September 19, 2013

Mr. Dan Pina
Flynnville Wine Company
c/o PD Properties
955 Vintage Avenue
St. Helena, CA 94574

Subject: ***Focused Traffic Analysis for the Proposed Flynnville Winery Project - Located at State Highway 29/Maple Lane in Napa County.***

Dear Mr. Pina:

This report provides a focused traffic analysis for the proposed Flynnville Winery project located between Maple Lane and Drew Drive immediately north of State Route 29 in Napa County (see Figure 1 for project vicinity map). This study reflects our discussions regarding the project characteristics, field reviews, traffic counts, and analyses of the project's effect on traffic based on initial comments received from Napa County Planning, Building, and Environmental Services.[i] Some of the key issues evaluated in this study include the following:

- Existing and future weekday PM and weekend mid-day peak hour operations at the Drew Drive-Heitz Way/SR-29 and Maple Lane/SR-29 intersections;
- Near-term (Year 2016) traffic conditions reflecting other approved winery projects in the study area;
- Proposed project trip generation relative to current site entitlements and winery production, employment, and visitor data;
- Project site circulation and vehicle access at Drew Drive and Maple Lane and truck circulation;
- Cumulative year 2030 (no project) conditions along SR-29 based on the Napa County General Plan Update EIR.

The following sections outline existing and future traffic conditions with and without the proposed Flynnville Winery project based on input from Napa County Planning staff. Where necessary, measures have been recommended to ensure acceptable traffic flow, circulation, and/or fair share contribution to regional cumulative traffic improvements along SR-29. I trust that this report responds to your needs. Please review this information and call me with any questions or comments.

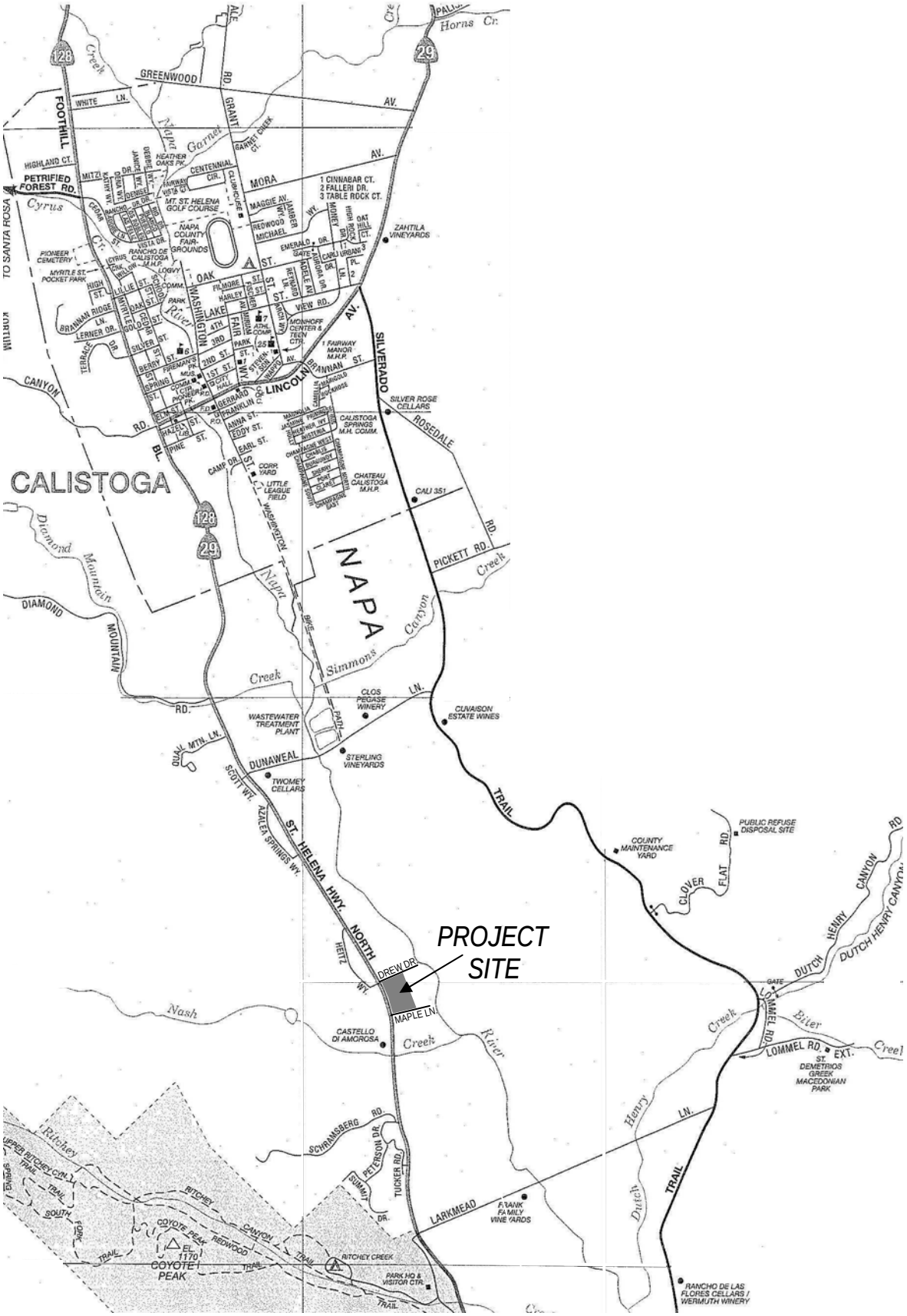
Sincerely,

George Nickelson

George W. Nickelson, P.E.
OMNI-MEANS, Ltd.
Engineers & Planners

R1657TIA002.doc/35-3064-01

Attachments: Appendices



Project Vicinity Map

North

omni-means

figure 1

1. EXISTING TRAFFIC CONDITIONS

Roadways

The proposed Flynnville Winery project would be located on the east side of State Route 29 between Drew Drive (to the north) and Maple Lane (to the south). It is noted that State Route 29 is primarily a north-south facility through the Napa Valley. A brief description of each roadway follows:

State Route 29 (SR-29) is a State facility that extends in a north-south direction between St. Helena and Calistoga in the project study area. A two-lane rural highway, SR-29 provides access north to Calistoga and State Route 128 as well as south to St. Helena, Rutherford, Yountville, Napa, and Vallejo. In the immediate project site area, SR-29 has two 12-foot travel lanes with 10-feet striped shoulders at its intersection with Drew Drive. South of Drew Drive, the highway widens to provide two 12-foot travel lanes, 8-foot striped shoulders, and a bay taper median with a 12-foot southbound left-turn lane at its intersection with Maple Lane. This southbound left-turn lane has approximately 145 feet of vehicle storage (field checked). South of Maple Lane, the highway configuration continues with two 12-foot travel lanes, 8-foot striped shoulders, and a 12-foot striped median that extends 500 feet south to a private driveway serving the Castello di Amorosa winery. South of this winery, SR-29 continues with 8-foot shoulders, two 12-foot travel lanes, and a 12-foot two-way-left-turn-lane that extends another 650 feet south (approximately) on SR-29.

Drew Drive is a County facility extends in an easterly direction from SR-29 and would form the northern border of the site. A two-lane, unimproved roadway (gravel-pavement), Drew Drive provides access to existing businesses on the proposed project site as well as a single-family residence located north of the project site. The two-lane roadway extends for approximately 900 feet from SR-29 directly opposite Heitz Way and would provide direct access to the project site.

Maple Lane is a County facility that extends in an easterly direction from SR-29 approximately 680 feet south of Drew Drive. A two-lane unimproved roadway, Maple Lane provides access to existing businesses (and a single-family residence) on the proposed project site as well as other single-family residences and agricultural parcels located east of the project site. The roadway is paved for approximately 900 feet before crossing over the Napa River via a one-lane bridge. East of the Napa River, Maple Lane continues as a gravel roadway providing access to agricultural (vineyard) areas.

Ida Lane is a private roadway extends in a north-south direction along the eastern edge of the project site. A two-lane gravel road, Ida Lane extends north from Maple Lane to provide access to existing businesses on the proposed project site and a single-family residence located on the southeast quadrant of the Maple Lane/Ida Lane intersection.

Heitz Way is County facility located directly opposite Drew Drive at SR-29 and forms the eastbound leg of the four-way intersection. A two-lane street, Heitz Way extends northwest from the intersection paralleling SR-29 providing access to agricultural and residential areas before re-connecting with SR-29 approximately 1,200 feet north of Drew Drive.

Based on the most recent Caltrans traffic volume records, SR-29 has a current average daily traffic volume west of Larkmead Lane of 12,600 vehicles and a peak month daily volume of 13,700 vehicles.[ii] The peak month daily volumes are within the carrying capacity of a rural two lane highway and indicative of Level-of-Service conditions (see below) of 'C' (less than 16,000 daily vehicles).

Intersection Volumes

In order to identify peak hour conditions, existing traffic counts were conducted at the Drew Lane/SR-29 and Maple Lane/SR-29 intersections during a weekday PM commute period and a Saturday afternoon.[iii] Based on Caltrans daily volumes, the peak month volumes (summer season) are approximately 9% higher than average month volumes. The peak hour counts for this study were conducted in October, 2012. Therefore, the peak hour count volumes on SR-29 were increased 9% for the analysis as a conservative measure to reflect existing peak summer season conditions.

Existing weekday PM peak hour and weekend mid-day peak hour intersection volumes have been shown in Figure 2.

Intersection Operation

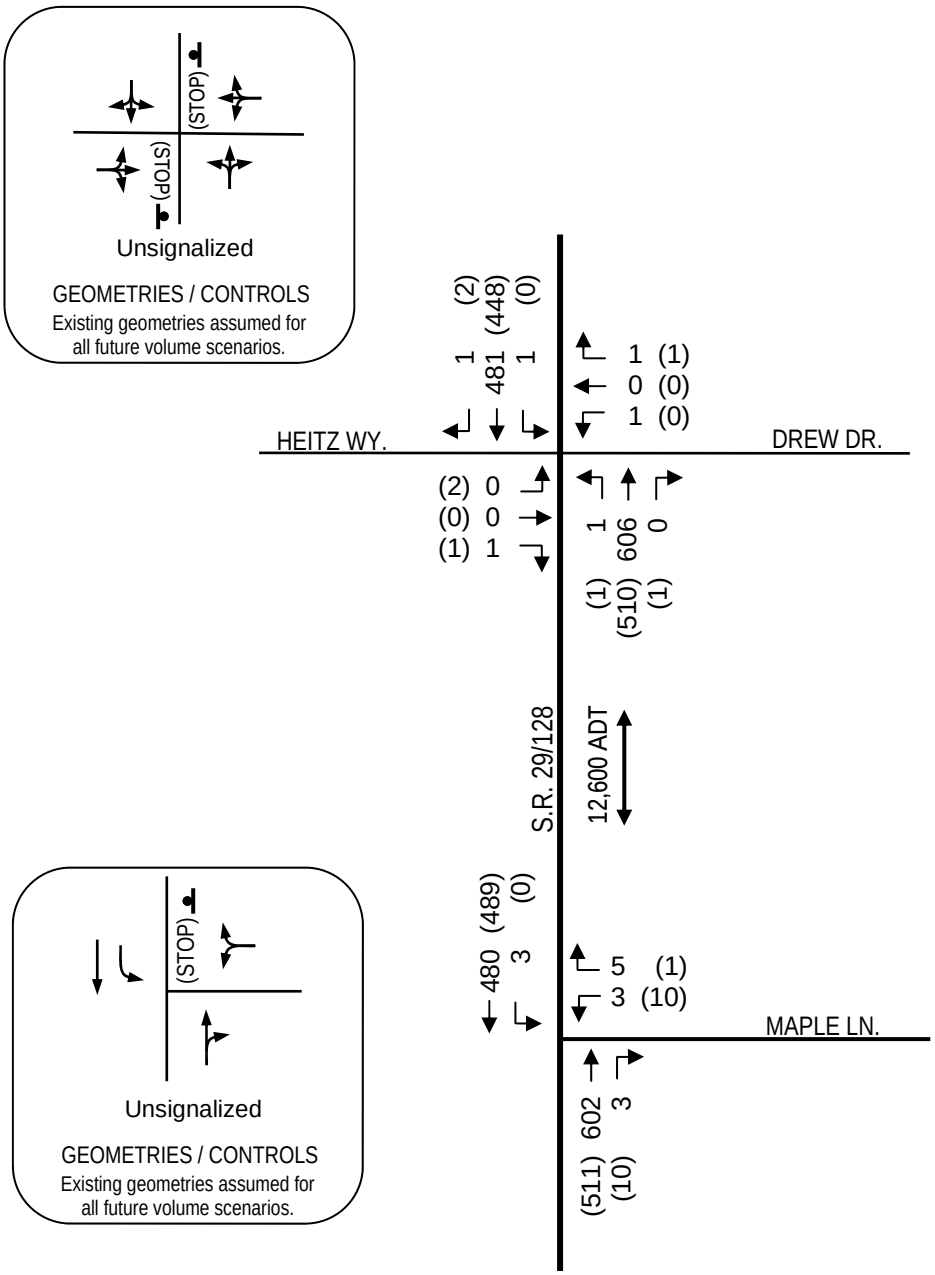
Intersection operation is one of the primary factors in evaluating the carrying capacity of a roadway network. Traffic conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of intersection performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays at the approaches. For intersections with minor street stop control, the LOS reflects the delays experienced by the minor street approach. (LOS definitions and calculation worksheets are provided in the Appendix).

The Drew Drive-Heitz Way/SR-29 is a minor-street stop controlled intersection. The minor streets consist of a single lane stopped approach for southbound Drew Drive and northbound Heitz Way (Heitz Way has flared single lane approach this is striped to accommodate two separate vehicle movements). East-west approaches on free-flowing SR-29 are uncontrolled and there are no turn lanes from SR-29 onto Drew Drive or Heitz Way. The Maple Lane/SR-29 intersection is a three-way (T-type) intersection with northbound Maple Lane stop-sign controlled at SR-29. Like Heitz Way, Maple Lane has a flared approach at SR-29 which can accommodate separate left and right-turn movements. An existing eastbound left-turn is present on SR-29 at Maple Lane. This eastbound left-turn lane on SR-29 has a storage capacity of approximately 145 feet.

Based the Highway Capacity Manual (HCM) 2000 operations methodology for unsignalized intersections, existing weekday PM peak and weekend mid-day peak hour existing (no project) level-of-service has been shown in Table 1. As calculated during the weekday PM peak hour, the Heitz Way-Drew Drive/SR-29 intersection is operating at LOS C (20.0 seconds) for the stop-sign controlled southbound turning movements from Drew Lane onto SR-29. The Maple Lane/SR-29 intersection is operating at LOS B (13.9 seconds) for the stop-sign controlled southbound left-turn movement from Maple Lane onto eastbound SR-29. All remaining turning movements from SR-29 are operating at LOS A at both intersections. During the weekend mid-day peak hour, the same stop-sign controlled movements are operating at LOS C (19.9 seconds) and LOS B (14.7 seconds), respectively.

It is noted that Caltrans has minimum design standards for left-turn deceleration lanes. The existing left-turn lane on SR-29 at Maple Lane does not meet these standards based on current design guidelines in the Caltrans Highway Design Manual.[1] Deceleration lengths for left-turn lanes are based on the design speed of the highway (55 mph) which would require 435 feet of deceleration length. However, Caltrans indicates that this would be the *desirable* deceleration length and that this is not always possible given the physical restrictions and/or lack of ROW. Partial deceleration can permitted in the through lane of travel and required deceleration lengths can be reduced by 10-20 mph. The combined deceleration/storage

[1] Caltrans, Highway Design Manual, Chapter 400, Section 405.2, Left-Turn Channelization, 2009.



Existing Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 2

TABLE 1
EXISTING AND NEAR-TERM (NO PROJECT) CONDITIONS: INTERSECTION LEVELS-OF-SERVICE
WEEKDAY PM PEAK AND WEEKEND MID-DAY PEAK HOUR

			Wkdy. PM LOS/Delay		Wknd. Mid-Day LOS/Delay	
#	Intersection	Control Type	Existing (No Project)	Near-Term (No Project)	Existing (No Project)	Near-Term (No Project)
1	Drew Drive-Heitz Way/State Route 29	Stop	C 20.0	C 20.9	C 19.9	C 20.6
2	Maple Lane/State Route 29	Stop	B 13.9	B 14.2	B 14.7	B 15.0

Based on Highway Capacity Manual (HCM) 2000, Operations methodology for stop-sign controlled (unsignalized) intersections using Synchro-Simtraffic software. Intersection calculation yields an LOS and vehicle delay in seconds. Stated LOS refers to the minor street (stop-sign) controlled movement.

length for the southbound left-turn lane on SR-29 at Maple Lane is 220 feet which would be within 100 feet of required storage allowing for partial deceleration in the through-lane. Given that the southbound left-turn lane experiences an existing traffic volume of three (3) vehicles during the highest peak hour period this deceleration/storage length would be adequate.

The adjusted baseline (no project) peak summer season volumes were applied to California Manual on Uniform Traffic Control Devices (CAMUTCD) peak hour signal warrants.[iv] The peak hour warrants are one of several standards to help determine if installation of a traffic signal is appropriate. Qualifying for signalization using the peak hour warrants does not necessarily mean signals should be installed. The Heitz Way-Drew Drive/SR-29 and Maple Lane/SR-29 intersections do not qualify for signalization under the peak hour warrants using these baseline (no project) volumes (the warrant graphs are provided in the Appendix).

Current and Previous Site Traffic/Entitlements

To accurately assess the proposed project's trip generation and impacts, the existing site traffic was counted and/or documented to establish its current traffic generation under existing County use permit conditions. Based on field observations and existing site data provided by the project applicant, current and previous uses on the site include the following:

Current Site Uses:

- Single-family residence
- Davey Tree Service – 6,250 square feet
- Jim's Supply – 2,400 square feet
- Wine County Cases – 2,400 square feet
- Barrel Builders/Storage – 4,800 square feet
- Agricultural Services – 1,250 square feet

Previous Site Uses:

- PG&E Contracting/Service Yard/Warehouse-Storage – 12,600 square feet

In addition to existing site uses, there are also residential and agricultural parcels east of the project site that gain access to SR-29 via Maple Lane. These include six residences and 4-5 large agricultural parcels.

With regard to current uses on the site and existing traffic related to residential/agricultural parcels located east of the project site, all vehicle traffic related to these uses was accounted for in existing peak period intersection counts conducted at the Drew Lane/SR-29 and Maple Lane/SR-29 intersections. However, with

respect to previous on-site PG&E uses no physical count data was available to document their traffic generation. Therefore, PG&E representative(s) were contacted directly for historical use information on the site.[v] PG&E staff indicates that the site was used for their corporation/service yard activities and that its population (employees and trucks) would vary depending on the time of year and anticipated need. On average, the site had eight employees with 5-6 service trucks. Work hours were primarily on weekdays during the AM and PM commute periods. However, work trucks would come and go throughout the day to drop-off/pick-up materials from the yard. For the purposes of this analysis, the weekday PM peak period has been analyzed with PG&E traffic (no activity on weekend periods). No carpool or ridesharing was assumed for PG&E traffic. During the PM peak hour, it was assumed that all PG&E truck traffic was returning to the yard (inbound) and all employees would be leaving the yard (outbound). Based on this information, it is estimated that previous site uses would have generated 13 weekday AM and PM peak hour trips (5 truck trips plus 8 employee trips during each peak hour).

2. NEAR-TERM (NO PROJECT) CONDITIONS

Near-Term (Approved Projects)

Near-term (no project) conditions represent a reasonable period of time in which the proposed project could be approved and/or constructed. Based on discussions with County staff, a three-year period to the year 2016 has been established for near-term (no project) conditions. To generate near-term (no project) conditions, Napa County Planning staff was contacted for recently approved projects within the project site study area. These projects are located both north and south of the project site between St. Helena and Calistoga and are described as follows:

Azalea Springs Winery 4301 Azalea Springs Way Calistoga, CA 94515	Production: 12,500 gallons Visitors: 125/week Employees: 2 full-time
Cairdean Vineyard 3111 St. Helena Hwy. North St. Helena, CA 94574	Production: 50,000 gallons Visitors: 175/week Employees: 10 full-time
Joseph Cellars 4455 St. Helena Hwy. North St. Helena, CA 94574	Production: 20,000 gallons Visitors: 525 visitors/week Employees: 6 full-time
Morlet Family Estate 2825 St. Helena Hwy. St. Helena, CA 94574	Production: 20,000 gallons Visitors: 25 visitors/week Employees: 6 full-time
Tilley Winery 3199 St. Helena Hwy. St. Helena, CA 94574	Production: 20,000 gallons Visitors: 13 visitors/week Employees: 3 full-time
Wallis Family Estate 1670 Diamond Mountain Road Calistoga, CA 94515	Production: 30,000 gallons Visitors: 108 visitors/week Employees: 3 employees

Near-Term (No Project) Trip Generation

Near-term (approved) project PM weekday and weekend peak hour and daily traffic volumes have been calculated and are shown in Table 2. Employee peaking factors and auto occupancy rates for visitors are based on recent winery research conducted by the Napa County Conservation, Development, and Planning Department.[vi] For calculation purposes, all production, visitor, and employee data has been combined to generate absolute totals. The vehicle trips were then allocated to each winery based on their proportional amount.

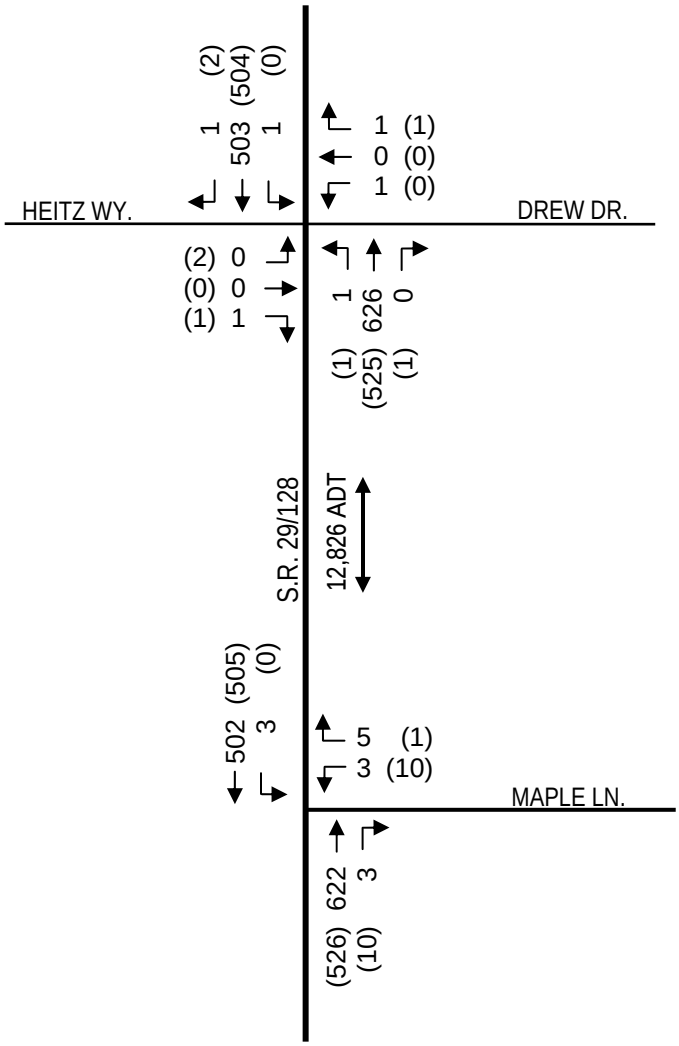
As calculated in Table 2, near-term projects would be expected to generate 226 daily trips and 81 PM peak hour trips during the weekday periods. During the weekend period, near-term projects would generate 214 daily trips daily trips with 61 mid-day peak hour trips.

TABLE 2
NEAR-TERM (NO PROJECT) CONDITIONS
PEAK HOUR AND DAILY TRIP GENERATION

Weekday Daily Traffic:		
158 visitors/2.6 persons per vehicle x 2 one-way trips	=	122 daily trips
33 full time employees x 3.05 one-way trips	=	101 daily trips
152,500 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	3 daily trips
Total Weekday Daily Trips	**=**	**226 daily trips**
Weekday PM Peak Hour Traffic:		
(122 daily visitor trips + 3 daily truck trips) x 0.38	=	48 peak hour trips
33 full time employees x 1 trip/employee	=	33 peak hour trips
Total Weekday PM Peak Hour Trips	**=**	**81 trips (24 in, 57 out)**
Weekend (Saturday) Daily Traffic:		
158 visitors/2.8 persons per vehicle x 2 one-way trips	=	113 daily trips
33 full time employees x 3.05 one-way trips	=	101 daily trips
Total Weekend (Saturday) Daily Trips	**=**	**214 daily trips**
Weekend (Saturday) Peak Hour Traffic:		
113 daily visitor trips x 0.25	=	28 peak hour trips
33 full time employees x 1 trip/employee	=	33 peak hour trips
Total Weekend (Saturday) Peak Hour Trips	**=**	**61 trips (33 in, 29 out)**

Source: Production, employee, and visitor data provided by Ms. Linda St. Claire (Napa County Planner III) using the County's Winery Database, December, 2012. Daily and peak hour calculations based on County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.

Near-term (no project) daily and peak hour volumes for the weekday and weekend have been added to existing intersection volumes based on SR-29 travel flow and specific project location and are shown in Figure 3.



Near Term Without Project
Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 3

Near-Term (No Project) Intersection Operation

With near-term (no project) volumes, study intersection LOS has been calculated and are shown in Table 1. Both the Drew Drive-Heitz Way/SR-29 and Maple Lane/SR-29 intersection would experience slight increases in vehicle delays during the weekday PM peak hour and weekend mid-day peak hour. However, both intersection's LOS would remain unchanged from existing levels and continue to operate at acceptably (LOS C or better).

Based on CAMUTCD peak hour signal warrant criteria (Warrant #3), neither the Drew Drive-Heitz Way/SR-29 or Maple Lane/SR-29 intersections would qualify for signalization with near-term (no project) volumes.

3. NAPA COUNTY SIGNIFICANCE CRITERIA

The County of Napa's significance criteria has been based on a review of the Napa County Transportation and Planning Agency and Napa County General Plan documentation on roadway and intersection operations. Specifically, the Circulation Element of the County's General Plan outlines the following significance criteria specific to intersection operation:

Intersections

- The County shall seek to maintain a Level of Service D or better at all intersections, except where the level of service already exceeds this standard (i.e. Level of Service E or F) and where increased intersection capacity is not feasible without substantial additional right-of-way.

  No single level of service standard is appropriate for un-signalized intersections, which shall be evaluated on a case-by-case basis to determine if signal warrants are met.

Further significance criteria are based on County and CEQA guidelines and apply mainly to intersection operation and access. A significant impact occurs if project traffic would result in the following:

- Cause an increase in traffic which is substantial in relation to existing traffic load and capacity of the street system (i.e. result in a substantial increase in either the number of vehicle trips, the volume capacity ratio on roads, or congestion at intersections);
- Exceed either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways;
- Result in a change of traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency vehicle access;
- Project site or internal circulation on the site is not adequate to accommodate pedestrians and bicycles;

4. PROPOSED PROJECT IMPACTS

Project Description

Propose winery operations would include production, employees, visitors and special event components that can be described as follows:

- 300,000 gallons of annual production (approximately 121,500 cases or 2.47 gallons/case);

- Employees: Weekday: 30 employees
  Weekend: 20 employees

- Visitors: Weekday: 300 visitors
  Weekend: 500 visitors

- Trucks: Weekday: 5 trucks per day
  Weekend: 5 trucks per day

- Hospitality and Special Events: 18 special events per year with up to 100 visitors;
  5 special events per year with up to 250 visitors;
  1 special event per year with up to 500 visitors (largest).

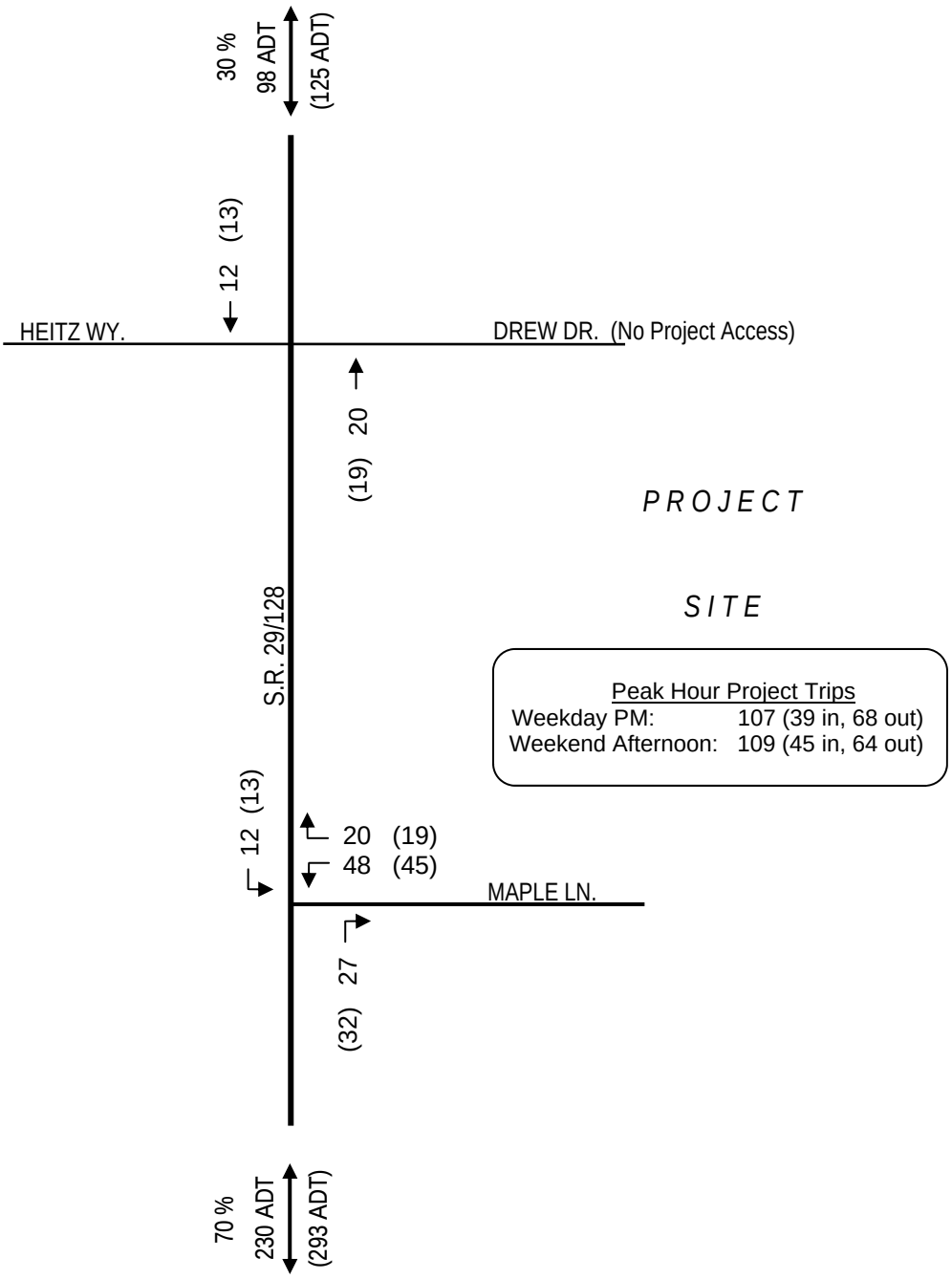
The proposed Flynnville Winery project would involve an on-site winery operation with a maximum annual production of 300,000 gallons (121,500 cases).[vii] The vast majority of the fruit (300,000 gallons of production) would be brought in on-site during the year (trucked in) with the majority occurring during the harvest/crush season. Visitors (by appointment only) are expected; a maximum of 300 (daily) on a typical weekday and 500 daily visitors on a Saturday. It is likely that there would be fewer visitors on a weekday as compared to a weekend period when maximum attendance could be expected. Visitor hours would be limited between 10:00 a.m. – 6:30 p.m. Employment is expected to be a maximum of 30 FTE during a weekday and 20 FTE on a weekend. Larger marketing or "special events" are proposed as part of winery operations (special events are defined as events of 35 person or more as per the Napa County permitting process). The largest yearly special event would consist of 500 visitors with 5 event staff. Table 1 outlines the winery's expected peak hour and daily traffic generation on a typical weekday and on a typical Saturday day (weekend).

Project Trip Generation/Distribution

The proposed project's weekday and weekend peak hour and daily traffic volumes have been calculated and are shown in Table 3. Employee peaking factors and auto occupancy rates for visitors are based on recent winery research conducted by the Napa County Conservation, Development, and Planning Department.[viii] Based on a 300,000 gallon winery with 30 FTE employees and 300 daily visitors, the proposed project would be expected to generate 328 weekday daily trips with 120 weekday PM peak hour trips (45 in, 75 out). During a typical weekend (Saturday), the project would be expected to generate 418 daily trips with 109 mid-day (afternoon) peak hour trips (45 in, 64 out).

To determine traffic conditions with the proposed project, the calculated project trips were added to existing volumes. It is noted that for the weekday PM peak hour period, the net new project trips were added to existing (no project) volumes to account for previous PG&E uses on the site. Less the 13 PM peak hour PG&E trips, the proposed project would generate 107 weekday PM peak hour trips (39 in, 68 out). Proposed project trips were distributed at Maple Lane onto SR-29 with 70% to/from the south and 30% to/from the north (based on the existing intersection traffic flow at the Maple Lane-Drew Lane intersections at SR-29).

Daily, weekday PM peak hour, and weekend mid-day peak hour project trips (only) have been shown in Figure 4.



Project Trips
Weekday PM and (Weekend) Peak Hour

North

omni-means

figure 4

TABLE 3
PEAK HOUR AND DAILY TRIP GENERATION:
PROPOSED FLYNNVILLE WINERY 300,000 GALLONS ANNUAL PRODUCTION

Weekday Daily Traffic:		
300 visitors/2.6 persons per vehicle x 2 one-way trips	=	231 daily trips
30 full time employees x 3.05 one-way trips	=	92 daily trips
300,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	5 daily trips
Total Weekday Daily Trips	**=**	**328 daily trips**
Weekday PM Peak Hour Traffic:		
(231 daily visitor trips + 5 daily truck trips) x 0.38	=	90 peak hour trips
30 full time employees x 1 trip/employee	=	30 peak hour trips
Total Weekday PM Peak Hour Trips	**=**	**120 trips (45 in, 75 out)**
Weekend (Saturday) Daily Traffic:		
500 visitors/2.8 persons per vehicle x 2 one-way trips	=	357 daily trips
20 full time employees x 3.05 one-way trips	=	61 daily trips
Total Weekend (Saturday) Daily Trips	**=**	**418 daily trips**
Weekend (Saturday) Peak Hour Traffic:		
357 daily visitor trips x 0.25	=	89 peak hour trips
20 full time employees x 1 trip/employee	=	20 peak hour trips
Total Weekend (Saturday) Peak Hour Trips	**=**	**109 trips (45 in, 64 out)**
Weekend (Saturday) Daily Harvest/Crush Traffic:		
500 visitors/2.8 persons per vehicle x 2 one-way trips	=	357 daily trips
30 full time employees (crush) x 3.05 one-way trips	=	92 daily trips
300,000 gallons/1,000 x .009 daily trucks x 2 o-w trips	=	5 daily trips
1,818 annual grapes (tons)/144 daily trucks x 2 o-w trips	=	25 daily trips
Total Weekend (Saturday) Daily Harvest/Crush Trips	**=**	**479 daily trips**

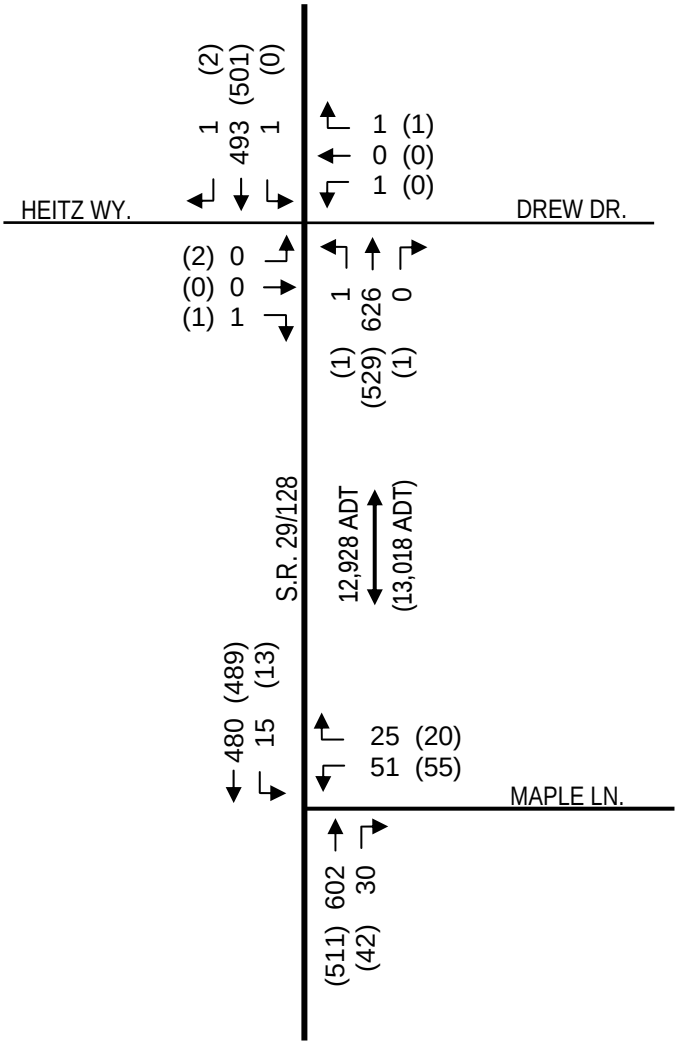
Source: Production, employee, and visitor data provided by Mr. Dan Pinal (project applicant) and Mr. Jeff Redding (Planning Consultant), project representative, August 27, 2012. Daily and peak hour calculations based on County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.

Project Effects on Roadway/Intersection Operation

a. Existing Plus Project Conditions

The project would be expected to add approximately 230 daily trips south of the site and 98 daily trips north of the site on SR-29. The project would add 3.3 percent or less to the daily volumes on SR-29 adjacent to the site. The combined existing plus project volume of 12,928 daily trips would remain within the carrying capacity of a two lane rural highway with conditions equivalent to LOS 'C'.

The project would generate 107 weekday PM peak hour and 109 Saturday mid-day peak hour trips. Existing plus project peak hour volumes are shown in Figure 5. Weekday PM peak hour and weekend mid-day peak hour intersection levels of service were evaluated with proposed project traffic and are shown in Table 4.



Existing Plus Project
Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 5

With respect to overall intersection operation, all proposed project trips would be directed to/from Maple Lane based on project access points and driveway operations (please see Site Access/Design Parameters section). No proposed project trips would be to/from Drew Drive to reduce neighborhood intrusion (and utilize available turn lanes/storage capacity at the Maple Lane/SR-29 intersection).

At the Drew Drive-Heitz Way/SR-29 intersection, the minor street stop-sign approach(s) would operate at LOS C with slight increases in vehicle delays (worst case). This would equate to 20.7 seconds of delay on the weekdays and 20.6 seconds of delay on the weekends. At the Maple Lane/SR-29 intersection, the southbound Maple Lane approach would operate at LOS C with 17.7 seconds of delay on the weekdays and 16.6 seconds of delay on the weekends. Unsignalized LOS would be within the County's significance thresholds (LOS D or better).

The Drew Drive-Heitz Way/SR-29 and Maple Lane/SR-29 baseline plus project intersection volumes were compared to peak hour volume warrants for installing a traffic signals. With existing plus proposed project traffic, the Maple Lane/SR-29 intersection would just exceed the minimum volumes (Peak Hour Warrant #3—Rural Areas) for installation of a signal. However, with acceptable operation of all turning movements at this intersection a signal is not recommended with existing plus project traffic volumes at this time. The Heitz Way-Drew Drive/SR-29 intersection volumes would remain below the threshold for signalization (warrant graphs are provided in the Appendix).

b. Near-Term Plus Project Conditions

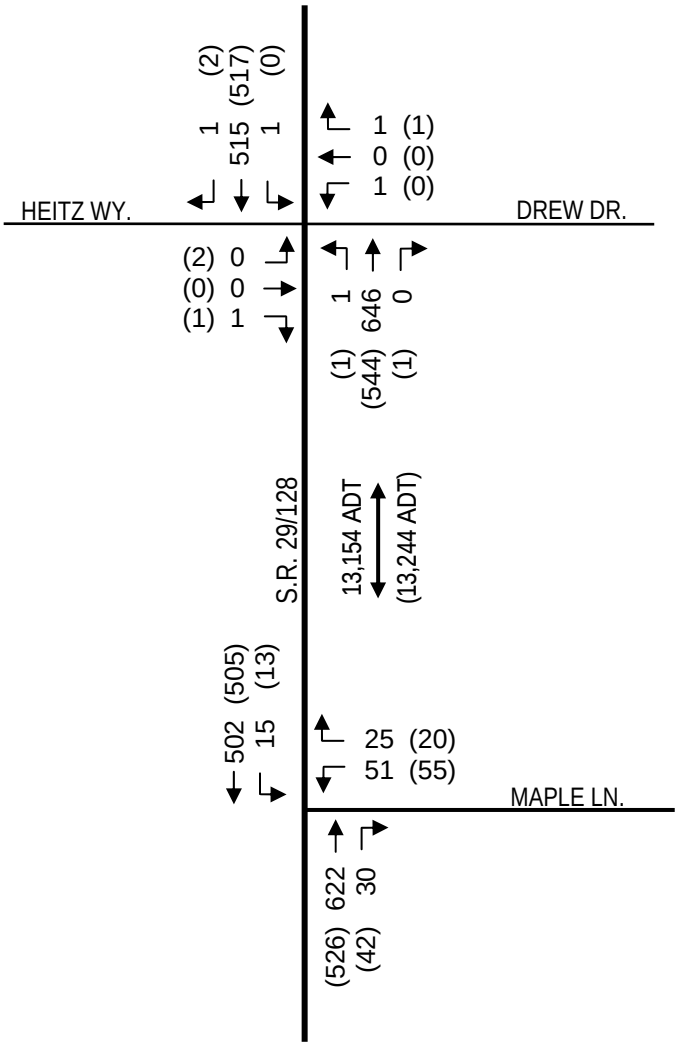
Near-term plus project daily and peak hour traffic volumes have been shown in Figure 6. Under near-term plus project conditions, daily traffic volumes on SR-29 would increase to 13,154 ADT maintaining LOS C conditions. Study intersection operation would be LOS C for the minor street stop sign controlled movements. Specifically, the Drew Drive-Heitz Way/SR-29 intersection minor street stop-sign approach(s) would operate at 21.7 seconds of delay on the weekdays and 21.4 seconds of delay on the weekends. At the Maple Lane/SR-29 intersection, the southbound Maple Lane approach would operate at LOS C with 18.3 seconds of delay on the weekdays and 17.1 seconds of delay on the weekends. Unsignalized LOS would be within the County's significance thresholds (LOS D or better).

As under existing plus project conditions, near-term plus project conditions were evaluated for peak hour signal warrants based on CAMUTCD criteria. With near-term plus proposed project traffic, the Maple Lane/SR-29 intersection would just exceed the minimum volumes (Peak Hour Warrant #3—Rural Areas) for installation of a signal. However, with acceptable operation of all turning movements at this intersection a signal is not recommended under near-term plus project traffic conditions at this time. The Heitz Way-Drew Drive/SR-29 intersection volumes would remain below the threshold for signalization (warrant graphs are provided in the Appendix).

TABLE 4
EXISTING PLUS PROJECT AND NEAR-TERM PLUS PROJECT CONDITIONS:
INTERSECTION LEVELS-OF-SERVICE
WEEKDAY PM PEAK AND WEEKEND MID-DAY PEAK HOUR

			Wkdy. PM LOS/Delay		Wknd. Mid-Day LOS/Delay	
#	Intersection	Control Type	Existing + Project	Near-Term + Project	Existing + Project	Near-Term + Project
1	Drew Drive-Heitz Way/State Route 29	Stop	C 20.7	C 21.7	C 20.6	C 21.4
2	Maple Lane/State Route 29	Stop	C 17.7	C 18.3	C 16.6	C 17.1

Based on Highway Capacity Manual (HCM) 2000, Operations methodology for stop-sign controlled (unsignalized) intersections using Synchro-Simtraffic software. Intersection calculation yields an LOS and vehicle delay in seconds. Stated LOS refers to the minor street (stop-sign) controlled movement.



Near Term Plus Project
Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 6

5. SITE ACCESS/DESIGN PARAMETERS

Left-Turn Lane Storage/Right-Turn Deceleration Lane

The Maple Lane/SR-29 intersection would serve all of the employee, delivery, and visitor trips. In addition, Maple Lane intersects SR-29 where an existing 145-foot southbound left-turn lane already exists. Based on *Synchro-Simtraffic* software, the southbound left-turn lane from SR-29 onto eastbound Maple Lane was evaluated for adequate vehicle storage requirements.

Vehicular queuing projections have been estimated utilizing *SimTraffic* micro-simulation software which is an extension of *Synchro.* Developed by *Trafficware*, Simtraffic software utilizes all field obtained inputs from Synchro intersection LOS including lane geometries, existing storage lengths, vehicle control, and volumes to simulate traffic flows through the study intersections and corridor. Essentially, the software simulates traffic flows on the street network by randomly "seeding" vehicles using all measured/recorded field data. Vehicle queuing projections are provided in terms of the 95th percentile queue lengths. Intersections are designed using the 95th percentile queue lengths for maximum storage capacity. The available storage lengths for vehicle turn lanes has been based on measurements recorded in the field during the peak commute periods and corroborated by from aerial photographs of the corridor(s) (Google earth).

Based on near-term plus project weekday PM peak hour volumes (worst case), the southbound left-turn lane from SR-29 onto Maple Lane would have adequate vehicle storage with proposed project traffic. As calculated, the 95th percentile vehicle queue would be 39 feet. With 145 feet of existing vehicle storage, the southbound left-turn lane would not experience significant vehicle queuing. In addition, the westbound Maple Lane approach would experience a 95th percentile vehicle queue of 69 feet (2-2.5 vehicles). Maple Lane currently has at least 200-300 feet of vehicle storage along the proposed project frontage and vehicle queuing would not be considered significant.

The projected northbound right-turn volume from SR-29 onto Maple Lane has been evaluated for deceleration lane requirements. Based on traffic volume guidelines for design of right-turn lanes, the 42 projected right-turn movements from SR-29 onto Maple Lane would require a right-turn deceleration taper. These findings are based on surveyed vehicle speeds of 60 mph (85th percentile critical speed) on SR-29 at Maple Lane and overall right-turn/approach volumes at the intersection (right turn lane warrant graphs are included in the Appendix.)[ix]

Sight Distance

Vehicle sight distance at the Heitz Way-Drew Drive/SR-29 and Maple Lane/SR-29 intersections were evaluated. The required vehicle visibility or "corner sight distance" is a function of travel speeds on SR-29. Caltrans design standards indicate that for appropriate corner sight distance, "a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the cross road and the driver of an approaching vehicle in the right lane of the main highway". Caltrans design guidelines also indicate that the minimum corner sight distance "shall be equal to the stopping sight distance".

The posted speed limit on SR-29 at Maple Lane and Drew Drive is 55 mph. Radar speed surveys were conducted as a part of this study which identified an 85th % speed (the speed at which 85% of all surveyed vehicles travel at or below) of 60.7 mph.[x] Based on Caltrans' design standards, a stopping sight distance of approximately 580 feet is required along SR- 29.[xi] Both Drew Drive and Maple Drive are located on a slightly curved (convex) section of SR-29. Field observations indicate the sight distances from the roadways

are approximately 1000-2000 feet to the west and 800-1,100 feet to the east, which would exceed the minimum standards.

Effects of Proposed Project Traffic on Maple Lane

The proposed Flynnville Winery project would be expected to add 120 weekday PM peak hour trips and 109 weekend mid-day peak hour trips to Maple Lane. Currently, Maple Lane carries 14 weekday PM peak hour trips and 21 weekend peak hour trips to/from SR-29. These existing peak hour roadway volumes would be considered extremely low for peak hour traffic. However, the addition of proposed project trips would increase these volumes three-fold and local residents using Maple Lane to access to/from SR-29 would notice an increase in traffic volumes over the course of the weekday and weekend peak hour(s). With project traffic, Maple Lane would continue operate at acceptable levels at SR-29.

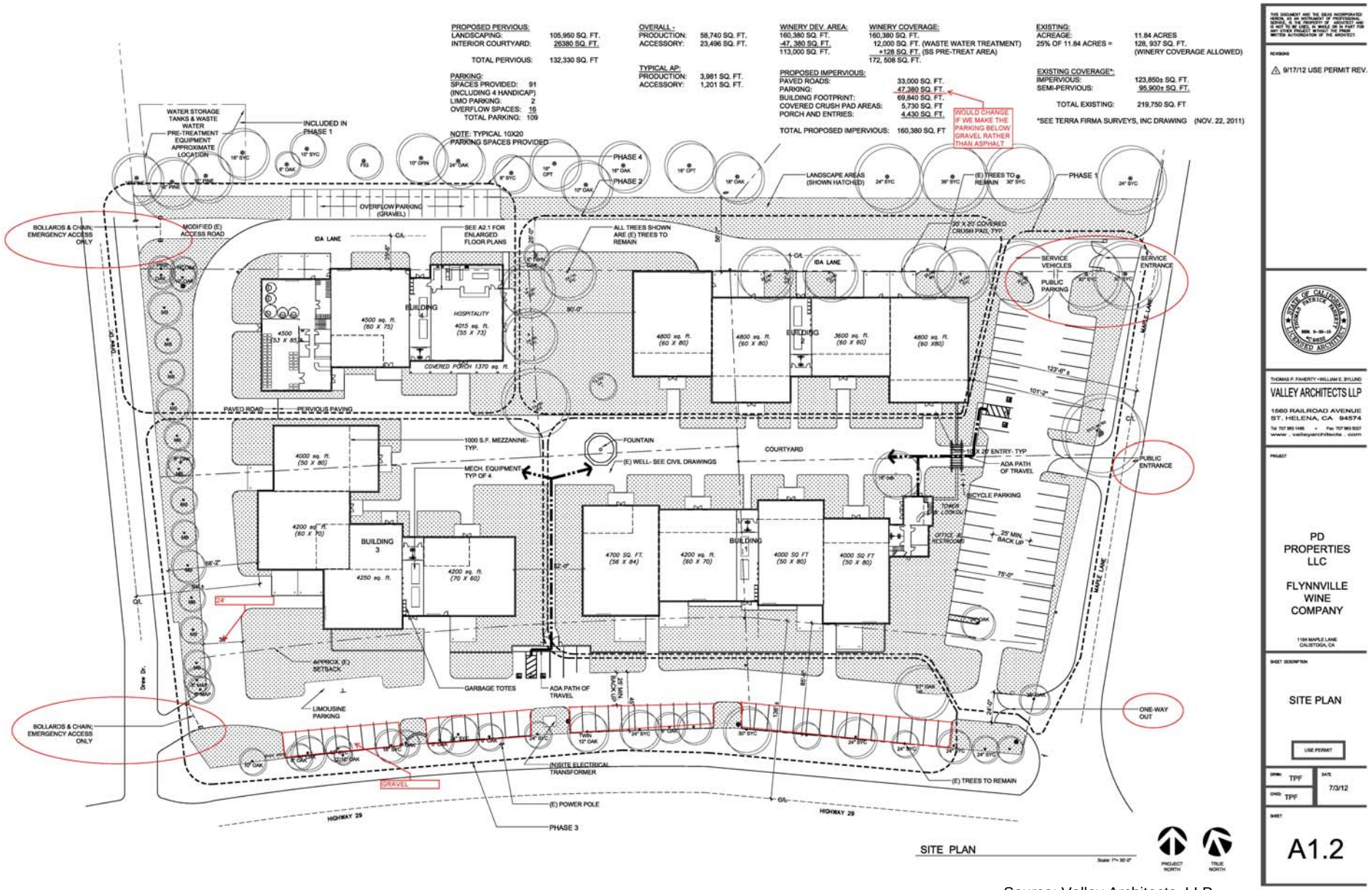
Although no daily traffic volumes are available for Maple Lane, a conservative measure to estimate daily traffic assumes peak hour residential/agricultural traffic volumes make up 25% of the daily traffic.[xii] Using this 25% conversion factor, Maple Lane carries approximately 84 daily vehicles (ADT). The proposed project would add 418 daily trips to Maple Lane bringing the overall total (weekend worst case) to 502 ADT. Based on ADT LOS criteria for a two-lane collector street (purely local), ADT volumes would have to reach 550 daily vehicles before roadway LOS would be operating at LOS C. Therefore, overall daily roadway operation on Maple Lane would be in the LOS A-B range with proposed project traffic.

Vehicle Access/Circulation

Vehicle access to the proposed project's driveways would be provided directly by Maple Lane with limited and/or emergency vehicle access from Drew Drive (see Figure 7--Project Site Plan). As described previously, Maple Lane extends east from SR-29 for approximately 450 feet through Ida Lane and continues north another 650 feet (and beyond) providing access to single-family residences and vineyard areas. Along the 450-foot project frontage, Maple Lane's roadway width would be improved to 24 feet and this width would be adequate for two-way vehicle travel. Three project driveways would be located off of Maple Lane that would allow for vehicle and truck access to/from the site. The first driveway would be located approximately 60 feet east of State Route 29 and would be limited to outbound access only onto Maple Lane. This limited access driveway would allow both outbound vehicle and truck access from the project site onto Maple Lane. In addition, potential vehicle queuing on Maple Lane (from motorists turning inbound from SR-29 and turning into the site) would be prevented (given the relatively short storage length of 60 feet to this project driveway). The mid-block driveway would be located approximately 300 feet east of SR-29 and would serve the public parking lot. A full-access driveway, this driveway would be primarily limited to visitor access. The last project driveway off Maple Lane would be located at Ida Lane and would provide full-access for both vehicles and trucks. The driveway would allow access to the parking lot that parallels Maple Lane as well as the service entrance drive aisle (Ida Lane) that extends along the rear portion of the project site.

Two project driveways would be located off of Drew Drive; 60 feet east of SR-29 and approximately 400-450 east of SR-29. Both driveways would be limited to emergency access only and would be controlled by bollards/chains to prevent vehicle ingress/egress.

Vehicle circulation through the site would be provided by an internal 24-25 foot drive aisle that would circulate around the entire site. Starting at the Ida Lane driveway/service entrance at Maple Lane, the internal drive aisle would extend north along the rear (north side) of the project site towards Drew Drive. Though open to vehicular travel, this rear drive aisle segment would mainly serve service trucks accessing



Source: Valley Architects, LLP

Project Site Plan

North

omni-means

figure 7

the crush pads or hospitality area buildings. Just prior to Drew Drive, the internal drive aisle would extend west toward SR-29 paralleling Drew Drive to the north. Prior to SR-29, the internal drive would extend south through a main parking area towards Maple Lane. Vehicle parking in this area would mainly front along the western border of the site with SR-29 with ADA parking adjacent to winery buildings. Finally, the internal drive would then extend east back to Ida Lane through the main visitor parking area. Parking spaces would be located along the project site's south frontage with Maple Lane and also along the north side of the aisle fronting winery courtyard/buildings.

It is noted that project driveway ingress/egress from Maple Lane would be restricted into the site. Discussions with the project architect indicate that these driveway entrances will be gated.[xiii] When visitors arrive for a tasting or event, they will be "buzzed in" through the gates into the main parking areas. This measure would serve to reduce casual project traffic to/from SR-29 from accessing the site and also maintain daily visitor traffic that would be allowed under the County's permit process.

Truck access to the water treatment pond would be gained via Maple Lane in the eastern portion of the site (north of Ida Lane). Trucks would access a one-lane 10-12 foot roadway from Maple Lane to the water treatment pond. Trucks would then circulate around the pond and exit out the same route.

Napa Countywide Bicycle Plan (2012)

Based on the most recent Napa Countywide Bicycle Plan, SR-29 has been designated (proposed) as a primary Class II bicycle route.[xiv] Class II bicycle routes (lanes) provide a striped and signed lane established for one-way travel on a street or highway. Minimum Class II bike lanes range between 4-5 feet in width and are identified by a six inch white stripe, signing, and pavement legends. Currently, no Class II bike lanes exist on SR-29 along the proposed project frontage or along SR-29 north and south of the site. The plan proposes to add Class II bike lanes to the highway. However, the Plan also states "All proposed routes shown on the map are for study purposes only. Designation of a route as "proposed" does not imply any actual plans or project will be considered along the route." SR-29 has very wide shoulders (10-12 feet) in the Drew Drive and Maple Lane vicinity. The proposed project would not encroach on these existing SR-29 shoulders. Therefore, ample ROW would be available on SR-29 should the County and/or Caltrans determine Class II bike lanes are appropriate for this highway segment.

6. CUMULATIVE CONDITIONS

Cumulative Year 2030 Projections

Cumulative (Year 2030) volume projections on SRS-29 were derived from the traffic volume forecasts in the Napa County General Plan Update EIR.[xv] The increase in volume-to-capacity (v/c) ratio from Year 2003 to Year 2030 on SR-29 was applied to the provided Year 2003 peak hour two-way volume (1,344 trips) on the nearest data point to Maple Lane, yielding a volume of 2,896 weekday PM peak hour trips on SR-29 in the Year 2030.

The cumulative volume represents an almost (three-fold) increase compared to the existing (Year 2012) peak hour volume of 1,010 trips. With the forecasted volumes, the existing daily volume on SR-29 would increase from 12,600 daily trips to 27,150 daily trips. By comparison, the existing peak hour volume of 1,010 two-way peak hour trips (Year 2012) is 334 trips less than the 1,344 trips (Year 2003) identified in the EIR. Also, a review of annual daily traffic volumes on SR-29 near Maple Lane indicate that volumes have declined every year since 2007 and are at their lowest point in 2012. Therefore, it is unlikely volumes will increase to the projected levels (at least within the forecast timeframe).

The County has identified measures in the General Plan to both improve the street network and reduce vehicle trips through public transit and Transportation Demand Management (TDM) strategies. With the adopted development and street improvements under the General Plan Update Circulation Element ("Alternative B"), SR-29 has projected operating conditions of LOS 'F'. Within the General Plan Update, the Solano/Napa County travel demand model was adjusted to reflect implementation of TDM policies. Even with these policies in place all three scenarios (including the minimum alternative of 3% reduction in local trips only), SR-29 is projected LOS 'F' operating conditions in the project study area.

In order to identify cumulative weekend conditions, the General Plan Update provides a ratio of weekday to weekend peak hour volumes. The nearest data point to Maple Lane had an average ratio of 1, indicating similar volumes during both peak hours. The traffic volumes counted for this study found slightly lower weekend volumes (approximately 93% of weekday volumes). Therefore the weekend conditions would be expected to be the same or better than the weekday peak hour.

Cumulative year 2030 (no project) daily, weekday PM peak hour, and weekend mid-day peak hour volumes have been shown in Figure 8.

Cumulative Year 2030 (No Project) Operating Conditions

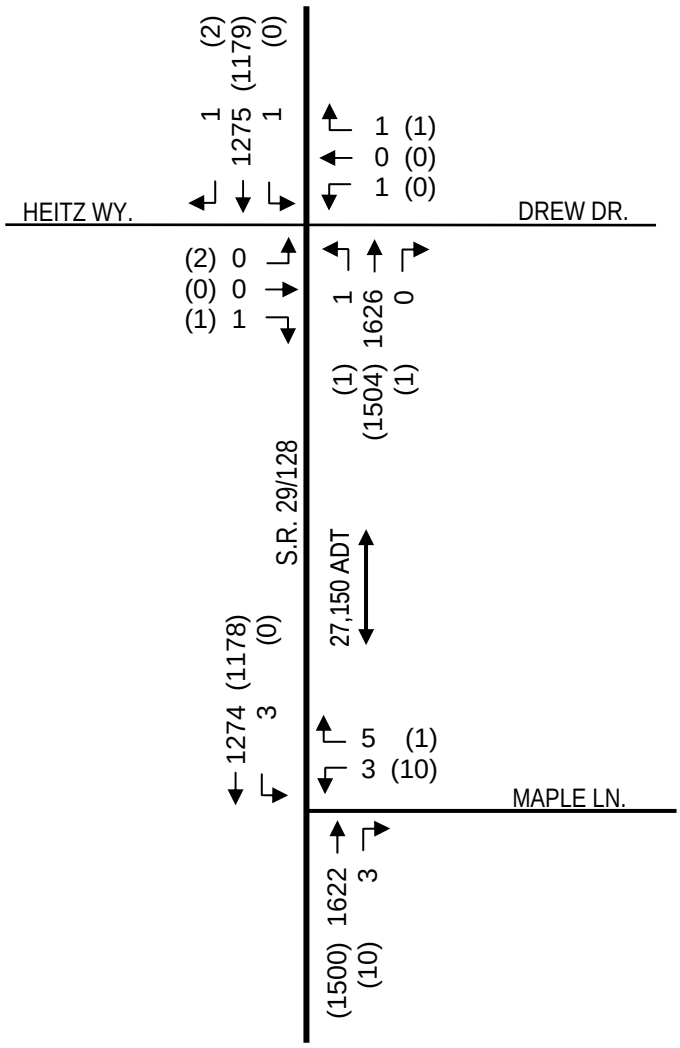
Cumulative year 2030 (no project) intersection operating conditions at the Drew Drive-Heitz Way/SR-29 and Maple Lane/SR-29 intersections have been shown in Table 5. Under cumulative year 2030 (no project) conditions, the Drew Drive-Heitz Way/SR-29 would be operating at LOS F (>50.0 seconds of delay for minor street approaches) during the weekday and weekend peak hours based on the existing property use. The Maple Lane/SR-29 intersection would be operating at LOS E during both the weekday PM peak hour and weekend mid-day peak hour with 45.5 and 43.8 seconds of delay respectively. Significant impacts to cumulative year 2030 (no project) intersection operation are directly related to substantial increases in peak hour through-traffic on SR-29 (as discussed above).

Cumulative year 2030 (no project) conditions were evaluated for peak hour signal warrants based on CAMUTCD criteria. Neither the Drew Drive-Heitz Way/SR-29 nor the Maple Lane/SR-29 intersection would qualify for signalization under future traffic conditions.

TABLE 5
CUMULATIVE YEAR 2030 (NO PROJECT) AND CONDITIONS:
INTERSECTION LEVELS-OF-SERVICE
WEEKDAY PM PEAK AND WEEKEND MID-DAY PEAK HOUR

			Wkdy. PM LOS/Delay		Wknd. Mid-Day LOS/Delay	
#	Intersection	Control Type	Cumulative (No Project)	Cumulative + Project	Cumulative (No Project)	Cumulative + Project
1	Drew Drive-Heitz Way/State Route 29	Stop	F >50.0	F >50.0	F >50.0	F >50.0
2	Maple Lane/State Route 29	Stop	E 45.5	F >50.0	E 43.8	F >50.0

Based on Highway Capacity Manual (HCM) 2000, Operations methodology for stop-sign controlled (unsignalized) intersections using Synchro-Simtraffic software. Intersection calculation yields an LOS and vehicle delay in seconds. Stated LOS refers to the minor street (stop-sign) controlled movement.



Cumulative Year 2030 Without Project
Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 8

Cumulative Plus Project Operating Conditions

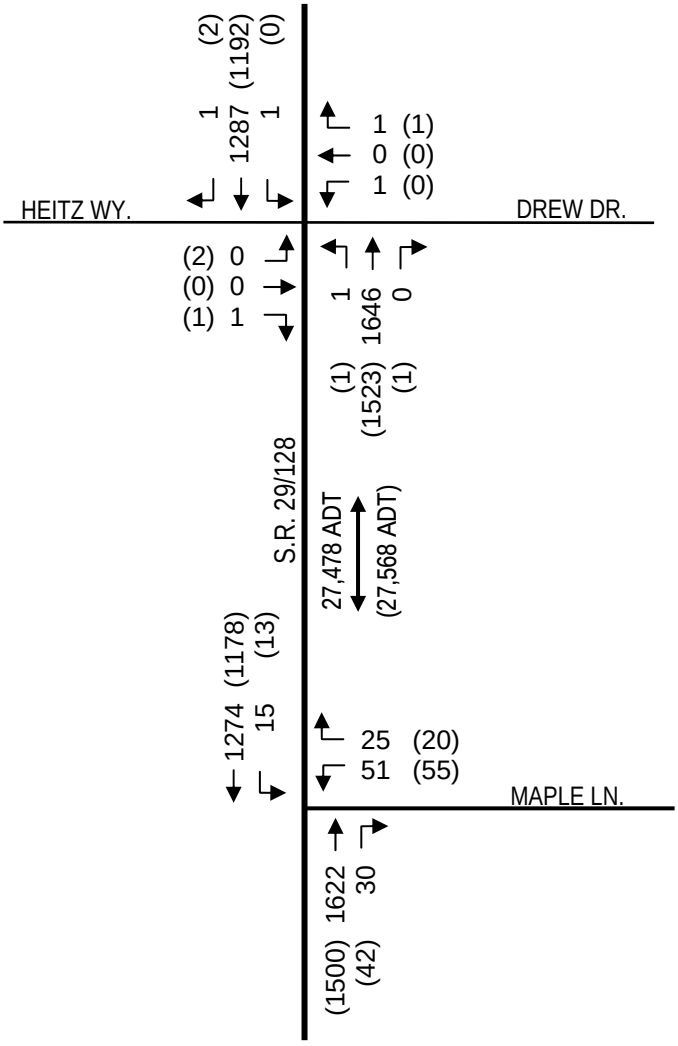
Proposed project trips were added to the cumulative year 2030 (no project) volumes and have been shown in Figure 9. As shown in Table 5, the Drew Drive-Heitz Way/SR-29 would continue to operate at LOS F (>50.0 seconds of delay for minor street approaches) during the weekday and weekend peak hours. The Maple Lane/SR-29 intersection would change from LOS E to LOS F during both the weekday PM peak hour and weekend mid-day peak hour.

Cumulative year 2030 plus project conditions were evaluated for peak hour signal warrants based on CAMUTCD criteria. The Maple Lane/SR-29 intersections would just exceed the minimum volumes (Peak Hour Warrant #3—Rural Areas) for installation of a signal. However, the CAMUTCD manual states that "*The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal, since the installation of traffic signals may increase certain types of collisions. Delay, congestion, approach conditions, driver confusion, future land use or other evidence of the need for right of way assignment beyond that which could be provided by stop signs must be demonstrated*." The manual recommends engineering judgment should ultimately be used when deciding the appropriateness of signal controls. The fact that an existing left-turn lane exists on SR-29 at Maple Lane (southbound) and minor street volumes would only be reached during peak weekday and weekend hours would indicate additional signal analyses would be necessary. In addition, this segment of SR-29 has a recorded critical speed of 60.7 mph and a signal could cause undo delays to through-traffic in this highway segment. The Heitz Way-Drew Drive/SR-29 intersection volumes would remain below the threshold for signalization (warrant graphs are provided in the Appendix).

As documented, historical volumes on SR-29 over the previous five years indicate a lower growth rate than the forecasted volumes. However, in keeping with the policies of the General Plan to proactively address potential traffic volumes under cumulative conditions, the County has adopted a policy to help reduce vehicle trips and emissions: "The project should support programs to reduce single occupant vehicle use and encourage alternative travel modes." In keeping with the policy, the project would provide bicycle racks and an electric vehicle charging station.

In addition, the County has identified other mitigation policies, including development of a traffic impact fee to be developed in cooperation with the NCTPA (Mitigation Measure 4.4.1C). This would require new projects to pay their "fair share" of countywide traffic improvements they contribute the need for. The concept is under development but presumably the fee would be applied on a "per trip" basis if/when implemented. It is assumed that Napa County would require proposed project mitigation and/or traffic impact fees commensurate with project impacts.

If volumes reach forecast levels, all driveways and side street approaches along SR-29 would be affected. Left turn lane warrants would be met for all side roads/driveways with volumes exceeding 20 daily trips. Most minor street stop-sign controlled intersections at SR-29 would be operating at LOS F for the minor street movement during the weekday PM and weekend mid-day peak hours. Though not a part of the General Plan's listed road improvements, consideration could be given to applying TIF funds toward construction of a continuous two-way left turn lane on SR-29, if volumes reach warranted levels. The project's 328-418 new daily trips would represent 1.2-1.5% of the forecast cumulative ADT volumes on SR-29.



Cumulative Year 2030 Plus Project
Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 9

7. SUMMARY AND CONCLUSIONS

Daily and Peak Hour Operations/Near-Term

The proposed Flynnville Winery project would generate 328-418 new daily trips during the weekday and weekend periods (respectively). The project traffic would represent an increase of approximately 2.6-3.3 over the existing SR-29 volume of 12,600 annual average daily trips. With the project site located on a relatively free-flowing segment of SR-29, traffic flows would continue to operate at LOS B conditions under existing plus project conditions.

The Drew Drive-Heitz Way/SR-29 and Maple Lane/SR-29 intersections operate at LOS C and LOS B under existing conditions for the minor street stop-sign controlled movements. The intersections would continue to operate at satisfactory levels-of-service under existing plus project conditions. The Drew Drive-Heitz Way/SR-29 intersection would continue to operate at LOS C for the stop-sign approaches. The Maple Lane/SR-29 intersection would change from LOS B to LOS C during both the weekday PM peak and weekend mid-day peak hour periods. Unsignalized LOS would be within the County's significance thresholds (LOS D or better).

With near-term (approved) development traffic volumes, the near- term and near-term plus project conditions would continue to operate acceptably. Near-term daily volumes on SR-29 are expected to be approximately 12,826 ADT without the project and 13,154 with the project trips, representative of LOS B conditions.

The study intersections would continue to operate at satisfactory levels-of-service under near-term plus project conditions. The Drew Drive-Heitz Way/SR-29 intersection would operate at LOS C for the stop-sign approaches. The Maple Lane/SR-29 intersection would change from LOS B to LOS C during both the weekday PM peak and weekend mid-day peak hour periods. Again, LOS would be within the County's significance thresholds (LOS D or better).

Operational vehicle queuing analyses conducted for the Maple Lane/SR-29 intersection indicate that there is ample storage capacity for vehicle turning movements with project traffic. This would include the inbound (eastbound) left-turn lane from SR-29 and outbound (southbound) shared left/right turn movement from Maple Lane.

Warrant and Vehicle Sight Distance/Near-Term

Based on CAMUTCD peak hour signal warrant criteria (Warrant #3), the Drew Drive-Heitz Way/SR-29 would not qualify for signalization under existing plus project or near-term plus project conditions. However, the Maple Lane/SR-29 intersections would just meet the minimum volume thresholds for signalization. Given that projected LOS at this intersection would be acceptable under both existing and near-term (with project) conditions, a signal would not be recommended at this time.

The Maple Lane/SR-29 intersection was evaluated for right-turn lane warrant from SR-29 onto Maple Lane. Based on traffic volume guidelines for the design of right-turn lanes, the intersection would qualify for a right-turn taper with a combined through/right-turn approach volume of 553 vehicles with 42 right-turn movements. **Therefore, it is recommended that a westbound right-turn taper be installed from SR-29 onto Maple Lane to ensure acceptable traffic flows with project traffic**.

Both Drew Drive and Maple Drive are located on a slightly curved section of SR-29. Field observations indicate the sight distances from the roadways are approximately 1000-2000 feet to the west and 800-1,100

feet to the east, which would exceed the minimum Caltrans standards. (The project's civil engineer should confirm the adequacy of sight distances along SR-29.)

Vehicle Circulation/Access

The proposed project's primary access would be to/from the Maple Lane/SR-29 intersection. The Drew Drive-Heitz Way/SR-29 intersection would have limited access (emergency vehicles only). No visitor or staff vehicles would be allowed to use Drew Drive in order to calm traffic on the unimproved roadway and focus project trips to the Maple Lane access driveways. **To this end, it is recommended that a sign be placed at Drew Drive for SR-29 traffic indicating "No Winery Access---Visitors Please Use Maple Lane."**

Project traffic would access the winery using the second or third project driveway off of Maple Lane. The first project driveway off Maple Lane (nearest SR-29) would be for outbound vehicle/truck access only to prevent any potential vehicle queuing issues on Maple Lane from inbound visitors. Visitor traffic would access parking fields along the east and south sides of the project site. With respect to truck access, trucks would travel inbound from Maple Lane to the third project driveway (Ida Lane) and proceed west along the rear of the project site. They would then circulate counter-clockwise around the winery and exit out the first driveway locate north of SR-29. (The project's civil engineer should confirm adequate turning paths.) In keeping with the policies of the General Plan Update to promote alternative modes of transportation, the project would provide bicycle racks and an electric vehicle charging station.

Cumulative Year 2030 Conditions

Travel model forecasts from the Napa County General Plan Update were used to calculate cumulative volumes. Study locations would operate at unacceptable levels with the Drew Drive-Heitz Way/SR-29 operating at LOS F and the Maple Lane/SR-29 intersection operating at LOS E under cumulative year 2030 (no project) conditions. With proposed project traffic, both intersections would be operating at LOS F during both the weekday and weekend peak hours. Additional road improvement measures and vehicle trip reduction strategies may further improve the cumulative intersection operating conditions but likely not to acceptable levels.

The CAMUTCD peak hour signal warrant criteria indicate that the Maple Lane/SR-29 intersection would just qualify for signalization with cumulative year 2030 plus project volumes (the Drew Drive-Heitz Way/SR-29 would not meet peak hour signal warrant). However, with cumulative year 2030 peak hour volumes on SR-29, it is likely that all unsignalized minor street/driveways would be operating at unacceptable LOS E-F conditions (see below). The manual recommends engineering judgment should ultimately be used when deciding the appropriateness of signal controls. With an existing left-turn lane on SR-29 at Maple Lane (southbound) and minimum minor street volumes for a signal only reached during peak weekday and weekend hours, additional signal analyses would be necessary. In addition, this segment of SR-29 has a recorded critical speed of 60.7 mph and a signal could cause undo delays to through-traffic in this highway segment.

As previously noted, the forecast cumulative year 2030 volume increases on SR-29 are quite large. In addition to minor street/driveways likely operating at LOS E-F, overall cumulative volumes on SR-29 would likely warrant left turn lanes at all side streets and driveways exceeding twenty daily trips. A traffic impact fee may be adopted by the County to fund the General Plan improvements or other projects, such as a continuous two-way left turn lane on SR-29. The project's contribution to cumulative ADT volumes at Maple Lane/SR-29 would equate to $1/10^{th}$ of 1% of the projected volumes. If a TIF program were enacted, the proposed project could contribute a "fair share" towards such future circulation improvements. The

project's 328-418 new daily trips would represent 1.2-1.5% of the forecast cumulative ADT volumes on SR-29.

---

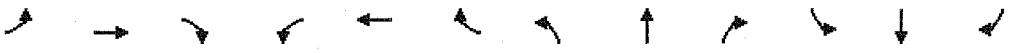
[i] *Ms. Linda St. Claire, Project Planner, Planning, Building, and Environmental Services, Correspondence to PD Properties LLC (Flynnville Winery Company), Use Permit (#P12-00223), July 30, 2012.*
[ii] *Caltrans, 2011 Volumes on the California State Highway System, (on-line data base).*
[iii] *Omni-Means Engineers & Planners, traffic counts, speed surveys, and field measurements on April 20, 2012 (4-6 PM) & April 21, 2012 (1-3 PM).*
[iv] *Caltrans, California Manual on Uniform Traffic Control Devices, 2012 Edition.*
[v] *Mr. Troy Bard, Supervising Mechanic, PG&E, Napa Corporation Yard, Personal communication on October 25, 2012.*
[vi] *County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.*
[vii] *Production, employee, and visitor data provided by Mr. Tim Carl (project applicant) and Ms. Donna Oldford (Plans4Wine), project representative, August 27, 2012.*
[viii] *County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012.*
[ix] *Transportation Research Board, National Cooperative Highway Research Program Report 279, "Intersection Channelization Design Guide", November, 1985.*
[x] *Omni-Means Engineers & Planners, ibid.*
[xi] *Caltrans, Highway Design Manual – Sixth Edition, July 1, 2010.*
[xii] *County of Napa, Conservation, Development, and Planning Department, "Use Permit Application Package," Napa County Winery Traffic Generation Characteristics, 2012*
[xiii] *Mr. Tom Faherty, AIA, Architect/Partner, Valley Architects LLP, Personal communication on Flynnville Winery site circulation and driveway access, November 6th, 2012.*
[xiv] *County of Napa, Napa Countywide Bicycle Plan (2012), Planning Area—North Valley, May 2012.*
[xv] *Dowling Associates, Inc., The Napa County General Plan Update EIR (Technical Memorandum for Traffic and Circulation Supporting the Findings and Recommendations), Napa County, February 9, 2007.*

APPENDIX

- Level of Service Definitions
- Level of Service Calculations
- Vehicle Queuing Sheet
- Turn Lane Warrant Graphs
- Vehicle Speed Survey
- Existing Counts
- Signal Warrant Sheets

Level of Service	Type of Flow	Delay	Maneuverability	Control Delay (seconds/vehicle)		
				Signalized	Unsignalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10.0 secs. ≤ 0.60 v/c	≤ 10.0	≤ 10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10 and ≤ 20.0 secs. 0.61 – 0.70 v/c	>10 and ≤ 15.0	>10 and ≤ 15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20 and ≤ 35.0 secs. 0.71 – 0.80 v/c	>15 and ≤ 25.0	>15 and ≤ 25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles of stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35 and ≤ 55.0 secs. 0.81 – 0.90 v/c	>25 and ≤ 35.0	>25 and ≤ 35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55 and ≤ 80.0 secs. 0.91 – 1.00 v/c	>35 and ≤ 50.0	>35 and ≤ 50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	> 80.0 secs. > 1.00 v/c	> 50.0	> 50.0

References: 1. Highway Capacity Manual, Fourth Edition, Transportation Research Board, 2000, Contra Costa Transportation Authority (CCTA), Technical Procedures Update, Final, July 9, 2006.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	481	1	1	606	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	523	1	1	659	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	659			524			1188	1186	523	1188	1187	659
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	659			524			1188	1186	523	1188	1187	659
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	929			1043			164	188	554	165	188	464

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	525	660	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	929	1043	554	243
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	11.5	20.0
Lane LOS	A	A	B	C
Approach Delay (s)	0.0	0.0	11.5	20.0
Approach LOS			B	C

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	42.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	480	602	3	3	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	522	654	3	3	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	658				1184	656
vC1, stage 1 conf vol					656	
vC2, stage 2 conf vol					528	
vCu, unblocked vol	658				1184	656
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	930				346	465

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	3	522	658	9
Volume Left	3	0	0	3
Volume Right	0	0	3	5
cSH	930	1700	1700	412
Volume to Capacity	0.00	0.31	0.39	0.02
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	8.9	0.0	0.0	13.9
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	13.9
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	488	2	1	510	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	530	2	1	554	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	555			533			1090	1089	532	1090	1090	555
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	555			533			1090	1089	532	1090	1090	555
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1015			1035			192	215	548	192	215	531

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	533	557	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	1015	1035	245	531
Volume to Capacity	0.00	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	19.9	11.8
Lane LOS		A	C	B
Approach Delay (s)	0.0	0.0	19.9	11.8
Approach LOS			C	B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	489	511	10	10	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	532	555	11	11	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	566				1092	561
vC1, stage 1 conf vol					561	
vC2, stage 2 conf vol					532	
vCu, unblocked vol	566				1092	561
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1006				373	527

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	0	532	566	12
Volume Left	0	0	0	11
Volume Right	0	0	11	1
cSH	1700	1700	1700	383
Volume to Capacity	0.00	0.31	0.33	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	14.7
Lane LOS				B
Approach Delay (s)	0.0		0.0	14.7
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	503	1	1	626	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	547	1	1	680	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	680			548			1233	1232	547	1233	1233	680
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680			548			1233	1232	547	1233	1233	680
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	912			1022			153	177	537	153	177	451

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	549	682	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	912	1022	537	229
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	11.7	20.9
Lane LOS	A	A	B	C
Approach Delay (s)	0.0	0.0	11.7	20.9
Approach LOS			B	C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	502	622	3	3	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	546	676	3	3	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	679				1230	678
vC1, stage 1 conf vol					678	
vC2, stage 2 conf vol					552	
vCu, unblocked vol	679				1230	678
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	99
cM capacity (veh/h)	913				334	452

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	3	546	679	9
Volume Left	3	0	0	3
Volume Right	0	0	3	5
cSH	913	1700	1700	399
Volume to Capacity	0.00	0.32	0.40	0.02
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	9.0	0.0	0.0	14.2
Lane LOS	A			B
Approach Delay (s)	0.1		0.0	14.2
Approach LOS				B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	504	2	1	525	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	548	2	1	571	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	572			550			1123	1123	549	1123	1123	571
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	572			550			1123	1123	549	1123	1123	571
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	1001			1020			182	205	536	182	205	520

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	550	573	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	1001	1020	234	520
Volume to Capacity	0.00	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	20.6	11.9
Lane LOS		A	C	B
Approach Delay (s)	0.0	0.0	20.6	11.9
Approach LOS			C	B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	505	526	10	10	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	549	572	11	11	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	583				1126	577
vC1, stage 1 conf vol					577	
vC2, stage 2 conf vol					549	
vCu, unblocked vol	583				1126	577
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	992				363	516

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	0	549	583	12
Volume Left	0	0	0	11
Volume Right	0	0	11	1
cSH	1700	1700	1700	374
Volume to Capacity	0.00	0.32	0.34	0.03
Queue Length 95th (ft)	0	0	0	2
Control Delay (s)	0.0	0.0	0.0	15.0
Lane LOS				B
Approach Delay (s)	0.0		0.0	15.0
Approach LOS				B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	38.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	493	1	1	626	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	536	1	1	680	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	680			537			1222	1221	536	1222	1222	680
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	680			537			1222	1221	536	1222	1222	680
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	912			1031			156	179	544	156	179	451

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	538	682	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	912	1031	544	231
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	11.6	20.7
Lane LOS	A	A	B	C
Approach Delay (s)	0.0	0.0	11.6	20.7
Approach LOS			B	C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	15	480	602	30	51	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	522	654	33	55	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	687				1225	671
vC1, stage 1 conf vol					671	
vC2, stage 2 conf vol					554	
vCu, unblocked vol	687				1225	671
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				83	94
cM capacity (veh/h)	907				332	457

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	16	522	687	83
Volume Left	16	0	0	55
Volume Right	0	0	33	27
cSH	907	1700	1700	365
Volume to Capacity	0.02	0.31	0.40	0.23
Queue Length 95th (ft)	1	0	0	21
Control Delay (s)	9.0	0.0	0.0	17.7
Lane LOS	A			C
Approach Delay (s)	0.3		0.0	17.7
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	501	2	1	529	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	545	2	1	575	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	576			547			1124	1124	546	1124	1124	576
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	576			547			1124	1124	546	1124	1124	576
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	997			1023			182	205	538	182	205	517

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	547	577	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	997	1023	233	517
Volume to Capacity	0.00	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	20.6	12.0
Lane LOS		A	C	B
Approach Delay (s)	0.0	0.0	20.6	12.0
Approach LOS			C	B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	13	489	511	32	55	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	532	555	35	60	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	590				1133	573
vC1, stage 1 conf vol					573	
vC2, stage 2 conf vol					560	
vCu, unblocked vol	590				1133	573
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	96
cM capacity (veh/h)	985				358	519

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	14	532	590	82
Volume Left	14	0	0	60
Volume Right	0	0	35	22
cSH	985	1700	1700	391
Volume to Capacity	0.01	0.31	0.35	0.21
Queue Length 95th (ft)	1	0	0	19
Control Delay (s)	8.7	0.0	0.0	16.6
Lane LOS	A			C
Approach Delay (s)	0.2		0.0	16.6
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	515	1	1	646	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	560	1	1	702	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	702			561			1268	1267	560	1268	1267	702
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	702			561			1268	1267	560	1268	1267	702
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	100	99	100	100
cM capacity (veh/h)	895			1010			145	168	528	145	168	438

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	562	703	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	895	1010	528	218
Volume to Capacity	0.00	0.00	0.00	0.01
Queue Length 95th (ft)	0	0	0	1
Control Delay (s)	0.0	0.0	11.8	21.7
Lane LOS	A	A	B	C
Approach Delay (s)	0.0	0.0	11.8	21.7
Approach LOS			B	C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	15	502	622	30	51	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	546	676	33	55	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	709				1271	692
vC1, stage 1 conf vol					692	
vC2, stage 2 conf vol					578	
vCu, unblocked vol	709				1271	692
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				83	94
cM capacity (veh/h)	890				321	444

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	16	546	709	83
Volume Left	16	0	0	55
Volume Right	0	0	33	27
cSH	890	1700	1700	353
Volume to Capacity	0.02	0.32	0.42	0.23
Queue Length 95th (ft)	1	0	0	22
Control Delay (s)	9.1	0.0	0.0	18.3
Lane LOS	A			C
Approach Delay (s)	0.3		0.0	18.3
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	517	2	1	544	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	562	2	1	591	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	592			564			1158	1158	563	1158	1158	592
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	592			564			1158	1158	563	1158	1158	592
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			99	100	100	100	100	100
cM capacity (veh/h)	983			1007			172	196	526	173	196	506

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	564	593	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	983	1007	222	506
Volume to Capacity	0.00	0.00	0.01	0.00
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	21.4	12.1
Lane LOS		A	C	B
Approach Delay (s)	0.0	0.0	21.4	12.1
Approach LOS			C	B

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	39.5%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	13	505	526	42	55	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	549	572	46	60	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	617				1172	595
vC1, stage 1 conf vol					595	
vC2, stage 2 conf vol					577	
vCu, unblocked vol	617				1172	595
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				83	96
cM capacity (veh/h)	963				348	504

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	14	549	617	82
Volume Left	14	0	0	60
Volume Right	0	0	46	22
cSH	963	1700	1700	379
Volume to Capacity	0.01	0.32	0.36	0.22
Queue Length 95th (ft)	1	0	0	20
Control Delay (s)	8.8	0.0	0.0	17.1
Lane LOS	A			C
Approach Delay (s)	0.2		0.0	17.1
Approach LOS				C

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	1275	1	1	1626	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1386	1	1	1767	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1767			1387			3159	3158	1386	3159	3159	1767
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1767			1387			3159	3158	1386	3159	3159	1767
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	83	100	99
cM capacity (veh/h)	352			494			6	11	175	6	11	104

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1388	1768	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	352	494	175	12
Volume to Capacity	0.00	0.00	0.01	0.18
Queue Length 95th (ft)	0	0	0	12
Control Delay (s)	0.3	0.0	25.7	364.4
Lane LOS	A	A	D	F
Approach Delay (s)	0.3	0.0	25.7	364.4
Approach LOS			D	F

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	96.4%	ICU Level of Service	F	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	3	1274	1622	3	3	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	1385	1763	3	3	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1766				3156	1765
vC1, stage 1 conf vol					1765	
vC2, stage 2 conf vol					1391	
vCu, unblocked vol	1766				3156	1765
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	95
cM capacity (veh/h)	353				88	104

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	3	1385	1766	9
Volume Left	3	0	0	3
Volume Right	0	0	3	5
cSH	353	1700	1700	97
Volume to Capacity	0.01	0.81	1.04	0.09
Queue Length 95th (ft)	1	0	0	7
Control Delay (s)	15.3	0.0	0.0	45.5
Lane LOS	C			E
Approach Delay (s)	0.0		0.0	45.5
Approach LOS				E

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1179	2	1	1504	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1282	2	1	1635	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1636			1284			2921	2921	1283	2921	2921	1635
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1636			1284			2921	2921	1283	2921	2921	1635
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			77	100	99	100	100	99
cM capacity (veh/h)	396			540			9	15	202	10	15	125

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1284	1637	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	396	540	14	125
Volume to Capacity	0.00	0.00	0.23	0.01
Queue Length 95th (ft)	0	0	16	1
Control Delay (s)	0.0	0.6	329.9	34.2
Lane LOS		A	F	D
Approach Delay (s)	0.0	0.6	329.9	34.2
Approach LOS			F	D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	0	1178	1500	10	10	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1280	1630	11	11	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1641				2916	1636
vC1, stage 1 conf vol					1636	
vC2, stage 2 conf vol					1280	
vCu, unblocked vol	1641				2916	1636
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				89	99
cM capacity (veh/h)	394				103	124

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	0	1280	1641	12
Volume Left	0	0	0	11
Volume Right	0	0	11	1
cSH	1700	1700	1700	105
Volume to Capacity	0.00	0.75	0.97	0.11
Queue Length 95th (ft)	0	0	0	9
Control Delay (s)	0.0	0.0	0.0	43.8
Lane LOS				E
Approach Delay (s)	0.0		0.0	43.8
Approach LOS				E

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	89.6%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	1287	1	1	1646	0	0	0	1	1	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	1399	1	1	1789	0	0	0	1	1	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1789			1400			3194	3193	1399	3194	3193	1789
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1789			1400			3194	3193	1399	3194	3193	1789
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	99	82	100	99
cM capacity (veh/h)	346			488			6	10	172	6	10	101

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1401	1790	1	2
Volume Left	1	1	0	1
Volume Right	1	0	1	1
cSH	346	488	172	11
Volume to Capacity	0.00	0.00	0.01	0.19
Queue Length 95th (ft)	0	0	0	12
Control Delay (s)	0.3	0.0	26.1	389.2
Lane LOS	A	A	D	F
Approach Delay (s)	0.3	0.0	26.1	389.2
Approach LOS			D	F

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	97.4%	ICU Level of Service	F	
Analysis Period (min)	15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	15	1274	1622	30	51	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	1385	1763	33	55	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1796				3197	1779
vC1, stage 1 conf vol					1779	
vC2, stage 2 conf vol					1417	
vCu, unblocked vol	1796				3197	1779
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				34	73
cM capacity (veh/h)	344				84	102

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	16	1385	1796	83
Volume Left	16	0	0	55
Volume Right	0	0	33	27
cSH	344	1700	1700	90
Volume to Capacity	0.05	0.81	1.06	0.92
Queue Length 95th (ft)	4	0	0	129
Control Delay (s)	16.0	0.0	0.0	158.1
Lane LOS	C			F
Approach Delay (s)	0.2		0.0	158.1
Approach LOS				F

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1192	2	1	1523	1	2	0	1	0	0	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1296	2	1	1655	1	2	0	1	0	0	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1657			1298			2956	2955	1297	2956	2956	1656
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1657			1298			2956	2955	1297	2956	2956	1656
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			76	100	99	100	100	99
cM capacity (veh/h)	389			534			9	15	198	9	14	121

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1298	1658	3	1
Volume Left	0	1	2	0
Volume Right	2	1	1	1
cSH	389	534	13	121
Volume to Capacity	0.00	0.00	0.25	0.01
Queue Length 95th (ft)	0	0	16	1
Control Delay (s)	0.0	0.9	353.4	35.0
Lane LOS		A	F	E
Approach Delay (s)	0.0	0.9	353.4	35.0
Approach LOS			F	E

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	13	1178	1500	42	55	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	1280	1630	46	60	22
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1676				2962	1653
vC1, stage 1 conf vol					1653	
vC2, stage 2 conf vol					1309	
vCu, unblocked vol	1676				2962	1653
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				39	82
cM capacity (veh/h)	382				99	121

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	14	1280	1676	82
Volume Left	14	0	0	60
Volume Right	0	0	46	22
cSH	382	1700	1700	104
Volume to Capacity	0.04	0.75	0.99	0.79
Queue Length 95th (ft)	3	0	0	108
Control Delay (s)	14.8	0.0	0.0	112.3
Lane LOS	B			F
Approach Delay (s)	0.2		0.0	112.3
Approach LOS				F

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

Intersection: 1: SR-29 & Drew Ln.

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LR	LR
Maximum Queue (ft)	18	18	24	31
Average Queue (ft)	1	1	1	2
95th Queue (ft)	10	10	8	14
Link Distance (ft)	1355	616	1227	1902
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: SR-29 & Maple Ln.

Movement	EB	SB
Directions Served	L	LR
Maximum Queue (ft)	32	83
Average Queue (ft)	8	39
95th Queue (ft)	29	69
Link Distance (ft)	616	1861
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

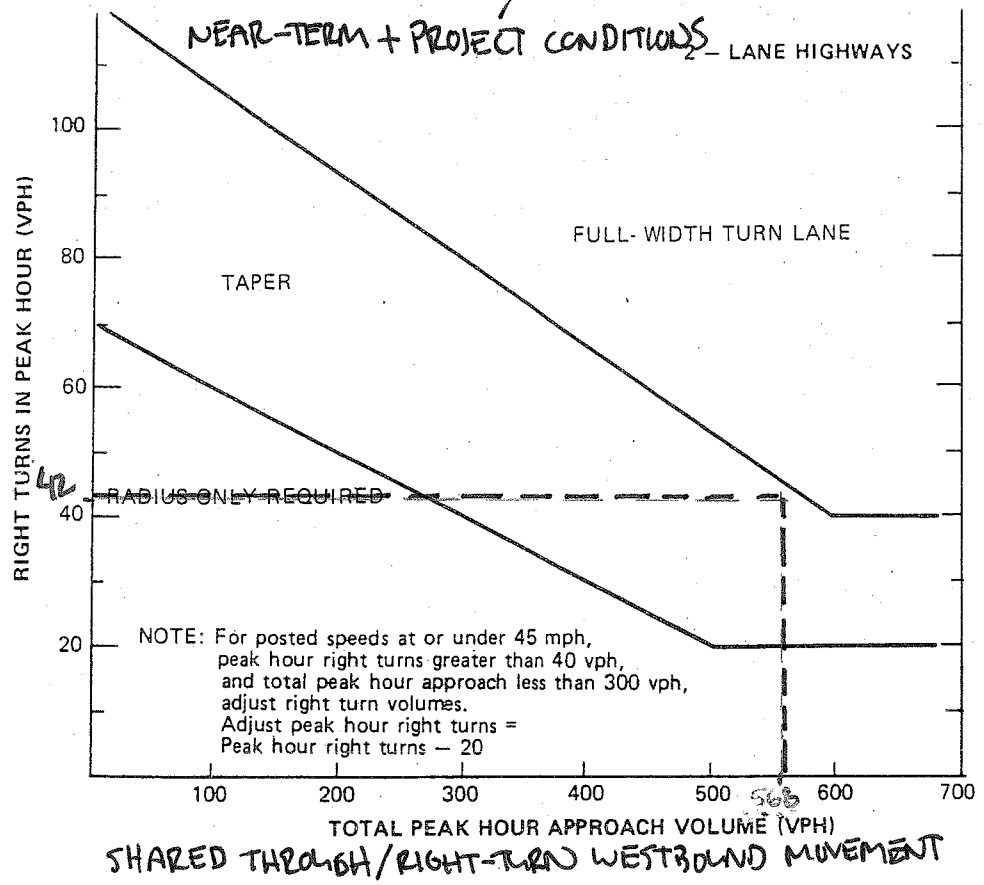
Nework Summary

Network wide Queuing Penalty: 0

WESTBOUND RIGHT-TURN MOVEMENT @ MAPLE LN.

MAPLE LN. / SR-29

NEAR-TERM + PROJECT CONDITIONS



SHARED THROUGH/RIGHT-TURN WESTBOUND MOVEMENT

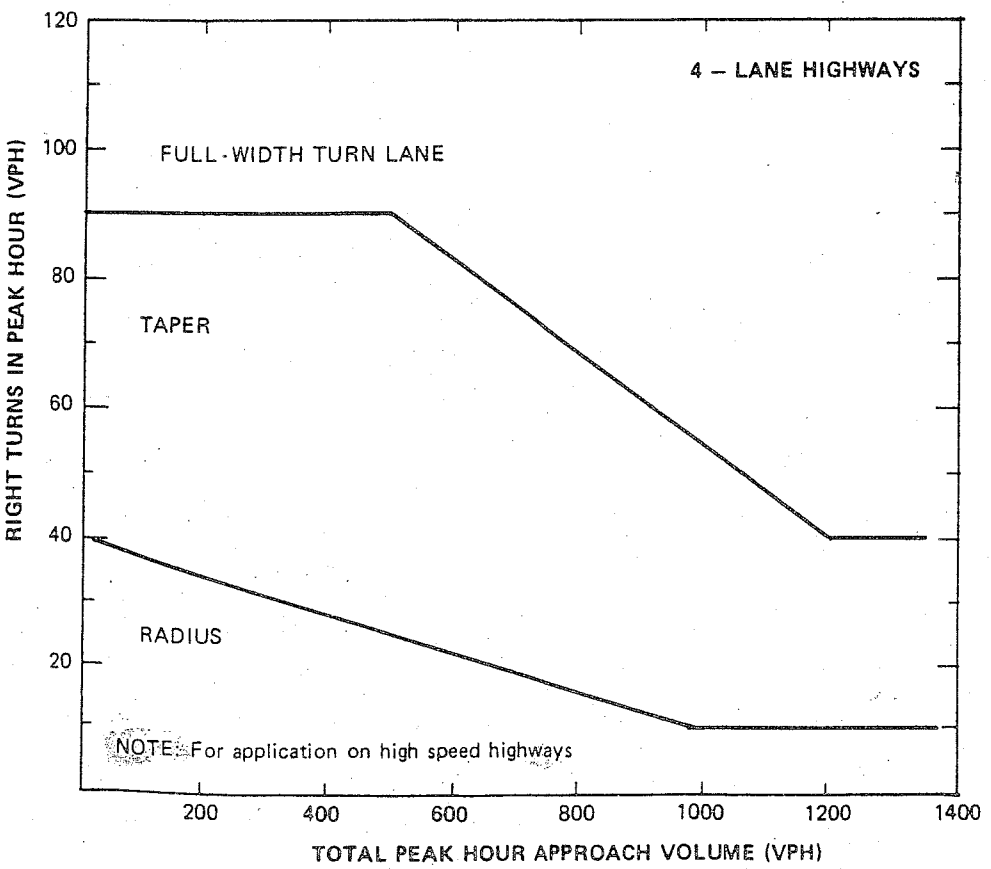


Figure 4-23. Traffic volume guidelines for design of right-turn lanes. (Source: Ref. *4-11*)

RADAR SPEED SURVEY

OMNI-MEANS LTD.

S.R. 29/120 approaching Maple/Drew

DATE: 10/11/12 TIME START: 4:30 pm TIME END: 6:00 pm WEATHER: cloudy; dry ROAD TYPE: 2 lanes; rural

DIRECTION: Southbound
SPEED LIMIT: 55 mph OBSERVER: o-m CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
45	2	2.0	!**
46	0	2.0	!**
47	0	2.0	!**
48	1	3.0	!***
49	1	4.0	!****
50	1	5.0	!****5
51	5	10.0	!****5****1
52	2	12.0	!****5****!**
53	6	18.0	!****5****!****5***
54	6	24.0	!****5****!****5****2****
55	10	34.0	!****5****!****5****2****5****3****
56	14	48.0	!****5****!****5****2****5****3****5****4****5***
57	11	59.0	!****5****!****5****2****5****3****5****4****5****5****5***
58	9	68.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5***
59	7	75.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5
60	3	78.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5***
61	4	82.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8**
62	7	89.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****
63	6	95.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5
64	2	97.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5**
65	3	100.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0

100

AVERAGE SPEED = 56.9
50th PERCENTILE = 56.1
85th PERCENTILE = 61.4
90th PERCENTILE = 62.1
95th PERCENTILE = 63

PACE = 53 - 62
% IN PACE = 77
VEHICLES IN PACE = 77

SAMPLE VARIANCE = 17.41951
STANDARD DEVIATION = 4.173669
RANGE 1*S = 70
RANGE 2*S = 97
RANGE 3*S = 100

RADAR SPEED SURVEY

OMNI-MEANS LTD.

S.R. 29/128 approaching Maple/Drew

DATE: 10/11/12 TIME START: 4:30 pm TIME END: 6:00 pm WEATHER: cloudy; dry ROAD TYPE: 2 lanes; rural

DIRECTION: Northbound
SPEED LIMIT: 55 mph OBSERVER: o-m CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
39	1	1.0	!*
40	0	1.0	!*
41	0	1.0	!*
42	0	1.0	!*
43	0	1.0	!*
44	0	1.0	!*
45	1	2.0	!**
46	0	2.0	!**
47	2	4.0	!****
48	2	6.0	!****5*
49	2	8.0	!****5***
50	7	15.0	!****5****!****5
51	2	17.0	!****5****!****5**
52	4	21.0	!****5****!****5****2*
53	4	25.0	!****5****!****5****2****5
54	8	33.0	!****5****!****5****2****5****3***
55	5	38.0	!****5****!****5****2****5****3****5***
56	14	52.0	!****5****!****5****2****5****3****5****4****5****5**
57	8	60.0	!****5****!****5****2****5****3****5****4****5****5****5****6
58	9	69.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****
59	8	77.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5**
60	5	82.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8**
61	10	92.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9**
62	6	98.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
63	1	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
64	0	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
65	0	99.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
66	1	100.0	!****5****!****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0

100

AVERAGE SPEED = 55.9
50th PERCENTILE = 55.8
85th PERCENTILE = 60.3
90th PERCENTILE = 60.8
95th PERCENTILE = 61.5

PACE = 53 - 62
% IN PACE = 77
VEHICLES IN PACE = 77

SAMPLE VARIANCE = 20.68529
STANDARD DEVIATION = 4.548109
RANGE 1*S = 65
RANGE 2*S = 97
RANGE 3*S = 99

RADAR SPEED SURVEY

OMNI-MEANS LTD.

S.R. 29/128 approaching Maple/Drew

DATE: 10/11/12 TIME START: 4:30 pm TIME END: 6:00 pm WEATHER: cloudy; dry ROAD TYPE: 2 lanes; rural

DIRECTION: Both SPEED LIMIT: 55 mph OBSERVER: o-m CALIBRATION TEST: Yes

SPEED	FREQUENCY	ACUM %	PERCENTAGE BREAKDOWN
39	1	0.5	|
40	0	0.5	|
41	0	0.5	|
42	0	0.5	|
43	0	0.5	|
44	0	0.5	|
45	3	2.0	|**
46	0	2.0	|**
47	2	3.0	|***
48	3	4.5	|****
49	3	6.0	|****5*
50	8	10.0	|****5****|
51	7	13.5	|****5****1***
52	6	16.5	|****5****1****5*
53	10	21.5	|****5****1****5****2*
54	14	28.5	|****5****1****5****2****5***
55	15	36.0	|****5****1****5****2****5****3****5*
56	28	50.0	|****5****1****5****2****5****3****5****4****5****5
57	19	59.5	|****5****1****5****2****5****3****5****4****5****5****5****
58	18	68.5	|****5****1****5****2****5****3****5****4****5****5****5****6****5***
59	15	76.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5*
60	8	80.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8
61	14	87.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5**
62	13	93.5	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9***
63	7	97.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5**
64	2	98.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
65	3	99.5	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****
66	1	100.0	|****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0

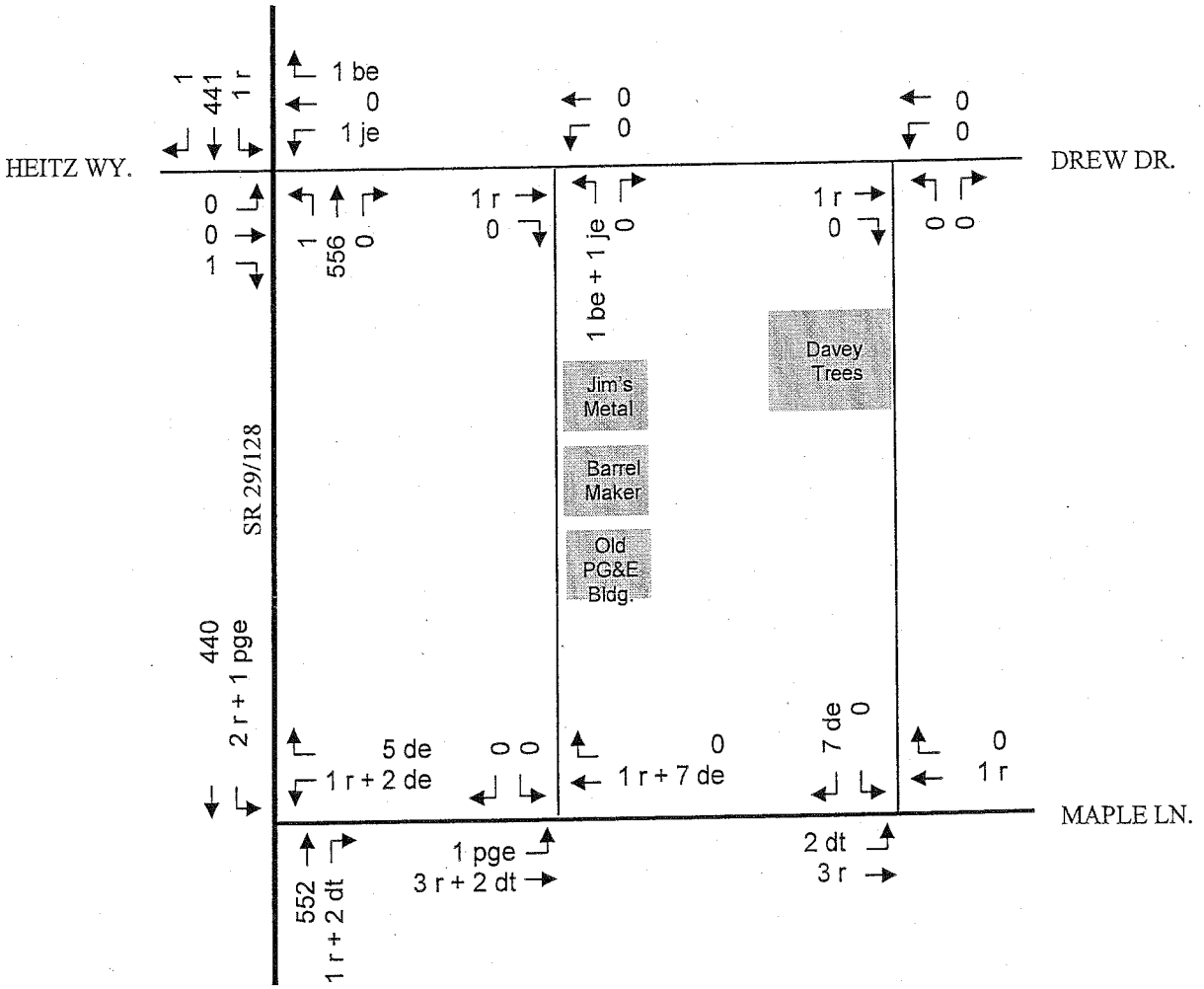
200

AVERAGE SPEED = 56.4
50th PERCENTILE = 56
85th PERCENTILE = 60.7
90th PERCENTILE = 61.4
95th PERCENTILE = 62.4

PACE = 53 - 62
% IN PACE = 77
VEHICLES IN PACE = 154

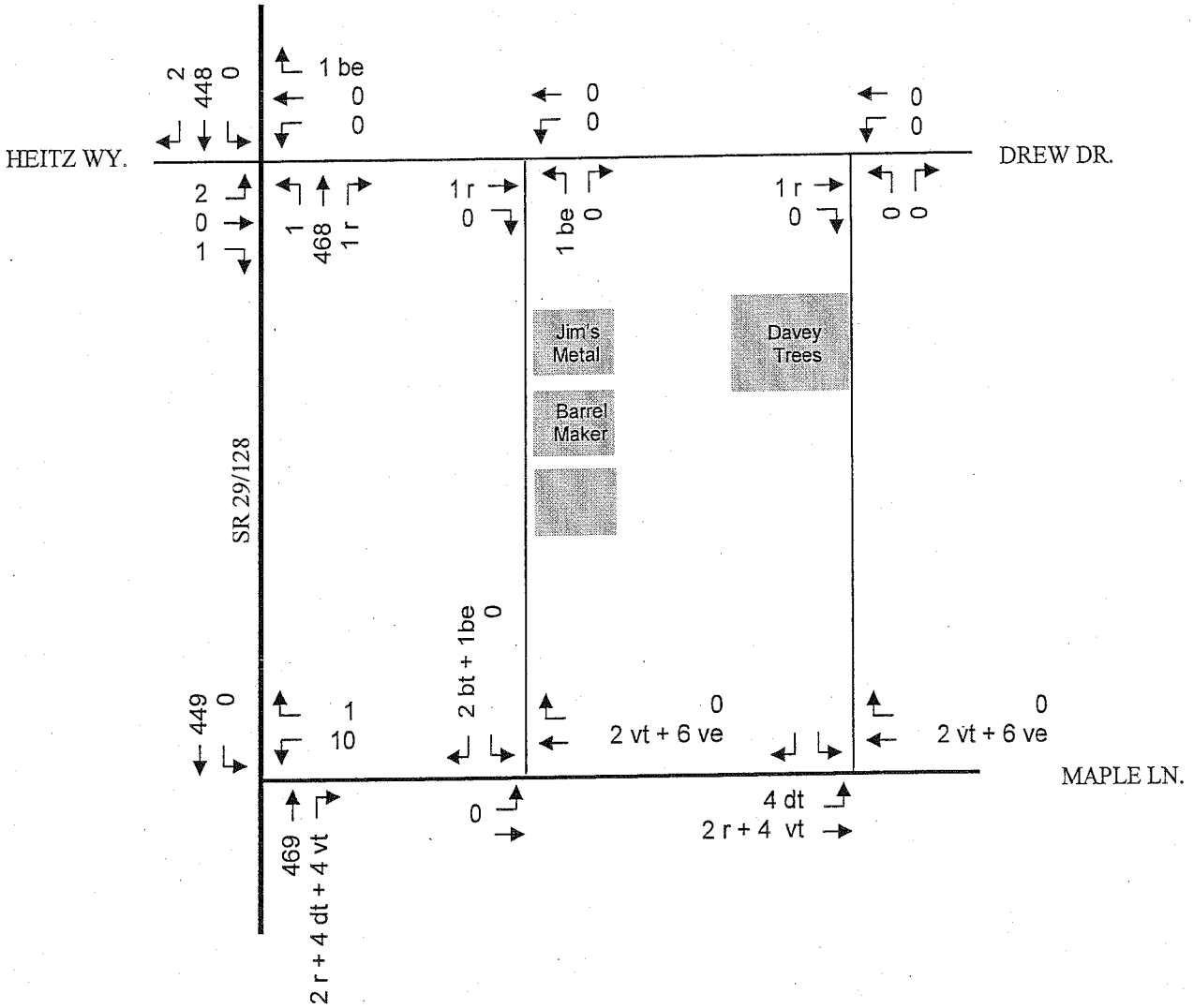
SAMPLE VARIANCE = 19.19284
STANDARD DEVIATION = 4.380964
RANGE 1*S = 63.5
RANGE 2*S = 96.5
RANGE 3*S = 99.5

Weekday Existing PM Peak Hour (Thurs. 10/11/12)



r = resident
dt = davey truck
de = davey employee car
bt = barrel truck
be = barrel employee car
vt = vineyard truck (Bayview Vineyards) *probably seasonal?
ve = vineyard employee car *probably seasonal?
je = jim's store employee
pge = private car parked at old pg&e building (resident?/employ?)

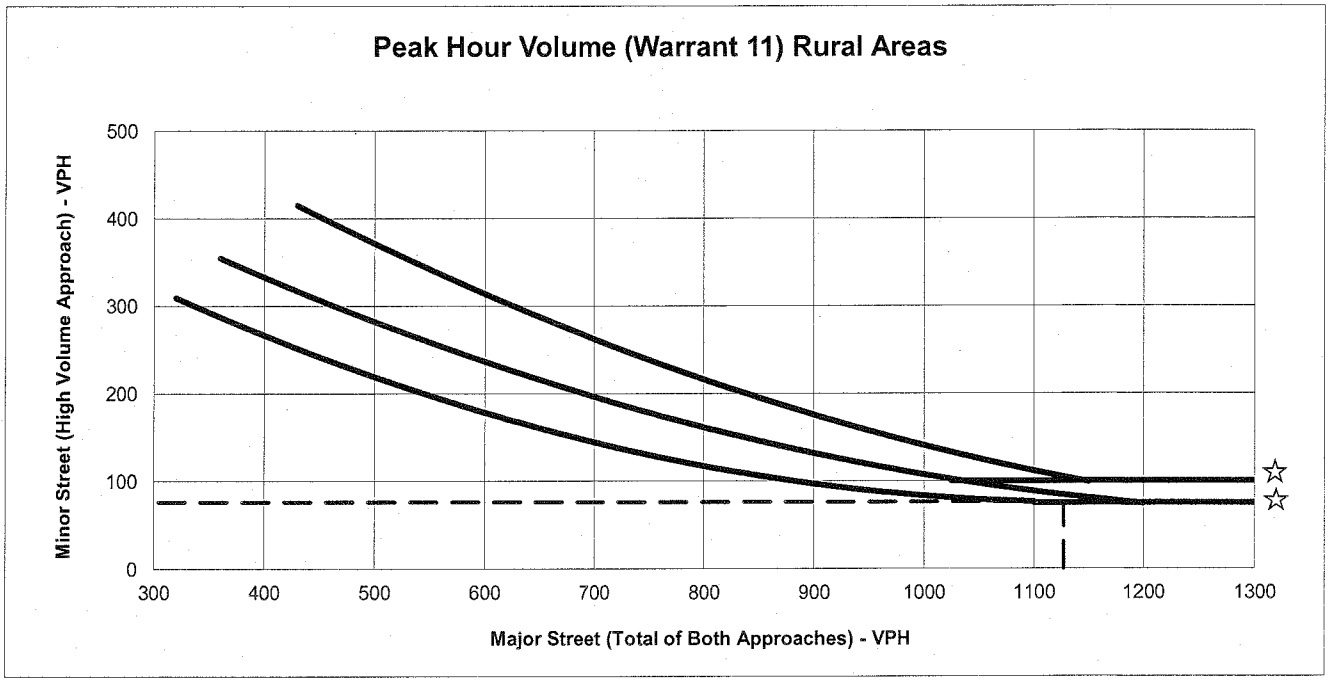
Saturday Existing Peak Hour (10/6/12)



r = resident
dt = davey truck
de = davey employee car *no trips, but 4-6 employees onsite?
bt = barrel truck
be = barrel employee car
vt = vineyard truck (Bayview Vineyards) *probably seasonal?
ve = vineyard employee car *probably seasonal?

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

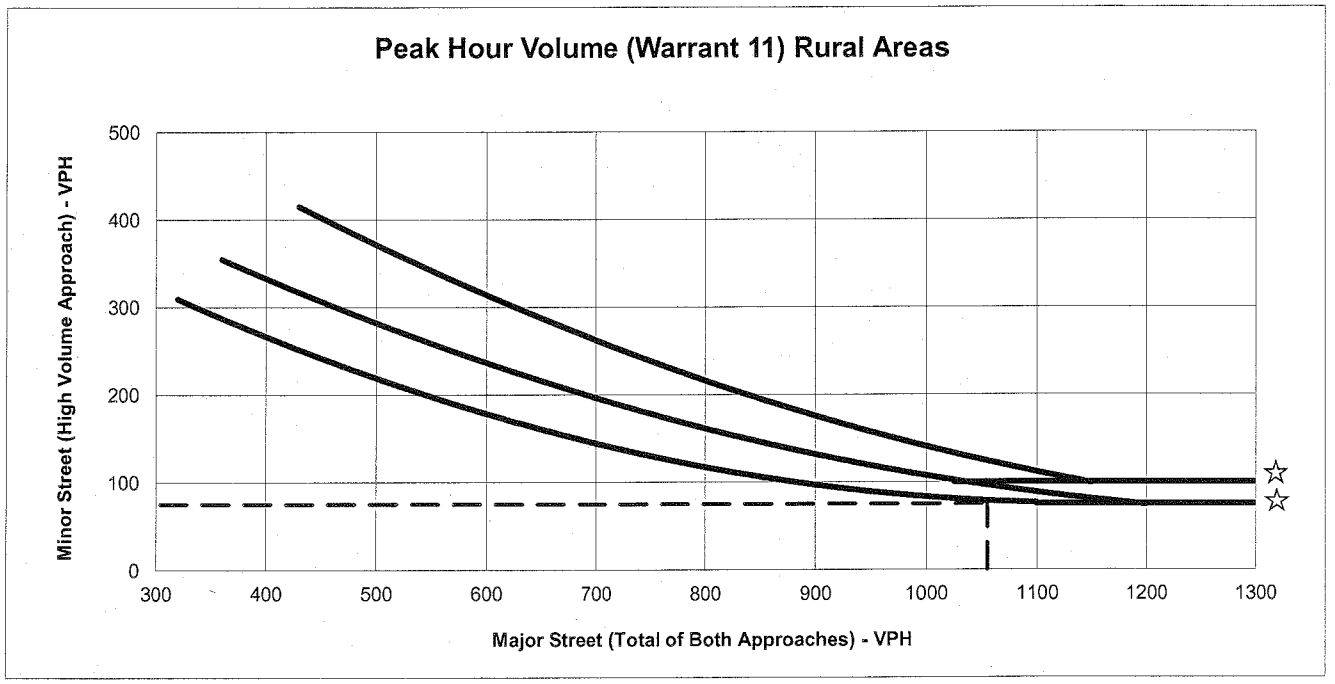


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection:	Maple Lane / SR-29
Scenario:	Existing W/ Project Weekday PM Peak Hour
Minor St. Volume:	76
Major St. Volume:	1127
Warrant Met?:	MARGINAL

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

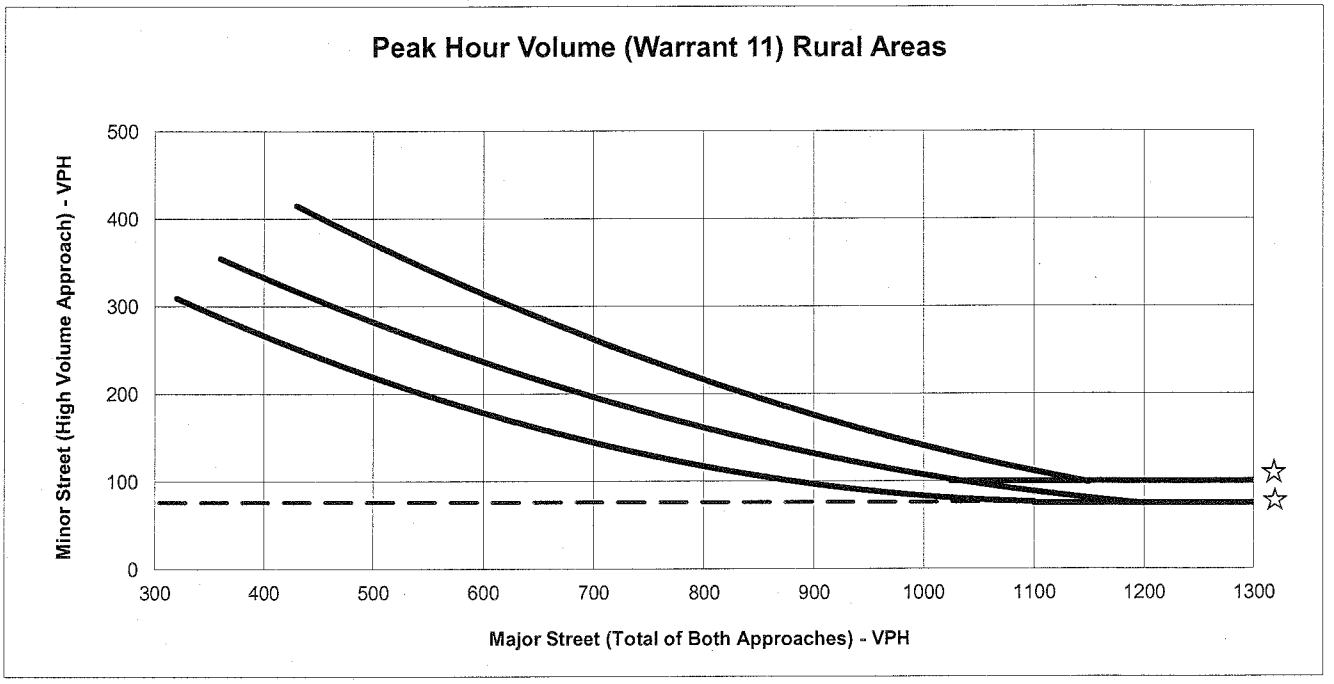


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection:	Maple Lane / SR-29
Scenario:	Existing W/ Project Weekend Mid-Day Peak Hour
Minor St. Volume:	75
Major St. Volume:	1055
Warrant Met?:	MARGINAL

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

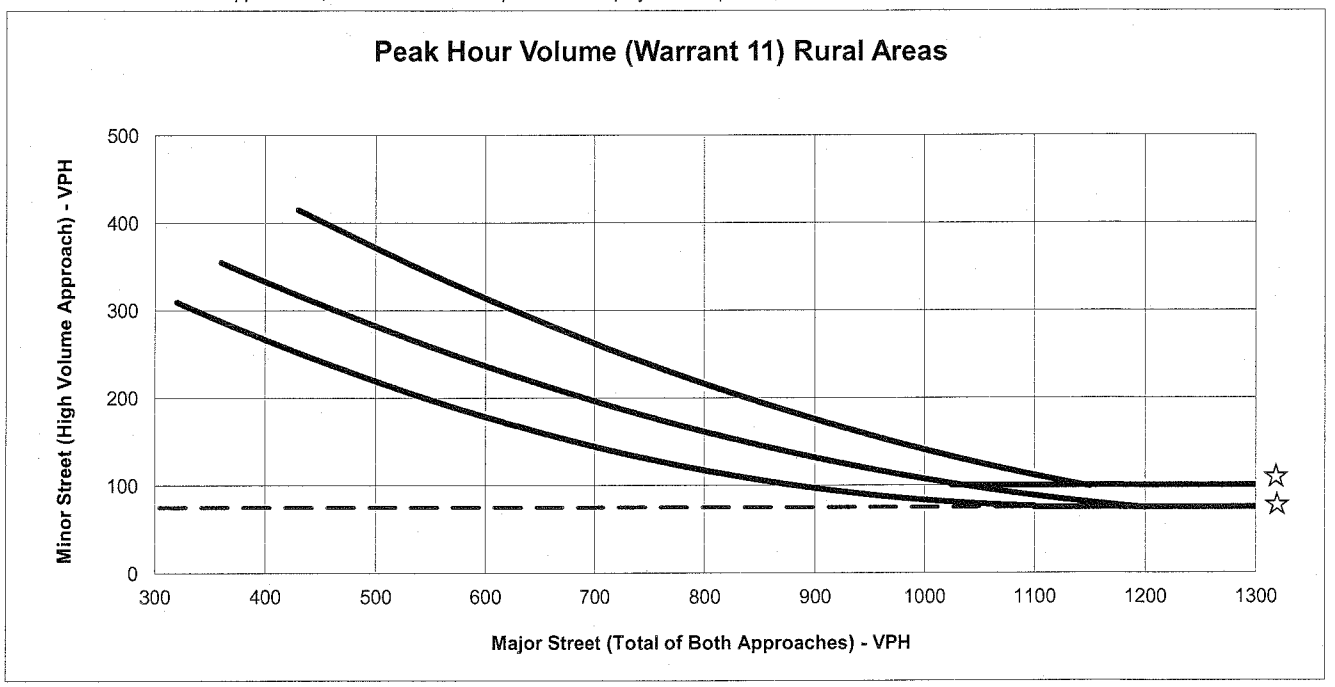


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Intersection:	Maple Lane / SR-29
Scenario:	Cumulative Year 2030 + Project Weekday PM Peak Hour
Minor St. Volume:	76
Major St. Volume:	2941
Warrant Met?:	MARGINAL

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
370	280				
400	270	460	297	430	410
500	215	500	290	500	380
600	185	600	230	600	310
700	140	700	198	700	265
800	115	800	170	800	210
900	99	900	125	900	180
1000	85	1000	105	1000	140
1100	75	1100	90	1100	110
1200	75	1200	75	1150	100
1300	75	1300	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR 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.

Intersection:	Maple Lane / SR-29
Scenario:	Cumulative Year 2030 + Project Weekend Mid-Day Peak Hour
Minor St. Volume:	75
Major St. Volume:	2733
Warrant Met?:	MARGINAL