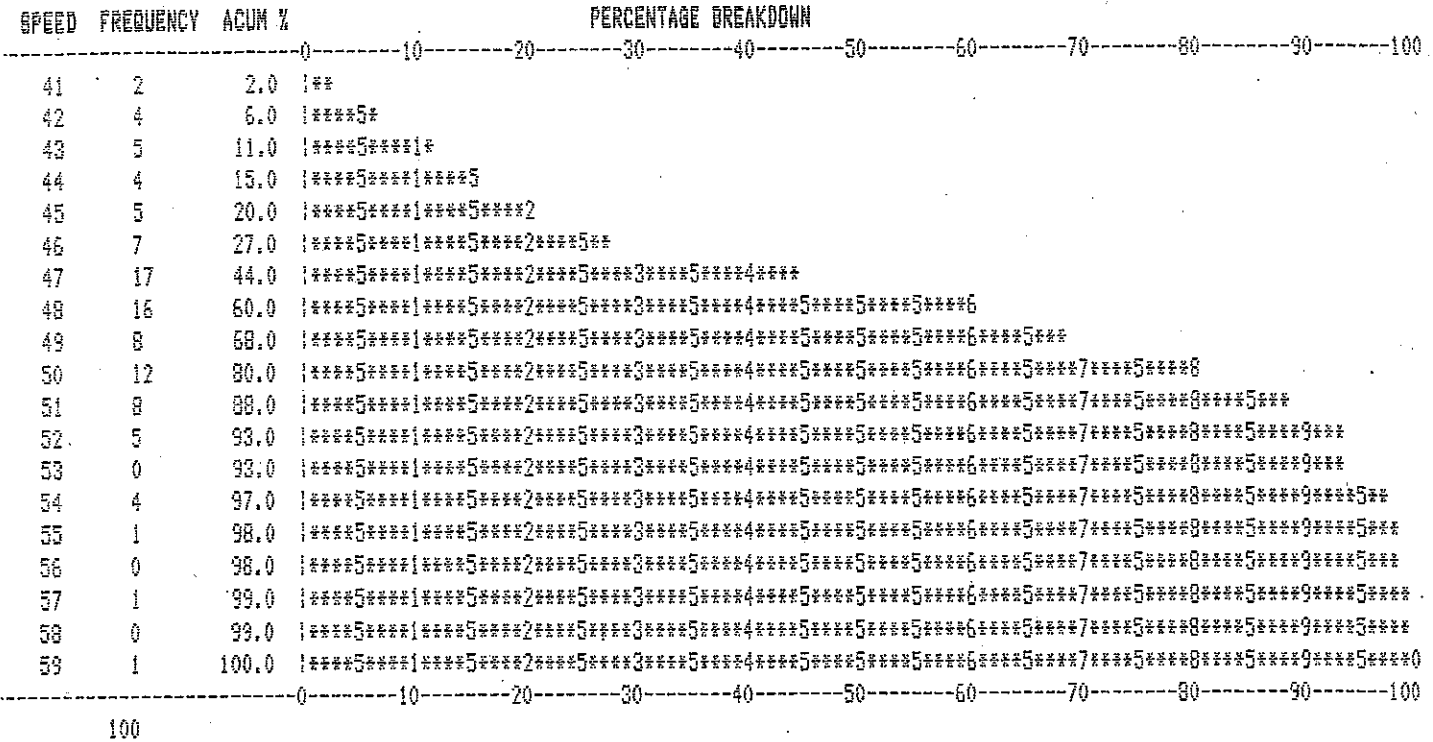
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 STANDARD DEVIATION = 3.560113
 RANGE 1*S = 68
 RANGE 2*S = 97
 RANGE 3*S = 99

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Hwy. 29 at Project Access (#7354)

DATE: 4/1/08 *Tue* TIME START: 3:30 pm TIME END: 6:00 pm WEATHER: Clear ROAD TYPE: 2 lanes
 DIRECTION: SB SPEED LIMIT: 55 mph OBSERVER: gwn CALIBRATION TEST: Yes



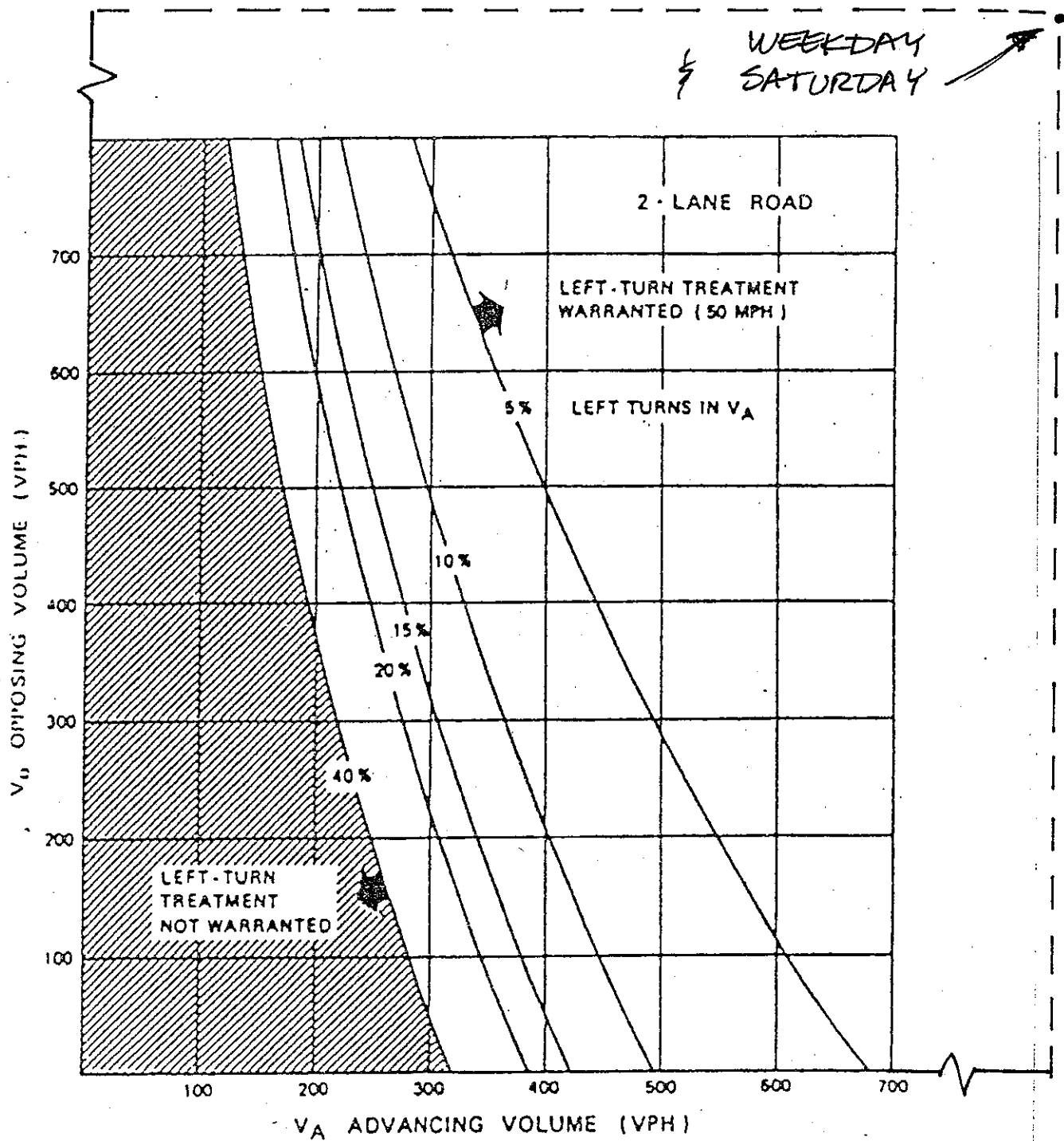
AVERAGE SPEED = 48
 50th PERCENTILE = 47.3
 85th PERCENTILE = 50.6 *
 90th PERCENTILE = 51.4
 95th PERCENTILE = 53.5

PAGE = 43 - 52
 % IN PAGE = 67
 VEHICLES IN PAGE = 87

SAMPLE VARIANCE = 11.35306
 STANDARD DEVIATION = 3.369431
 RANGE 1'S = 73
 RANGE 2'S = 95
 RANGE 3'S = 99

*NOT REALLY FLOW-FLOW.

NORTHBOUND SR 29



SOUTHBOUND SR 29