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Traffic Study

TRAFFIC IMPACT REPORT

PROPOSED VINEYARD 3646 WINERY ALONG SPRING MOUNTAIN ROAD IN THE NAPA VALLEY NORTH OF THE CITY OF ST. HELENA

July 9, 2014

Prepared for: Vineyard 3646 Winery

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I. INTRODUCTION

This report has been prepared at the request of the Napa County Public Works Department as authorized by the Vineyard 3646 Winery applicant to determine if the proposed Vineyard 3646 Winery along Spring Mountain Road will result in any significant circulation system impacts at the project entrance on Spring Mountain Road or at the nearby SR 29/Madrona Avenue-Fulton Lane intersection in the City of St. Helena. Analysis has been provided for harvest Friday and Saturday PM peak hour conditions for existing, year 2016 (first year of full project production) and year 2030 (general plan buildout) horizons.

II. SUMMARY OF FINDINGS

A. "WITHOUT PROJECT" OPERATING CONDITIONS

1. Spring Mountain Road adjacent to the proposed project site now has higher June two-way traffic volumes during the Friday PM peak traffic hour compared to the Saturday afternoon peak traffic hours (103 two-way peak hour vehicles on Friday versus 75 two-way peak hour vehicles on Saturday). At the SR 29/Madrona Avenue-Fulton Lane intersection volumes entering the intersection were higher during the Friday PM peak hour compared to the Saturday PM peak hour (1,681 versus 1,552 two-way vehicles). There were 12 vehicles using the shared use driveway serving the project site during the Friday peak traffic hour and 9 vehicles using the driveway during the Saturday peak traffic hour. About 82 percent of all traffic using the project's shared use driveway turned to or from the east (towards St. Helena) during the nine hours of traffic counts at the Spring Mountain Road/Project shared use driveway intersection.

5. The daily two-way volume along Spring Mountain Road adjacent to the project site averaged 770 vehicles over a three-day period (Tuesday to Thursday) in late June 2014.

3. During 2014 harvest conditions, the SR 29/Madrona Avenue-Fulton Lane signalized intersection would have acceptable levels of service (LOS B) during both the Friday and Saturday PM peak traffic hours.

4. By 2016, the SR 29/Madrona Avenue-Fulton Lane intersection will be experiencing acceptable levels of service (LOS C) during both the harvest Friday and Saturday PM peak traffic hours.

5. By 2030, the SR 29/Madrona Avenue-Fulton Lane intersection will be experiencing acceptable levels of service (LOS C) during both the harvest Friday and Saturday PM peak traffic hours.

6. Sight lines at the project's shared use driveway connection to Spring Mountain Road are adequate to the east. However, sight lines to the west are limited due to the hillside and a tree along the north side of the road and the mailboxes at the driveway connection.

B. PROJECT IMPACTS

1. The project will result in 1-2 inbound and 1 outbound trips during the harvest Friday PM peak traffic hour at the SR 29/Madrona Avenue-Fulton Lane intersection (3:15 to 4:15), with about 1-2 inbound and 1 outbound trips during the harvest Saturday PM peak traffic hour (3:30 to 4:30). Project trips during both the Friday and Saturday afternoon peak traffic hours will be visitors by appointment. It is also possible that more visitor vehicles may be traveling outbound rather than inbound during these hours on some days or that there will be no visitor traffic during these hours. This will be dependent upon the appointment schedules.

2. Volumes along Spring Mountain Road at the project entrance in combination with daily volumes on the shared use project driveway will not meet County warrant criteria for provision of a left turn lane on the eastbound Spring Mountain Road approach to the project shared use driveway.

3. Project traffic during harvest will not produce any significant operational impacts (level of service or delay) at the SR 29/Madrona Avenue-Fulton Lane intersection in St. Helena during harvest Friday or Saturday PM peak traffic conditions for the near term (year 2016) or long term (year 2030) analysis horizons. The intersection will maintain acceptable LOS C operation during both the Friday and Saturday PM peak traffic hours with the addition of up to two to three new project vehicles each hour.

4. Project drivers will experience the same limited sight lines as existing drivers when they turn left from the project's shared use driveway connection to Spring Mountain Road.

C. CONCLUSIONS & RECOMMENDATIONS

The project would result in no significant off-site circulation system operational impacts at the SR 29/Madrona Avenue-Fulton Lane intersection in St. Helena. Therefore, no mitigations are needed for this location. In addition, existing + project traffic in combination with ambient traffic volumes along Spring Mountain Road will not meet County warrant criteria for provision of a left turn lane on the eastbound Spring Mountain Road approach to the project entrance. The vast majority of existing traffic accessing the site as well as project employee and visitor traffic will be coming from St. Helena and making a right turn to the project driveway. However, sight lines at the shared use project driveway connection to Spring Mountain Road for existing and project drivers to see eastbound traffic will continue to be limited due to the hillside and tree west of the intersection and the mailboxes in the middle of the driveway.

It is recommended that signs be provided along the eastbound Spring Mountain Road approach to the project's shared use driveway indicating the presence of a hidden driveway. It is also recommended that the mailboxes in the middle of the driveway connection be moved back at least eight feet from Spring Mountain Road.

III. PROJECT LOCATION & DESCRIPTION

The Vineyard 3646 Winery will be located on the north side of Spring Mountain Road about three and a half miles west of the City of St. Helena (see **Figure 1**). The project driveway is shared with eight other property owners. Some have vineyards and/or residences and there is one operational winery.

The proposed Vineyard 3646 Winery will have the following yearly production and visitor/special event levels.

- 20,000 gallons per year production.
- Employees: 2 full time/2 part time/2 part time harvest only
- Bottling on-site.
- 100 percent of the grapes will be grown on site. This will eliminate 11 trucks per year now hauling grapes from project vineyards on Spring Mountain Road and SR 29 to processing in Napa.
- Tours and tasting by appointment only – 7 days per week from 10:00 AM to 6:00 PM, maximum 12 visitors per day (resulting in about 5 vehicles).
- Food and wine pairing events – 2 per month: 1 @ 12 visitors (5 vehicles) and 1 @ 20 visitors (8 vehicles) between 10:00 AM and 11:00 PM.
- Wine auction – 1 per year, maximum 75 visitors (about 27 vehicles) on weekends between 10:00 AM and 11:00 PM.
- Wine Club release – 2 per year, maximum 50 visitors (about 18 vehicles) per event on weekends between 10:00 AM and 11:00 PM.

IV. EXISTING CIRCULATION SYSTEM OPERATION

A. ANALYSIS LOCATIONS

At County request, the following locations have been evaluated.

- SR 29/Madrona Avenue-Fulton Lane signalized intersection in St. Helena
- Spring Mountain Road/Project Driveway intersection

Figure 2 presents approach geometrics and control at each analysis intersection.

B. VOLUMES

Friday 3:00 to 6:00 PM and Saturday noon to 6:00 PM turn movement counts were conducted by Crane Transportation Group (CTG) in mid June 2014 at the SR 29/Madrona Avenue-Fulton Lane and Spring Mountain Road/Property access shared use driveway intersections. On Friday the peak traffic hours were determined to be 3:15-4:15 at the SR 29/Madrona Avenue-Fulton Lane intersection, and 3:45-4:45 at the Spring Mountain Road/Project access driveway intersection, while on Saturday the peak traffic hours were determined to be 3:30-4:30 at the SR 29/Madrona Avenue-Fulton Lane intersection and 2:30-3:30 at the Spring Mountain Road/Project access driveway intersection. Resultant peak hour counts are presented in **Figure 3**. Overall, two-way PM peak hour volumes along Spring Mountain Road at the project entrance were higher on Friday than on Saturday (103 vehicles per hour [vph] on Friday versus 75 vph on Saturday). At SR 29/ Madrona Avenue-Fulton Lane, total volumes entering the intersection were higher during the Friday PM peak hour than during the Saturday PM peak hour (1,681 versus 1,552 vehicles per hour, respectively). Daily two-way counts were also conducted along Spring Mountain Road adjacent to the project site on Tuesday, Wednesday and Thursday, June 17-19, 2014. Daily two-way volumes were 732, 779 and 798 vehicles, respectively, with a three-day daily two-way average of 770 vehicles. About 82 percent of all traffic using the project's shared use driveway turned to or from the east (towards St. Helena) during the nine hours of Friday and Saturday afternoon traffic counts at the Spring Mountain Road/Project shared use driveway intersection.

June peak hour traffic counts were seasonally adjusted to reflect September harvest conditions based upon monthly adjustment factors utilized in other Napa Valley jurisdictions as well as a recent traffic study in St. Helena.[1] Overall, June PM peak hour volumes in St. Helena would be expected to increase by about 3 percent on Friday and 9 percent on Saturday to reflect fall harvest conditions. Resultant projected 2014 Friday and Saturday peak hour harvest volumes are presented in **Figure 4**.

C. ROADWAYS

Roadway descriptions are based upon the assumption that Spring Mountain Road runs in a general east-west direction through the project area and SR 29 runs in a north-south direction.

Spring Mountain Road is a narrow two-lane rural road with centerline striping extending westerly from the City of St. Helena into Sonoma County and towards the City of Santa Rosa. The project access driveway connection is located on the north side of the road about three and a half miles west of St. Helena. The roadway has an uphill grade from St. Helena to the project access with numerous horizontal and vertical curves. There are no shoulders in almost all locations. Observed vehicle speeds ranged from 15 to 35 miles per hour, with several curves having posted 20 mph speed limits. At one point the road has a 15 mph speed limit and narrows to one lane to fit between two large trees. The posted speed limit along Spring Mountain Road in the City of St. Helena is 25 mph.

[1] Hunter Subdivision Draft EIR, May 29, 2012.

D. INTERSECTION LEVEL OF SERVICE

1. Analysis Methodology

Transportation engineers and planners commonly use a grading system called level of service (LOS) to measure and describe the operational status of the local roadway network. LOS is a description of the quality of a roadway facility's operation, ranging from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing oversaturated conditions where traffic flows exceed design capacity, resulting in long queues and delays). Intersections, rather than roadway segments between intersections, are almost always the capacity controlling locations for any circulation system.

Signalized Intersections. For signalized intersections, the 2000 *Highway Capacity Manual* (Transportation Research Board, National Research Council) methodology was utilized. With this methodology, operations are defined by the level of service and average control delay per vehicle (measured in seconds) for the entire intersection. For a signalized intersection, control delay is the portion of the total delay attributed to traffic signal operation. This includes delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between delay and LOS for signalized intersections.

2. Minimum Acceptable Operation

The City of St. Helena's 1993 General Plan establishes two guiding policies (policies 5.4.1 and 5.4.2) on traffic service standards. Policy 5.4.1 states that LOS C shall be maintained at all signalized intersections in St. Helena, except along Main Street, where service level LOS D shall be permitted. Exceptions to this policy are that lower service levels shall be permitted at any location where the existing service level does not meet this standard. In these locations, the service level shall not be lower than the existing traffic conditions indicated in the General Plan. The City Council may also allow an exception to this policy if it finds overriding circumstances that make maintenance of the policy impractical or infeasible. There is no established LOS standard for unsignalized intersections, however, General Plan Policy 5.4.2 states that LOS C is a goal at stop-sign-controlled intersections.

3. Existing Harvest Operation

Table 2 shows that during the 2014 harvest season, operation of the SR 29/Madrona Avenue-Fulton Lane intersection would be an acceptable LOS B during both the Friday and Saturday peak traffic hours.

E. PLANNED IMPROVEMENTS

There are no planned and funded capacity improvements along Spring Mountain Road in Napa County.[2]

[2] Mr. Paul Wilkinson, Napa County Public Works Department, May 2012.

V. FUTURE HORIZON CIRCULATION SYSTEM OPERATION WITHOUT THE PROJECT

A. TRAFFIC MODELING PROJECTIONS

1. Napa County (Spring Mountain Road)

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 2016. The long term horizon reflects the County's general plan buildout year, which is 2030. Future horizon year volumes along Spring Mountain Road have been first obtained from the traffic modeling projections for the year 2030 from the County's General Plan Circulation Element. However, due to the unreliability of the County traffic model projections on low volume rural roads, the extremely high increases were considered unrealistic (up to an additional 900 vehicles per hour expected by 2030 on a road that now only has about 100 vehicles per hour). After discussion with County Public Works, the traffic consultant preparing this report projected a 100 percent increase in traffic on Spring Mountain Road between 2014 and 2030. Year 2016 volumes were developed projecting straight line growth between 2014 and 2030. Projecting straight-line traffic growth for analysis purposes, this translated into about a 13 percent growth in harvest PM peak hour traffic from 2014 to the year 2016.

2. City of St. Helena (SR 39/Madrona Avenue-Fulton Lane Intersection)

Within St. Helena, year 2030 harvest traffic projections for the SR 29/Madrona Avenue-Fulton Lane intersection were obtained from a recent EIR for the Hunter subdivision.[3] Year 2016 projections were developed assuming straight line growth between 2014 and 2030.

B. YEAR 2016 WITHOUT PROJECT EVALUATION

1. Volumes

Year 2016 "Without Project" Friday and Saturday PM peak hour harvest volumes are presented in **Figure 5**.

2. Intersection Level of Service

Table 2 shows that in 2016 during harvest season, "Without Project" operation of the SR 29/Madrona Avenue-Fulton Lane intersection would be at acceptable LOS C during both the Friday and Saturday PM peak traffic hours.

[3] Hunter Subdivision Draft EIR, May 29, 2012.

C. 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. Intersection Level of Service

Table 2 shows that in 2030 during harvest season, "Without Project" operation of the SR 29/Madrona Avenue-Fulton Lane signalized intersection would be at acceptable LOS C conditions 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.

COUNTY OF NAPA

- 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.

- If the addition of project traffic increases volumes at the project access intersection to exceed County warrant criteria for purposes of a left turn lane on the uncontrolled County roadway intersection approach.

- If "without" project volumes at the private driveway intersection already exceed County left turn lane warrant criteria, project traffic produces any increase in total peak hour volumes passing through the intersection, particularly left turns.

CITY OF ST. HELENA

Based on the City of St. Helena's current transportation impact criteria and the state of the practice for evaluating impacts on the transportation system, CEQA guideline significance criteria have been interpreted as follows in evaluating the proposed project.

City Roadway and Intersection Impact Criteria. The City's current LOS standard is LOS D for signalized intersections on SR 29 (Main Street) and LOS C elsewhere. Based on existing CEQA and City of St. Helena standards, traffic impacts are identified as significant if implementation of the project would cause:

- Operations of a signalized intersection along SR 29-128 (Main Street) to deteriorate from LOS D under conditions without the project to LOS E or F.

- The LOS to deteriorate to LOS F for signalized intersections that operate at LOS E under conditions without the project.

- The average intersection delay to increase by more than five seconds for signalized intersections that operate at LOS E or F under conditions without the project.

- If, in the opinion of the registered traffic engineer conducting this study, certain project-related traffic changes would substantially increase safety or operational concerns, the impact is considered significant and would require mitigation.

B. TRIP GENERATION

Friday and Saturday afternoon trip generation projections were developed with the assistance of the project applicant and their representative for all components of the employee and visitor activities at the proposed Vineyard 3646 Winery (see worksheets in the **Appendix**). Results are presented on an hourly basis in **Tables 3A** and **3B** for Friday and Saturday afternoon conditions. During the Friday PM peak traffic hour, there would be a projected 1-2 inbound and 1 outbound project trips, while during the Saturday afternoon PM peak traffic hour, there would be a projected 1-2 inbound and 1 outbound project trips. However, depending upon the scheduling of visitor tours, more visitor vehicles could be outbound rather than inbound or there could be no visitor vehicles during these hours. As shown, winery administrative and production employees would not be expected on the local roadway network during harvest Friday or Saturday PM peak hour conditions. The visitor-serving employee would also be working until 6:00 PM every day, as tours and tasting by appointment would close at 6:00 PM. Therefore, the only winery-related traffic expected on the local roadway network during both Friday and Saturday PM peak traffic hours would be visitor related. Assuming average size groups of 2 to 3 people, this could result in 1 to 2 visitor-related vehicles accessing the winery during any given traffic hour between 10:00 AM and 6:00 PM.

C. TRIP DISTRIBUTION

Project traffic was distributed to Spring Mountain Road and SR 29/Madrona Avenue-Fulton Lane intersection in St. Helena in a pattern reflective of existing distribution patterns at the SR 29/Madrona Avenue-Fulton Lane intersection as well as at the project driveway connection to Spring Mountain Road. Virtually all visitor and employee traffic would be expected to travel to/from the east and St. Helena on Spring Mountain Road. During the eight hours of turn counts at the project driveway intersection, about 82 percent of all turn movements at the project driveway were to or from the east (and St. Helena).

The Friday and Saturday project traffic increments expected on Spring Mountain Road and at the SR 29/Madrona Avenue-Fulton Lane intersection during times of ambient PM peak traffic flow

are presented in **Figure 7**, while Friday and Saturday "With Project" PM peak hour volumes for the years 2016 and 2030 are presented in **Figures 8** and **9,** respectively.

D. PLANNED ROADWAY IMPROVEMENTS

There are no planned and funded capacity increasing roadway improvements by the City of St. Helena or the County on this local roadway network serving the project site.[4]

E. YEAR 2016 INTERSECTION IMPACTS

1. Level of Service

Project traffic would not produce a significant level of service impact at the SR 29/Madrona Avenue-Fulton Lane intersection during either the Friday or Saturday year 2016 PM peak traffic hours along SR 29. Project traffic would not change acceptable LOS C operation during either the Friday or Saturday PM peak traffic hours. Project PM peak hour volume increases would be less than half a percent at this location.

F. YEAR 2030 INTERSECTION IMPACTS

1. Level of Service

Project traffic would not produce a significant level of service impact at the SR 29/Madrona Avenue-Fulton Lane intersection during either the Friday or Saturday year 2030 PM peak traffic hours along SR 29. Project traffic would not change acceptable LOS C operation during either the Friday or Saturday PM peak traffic hours. Project PM peak hour volume increases would be less than half a percent at this location.

G. SIGHT LINE ADEQUACY

Sight lines would be acceptable to the east, but not to the west for drivers turning from the project shared use driveway to Spring Mountain Road. Sight lines to the east would be about 250 feet, while sight lines to the east to see downhill traffic would be about 100 feet. Based upon travel speeds along Spring Mountain Road of 25 miles per hour, the required stopping sight distances would be 147 feet for westbound (uphill) traffic and 158 feet for eastbound (downhill) traffic. Available sight lines would be greater than minimum required stopping sight distances to the east, but less than minimum required stopping sight distances looking to the west.[5] Drivers exiting the project driveway have a choice of where to turn to Spring Mountain Road: to the left or right of the group of mailboxes built in the middle of the driveway. To the right of the mailboxes sight lines to the west are limited by a hillside and a tree, while to the left of the mailboxes sight lines to the west are blocked by the mailboxes as well as to the hillside and the tree. Exiting drivers turning left must pull into the westbound travel lane in order to obtain

[4] Paul Wilkinson, Napa County Public Works Department & Hunter Subdivision Draft EIR.

[5] *A Policy on Geometric Design of Highways and Streets*, 2011, AASHTO.

adequate sight lines to see eastbound traffic. This is an existing problem and would continue to be an issue for project traffic.

H. PROJECT ENTRANCE LEFT TURN LANE REQUIREMENT

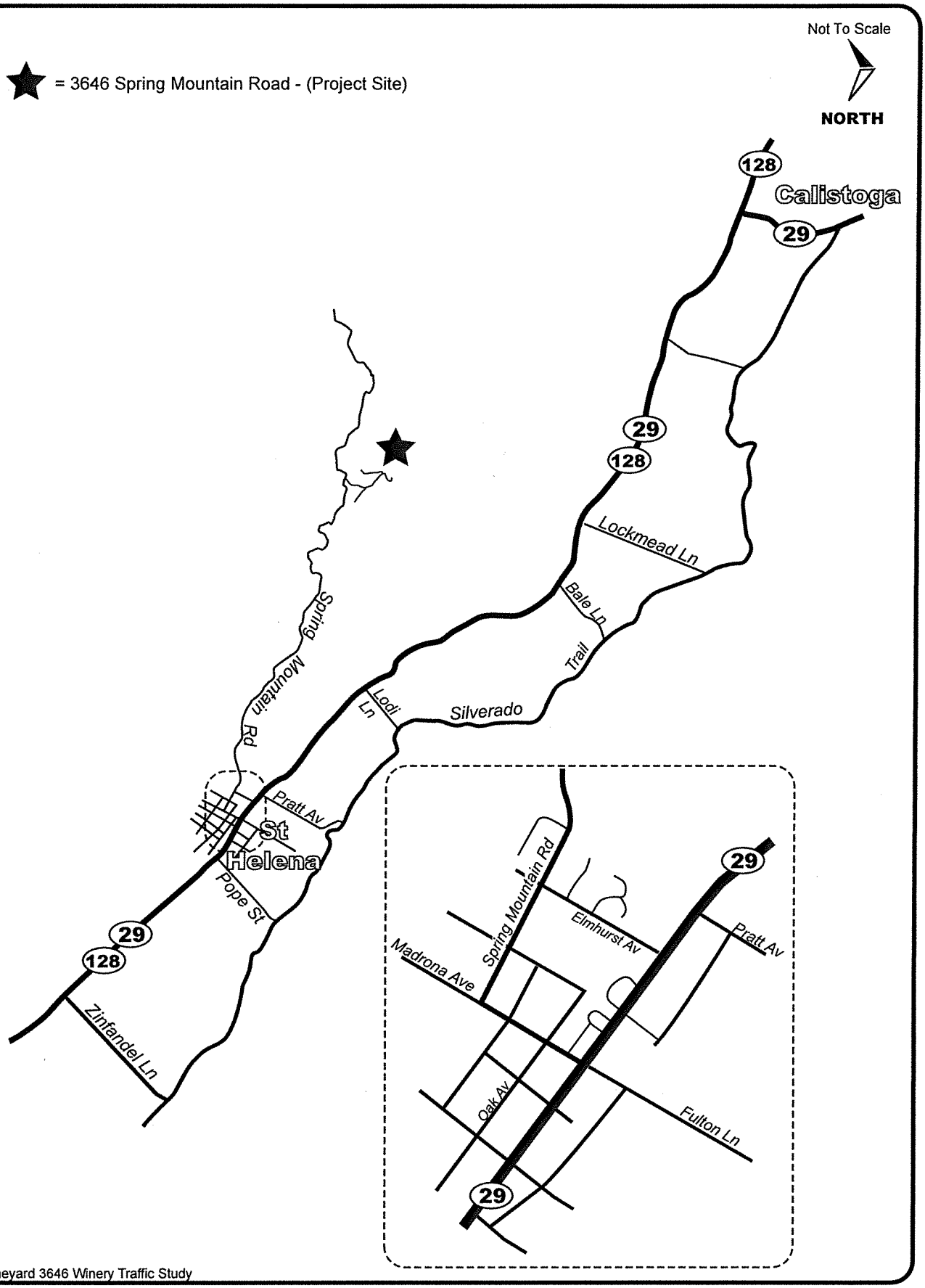
County warrant criteria have been evaluated to determine the need for a left turn lane on the eastbound Spring Mountain Road approach to the project's shared use driveway. County warrant criteria in **Table 4** shows that existing average two-way daily traffic volumes along Spring Mountain Road in combination with projected weekday two-way daily volumes on the project shared use driveway with project traffic will not meet County warrant criteria for provision of a left turn lane on the eastbound Spring Mountain Road intersection approach. It should also be noted that while County criteria only take into consideration daily traffic volumes on the main road and project driveway and not the pattern of turn movements at the project access intersection, about 80 to 85 percent of the turns into the project driveway would be expected to be right turns. During the nine hours of turn movement counts on Friday and Saturday in June at the project access intersection with Spring Mountain Road, there were only four left turns into the driveway.

VII. CONCLUSIONS & RECOMMENDATIONS

The project would result in no significant off-site circulation system operational impacts at the SR 29/Madrona Avenue-Fulton Lane intersection in St. Helena. Therefore, no mitigations are needed for this location. In addition, existing + project traffic in combination with ambient traffic volumes along Spring Mountain Road will not meet County warrant criteria for provision of a left turn lane on the eastbound Spring Mountain Road approach to the project entrance. The vast majority of existing traffic accessing the site as well as project employee and visitor traffic will be coming from St. Helena and making a right turn to the project driveway. However, sight lines at the shared use project driveway connection to Spring Mountain Road for existing and project drivers to see eastbound traffic will continue to be limited due to the hillside and tree west of the intersection and the mailboxes in the middle of the driveway.

It is recommended that signs be provided along the eastbound Spring Mountain Road approach to the project's shared use driveway indicating the presence of a hidden driveway. It is also recommended that the mailboxes in the middle of the driveway connection be moved back at least eight feet from Spring Mountain Road.

Figures



Vineyard 3646 Winery Traffic Study

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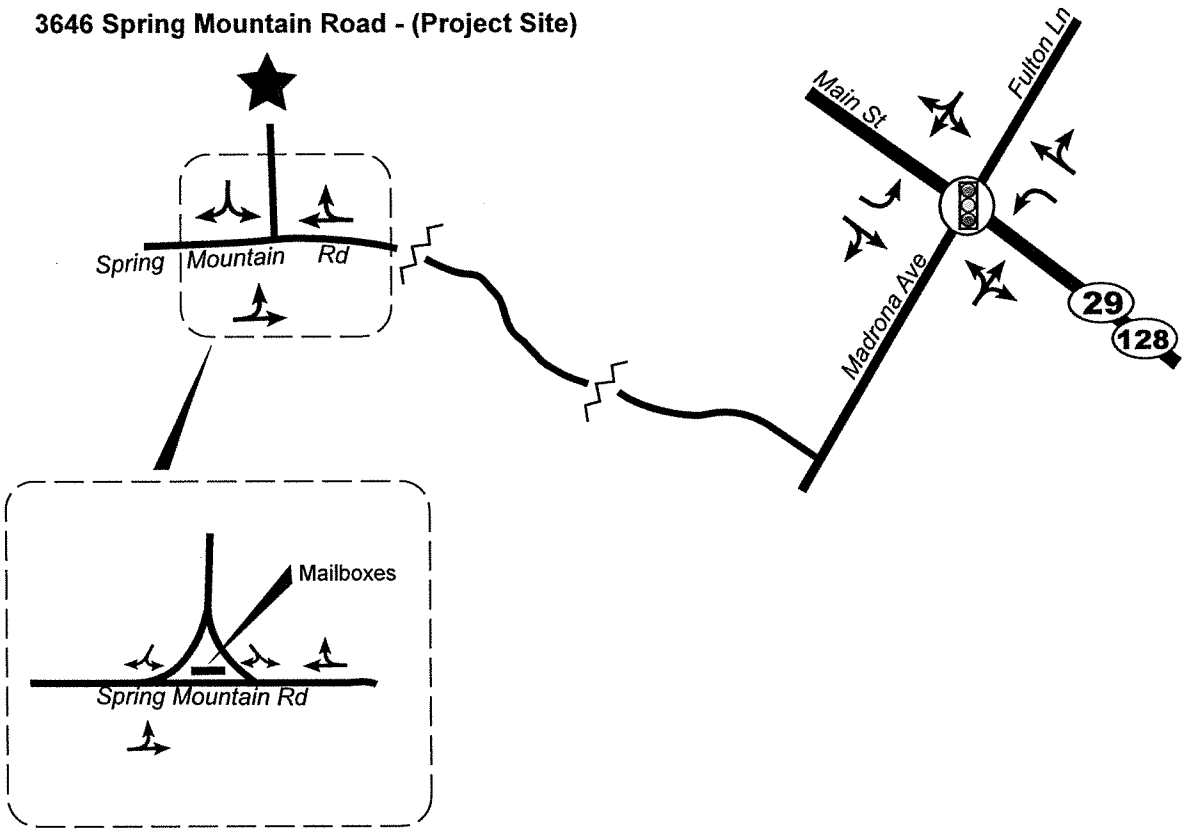
Figure 1

Area Map

Vineyard 3646 Winery

Not To Scale

NORTH



Vineyard 3646 Winery Traffic Study

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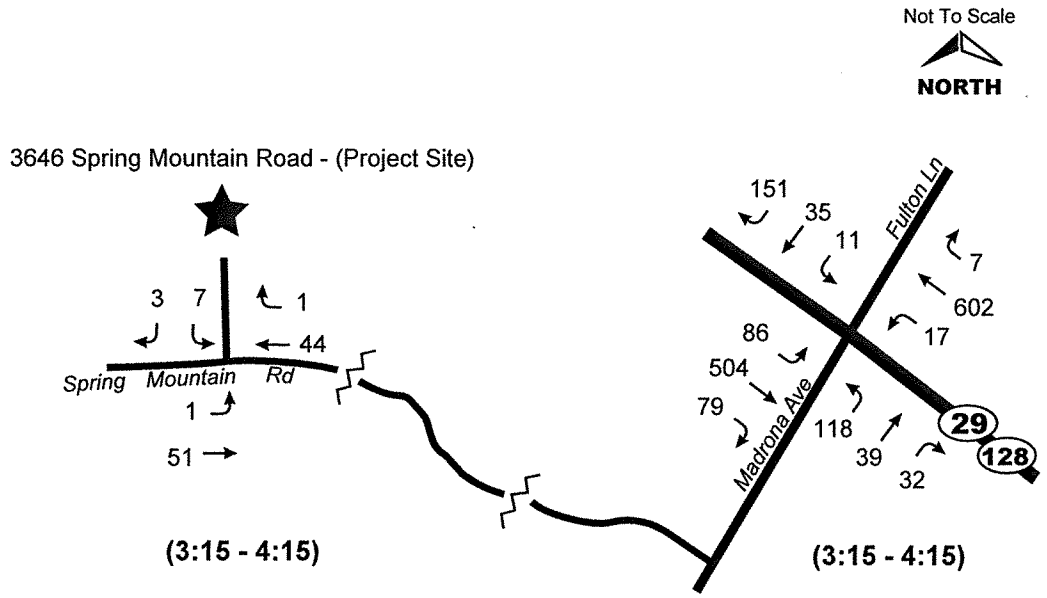
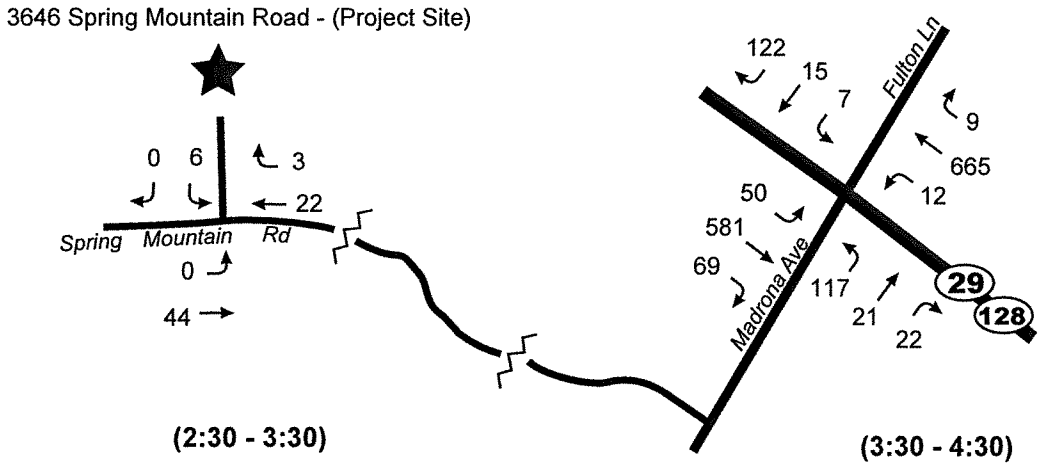
Figure 2

Existing Lane Geometrics and Intersection Control



Friday PM Peak Hours



Saturday PM Peak Hours

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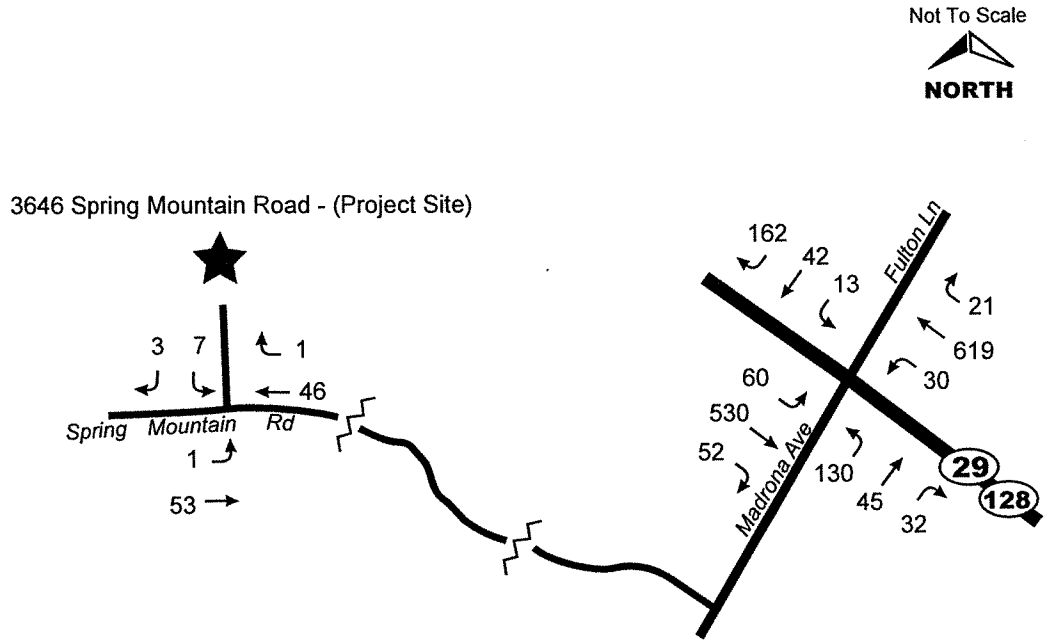
Figure 3
Existing (June 2014)
Friday and Saturday
PM Peak Hour Volumes



Vineyard 3646 Winery Traffic Study

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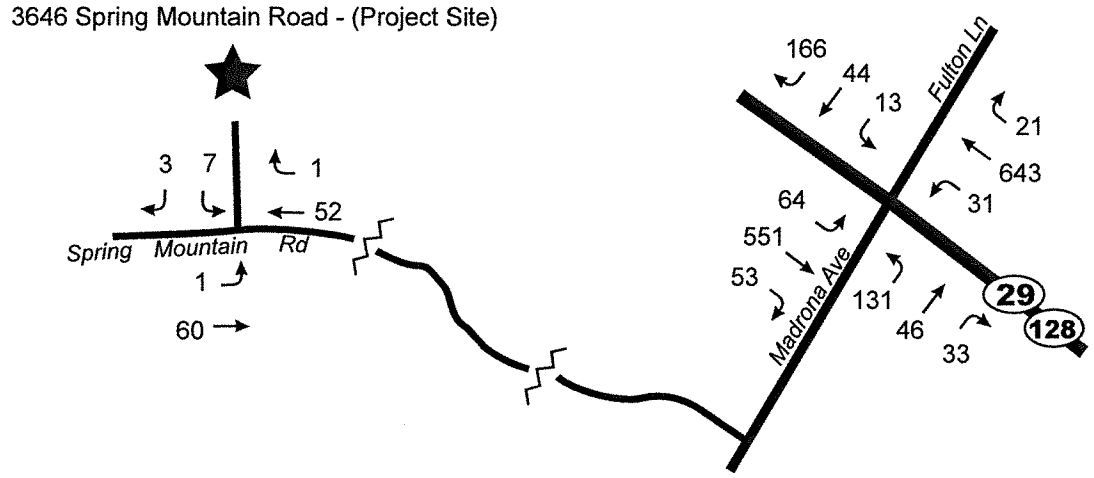
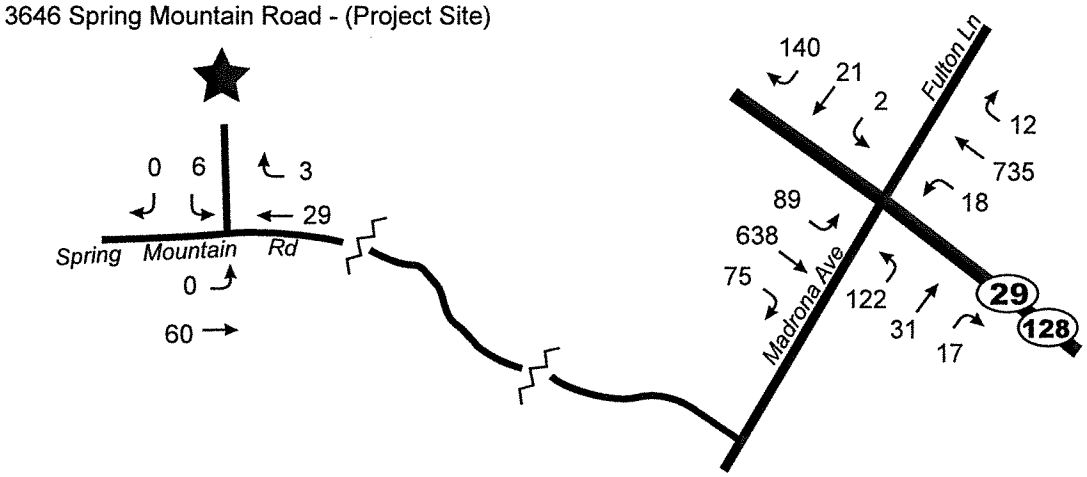
Figure 4
Existing (2014) Harvest w/o Project
Friday and Saturday
PM Peak Hour Volumes

Not To Scale

NORTH



Friday PM Peak Hour



Saturday PM Peak Hour

Vineyard 3646 Winery Traffic Study

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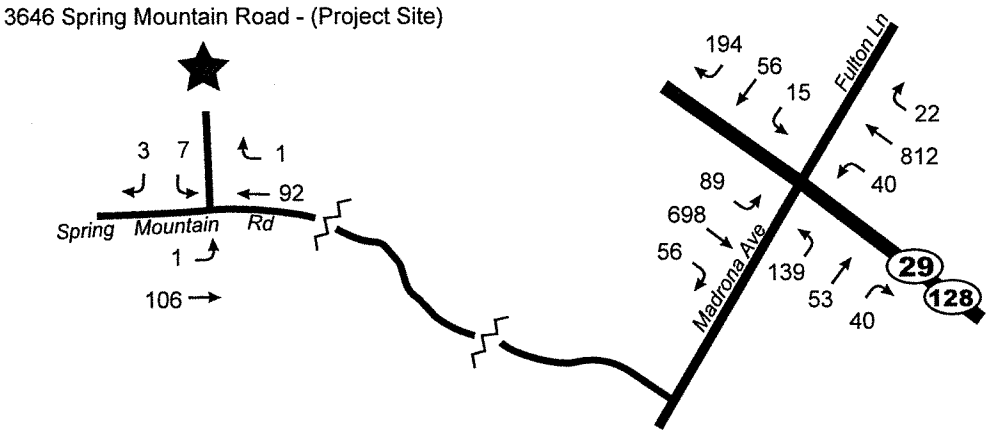
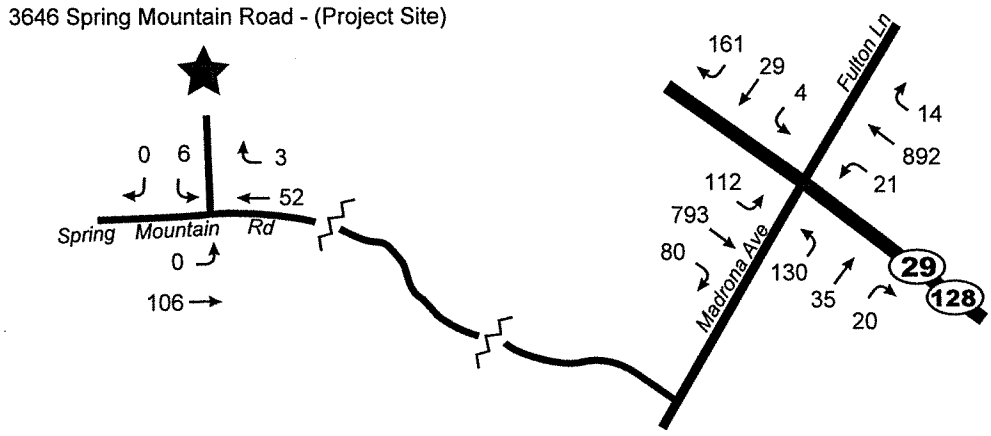
Figure 5
Year 2016 Harvest without Project
Friday and Saturday
PM Peak Hour Volumes

Not To Scale

NORTH



Friday PM Peak Hour



Saturday PM Peak Hour

Vineyard 3646 Winery Traffic Study

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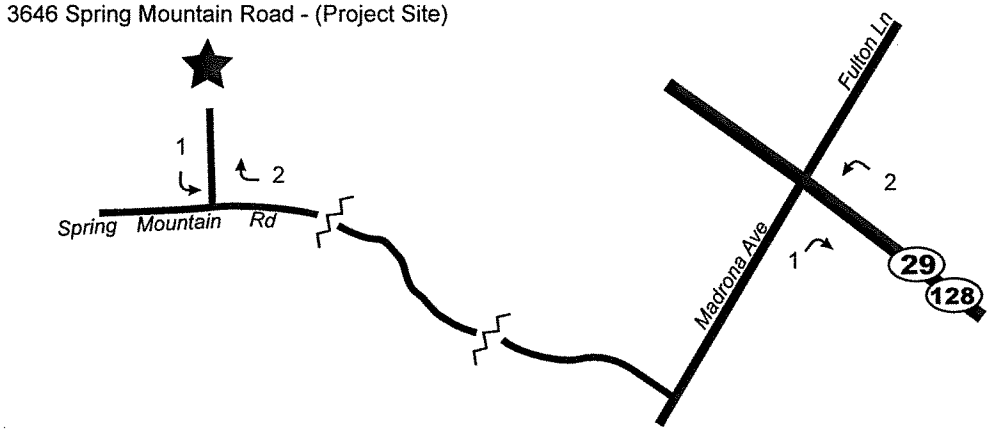
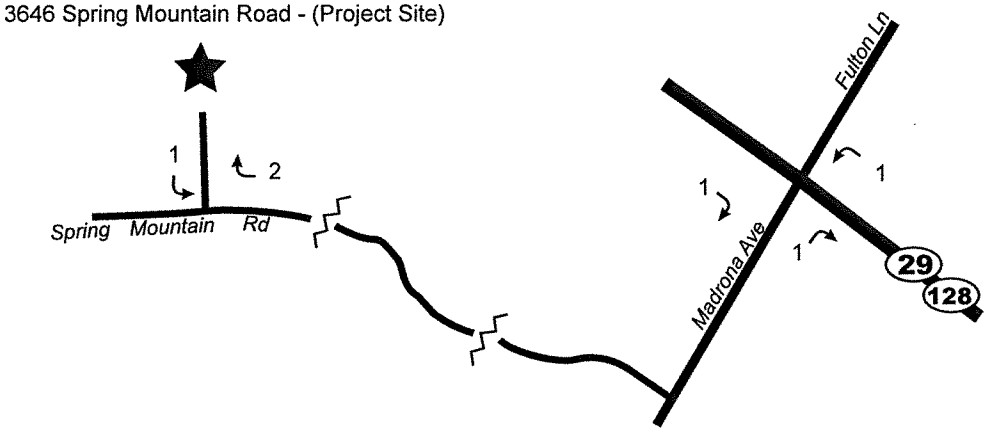
Figure 6
Year 2030 Harvest without Project
Friday and Saturday
PM Peak Hour Volumes

Not To Scale

NORTH



Friday PM Peak Hour



Saturday PM Peak Hour

Vineyard 3646 Winery Traffic Study

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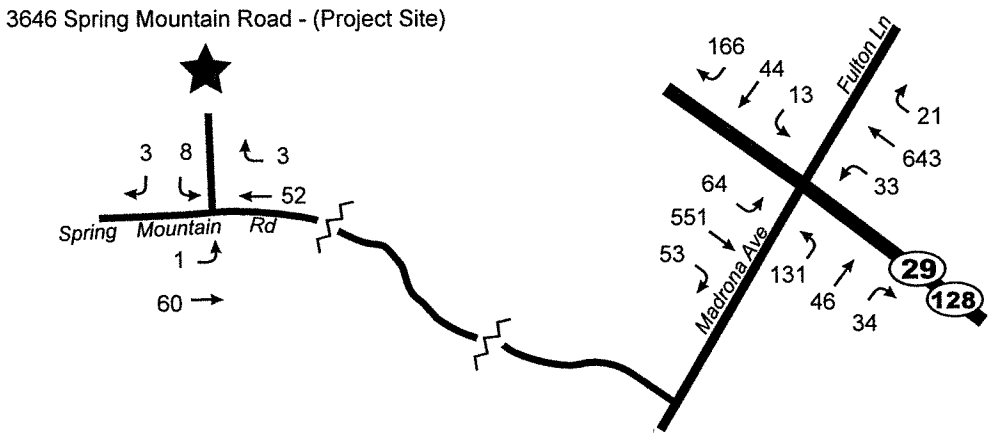
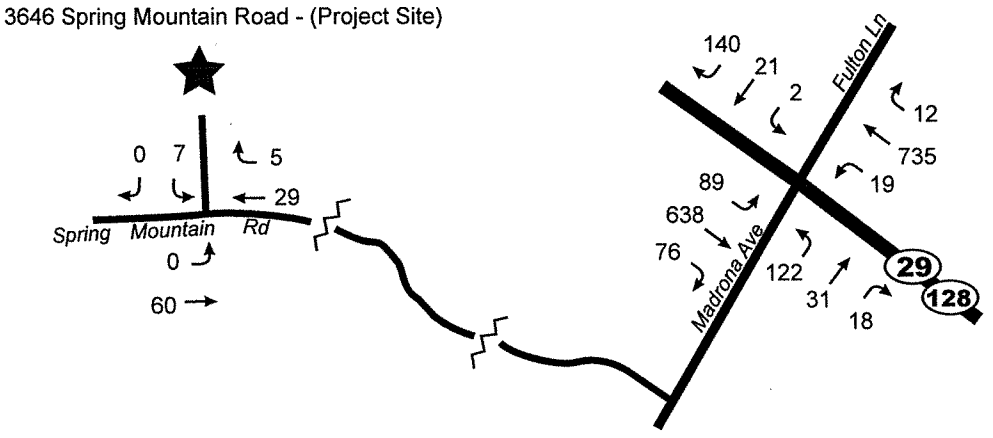
Figure 7
Friday and Saturday
Project Increment
PM Peak Hour Volumes

Not To Scale

NORTH



Friday PM Peak Hour



Saturday PM Peak Hour

Vineyard 3646 Winery Traffic Study

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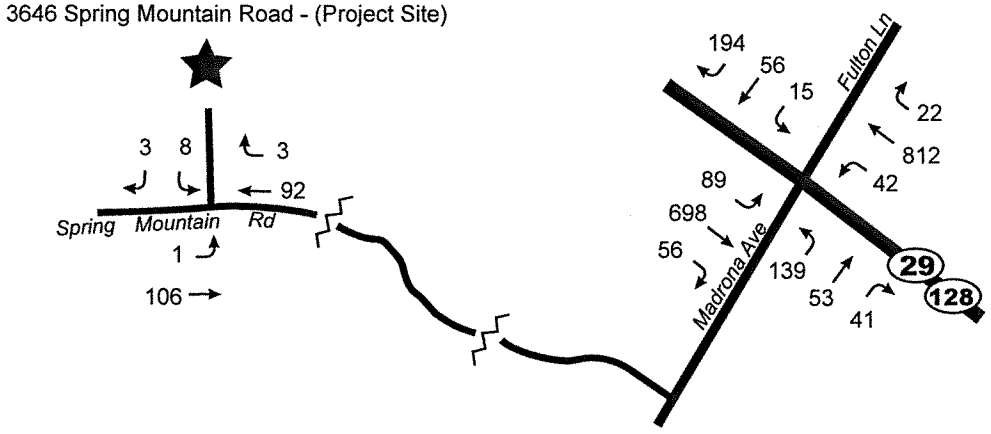
Figure 8

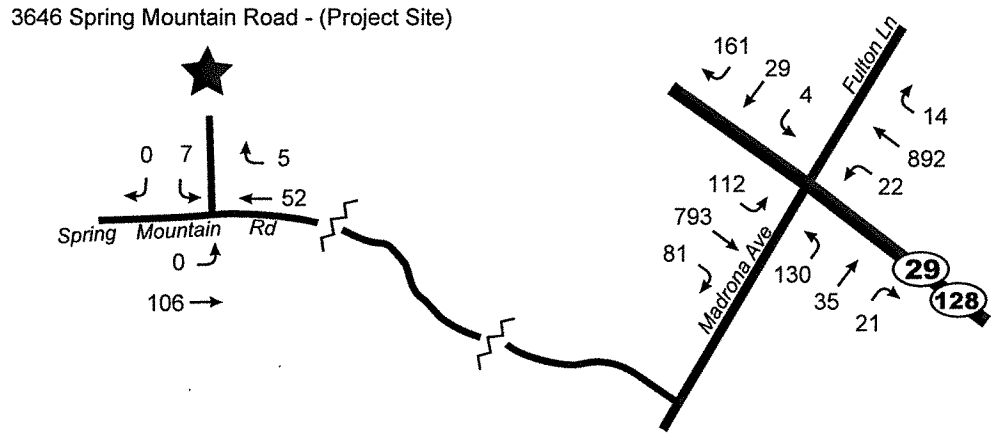
Year 2016 Harvest with Project
Friday and Saturday
PM Peak Hour Volumes

Not To Scale

NORTH



Friday PM Peak Hour



Saturday PM Peak Hour

Vineyard 3646 Winery Traffic Study

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Figure 9

Year 2030 Harvest with Project
Friday and Saturday
PM Peak Hour Volumes

Tables

Table 1

SIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 20.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.1 to 80.0
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80.0

Source: 2000 Highway Capacity Manual (Transportation Research Board).

Table 2

INTERSECTION LEVEL OF SERVICE

SR 29/MADRONA AVENUE-FULTON LANE

HARVEST 2014 – 2A

FRIDAY PM PEAK HOUR	SATURDAY PM PEAK HOUR
B-17.4[(1)]	B-14.9

HARVEST 2016 – 2B

FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
C-17.8	C-17.8	C-15.1	C-15.1

HARVEST 2030 – 2C

FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
C-22.1	C-22.1	C-22.4	C-22.6

(1) Signalized level of service – control delay in seconds.

Source: Crane Transportation Group

Table 3

VINEYARD 3646 WINERY TRIP GENERATION

HARVEST FRIDAY – 3A

CATEGORY	NUMBER	HOURS	TRIPS					
			3-4 PM		4-5 PM		5-6 PM	
			IN	OUT	IN	OUT	IN	OUT
Admin Employees	1	6AM-6PM	0	0	0	0	0	0
Production Employees – Full Time	1	6AM-6PM	0	0	0	0	0	0
Production Employees – Part Time	4	6AM-6PM	0	0	0	0	0	0
Tours/Tasting Employees*	0	10AM-6PM	0	0	0	0	0	0
Grape Delivery Trucks (100% grown on-site)	0	–	0	0	0	0	0	0
Reduction in Grape Outhaul Trucks	1/day	7AM-3PM	0	0	0	0	0	0
Visitors	12 total = 5 vehicles**	10AM-6PM	0	1	1-2	0	0	1-2

* Same as admin employee.
** 2.6 visitors/vehicle average on weekdays per County data.

HARVEST SATURDAY – 3B

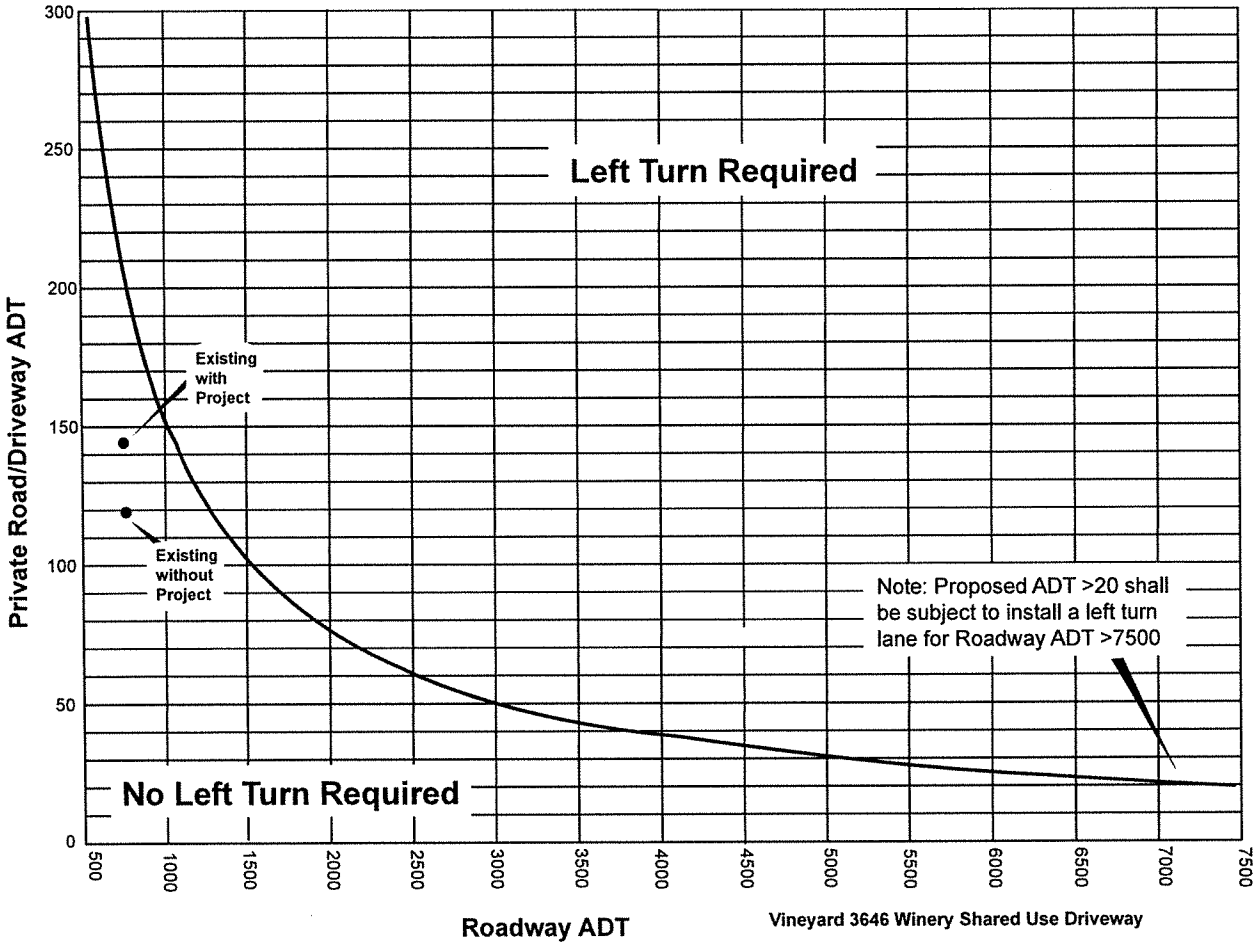
CATEGORY	NUMBER	HOURS	TRIPS							
			2-3 PM		3-4 PM		4-5 PM		5-6 PM	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees	1	6AM-6PM	0	0	0	0	0	0	0	0
Production Employees – Full Time	1	6AM-6PM	0	0	0	0	0	0	0	0
Production Employees – Part Time	4	6AM-6PM	0	0	0	0	0	0	0	0
Tours/Tasting Employees*	0	9AM-6PM	0	0	0	0	0	0	0	0
Grape Delivery Trucks (100% grown on-site)	0		0	0	0	0	0	0	0	0
Reduction in Grape Outhaul Trucks	1/day	7AM-3PM	0	0	0	0	0	0	0	0
Visitors	12 total = 5 vehicles**	10AM-6PM	1	0	0	1	1-2	0	0	1-2

* Same as admin employee.
** 2.8 visitors/vehicle average on Saturdays per County data.

Source: Crane Transportation Group

Table 4

COUNTY of NAPA LEFT TURN WARRANT GRAPH at Private Road and Driveway Intersections



Appendix

Appendix

VINEYARD 3646 WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

	HARVEST CONDITIONS	NON-HARVEST CONDITIONS
A.	**Full-time admin employees** # on Weekdays __1__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 6:00 AM to 6:00 PM Saturday 6:00 AM to 6:00 PM Sunday 6:00 AM to 6:00 PM	**Full-time admin employees** # on Weekdays __1__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 9:00 AM to 6:00 PM Saturday ___–___ to ___–___ Sunday ___–___ to ___–___
B.	**Full-time production employees** # on Weekdays __1__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 6:00 AM to 6:00 PM Saturday 6:00 AM to 6:00 PM Sunday 6:00 AM to 6:00 PM	**Full-time production employees** # on Weekdays __1__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 9:00 AM to 6:00 PM Saturday ___–___ to ___–___ Sunday ___–___ to ___–___
C.	**Part-time production employees** # on Weekdays __4__ # on Saturday __4__ # on Sunday __4__ Work hours: Weekday 6:00 AM to 6:00 PM Saturday 6:00 AM to 6:00 PM Sunday 6:00 AM to 6:00 PM	**Part-time production employees** # on Weekdays __2__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday 9:00 AM to 6:00 PM Saturday ___–___ to ___–___ Sunday ___–___ to ___–___
D.	**Tours & tasting employees** # on Weekdays __1*__ # on Saturday __1*__ # on Sunday __1*__ Work hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM	**Tours & tasting employees** # on Weekdays __1*__ # on Saturday __1__ # on Sunday __1__ Work hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM

* Same as admin employee.

Appendix

VINEYARD 3646 WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

	HARVEST CONDITIONS	NON-HARVEST CONDITIONS
E.	**Grape delivery trucks** # on Weekdays __0__ # on Saturday __0__ # on Sunday __0__ All grapes grown on site.	No deliveries.
F.	**Maximum tours/tasting visitors** # on Weekdays __12 (5 vehicles)__ # on Saturday __12 (5 vehicles)__ # on Sunday __12 (5 vehicles)__ Tasting hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM	**Maximum tours/tasting visitors** # on Weekdays __12 (5 vehicles)__ # on Saturday __12 (5 vehicles)__ # on Sunday __12 (5 vehicles)__ Tasting hours: Weekday 10:00 AM to 6:00 PM Saturday 10:00 AM to 6:00 PM Sunday 10:00 AM to 6:00 PM
G.	**Other employees** # on Weekdays __0__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday __–__ to __–__ Saturday __–__ to __–__ Sunday __–__ to __–__	**Other employees** # on Weekdays __0__ # on Saturday __0__ # on Sunday __0__ Work hours: Weekday __–__ to __–__ Saturday __–__ to __–__ Sunday __–__ to __–__
H.	**Other trucks on regular basis** # on Weekdays __1-2/month__ # on Saturday __0__ # on Sunday __0__ Delivery hours: Weekday 9:00 AM to 4:00 PM Saturday __–__ to __–__ Sunday __–__ to __–__	**Other trucks on regular basis** # on Weekdays __1-2/month__ # on Saturday __0__ # on Sunday __0__ Delivery hours: Weekday 9:00 AM to 4:00 PM Saturday __–__ to __–__ Sunday __–__ to __–__

Appendix

VINEYARD 3646 WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

I. Grape source

Percent grapes grown on site: 100%

SPECIAL EVENTS

Food & wine pairing –	# events/month: 2 maximum # people/event: 1 @ 12 visitors & 1 @ 20 visitors typical days: Fridays & weekends typical start time: between 10:00 AM & 6:00 PM
Wine auction –	# events/year: 1 # people/event: 75 (27 vehicles) typical days: Weekends typical hours: 10:00 AM to 6:00 PM
Wine releases –	# events/year: 2 # people/event: 50 (18 vehicles) typical days: Weekends typical hours: 10:00 AM to 6:00 PM