**UPDATED TRAFFIC STUDY
FOR THE PROPOSED**

DAVIS ESTATES WINERY PROJECT
Napa County, CA

May 20, 2013

Prepared by:
Omni-Means, Ltd.
Engineers & Planners
1901 Olympic Blvd., Suite 120
Walnut Creek, CA 94596

R1684TIA003 / 35-3062-01

May 20, 2013

Davis Estates Vineyards
c/o Mr. Mark Phillips
Dickenson, Peatman & Fogarty
1455 First Street, Suite 301
Napa, CA 94559

Subject: ***Updated Traffic Study for a Proposed Davis Estates Vineyards Winery at 4060 Silverado Trail***

Dear Mr. Phillips:

This report presents our updated traffic analysis for the proposed Davis Estates Vineyards Winery at 4060 Silverado Trail in Napa County (see Figure 1 for site location map). The scope of this analysis is based on our additional discussions with you regarding the project description and comments received from Napa County staff on the original report (March 11, 2013) previously submitted for the project.

The analysis has determined that the proposed winery would not significantly impact traffic level of service conditions. Existing daily volumes on Silverado Trail are indicative of LOS 'B' conditions and would remain unchanged under existing plus project and near term plus project conditions. Peak hour intersection conditions would also operate at acceptable levels of service. At your direction it was determined all three of the winery's access driveways would be utilized. Based on the allocation of trips at the project driveways, the Silverado Trail/Larkmead Lane (Northern Winery Driveway) intersection and the Silverado Trail/Middle Winery Driveway intersection would operate at LOS 'B' or better, and the south driveway would operate at LOS 'A' under existing and near term conditions with the project.

The daily volumes on the project driveways and Silverado Trail under existing and near term plus project conditions were applied to the Napa County warrants for installation of a left turn lane on Silverado Trail. Based on our review of the warrant, a left turn lane is not required at any of the three driveway locations on Silverado Trail. The available sight distances along Silverado Trail at the driveway locations exceed Caltran's minimum sight distance guidelines. Recommendations to maintain sight distance and direct traffic to the proper driveways have been presented.

Travel model forecasts from the Napa County General Plan Update were used to calculate cumulative volumes. Although there were no significant impacts associated with project, the forecast cumulative volume increases are quite large. (Historical volume data for the past several years indicates volumes are not increasing at the forecasted rate.) However, the County has adopted measures to proactively address potential volume growth. Such measures include trip reduction strategies and possible implementation of a traffic impact fee. If enacted, the project could presumably contribute a fair share towards the circulation improvements.
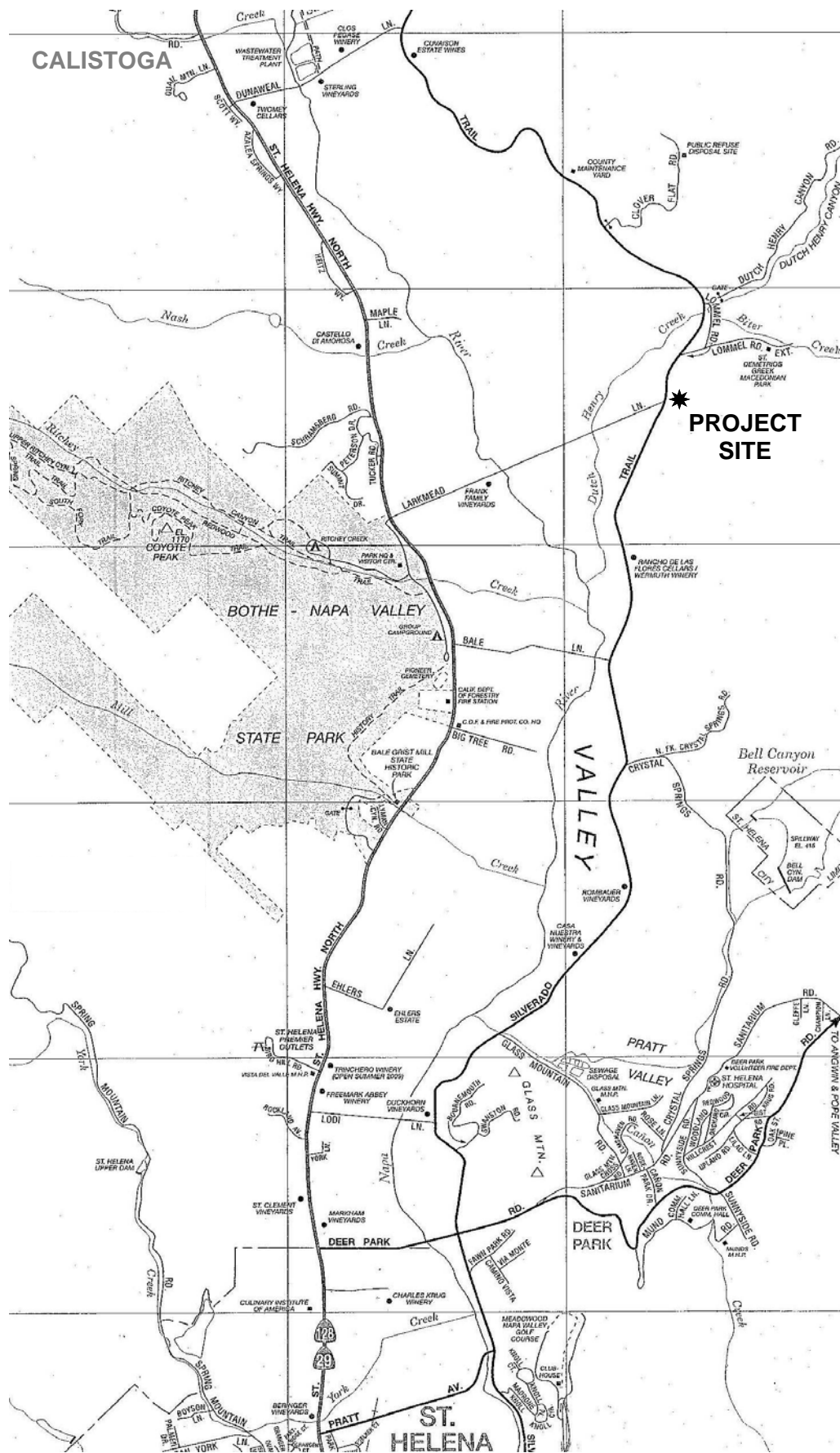
I trust that this report responds to your needs. Please feel free to call me with any questions or comments after your review.

Sincerely,

George Nickelson

George W. Nickelson, P.E.
OMNI-MEANS, Ltd.
Engineers & Planners
rt/R1684TIA001.doc/35-2455-01

CALISTOGA

PROJECT SITE

Project Vicinity Map

North

omni-means

figure 1

1. EXISTING TRAFFIC CONDITIONS

Site Location

The proposed Davis Estates winery would be located at the site of an existing vineyard/residential property at 4060 Silverado Trail. The property has three access driveways located on the east side of Silverado Trail (opposite Larkmead Lane, approximately 600 feet south of Larkmead Lane and approximately 1,000 feet south of Larkmead Lane). Silverado Trail is a rural two lane undivided arterial road oriented in a north-south direction throughout much of Napa County. Silverado Trail near the project site consists of two 12-feet wide travel lanes and 3-4 feet paved shoulders plus drainage swales or slopes in some areas.

Existing Traffic Operations

Traffic operating conditions are measured by Level of Service (LOS), which applies a letter ranking to successive levels of roadway and intersection traffic performance. LOS 'A' represents optimum conditions with free-flow travel and no congestion. LOS 'F' represents severe congestion with long delays. When applied to unsignalized intersections with minor street stop controls, the LOS reflects the delays experienced by the minor street approach. (LOS definitions, calculations, and volume worksheets are provided in the Appendix.) To identify LOS conditions, daily volumes were obtained from Napa County records, and peak hour traffic counts were conducted on Silverado Trail at the site driveways.

Based on Napa County records, Silverado Trail has an average daily traffic volume of 3,903 vehicles and a peak day volume of 4,187 vehicles south of Larkmead Lane.[1] The count data is somewhat old (2003); based on new peak hour counts (see below) that are about 6% higher than the 2003 peak hour volume, it has been assumed that current conditions reflect about a 6% increase over the 2003 volume. Applying this increase yields an existing average daily volume of about 4,140 vehicles. Although Saturday volumes on Silverado Trail are typically somewhat lower than weekday volumes, it has been conservatively assumed that the 4,140 daily volume reflects both weekday and Saturday conditions. The County counts were conducted in March, a reasonably average month in terms of winery activity. Thus, these volumes likely reflect the annual average daily traffic (AADT), described by Caltrans as generally used in a traffic analysis in order to account for seasonal influences, weekly variations, and other variables which may by present. This daily volume on Silverado Trail is indicative of Level of Service 'B' conditions (less than 5,300 ADT for a two lane rural arterial).[2]

In order to assess the peak hour intersection operating conditions, turning volume counts were conducted at the Silverado Trail/Davis Estates Access intersections. The counts were conducted during a weekday p.m. peak commute period (4:00-6:00 p.m.) and a Saturday afternoon peak period (1:00-3:00 p.m.).[3] The peak hour volume within each count period was identified and is shown in Figure 2. The two-way volume on Silverado Trail was 450 vehicles, about 6% higher than the peak hour counted in 2003. This suggests that traffic growth on Silverado Trail has been very modest over the last 10 years. The counts identified no peak hour trips in/out of the existing driveways. Essentially, neither the existing vineyard nor the existing residence had any observed activity.

With no vehicle trips in or out of the existing site, all three driveway approaches operate at LOS 'A' with zero seconds of delay. The eastbound Larkmead Lane approach operates at LOS 'B' (10-11 seconds of delay) during the weekday and weekend peak hours. The existing LOS are shown in Table 1.
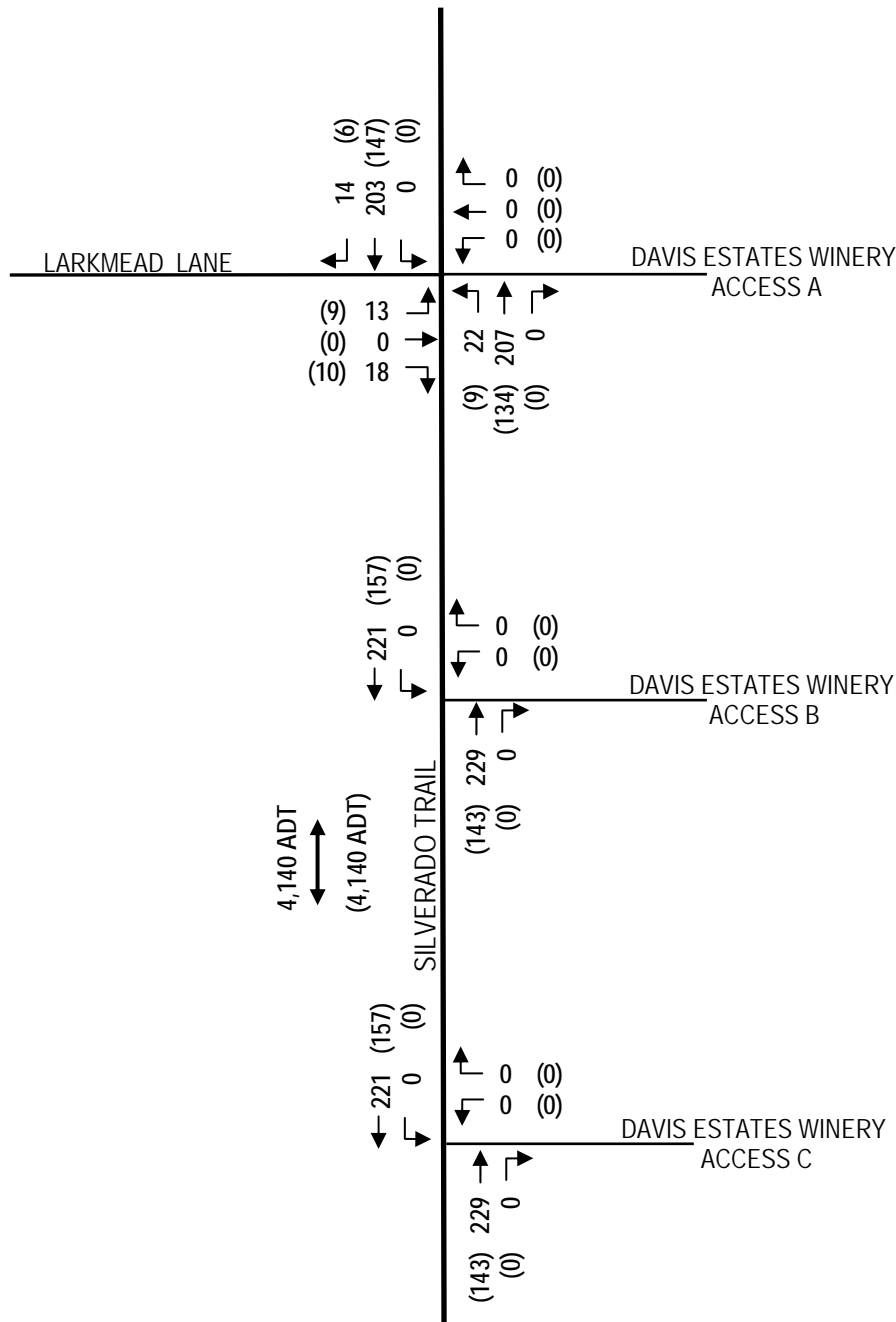
TABLE 1
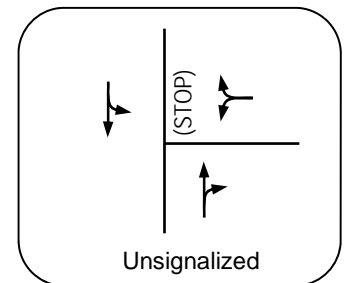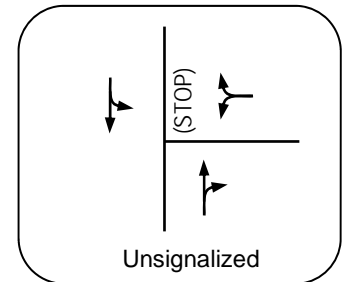**EXISTING PEAK HOUR INTERSECTION OPERATIONS**
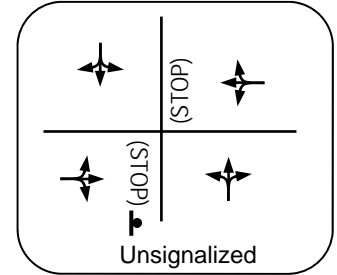**LEVEL OF SERVICE (LOS) AND SECONDS OF DELAY**

Intersection	Weekday PM Peak Hour	Saturday Afternoon Peak Hour
	Existing **LOS Delay**	Existing **LOS Delay**
Silverado Trail / Larkmead Lane (North Winery Driveway) *Unsignalized (minor street stops)*		
North Driveway westbound approach	A < 1"	A < 1"
Larkmead Lane eastbound approach	B 11.3"	B 10.2"
Silverado Trail southbound approach	A < 1"	A < 1"
Silverado Trail northbound approach	A < 1"	A < 1"
Silverado Trail / Middle Driveway *Unsignalized (minor street stop)*		
Middle Driveway westbound approach	A < 1"	A < 1"
Silverado Trail southbound approach	A < 1"	A < 1"
Silverado Trail / South Driveway *Unsignalized (minor street stop)*		
South Driveway westbound approach	A < 1"	A < 1"
Silverado Trail southbound approach	A < 1"	A < 1"

Existing Peak Hour Volumes:

LARKMEAD LANE

DAVIS ESTATES WINERY
ACCESS A

14 (6)
203 (147)
0 (0)

0 (0)
0 (0)
0 (0)

(9) 13
(0) 0
(10) 18

22
207
0

(9)
(134)
(0)

DAVIS ESTATES WINERY
ACCESS B

221 (157)
0 (0)

0 (0)
0 (0)

229 0

(143)
(0)

SILVERADO TRAIL

4,140 ADT
(4,140 ADT)

DAVIS ESTATES WINERY
ACCESS C

221 (157)
0 (0)

0 (0)
0 (0)

229 0

(143)
(0)

GEOMETRIES / CONTROLS

(STOP)

(STOP)

Unsignalized

(STOP)

Unsignalized

(STOP)

Unsignalized

Existing geometries assumed for
all future volume scenarios.

Existing Weekday PM and (Weekend) Peak Hour Volumes

North

omni-means

figure 2

2. PROPOSED PROJECT

Project Description

Although the project would be developed in two phases, this analysis has focused on the phase two project buildout conditions. The traffic generating components of the proposed project are summarized as follows:

- Production: 30,000 gallons annual wine production;

- Visitation: 20 weekday and 34 Saturday visitors (by appointment);

- Employees: 5 full-time employees on weekdays and Saturdays;

- Residences: Two residences would be on the site (housing 2 of the full-time employees);

- Marketing Events:
  2 per month for up to 50 guests at each event;
  2 per year for up to 100 guests.

Project Trip Generation/Distribution

The proposed winery traffic generation has been calculated in Table 2. New trips would be composed of visitors, employees, and wine production-related truck traffic. The two residences would also generate trips. Although two employees would be comprised of onsite residents, the trip calculation conservatively treated the employee trips and residential trips separately. The project was calculated to generate 51 weekday daily trips and 13 weekday peak hour trips (4 in, 9 out). On a typical Saturday the project would generate 60 daily trips and 12 afternoon peak hour trips (6 in, 6 out). During the six-week harvest season, the project would generate 67 daily trips and 14 peak hour trips (7 in, 7 out).

The project trips were distributed onto Silverado Trail based on the existing turning movements at the Silverado Trail/Larkmead Lane intersection. Based on the observed turning percentages, the project trips were distributed with 50% to/from the north and 40% to/from the south on Silverado Trail and 10% to/from the west on Larkmead Lane.

Each driveway would be designated for specific users of the site. The north driveway would be designated for employees and trucks. The middle driveway would be designated for visitors to the winery. And the south driveway would be designated for the private residential trips. The project trips are shown in Figure 3.

TABLE 2
TRIP GENERATION:
PROPOSED DAVIS ESTATES WINERY

Typical Weekday Daily Traffic:

Project: 20 visitors/2.6 per vehicle x 2 one-way trips	=	15 daily trips
5 full time employees x 3.05 one-way trips	=	15 daily trips
1 truck trip: (30,000 gls/1,000 x .009 x 2 o-w trips)	=	1 daily trip
Two residences (20 daily trips)[a]	=	20 daily trips
Total Weekday Daily Trips	**=**	**51 total daily trips**

Typical Weekday PM Peak Hour Traffic:

Project: (15 daily visitor trips + 1 daily truck trip) x .38	=	6 peak hour trips
5 full time employees	=	5 peak hour trips
Two residences (2 peak hour trips)[a]	=	2 peak hour trips
Total Weekday Peak Hour Trips	**=**	**13 total trips (4 in, 9 out)**

Typical Saturday Daily Traffic:

Project: 34 visitors/2.8 per vehicle x 2 one-way trips	=	24 daily trips
5 full time employees x 3.05 one-way trips	=	15 daily trips
1 truck trip: (30,000 gls/1,000 x .009 x 2 o-w trips)	=	1 daily trip
Two residences (20 daily trips)	=	20 daily trips
Total Weekday Daily Trips	**=**	**60 total daily trips**

Typical Saturday Peak Hour Traffic:

Project: (24 daily visitor + 15 employee + 1 truck trip = 40 trips) x 25%	=	10 peak hour trips
Two residences (2 peak hour trips)	=	2 peak hour trips
Total Saturday Peak Hour Trips (54 daily trips x 25%)	**=**	**12 total trips (6 in, 6 out)**

Weekend (Saturday) Daily Traffic During Crush:

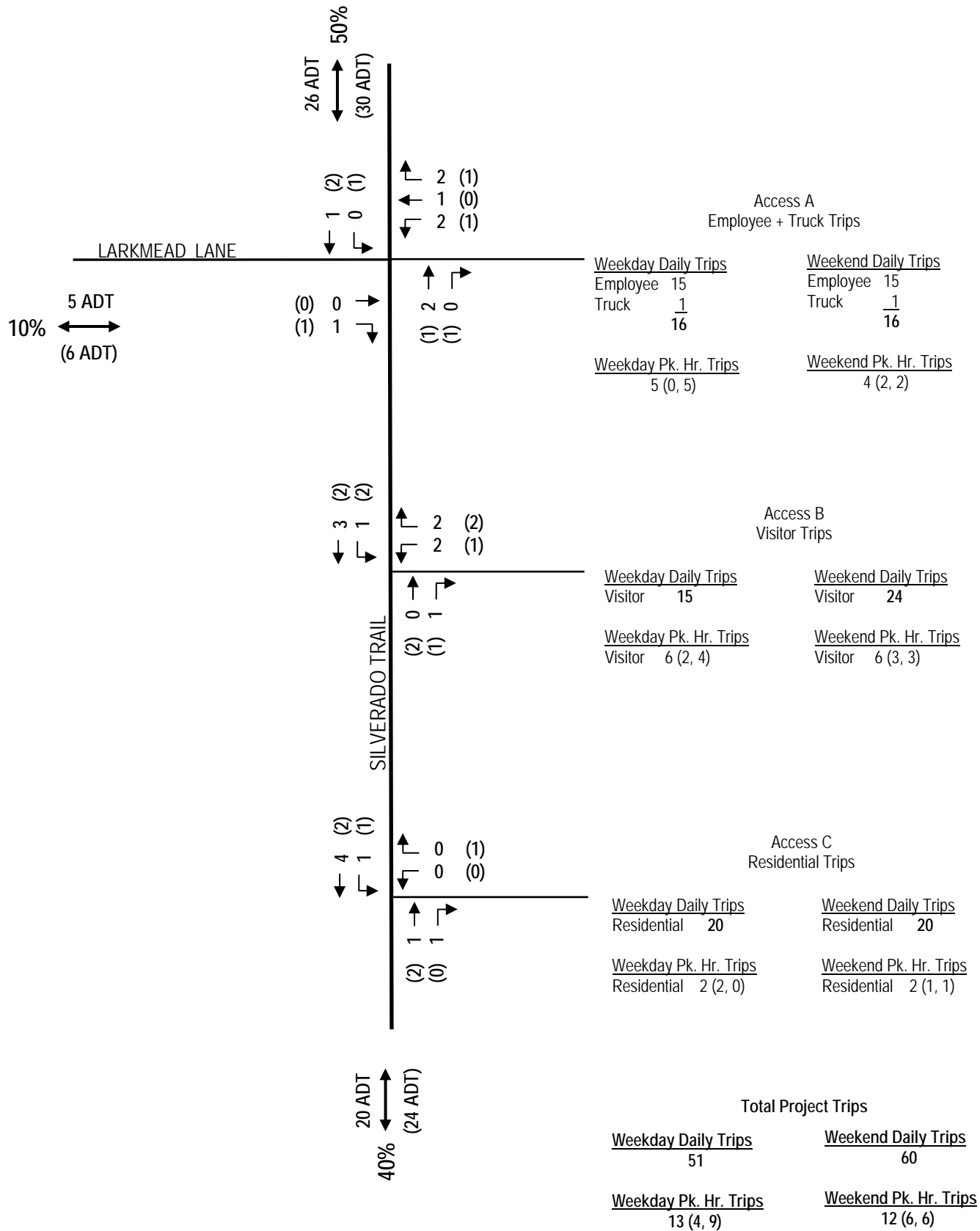|		
Project: 34 visitors/2.8 per vehicle x 2 one-way trips	=	24 daily trips
7 full time employees x 3.05 one-way trips	=	21 daily trips
1 truck trip: (60,000 gls/1,000 x .009 x 2 trips)	=	1 daily trip
95 annual tons grape on-haul/4 tons per truck/36 days x 2 trips	=	1 daily trip
Two residences (20 daily trips)	=	20 daily trips
Total Weekend (Saturday) Daily Harvest/Crush Trips	**=**	**67 total daily trips**

Weekend (Saturday) Peak Hour Traffic During Crush:

Project: (24 daily visitor + 21 employee + 2 truck trips = 47 trips) x 25%	=	12 peak hour trips
Two residences (2 peak hour trips)	=	2 peak hour trips
Total Weekend Peak Hour Harvest Trips	**=**	**14 total trips (7 in, 7 out)**

Production, visitor, and employee data provided by Mr. Mark Phillips(project representative) and Use Permit Application.
Trip equations for daily and weekday peak hour derived from Napa County, Conservation, Planning, & Development
Department, "Use Permit Application Package", Napa County Winery Traffic Generation Characteristics, 2012. Trip equation
for weekend peak hour based on conservative assumption that 25% of daily trips occur in peak hour.
[a]*Residential trips based on Institute of Transportation Engineers, Trip Generation, 9th Edition, 2012.*

26 ADT
50%
(30 ADT)

1 (2)
0 (1)

2 (1)
1 (0)
2 (1)

LARKMEAD LANE

5 ADT
10%
(6 ADT)

(0) 0 →
(1) 1

2 0
(1) (1)

Access A
Employee + Truck Trips

Weekday Daily Trips
Employee 15
Truck 1
16

Weekend Daily Trips
Employee 15
Truck 1
16

Weekday Pk. Hr. Trips
5 (0, 5)

Weekend Pk. Hr. Trips
4 (2, 2)

3 (2)
1 (2)

2 (2)
2 (1)

Access B
Visitor Trips

0 1

(2) (1)

SILVERADO TRAIL

Weekday Daily Trips
Visitor **15**

Weekend Daily Trips
Visitor **24**

Weekday Pk. Hr. Trips
Visitor 6 (2, 4)

Weekend Pk. Hr. Trips
Visitor 6 (3, 3)

4 (2)
1 (1)

0 (1)
0 (0)

Access C
Residential Trips

1 1

(2) (0)

Weekday Daily Trips
Residential **20**

Weekend Daily Trips
Residential **20**

Weekday Pk. Hr. Trips
Residential 2 (2, 0)

Weekend Pk. Hr. Trips
Residential 2 (1, 1)

20 ADT
(24 ADT)
40%

Total Project Trips

Weekday Daily Trips
51

Weekend Daily Trips
60

Weekday Pk. Hr. Trips
13 (4, 9)

Weekend Pk. Hr. Trips
12 (6, 6)

Project Trips and Distribution
Weekday PM & (Weekend Saturday) Peak Hour and Daily Trips

N_{orth}

omni-**means**

figure 3

3. EXISTING PLUS PROJECT CONDITIONS

Napa County Significance Criteria

The County of Napa's significance criteria has been based on a review of the Napa County Transportation & 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:

- o 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:

- o 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);
- o Exceed either individually or cumulatively, an LOS standard established by the county congestion management agency for designated roads or highways;
- o 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;
- o Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- o Result in inadequate emergency vehicle access;
- o Project site or internal circulation on the site is not adequate to accommodate pedestrians and bicycles.

Existing Plus Project Operating Conditions

The distribution of project trips would add 28 weekday and 33 Saturday daily trips to the highest volume segment of Silverado Trail. The daily project traffic would add 0.8% to the existing daily volume of 4,140 trips on Silverado Trail. Silverado Trail would continue to function at LOS 'B' conditions. The traffic increases would be somewhat higher during the six-week harvest season, but these volumes would also not significantly affect traffic flows.

The peak hour conditions were evaluated for the three study intersections on Silverado Trail and are listed in Table 3. At the north intersection, the winery driveway and Larkmead Lane approaches would operate at LOS 'B' during the weekday and weekend peak hours. The middle driveway westbound approach would operate at LOS 'B' during the weekday peak hour and LOS 'A' during the weekend peak hour. At the south driveway intersection, the westbound winery approach would function at LOS 'A' during both peak hours. The northbound and southbound Silverado Trail approaches would operate at LOS 'A'. The intersections would continue to operate acceptably. The existing plus project volumes are shown in Figure 4.

Turn Lane Warrants (Existing and Existing Plus Project Conditions)

The existing and existing plus project volumes were compared with the Napa County guidelines for installing a left turn lane in Silverado Trail. [4] The warrant graphs for weekday and Saturday conditions are provided in the Appendix – the Saturday conditions represent the peak. With existing plus project volumes of 16 daily trips at the north driveway, 15-24 weekday/weekend trips at the middle driveway, 20 daily trips at the south driveway, and approximately 4,170 annual average daily trips on Silverado Trail, a left turn lane is not warranted at any of the access driveways.

The projected right turn volumes at the site driveways are well below minimum thresholds at which right turn lanes would be required (right turn lane warrant graphs are included in the Appendix).[5]

TABLE 3
EXISTING AND EXISTING + PROJECT PEAK HOUR INTERSECTION OPERATIONS
LEVEL OF SERVICE (LOS) AND SECONDS OF DELAY

Intersection	Weekday PM Peak Hour		Saturday Afternoon Peak Hour	
	Existing LOS Delay	Existing + Project LOS Delay	Existing LOS Delay	Existing + Project LOS Delay
Silverado Trail / Larkmead Lane (North Winery Driveway) *Unsignalized (minor street stops)*				
North Driveway westbound approach	A < 1"	B 11.8"	A < 1"	B 10.2"
Larkmead Lane eastbound approach	B 11.3"	B 11.3"	B 10.2"	B 10.2"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail northbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail / Middle Driveway *Unsignalized (minor street stop)*				
Middle Driveway westbound approach	A < 1"	B 10.7"	A < 1"	A 9.5"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail / South Driveway *Unsignalized (minor street stop)*				
South Driveway westbound approach	A < 1"	A < 1"	A < 1"	A 9.1"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 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.

Existing + Project Peak Hour Volumes:

(6)
(149)
(1)
14
204
0

2 (1)
1 (0)
2 (1)

LARKMEAD LANE

DAVIS ESTATES WINERY
ACCESS A

(9) 13
(0) 0
(11) 19

22 209 0
(9) (135) (1)

224 (159) (2)
1

2 (2)
2 (1)

DAVIS ESTATES WINERY
ACCESS B

229 1
(145) (1)

4,167 ADT
(4,170 ADT)

SILVERADO TRAIL

225 (159) (1)
1

0 (1)
0 (0)

DAVIS ESTATES WINERY
ACCESS C

230 1
(145) (0)

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

N_{orth}

omni-means

figure 4
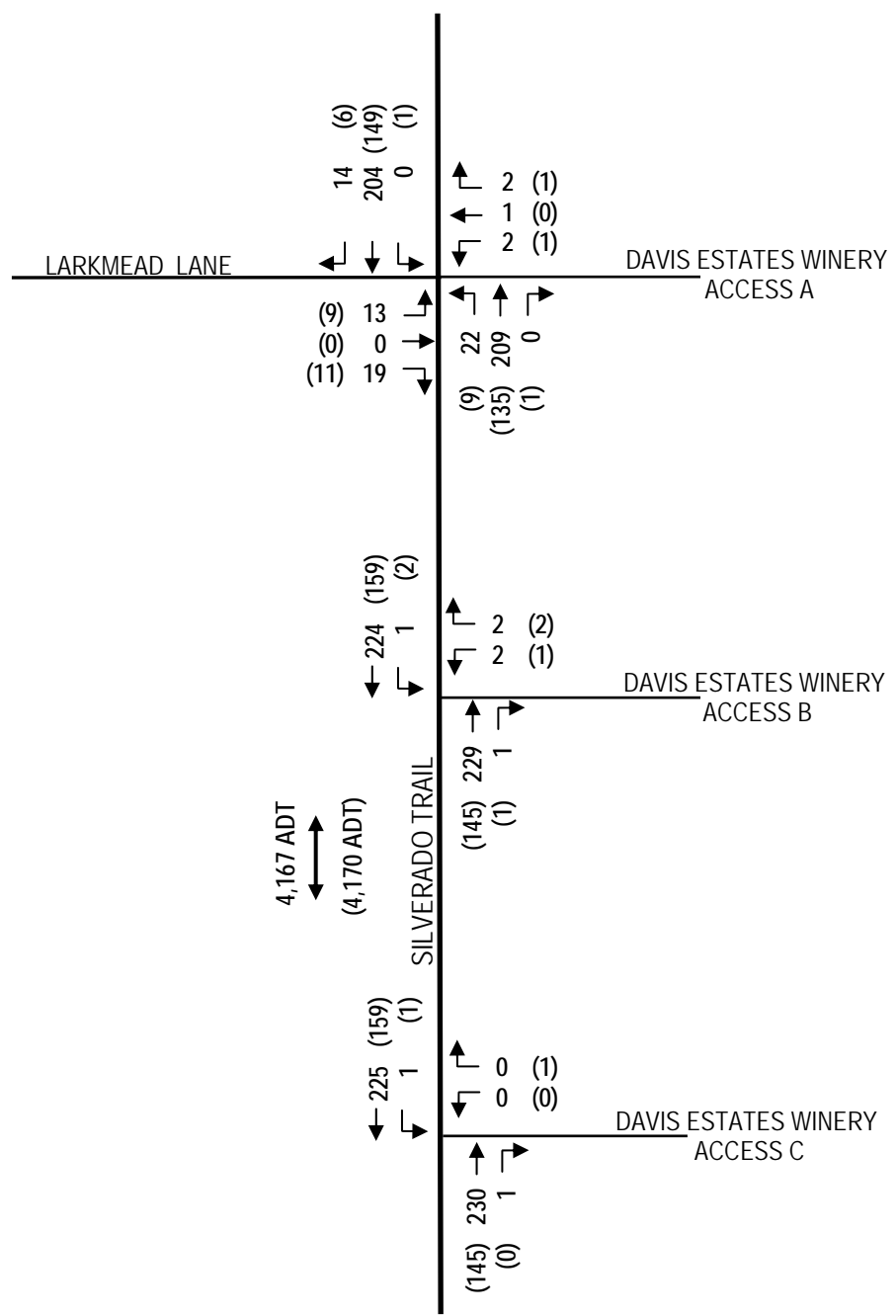
4. NEAR TERM CONDITIONS

Approved Developments

Near term conditions reflect existing volumes plus any additional volumes expected to be generated by approved developments within the project study area. Approved developments include structures that are built but not fully occupied or are not yet built but are expected to be within the near term future. The County of Napa and City of Calistoga planning departments each provided information regarding approved developments.[6, 7] The vehicle trips for these developments were taken from traffic studies when available or generated based on the type of development and distributed onto the street network. (A list of the developments that have calculated trips on Silverado Trail is provided in the Appendix.)

Near Term Operating Conditions

The approved developments will generate 270 daily trips on Silverado Trail adjacent to the site. Added to the existing volume of 4,140 daily trips results in 4,410 daily trips on Silverado Trail for near term conditions. Silverado Trail would continue to function at LOS 'B' conditions.

The peak hour trips generated by the approved developments were also identified and added to existing volumes. The near term volumes are shown in Figure 5. The Silverado Trail/Larkmead Lane (north driveway) intersection would operate at LOS 'B' or better conditions during the weekday and weekend peak hours. The middle and south driveway intersections would operate at LOS 'A' during the weekday and weekend peak hours. The LOS are shown in Table 4.

Near Term Plus Project Operating Conditions

The project trips were added to the near term volumes (shown in Figure 6). The project would add 28-33 daily trips on the highest volume segment to the near term volume of 4,410 daily trips, resulting in about 4,440 daily trips on Silverado Trail under near term plus project conditions. The project traffic would add 0.7 % to the near term daily volumes on Silverado Trail. Silverado Trail would continue to function at LOS 'B'. Silverado Trail would continue to operate at acceptable conditions.

The peak hour intersection operating conditions were evaluated for near term plus project conditions and are shown in Table 4. The Silverado Trail/Larkmead Lane (north driveway) intersection would operate at LOS 'B' during the weekday and Saturday peak hours. The middle driveway intersection would operate at LOS 'B' during the weekday peak hour and LOS 'A' during the weekend peak hour. The south driveway would operate at LOS 'A' conditions. The Silverado Trail northbound and southbound approaches would operate at LOS 'A'. The intersections would continue to operate at acceptable conditions under near term plus project conditions. Based on the volumes there would not be any expected vehicle queuing issues at the project access intersections.

Turn Lane Warrants (Near Term and Near Term Plus Project Conditions)

The near term and near term plus project volumes were compared with the Napa County guidelines for installing a left turn lane on Silverado Trail. (The warrant graphs for weekday and Saturday conditions are provided in the Appendix.) Under near term plus project conditions with 4,440 trips on Silverado Trail, 16 daily trips at the north driveway, 15-24 trips at the middle driveway, and 20 daily trips at the south driveway a left turn lane would not be warranted at any of the driveways.

The projected right turn volumes at the site driveways would remain well below minimum thresholds at which right turn lanes would be required (right turn lane warrant graphs are included in the Appendix).

TABLE 4
NEAR TERM AND NEAR TERM + PROJECT PEAK HOUR INTERSECTION OPERATIONS
LEVEL OF SERVICE (LOS) AND SECONDS OF DELAY

Intersection	Weekday PM Peak Hour		Saturday Afternoon Peak Hour	
	Near Term LOS Delay	Near Term + Project LOS Delay	Near Term LOS Delay	Near Term + Project LOS Delay

Silverado Trail / Larkmead Lane
  (North Winery Driveway)
  Unsignalized (minor street stops)				

North Driveway westbound approach	A < 1"	B 12.0"	A < 1"	B 10.4"
Larkmead Lane eastbound approach	B 11.4"	B 11.4"	B 10.3"	B 10.3"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail northbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail / Middle Driveway *Unsignalized (minor street stop)*				
Middle Driveway westbound approach	A < 1"	B 10.8"	A < 1"	A 9.7"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 1"
Silverado Trail / South Driveway *Unsignalized (minor street stop)*				
South Driveway westbound approach	A < 1"	A < 1"	A < 1"	A 9.1"
Silverado Trail southbound approach	A < 1"	A < 1"	A < 1"	A < 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.

Near Term Peak Hour Volumes:

LARKMEAD LANE

14 (6)
212 (161)
0 (0)

0 (0)
0 (0)
0 (0)

DAVIS ESTATES WINERY
ACCESS A

(9) 13
(0) 0
(11) 18

22 (9)
219 (148)
0 (0)

230 (172)
0 (0)

0 (0)
0 (0)

DAVIS ESTATES WINERY
ACCESS B

241 (157)
0 (0)

4,410 ADT
(4,410 ADT)

SILVERADO TRAIL

230 (172)
0 (0)

0 (0)
0 (0)

DAVIS ESTATES WINERY
ACCESS C

241 (157)
0 (0)

Near Term + Project Peak Hour Volumes:

LARKMEAD LANE

14 (6)
213 (163)
0 (1)

2 (1)
1 (0)
2 (1)

DAVIS ESTATES WINERY
ACCESS A

(9) 13
(0) 0
(12) 19

22 (9)
221 (149)
0 (1)

233 (174)
1 (2)

2 (2)
2 (1)

DAVIS ESTATES WINERY
ACCESS B

241 (159)
1 (1)

4,437 ADT
(4,440 ADT)

SILVERADO TRAIL

234 (174)
1 (1)

0 (1)
0 (0)

DAVIS ESTATES WINERY
ACCESS C

242 (159)
1 (0)

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

omni-means

figure 6

North
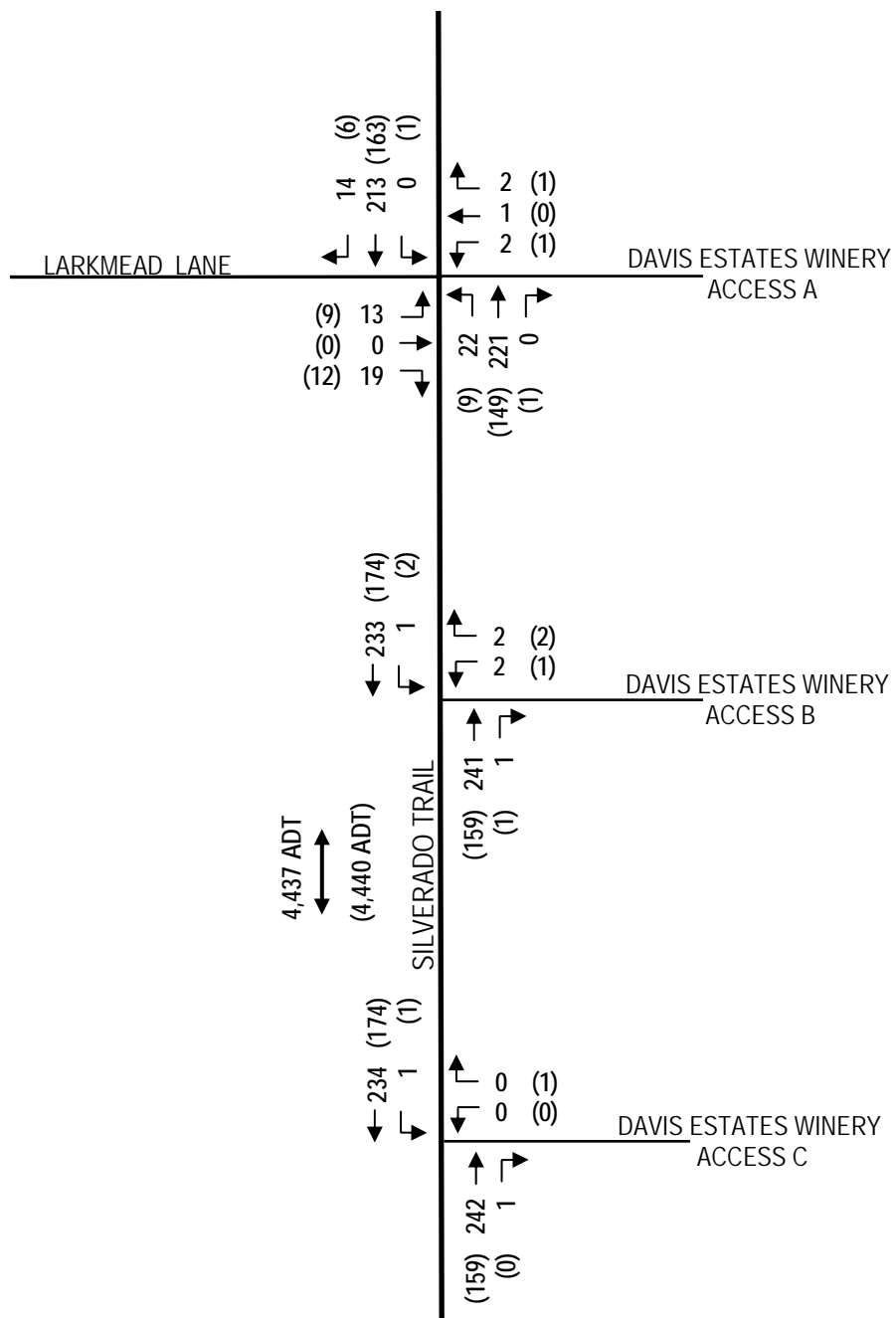
5. SITE ACCESS / DESIGN PARAMETERS

Sight Distances on Silverado Trail

Vehicle sight distances along Silverado Trail to/from the project driveways were evaluated. The required vehicle visibility or "corner sight distance" is a function of travel speeds on Silverado Trail. 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 at private access intersections the minimum corner sight distance "shall be equal to the stopping sight distance".

Silverado Trail has a posted speed limit of 50-55 mph. Radar speed surveys of Silverado Trail were also conducted at the project site.[8] The "critical" vehicle speed (the speed at which 85% of all surveyed vehicles travel at or below) along Silverado Trail was measured at 55-57 mph. Caltrans' design standards indicate that these vehicle speeds require a stopping sight distance of 500-550 feet, measured along the travel lanes on Silverado Trail.[9] Based on field measurements, sight distances from the driveway locations are in excess of this distance in both directions on Silverado Trail. Therefore, the sight distance recommendations are met for the speed limit and measured vehicle speeds. There is some vegetation south of the project site along the east side of Silverado Trail which may require occasional trimming in order to retain adequate sight distance from the south driveway.

Project Access and Circulation

A project site plan is provided in Figure 7. It is our understanding the driveways are proposed to be at least 18 feet wide which would meet the Napa County standard of 18 feet for two-way traffic flow.[10] Any changes or modifications to the proposed driveway designs should meet the roadway standards set forth by Napa County, including providing adequate turning radius at the driveway entrance to Silverado Trail for trucks serving the winery.

Each driveway would be designated for specific users. The north driveway would serve employee and truck trips, the middle driveway would serve visitor trips, and the south driveway would serve the private residential trips.

> In order to direct users of the site to the appropriate driveway, signs explaining the allowed vehicle type at each driveway should be installed at each driveway entrance. (For example, "Delivery Trucks Only" sign at the north driveway, "Visitor Entrance" sign at the middle driveway, and a "No Winery Access: Private Residence" sign at the south driveway.)

The Napa County Transportation & Planning Agency (NCTPA) in cooperation with Napa County and local City agencies is developing bicycle routes as outlined in the Napa Countywide Bicycle Plan.[11] The plan encourages new developments to incorporate bicycle friendly design. Silverado Trail has striped shoulder area bike lanes (Class II) in both directions. Some visitors may utilize bicycles to access the proposed project. The project would provide bicycle racks for visitors to the proposed winery.

Marketing Events

The winery proposes to host the following marketing events: two monthly events with 20-50 guests; and two annual events with 100 guests.

Based on standard auto occupancy rates, a monthly 50-person event would be expected to generate approximately 46-50 trips (25 in, 25 out) including visitors and staff. The largest events (100 people) would

generate up to 84-86 trips (43 in, 43 out). These events are typically of sufficient duration in length that the inbound and outbound trips occur in separate hours, thus the number of trips on the street network at one time are half of the total volume.

These events are usually held outside of typical peak traffic periods (during the middle of the day or later than 6:00 p.m.) and therefore generally do not impact peak hour operations. In the Use Permit Project Statement, it states the weekday evening events would occur after the peak traffic hour and would end by 9:00 p.m.; the weekend events would end by 10:00 p.m.; and no other visitation or events would occur during the larger monthly and annual events.

PROPOSED SITE PLAN
SCALE: 1" = 60'-0"

EXISTING SECOND RESIDENCE
PROPOSED WINERY
PROPOSED WINE BARN
EXISTING UTILITY BARN
EXISTING WINDMILL

EXISTING HISTORIC BARN APPROVED WINERY
EXISTING MAIN RESIDENCE w/ EXISTING TASTING ROOM

SILVERADO TRAIL

0'   60'   120'   180'   240'

BACKEN GILLAM KROEGER architects

DAVIS ESTATES
4060 SILVERADO TRAIL
CALISTOGA, CA

PROPOSED SITE PLAN

SCALE: AS NOTED

UP1.1

Project Site Plan

omni-means

figure 7

North

6. CUMULATIVE CONDITIONS

Cumulative Year 2030 Projections

Model Forecast

Cumulative (Year 2030) volume projections on Silverado Trail were derived from the Napa County Transportation & Planning Agency's traffic volume forecasts in the Napa County General Plan Update EIR.[12]   The forecast increase in volume-to-capacity (v/c) ratio from Year 2003 to Year 2030 on Silverado Trail in the project vicinity was applied to the provided Year 2003 peak hour two-way volume (559 trips) on Silverado Trail, yielding a volume of 1,344 weekday PM peak hour trips on Silverado Trail in Year 2030.

The projected cumulative volume represents a large (300%) increase compared to the existing (Year 2013) peak hour volume of 450 trips. With the forecasted volumes, the existing daily volume on Silverado Trail would increase from 4,140 trips to 12,400 daily trips.

Historical Data

For comparison, average annual daily traffic volumes on SR 29 south of Larkmead Lane over the previous twenty years were reviewed.   The AADT on SR 29 in Year 1992 was 10,000 trips and in Year 2011 was 12,700 trips. The volumes were highest in Year 2003, reaching 14,100 AADT. The daily volumes have declined since then and are lower today than they were in 1999. The increase in volumes between year 1992 and the highest year of 2003 equates to an annual increase of 3½% per year. Applying the same annual increase to the current ADT on Silverado Trail of 4,140 (a conservative approach) results in about 7,700 ADT in year 2030 (3½% per year added for 18 years).

Cumulative volumes based on historical data are approximately 60% of the model forecast volumes. The model volumes are higher than historical growth trends, therefore volumes may not increase to the model's forecasted levels (at least within the given timeframe). However, in order to proactively address potential traffic volumes under cumulative conditions, the County has adopted several measures identified in the General Plan to improve the street network and also reduce vehicle trips.

In order to identify weekend cumulative conditions, the General Plan Update provides a ratio of weekday to weekend peak hour volumes on key streets within the valley. Several segments on SR 29 in the vicinity of the project were shown to have an average ratio of 0.76-0.80, indicating weekend peak hour volumes are expected to be about 80% of weekday volumes. This corresponds with the volumes counted for this study which found the weekend peak hour volumes to be 67% of the weekday peak hour volumes. Therefore the future weekday vs. weekend peak hour volumes would be expected to remain in the same ratio as the existing volumes.

Cumulative Operating Conditions

Although cumulative volumes are tenuous, the forecast volumes would yield acceptable LOS 'C' or better conditions (less than 13,800 ADT) on Silverado Trail.

Additional improvements to the street network are anticipated and have been included in the General Plan's Improved 2030 Network model. As noted, the County has also adopted several measures identified in the General Plan to reduce vehicle trips through public transit and Transportation Demand Management (TDM) strategies: "The project should support programs to reduce single occupant vehicle use and encourage alternative travel modes."

In keeping with the policy, the winery project will provide bicycle racks for visitors who may arrive by bike. The project should also promote the use of public transportation and carpooling of employees (by adjusting work schedules, etc.) to facilitate the use of other transportation modes.

The County has identified other mitigation policies, including development of a traffic impact fee (TIF) 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. Examples of such improvements could include construction of a two-way left turn lane on Silverado Trail or signalizing the Silverado Trail/Larkmead Lane intersection. The concept is under development but presumably the fee would be applied on a "per trip" basis if/when implemented.

7. SUMMARY AND CONCLUSIONS

The findings of the study and recommendations are presented as follows:

The proposed Davis Estates Winery project was calculated to generate 51-60 daily trips and 12-13 peak hour trips. The project traffic (approximately 28-33 daily trips to the north and 20-24 trips to the south) would represent an increase of approximately 0.7% to existing volumes (4,140 trips) and near term volumes (4,410 trips) on Silverado Trail.

- Silverado Trail traffic flows would continue to operate at acceptable LOS 'B' conditions with the project.

The northern winery driveway westbound approach operates at LOS 'A' under existing and near term peak hour conditions without the project and would operate at LOS 'B' with the added project trips. The eastbound Larkmead Lane approach operates at LOS 'B' without the project trips and would continue to do so with the project during weekday and weekend peak hours. The middle driveway westbound approach would operate at LOS 'B' and the south driveway westbound approach would operate at LOS 'A' under existing and near term conditions with the project.

- The study intersections would also operate at satisfactory levels-of-service (LOS 'A'-'B') with the proposed winery trips.

The project trips would be distributed at the three driveways with employee and truck trips using the north driveway, visitor trips using the middle driveway, and the private residential trips using the south driveway.

- The winery's volumes would not warrant a left turn lane on Silverado Trail at any of the driveways based on Napa County standards. The volumes would also be below the thresholds at which right turn lanes would be needed.

Based on field observations, the available sight distances along Silverado Trail at the driveways would be adequate. (The project's Civil Engineer should confirm the adequacy of sight distances along Silverado Trail.) However, there is some vegetation south of the project site on the east side of Silverado Trail.

- The vegetation growth south of the project on the east side of Silverado Trail should be monitored and trimmed, if necessary, in order to retain adequate sight distance from the south driveway.

It is our understanding that all of the winery access driveways will be designed to meet the Napa County standards for travel widths and turning radii for inbound and outbound vehicles. Therefore, the access driveways would reflect an adequate design to accommodate the projected traffic flows.

- Any changes or modifications to the driveways should be designed to meet the County standards.

The project driveways would be designated for specific users, with the north driveway serving employee and truck trips, the middle driveway serving visitor trips, and the south driveway serving the private residential trips.

- In order to direct motorists to the appropriate access location, signs explaining the allowed vehicle type should be installed at each driveway.

Cumulative (Year 2030) conditions were assessed based on a review of volume forecasts from the Napa County General Plan Update transportation model as well as historical volume data. The model forecast volumes are substantially higher than historical volume growth over the past twenty years would indicate. Therefore it is unlikely volumes will increase to the model's forecasted levels. The projections on Silverado Trail near the project vicinity represent LOS 'C' or better conditions.

However, the General Plan also seeks to proactively address potential volume increases by implementing planned street improvements and reducing vehicle trips from proposed projects by encouraging alternative transportation modes. In keeping with the policy, the proposed project would provide bicycle racks for visitors who may ride bikes to the winery. The winery should also work with employees to reduce vehicle trips by providing public transit information and allow scheduling options to facilitate carpooling.

A traffic impact fee may be adopted by the County to fund the General Plan improvements or other projects. If a TIF program were enacted, the proposed project could contribute a "fair share" towards such future circulation improvements.

References:

(1)   Napa County daily volume count, March 2003.

(2)   Napa County Baseline Data Report, Chapter 11 – Transportation and Circulation, November 2005.

(3)   Omni-Means Engineers & Planners, traffic counts on January 19, 2013 (1:00-3:00 p.m.) and January 28, 2013 (4:00-6:00 p.m.).

(4)   Napa County, *Adopted Road and Street Standards*, revised November 21, 2006.

(5)   Transportation Research Board, National Cooperative Highway Research Program Report 279, "Intersection Channelization Design Guide", November, 1985.

(6)   Napa County, Larkmead Vineyard Expansion.

(7)   City of Calistoga, Silver Rose Winery/Resort and Indian Springs Expansion Project.

(8)   Omni-Means Engineers & Planners, ibid.

(9)   Caltrans, *Highway Design Manual*, July 1, 2004.

(10)   Napa County, *Adopted Road and Street Standards*, revised November 21, 2006.

(11)   Napa County, Countywide Bicycle Plan (2012), Planning Area-North Valley, May 2012.

(12)   Napa County, *The Napa County General Plan Update EIR*, prepared by Dowling Associates, Inc., February 9, 2007.

APPENDIX

- Level of Service Definitions

- Level of Service Calculations

- Napa County Left Turn Lane Warrant Graphs

- Right Turn Lane Warrant Graphs

- Existing Volume Counts

- Radar Speed Surveys

LEVEL-OF-SERVICE CRITERIA FOR INTERSECTIONS

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.	$\leq$ 10.0 secs. $\leq$ 0.60 v/c	$\leq$ 10.0	$\leq$ 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 $\leq$ 20.0 secs. 0.61 – 0.70 v/c	>10 and $\leq$ 15.0	>10 and $\leq$ 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 $\leq$ 35.0 secs. 0.71 – 0.80 v/c	>15 and $\leq$ 25.0	>15 and $\leq$ 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 $\leq$ 55.0 secs. 0.81 – 0.90 v/c	>25 and $\leq$ 35.0	>25 and $\leq$ 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 $\leq$ 80.0 secs. 0.91 – 1.00 v/c	>35 and $\leq$ 50.0	>35 and $\leq$ 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. For the purposes of this study, CCTA intersection methodology has been used for signalized intersections yielding an LOS and v/c ratio.

Napa County Roadway Segment Daily LOS Volume Thresholds

Facility Class	Lanes	Area Type	LOS A	LOS B	LOS C	LOS D	LOS E
Freeway	4	All	23,800	39,600	55,200	67,100	74,600
	6	All	36,900	61,100	85,300	103,600	115,300
	8	All	49,900	82,700	115,300	140,200	156,000
Arterial[1]	2	Rural[2]	2,600	5,300	8,600	13,800	22,300
	2	Urban[3]	1,000	1,900	11,200	15,400	16,300
	4	Rural[2]	17,500	28,600	40,800	52,400	58,300
	4	Urban[3]	1,500	4,100	26,000	32,700	34,500
	6	Urban[3]	2,275	6,500	40,300	49,200	51,800
Collector[1]	2	All	1,067	3,049	9,100	14,600	15,600
	4	All	2,509	7,169	21,400	31,100	32,900

Notes:

[1] All two-lane roads are assumed to be undivided. Four- and six-lane roads are assumed to be divided.

[2] Rural roads are assumed as uninterrupted flow highways; FDOT Capacity Table 4-3.

[3] Urban arterials are assumed to be Class III with >4.5 signals per mile; FDOT Capacity Table 4.1

Source: Adapted from Florida Department of Transportation 2002; and Fehr & Peers 2005

Napa County Baseline Data Report, Chapter 11 Transportation and Circulation, November 2005.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⟷			⟷			⟷			⟷	
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	0	18	0	0	0	22	207	0	0	203	14
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)	14	0	20	0	0	0	24	225	0	0	221	15
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	511	511	238	531	519	235	241			230		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	511	511	238	531	519	235	241			230		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	98	100	100	100	98			100		
cM capacity (veh/h)	460	454	794	435	449	797	1320			1332		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	0	249	236
Volume Left	14	0	24	0
Volume Right	20	0	0	15
cSH	609	1700	1320	1332
Volume to Capacity	0.06	0.00	0.02	0.00
Queue Length 95th (ft)	4	0	1	0
Control Delay (s)	11.3	0.0	0.9	0.0
Lane LOS	B	A	A	
Approach Delay (s)	11.3	0.0	0.9	0.0
Approach LOS	B	A		

Intersection Summary				
Average Delay		1.2		
Intersection Capacity Utilization		39.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⋎		⯈			⯇
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	229	0	0	221
Peak Hour Factor	0.92	0.92	0.92	0.92	-0.92	0.92
Hourly flow rate (vph)	0	0	249	0	0	240
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	489	249			249	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	489	249			249	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	538	790			1317	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	249	240
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1317
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		15.4%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		⇞			⇙
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	229	0	0	221
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	249	0	0	240
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	489	249			249	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	489	249			249	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	538	790			1317	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	249	240
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1317
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		15.4%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	0	10	0	0	0	9	134	0	0	147	6
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)	10	0	11	0	0	0	10	146	0	0	160	7
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	338	338	173	349	342	156	171			151		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	338	338	173	349	342	156	171			151		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	100	100	100	99			100		
cM capacity (veh/h)	603	574	863	586	572	883	1400			1424		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1		
Volume Total	21	0	155	166		
Volume Left	10	0	10	0		
Volume Right	11	0	0	7		
cSH	717	1700	1400	1424		
Volume to Capacity	0.03	0.00	0.01	0.00		
Queue Length 95th (ft)	2	0	1	0		
Control Delay (s)	10.2	0.0	0.5	0.0		
Lane LOS	B	A	A			
Approach Delay (s)	10.2	0.0	0.5	0.0		
Approach LOS	B	A				

Intersection Summary				
Average Delay		0.9		
Intersection Capacity Utilization		26.0%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⊻		↿			⇃
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	143	0	0	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	155	0	0	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	326	155			155	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	155			155	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	668	890			1425	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	155	171
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1425
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		11.6%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	ᚁ		ᚂ			ᚃ
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	143	0	0	157
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	155	0	0	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	326	155			155	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	326	155			155	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	668	890			1425	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	155	171
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1425
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		11.6%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	0	19	2	1	2	22	209	0	0	204	14
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)	14	0	21	2	1	2	24	227	0	0	222	15
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	517	514	239	535	522	237	242			232		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	517	514	239	535	522	237	242			232		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	97	99	100	100	98			100		
cM capacity (veh/h)	453	452	793	432	447	795	1319			1330		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	5	251	237
Volume Left	14	2	24	0
Volume Right	21	2	0	15
cSH	608	533	1319	1330
Volume to Capacity	0.06	0.01	0.02	0.00
Queue Length 95th (ft)	5	1	1	0
Control Delay (s)	11.3	11.8	0.9	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.3	11.8	0.9	0.0
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↟			↟
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	2	229	1	1	224
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	249	1	1	243
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	495	249			250	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	495	249			250	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	533	789			1316	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	250	245
Volume Left	2	0	1
Volume Right	2	1	0
cSH	637	1700	1316
Volume to Capacity	0.01	0.15	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.7	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	10.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		22.6%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		♪			↲
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	230	1	1	225
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	250	1	1	245
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	497	251			251	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	497	251			251	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	532	788			1314	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	251	246
Volume Left	0	0	1
Volume Right	0	1	0
cSH	1700	1700	1314
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.0%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	0	11	1	0	1	9	135	1	1	149	6
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)	10	0	12	1	0	1	10	147	1	1	162	7
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	345	345	175	356	348	157	173			153		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	345	345	175	356	348	157	173			153		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	100	100	100	99			100		
cM capacity (veh/h)	596	569	861	579	567	881	1397			1422		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	2	158	170
Volume Left	10	1	10	1
Volume Right	12	1	1	7
cSH	717	698	1397	1422
Volume to Capacity	0.03	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	10.2	10.2	0.5	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	10.2	10.2	0.5	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	2	145	1	2	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	158	1	2	173
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	335	158			159	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	335	158			159	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	659	887			1421	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	159	175
Volume Left	1	0	2
Volume Right	2	1	0
cSH	795	1700	1421
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.5	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.5	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		20.0%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↟			↴
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	1	145	0	1	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	158	0	1	173
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	333	158			158	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	333	158			158	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	662	888			1422	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	158	174
Volume Left	0	0	1
Volume Right	1	0	0
cSH	888	1700	1422
Volume to Capacity	0.00	0.09	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.1	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		19.2%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	0	18	0	0	0	22	219	0	0	212	14
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)	14	0	20	0	0	0	24	238	0	0	230	15
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	534	534	248	553	542	248	251			243		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	534	534	248	553	542	248	251			243		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	98	100	100	100	98			100		
cM capacity (veh/h)	444	440	784	420	436	784	1309			1318		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	34	0	262	246
Volume Left	14	0	24	0
Volume Right	20	0	0	15
cSH	593	1700	1309	1318
Volume to Capacity	0.06	0.00	0.02	0.00
Queue Length 95th (ft)	5	0	1	0
Control Delay (s)	11.4	0.0	0.9	0.0
Lane LOS	B	A	A	
Approach Delay (s)	11.4	0.0	0.9	0.0
Approach LOS	B	A		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		39.9%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⅄		⍏			⟨
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	241	0	0	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	262	0	0	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	512	262			262	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	512	262			262	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	522	777			1302	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	262	250
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1302
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.0%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		ꜛ			ꜛ
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	241	0	0	230
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	262	0	0	250
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	512	262			262	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	512	262			262	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	522	777			1302	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	262	250
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1302
Volume to Capacity	0.00	0.15	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.0%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	0	11	0	0	0	9	148	0	0	161	6
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)	10	0	12	0	0	0	10	161	0	0	175	7
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	369	369	188	381	372	171	187			166		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369	369	188	381	372	171	187			166		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	99	100	100	100	99			100		
cM capacity (veh/h)	576	552	847	558	550	866	1382			1406		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	0	171	182
Volume Left	10	0	10	0
Volume Right	12	0	0	7
cSH	699	1700	1382	1406
Volume to Capacity	0.03	0.00	0.01	0.00
Queue Length 95th (ft)	2	0	1	0
Control Delay (s)	10.3	0.0	0.5	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.3	0.0	0.5	0.0
Approach LOS	B	A		

Intersection Summary				
Average Delay		0.8		
Intersection Capacity Utilization		26.7%	ICU Level of Service	A
Analysis Period (min)		15		

	↰	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		↑↰			↰↑
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	157	0	0	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	171	0	0	187
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	358	171			171	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	171			171	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	641	873			1407	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	171	187
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1407
Volume to Capacity	0.00	0.10	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		12.4%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⅄		↟			↲
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	157	0	0	172
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	171	0	0	187
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	358	171			171	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	171			171	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	641	873			1407	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	171	187
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1700	1407
Volume to Capacity	0.00	0.10	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		12.4%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	0	19	2	1	2	22	221	0	0	213	14
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)	14	0	21	2	1	2	24	240	0	0	232	15
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	540	537	249	558	545	250	252			245		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	540	537	249	558	545	250	252			245		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	97	99	100	100	98			100		
cM capacity (veh/h)	438	438	783	417	434	782	1308			1315		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	35	5	264	247
Volume Left	14	2	24	0
Volume Right	21	2	0	15
cSH	593	517	1308	1315
Volume to Capacity	0.06	0.01	0.02	0.00
Queue Length 95th (ft)	5	1	1	0
Control Delay (s)	11.4	12.0	0.9	0.0
Lane LOS	B	B	A	
Approach Delay (s)	11.4	12.0	0.9	0.0
Approach LOS	B	B		

Intersection Summary				
Average Delay		1.3		
Intersection Capacity Utilization		40.1%	ICU Level of Service	A
Analysis Period (min)		15		

	⬈	⬋	↑	⬉	⬊	↓

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	⅄		⇂			⇃
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	2	2	241	1	1	233
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	262	1	1	253
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	518	262			263	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	518	262			263	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	517	776			1301	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	4	263	254
Volume Left	2	0	1
Volume Right	2	1	0
cSH	621	1700	1301
Volume to Capacity	0.01	0.15	0.00
Queue Length 95th (ft)	1	0	0
Control Delay (s)	10.8	0.0	0.0
Lane LOS	B		A
Approach Delay (s)	10.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		23.1%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		⅏			⅏
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	242	1	1	234
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	263	1	1	254
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520	264			264	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520	264			264	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	516	775			1300	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	0	264	255
Volume Left	0	0	1
Volume Right	0	1	0
cSH	1700	1700	1300
Volume to Capacity	0.00	0.16	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS	A		A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.0	
Intersection Capacity Utilization		16.4%	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		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	9	0	12	1	0	1	9	149	1	1	163	6
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)	10	0	13	1	0	1	10	162	1	1	177	7
Pedestrians		5			5			5			5	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	376	375	190	388	378	172	189			168		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	376	375	190	388	378	172	189			168		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	98	100	100	100	99			100		
cM capacity (veh/h)	569	547	844	551	545	864	1380			1404		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	2	173	185
Volume Left	10	1	10	1
Volume Right	13	1	1	7
cSH	699	673	1380	1404
Volume to Capacity	0.03	0.00	0.01	0.00
Queue Length 95th (ft)	3	0	1	0
Control Delay (s)	10.3	10.4	0.5	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	10.3	10.4	0.5	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	25.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↟			↲
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	1	2	159	1	2	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	2	173	1	2	189
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	367	173			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	367	173			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	632	870			1403	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	3	174	191
Volume Left	1	0	2
Volume Right	2	1	0
cSH	773	1700	1403
Volume to Capacity	0.00	0.10	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.7	0.0	0.1
Lane LOS	A		A
Approach Delay (s)	9.7	0.0	0.1
Approach LOS	A		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		20.8%	ICU Level of Service	A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	¥		↟			↲
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	1	159	0	1	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	-0.92
Hourly flow rate (vph)	0	1	173	0	1	189
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	364	173			173	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	364	173			173	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	635	871			1404	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	1	173	190
Volume Left	0	0	1
Volume Right	1	0	0
cSH	871	1700	1404
Volume to Capacity	0.00	0.10	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	9.1	0.0	0.0
Lane LOS	A		A
Approach Delay (s)	9.1	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		20.0%	ICU Level of Service	A
Analysis Period (min)		15	

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

No Left Turn Lane Required

DAVIS ESTATE ACCESS A
Private Road/Driveway ADT

(Y-axis values: 0, 16, 50, 100, 150, 200, 250, 300)

(X-axis values: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, **4,168**, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500)

Roadway   ADT
SILVERADO TRAIL
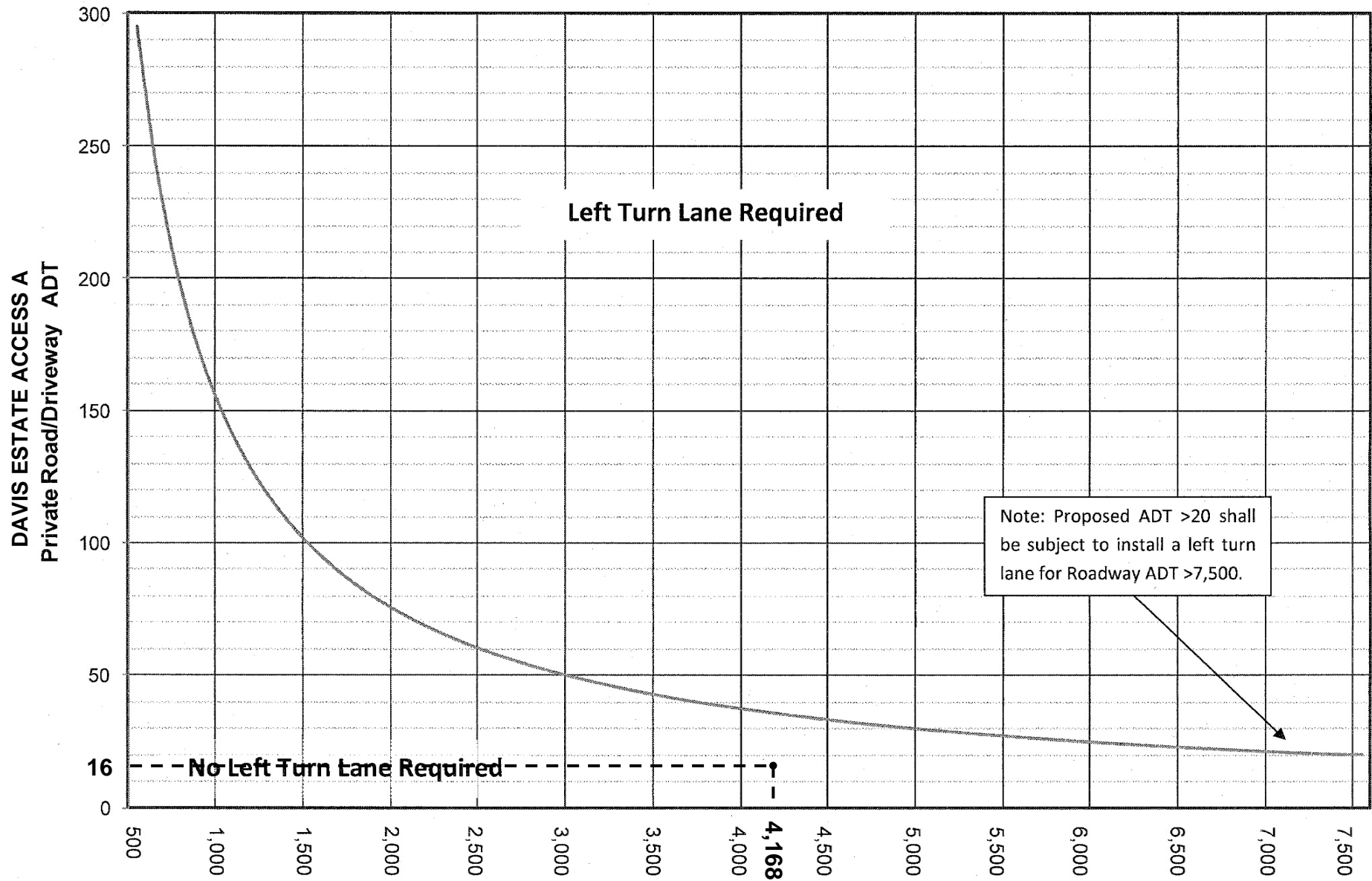
Davis Estate Winery Access A:
Weekday Existing + Project Conditions:
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

No Left Turn Lane Required

Y-axis: **DAVIS ESTATE ACCESS A** / **Private Road/Driveway ADT** — 0, 16, 50, 100, 150, 200, 250, 300

X-axis: **Roadway ADT / SILVERADO TRAIL** — 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, **4,173**, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500
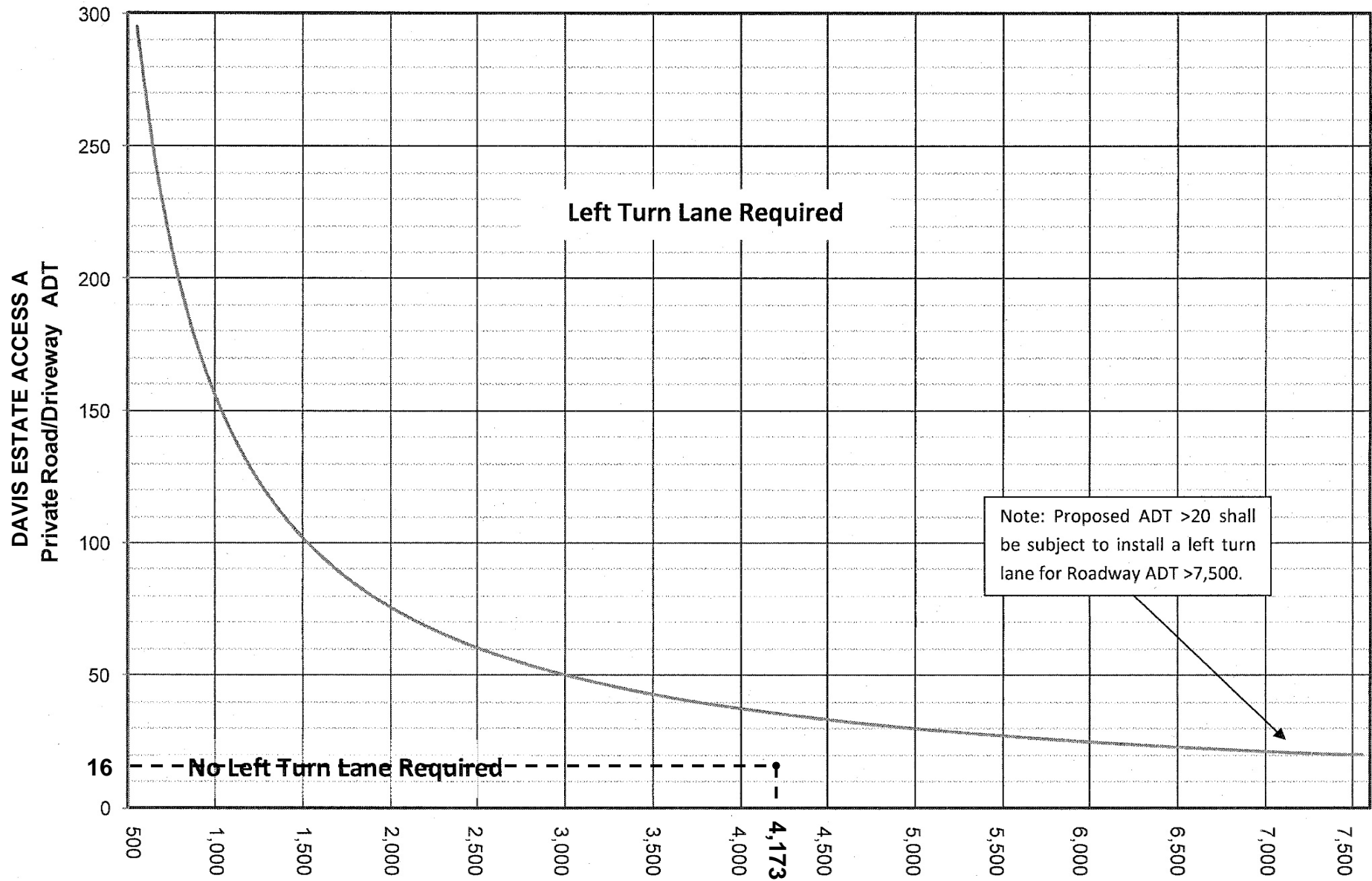
Davis Estate Winery Access A:
Weekend Existing + Project Conditions:
Left Turn Lane Not Warranted

Napa County, *Adopted Road and Street Standards*, revised August 31, 2004.

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

16 No Left Turn Lane Required

Y-axis: DAVIS ESTATE ACCESS A — Private Road/Driveway ADT (0, 16, 50, 100, 150, 200, 250, 300)

X-axis: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,438, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500
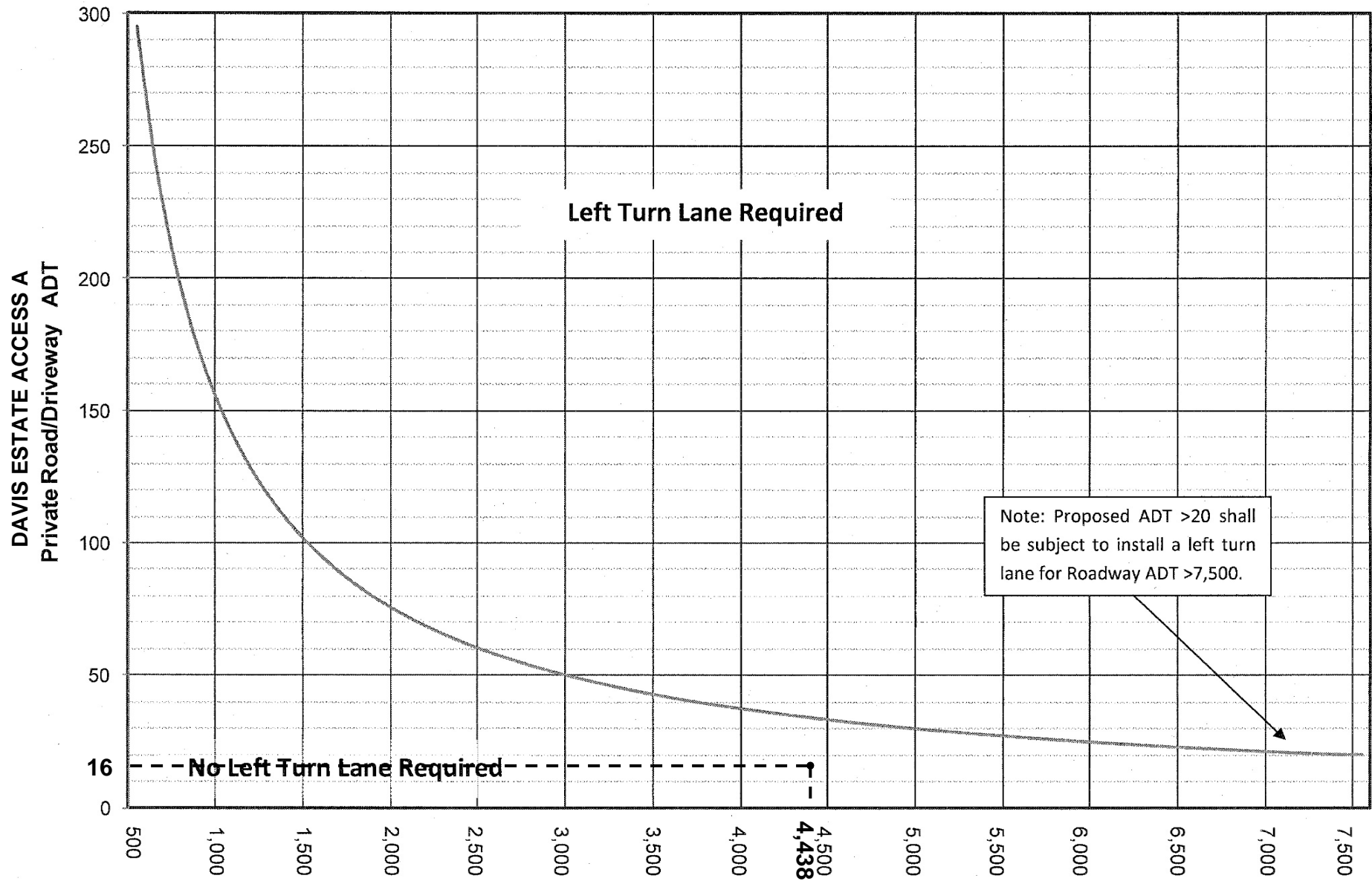
Davis Estate Winery Access A:
Weekday Near Term + Project Conditions
Left Turn Lane Not Warranted

Roadway   ADT
SILVERADO TRAIL

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

No Left Turn Lane Required

Y-axis: DAVIS ESTATE ACCESS A Private Road/Driveway ADT — 0, 16, 50, 100, 150, 200, 250, 300

X-axis: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,443, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500

**Roadway   ADT
SILVERADO TRAIL**
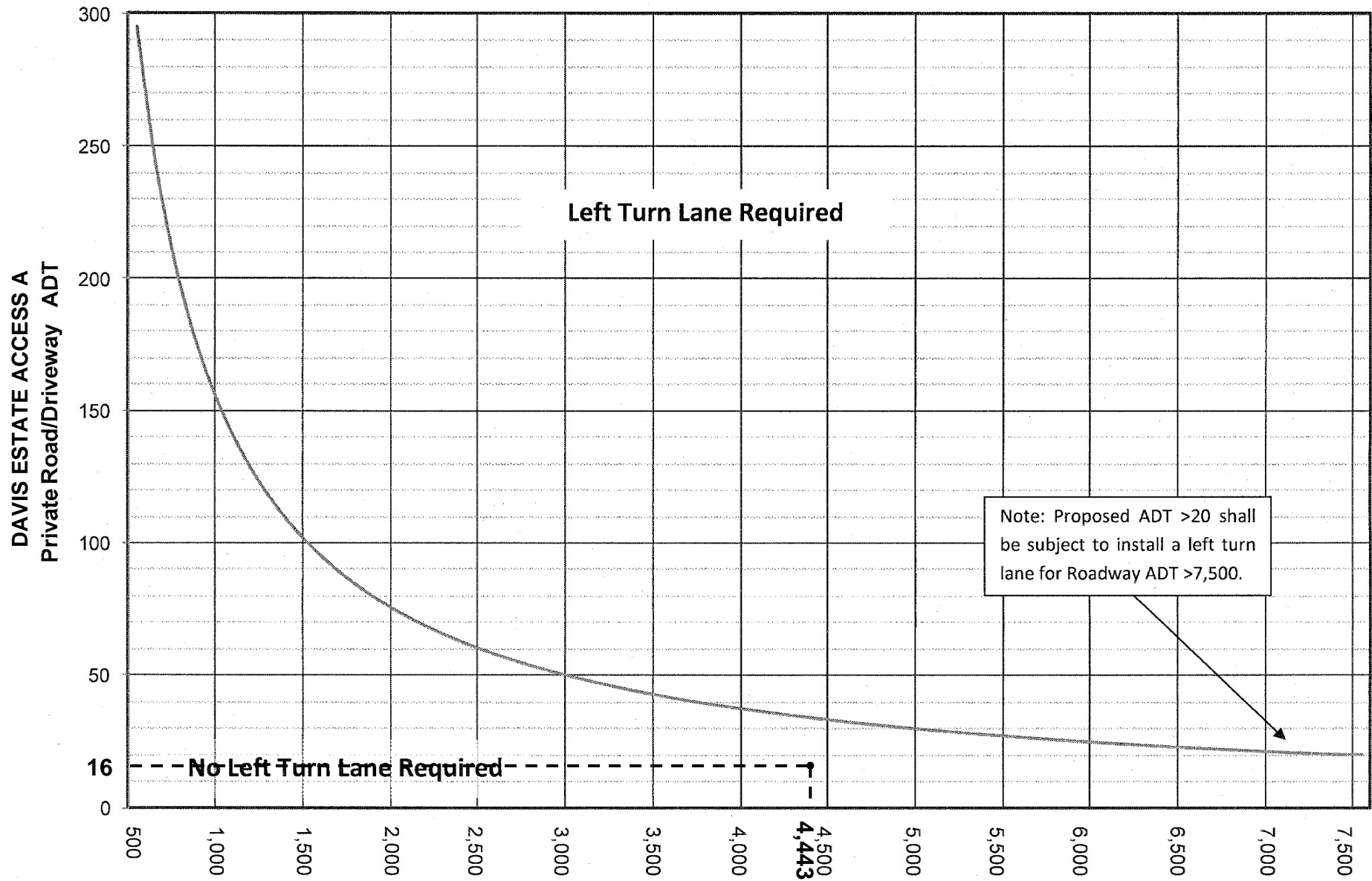
**Davis Estate Winery Access A:
Weekend Near Term + Project Conditions
Left Turn Lane Not Warranted**

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

15 – – – – No Left Turn Lane Required –

Y-axis: DAVIS ESTATE ACCESS B — Private Road/Driveway ADT

Y-axis values: 0, 15, 50, 100, 150, 200, 250, 300

X-axis values: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, **4,168**, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500
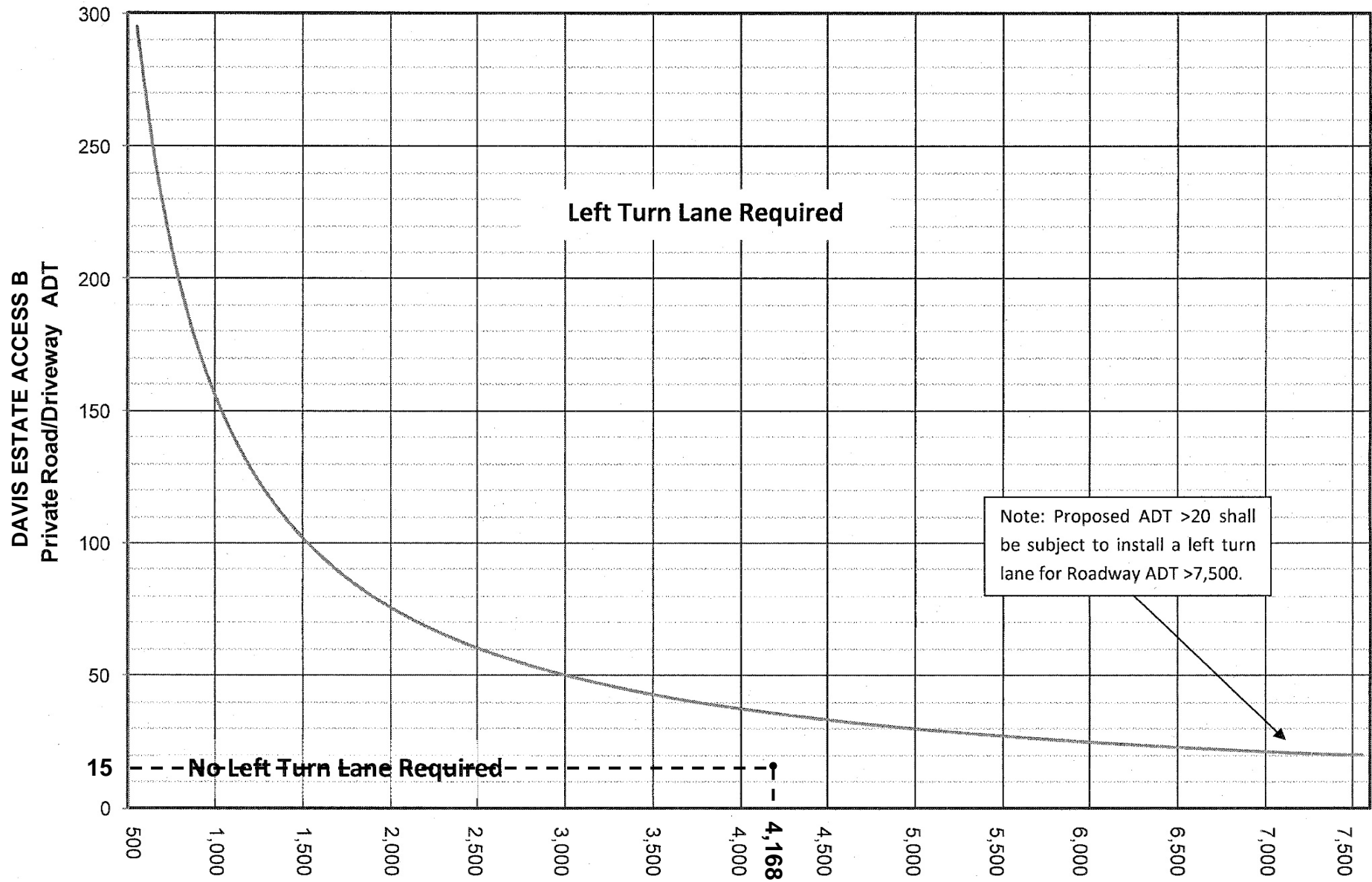
Davis Estate Winery Access B:
Weekday Existing + Project Conditions:
Left Turn Lane Not Warranted

Roadway   ADT
SILVERADO TRAIL

LEFT TURN LANE WARRANT GRAPH

Y-axis: DAVIS ESTATE ACCESS B — Private Road/Driveway ADT (0, 24, 50, 100, 150, 200, 250, 300)

X-axis: Roadway ADT — SILVERADO TRAIL (500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,173, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500)

Left Turn Lane Required

No Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.
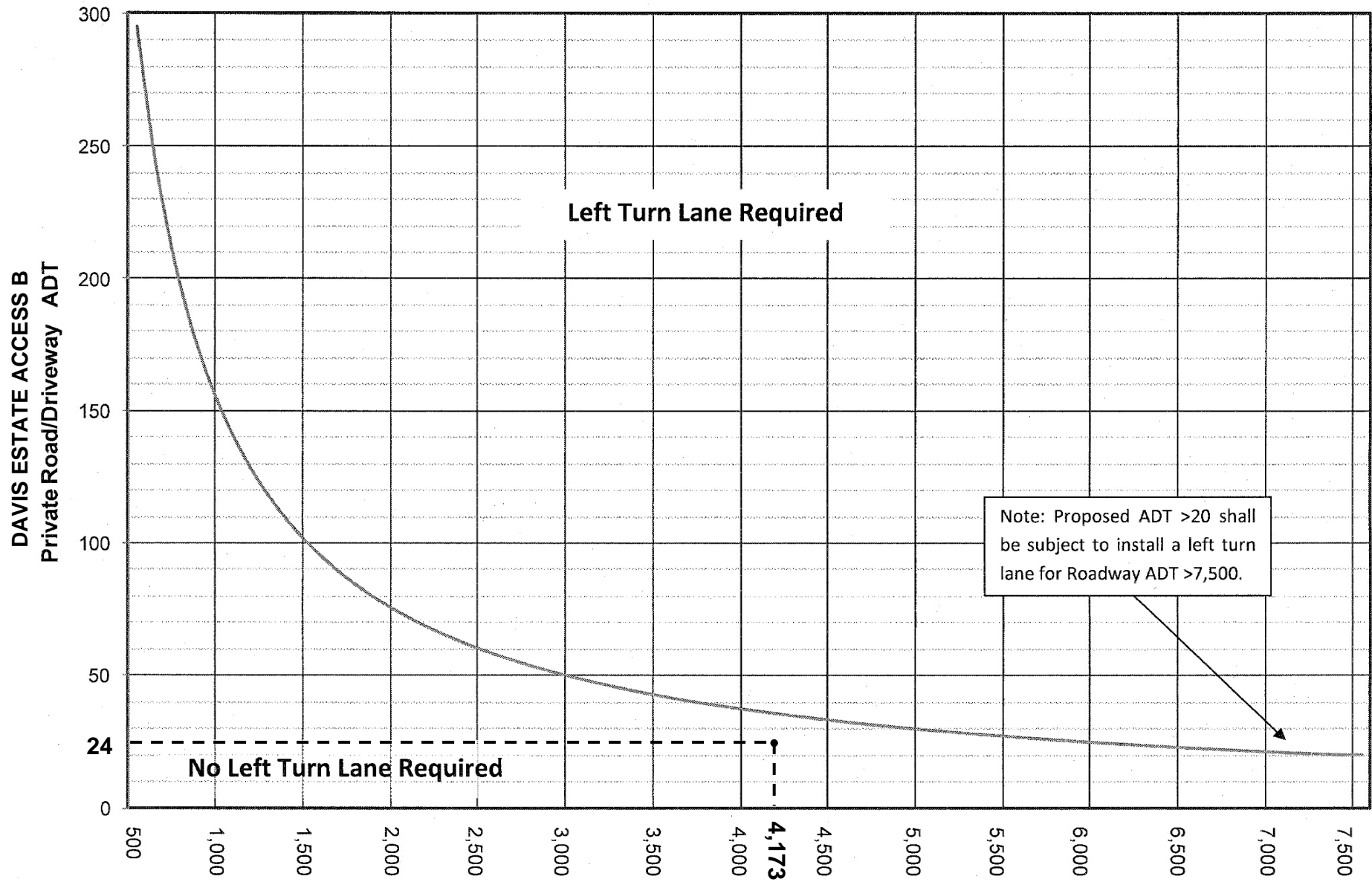
Davis Estate Winery Access B:
Weekend Existing + Project Conditions
Left Turn Lane Not Warranted

Roadway   ADT
SILVERADO TRAIL

Napa County, *Adopted Road and Street Standards*, revised August 31, 2004.

LEFT TURN LANE WARRANT GRAPH

DAVIS ESTATE ACCESS B
Private Road/Driveway ADT (y-axis)

Roadway   ADT
SILVERADO TRAIL (x-axis)

Left Turn Lane Required

No Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.
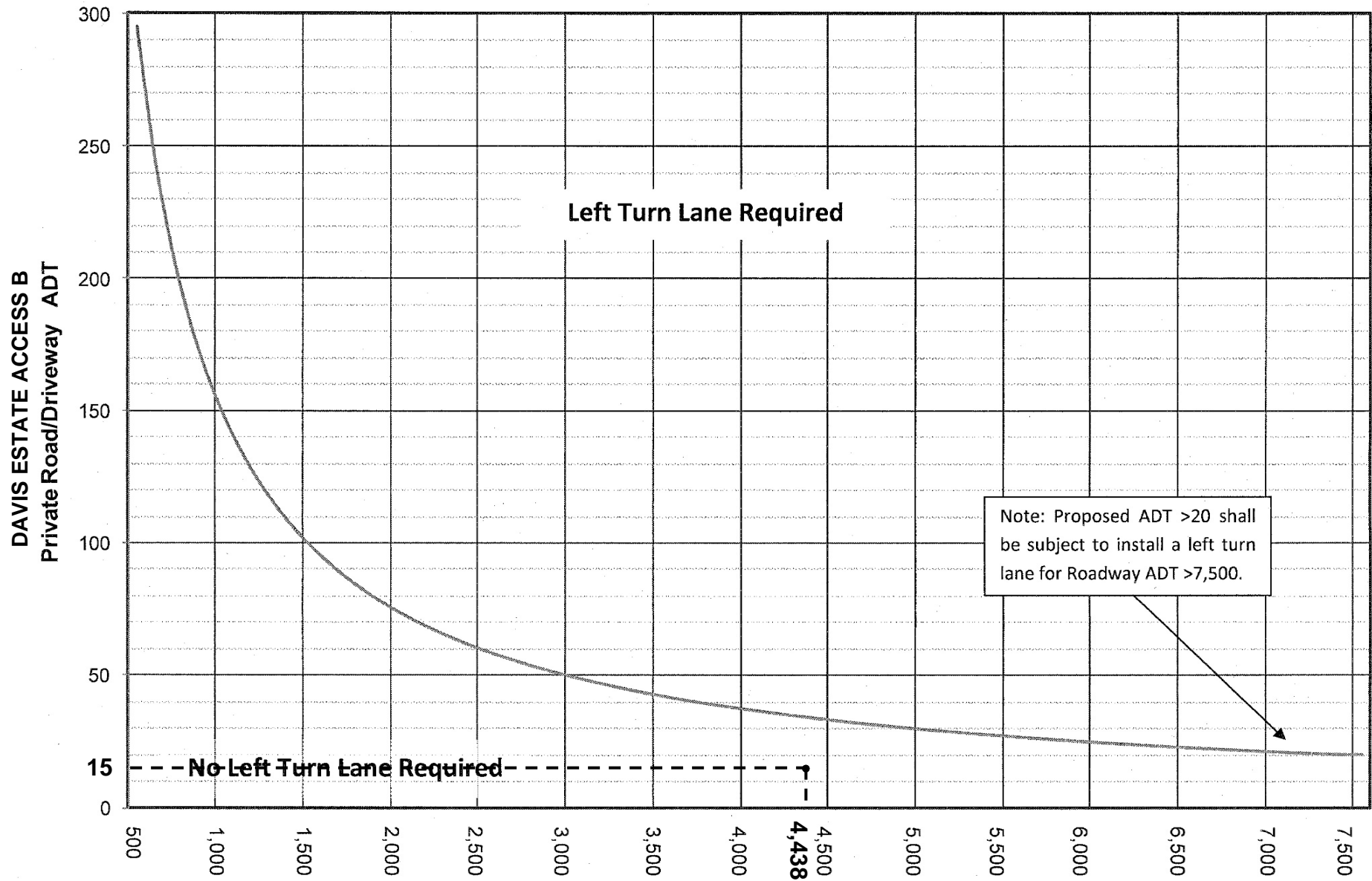
Davis Estate Winery Access B:
Weekday Near Term + Project Conditions:
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

No Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

Y-axis: DAVIS ESTATE ACCESS B — Private Road/Driveway ADT

0, 24, 50, 100, 150, 200, 250, 300

X-axis: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, **4,443**, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500

Roadway ADT
SILVERADO TRAIL
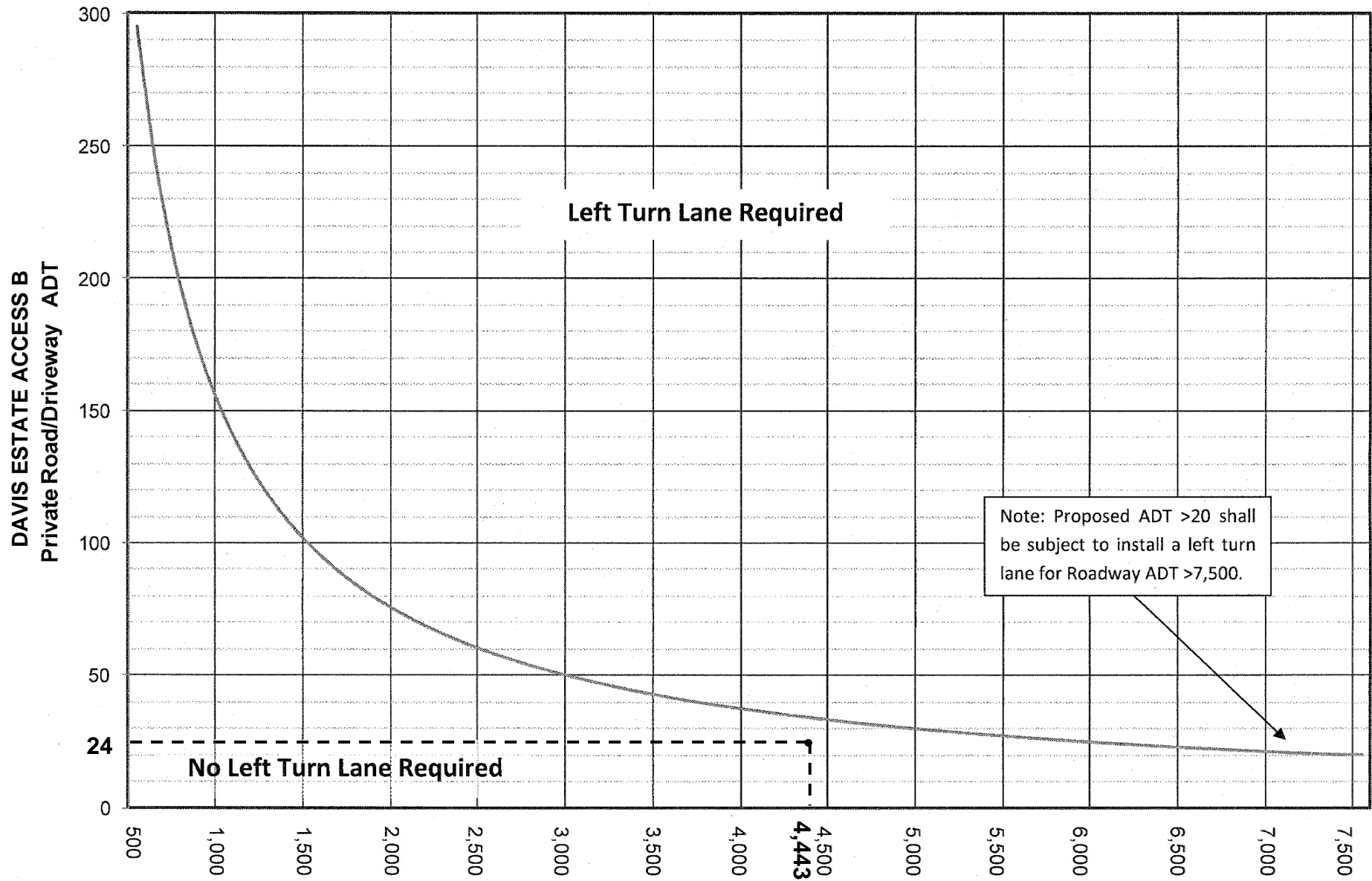
Davis Estate Winery Access B:
Weekend Near Term + Project Conditions
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

DAVIS ESTATE ACCESS C
Private Road/Driveway ADT

Left Turn Lane Required

No Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

Y-axis values: 300, 250, 200, 150, 100, 50, 20, 0

X-axis values: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, **4,165**, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500

Roadway   ADT
SILVERADO TRAIL
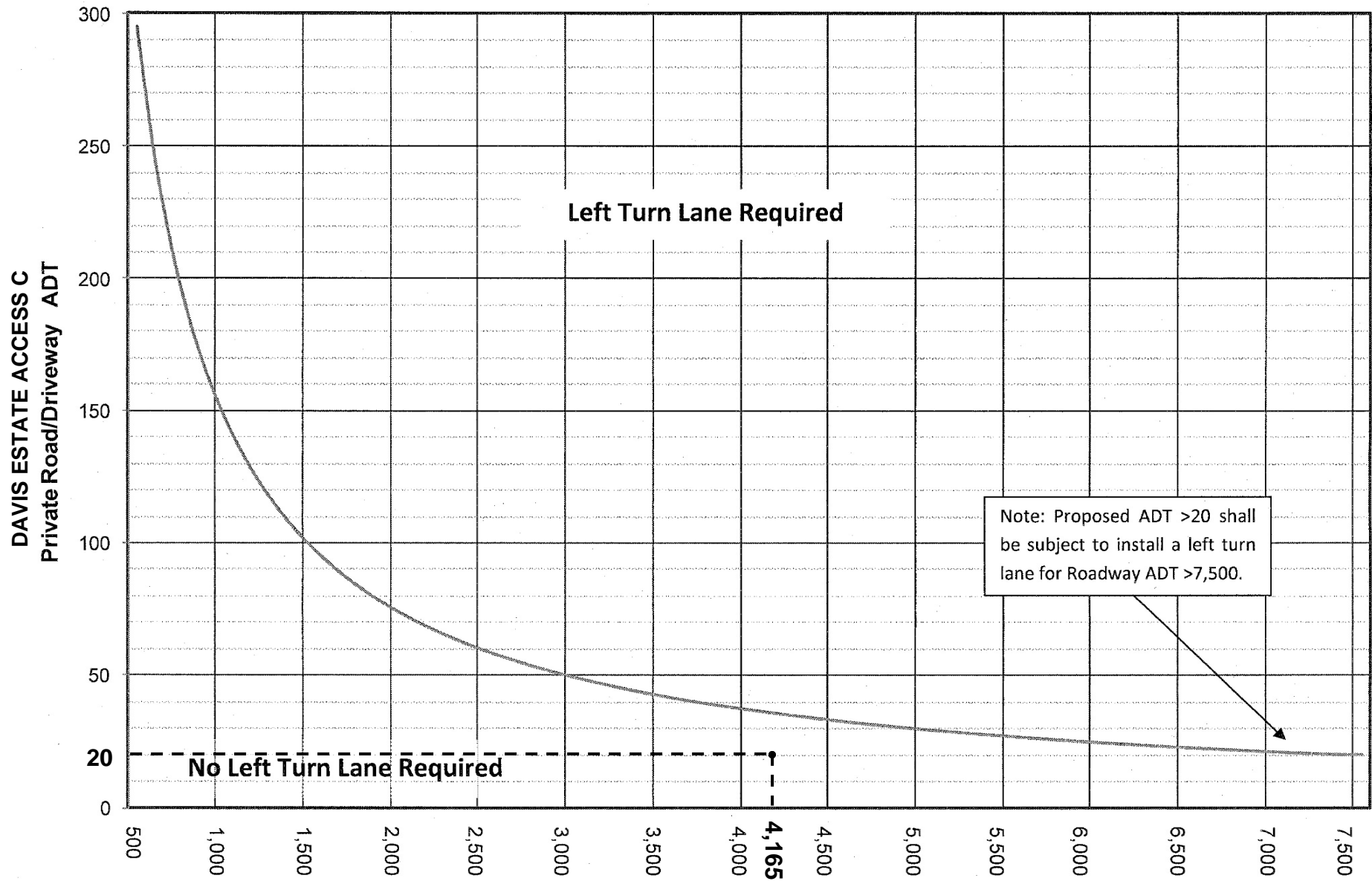
Davis Estate Winery Access C:
Weekday Existing + Project Conditions
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

DAVIS ESTATE ACCESS C
Private Road/Driveway ADT

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

No Left Turn Lane Required

4,169

Roadway   ADT
SILVERADO TRAIL
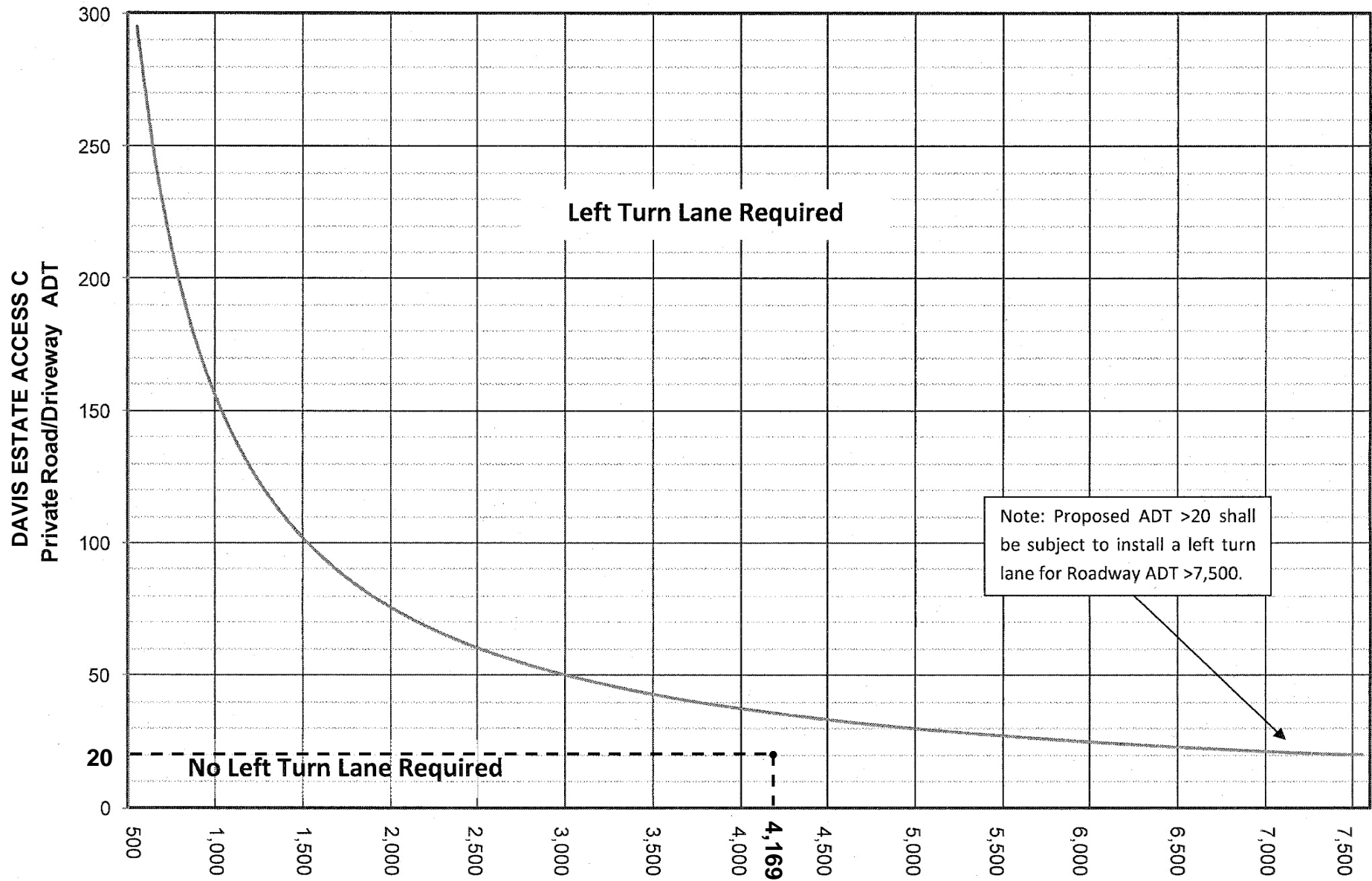
Davis Estate Winery Access C:
Weekend Existing + Project Conditions
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

No Left Turn Lane Required

DAVIS ESTATE ACCESS C
Private Road/Driveway ADT

Roadway ADT
SILVERADO TRAIL
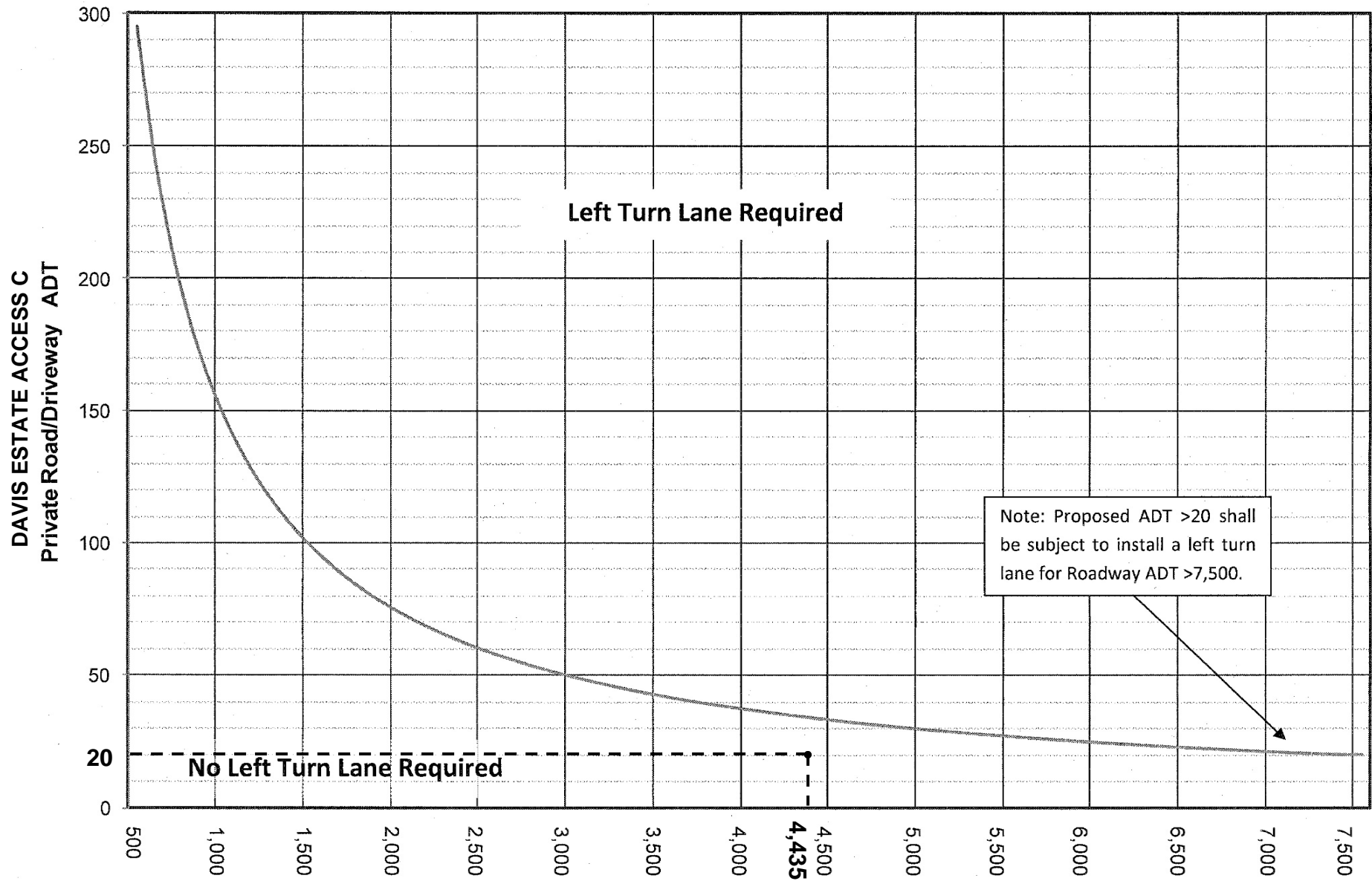
Davis Estate Winery Access C:
Weekday Near Term + Project Conditions
Left Turn Lane Not Warranted

LEFT TURN LANE WARRANT GRAPH

Left Turn Lane Required

No Left Turn Lane Required

Note: Proposed ADT >20 shall be subject to install a left turn lane for Roadway ADT >7,500.

DAVIS ESTATE ACCESS C
Private Road/Driveway ADT

(y-axis values: 0, 20, 50, 100, 150, 200, 250, 300)

(x-axis values: 500, 1,000, 1,500, 2,000, 2,500, 3,000, 3,500, 4,000, 4,439, 4,500, 5,000, 5,500, 6,000, 6,500, 7,000, 7,500)
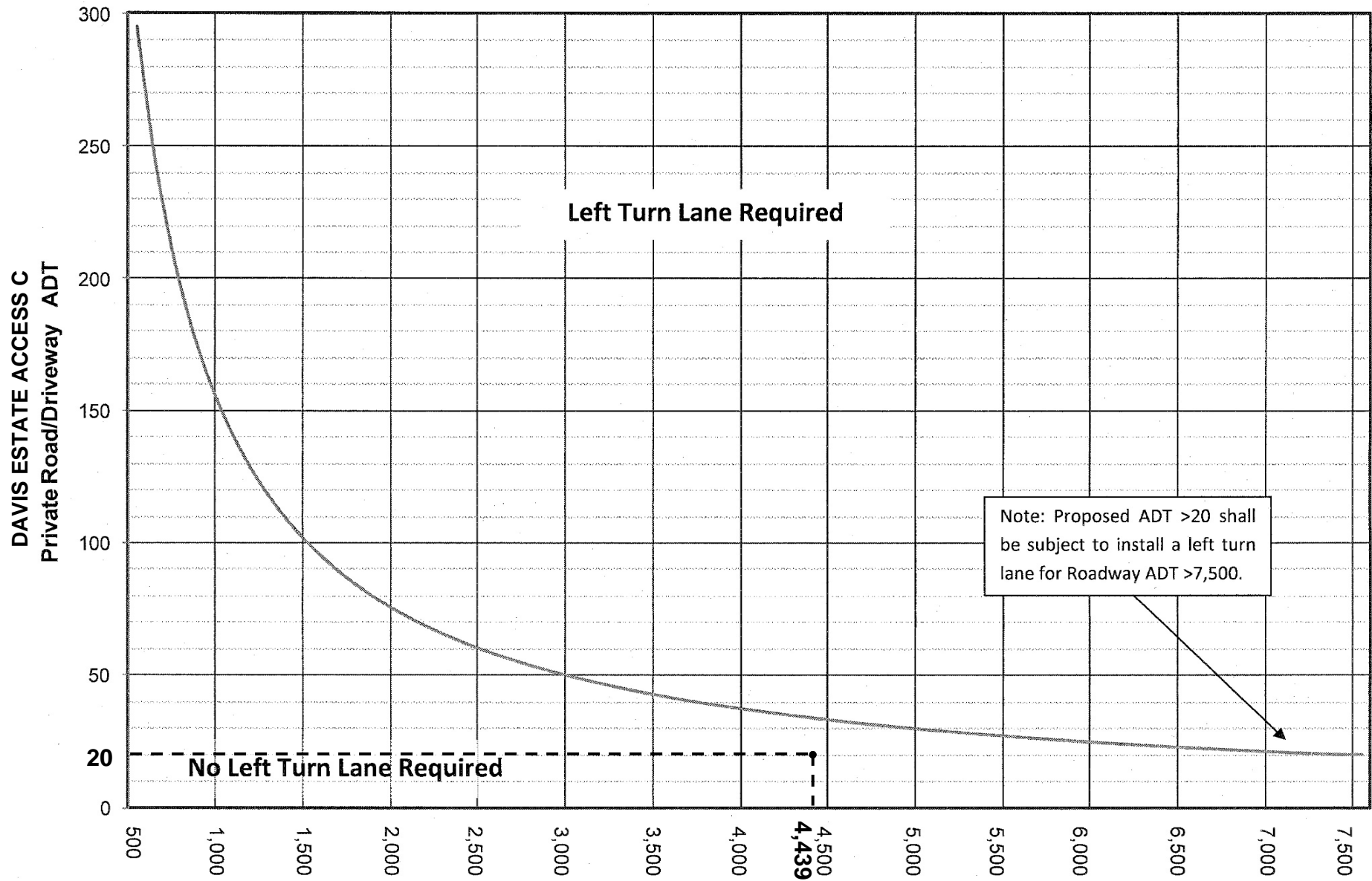
Davis Estate Winery Access C:
Weekend Near Term + Project Conditions
Left Turn Lane Not Warranted

Roadway   ADT
SILVERADO TRAIL

CALTRANS RIGHT TURN LANE WARRANTS

Y-axis (vertical): Silverado Trail Northbound at Access A — RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns − 20

100   200 231   300   400   500   600   700

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access A

Davis Estate Winery Project

Silverado Trail / Winery Access A Intersection

EXISTING + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access A

RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

100

80

FULL- WIDTH TURN LANE

TAPER

60

40

RADIUS ONLY REQUIRED

20

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

1

100   145   200   300   400   500   600   700

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access A

Davis Estate Winery Project

Silverado Trail / Winery Access A Intersection

EXISTING + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access A

RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

100   200 243   300   400   500   600   700

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access A

Davis Estate Winery Project

Silverado Trail / Winery Access A Intersection

NEAR TERM + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access A

Davis Estate Winery Project

Silverado Trail / Winery Access A Intersection

NEAR TERM + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access B

Davis Estate Winery Project

Silverado Trail / Winery Access B Intersection

EXISTING + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

2 – LANE HIGHWAYS

FULL-WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

Silverado Trail Northbound at Access B
RIGHT TURNS IN PEAK HOUR (VPH)

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access B

Davis Estate Winery Project

Silverado Trail / Winery Access B Intersection

EXISTING + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

Silverado Trail Northbound at Access B
RIGHT TURNS IN PEAK HOUR (VPH)

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

242

Silverado Trail Northbound at Access B

Davis Estate Winery Project

Silverado Trail / Winery Access B Intersection

NEAR TERM + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access B
RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access B

Davis Estate Winery Project

Silverado Trail / Winery Access B Intersection

NEAR TERM + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access C

RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.
Adjust peak hour right turns = Peak hour right turns − 20

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access C

Davis Estate Winery Project

Silverado Trail / Winery Access C Intersection

EXISTING + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access C

Davis Estate Winery Project

Silverado Trail / Winery Access C Intersection

EXISTING + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access C (y-axis)
RIGHT TURNS IN PEAK HOUR (VPH) (y-axis)

2 – LANE HIGHWAYS

100

FULL- WIDTH TURN LANE

80

TAPER

60

RADIUS ONLY REQUIRED

40

20

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns – 20

1

100   200 243 300   400   500   600   700

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access C

Davis Estate Winery Project

Silverado Trail / Winery Access C Intersection

NEAR TERM + PROJECT WEEKDAY PM PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

CALTRANS RIGHT TURN LANE WARRANTS

Silverado Trail Northbound at Access C

RIGHT TURNS IN PEAK HOUR (VPH)

2 – LANE HIGHWAYS

FULL- WIDTH TURN LANE

TAPER

RADIUS ONLY REQUIRED

NOTE: For posted speeds at or under 45 mph,
peak hour right turns greater than 40 vph,
and total peak hour approach less than 300 vph,
adjust right turn volumes.
Adjust peak hour right turns =
Peak hour right turns — 20

100   159 200   300   400   500   600   700

TOTAL PEAK HOUR APPROACH VOLUME (VPH)

Silverado Trail Northbound at Access C

Davis Estate Winery Project

Silverado Trail / Winery Access C Intersection

NEAR TERM + PROJECT WEEKEND PEAK HOUR

RIGHT TURN LANE NOT WARRANTED

N

1 2 3

Silverado Trail

Davis Estates Winery

Counts: 1/19/13, 1/28/13 Sat.
Weather: Clear

12   c   a   **4**
11   d   **5**
10   b   **6**

Davis Estates North Access

Larkmead Ln.

9 8 7

Silverado Trail
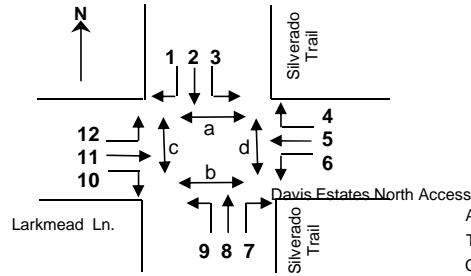
A = Adult
T = Teen
C = Child
B = Bike

Weekday PM

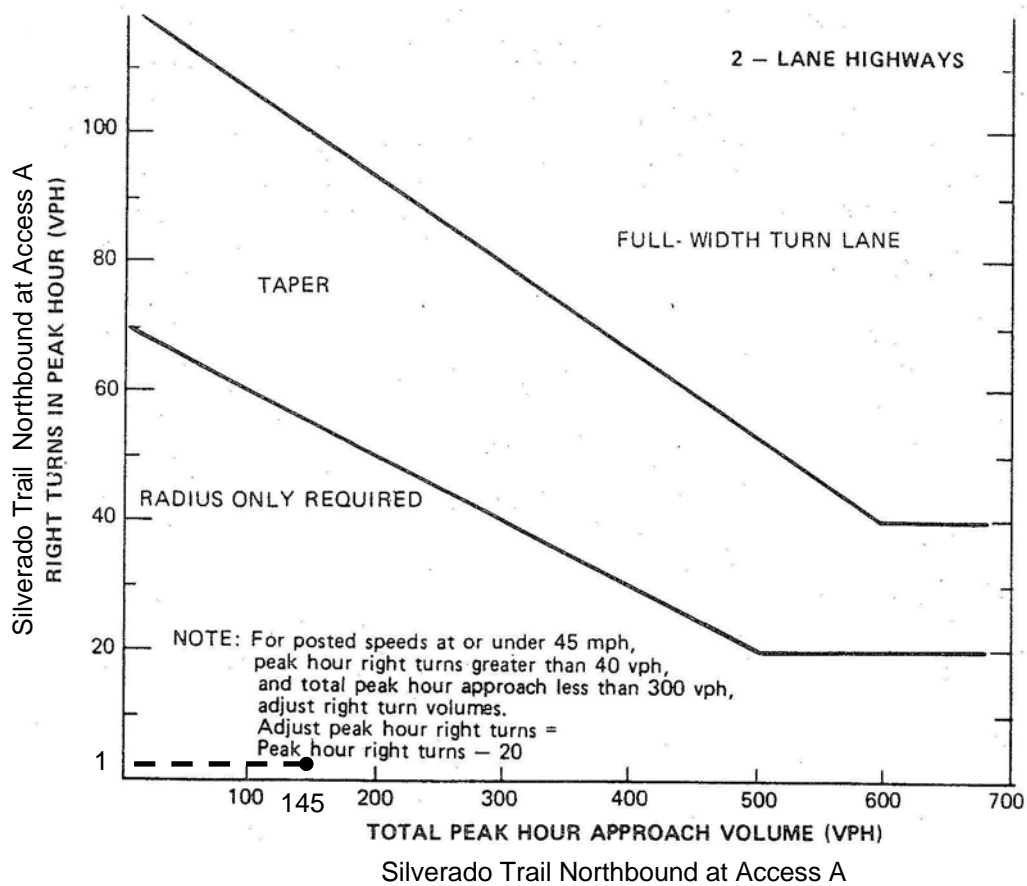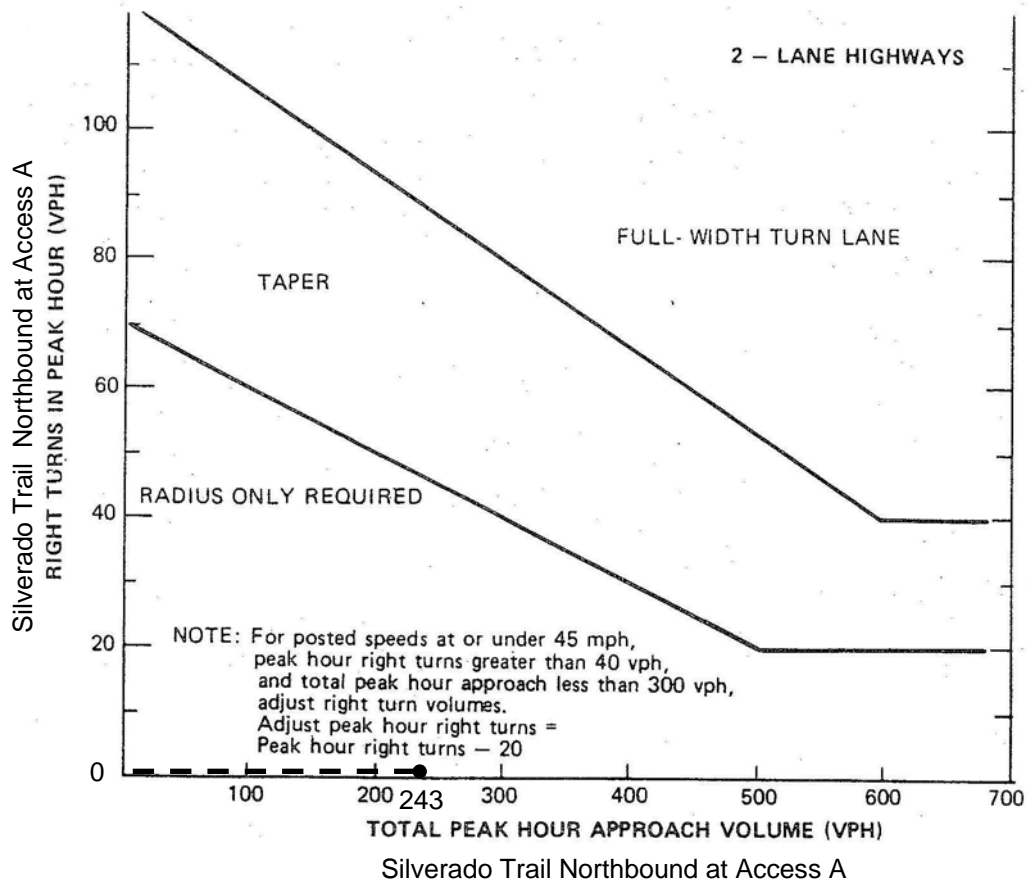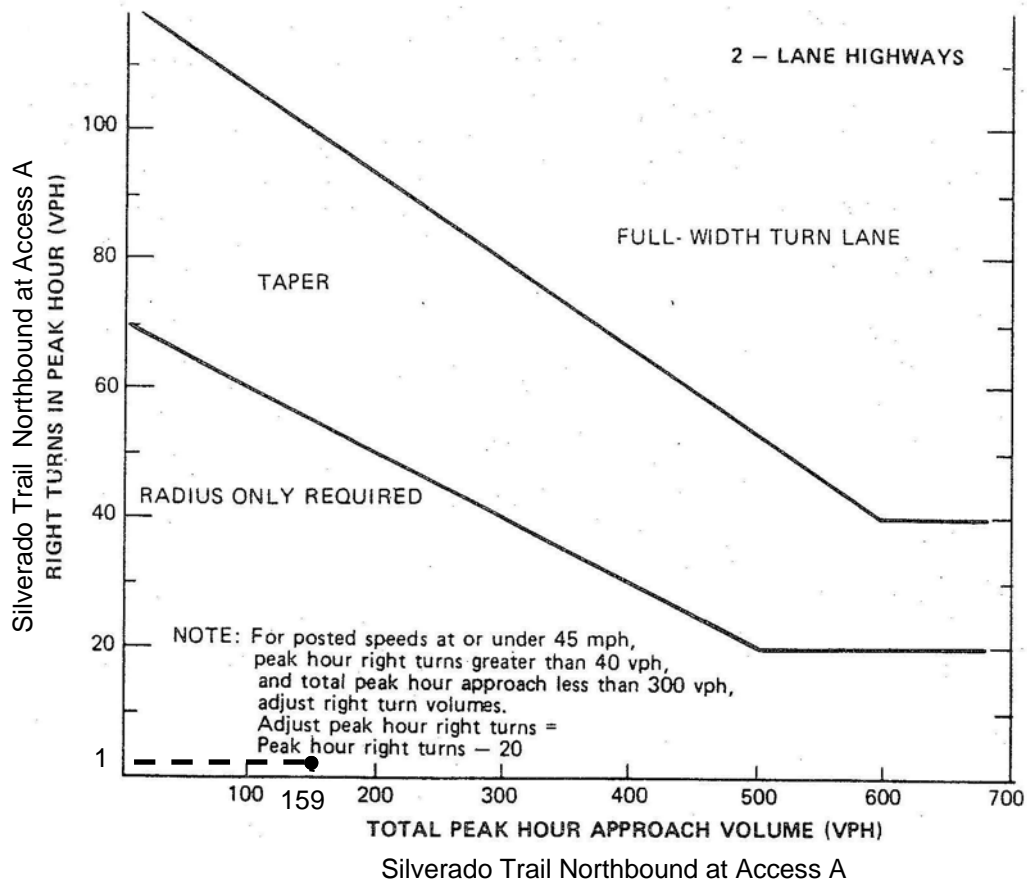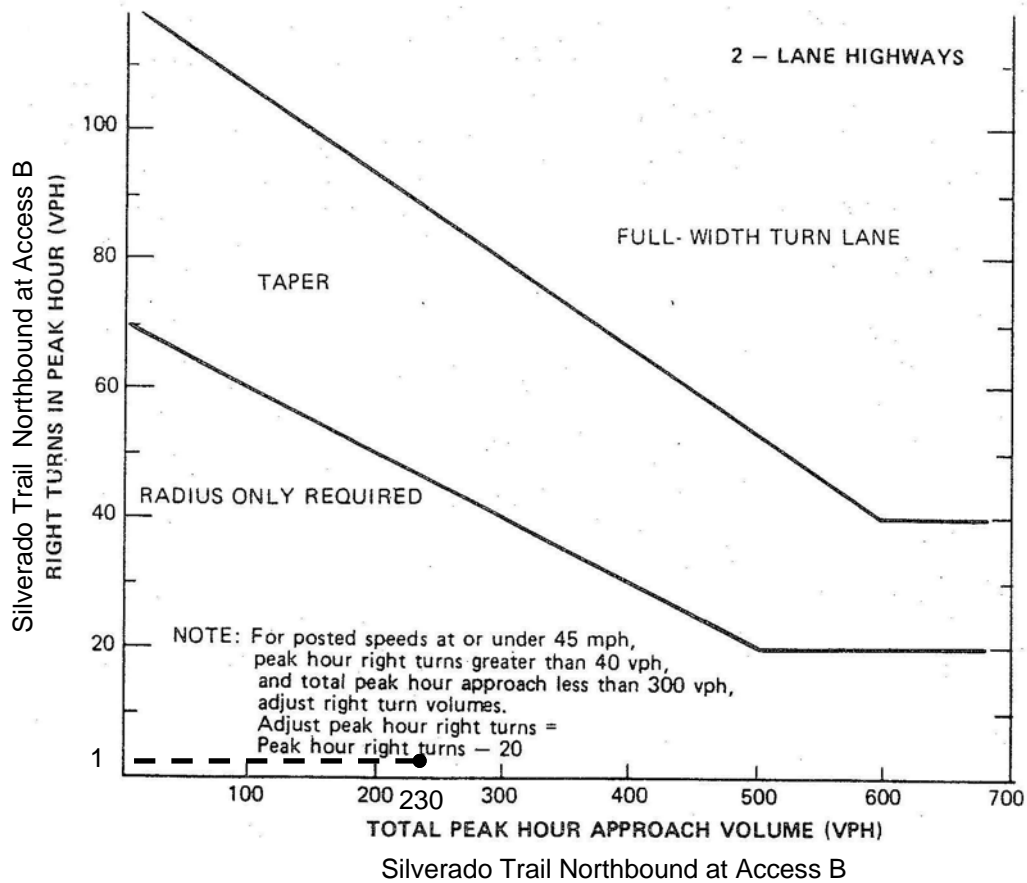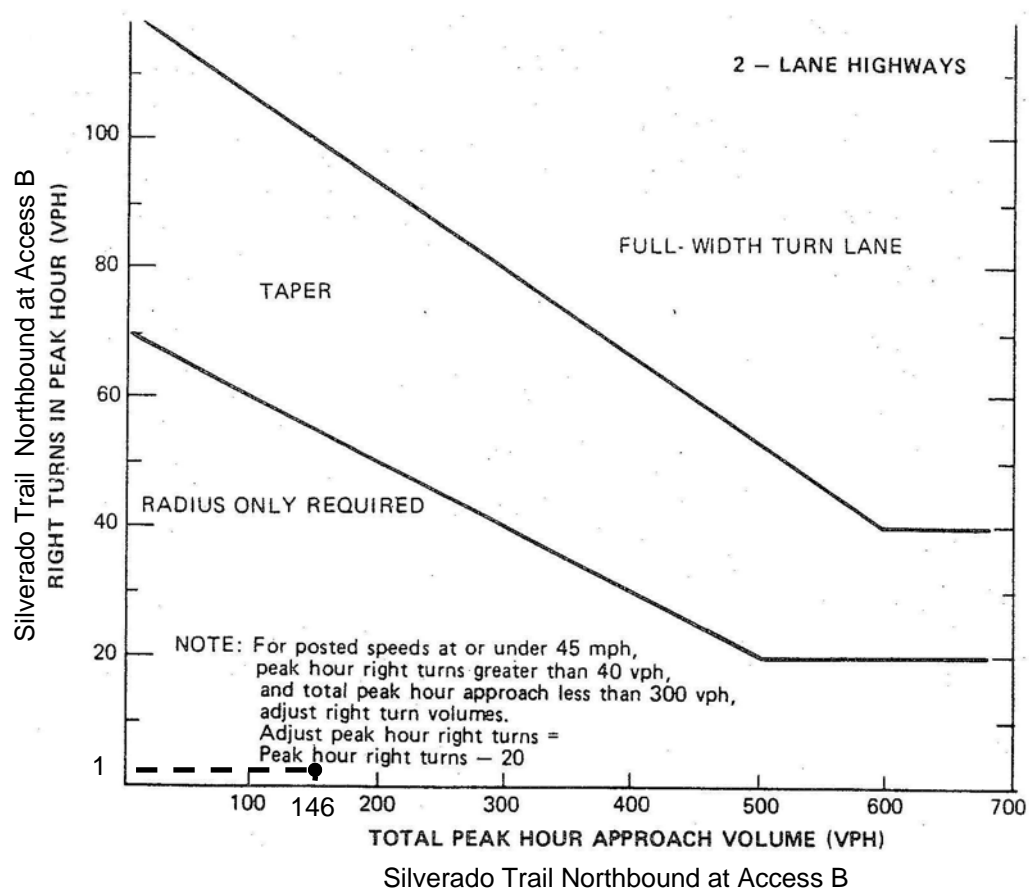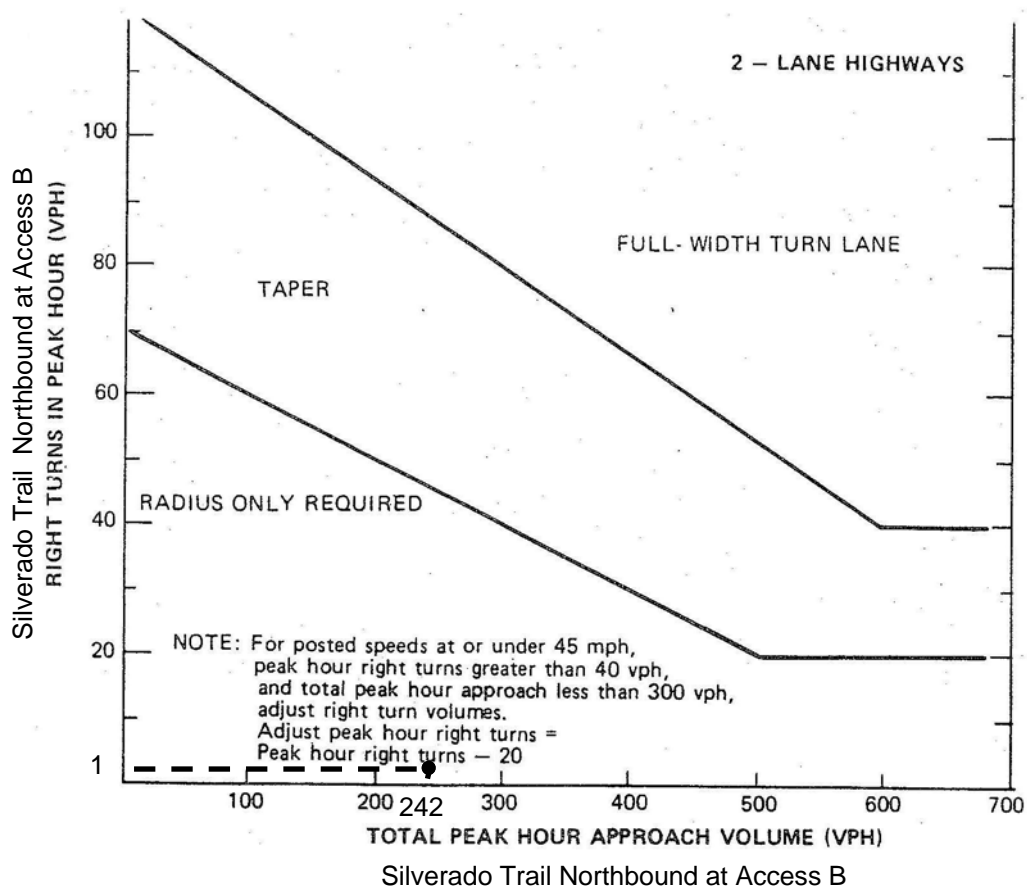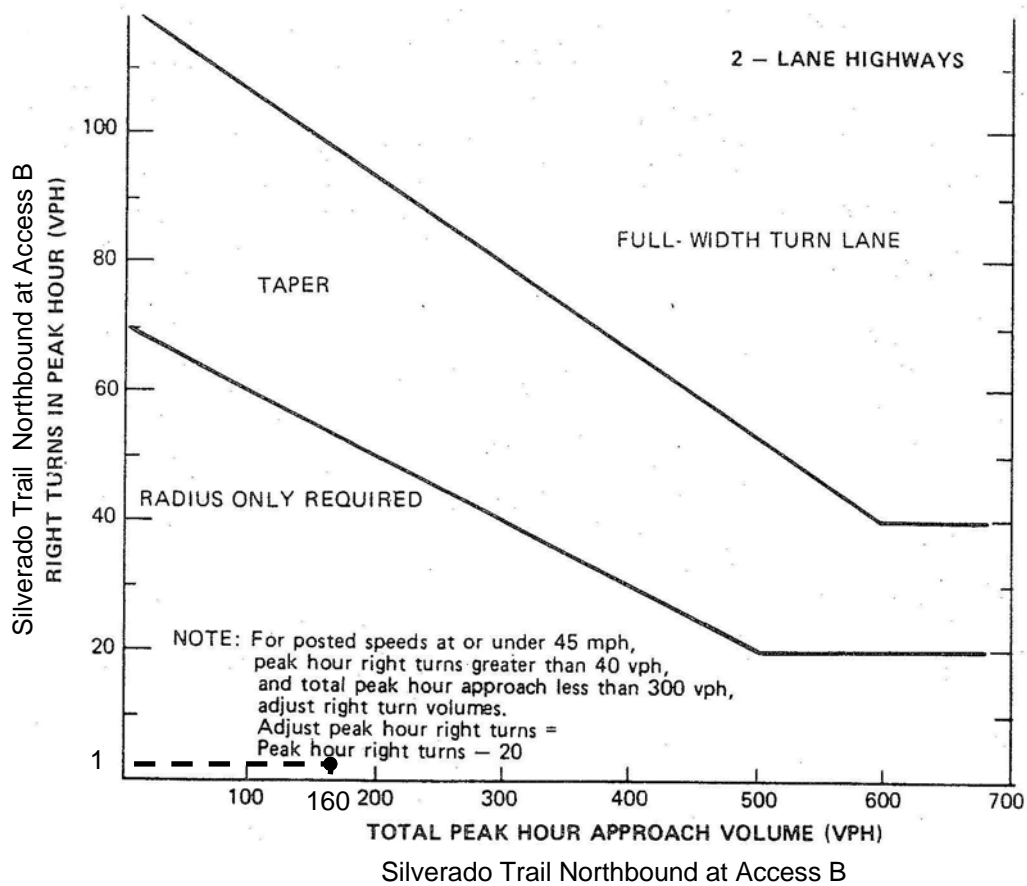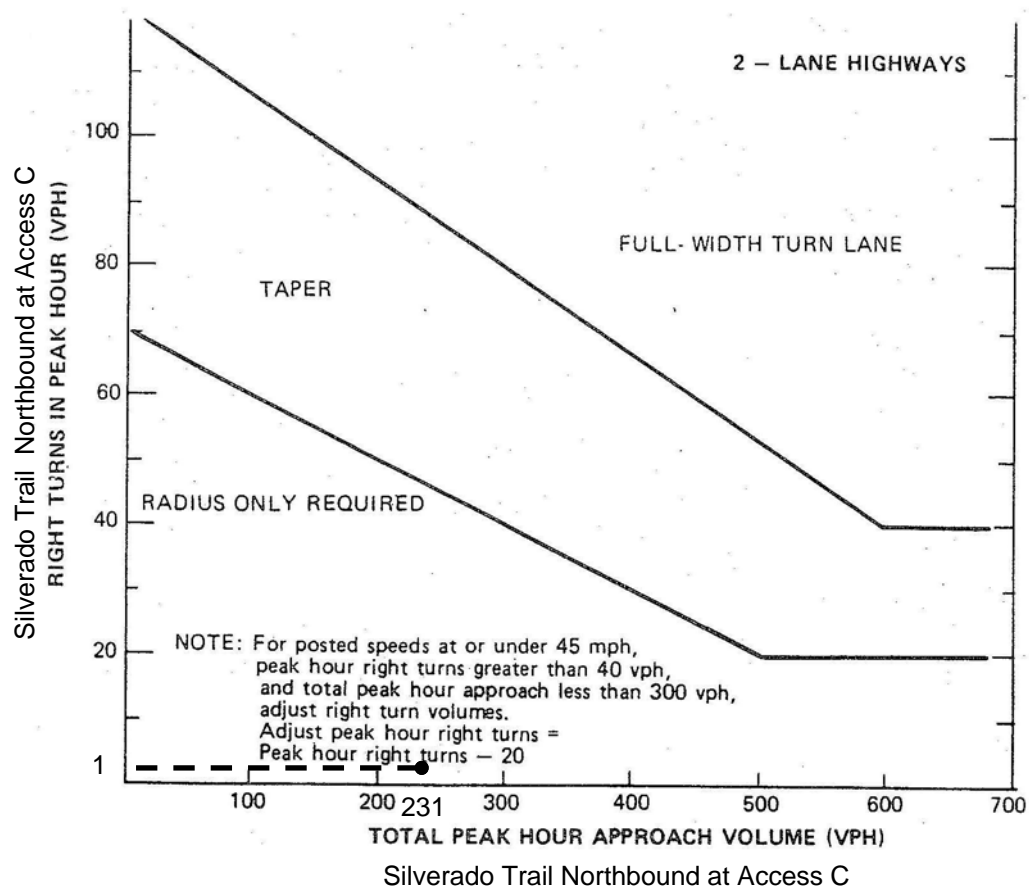|	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN.	60 MIN.	Pds&Bicy a - b / c - d	Project Access In	Out
4:00-4:15	2	41	0	0	0	0	0	59	11	7	0	6	126		0	0	0
4:15-4:30	3	62	0	0	0	0	0	45	3	4	0	3	120		0	0	0
4:30-4:45	3	46	0	0	0	0	0	52	5	3	0	1	110		0 - 0 / 2AB - 0	0	0
4:45-5:00	6	54	0	0	0	0	0	51	3	4	0	3	121	477	0	0	0
5:00-5:15	5	41	0	0	0	0	0	50	1	3	0	1	101	452	0	0	0
5:15-5:30	2	37	0	0	0	0	0	44	1	2	0	1	87	419	0 - 0 / 2AB - 0	0	0
5:30-5:45	1	29	0	0	0	0	0	48	2	2	0	3	85	394	0	0	0
5:45-6:00	1	22	0	0	0	0	0	30	1	3	0	2	59	332	0	0	0
PeakHour:																	
4:00-5:00	14	203	0	0	0	0	0	207	22	18	0	13	477	477	0 - 0 / 4AB - 0	**0**	**0**
											phf =		0.95		0 - 0 / 4 - 0		

Weekend Afternoon

	1	2	3	4	5	6	7	8	9	10	11	12	15 MIN.	60 MIN.	Pds&Bicy a - b / c - d	Project Access In	Out
1:00-1:15	0	37	0	0	0	0	0	31	0	5	0	0	73		0	0	0
1:15-1:30	0	31	0	0	0	0	0	32	3	3	0	4	73		0	0	0
1:30-1:45	3	35	0	0	0	0	0	29	2	2	0	5	76		0 - 1AB / 0 - 1AB	0	0
1:45-2:00	2	33	0	0	0	0	0	33	1	3	0	2	74	296	0	0	0
2:00-2:15	1	36	0	0	0	0	0	35	2	2	0	1	77	300	0 - 0 / 4AB - 0	0	0
2:15-2:30	0	43	0	0	0	0	0	37	4	3	0	1	88	315	0 - 0 / 0 - 3AB	0	0
2:30-2:45	2	30	0	0	0	0	0	28	1	0	0	2	63	302	0	0	0
2:45-3:00	3	30	0	0	0	0	0	29	1	2	0	3	68	296	0	0	0
PeakHour:																	
1:30-2:30	6	147	0	0	0	0	0	134	9	10	0	9	315	315	0 - 1AB / 4AB - 4AB	**0**	**0**
											phf =		0.89		0 - 1 / 4 - 4		

wkday pk in   217
wkday pk out   220

wkend pk in   153
wkend pk out   143

N

Silverado Trail

| 6 | 147 | 0 |
| 14 | 203 | 0 |

31 wkday pk in						wkday pk in	0
36 wkday pk out	9	13	Peak Hour Volumes		0	0	wkday pk out	0
	0	0			0	0		
19 wkend pk in	10	18	Wkday. and Wkend.		0	0	wkend pk in	0
15 wkend pk out						wkend pk out	0

Larkmead Ln.

Davis Estates North Access

Silverado Trail

| 22 | 207 | 0 |
| 9 | 134 | 0 |

wkday pk in   229
wkday pk out   221

wkend pk in   143
wkend pk out   157
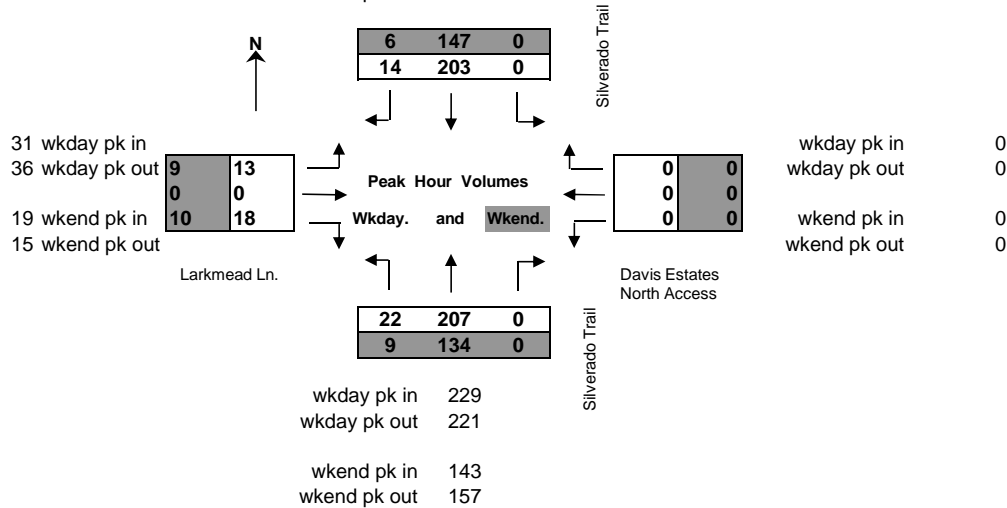
OMNI-MEANS

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Silverado Trail at Frostfire property

DATE: 1/3/12 Tue   TIME START: 2:00 pm TIME END: 3:00 pm   WEATHER: Clear   ROAD TYPE: 2 lanes

DIRECTION: Northbound

SPEED LIMIT: 55 mph   OBSERVER: O-M   CALIBRATION TEST: Yes

```
SPEED  FREQUENCY  ACUM %                    PERCENTAGE BREAKDOWN
-----------------------------0--------10--------20--------30--------40--------50--------60--------70--------80--------90-------100
  46       6        6.0   !****5*
  47       2        8.0   !****5***
  48       6       14.0   !****5****1****
  49       6       20.0   !****5****1****5****2
  50       8       28.0   !****5****1****5****2****5***
  51      15       44.0   !****5****1****5****2****5****3****5****4****
  52      10       54.0   !****5****1****5****2****5****3****5****4****5****5****
  53       5       60.0   !****5****1****5****2****5****3****5****4****5****5****5****6
  54       8       68.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5***
  55       8       76.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5*
  56       6       82.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8**
  57       2       84.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5***
  58       4       88.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5***
  59       6       94.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****
  60       4       98.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
  61       0       98.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
  62       0       98.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
  63       0       98.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0
  64       2      100.0   !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0
-----------------------------0--------10--------20--------30--------40--------50--------60--------70--------80--------90-------100
        100
```

AVERAGE SPEED = 52.8   PACE = 46 - 55   SAMPLE VARIANCE = 16.51263
50th PERCENTILE = 51.6   % IN PACE = 76   STANDARD DEVIATION = 4.063573
85th PERCENTILE = 57.2   VEHICLES IN PACE = 76   RANGE 1*S = 66
90th PERCENTILE = 58.3   RANGE 2*S = 98
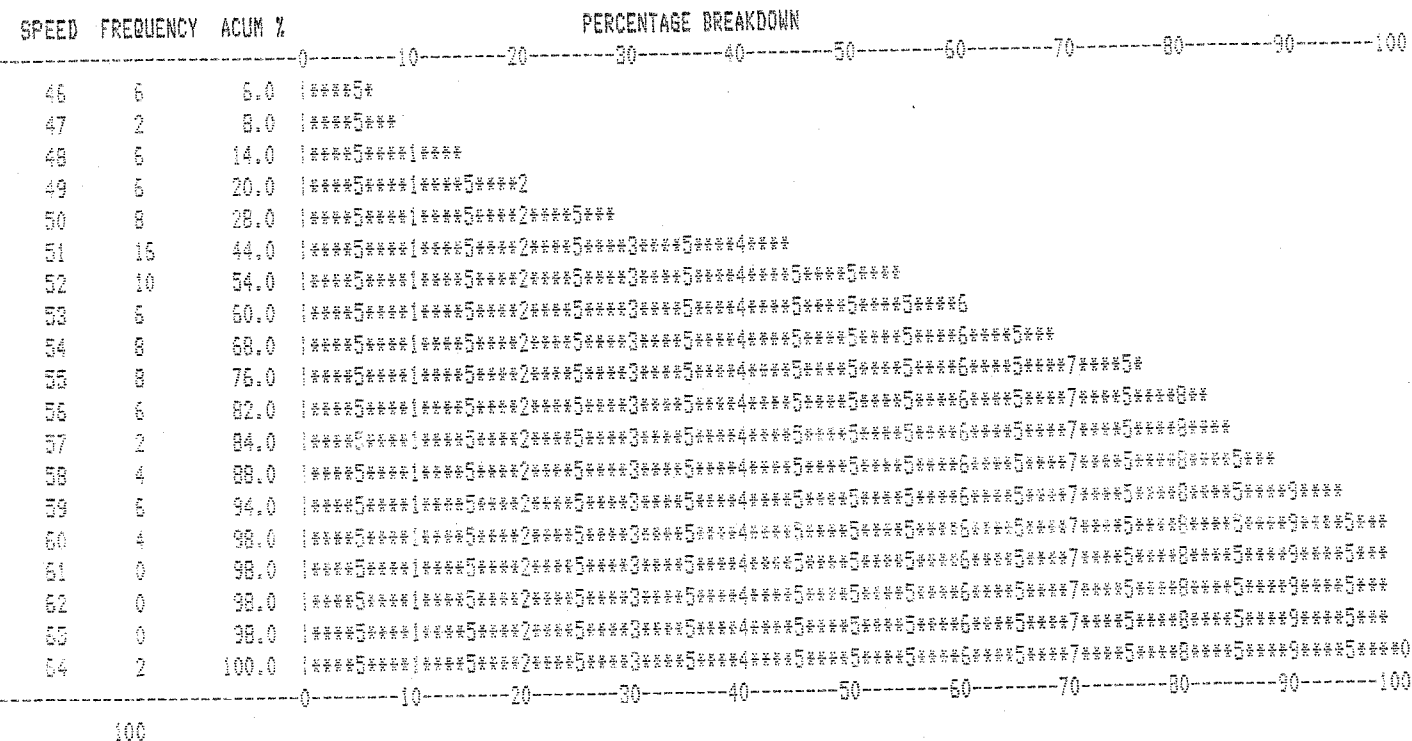95th PERCENTILE = 59.2   RANGE 3*S = 100

RADAR SPEED SURVEY

OMNI-MEANS LTD.

Silverado Trail at Frostfire property

DATE: 1/3/12 Tue   TIME START: 2:00 pm TIME END: 3:00 pm   WEATHER: Clear   ROAD TYPE: 2 lanes

DIRECTION: Southbound

SPEED LIMIT: 55 mph   OBSERVER: O-M   CALIBRATION TEST: Yes

```
SPEED  FREQUENCY  ACUM %                          PERCENTAGE BREAKDOWN
----------------------------------0--------10--------20--------30--------40--------50--------60--------70--------80--------90--------100
  43       4        4.0  !****
  44       0        4.0  !****
  45       0        4.0  !****
  46       2        6.0  !****5*
  47       4       10.0  !****5****1
  48       6       16.0  !****5****1****5*
  49       6       22.0  !****5****1****5****2**
  50      18       40.0  !****5****1****5****2****5****3****5****4
  51      14       54.0  !****5****1****5****2****5****3****5****4****5****5****
  52       6       60.0  !****5****1****5****2****5****3****5****4****5****5****5****6
  53       8       68.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5***
  54       8       76.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5*
  55       6       82.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8**
  56       8       90.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9
  57       2       92.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9**
  58       0       92.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9**
  59       2       94.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****
  60       4       98.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
  61       0       98.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5***
  62       2      100.0  !****5****1****5****2****5****3****5****4****5****5****5****6****5****7****5****8****5****9****5****0
----------------------------------0--------10--------20--------30--------40--------50--------60--------70--------80--------90--------100
         100
```

AVERAGE SPEED = 51.9   PACE = 47 - 56   SAMPLE VARIANCE = 15.72727
50th PERCENTILE = 50.7   % IN PACE = 84   STANDARD DEVIATION = 3.965763
85th PERCENTILE = 55.3   VEHICLES IN PACE = 84   RANGE 1*S = 72
90th PERCENTILE = 56   RANGE 2*S = 90
95th PERCENTILE = 59.2   RANGE 3*S = 100