“H”

Traffic Study

Darms Lane Winery P16-00017-UP & P18-00152-VIEW
Planning Commission Hearing Date March 20, 2019

FINAL TRAFFIC IMPACT REPORT

PROPOSED DARMS LANE WINERY IN NAPA VALLEY, CALIFORNIA

January 21, 2019

Prepared for: **DARMS LANE WINERY**

Prepared by: **Mark D. Crane, P.E.**
California Registered Traffic Engineer (#1381)
CRANE TRANSPORTATION GROUP
2621 E. Windrim Court
Elk Grove, CA 95758
(916) 647-3406
cranetransgroup@gmail.com

Table of Contents

I. INTRODUCTION

This report has been prepared at the request of the Napa County Public Works Department to determine if the proposed Darms Lane Winery will result in any significant circulation system impacts along Darms Lane or at the nearby Solano Avenue/Darms Lane, Solano Avenue/SR 29 Connector Roadway or SR 29/Solano Avenue-Washington Street Connector Roadway intersections. Analysis has been provided for the harvest Friday and Saturday PM peak hours for year 2015, 2020 and 2030 (cumulative) conditions.

II. SUMMARY OF FINDINGS

A. "WITHOUT PROJECT" OPERATING CONDITIONS

1. Solano Avenue in the project vicinity had higher June (2014) two-way traffic volumes during the Friday PM peak traffic hour compared to the Saturday afternoon peak traffic hour (199 two-way peak hour vehicles on Friday versus 162 two-way peak hour vehicles on Saturday). Along SR 29, two-way volumes were similar during the Friday PM peak hour compared to the Saturday PM peak hour (2,755 versus 2,763 two-way vehicles).

2. During 2015 harvest conditions, the Solano Avenue/Darms Lane and Solano Avenue/SR 29 Connector Roadway intersections had acceptable (LOS A) stop sign controlled operation during both the Friday and Saturday PM peak hours. At the SR 29/Solano Avenue-Washington Street Connector Roadway intersection both stop sign controlled approaches to SR 29 had unacceptable (LOS E or F) operation in the combined thru/left turn lanes and acceptable operation in the exclusive right turn lanes. Left turn volumes turning to SR 29 were small, potentially because there were a nearby interchange and signalized intersection where left turn access to the state highway could be conducted.

3. During year 2020 and 2030 (cumulative) harvest conditions, the Solano Avenue/Darms Lane and Solano Avenue/SR 29 Connector Roadway intersections would be experiencing acceptable (LOS A) operation during both the Friday and Saturday PM peak traffic hours. At the SR 29/Solano Avenue-Washington Street Connector Roadway intersection, during both the Friday and Saturday PM peak hours both the east and westbound stop sign controlled two-lane approaches to SR 29 would have unacceptable 2020 or 2030 (LOS E or F) operation for the combined thru/left turn lanes and acceptable LOS B or C operation for the right turn lanes. As with 2015 operation, left turns from the Solano Avenue Connector Road to northbound SR 29 would take extended lengths of time resulting in small left turn volumes as there would be a nearby interchange and signalized intersection where left turn access to the state highway could be conducted.

4. Drivers turning from Darms Lane to Solano Avenue have less than acceptable sight lines to the south (to see northbound vehicles) due to trees and brush along the south bank of Dry Creek in close proximity to the west edge of Solano Avenue.

B. PROJECT IMPACTS

1. The project will result in about 1 inbound and 1 outbound trips during the harvest Friday PM peak traffic hour along SR 29, with about 1 inbound and 3 outbound trips during the harvest Saturday PM peak traffic hour. Project trips during both the Friday and Saturday PM peak traffics will be visitors by appointment.

2. No left turn lane will be required at the project entrance since it is at the west (dead) end of Darms Lane and inbound movements from Darms Lane will all be right turns.

3. Project traffic during harvest will not produce any significant operational impacts (level of service or delay) at the Solano Avenue/Darms Lane, Solano Avenue/SR 29 Connector Roadway or SR 29/Solano Avenue-Washington Street Connector Roadway intersections for the year 2015, 2020 or 2030 (cumulative) analysis horizons. However, any visitor leaving the project desiring to travel north on SR 29 will experience extended delay if attempting to make a left turn from the Solano Avenue Connector Roadway to northbound SR 29. These drivers will need to be directed to the California Drive interchange to the north for access to northbound SR 29. Analysis for another recent study in the area (Mira Winery) shows that the California Drive interchange intersections with the SR 29 northbound and southbound ramps are projected to have acceptable levels of service during the Friday and Saturday PM peak traffic hours through the year 2030.

4. Sight lines will be adequate at the project's proposed driveway connection to Darms Lane.

C. PROJECT MITIGATION

1. Provide a sign on the project driveway for exiting drivers directing them to use Solano Avenue to access the California Drive interchange in Yountville if they desire to travel northbound into the Napa Valley.

D. CONCLUSIONS & RECOMMENDATIONS

The project would result in no significant off-site circulation system operational impacts to the Solano Avenue/Darms Lane, Solano Avenue/SR 29 Connector Roadway or SR 29/Solano Avenue-Washington Street Connector Roadway intersections. In addition, there would be no sight line impacts at the proposed project driveway connection to Darms Lane. Therefore, no mitigations are needed for these issues. However, due to the extended delay of making a left turn to go north on SR 29 from the Solano Avenue Connector Roadway it is recommended that directions be given to all visitors leaving the winery who desire traveling north on SR 29 to use Solano Avenue to access the SR 29/California Drive interchange in Yountville.

It is also recommended that the County clear brush from the south bank of Dry Creek just west of Solano Avenue in order to provide acceptable sight lines for existing as well as project drivers turning left from Darms Lane to northbound Solano Avenue. This is needed with or without the proposed project.

III. PROJECT LOCATION & DESCRIPTION

The Darms Lane Winery will be located on the north side of Darms Lane near the west end of the street (see **Figure 1**). The project visitor and employee driveway will be on the north side of Darms Lane about half a mile west of its intersection with Solano Avenue (see **Figure 2**, Site Plan).

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

- 30,000 gallons per year production.
- 4 full-time and 2 part-time employees at all times, with an additional 2 seasonal employees during harvest.
- Bottling on-site.
- 90 percent of the grapes will be grown on site (with the remaining 10% accessing the winery from the north on SR 29). This will result in 3 new trucks hauling grapes to the project site and elimination of 11 trucks now outhauling grapes from site vineyards for processing at Laird Winery just to the south on Solano Avenue. The net change will be 8 fewer grape haul truck trips on Darms Lane and Solano Avenue during harvest.
- Tours and tasting by appointment only – 7 days per week from 10:00 AM to 6:00 PM, maximum 24 visitors per day (resulting in 9 to 10 vehicles/day) & 150 visitors maximum/week.
- Food and wine pairing events – 4 per month: 2 @ 12 visitors (5 vehicles) and 2 @ 24 visitors (9 vehicles) – weekends between 10:00 AM and 11:00 PM.
- Wine auction – 2 per year, maximum 125 visitors (45 vehicles) per event on weekends between 10:00 AM and 11:00 PM.
- Wine club release – 4 per year, maximum 75 visitors (27 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.

1. **Solano Avenue/Darms Lane intersection. (The Darms Lane approach is stop sign controlled.)**
2. **Solano Avenue/SR 29 Connector Roadway intersection. (The Connector Roadway westbound approach is stop sign controlled.)**
3. **SR 29/Solano Avenue-Washington Street Connector Road intersection. (The Connector Road eastbound and westbound approaches are stop sign controlled.)**

Figure 3 presents approach geometrics and control at each analysis intersection.

B. VOLUMES

1. Analysis Seasons and Days of the Week

Project traffic impacts have been evaluated during harvest conditions. Based upon more than four years of historical information from Caltrans PeMS (Performance Measurement System) count surveys along SR 29 in the Napa Valley, September has the highest daily volumes of the year (during harvest).

In regards to the peak traffic days of the week, the recently released Napa County Travel Behavioral Study[1] shows that the highest weekday volumes in Napa Valley occur on a Friday, with the highest weekend volumes occurring on a Saturday. In addition, historical count data from the City of Napa show that Friday has the highest volumes of any weekday, while Caltrans historical counts for SR 29 between St. Helena and Napa also show that weekday AM and PM peak hour volumes are higher on a Friday than on either a Wednesday or Thursday. Therefore, Friday and Saturday peak traffic conditions were evaluated in this study.

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 June 2014 at the Solano Avenue/Darms Lane, Solano Avenue/SR 29 Connector Roadway and SR 29/Solano Avenue-Washington Street Connector Roadway intersections. The peak traffic hours were determined to be 4:00-5:00 PM along SR 29 and from 3:30-4:30 along Solano Avenue. On Saturday, the peak traffic hours were determined to be 3:30-4:30 PM along SR 29 and from 2:15-3:15 along Solano Avenue. (Please see **Appendix Figure A-1**.) For analysis purposes, the peak hourly volumes at each location were evaluated. Overall, two-way volumes along Solano Avenue at the Darms Lane intersection were higher during the Friday PM peak traffic hour (199 vehicles per hour [vph] on Friday versus 162 vph on Saturday). Along SR 29, two-way volumes just south of the Solano Avenue-Washington Street Connector Road intersection were similar during the Friday and Saturday PM peak hours (2,755 two-way vehicles versus 2,763 two-way vehicles), while PM peak hour two-way counts on Darms Lane near Solano Avenue were higher on Friday than on Saturday (47 vph on Friday versus 20 vph on Saturday).

June 2014 peak hour traffic counts were seasonally adjusted to reflect September harvest conditions. Historical traffic count data from Caltrans PeMS system as well as past studies were used to determine that September Friday and Saturday volumes are about 2.8 percent higher than June Friday or Saturday volumes. September 2014 peak hour volumes were then factored to reflect harvest 2015 conditions based upon straight line growth between existing and year 2030 General Plan horizon traffic projections. **Figure 4** presents year 2015 harvest Friday and Saturday (Without Project) PM peak hour volumes.

[1] Fehr & Peers, December 8, 2014.

C. ROADWAYS & RAILROADS

Darms Lane is a level and straight two-lane rural road extending westerly from a Tee intersection with Solano Avenue. It lacks curb, gutter, sidewalks, pathways and centerline striping. There are dirt and grass shoulders along the majority of the road and the posted speed limit is 35 miles per hour. The road was repaved within the last three years and primarily has a smooth surface, although there are undulations extending across both lanes at random intervals. Darms Lane is stop sign controlled on its eastbound approach to Solano Avenue and ends at a gated property entrance just west of the project access driveway about half a mile from Solano Avenue.

Solano Avenue in the project vicinity has two well-paved 12-foot travel lanes and paved shoulders that are signed and striped as Class II bicycle lanes. It runs parallel to and about 80 feet west of the SR 29 expressway. No left turn lanes are provided on either the northbound approach to Darms Lane or on the southbound approach to the SR 29 Connector Road. The posted speed limit is 50 miles per hour and the roadway is level and straight at both intersections. There is a bridge crossing Dry Creek starting about 40 feet south of the Darms Lane intersection. Trees and shrubbery along the south bank of the creek limit sight lines to the south for drivers turning left from Darms Lane.

State Route 29 (SR 29) is a level and straight four-lane expressway in the project area. The north and southbound travel lanes are separated by a wide raised median and the posted speed limit is 60 miles per hour. There is an unsignalized intersection about 500 feet north of Darms Lane that provides a connection between Solano Avenue and the state highway (on the west) and between Washington Street and the state highway (on the east). Left and right turn paved deceleration areas are provided on both SR 29 approaches to this intersection. In addition, there are refuge acceleration areas in the median for vehicles turning left from both Solano Avenue (to go north on the state highway) and from Washington Street (to go south on the state highway).

The ***Solano Avenue to Washington Street Connector Roadway*** has about 60 feet of storage between Solano Avenue and SR 29 and is stop sign controlled on the approaches to both roadways. It is wide enough to allow two lanes of vehicle storage in both directions such that left/through and right turning vehicles can separate on the approaches to both SR 29 and Solano Avenue. Dimensions are similar on the section of the Connector Roadway between Washington Street and SR 29. The Napa Valley Wine Train single track railroad has an at-grade crossing of the Connector Road between Solano Avenue and SR 29 that is protected by flashing lights and gates. Currently, there are two to four train crossings each day, with the gates being down about 90 seconds for each crossing.

The ***Napa Valley Wine Train*** track extends from the City of Napa northerly to the City of St. Helena. In the project vicinity the single track line runs parallel to and just west of SR 29.

D. BICYCLE FEATURES

Solano Avenue has Class II signed and striped bicycle lanes on its paved shoulders. In addition, the VINE Class I bicycle path was recently completed in the project vicinity and runs between and parallel to Solano Avenue and the Napa Valley Wine Train track. This section of the Vine Trail extends northerly from the City of Napa to California Drive in the Town of Yountville.

E. 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.

Unsignalized Intersections. For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the 2017 *Highway Capacity Manual, Version 6* (Transportation Research Board, National Research Council) methodology for unsignalized intersections was utilized. For side-street stop-controlled intersections, operations are defined by the level of service and average control delay per vehicle (measured in seconds), with delay reported for the stop sign controlled approaches or turn movements. For all-way stop-controlled intersections, operations are defined by the average control delay for the entire intersection (measured in seconds per vehicle). The delay at an unsignalized intersection incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. **Table 1** summarizes the relationship between delay and LOS for unsignalized intersections while capacity worksheets are provided in the **Appendix**.

2. Minimum Acceptable Operation

Napa County uses Level of Service D (LOS D) is the poorest acceptable operation for side street stop sign controlled approaches at two-way stop intersections and for overall operation at all-way-stop intersections.

F. INTERSECTION SIGNAL WARRANTS

Traffic signals are used to provide an orderly flow of traffic through an intersection. Many times they are needed to offer side street traffic an opportunity to access a major road where high volumes and/or high vehicle speeds block crossing or turn movements. They do not, however, increase the capacity of an intersection (i.e., increase the overall intersection's ability to accommodate additional vehicles) and, in fact, often slightly reduce the number of total vehicles that can pass through an intersection in a given period of time. Signals can also cause an increase in traffic accidents if installed at inappropriate locations.

There are 10 possible tests for determining whether a traffic signal should be considered for installation. These tests, called "warrants", consider criteria such as actual traffic volume, pedestrian volume, presence of school children, and accident history. The intersection volume data together with the available collision histories were compared to warrants contained in the *California Manual on Uniform Traffic Control Devices, 2014, Revision 2 (2014 CMUTCD Rev. 2)*. Section 4C of the 2014 CMUTCD Rev. 2 provides guidelines, or warrants, which may indicate need for a traffic signal at an unsignalized intersection. As indicated in the 2014 CMUTCD Rev. 2, satisfaction of one or more warrants does not necessarily require immediate installation of a traffic signal. It is merely an indication that the local jurisdiction should begin monitoring conditions at that location and that a signal may ultimately be required.

Warrant 3, the peak hour volume warrant, is often used as an initial check of signalization needs since peak hour volume data is typically available and this warrant is usually the first one to be met. Warrant 3 is based on a logarithmic curve and takes only the hour with the highest volume of the day into account. For intersections in rural locations (with local area population less than 10,000 people or where the posted speed limit or 85th percentile speed on the uncontrolled intersection approaches is greater than 40 miles per hour) a 70 percent warrant is applied. The regular and 70 percent warrants are typically referred to as the urban and rural peak hour warrants. Please see the **Appendix** for the warrant charts.

G. PLANNED IMPROVEMENTS

There are no planned and funded improvements at any location evaluated in this study.[2]

V. FUTURE HORIZON TRAFFIC VOLUME PROJECTIONS

Traffic analysis has been conducted for existing (2015), year 2020 and cumulative year 2030 horizons at County request. The 2030 cumulative horizon reflects the County General Plan Buildout year. Traffic modeling for the General Plan shows the following growths in two-way traffic between 2015 and 2030 for the following roadways.

Route	2015 to 2030 Projected Growth in Weekday PM Peak Hour Traffic
SR 29 at Solano Avenue	±17%
Connector Road	

[2] Mr. Mike Hawkins, Napa County Public Works Department, February 2018.

Projecting straight line traffic growth for analysis purposes, this translates into the following growths in two-way traffic from 2015 to 2020.

Route	2015 to 2020 Projected Growth in Weekday PM Peak Hour Traffic
SR 29 at Solano Avenue Connector Road	±6%

Since traffic modeling projections were only available for weekday PM peak hour conditions and not for the Saturday PM peak hour, Saturday two-way PM peak hour volumes were increased by the percentages found for the weekday PM peak hour.

Solano Avenue is not contained in the County traffic model due to their existing low volumes and lack of anticipated significant growth. Projected growth from 2014 to 2030 at the project site utilized in this study was about 9 percent during the PM peak hour, or about half of the traffic growth along SR 29.

Resultant year 2020 harvest "Without Project" Friday and Saturday peak hour volumes are presented in **Figure 5**, while cumulative (year 2030) harvest "Without Project" Friday and Saturday peak hour volumes are presented in **Figure 6**.

VI. OFF-SITE CIRCULATION SYSTEM OPERATION – WITHOUT PROJECT

1. YEAR 2015 HARVEST OPERATING CONDITIONS (WITHOUT PROJECT)

A. INTERSECTION LEVEL OF SERVICE – Table 2

1. SOLANO AVENUE/DARMS LANE

a) Friday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

b) Saturday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday PM Peak Hour

Acceptable SR 29 Connector Road stop sign controlled westbound approach: LOS A

b) Saturday PM Peak Hour

Acceptable SR 29 Connector Road stop sign controlled westbound approach: LOS A

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS E or F
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS B or C

b) Saturday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS E
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS B or C

B. INTERSECTION SIGNAL WARRANTS – Table 3

1. SOLANO AVENUE/DARMS LANE

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

2. YEAR 2020 HARVEST OPERATING CONDITIONS (WITHOUT PROJECT)

A. INTERSECTION LEVEL OF SERVICE – Table 2

1. SOLANO AVENUE/DARMS LANE

a) Friday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

b) Saturday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday PM Peak Hour

Acceptable SR 29 Connector Road stop sign controlled westbound approach: LOS A

b) Saturday PM Peak Hour

Acceptable SR 29 Connector Road stop sign controlled westbound approach: LOS A

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS F
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS B or C

b) Saturday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS E or F
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS B or C

B. INTERSECTION SIGNAL WARRANTS – Table 3

1. SOLANO AVENUE/DARMS LANE

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

3. YEAR 2030 (CUMULATIVE) HARVEST OPERATING CONDITIONS (WITHOUT PROJECT)

A. INTERSECTION LEVEL OF SERVICE – Table 2

1. SOLANO AVENUE/DAMS LANE

a) Friday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

b) Saturday PM Peak Hour

Acceptable Darms Lane stop sign controlled approach: LOS A

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday PM Peak Hour

Acceptable Connector Road stop sign controlled westbound approach: LOS A

b) Saturday PM Peak Hour

Acceptable Connector Road stop sign controlled westbound approach: LOS A

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS F
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS B or C

b) Saturday PM Peak Hour

Unacceptable eastbound or westbound thru/left turn lane approaches to SR 29: LOS F
Acceptable eastbound or westbound right turn lane approaches to SR 29: LOS C

B. INTERSECTION SIGNAL WARRANTS – Table 3

1. SOLANO AVENUE/DARMS LANE

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

2. SOLANO AVENUE/SR 29 CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

3. SR 29/SOLANO AVENUE-WASHINGTON STREET CONNECTOR ROAD

a) Friday & Saturday PM Peak Hours

Volumes would not meet rural peak hour signal warrant criteria levels.

VII. PROJECT IMPACTS

A. SIGNIFICANCE CRITERIA

1. COUNTY OF NAPA

The following criteria have recently been developed for traffic impact analyses in Napa County.

EXISTING + PROJECT CONDITIONS

A. ARTERIAL SEGMENTS

A project would cause a significant impact requiring mitigation if:

1. An arterial segment operates at LOS A, B, C or D during the selected peak hours without project trips, and deteriorates to LOS E or F with the addition of project trips, or
2. An arterial segment operates at LOS E or F during the selected peak hours without project trips, and the addition of project trips increases the total segment volume by one percent or more.

For the second criteria, the following equation should be used if the arterial operates at LOS E or F without the project:

Project Contribution % = Project Trips ÷ Existing Volumes

B. SIGNALIZED INTERSECTIONS

A project would cause a significant impact requiring mitigation if:

1. A signalized intersection operates at LOS A, B, C or D during the selected peak hours without project trips, and deteriorates to LOS E or F with the addition of project trips, or
2. A signalized intersection operates at LOS E or F during the selected peak hours without project trips, and the addition of project trips increases the total entering volume by one percent or more.

For the second criteria, the following equation should be used if the signalized intersection operates at LOS E or F without the project:

Project Contribution % = Project Trips ÷ Existing Volumes

Maintaining LOS D or better at all signalized intersections would sometimes require expanding the physical footprint of an intersection. In some locations around the County, expanding physical transportation infrastructure could be in direct conflict with the County's goals of preserving the area's rural character, improving safety, and sustaining the agricultural industry, making these potential improvements infeasible. The County's Circulation Element lists intersections that are slated for improvement or expansion in unincorporated Napa County.[3]

Transportation studies should individually consider the feasibility of potential mitigation measures with respect to right-of-way acquisition, regardless of the intersection's place in the Circulation Element's identified improvement lists, and present potential alternative mitigation measures that do not require right-of-way acquisition. County staff would then review that information and make the decision about the feasibility of the identified potential mitigations.

For intersections that cannot be improved without substantial additional right-of-way according to both the Circulation Element and the individual transportation impact study, and where other mitigations such as updating signal timing, signal phasing and operations, and/or signing and striping improvements do not improve the LOS, LOS E or F will be considered acceptable and the one percent threshold would not apply. Analysis

[3] According to the Circulation Element dated June 8, 2008, the following intersections can be altered or expanded as a mitigation measure: SR-12/Airport Boulevard/SR-29, SR-221/SR-12/Highway 29, and several intersections along SR-29 and SR-128 north of Napa. The significance criteria shown above should apply to facilities where appropriate based upon the most recent Circulation Element chapter of the General Plan.

of signalized intersection LOS should still be presented for informational purposes, and there should still be an evaluation of effects on safety and local access, per Policy CIR-18.

C. UNSIGNALIZED INTERSECTIONS (ALL WAY STOP AND SIDE STREET STOP SIGN CONTROLLED)

LOS for all way stop controlled intersections is defined as an average of the delay at all approaches. LOS for side street stop controlled intersections is defined by the delay and LOS for the worst case approach. The recommended interpretation of Policy CIR-16 regarding unsignalized intersection significance criteria is as follows:

1. An unsignalized intersection operates at LOS A, B, C or D during the selected peak hours without project trips, the LOS deteriorates to LOS E or F with the addition of project traffic, and the peak hour traffic signal warrant criteria should also be evaluated and presented for information purposes, or
2. An unsignalized intersection operates at LOS E or F during the selected peak hours without project trips and the project contributes one percent or more of the total entering traffic for all way stop controlled intersections, or 10 percent or more of the traffic on a side street approach for side street stop controlled intersections; the peak hour traffic signal warrant criteria should also be evaluated and presented for informational purposes.

All Way Stop Controlled Intersections

For the second criteria at an all way stop controlled intersection, the following equation should be used if the all way stop controlled intersection operates at LOS E or F without the project.

$$\textit{Project Contribution \%} = \textit{Project Trips} \div \textit{Existing Volumes}$$

Side Street Stop Controlled Intersections

For the second criteria at a side street stop controlled intersection, the following equation should be used if the side street stop controlled intersection operates at LOS E or F without the project.

$$\textit{Project Contribution \%} = \textit{Project Trips} \div \textit{Existing Volumes}$$

Both of those volumes are for the stop controlled approaches only. Each stop controlled approach that operates at LOS E or F should be analyzed individually.

CUMULATIVE+ PROJECT CONDITIONS

A. ARTERIAL SEGMENTS, SIGNALIZED INTERSECTIONS AND UNSIGNALIZED INTERSECTIONS

A project would cause a significant cumulative impact requiring mitigation if:

1. The overall amount of expected traffic growth causes conditions to deteriorate such that any of the significance criteria described above for existing conditions are met, and
2. The project's contribution to a significant cumulative impact would be equal to or greater than five percent of the growth in traffic from existing conditions.

A project's contribution to a cumulative condition would be calculated as the project's percentage contribution to the total growth in traffic from existing conditions.

Project Contribution % = Project Trips ÷ (Cumulative Volumes - Existing Volumes)

- If projected daily volumes on the project driveway in combination with volumes on the roadway providing access to the project driveway meet County warrant criteria for provision of a left turn lane on the approach to the project entrance.

- If sight lines at project access driveways do not meet Caltrans stopping sight distance criteria based upon prevailing vehicle speeds.

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, grape delivery and visitor activities at the proposed Darms Lane Winery (see worksheets in the **Appendix**). Results are presented on an hourly basis in **Tables 4** and **5** for Friday and Saturday afternoon conditions. During the Friday PM peak traffic hour, there would be a projected 1 inbound and 1 outbound project trips, while during the Saturday afternoon PM peak traffic hour, there would be a projected 1 inbound and 3 outbound project trips. As shown, winery administrative and production employees would not be expected on the local roadway network during either harvest Friday or Saturday PM peak hour conditions. The visitor-serving employee would also be working until at least 6:00 PM every day as tours and tasting by appointment would close at 6:00 PM. In addition, the one expected grape delivery per day could be scheduled any time between 7:00 AM and 3:00 PM, although morning deliveries would be typical. Therefore, the only winery-related traffic expected on the local roadway network during either the Friday or Saturday afternoon peak traffic hours would be visitor traffic related. As shown in **Appendix Figure A-2**, half of all visitors are projected to be at the winery between 2:00 and 4:00 PM. Also shown in the **Appendix** are daily traffic projections as developed for the County's Winery Traffic Information/Trip Generation Sheet.

C. TRIP DISTRIBUTION

Project traffic was distributed to Solano Avenue and SR 29 in a pattern reflective of existing distribution patterns at the Solano Avenue/Darms Lane and SR 29/SR 29-Solano Avenue Connector Road intersections as well as input that would be provided by winery staff in regards to the safest access routes to SR 29. The vast majority of traffic would be expected to travel to/from the site on SR 29, with most traveling to/from the south. The Friday and Saturday project traffic increments expected on local roadways during the times of ambient PM peak traffic flow are presented in **Figure 7**, while resultant Friday and Saturday PM peak hour Existing (2015) + Project volumes are presented in **Figure 8**, year 2020 + Project volumes are presented in **Figure 9** and cumulative (year 2030) + Project volumes are presented in **Figure 10**. Due to the heavy traffic volumes on SR 29 and the lengthy delay likely to be encountered by project drivers attempting to make left turns from the Solano Avenue Connector Road to northbound SR 29, it was projected that visitors to the project would be provided information indicating that they should drive along Solano Avenue into Yountville for safe and minimum delay access to northbound SR 29 via the California Drive interchange.

D. PLANNED ROADWAY IMPROVEMENTS

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

E. PROJECT TRAFFIC IMPACTS DURING HARVEST

1. Year 2015 + Project

a. Intersection Level of Service

Table 2 shows that harvest operation would remain an acceptable LOS A at the two analyzed intersections along Solano Avenue with the addition of project traffic during both the Friday and Saturday PM peak traffic hours. At the SR 29/Solano Avenue-Washington Street Connector Road intersection, the eastbound Connector Road stop sign controlled approach right turn lane would be operating at an acceptable LOS C with or without project traffic, while the eastbound approach shared thru/left turn lane would be operating unacceptably at LOS E or F with or without the project during either the Friday or Saturday PM peak hours. However, no project traffic would be expected to be added to this left turn movement. Therefore, there would be no significant impact based upon County significance criteria.

Less than significant impact.

[4] Mr. Mike Hawkins, Napa County Public Works Department, February 2018.

b. Intersection Signal Warrant

Table 3 shows that project traffic would not increase either Friday or Saturday PM peak hour volumes to meet peak hour rural signal warrant criteria at any of the three analyzed intersections.

Less than significant impact.

2. Year 2020 + Project

a. Intersection Level of Service

Table 2 shows that harvest operation would remain an acceptable LOS A at the two analyzed intersections along Solano Avenue with the addition of project traffic during both the Friday and Saturday PM peak traffic hours. At the SR 29/Solano Avenue-Washington Street Connector Road intersection, the eastbound Connector Road stop sign controlled approach right turn lane would be operating at an acceptable LOS C with or without project traffic, while the eastbound approach shared thru/left turn lane would be operating unacceptably at LOS E or F with or without the project during either the Friday or Saturday PM peak hours. However, no project traffic would be expected to be added to this left turn movement. Therefore, there would be no significant impact based upon County significance criteria.

Less than significant impact.

b. Intersection Signal Warrant

Table 3 shows that project traffic would not increase either Friday or Saturday PM peak hour volumes to meet peak hour signal warrant criteria at any of the three analyzed intersections.

Less than significant impact.

3. Year 2030 + Project

a. Intersection Level of Service

Table 2 shows that harvest operation would remain an acceptable LOS A at the two analyzed intersections along Solano Avenue with the addition of project traffic during both the Friday and Saturday PM peak traffic hours. At the SR 29/Solano Avenue-Washington Street Connector Road intersection, the eastbound Connector Road stop sign controlled approach right turn lane would be operating at an acceptable LOS C with or without project traffic, while the eastbound approach shared thru/left turn lane would be operating unacceptably at LOS F with or without the project during either the Friday or Saturday PM peak hours. However, no project traffic would be expected to be added to this left turn movement. Therefore, there would be no significant impact based upon County significance criteria.

Less than significant impact.

b. Intersection Signal Warrant

Table 3 shows that project traffic would not increase either Friday or Saturday PM peak hour volumes to meet peak hour signal warrant criteria at any of the three analyzed intersections.

Less than significant impact.

F. PROJECT DRIVEWAY SIGHT LINE ADEQUACY

Sight lines would be acceptable for drivers turning from the project driveway to Darms Lane. Sight lines to the west would be clear the 130 feet to the gated entry of the one property to the west of the project, while sight lines to the east would be greater than 1,000 feet. Based upon an eastbound travel speed of 15 to 20 miles per hour for vehicles leaving the adjacent gated property, the required stopping sight distance for eastbound drivers would be up to 125 feet.[5]

Less than significant impact.

G. MARKETING EVENTS

Table 6 presents details of the number of guests, employees and hired event staffing that would likely be present for the project's three different types of proposed marketing events.

Food and wine pairing events would be held four times per month on either a Friday or weekend day, two times with up to 12 people (and about 5 vehicles) and two times with up to 24 people (and about 9-10 vehicles). Wine releases would be held four times per year on weekend days with up to 75 guests (and about 27 vehicles), while wine auctions would be held two times per year on weekend days with up to 125 guests (and about 45 vehicles). All events would take place between either 10:00 AM and 2:30 PM or from 6:30 to 11:00 PM. Hired event staffing for each of these events would result in an additional 6 vehicles accessing the winery for the largest event, and 2-3 vehicles for the smaller events.

There will be no regular visitation allowed during any marketing events.

Less than significant impact.

VIII. PROJECT MITIGATION

Provide a sign on the project driveway for exiting drivers directing them to use Solano Avenue to access the California Drive interchange in Yountville if they desire to travel northbound into the Napa Valley.

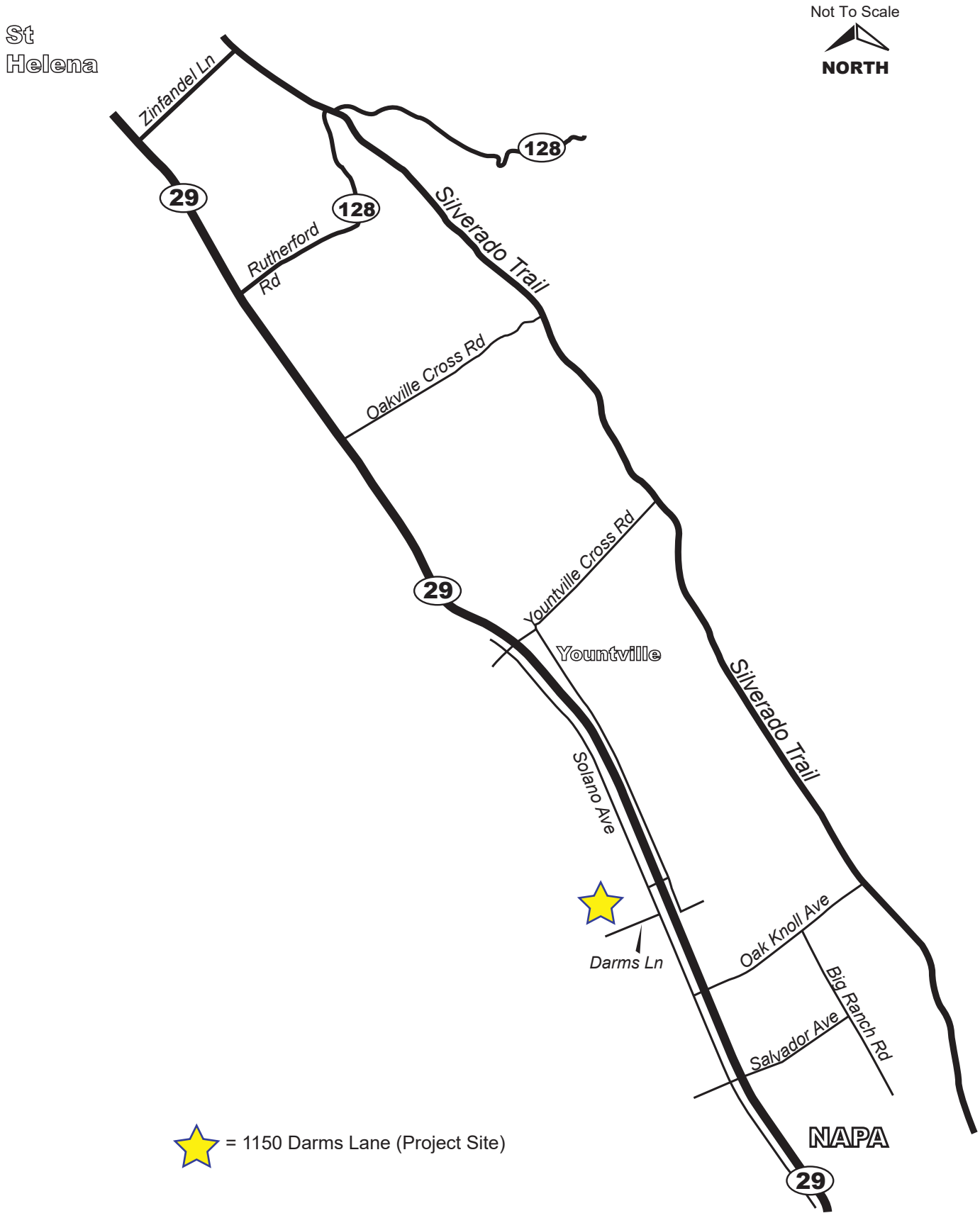
[5] Caltrans *Highway Design Manual,* Sight Distance Standards, July 2018.

VIX. CONCLUSIONS & RECOMMENDATIONS

The project would result in no significant off-site circulation system operational impacts to the Solano Avenue/Darms Lane, Solano Avenue/SR 29 Connector Roadway or SR 29/Solano Avenue-Washington Street Connector Roadway intersections. In addition, there would be no sight line impacts at the proposed project driveway connection to Darms Lane. Therefore, no mitigations are needed for these issues. However, due to the extended delay of making a left turn to go north on SR 29 from the Solano Avenue Connector Roadway it is recommended that directions be given to all visitors leaving the winery who desire traveling north on SR 29 to use Solano Avenue to access the SR 29/California Drive interchange in Yountville.

It is also recommended that the County clear brush from the south bank of Dry Creek just west of Solano Avenue in order to provide acceptable sight lines for existing as well as project drivers turning left from Darms Lane to northbound Solano Avenue. This is needed with or without the proposed project.

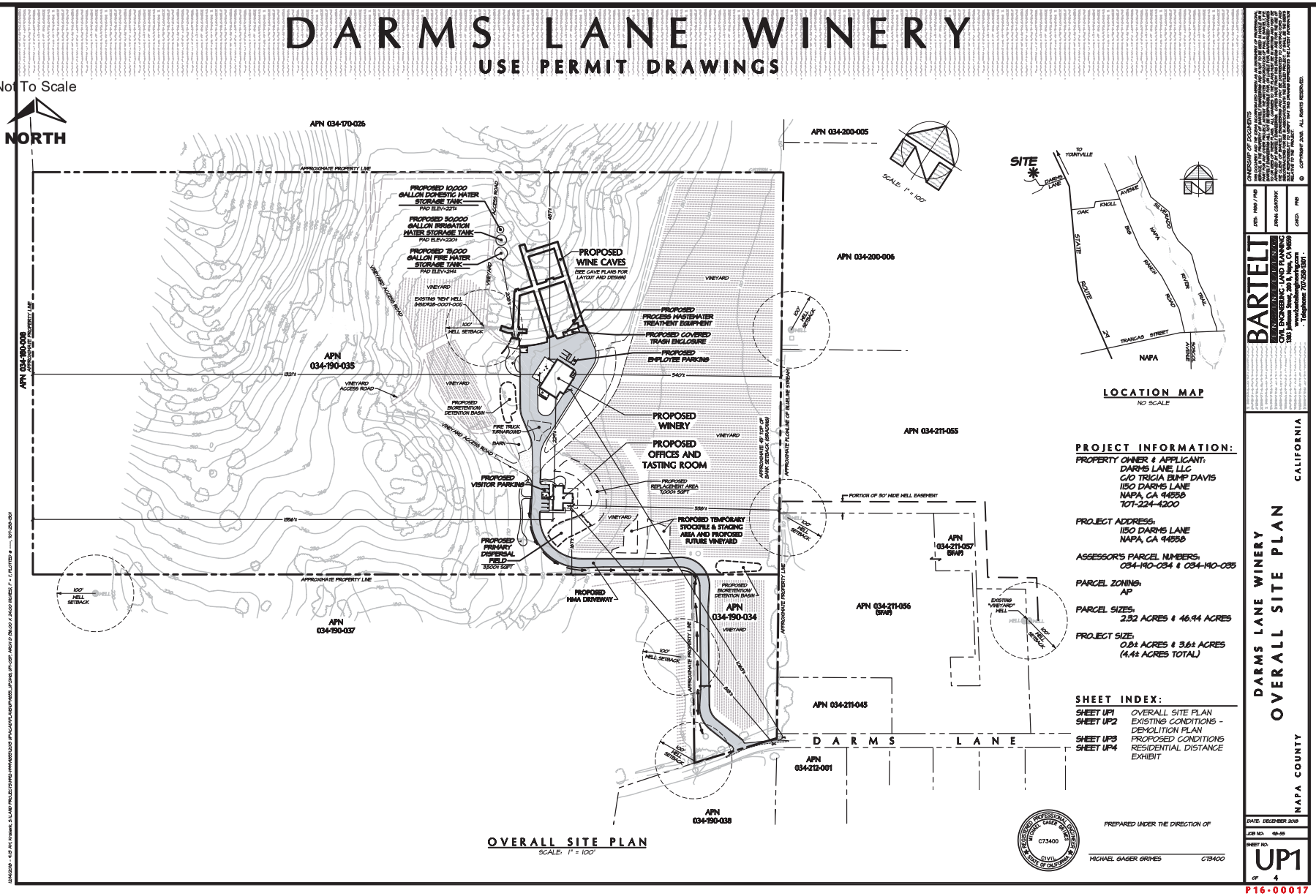
Figures



Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 1
Area Map
Darms Lane Winery

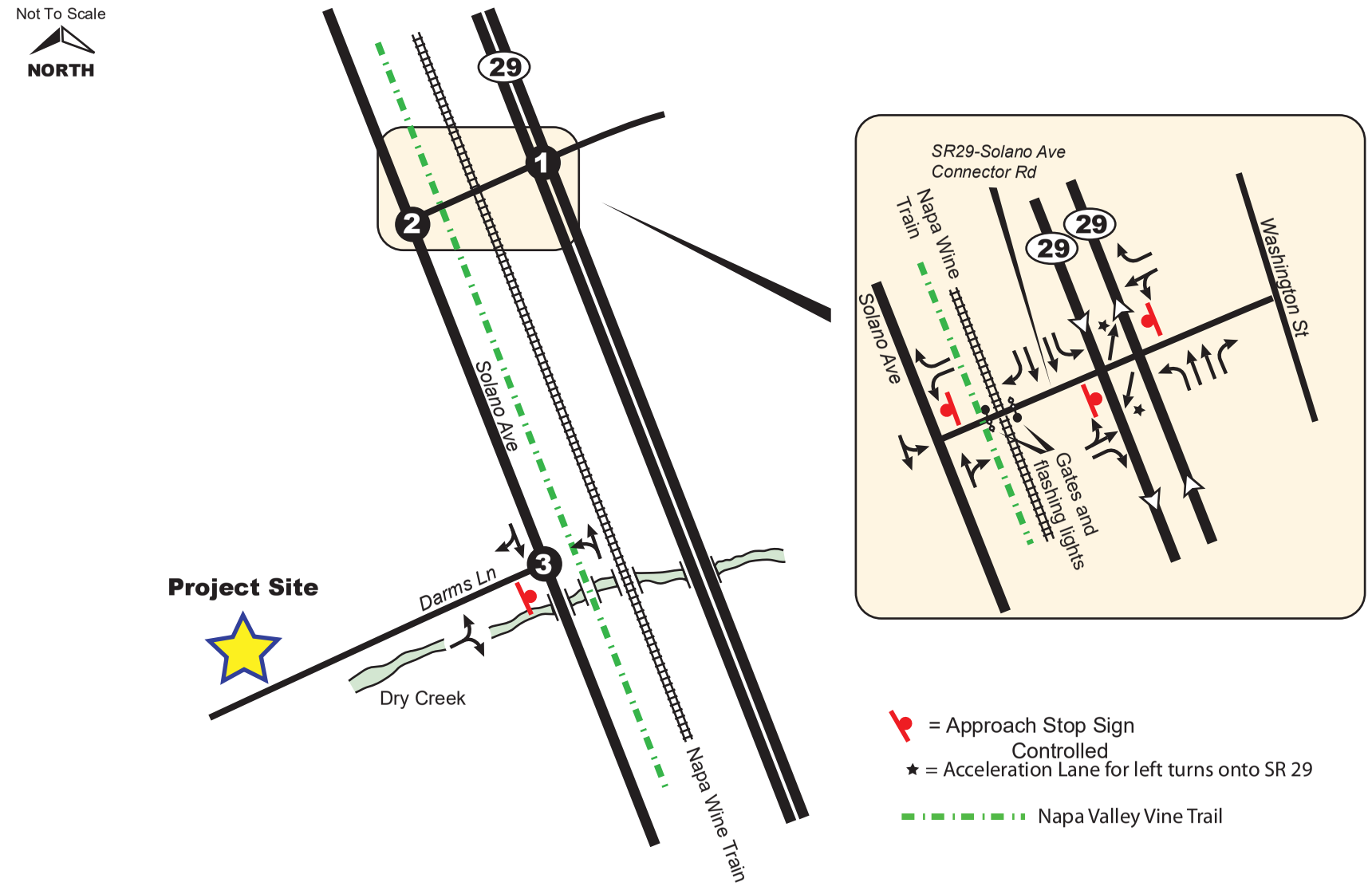


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 2

Site Plan

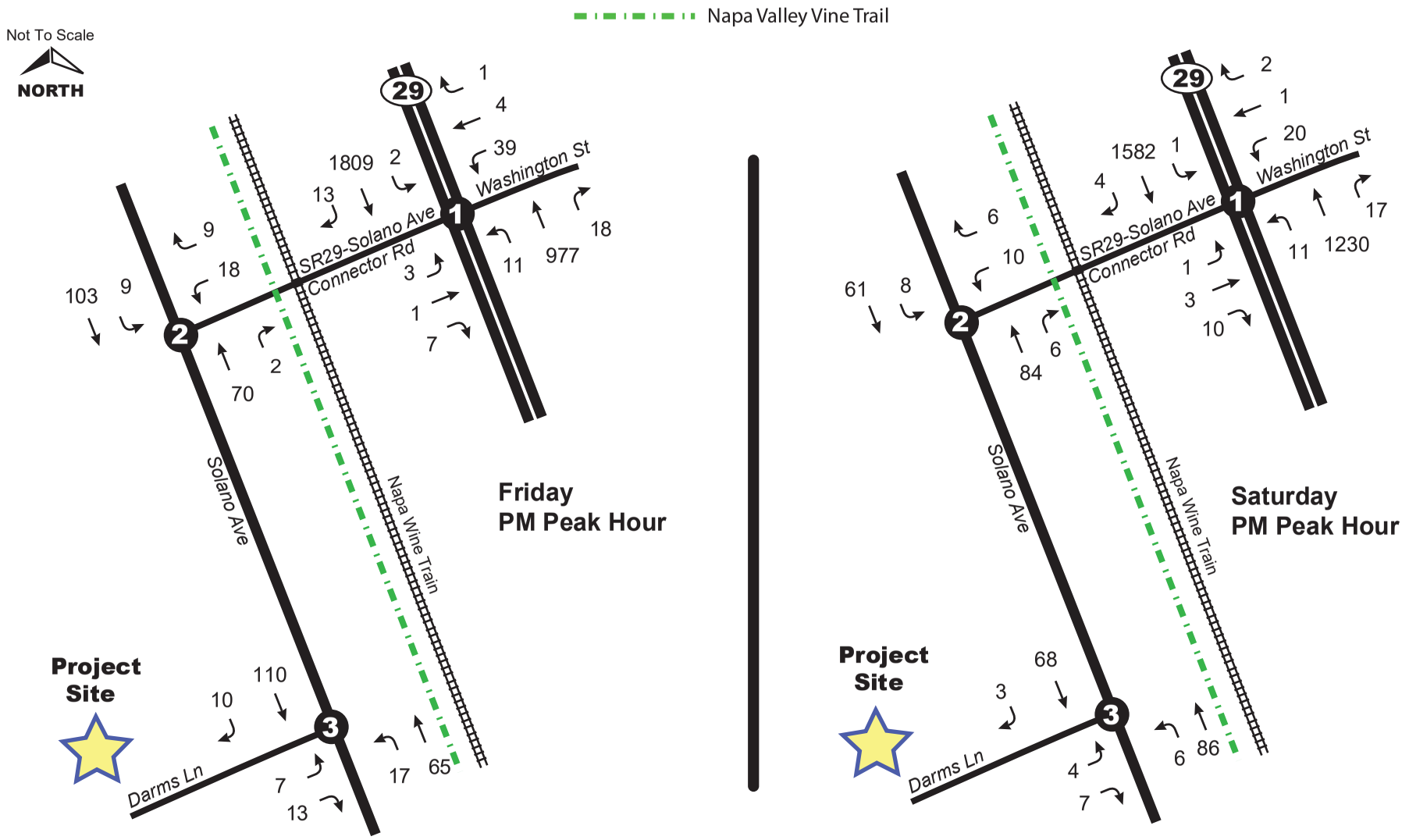


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 3

Existing Lane Geometrics and Intersection Control

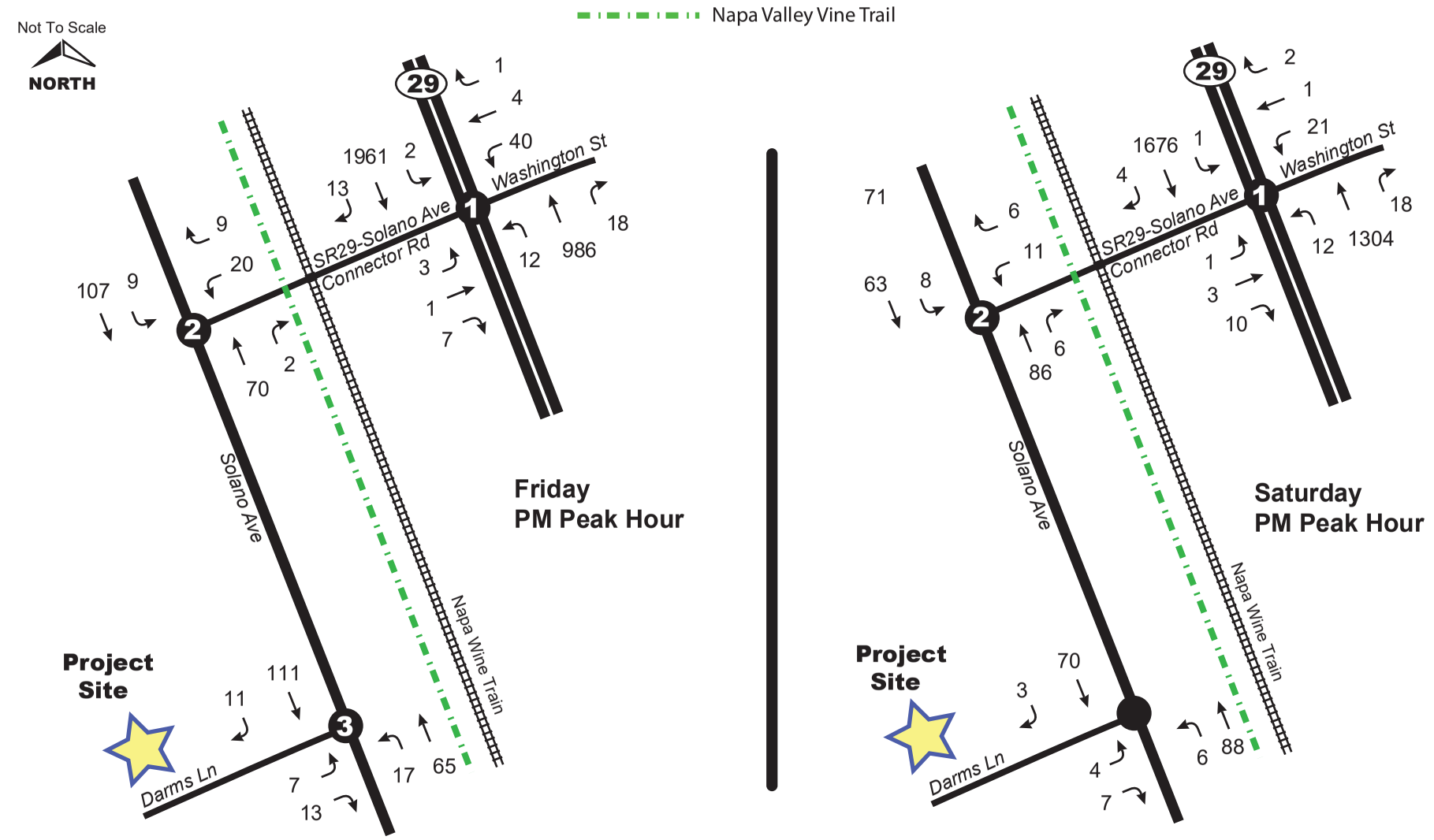


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 4

Existing (2015) Harvest Friday and Saturday (without Project) PM Peak Hour Volumes

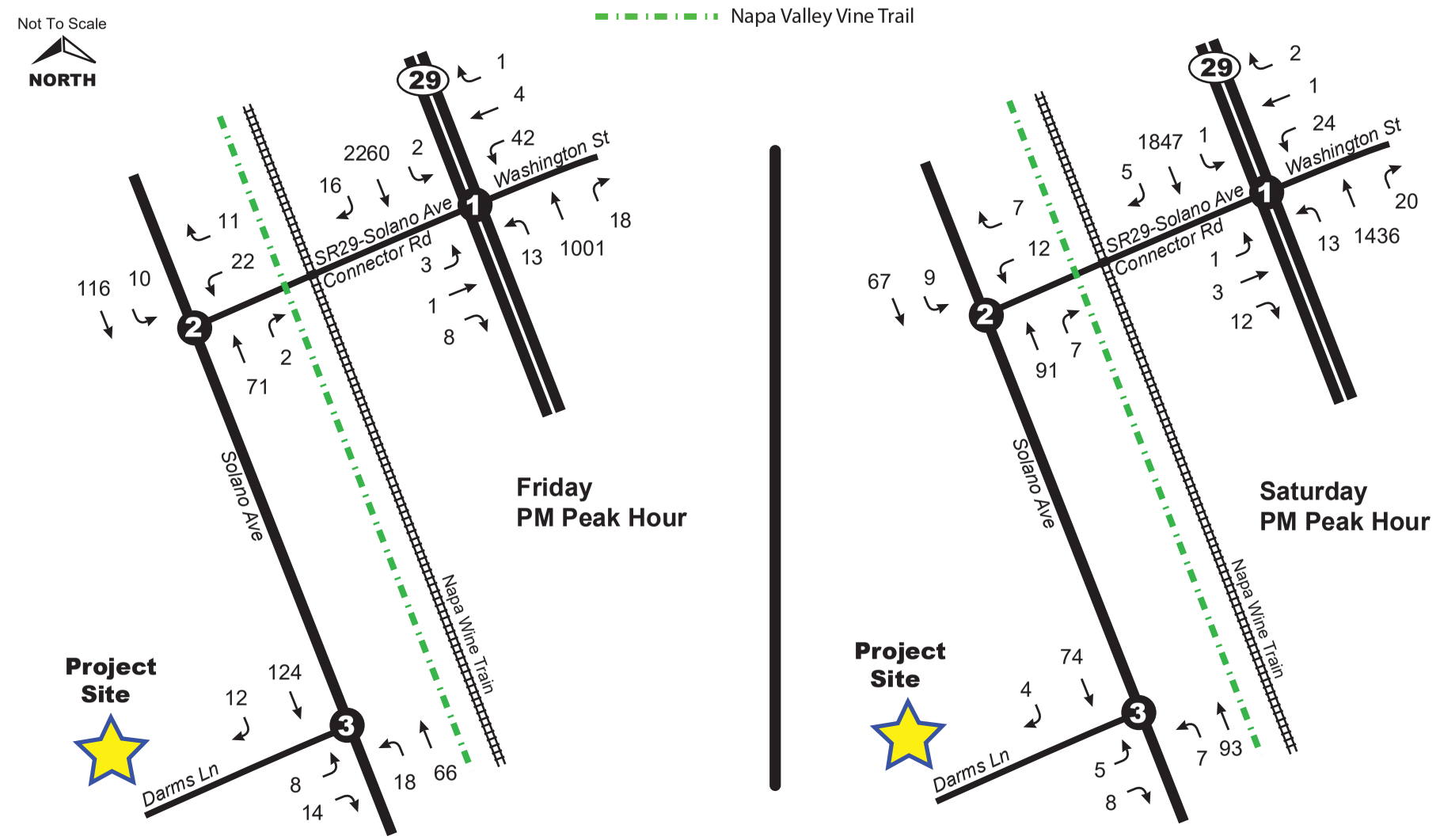


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 5

Year 2020 Harvest Friday and Saturday (without Project)
PM Peak Hour Volumes

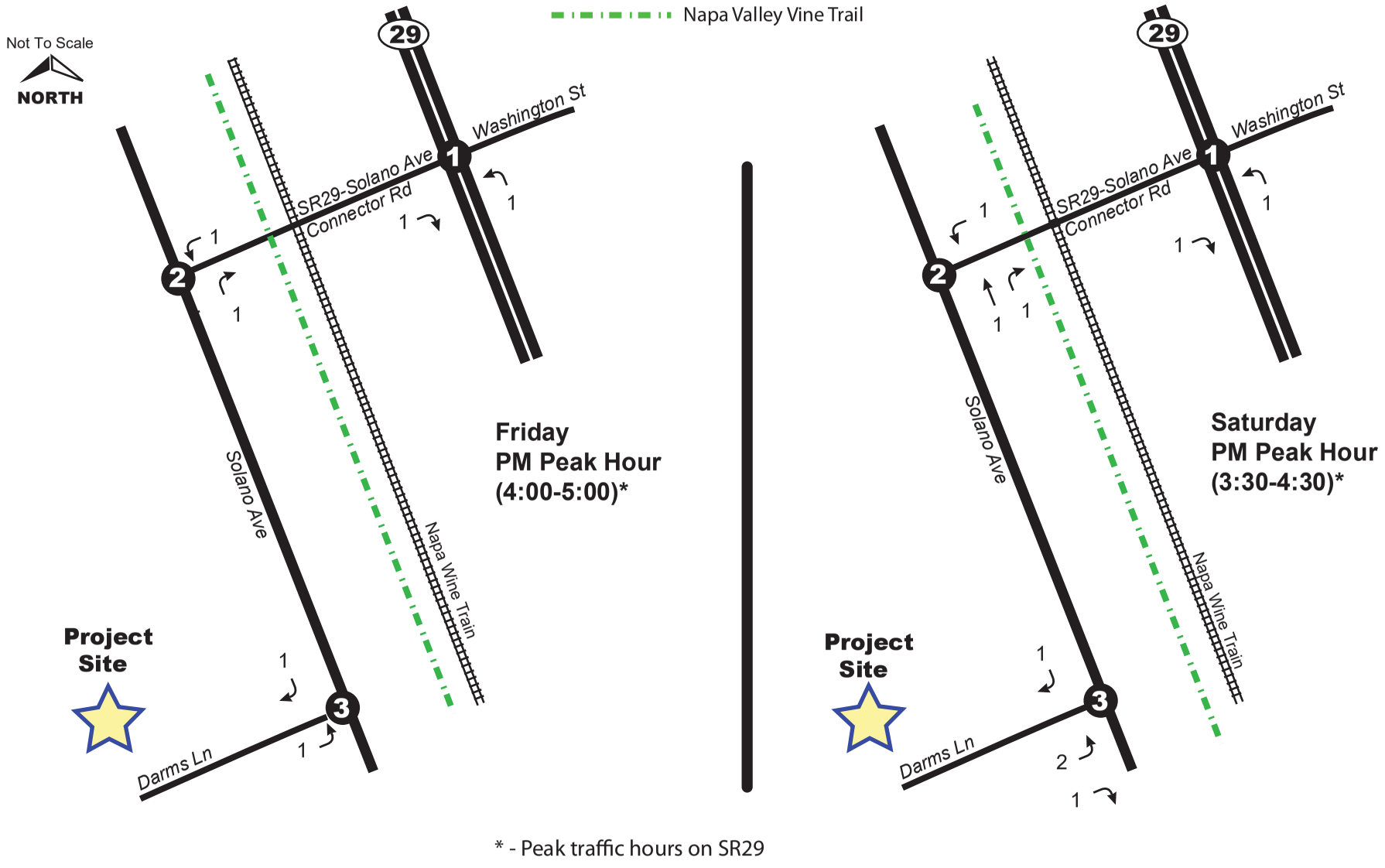


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 6

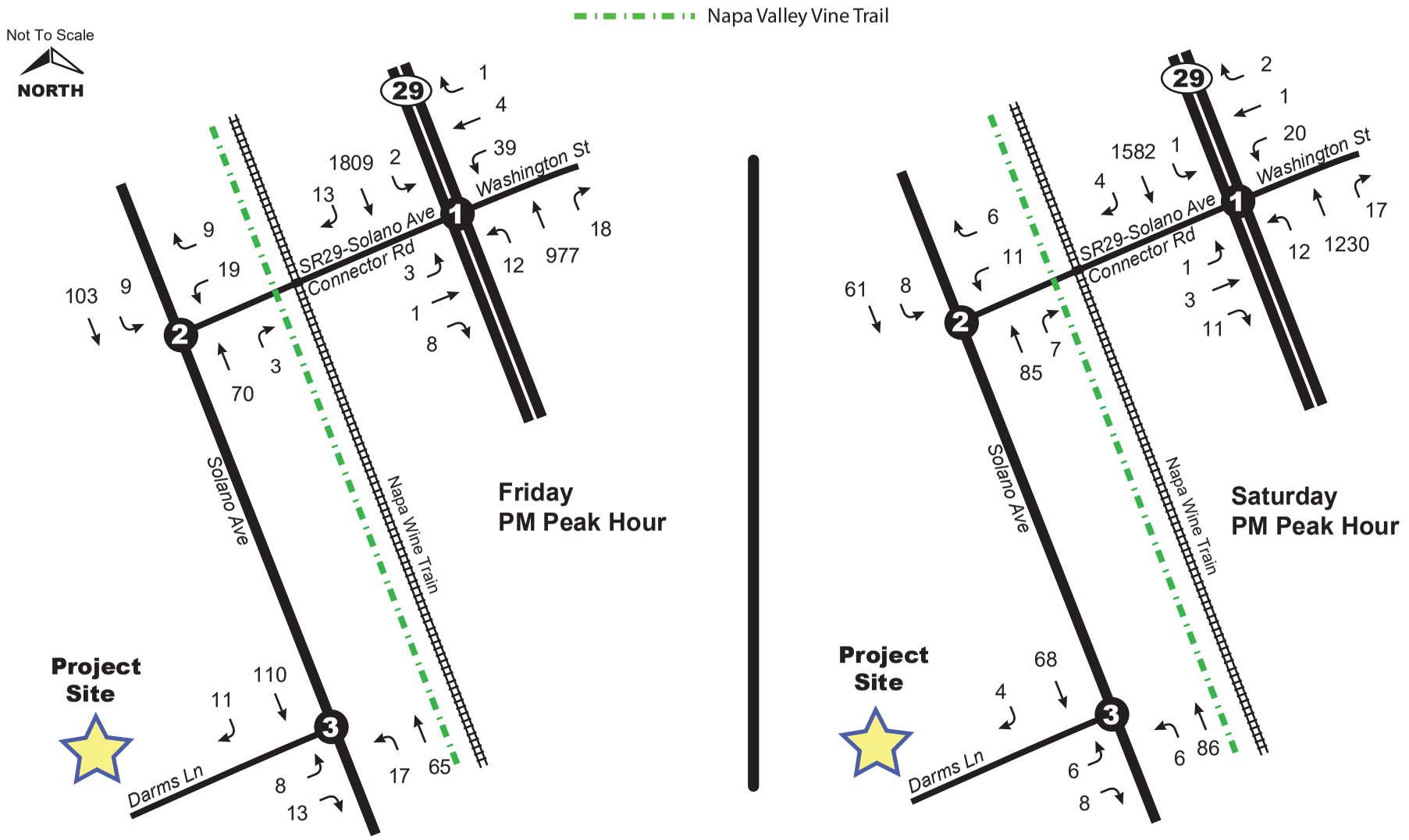
Year 2030 Harvest Friday and Saturday (without Project)
PM Peak Hour Volumes



Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 7
Friday and Saturday
PM Peak Hour Project Volume Increment

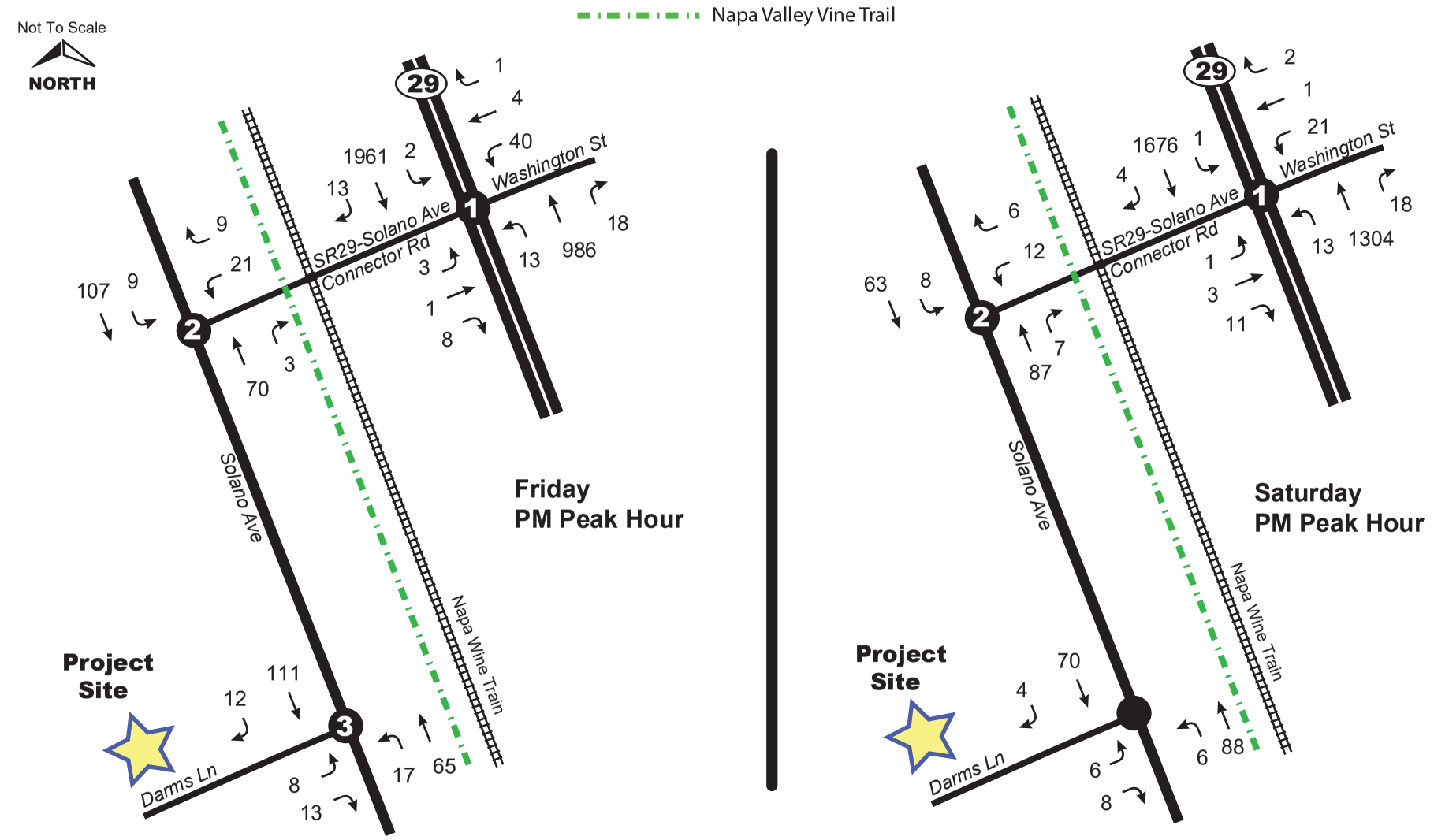


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 8

Existing (2015) Harvest Friday and Saturday (with Project) PM Peak Hour Volumes

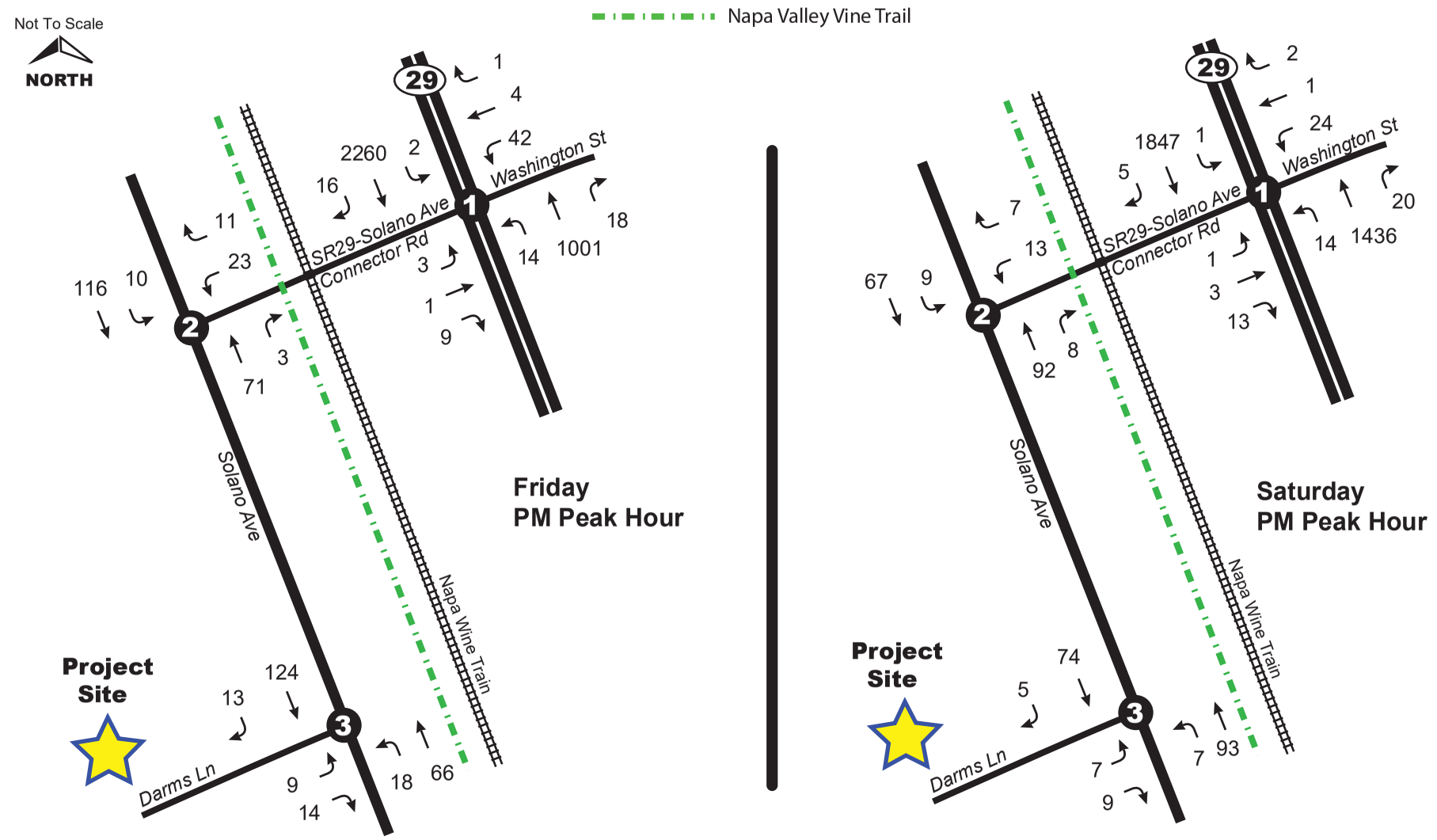


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Figure 9

Year 2020 Harvest Friday and Saturday (with Project)
PM Peak Hour Volumes



Darms Lane Winery Traffic Study

Figure 10

CRANE TRANSPORTATION GROUP

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

Tables

Table 1

UNSIGNALIZED INTERSECTION LOS CRITERIA

Level of Service	Description	Average Control Delay (Seconds Per Vehicle)
A	Little or no delays	≤ 10.0
B	Short traffic delays	10.0 to 15.0
C	Average traffic delays	15.0 to 25.0
D	Long traffic delays	25.0 to 35.0
E	Very long traffic delays	35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded (for an all-way stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection)	> 50.0

Source: 2017 Highway Capacity Manual Version 6 (Transportation Research Board).

Table 2

INTERSECTION LEVEL OF SERVICE
HARVEST

YEAR 2015

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./ Darms Lane	A-9.4[1]	A-9.5	A-9.0	A-9.1
Solano Ave./ SR 29 Connector Rd.	A-9.4[2]	A-9.4	A-9.2	A-9.3
SR 29/Solano Ave. Connector Rd. & Washington St. Connector Road	F-55.1/C-18.6 & E-48.8/B-12.0[3]	F-55.1/C-18.7 & E-49.4/B-12.0	E-40.0/C-16.9 & E-48.8/B-13.8	E-40.0/C-17.0 & E-49.4/B-13.8

YEAR 2020

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./ Darms Lane	A-9.4[1]	A-9.5	A-9.0	A-9.1
Solano Ave./ SR 29 Connector Rd.	A-9.5[2]	A-9.5	A-9.3	A-9.3
SR 29/Solano Ave. Connector Rd. & Washington St. Connector Road	F-68.3/C-20.4 & F-56.0/B-12.0[3]	F-68.3/C-20.5 & F-57.5/B-12.0	E-44.7/C-17.9 & F-57.0/B-14.3	E-45.1/C-18.0 & F-57.7/B-14.3

YEAR 2030 (CUMULATIVE)

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./ Darms Lane	A-9.5[1]	A-9.6	A-9.1	A-9.2
Solano Ave./ SR 29 Connector Rd.	A-9.6[2]	A-9.6	A-9.4	A-9.4
SR 29/Solano Ave. Connector Rd. & Washington St. Connector Road	F-102.3/C-24.4 & F-76.6/B-12.0[3]	F-105.0/C-24.5 & F-76.6/B-12.0	F-54.4/C-19.8 & F-75.6/C-15.2	F-54.4/C-19.9 & F-75.6/C-15.2

(1) HCM 6th Edition, unsignalized level of service – control delay in seconds. Darms Lane stop sign controlled approach.
(2) HCM 6th Edition, unsignalized level of service – control delay in seconds. SR 29 Connector Road stop sign controlled approach.
(3) HCM 6th Edition, unsignalized level of service – control delay in seconds. Solano Ave. Connector Road stop sign controlled approach to SR 29 thru-left turn lane/right turn lane & Washington Street Connector Road stop sign controlled approach to SR 29 thru-left turn lane/right turn lane.

6th Edition Highway Capacity Manual (HCM) Analysis Methodology
Source: Crane Transportation Group

Table 3

INTERSECTION SIGNAL WARRANT EVALUATION HARVEST

Do Volumes Exceed Warrant #3 Volume Criteria Levels? Rural Conditions

YEAR 2015

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./Darms Lane	No	No	No	No
Solano Ave./SR 29 Connector Road	No	No	No	No
SR 29/Solano Ave.-Washington Street Connector Road	No	No	No	No

YEAR 2020

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./Darms Lane	No	No	No	No
Solano Ave./SR 29 Connector Road	No	No	No	No
SR 29/Solano Ave.-Washington Street Connector Road	No	No	No	No

YEAR 2030 (CUMULATIVE)

LOCATION	FRIDAY PM PEAK HOUR		SATURDAY PM PEAK HOUR	
	W/O PROJECT	WITH PROJECT	W/O PROJECT	WITH PROJECT
Solano Ave./Darms Lane	No	No	No	No
Solano Ave./SR 29 Connector Road	No	No	No	No
SR 29/Solano Ave.-Washington Street Connector Road	No	No	No	No

Source: Crane Transportation Group

Table 4

DARMS LANE WINERY TRIP GENERATION
HARVEST FRIDAY

CATEGORY	NUMBER	HOURS	TRIPS					
			3-4 PM		4-5 PM[1]		5-6 PM	
			IN	OUT	IN	OUT	IN	OUT
Admin Employees	1	6AM-6PM	0	0	0	0	0	0
Production Employees – Full Time	2	6AM-6PM	0	0	0	0	0	0
Production Employees – Part Time	2	6AM-6PM	0	0	0	0	0	0
Seasonal Production Employees – Harvest Only	2	6AM-6PM	0	0	0	0	0	0
Tours/Tasting Employee	1	10AM-6PM	0	0	0	0	0	0
Grape Delivery Trucks (10% grown off-site-3 total)	1/day	7AM-3PM	0	0	0	0	0	0
Reduction in Grape Outhaul Trucks (11 total)	(-1/day)	7AM-3PM	0	0	0	0	0	0
Visitors	24 total = 10 vehicles*	10AM-6PM	1	3	1	1	0	1
TOTAL			1	3	1	1	0	1

[1] Peak traffic hour on SR 29.

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

Source: Crane Transportation Group

Table 5

DARMS LANE WINERY TRIP GENERATION
HARVEST SATURDAY

CATEGORY	NUMBER	HOURS	TRIPS									
			2-3 PM		3-4 PM		4-5 PM		5-6 PM		3:30-4:30[1]	
			IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Admin Employees	1	6AM-6PM	0	0	0	0	0	0	0	0	0	0
Production Employees – Full Time	2	6AM-6PM	0	0	0	0	0	0	0	0	0	0
Production Employees – Part Time	2	6AM-6PM	0	0	0	0	0	0	0	0	0	0
Seasonal Production Employees – Harvest Only	2	6AM-6PM	0	0	0	0	0	0	0	0	0	0
Tours/Tasting Employee	1	10AM-6PM	0	0	0	0	0	0	0	0	0	0
Grape Delivery Trucks (10% grown off-site-3 total)	1/day	7AM-3PM	0	0	0	0	0	0	0	0	0	0
Reduction in Grape Outhaul Trucks (11 total)	(-1/day)	7AM-3PM	0	0	0	0	0	0	0	0	0	0
Visitors	24 total = 9 vehicles*	10AM-6PM	3	2	1	3	1	1	0	1	1	3
Total			3	2	1	3	1	1	0	1	1	3

[1] Peak traffic hour on SR 29.

* 2.8 visitors/vehicle average on Saturdays per County data.

Source: Crane Transportation Group

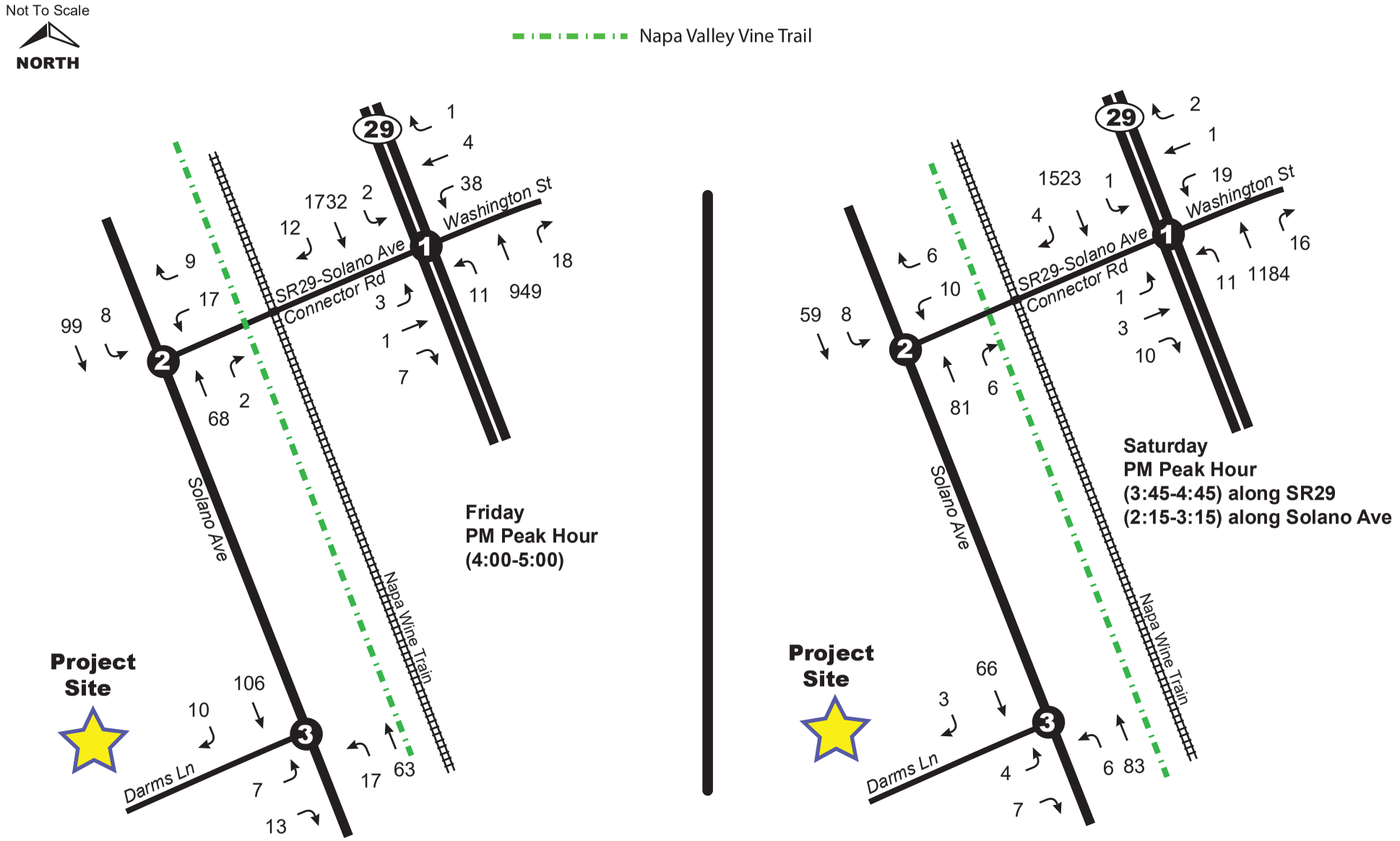
Table 6

DARMS LANE WINERY
MARKETING EVENT TRAFFIC DETAILS

MARKETING EVENT	STAFF/GUEST CATEGORY	# OF PEOPLE	# OF VEHICLES	TIMES	REGULAR VISITATION ELIMINATED DURING MARKETING EVENT?
Marketing Event #1 #/year: 4	Guests	24	9-10	Fridays & weekends Between 10:00 AM &11:00 PM (excluding 3:00-6:00 PM)	Yes
	Extra winery staff	2	2		
	Caterers	1	1		
	Entertainers	0	0		
	Delivery vehicles	2	2		
Marketing Event #2 #/year: 2	Guests	125	45	Weekends Between 10:00 AM & 11:00 PM (excluding 3:00-6:00 PM)	Yes
	Extra winery staff	4	4		
	Caterers	2	2		
	Entertainers	1	1		
	Delivery vehicles	5	5		
Marketing Event #3 #/year: 4	Guests	75	27	Weekends Between 10:00 AM & 11:00 PM (excluding 3:00-6:00 PM)	Yes
	Extra winery staff	3	3		
	Caterers	2	2		
	Entertainers	1	1		
	Delivery vehicles	4	4		

Source: Darms Lane Winery applicant

Appendix

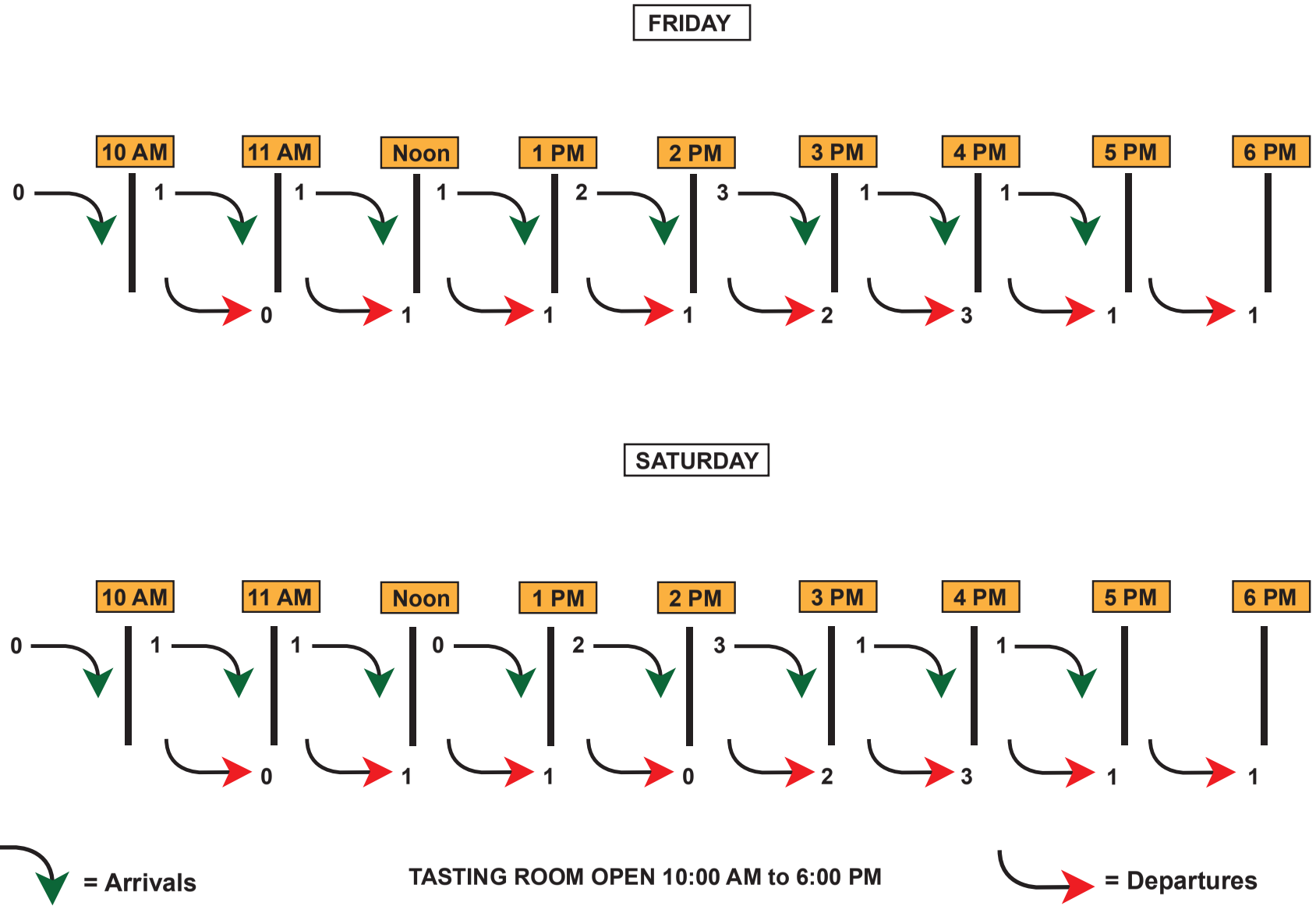


Darms Lane Winery Traffic Study

CRANE TRANSPORTATION GROUP

Appendix Figure A-1

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



CRANE TRANSPORTATION GROUP

Figure A-2
Darms Lane Winery
Projected Visitor by Appointment
Vehicle Distribution

Appendix

DARMS LANE WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

	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
B.	**Full-time production employees** # on Weekdays __2__ # on Saturday __2__ # on Sunday __2__ 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
C.	**Part-time production employees (+ seasonal harvest employees)** # on Weekdays __2 (+2)__ # on Saturday __2 (+2)__ # on Sunday __2 (+2)__ 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
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

Appendix

DARMS LANE WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

	HARVEST CONDITIONS
E.	**Grape delivery trucks** # on Weekdays __1__ # on Saturday ___1_ # on Sunday __0__ Delivery hours: Weekday 8:00 AM to 3:00 PM Saturday 8:00 AM to 3:00 PM 3 grape delivery trucks total
F.	**Maximum tours/tasting visitors** # on Weekdays __24 (10 vehicles)*__ # on Saturday ___24 (9 vehicles)**_ # on Sunday __24 (9 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 trucks on regular basis** # on Weekdays __1-2/week_ # on Saturday ___0__ # on Sunday __0___ Delivery hours: Weekday 9:00 AM to 4:00 PM Saturday _–___ to ___–_ Sunday _–___ to ___–_

* 2.6 winery visitors/vehicle County average.
** 2.8 winery visitors/vehicle County average.

Appendix

DARMS LANE WINERY
EXPECTED PROJECT TRAFFIC ACTIVITY DETAILS

H. **Grape source**

Percent grapes that will be grown on site or on adjacent vineyards: 90%

Percent grapes transported to the site from the north on SR 29: 100% - 3 trucks total

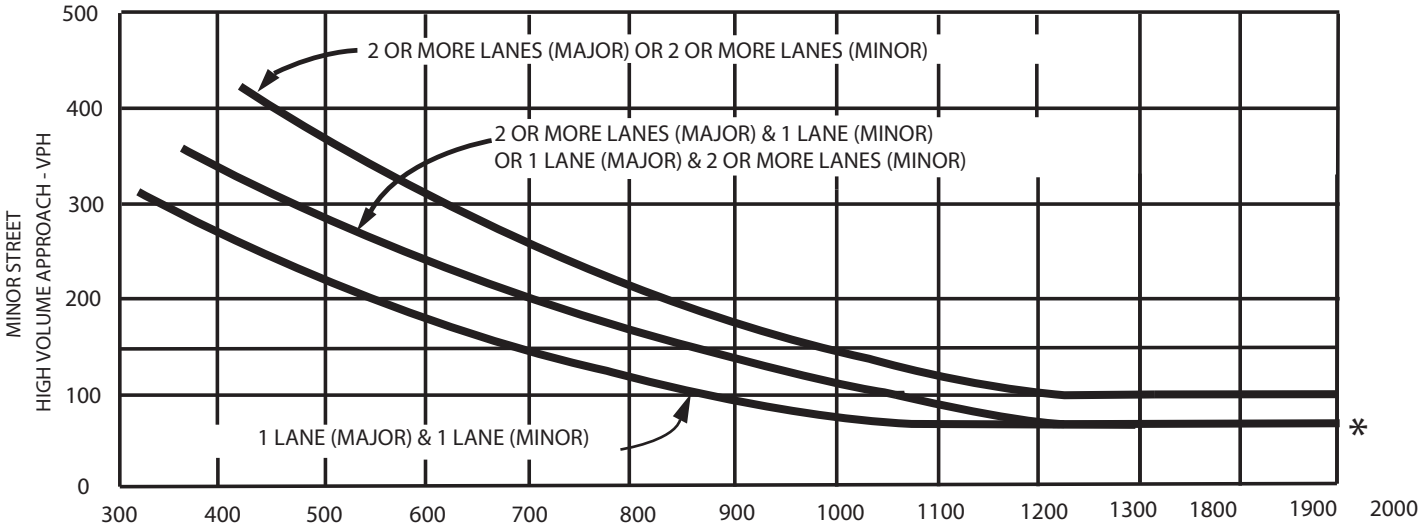
Percent grapes transported to the site from the south on SR 29: 0 %

I. **Grape Outhaul Trucks Eliminated**

11 total

SPECIAL EVENTS

Food & wine pairing –	# events/month: 4 maximum # people/event: 2 @ 12 visitors & 2 @ 24 visitors typical days: Fridays & weekends typical start time: between 10:00 AM & 11:00 PM (excluding 3:00-6:00 PM)
Wine auction –	# events/year: 2 # people/event: 125 (45 vehicles) typical days: Weekends typical hours: between 10:00 AM & 11:00 PM (excluding 3:00-6:00 PM)
Wine releases –	# events/year: 4 # people/event: 75 (27 vehicles) typical days: Weekends typical hours: between 10:00 AM & 11:00 PM (excluding 3:00-6:00 PM)



* NOTE

100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE

Source: Year 2014 Manual on Uniform Traffic Control Devices, Federal Highway Administration

CRANE TRANSPORTATION GROUP

PEAK HOUR VOLUME WARRANT #3
(Rural Area)

PEAK HOUR VOLUME WARRANT #3
(Urban Area)

* NOTE

150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE

Source: Year 2014 Manual on Uniform Traffic Control Devices, Federal Highway Administration

Winery Traffic Information / Trip Generation Sheet

Traffic during a Typical Weekday

Number of FT employees: 4 x 3.05 one-way trips per employee	=	12	daily trips.
Number of PT employees: 2 x 1.90 one-way trips per employee	=	4	daily trips.
Average number of weekday visitors: 20 / 2.6 visitors per vehicle x 2 one-say trips	=	8	daily trips.
Gallons of production: 30,000 1,000 x .009 truck trips daily[3] x 2 one-way trips	=	1	daily trips.
Total	=	25	daily trips.
Number of total weekday trips X .38	=	10	PM peak trips.

Traffic during a Typical Saturday

Number of FT employees (on Saturdays): 2 x 3.05 one-way trips per employee	=	12	daily trips.
Number of PT employees (on Saturdays): 2 x 1.90 one-way trips per employee	=	4	daily trips.
Average number of Saturday visitors: 24 / 2.8 visitors per vehicle x 2 one-say trips	=	17	daily trips.
Total	=	33	daily trips.
Number of total Saturday trips X .57	=	19	PM peak trips.

Traffic during a Crush Saturday

Number of FT employees (during crush): 2 x 3.05 one-way trips per employee	=	6	daily trips.
Number of PT employees (during crush): 4 x 1.90 one-way trips per employee	=	8	daily trips.
Average number of Saturday visitors: 24 / 2.8 visitors per vehicle x 2 one-say trips	=	17	daily trips.
Gallons of production: 30,000 / 1,000 x .009 truck trips daily x 2 one-way trips	=	1	daily trips.
Avg. annual tons of grape on-haul: 0 / 144 truck trips daily [4] x 2 one-way trips	=	0	daily trips
Total	=	32	daily trips.
Number of total Saturday trips X .57	=	18	PM peak trips

Largest Marketing Event – Additional Traffic

Number of event staff (largest event): 4 x 2 one-way trips per staff person	=	8	trips.
Number of visitors (largest event): 75 / 2.8 visitors per vehicle x 2 one-way trips	=	54	trips.
Number of special event truck trips (largest event): 4 x 2 one-way trips	=	8	trips.

---

[3]Assumes 1.47 materials & supplies trips + 0.8 case goods trips per 1,000 gallons of production / 250 days per year (see *Traffic Information Sheet Addendum* for reference).
[4]Assume 4 tons per trip / 36 crush days per year (see *Traffic Information Sheet Addendum* for reference).

TECHNICAL APPENDIX

Capacity Worksheets

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	7	39	4	1	11	977	18	2	1809	13
Future Vol, veh/h	3	1	7	39	4	1	11	977	18	2	1809	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	7	40	4	1	11	1007	19	2	1865	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2397	2917	933	1966	2911	504	1878	0	0	1026	0	0
Stage 1	1869	1869	-	1029	1029	-	-	-	-	-	-	-
Stage 2	528	1048	-	937	1882	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	18	16	271	~ 38	16	518	324	-	-	685	-	-
Stage 1	76	123	-	254	314	-	-	-	-	-	-	-
Stage 2	507	307	-	289	121	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	17	15	271	~ 36	15	518	324	-	-	685	-	-
Mov Cap-2 Maneuver	69	107	-	133	79	-	-	-	-	-	-	-
Stage 1	73	123	-	245	303	-	-	-	-	-	-	-
Stage 2	482	297	-	278	121	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.9	48	0.2	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	324	-	-	76	271	125	518	685	-	-
HCM Lane V/C Ratio	0.035	-	-	0.054	0.027	0.355	0.002	0.003	-	-
HCM Control Delay (s)	16.5	-	-	55.1	18.6	48.8	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	E	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.4	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	18	9	70	2	9	103
Future Vol, veh/h	18	9	70	2	9	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	10	79	2	10	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	216	80	0	0	81	0
Stage 1	80	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	772	980	-	-	1517	-
Stage 1	943	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	767	980	-	-	1517	-
Mov Cap-2 Maneuver	767	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	884	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	767	980	1517	-
HCM Lane V/C Ratio	-	-	0.026	0.01	0.007	-
HCM Control Delay (s)	-	-	9.8	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	13	17	65	110	10
Future Vol, veh/h	7	13	17	65	110	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	15	20	76	128	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	250	134	140	0	-	0
Stage 1	134	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	739	915	1443	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	729	915	1443	-	-	-
Mov Cap-2 Maneuver	729	-	-	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1443	-	840	-	-
HCM Lane V/C Ratio	0.014	-	0.028	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	10	20	1	2	11	1230	17	1	1582	4
Future Vol, veh/h	1	3	10	20	1	2	11	1230	17	1	1582	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	11	21	1	2	12	1309	18	1	1683	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2364	3036	842	2178	3022	655	1687	0	0	1327	0	0
Stage 1	1685	1685	-	1333	1333	-	-	-	-	-	-	-
Stage 2	679	1351	-	845	1689	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	19	13	312	26	13	413	384	-	-	527	-	-
Stage 1	100	152	-	165	225	-	-	-	-	-	-	-
Stage 2	412	221	-	328	151	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	18	13	312	24	13	413	384	-	-	527	-	-
Mov Cap-2 Maneuver	89	115	-	105	83	-	-	-	-	-	-	-
Stage 1	97	152	-	160	218	-	-	-	-	-	-	-
Stage 2	395	214	-	310	151	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.5	45.8	0.1	0
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	384	-	-	107	312	104	413	527	-	-
HCM Lane V/C Ratio	0.03	-	-	0.04	0.034	0.215	0.005	0.002	-	-
HCM Control Delay (s)	14.7	-	-	40	16.9	48.8	13.8	11.8	-	-
HCM Lane LOS	B	-	-	E	C	E	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.8	0	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	6	84	6	8	61
Future Vol, veh/h	10	6	84	6	8	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	11	7	95	7	9	69

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	186	99	0	0	102	0
Stage 1	99	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	808	962	-	-	1503	-
Stage 1	930	-	-	-	-	-
Stage 2	941	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	803	962	-	-	1503	-
Mov Cap-2 Maneuver	803	-	-	-	-	-
Stage 1	930	-	-	-	-	-
Stage 2	935	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	803	962	1503	-
HCM Lane V/C Ratio	-	-	0.014	0.007	0.006	-
HCM Control Delay (s)	-	-	9.5	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	7	6	86	68	3
Future Vol, veh/h	4	7	6	86	68	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	5	8	7	98	77	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	191	79	80	0	-	0
Stage 1	79	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	803	987	1531	-	-	-
Stage 1	949	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	799	987	1531	-	-	-
Mov Cap-2 Maneuver	799	-	-	-	-	-
Stage 1	944	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1531	-	909	-	-
HCM Lane V/C Ratio	0.004	-	0.014	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	7	40	4	1	12	986	18	2	1961	13
Future Vol, veh/h	3	1	7	40	4	1	12	986	18	2	1961	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	7	41	4	1	12	1016	19	2	2022	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2560	3085	1011	2056	3079	508	2035	0	0	1035	0	0
Stage 1	2026	2026	-	1040	1040	-	-	-	-	-	-	-
Stage 2	534	1059	-	1016	2039	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	13	12	241	~ 33	12	515	282	-	-	679	-	-
Stage 1	61	102	-	250	310	-	-	-	-	-	-	-
Stage 2	503	304	-	259	101	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	11	241	~ 31	11	515	282	-	-	679	-	-
Mov Cap-2 Maneuver	55	90	-	123	66	-	-	-	-	-	-	-
Stage 1	58	102	-	239	297	-	-	-	-	-	-	-
Stage 2	474	291	-	248	101	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.8	55	0.2	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	282	-	-	61	241	114	515	679	-	-
HCM Lane V/C Ratio	0.044	-	-	0.068	0.03	0.398	0.002	0.003	-	-
HCM Control Delay (s)	18.4	-	-	68.3	20.4	56	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.7	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	20	9	70	2	9	107
Future Vol, veh/h	20	9	70	2	9	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	10	79	2	10	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	220	80	0	0	81	0
Stage 1	80	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	768	980	-	-	1517	-
Stage 1	943	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	763	980	-	-	1517	-
Mov Cap-2 Maneuver	763	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	763	980	1517	-
HCM Lane V/C Ratio	-	-	0.029	0.01	0.007	-
HCM Control Delay (s)	-	-	9.9	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	13	17	65	111	11
Future Vol, veh/h	7	13	17	65	111	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	15	20	76	129	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	252	136	142	0	-	0
Stage 1	136	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	737	913	1441	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	727	913	1441	-	-	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.4	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1441	-	838	-	-
HCM Lane V/C Ratio	0.014	-	0.028	-	-
HCM Control Delay (s)	7.5	0	9.4	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	10	21	1	2	12	1304	18	1	1676	4
Future Vol, veh/h	1	3	10	21	1	2	12	1304	18	1	1676	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	11	22	1	2	13	1387	19	1	1783	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2505	3217	892	2308	3202	694	1787	0	0	1406	0	0
Stage 1	1785	1785	-	1413	1413	-	-	-	-	-	-	-
Stage 2	720	1432	-	895	1789	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	15	10	289	~ 21	10	390	351	-	-	492	-	-
Stage 1	86	135	-	148	206	-	-	-	-	-	-	-
Stage 2	390	202	-	306	135	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	10	289	~ 19	10	390	351	-	-	492	-	-
Mov Cap-2 Maneuver	77	103	-	93	73	-	-	-	-	-	-	-
Stage 1	83	135	-	143	198	-	-	-	-	-	-	-
Stage 2	371	195	-	287	135	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.6	53.4	0.1	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	351	-	-	95	289	92	390	492	-	-
HCM Lane V/C Ratio	0.036	-	-	0.045	0.037	0.254	0.005	0.002	-	-
HCM Control Delay (s)	15.6	-	-	44.7	17.9	57	14.3	12.3	-	-
HCM Lane LOS	C	-	-	E	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.9	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	6	86	6	8	63
Future Vol, veh/h	11	6	86	6	8	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	13	7	98	7	9	72

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	192	102	0	0	105	0
Stage 1	102	-	-	-	-	-
Stage 2	90	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	801	959	-	-	1499	-
Stage 1	927	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	796	959	-	-	1499	-
Mov Cap-2 Maneuver	796	-	-	-	-	-
Stage 1	927	-	-	-	-	-
Stage 2	933	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	796	959	1499	-
HCM Lane V/C Ratio	-	-	0.016	0.007	0.006	-
HCM Control Delay (s)	-	-	9.6	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	4	7	6	88	70	3
Future Vol, veh/h	4	7	6	88	70	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	5	8	7	100	80	3

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	196	82	83	0	-	0
Stage 1	82	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	797	983	1527	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	793	983	1527	-	-	-
Mov Cap-2 Maneuver	793	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1527	-	904	-	-
HCM Lane V/C Ratio	0.004	-	0.014	-	-
HCM Control Delay (s)	7.4	0	9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	8	42	4	1	13	1001	18	2	2260	16
Future Vol, veh/h	3	1	8	42	4	1	13	1001	18	2	2260	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	8	43	4	1	13	1021	18	2	2306	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2849	3375	1153	2205	3373	511	2322	0	0	1039	0	0
Stage 1	2310	2310	-	1047	1047	-	-	-	-	-	-	-
Stage 2	539	1065	-	1158	2326	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	8	8	194	~ 25	8	513	218	-	-	677	-	-
Stage 1	40	73	-	248	308	-	-	-	-	-	-	-
Stage 2	499	302	-	212	72	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	7	194	~ 23	7	513	218	-	-	677	-	-
Mov Cap-2 Maneuver	36	67	-	105	46	-	-	-	-	-	-	-
Stage 1	38	73	-	233	290	-	-	-	-	-	-	-
Stage 2	462	284	-	200	72	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	50.4	75.2	0.3	0
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	218	-	-	41	194	94	513	677	-	-
HCM Lane V/C Ratio	0.061	-	-	0.1	0.042	0.499	0.002	0.003	-	-
HCM Control Delay (s)	22.6	-	-	102.3	24.4	76.6	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.1	2.2	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	11	71	2	10	116
Future Vol, veh/h	22	11	71	2	10	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	12	80	2	11	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	233	81	0	0	82	0
Stage 1	81	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	755	979	-	-	1515	-
Stage 1	942	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	749	979	-	-	1515	-
Mov Cap-2 Maneuver	749	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	749	979	1515	-
HCM Lane V/C Ratio	-	-	0.033	0.013	0.007	-
HCM Control Delay (s)	-	-	10	8.7	7.4	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	14	18	66	124	12
Future Vol, veh/h	8	14	18	66	124	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	16	21	77	144	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	270	151	158	0	-	0
Stage 1	151	-	-	-	-	-
Stage 2	119	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	719	895	1422	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	708	895	1422	-	-	-
Mov Cap-2 Maneuver	708	-	-	-	-	-
Stage 1	864	-	-	-	-	-
Stage 2	906	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1422	-	817	-	-
HCM Lane V/C Ratio	0.015	-	0.031	-	-
HCM Control Delay (s)	7.6	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	12	24	1	2	13	1436	20	1	1847	5
Future Vol, veh/h	1	3	12	24	1	2	13	1436	20	1	1847	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	13	25	1	2	14	1512	21	1	1944	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2731	3507	972	2516	3491	756	1949	0	0	1533	0	0
Stage 1	1946	1946	-	1540	1540	-	-	-	-	-	-	-
Stage 2	785	1561	-	976	1951	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	10	6	256	~ 15	7	355	304	-	-	440	-	-
Stage 1	68	112	-	123	179	-	-	-	-	-	-	-
Stage 2	356	175	-	273	112	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	9	6	256	~ 13	7	355	304	-	-	440	-	-
Mov Cap-2 Maneuver	60	85	-	77	60	-	-	-	-	-	-	-
Stage 1	65	112	-	117	171	-	-	-	-	-	-	-
Stage 2	336	167	-	252	112	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.5	71.1	0.2	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	304	-	-	77	256	76	355	440	-	-
HCM Lane V/C Ratio	0.045	-	-	0.055	0.049	0.346	0.006	0.002	-	-
HCM Control Delay (s)	17.4	-	-	54.4	19.8	75.6	15.2	13.2	-	-
HCM Lane LOS	C	-	-	F	C	F	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	1.3	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	7	91	7	9	67
Future Vol, veh/h	12	7	91	7	9	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	14	8	103	8	10	76

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	203	107	0	0	111	0
Stage 1	107	-	-	-	-	-
Stage 2	96	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	790	953	-	-	1492	-
Stage 1	922	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	784	953	-	-	1492	-
Mov Cap-2 Maneuver	784	-	-	-	-	-
Stage 1	922	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	784	953	1492	-
HCM Lane V/C Ratio	-	-	0.017	0.008	0.007	-
HCM Control Delay (s)	-	-	9.7	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	8	7	93	74	4
Future Vol, veh/h	5	8	7	93	74	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	6	9	8	106	84	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	209	87	89	0	-	0
Stage 1	87	-	-	-	-	-
Stage 2	122	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	784	977	1519	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	908	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	779	977	1519	-	-	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	908	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1519	-	890	-	-
HCM Lane V/C Ratio	0.005	-	0.017	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	8	39	4	1	12	977	18	2	1809	13
Future Vol, veh/h	3	1	8	39	4	1	12	977	18	2	1809	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	8	40	4	1	12	1007	19	2	1865	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2399	2919	933	1968	2913	504	1878	0	0	1026	0	0
Stage 1	1869	1869	-	1031	1031	-	-	-	-	-	-	-
Stage 2	530	1050	-	937	1882	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	18	16	271	~ 38	16	518	324	-	-	685	-	-
Stage 1	76	123	-	253	313	-	-	-	-	-	-	-
Stage 2	506	307	-	289	121	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	17	15	271	~ 35	15	518	324	-	-	685	-	-
Mov Cap-2 Maneuver	69	107	-	132	78	-	-	-	-	-	-	-
Stage 1	73	123	-	244	301	-	-	-	-	-	-	-
Stage 2	480	296	-	277	121	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.8	48.6	0.2	0
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	324	-	-	76	271	124	518	685	-	-
HCM Lane V/C Ratio	0.038	-	-	0.054	0.03	0.357	0.002	0.003	-	-
HCM Control Delay (s)	16.6	-	-	55.1	18.7	49.4	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	E	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.5	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	9	70	3	9	103
Future Vol, veh/h	19	9	70	3	9	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	21	10	79	3	10	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	217	81	0	0	82	0
Stage 1	81	-	-	-	-	-
Stage 2	136	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	771	979	-	-	1515	-
Stage 1	942	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	766	979	-	-	1515	-
Mov Cap-2 Maneuver	766	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	884	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	766	979	1515	-
HCM Lane V/C Ratio	-	-	0.028	0.01	0.007	-
HCM Control Delay (s)	-	-	9.8	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	13	17	65	110	11
Future Vol, veh/h	8	13	17	65	110	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	15	20	76	128	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	251	135	141	0	-	0
Stage 1	135	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	738	914	1442	-	-	-
Stage 1	891	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	728	914	1442	-	-	-
Mov Cap-2 Maneuver	728	-	-	-	-	-
Stage 1	879	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1442	-	833	-	-
HCM Lane V/C Ratio	0.014	-	0.029	-	-
HCM Control Delay (s)	7.5	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	11	20	1	2	12	1230	17	1	1582	4
Future Vol, veh/h	1	3	11	20	1	2	12	1230	17	1	1582	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	12	21	1	2	13	1309	18	1	1683	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2366	3038	842	2180	3024	655	1687	0	0	1327	0	0
Stage 1	1685	1685	-	1335	1335	-	-	-	-	-	-	-
Stage 2	681	1353	-	845	1689	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	19	13	312	26	13	413	384	-	-	527	-	-
Stage 1	100	152	-	165	225	-	-	-	-	-	-	-
Stage 2	411	220	-	328	151	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	18	13	312	24	13	413	384	-	-	527	-	-
Mov Cap-2 Maneuver	89	115	-	104	83	-	-	-	-	-	-	-
Stage 1	97	152	-	159	217	-	-	-	-	-	-	-
Stage 2	393	213	-	308	151	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.1	46.3	0.1	0
HCM LOS	C	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	384	-	-	107	312	103	413	527	-	-
HCM Lane V/C Ratio	0.033	-	-	0.04	0.038	0.217	0.005	0.002	-	-
HCM Control Delay (s)	14.7	-	-	40	17	49.4	13.8	11.8	-	-
HCM Lane LOS	B	-	-	E	C	E	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.8	0	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	11	6	85	7	8	61
Future Vol, veh/h	11	6	85	7	8	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	13	7	97	8	9	69

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	188	101	0	0	105	0
Stage 1	101	-	-	-	-	-
Stage 2	87	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	806	960	-	-	1499	-
Stage 1	928	-	-	-	-	-
Stage 2	941	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	801	960	-	-	1499	-
Mov Cap-2 Maneuver	801	-	-	-	-	-
Stage 1	928	-	-	-	-	-
Stage 2	935	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	801	960	1499	-
HCM Lane V/C Ratio	-	-	0.016	0.007	0.006	-
HCM Control Delay (s)	-	-	9.6	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	8	6	86	68	4
Future Vol, veh/h	6	8	6	86	68	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	7	9	7	98	77	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	192	80	82	0	-	0
Stage 1	80	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	801	986	1528	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	918	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	797	986	1528	-	-	-
Mov Cap-2 Maneuver	797	-	-	-	-	-
Stage 1	943	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1528	-	895	-	-
HCM Lane V/C Ratio	0.004	-	0.018	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	8	40	4	1	13	986	18	2	1961	13
Future Vol, veh/h	3	1	8	40	4	1	13	986	18	2	1961	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	8	41	4	1	13	1016	19	2	2022	13

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2562	3087	1011	2058	3081	508	2035	0	0	1035	0	0
Stage 1	2026	2026	-	1042	1042	-	-	-	-	-	-	-
Stage 2	536	1061	-	1016	2039	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	13	12	241	~ 33	12	515	282	-	-	679	-	-
Stage 1	61	102	-	249	309	-	-	-	-	-	-	-
Stage 2	501	303	-	259	101	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	11	241	~ 30	11	515	282	-	-	679	-	-
Mov Cap-2 Maneuver	55	90	-	121	65	-	-	-	-	-	-	-
Stage 1	58	102	-	238	295	-	-	-	-	-	-	-
Stage 2	470	289	-	247	101	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	36.4	56.5	0.2	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	282	-	-	61	241	112	515	679	-	-
HCM Lane V/C Ratio	0.048	-	-	0.068	0.034	0.405	0.002	0.003	-	-
HCM Control Delay (s)	18.4	-	-	68.3	20.5	57.5	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	1.7	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	21	9	70	3	9	107
Future Vol, veh/h	21	9	70	3	9	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	10	79	3	10	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	221	81	0	0	82	0
Stage 1	81	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	767	979	-	-	1515	-
Stage 1	942	-	-	-	-	-
Stage 2	887	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	762	979	-	-	1515	-
Mov Cap-2 Maneuver	762	-	-	-	-	-
Stage 1	942	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	762	979	1515	-
HCM Lane V/C Ratio	-	-	0.031	0.01	0.007	-
HCM Control Delay (s)	-	-	9.9	8.7	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	13	17	65	111	12
Future Vol, veh/h	8	13	17	65	111	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	15	20	76	129	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	252	136	143	0	-	0
Stage 1	136	-	-	-	-	-
Stage 2	116	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	737	913	1440	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	727	913	1440	-	-	-
Mov Cap-2 Maneuver	727	-	-	-	-	-
Stage 1	878	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.5	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1440	-	832	-	-
HCM Lane V/C Ratio	0.014	-	0.029	-	-
HCM Control Delay (s)	7.5	0	9.5	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	11	21	1	2	13	1304	18	1	1676	4
Future Vol, veh/h	1	3	11	21	1	2	13	1304	18	1	1676	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	12	22	1	2	14	1387	19	1	1783	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2507	3219	892	2310	3204	694	1787	0	0	1406	0	0
Stage 1	1785	1785	-	1415	1415	-	-	-	-	-	-	-
Stage 2	722	1434	-	895	1789	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	15	10	289	~ 21	10	390	351	-	-	492	-	-
Stage 1	86	135	-	147	206	-	-	-	-	-	-	-
Stage 2	389	201	-	306	135	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	14	10	289	~ 19	10	390	351	-	-	492	-	-
Mov Cap-2 Maneuver	77	102	-	92	73	-	-	-	-	-	-	-
Stage 1	83	135	-	141	198	-	-	-	-	-	-	-
Stage 2	369	193	-	286	135	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	25.2	54.1	0.2	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	351	-	-	94	289	91	390	492	-	-
HCM Lane V/C Ratio	0.039	-	-	0.045	0.04	0.257	0.005	0.002	-	-
HCM Control Delay (s)	15.7	-	-	45.1	18	57.7	14.3	12.3	-	-
HCM Lane LOS	C	-	-	E	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0.9	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	6	87	7	8	63
Future Vol, veh/h	12	6	87	7	8	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	14	7	99	8	9	72

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	193	103	0	0	107	0
Stage 1	103	-	-	-	-	-
Stage 2	90	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	800	957	-	-	1497	-
Stage 1	926	-	-	-	-	-
Stage 2	939	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	795	957	-	-	1497	-
Mov Cap-2 Maneuver	795	-	-	-	-	-
Stage 1	926	-	-	-	-	-
Stage 2	933	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	795	957	1497	-
HCM Lane V/C Ratio	-	-	0.017	0.007	0.006	-
HCM Control Delay (s)	-	-	9.6	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	6	8	6	88	70	4
Future Vol, veh/h	6	8	6	88	70	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	7	9	7	100	80	5

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	197	83	85	0	-	0
Stage 1	83	-	-	-	-	-
Stage 2	114	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	796	982	1524	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	916	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	792	982	1524	-	-	-
Mov Cap-2 Maneuver	792	-	-	-	-	-
Stage 1	940	-	-	-	-	-
Stage 2	916	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.1	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1524	-	890	-	-
HCM Lane V/C Ratio	0.004	-	0.018	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	1	9	42	4	1	14	1001	18	2	2260	16
Future Vol, veh/h	3	1	9	42	4	1	14	1001	18	2	2260	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	0	0	3	0	0	2	0
Mvmt Flow	3	1	9	43	4	1	14	1021	18	2	2306	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2851	3377	1153	2207	3375	511	2322	0	0	1039	0	0
Stage 1	2310	2310	-	1049	1049	-	-	-	-	-	-	-
Stage 2	541	1067	-	1158	2326	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	8	8	194	~ 25	8	513	218	-	-	677	-	-
Stage 1	40	73	-	247	307	-	-	-	-	-	-	-
Stage 2	498	301	-	212	72	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	7	7	194	~ 22	7	513	218	-	-	677	-	-
Mov Cap-2 Maneuver	35	66	-	104	46	-	-	-	-	-	-	-
Stage 1	37	73	-	231	287	-	-	-	-	-	-	-
Stage 2	458	282	-	199	72	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	49.3	75.2	0.3	0
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	218	-	-	40	194	94	513	677	-	-
HCM Lane V/C Ratio	0.066	-	-	0.102	0.047	0.499	0.002	0.003	-	-
HCM Control Delay (s)	22.7	-	-	105	24.5	76.6	12	10.3	-	-
HCM Lane LOS	C	-	-	F	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3	0.1	2.2	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	11	71	3	10	116
Future Vol, veh/h	23	11	71	3	10	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	12	80	3	11	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	234	82	0	0	83	0
Stage 1	82	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	754	978	-	-	1514	-
Stage 1	941	-	-	-	-	-
Stage 2	876	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	748	978	-	-	1514	-
Mov Cap-2 Maneuver	748	-	-	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	869	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	748	978	1514	-
HCM Lane V/C Ratio	-	-	0.035	0.013	0.007	-
HCM Control Delay (s)	-	-	10	8.7	7.4	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	14	18	66	124	13
Future Vol, veh/h	9	14	18	66	124	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	16	21	77	144	15

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	271	152	159	0	-	0
Stage 1	152	-	-	-	-	-
Stage 2	119	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	718	894	1420	-	-	-
Stage 1	876	-	-	-	-	-
Stage 2	906	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	707	894	1420	-	-	-
Mov Cap-2 Maneuver	707	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	906	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	1.6	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1420	-	810	-	-
HCM Lane V/C Ratio	0.015	-	0.033	-	-
HCM Control Delay (s)	7.6	0	9.6	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	3	13	24	1	2	14	1436	20	1	1847	5
Future Vol, veh/h	1	3	13	24	1	2	14	1436	20	1	1847	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	200	-	200	200	-	200
Veh in Median Storage, #	-	2	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	0	0	1	0
Mvmt Flow	1	3	14	25	1	2	15	1512	21	1	1944	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2733	3509	972	2518	3493	756	1949	0	0	1533	0	0
Stage 1	1946	1946	-	1542	1542	-	-	-	-	-	-	-
Stage 2	787	1563	-	976	1951	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	10	6	256	~ 15	7	355	304	-	-	440	-	-
Stage 1	68	112	-	123	178	-	-	-	-	-	-	-
Stage 2	355	174	-	273	112	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	9	6	256	~ 13	7	355	304	-	-	440	-	-
Mov Cap-2 Maneuver	60	85	-	77	59	-	-	-	-	-	-	-
Stage 1	65	112	-	117	169	-	-	-	-	-	-	-
Stage 2	333	165	-	251	112	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28	71.1	0.2	0
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	304	-	-	77	256	76	355	440	-	-
HCM Lane V/C Ratio	0.048	-	-	0.055	0.053	0.346	0.006	0.002	-	-
HCM Control Delay (s)	17.4	-	-	54.4	19.9	75.6	15.2	13.2	-	-
HCM Lane LOS	C	-	-	F	C	F	C	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.2	1.3	0	0	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	13	7	92	8	9	67
Future Vol, veh/h	13	7	92	8	9	67
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	1	0	0	0
Mvmt Flow	15	8	105	9	10	76

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	206	110	0	0	114	0
Stage 1	110	-	-	-	-	-
Stage 2	96	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	787	949	-	-	1488	-
Stage 1	920	-	-	-	-	-
Stage 2	933	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	781	949	-	-	1488	-
Mov Cap-2 Maneuver	781	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	926	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	781	949	1488	-
HCM Lane V/C Ratio	-	-	0.019	0.008	0.007	-
HCM Control Delay (s)	-	-	9.7	8.8	7.4	0
HCM Lane LOS	-	-	A	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	0	-

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	9	7	93	74	5
Future Vol, veh/h	7	9	7	93	74	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	0	1	0	0
Mvmt Flow	8	10	8	106	84	6

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	209	87	90	0	-	0
Stage 1	87	-	-	-	-	-
Stage 2	122	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	784	977	1518	-	-	-
Stage 1	941	-	-	-	-	-
Stage 2	908	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	779	977	1518	-	-	-
Mov Cap-2 Maneuver	779	-	-	-	-	-
Stage 1	935	-	-	-	-	-
Stage 2	908	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.2	0.5	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1518	-	879	-	-
HCM Lane V/C Ratio	0.005	-	0.021	-	-
HCM Control Delay (s)	7.4	0	9.2	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-