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Traffic Study and Subsequent Traffic Memos

TJKM VISION THAT MOVES YOUR COMMUNITY

TECHNICAL MEMORANDUM

Date: June 21, 2018

To: John Wambaa
Email: wambaa.john@yahoo.com

Jurisdiction: Napa County

From: Chris Kinzel, P.E., T.E.
Vice President, TJKM

Subject: ***Updated Focused Traffic Impact Analysis for the Proposed New Life Community Church Project at 1451 American Canyon Road, American Canyon, California.***

The purpose of this technical memorandum is to prepare a focused traffic impact analysis for the proposed New Life Community Church, which is located at 1451 American Canyon Road. This technical memorandum addresses comments made by Mike Hawkins in an April 13, 2018 memorandum to PBES Staff, referencing an earlier version of this memorandum dated August 20, 2017.

The proposed project is to comply with the Napa County permit application requirements. Access to the project site would be provided via one full-access driveway on American Canyon Road. The project is located near to the Dwight Eisenhower Highway (I-80) as shown on **Figure 1**. The project site is currently a vacant lot, surrounded by agricultural land uses. **Figure 2** shows the project site plan.

TJKM evaluated traffic conditions at two study intersections during the Saturday peak of the project, 9:00 a.m. to 11:00 a.m. The highest single one-hour period recorded for the peak period was used in the analysis. The study intersections and associated traffic controls are as follows:

- American Canyon Road and the Project Driveway (One-Way Stop Control)
- American Canyon Road and Flosden Road/Newell Drive (Signalized)

This study addresses the following four traffic scenarios:

- *Existing Conditions* – This scenario evaluates the study intersection based on existing traffic volumes, lane geometry, and traffic controls. For the existing conditions scenario, the proposed site is analyzed as vacant.
- *Existing plus Project Conditions* – This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project.

Vicinity Map

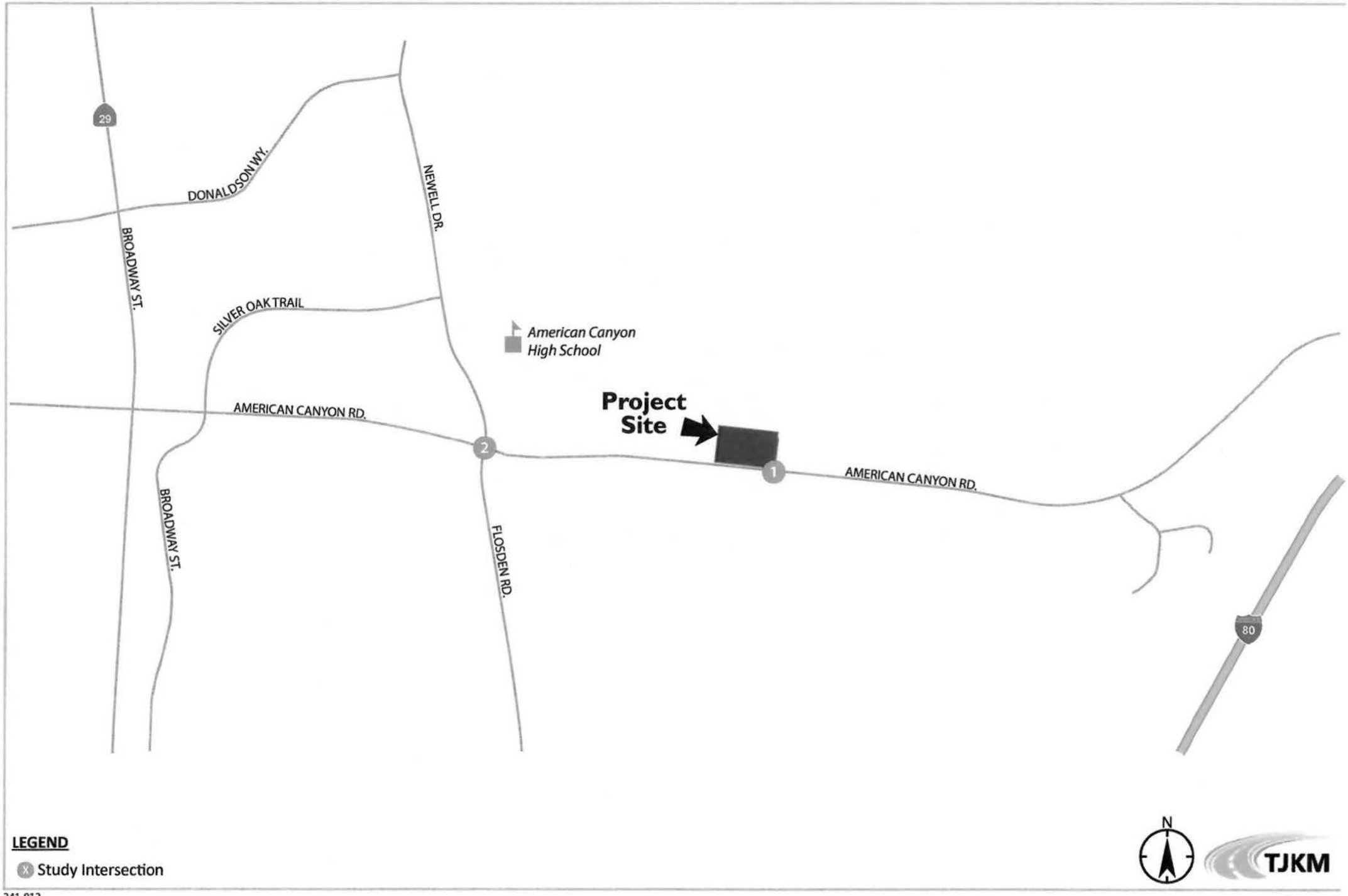

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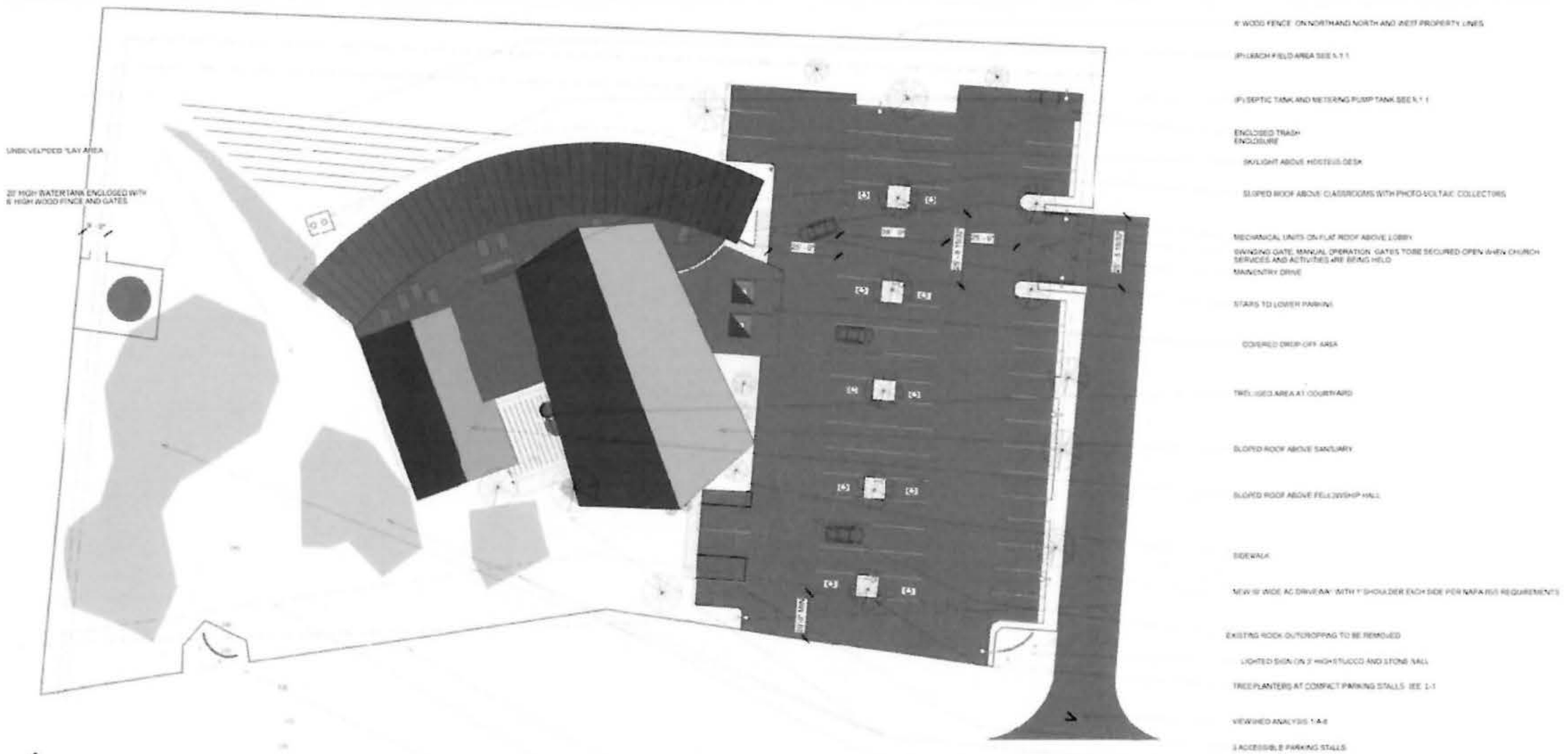
Figure 1

Site Plan



GENERAL NOTES:

1. TOTAL SANCTUARY AND BALCONY SEATING: 150
2. TOTAL PARKING REQUIRED: 150 / 3.5 = 43 SPACES REQUIRED + 2 EMPLOYEE SPACES = 45 TOTAL SPACES REQUIRED. TOTAL PROVIDED 56
3. 10 COMPACT PARKING STALLS (16' x 8') + 3 ACCESSIBLE PARKING STALLS (9' x 19') + 43 STANDARD STALLS (9' x 19') = 56 PARKING STALLS PROVIDED. 1 STALL SHALL BE DESIGNATED FOR ELECTRIC VEHICLE CHARGING.
4. SITE LIGHTING TO CONSIST OF POLE MOUNTED LED LIGHT FIXTURES ON 25' HIGH POLES @ PARKING LOT. OTHER EXTERIOR LIGHTS TO BE BUILDING MOUNTED LED WITH LIGHTING CONTAINED WITHIN THE SITE. LIGHTING TO PROVIDE ADEQUATE SECURITY COVERAGE AND TO PROVIDE SECURITY CAMERAS REQUIRED MINIMUM LEVELS. LIGHTING SHALL MEET LIGHT POLLUTION REDUCTION STANDARDS REQUIRED BY THE CALIFORNIA GREEN BUILDING CODE 5.106.8
5. FOR THE FEW EVENTS DURING THE YEAR WHERE ADDITIONAL PARKING IS NEEDED. OFF SITE PARKING WITH A SHUTTLE SERVICE OR PARKING ON THE PROPERTY TO THE NORTH WILL BE PROVIDED BY THE CHURCH
6. USE PERMIT #P16-0021-UP, 1451 AMERICAN CANYON ROAD; APN: 059-100-020
7. ALL SURROUNDING PROPERTIES ARE ZONED AW

Source: H. Adams, Architect

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Figure 2

- *Cumulative Conditions* – This scenario is similar to the Existing Conditions but with the projected growth rate of one percent per year for 18 years (Year 2035-forecasted traffic) which was applied to Existing Conditions Traffic Volumes.
- *Cumulative plus Project Conditions* – This scenario is identical to Cumulative Conditions, but with the addition of traffic from the proposed project.

Existing Conditions

Important roadways adjacent to the project site are discussed below:

Interstate 80 (I-80) is an east-west divided freeway with four westbound lanes and four eastbound lanes. It is part of the Interstate Highway System, providing regional access to and from Sacramento, Solano, Contra Costa, Alameda, and San Francisco Counties. The posted speed limit along I-80 is 65 miles per hour (mph).

State Route 29 (SR-29) is a north-south, four-lane divided state highway that connects Interstate 80 (I-80) to the cities of Vallejo, American Canyon, and Napa to the north. Within the City of American Canyon, SR-29 bisects the City as a four-lane highway with signalized intersections at major cross streets. It serves as a primary route for commuter and industrial truck traffic traveling between Napa County and the San Francisco- Oakland Bay Area. The posted speed limit along SR-29 is 50 mph to 55 miles per hour (mph).

American Canyon Road is a major east-west, two to four-lane arterial roadway that traverses between Wetlands Edge Road, from within the City, to I-80, where it forms a grade separated interchange. American Canyon Road serves primarily residential and commuter traffic in the City, and acts as a rural connector east of the City limits. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential developments.

Newell Drive is a four-lane north-south roadway that connects Donaldson Way in the north and American Canyon Road in the south. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential, commercial and agricultural developments.

Flosden Road is a four-lane north-south roadway that connects American Canyon Road in the north and Corcoran Avenue in the south. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential and commercial developments.

Existing Pedestrian, Bicycle, and Transit Facilities

In the project vicinity, American Canyon Road and Flosden Road/Newell Drive intersection is signalized and equipped with countdown pedestrian signal heads. There are continuous sidewalks present on Flosden Road and Newell Drive along the both sides within the project vicinity. There are discontinuous sidewalks along the east side of American Canyon Road. There is adequate street lighting in the vicinity. There are no bus stops in the immediate vicinity of the project site.

There are no bicycle facilities on American Canyon Road, Newell Drive and Flosden Road. As per City of American Canyon Bicycle Plan (January 2012), prepared by the Napa Valley

Transportation Authority (NVTA), Class II bicycle lanes are proposed on American Canyon Road between SR 29 to South Kelly Road.

There is no transit service within the project vicinity. The nature of the traffic generated by the proposed project would also not create any demand for new transit service, and is not expected to generate a need for transit in the area.

Level of Service Analysis Methodology and Significant Impact Criteria

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from A to F, with A indicating no congestion of any kind, and F indicating intolerable congestion and delays. The LOS analysis methods outlined in the Highway Capacity Manual (HCM, Transportation Research Board, 2000) were used in this study. Synchro 9.0 traffic analysis software was used for the analysis purposes. A signalized intersection's LOS is based on weighted average control delay measured in seconds per vehicle. At the side street, controlled intersections or two-way stop sign intersections, the control delay is calculated for each movement, not for the intersection as a whole. **Table 1 & Table 2** summarizes the relationship between control delay and LOS for signalized intersections and unsignalized intersections.

Table 1: Signalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay (seconds)
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	<10
B	Operations with low delay occurring with good progression and/or short cycle	>10 to 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20 to 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	>35 to 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	>55 to 80
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	>80

Source: Highway Capacity Manual, Transportation Research Board 2000

Table 2: Unsignalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay (seconds)
A	Little or no delay	≤10.0
B	Short traffic delays	10.1 to15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	>50.0

Source: Highway Capacity Manual, Transportation Research Board 2000

The Circulation Element of the Napa County General Plan, dated June 3, 2008, includes General Plan Policy CIR-16 regarding significance criteria for traffic conditions based on level of service (LOS).The County shall seek to maintain an adequate level of service on roads and at intersections as follows. The desired level of service shall be measured at peak hours on weekdays.

- The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map.
- The County shall seek to maintain a Level of Service D or better at all signalized 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.

EXISTING PEAK HOUR VOLUMES

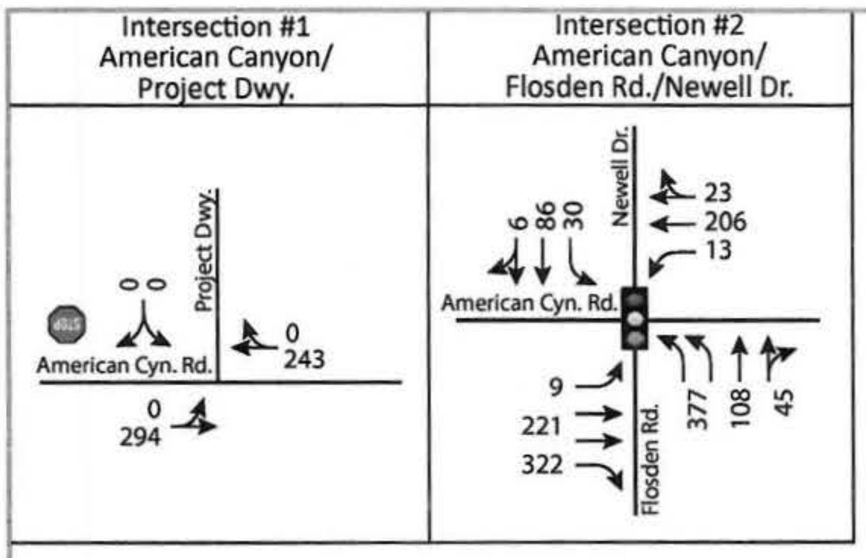
Intersection turning movement counts of vehicles, bicycles, and pedestrians were collected during weekend a.m. peak period (9:00-11:00 a.m.) on Saturday, January 14, 2017. Peak hour factors used in the analysis were based on the counts.

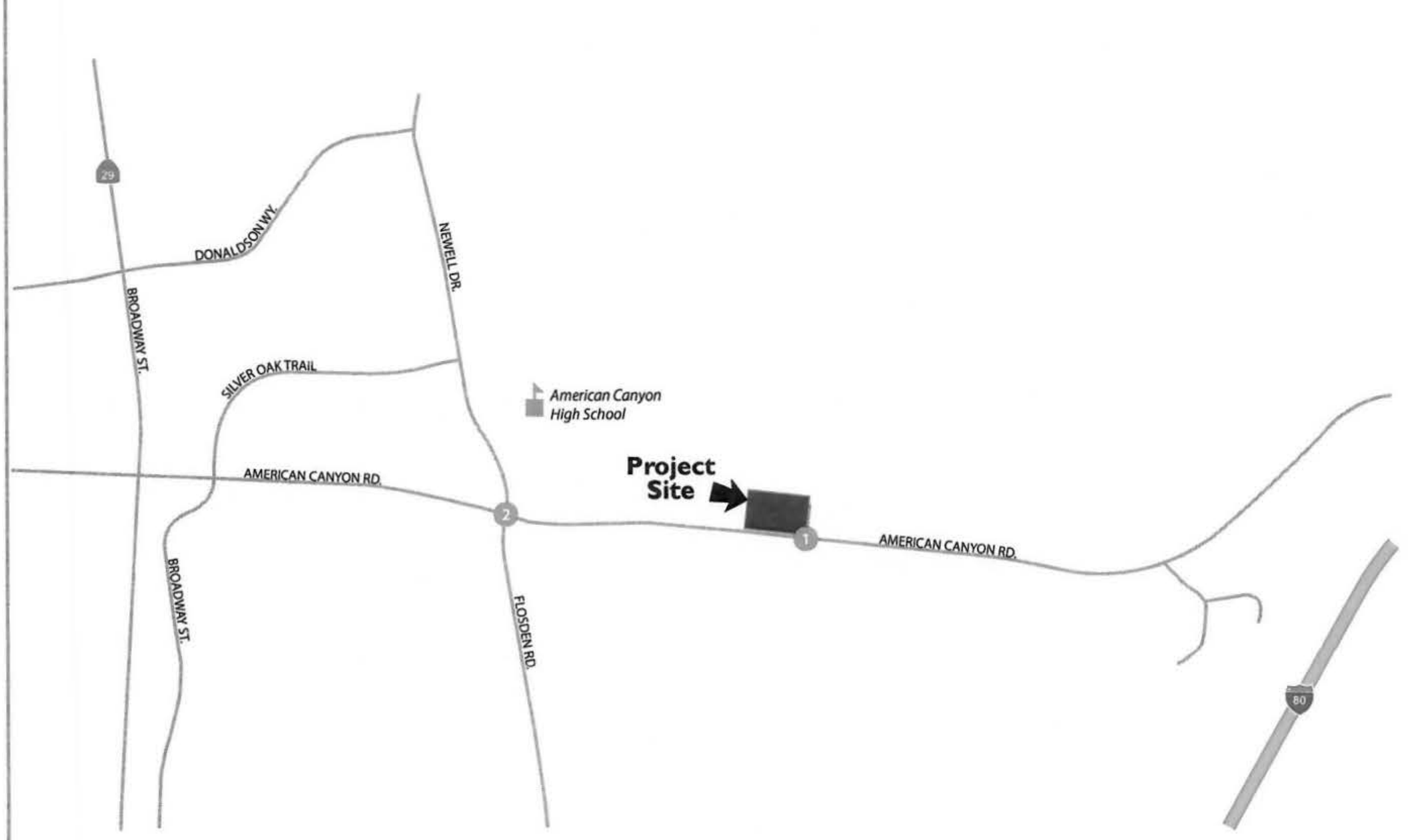
The study intersections and associated traffic controls are as follows:

1. American Canyon Road and the Project Driveway (One-Way Stop Control)
2. American Canyon Road and Flosden Road/Newell Drive (Signalized)

In addition to the intersection turning movement counts, one-day 24 hour vehicle classification counts were conducted on American Canyon Road.

Existing Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 3

Appendix A includes all the data sheets for the collected 24 hour classification counts, vehicle, bicycle and pedestrian counts. **Figure 3** illustrates the existing conditions peak hour traffic volumes, lane geometry and traffic control at the study intersections.

Intersection Level of Service Analysis – Existing Conditions

The existing operations of the study intersection were evaluated for the highest one-hour volume during the weekend a.m. peak period. Turning movement counts for the study intersection were collected by TJKM. The City of American Canyon provided signal timings for the study intersections. The results of the Level of Service (LOS) analysis using the Synchro 9.0 software program for Existing Conditions are summarized in **Table 3**. **Appendix B** contains the corresponding calculation sheets. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour.

Table 3: Intersection Level of Service Analysis – Existing Saturday Morning Conditions

ID	Intersections	Control	Peak Hour[1]	Existing Conditions	
				Average Delay[2]	LOS[3]
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	18.7	B

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.

Project Description and Trip Generation

The proposed project is located on a vacant parcel in unincorporated Napa County near the City of American Canyon. The area is mainly rural with American Canyon High School and residential developments located west of the project site. The proposed project consists of two buildings- a 3,115 square foot fellowship hall and a 7,911 square foot sanctuary. The existing New Life Community Church, which operates at a local elementary school off Silver Oak Trail in American Canyon, has a membership of 80 members, of those 30 are children. Services are on Saturdays in the morning, beginning with Sabbath School from 10:00 a.m. to 11:00 a.m., main service for worship from 11:00 am to 12:00 p.m., followed by lunch, and activity. The bulk of the membership arrive for the main service and lunch.

Initially, on the project site, the Sabbath school, main service, lunch, and afternoon activities would occur in the Fellowship Hall. As the membership grows, the Sanctuary would be built and activities would start in the fellowship Hall for classes, move on to worship for main services, then back to the Fellowship Hall for lunch and activities.

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the Institute of Transportation Engineer's (ITE) publication Trip Generation (9th Edition). TJKM used published trip rates for Church (ITE Land use Code 560). **Table 4** shows the trip generation for the proposed project. Since activities would not occur in both buildings concurrently, trip generation is based on the Sanctuary building, which has the larger square footage. Though Saturday is the day for this project to worship, TJKM used the Sunday peak hour generator, as it represents the average trips generated during worship services.

Using ITE rates, the project is expected to generate approximately 95 weekend peak hour trips (48 inbound, 47 outbound) during the peak hour. New Life Community Church only operates one day a week, with the maximum use of one hour a week.

Table 4: Proposed Project Trip Generation

Land Use (ITE Code)	Size		Daily		Sunday Peak Hour Generator			
			Rate	Trips	Rate	In	Out	Total
Church-Fellowship Hall (560)	3.115	ksf	36.63	114	12.04	19	19	38
Church-Sanctuary (560)	7.911	ksf	10.37	290	12.04	48	47	95

Notes: Source- Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012.
ksf=thousand square feet

Project Trip Distribution and Assignment

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area. Assignment determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed project were developed based on the existing travel patterns and TJKM's knowledge of the study area. The distribution assumptions for the proposed development are as follows:

- 10 percent to/from Newell Drive
- 20 percent to/from Flosden Road
- 50 percent to/from west of American Canyon Road
- 50 percent to/from east of American Canyon Road

Figure 4 illustrates the net project trip assignment at the study intersections expected from the proposed development.

Using ITE information, during Saturday service, it is estimated that, at full occupancy, 24 trips will arrive from the west and 24 trips from the east on American Canyon Road, to enter the project site during the Saturday peak hour. However, the church does not anticipate full capacity and will be built in phases, using the Fellowship Hall for both worship and classes which would result in 19 trips total, with only 10 trips arriving from the east and 9 trips arriving from the west on American Canyon Road. To be conservative, this report analyzes the full 48 Saturday morning trips at project buildout.

INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

The results of the intersection level of service calculations for Existing plus Project Conditions are presented in **Table 5**. **Appendix B** contains the corresponding calculation sheets. The results for Existing Conditions are included for comparison purpose, along with the projected increases in delay. The changes in delay between Existing and Existing plus Project Conditions are used to identify significant impacts. **Figure 5** shows projected turning movement volumes at the study intersections for Existing plus Project Conditions. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour. Based on the County of Napa impact criteria, the project is expected to have a less-than-significant impact at the study intersections.

Table 5: Intersection Level of Service Analysis – Existing Saturday Morning plus Project Conditions

ID	Intersections	Control	Peak Hour[1]	Existing Conditions		Existing plus Project Conditions		Change in Delay[4] (Sec)
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A	11.9	B	11.9
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	18.7	B	19.0	B	0.60

Notes:

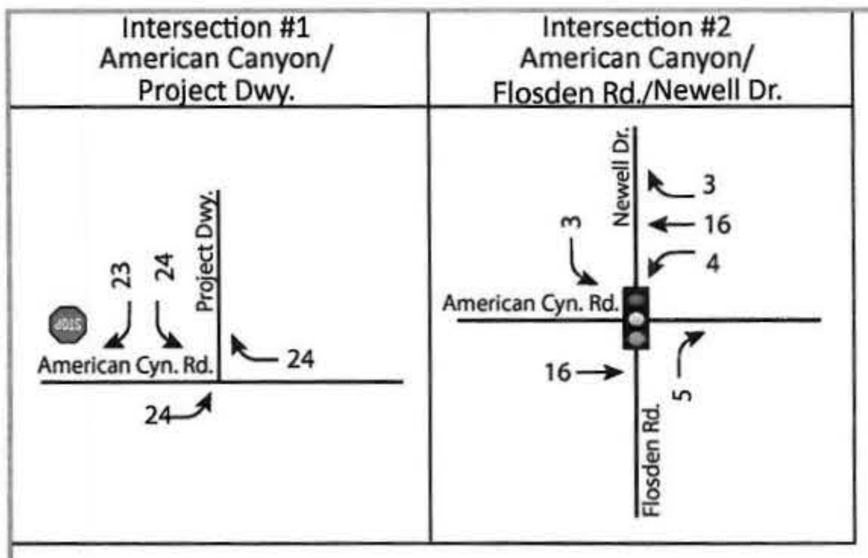
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)

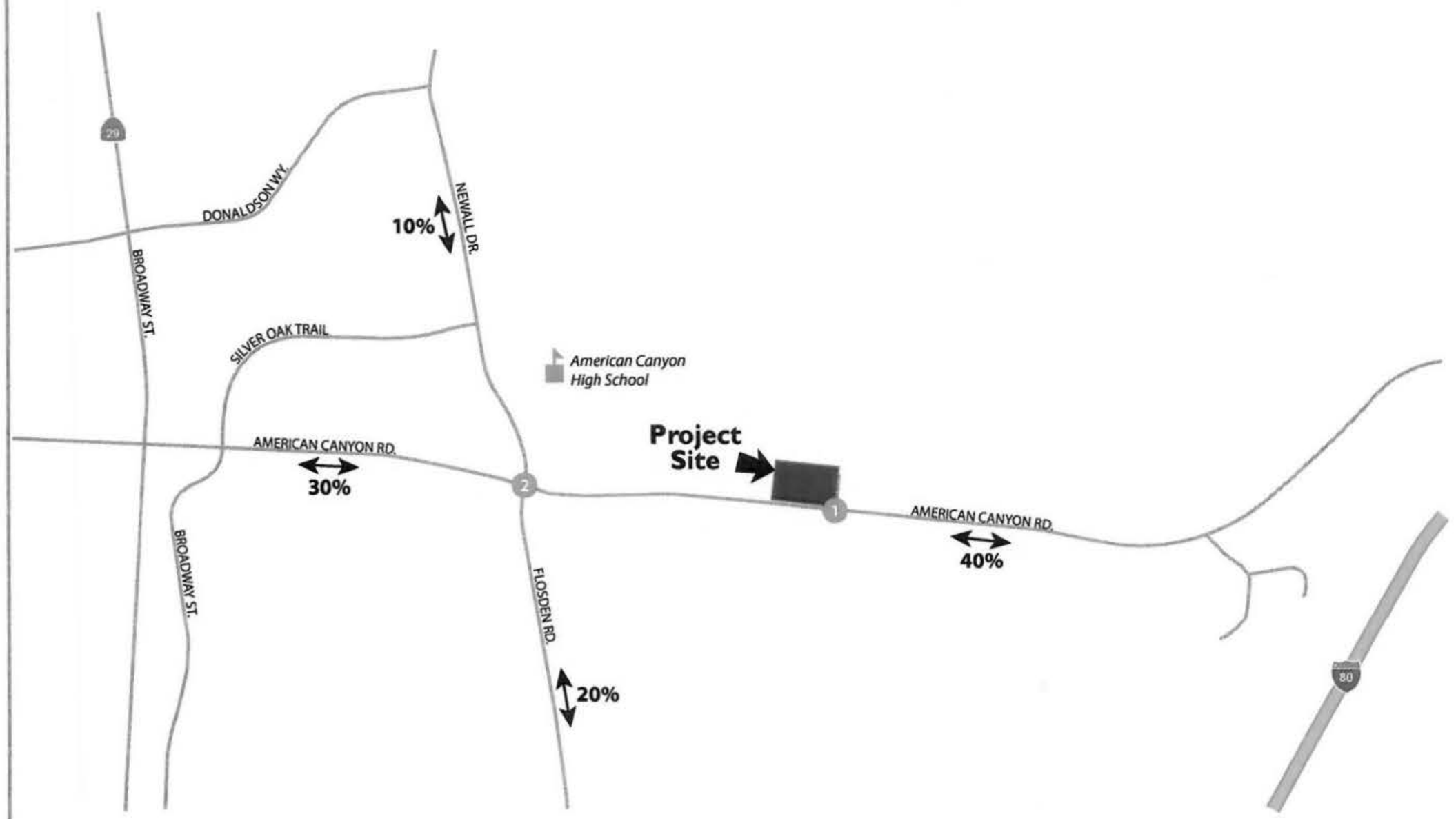
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.

[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.

[4] Change in delay between Existing and Existing plus Project Conditions.

Trip Distribution and Assignment





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Trips
- **XX%** Trip Distribution

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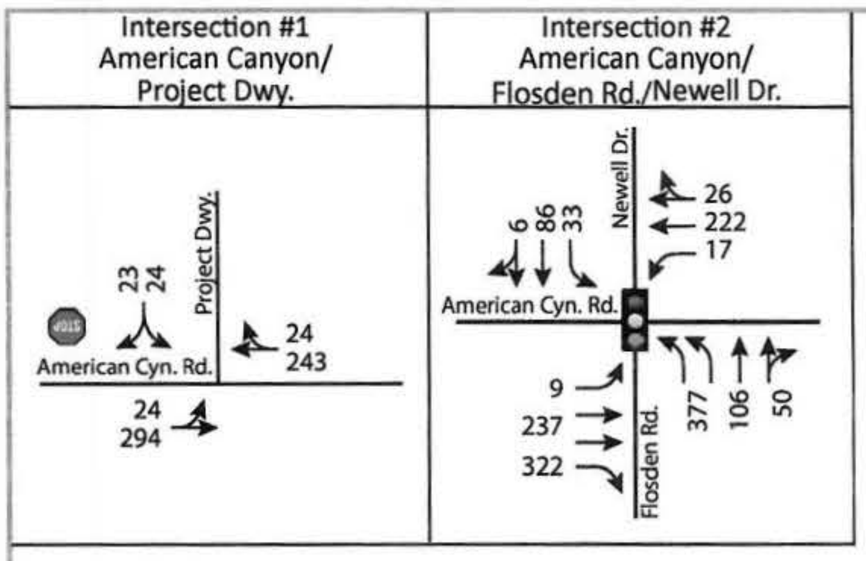
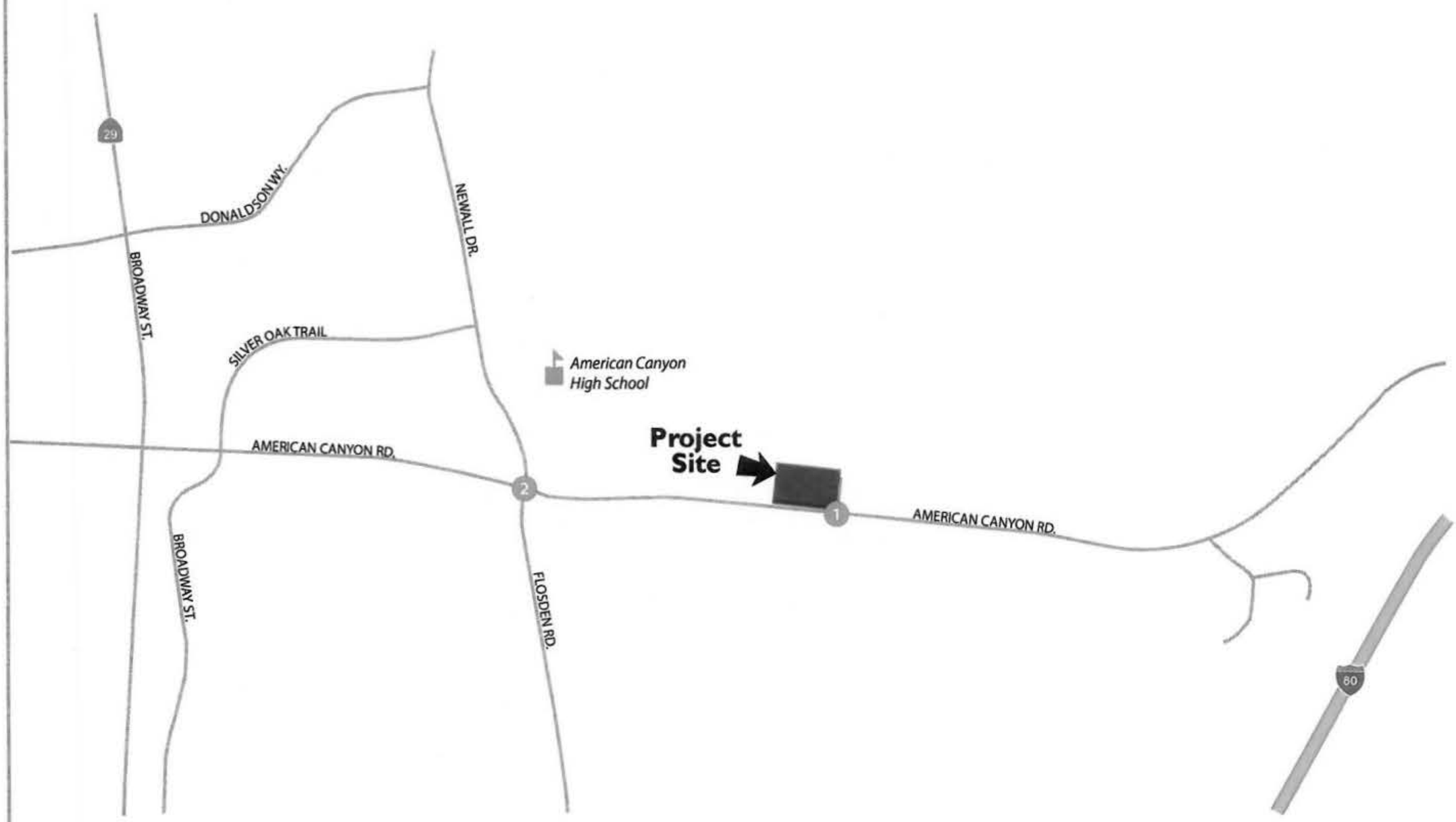
Figure 4

Existing plus Project Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 5

Queuing Analysis at Study Intersections

TJKM conducted a vehicle queuing and storage analysis for all exclusive left and right turn pockets at study intersections where project traffic is added under Existing plus Project Conditions. The 95th percentile (maximum) queues were analyzed using the HCM 2000 Queue methodology contained in Synchro software for the exclusive left turn/right turn pockets at the study intersections. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario. **Table 6** summarizes the 95th percentile queue lengths at study intersections under Existing and Existing plus Project Conditions scenarios. The proposed project *does not create a significant queues* on the expected left-turn or right-turn queues at study intersections.

Table 6: Saturday Morning 95th Percentile Queues at Turn Pockets Affected by Project Traffic

ID	Intersection	Lane Group	Storage Length per Lane	Existing Saturday Morning Peak		Existing plus Project	
				AM	PM	AM	PM
2	American Canyon Road and Flosden Road/Newell Drive	EBL	120	30	30	0	EBL
		EBR	120	50	50	0	EBR
		WBL	95	30	40	10	WBL
		NBL	265	180	180	0	NBL
		SBL	180	50	50	0	SBL

Notes: Storage length and 95th percentile queue is expressed in feet per lane
Queue length is rounded to nearest tenth value.

Intersections Level of Service Analysis – Cumulative (Year 2035) Conditions

Cumulative No Project Conditions are defined as conditions that occurs within the next 18 years (Year 2035). Level of service analysis at the study intersections was conducted for this scenario to establish a base to evaluate the impacts due to the addition of traffic from the proposed project. This scenario is similar to the Existing Conditions, but with a projected growth rate of one percent per year applied over 18 years to project traffic demands for the Year 2035. **Figure 6** shows turning movement volumes at the study intersections for Cumulative Conditions. The intersection LOS analysis results for Cumulative Conditions are summarized in **Table 7**. Detailed calculation sheets for Cumulative Conditions are contained in **Appendix B**. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour.

Table 7: Intersection Level of Service Analysis – Saturday Morning Cumulative (Year 2035) Conditions

ID	Intersections	Control	Peak Hour[1]	Cumulative Conditions	
				Average Delay[2]	LOS[3]
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	19.5	B

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.

Intersection Level of Service Analysis – Cumulative Plus Project Conditions

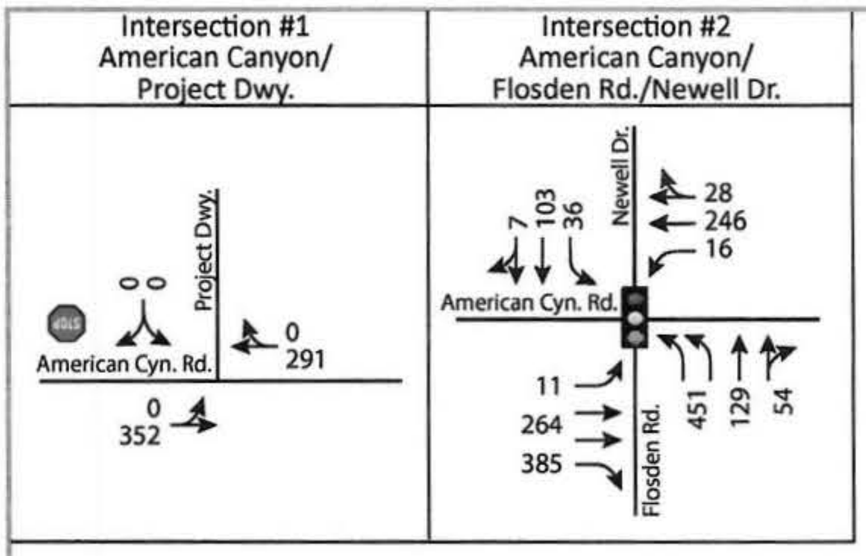
The intersection LOS analysis results for Cumulative (Year 2035) plus Project Conditions are summarized in **Table 8**. Detailed calculation sheets for Cumulative plus Project Conditions are contained in **Appendix B**. **Figure 7** shows turning movement volumes at the study intersections for Cumulative plus Project Conditions. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour. Based on the County of Napa impact criteria, the project is expected to have a less-than-significant impact at the study intersections.

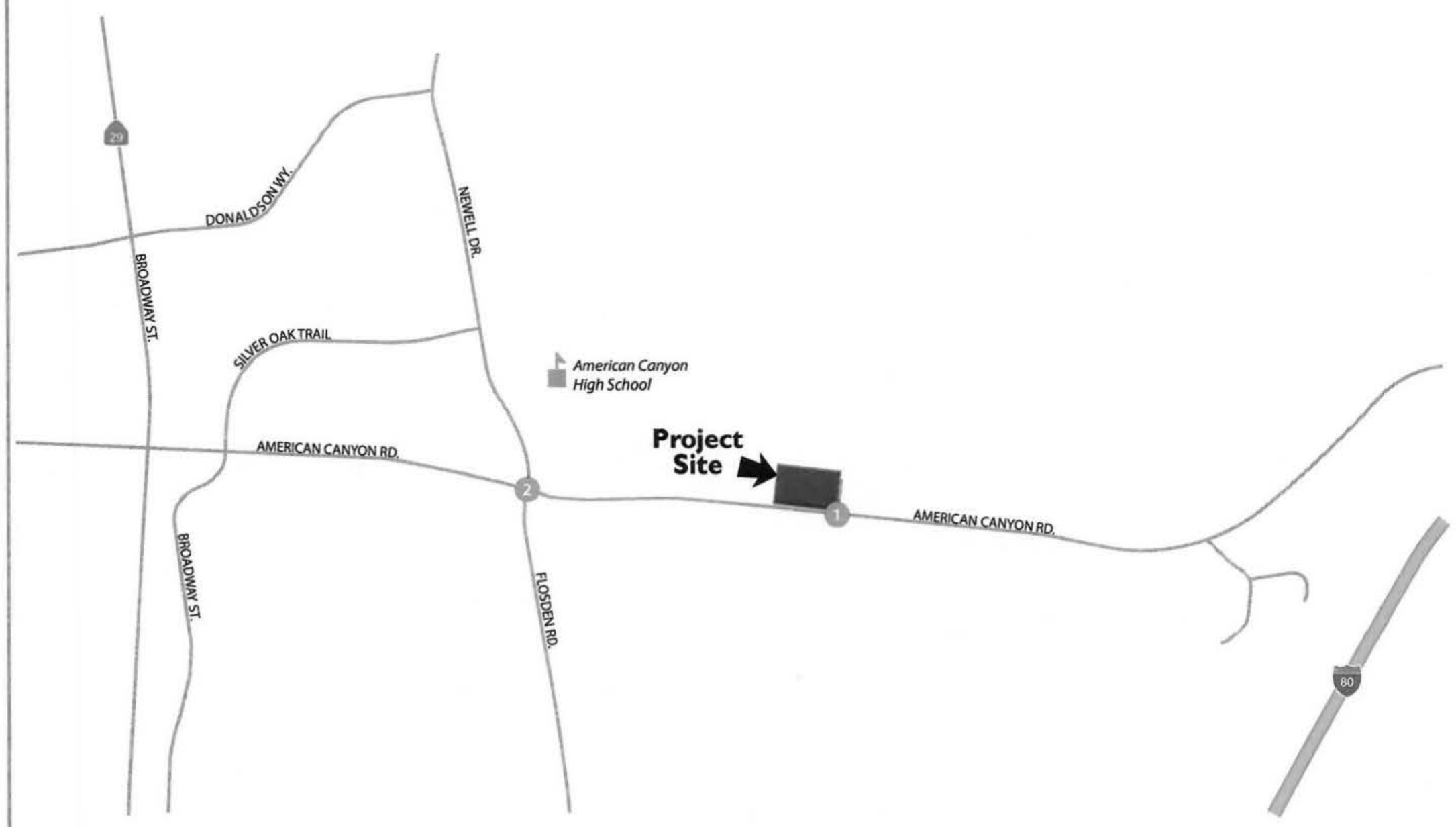
Table 8: Intersection Level of Service Analysis – Saturday Morning Cumulative plus Project Conditions

No	Intersections	Control	Peak Hour1	Cumulative Conditions		Cumulative plus Project Conditions		Change in Delay[4] (Sec)
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A	13.2	B	13.2
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	19.5	B	19.6	B	0.10

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.
[4] Change in delay between Cumulative and Cumulative plus Project Conditions.

Cumulative (Year 2035) Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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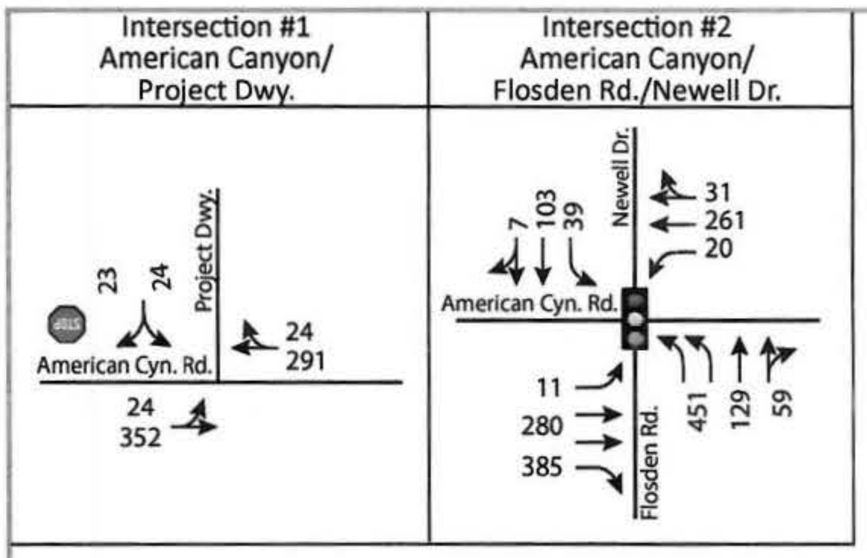
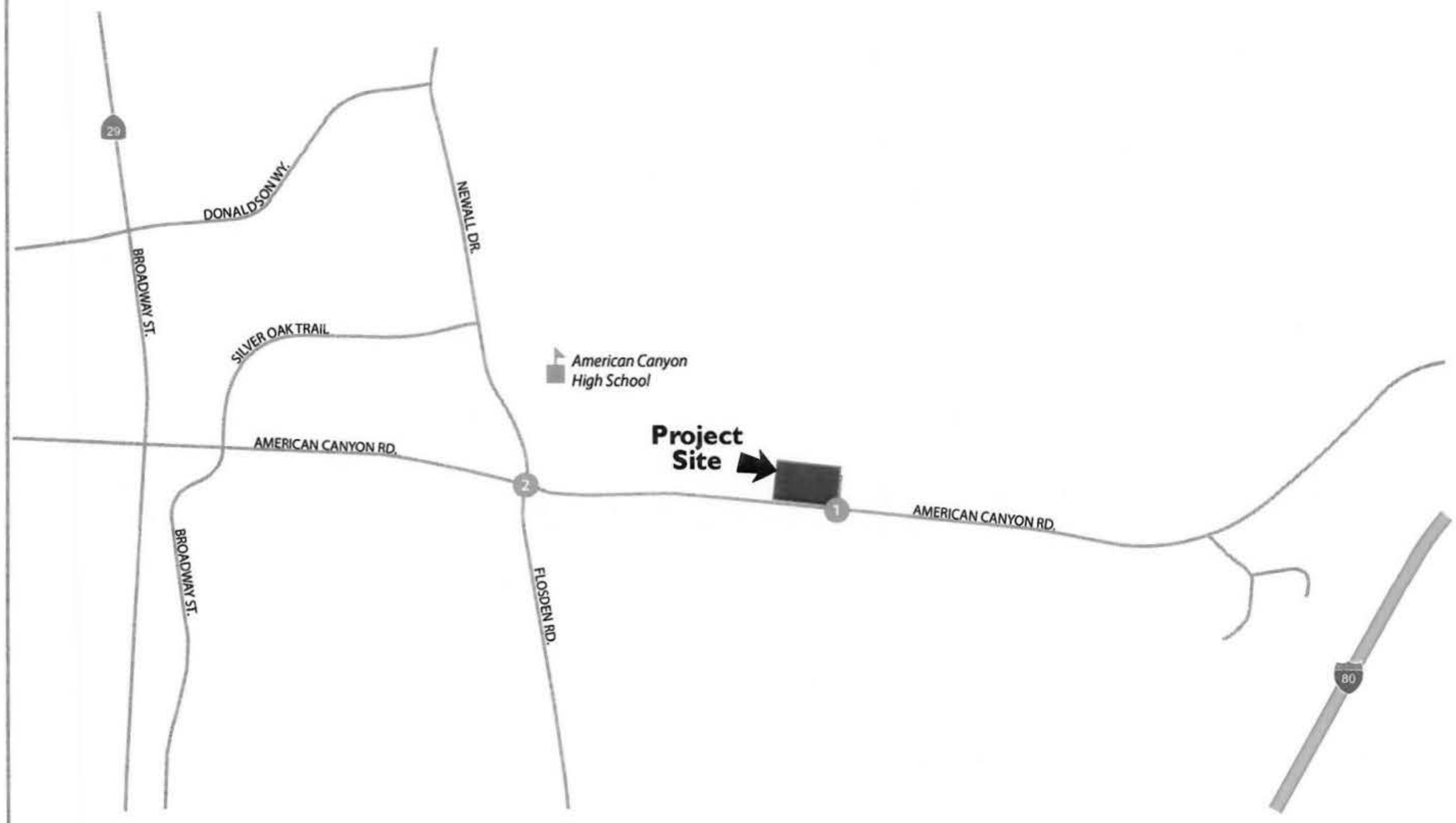
Figure 6

Cumulative plus Project Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- Study Intersection
- Traffic Signal
- Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 7

ALTERNATIVE ANALYSIS DISCUSSION

The unique nature of the land use caused TJKM to perform an alternative analysis of an actual trip generation to determine realistic impacts of the development. The current membership is 80 members, approximately 50 adults and 30 children. Anticipating a near term situation of the church building in stages, the Fellowship Hall would be built first and will accommodate the current 80 members. As the church continues to grow in membership and funding for the ultimate buildout, which would include the sanctuary and classrooms, TJKM documented the increase of membership at full capacity of the main sanctuary, which is 150 seats. To document the actual number of vehicles driving eastbound, turning left, and vehicles driving eastbound to turn right into the project site from American Canyon Road, TJKM used the approved trip distribution rate as discussed in the Trip Generation and Distribution section of this report.

Alternative Trip Generation Analysis

Scenario	Number of members	Number of Members per Vehicle	Total number of vehicles entering during Saturday peak	EB direction rate	WB direction Rate	EB Direction# of left turning vehicles	WB direction # of right turning vehicles
Near Term	80	3	27	0.60	0.40	16	11
Future Buildout Capacity	150	3	50	0.60	0.40	30	20

*Left turn rate per approved trip distribution.

As with the ITE Trip generation analysis, the alternative trip generation analysis assumes that, based on the operation schedule of the church, the sanctuary and fellowship hall activities are not concurrent. The same members would begin in the fellowship hall for the Sabbath School; migrate to the Sanctuary for worship, then return to the fellowship hall for lunch.

SITE ACCESS AND ON-SITE CIRCULATION

TJKM reviewed site access and internal circulation for vehicles, pedestrians and bicycles based on the site plan. TJKM reviewed internal and external access for the project site for passenger vehicles, trucks, pedestrians, and bicycles.

TJKM reviewed the proposed project site plan to evaluate access to the project. The proposed project's access will be via one full access driveway on American Canyon Road as shown in the project site plan dated April 12, 2016. The internal circulation for the proposed project was reviewed for issues related to queuing, safety, dead-end aisles, and parking spaces that may be difficult to maneuver in and out of project site. The circulation aisles are about 30 feet wide and accommodate two-way travel. TJKM recommends the installation of Stop control at the project

driveways with appropriate pavement delineation and signing to enhance traffic safety and operations at the driveways.

TJKM also examined the project site plan, in order to evaluate the adequacy of maneuvering by on-site vehicles and emergency vehicles circulation. The turning radii are adequate for the passenger vehicles. Emergency vehicles can access the project via American Canyon Road. Overall, the proposed on-site vehicle circulation is adequate and should not result in any traffic operations issues on-site that would provide significant impacts on City streets.

Left Turn Lane Warrants

The California Manual on Uniform Traffic Control Devices, the Caltrans Standard Specs and the Caltrans Highway Design manual shall be utilized to determine traffic warrants, design and construction procedures for all traffic control devices with the exception of left-turn lanes. Warrants for construction of a left-turn lane on County maintained roads as defined in Sections 18.112.040 through 18.112.080 of the County Code shall be as follows:

- Left-Turn Lane Warrant Graph based on road average daily trips (ADT) and the projected ADT of the proposed use. The chart is a representation of probable conflict between turning traffic and advancing traffic. Private Road or Driveway ADT is the total average daily traffic utilizing the facility. A left-turn lane will not be considered for uses generating an ADT of 20 or less.
- If the corner sight distance in advancing direction, measured from the driveway, is less than required per Caltrans design standards (usually the posted speed limit multiplied by 11, read in feet) a left-turn lane shall be installed.

TJKM notes that the County's standard for determining when left turn lanes are required does not appear to be based on actual left turning vehicles. Instead, the variable is side street ADT. Perhaps the standard is intending to indicate that an ADT of 20 LEFT TURNING vehicles might justify a left turn lane on streets with volumes that exist along American Canyon Road. In this situation, the actual opening-day number of arriving left turning vehicles would be a conservative estimate of 16 left turners during the busiest hour of the church week, which would be on a Saturday morning. Given the low demand for left turns at the site and difficult site conditions, which make the construction of a full left turn lane expensive, TJKM recommends that the County consider deferring the consideration of the need for a left turn lane upon completion of the full sanctuary and traffic evaluations are conducted.

The need for a left-turn lane on American Canyon Road at the project driveway was evaluated based on criteria contained in the Napa County Road and Street Standards, 2011. Based on the 24-hour classification counts, average daily traffic on American Canyon Road is 9,034 vehicles. The proposed project driveway average daily traffic is 82 trips. Based on these traffic levels, a left-turn lane would technically be warranted at the project driveway, with a 165 feet storage lane. However, the warrant only accounts for the number of trips on the roadway on a daily basis. At full occupancy, (150 seats and 7,911 square feet based on the site plan), the (ITE) trip generation anticipates eight left turns into the project site during the Saturday peak. However, the initial stage of development may only include the construction of the fellowship hall, which

would only generate 32 average daily trips, and 11-peak hour trips, of those four would be left turns into the project site. With the alternative trip generation analysis, TJKM determined, based on the number of members, that during an interim near-term scenario with just the fellowship hall built, and current members, there would be a total of 27 added vehicles to the roadway network, of those, 16 vehicles would turn left into the project driveway. At a future buildout membership of 150 members, the capacity of the Sanctuary, there would be a maximum of 50 vehicles added to the roadway network: 30 of which would be turning left into the project site.

The project use is unique and will only operate service one day a week, and one hour for the main service. Because of the property site usage is one day a week, the number of actual left turns anticipated into the site is relatively low, it can be suggested a left-turn is not needed at the time of initial construction. In the future, with 30 peak left turn movements associated with the development of the main sanctuary, TJKM is of the opinion that a left turn lane is only marginally required, but the potential need for the lane can be determined at that time.

The current roadway width would not allow for the restriping of a left turn lane without constructing additional pavement, which would be hindered by the presence of a very large tree on the south shoulder. Minor widening to allow vehicles behind the left turners to pass on the right is an alternate possibility.

In a February 14, 2018 letter to Napa County Public Works Director Steven E. Lederer, the applicant requested a road exception to allow the left turn movement without a left turn lane. Alternatively, the applicant expressed a willingness to allow only right turn movements in and out of the project access driveway. That decision is pending.

Pedestrian access

In the project vicinity, one study intersection was signalized. Sidewalks are provided on American Canyon Road and Newell Drive and Flosden Road. There are discontinuous sidewalks along the east side of American Canyon Road. There is adequate street lighting in the vicinity. Based on the pedestrian counts conducted there is little pedestrian activity within the vicinity of project. The proposed project will not result in any impacts to existing or planned pedestrian facilities in the immediate vicinity of the project. The proposed project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is *less-than-significant.*

Bicycle Access

In terms of bicycle access to the project site, there are no bicycle facilities within the project vicinity. As per City of American Canyon Bicycle Plan (January 2012), Class II bicycle lanes are proposed on American Canyon Road between SR 29 to South Kelly Road. The project does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is *less-than-significant.*

TRANSIT

There is no transit service within the vicinity of study area so the project would not impose any impacts on existing transit service. The nature of the traffic generated by the proposed project would also not create any demand for new transit service and is not expected to generate a need for transit in the area. Therefore, impacts to transit service are expected to be *less-than-significant.*

SIGHT DISTANCE ANALYSIS

Sight distance is evaluated to determine if a driver will have adequate visibility to enter a roadway safely without resulting in a conflict with traffic already on the roadway. The distance between the intersection of American Canyon Road and Flosden Road/Newell Drive and the proposed site driveway on American Canyon Road is approximately half mile. According to the Caltrans Highway Design Manual (HDM), Chapter 200, 2014, the required minimum stopping sight distance for design speed of 15 mph (project driveway) should be 100 feet. The speed limit on American Canyon Road is 45 mph. According to HDM, Chapter 200, 2014, the required minimum stopping sight distance for design speed of 45 mph is 360 feet. Therefore, there is ample sight distance for vehicular speeds of 45 mph.

PARKING

Based on the project site plan dated April 12, 2016, 65 standard parking spaces are provided for the New Life Community Church project, which includes auto parking and ADA parking. According to the Napa County Municipal Code (18.110.030), Churches requires one per employee plus one per each 3.5 seats in main sanctuary. Based on the proposed parking spaces to be provided on site, no parking impacts are projected on City Streets.

CONCLUSIONS

Operation of New Life Community Church facility, as proposed, would not result in a significant traffic impacts under Napa County guidelines, therefore no mitigation is needed to the study intersections. As an added safety measure, TJKM recommends the installation of a stop control at the project driveway with appropriate pavement delineation and signing.

Per the Napa County Road and Street Standards, a left-turn lane may to be warranted on American Canyon Road at the project driveway. However, due to the unique circumstance, initial membership and building staging, a left turn lane does not appear to be necessary at the time of initial construction. The County can consider deferring the consideration of the need for a left turn lane upon completion of the full sanctuary and traffic evaluations are conducted. The County could consider minor widening on the south side of American Canyon Road, to permit eastbound through vehicles to slowly pass stopped church traffic that may be awaiting a gap in westbound traffic.

In a February 14, 2018 letter to Napa County Public Works Director Steven E. Lederer, the applicant requested a road exception to allow the left turn movement without a left turn lane. Alternatively, the applicant expressed a willingness to allow only right turn movements in and out of the project access driveway. That decision is pending.

TJKM VISION THAT MOVES YOUR COMMUNITY

APPENDIX A

- Turning Movement Counts (TMC) for vehicles, Pedestrians and Bicycles & Classification Traffic Counts

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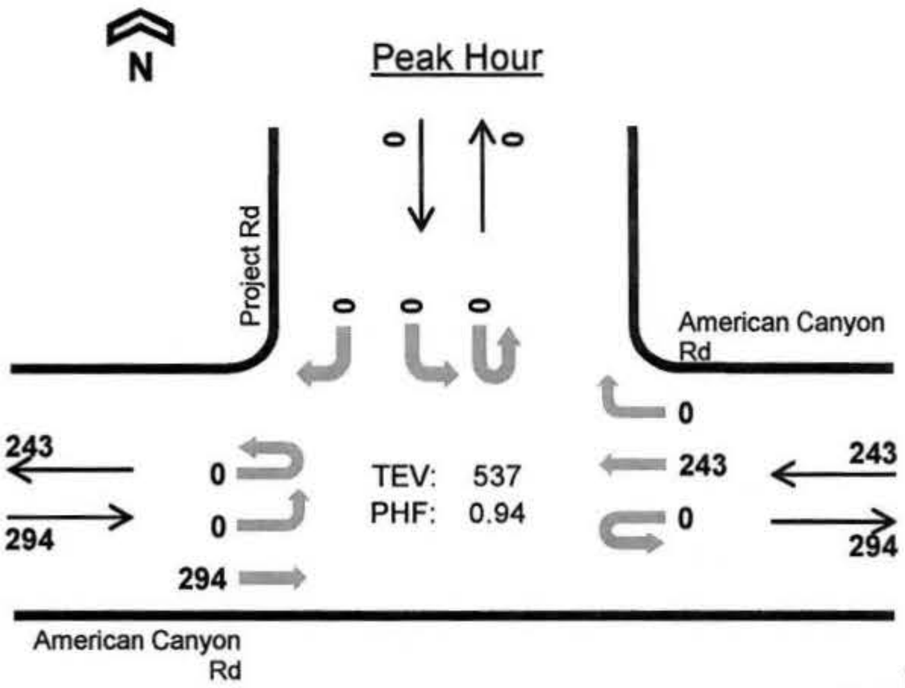
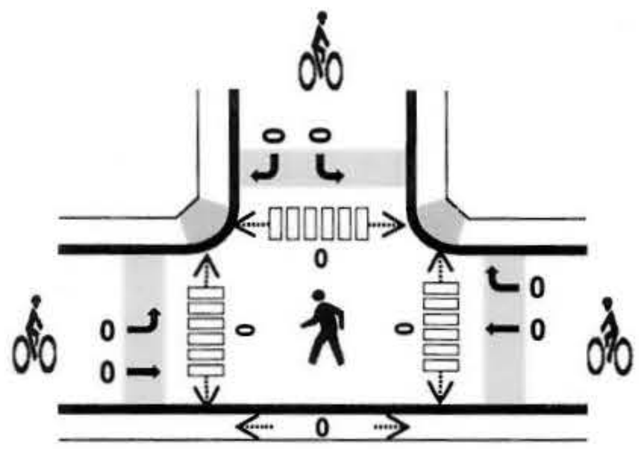
Project Rd
American Canyon Rd



Date: 01/14/2017
Count Period: 9:00 AM to 11:00 AM
Peak Hour: 10:00 AM to 11:00 AM



	HV %:	PHF
EB	0.7%	0.80
WB	0.4%	0.87
NB	-	-
SB	-	-
TOTAL	0.6%	0.94

Two-Hour Count Summaries

Interval Start	American Canyon Rd Eastbound				American Canyon Rd Westbound				0 Northbound				Project Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	63	0	0	0	46	0	0	0	0	0	0	0	0	0	109	0
9:15 AM	0	0	44	0	0	0	59	0	0	0	0	0	0	0	0	0	103	0
9:30 AM	0	0	53	0	0	0	52	0	0	0	0	0	0	0	0	0	105	0
9:45 AM	0	0	67	0	0	0	57	0	0	0	0	0	0	0	0	0	124	441
10:00 AM	**0**	**0**	**67**	**0**	**0**	**0**	**58**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**125**	457
10:15 AM	**0**	**0**	**62**	**0**	**0**	**0**	**67**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**129**	483
10:30 AM	**0**	**0**	**92**	**0**	**0**	**0**	**48**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**140**	518
10:45 AM	**0**	**0**	**73**	**0**	**0**	**0**	**70**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**143**	**537**
Count Total	0	0	521	0	0	0	457	0	0	0	0	0	0	0	0	0	978	0
Peak Hour All	**0**	**0**	**294**	**0**	**0**	**0**	**243**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**537**	**0**
Peak Hour HV	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
Peak Hour HV%	-	-	**1%**	-	-	-	**0%**	-	-	-	-	-	-	-	-	-	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
9:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
9:15 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
9:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
9:45 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
10:00 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
10:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
10:30 AM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
10:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	2	3	0	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**2**	**1**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	American Canyon Rd				American Canyon Rd				0				Project Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
10:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
10:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**4**
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	5	0
Peak Hour	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	American Canyon Rd			American Canyon Rd			0			Project Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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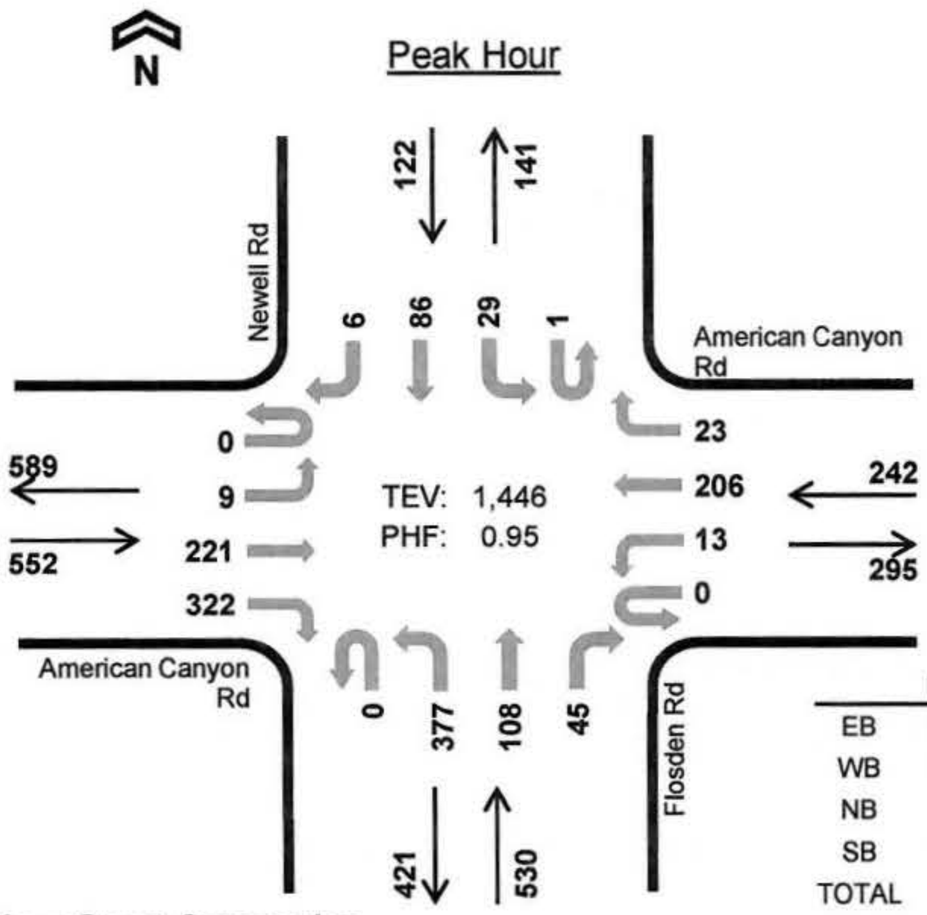
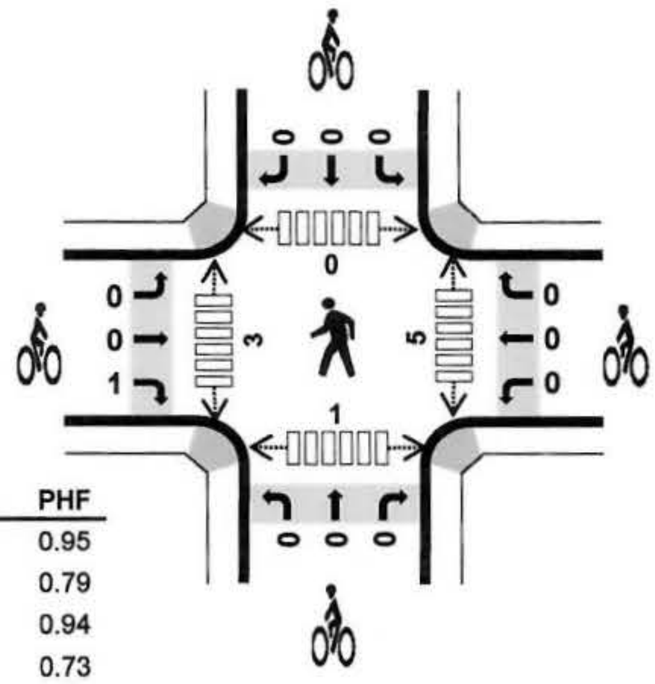
Newell Rd
American Canyon Rd



Date: 01/14/2017
Count Period: 9:00 AM to 11:00 AM
Peak Hour: 10:00 AM to 11:00 AM



	HV %:	PHF
EB	1.1%	0.95
WB	0.0%	0.79
NB	0.9%	0.94
SB	3.3%	0.73
TOTAL	1.0%	0.95

Two-Hour Count Summaries

Interval Start		American Canyon Rd Eastbound				American Canyon Rd Westbound				Flosden Rd Northbound				Newell Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM		0	0	44	48	0	3	38	2	0	72	16	9	0	6	15	0	253	0
9:15 AM		0	4	27	79	0	5	47	4	0	79	17	9	0	6	21	0	298	0
9:30 AM		0	3	35	56	0	5	51	4	0	80	30	10	0	4	15	0	293	0
9:45 AM		0	3	51	67	0	3	55	16	0	100	21	14	0	7	25	0	362	1,206
10:00 AM		**0**	**1**	**50**	**82**	**0**	**2**	**52**	**7**	**0**	**86**	**37**	**18**	**0**	**4**	**20**	**0**	**359**	1,312
10:15 AM		**0**	**1**	**46**	**87**	**0**	**5**	**44**	**6**	**0**	**92**	**22**	**9**	**0**	**10**	**28**	**4**	**354**	1,368
10:30 AM		**0**	**6**	**66**	**74**	**0**	**1**	**47**	**1**	**0**	**92**	**25**	**12**	**1**	**9**	**19**	**1**	**354**	1,429
10:45 AM		**0**	**1**	**59**	**79**	**0**	**5**	**63**	**9**	**0**	**107**	**24**	**6**	**0**	**6**	**19**	**1**	**379**	**1,446**
Count Total		0	19	378	572	0	29	397	49	0	708	192	87	1	52	162	6	2,652	0
Peak Hour	All	**0**	**9**	**221**	**322**	**0**	**13**	**206**	**23**	**0**	**377**	**108**	**45**	**1**	**29**	**86**	**6**	**1,446**	**0**
	HV	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**4**	**0**	**15**	**0**
	HV%	**-**	**0%**	**1%**	**1%**	**-**	**0%**	**0%**	**0%**	**-**	**1%**	**1%**	**2%**	**0%**	**0%**	**5%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
9:00 AM	1	0	2	0	*3*	0	0	0	0	*0*	0	1	0	1	*2*
9:15 AM	2	0	0	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
9:30 AM	1	1	0	0	*2*	0	0	0	0	*0*	0	1	0	0	*1*
9:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
10:00 AM	**1**	**0**	**3**	**0**	*4*	**0**	**0**	**0**	**0**	*0*	**3**	**0**	**0**	**0**	*3*
10:15 AM	**0**	**0**	**1**	**1**	*2*	**0**	**0**	**0**	**0**	*0*	**2**	**1**	**0**	**0**	*3*
10:30 AM	**5**	**0**	**0**	**2**	*7*	**0**	**0**	**0**	**0**	*0*	**0**	**2**	**0**	**0**	*2*
10:45 AM	**0**	**0**	**1**	**1**	*2*	**1**	**0**	**0**	**0**	*1*	**0**	**0**	**0**	**1**	*1*
Count Total	10	1	7	5	*23*	1	0	0	0	*1*	5	5	0	2	*12*
Peak Hour	**6**	**0**	**5**	**4**	*15*	**1**	**0**	**0**	**0**	*1*	**5**	**3**	**0**	**1**	*9*

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Two-Hour Count Summaries - Heavy Vehicles

Interval Start	American Canyon Rd Eastbound				American Canyon Rd Westbound				Flosden Rd Northbound				Newell Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	3	0
9:15 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	3	0
9:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
10:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**4**	9
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**2**	8
10:30 AM	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**7**	13
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**15**
Count Total	0	0	3	7	0	1	0	0	0	5	1	1	0	0	5	0	23	0
Peak Hour	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**4**	**0**	**15**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	American Canyon Rd Eastbound			American Canyon Rd Westbound			Flosden Rd Northbound			Newell Rd Southbound			15-min Total	Rolling One Hour
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:45 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
Count Total	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

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Vehicle Classification Report Summary

Location: American Canyon Rd
Count Direction: Eastbound / Westbound
Date Range: 1/14/2017 to 1/14/2017
Site Code: 01

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
	Study Total													
Eastbound	15	3,252	867	0	253	3	0	1	0	1	0	0	0	4,392
Percent	0.3%	74.0%	19.7%	0.0%	5.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Westbound	17	3,685	773	0	165	0	0	2	0	0	0	0	0	4,642
Percent	0.4%	79.4%	16.7%	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	32	6,937	1,640	0	418	3	0	3	0	1	0	0	0	9,034
Percent	0.4%	76.8%	18.2%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

FHWA Vehicle Classification	
Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
Class 4 - Buses	Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks	Class 12 - Six-Axle Multi-Trailer Trucks
Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	

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Location: American Canyon Rd
Date Range: 1/14/2017 to 1/14/2017
Site Code: 01

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Saturday, January 14, 2017
Westbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	64	11	0	3	0	0	0	0	0	0	0	0	**78**
1:00 AM	0	30	6	0	1	0	0	0	0	0	0	0	0	**37**
2:00 AM	0	25	4	0	3	0	0	0	0	0	0	0	0	**32**
3:00 AM	0	18	1	0	4	0	0	0	0	0	0	0	0	**23**
4:00 AM	0	24	3	0	0	0	0	0	0	0	0	0	0	**27**
5:00 AM	0	28	6	0	1	0	0	0	0	0	0	0	0	**35**
6:00 AM	0	44	10	0	7	0	0	1	0	0	0	0	0	**62**
7:00 AM	0	98	18	0	3	0	0	0	0	0	0	0	0	**119**
8:00 AM	2	115	31	0	14	0	0	1	0	0	0	0	0	**163**
9:00 AM	0	154	43	0	15	0	0	0	0	0	0	0	0	**212**
10:00 AM	0	186	52	0	7	0	0	0	0	0	0	0	0	**245**
11:00 AM	2	237	51	0	17	0	0	0	0	0	0	0	0	**307**
12:00 PM	1	248	41	0	14	0	0	0	0	0	0	0	0	**304**
1:00 PM	0	224	38	0	10	0	0	0	0	0	0	0	0	**272**
2:00 PM	2	298	71	0	14	0	0	0	0	0	0	0	0	**385**
3:00 PM	1	301	61	0	14	0	0	0	0	0	0	0	0	**377**
4:00 PM	3	286	71	0	5	0	0	0	0	0	0	0	0	**365**
5:00 PM	0	285	65	0	14	0	0	0	0	0	0	0	0	**364**
6:00 PM	3	244	52	0	6	0	0	0	0	0	0	0	0	**305**
7:00 PM	0	191	45	0	3	0	0	0	0	0	0	0	0	**239**
8:00 PM	1	211	37	0	3	0	0	0	0	0	0	0	0	**252**
9:00 PM	0	161	25	0	5	0	0	0	0	0	0	0	0	**191**
10:00 PM	0	117	18	0	0	0	0	0	0	0	0	0	0	**135**
11:00 PM	2	96	13	0	2	0	0	0	0	0	0	0	0	**113**
Total	**17**	**3,685**	**773**	**0**	**165**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**4,642**
Percent	**0.4%**	**79.4%**	**16.7%**	**0.0%**	**3.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

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Location: American Canyon Rd
Date Range: 1/14/2017 to 1/14/2017
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Total Study Average
Eastbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	33	5	0	0	0	0	0	0	0	0	0	0	**38**
1:00 AM	0	23	6	0	4	0	0	0	0	0	0	0	0	**33**
2:00 AM	0	21	5	0	4	0	0	0	0	0	0	0	0	**30**
3:00 AM	0	12	1	0	2	0	0	0	0	0	0	0	0	**15**
4:00 AM	0	16	7	0	0	0	0	0	0	0	0	0	0	**23**
5:00 AM	0	32	14	0	4	0	0	0	0	0	0	0	0	**50**
6:00 AM	0	61	19	0	8	0	0	0	0	0	0	0	0	**88**
7:00 AM	0	77	43	0	10	0	0	0	0	0	0	0	0	**130**
8:00 AM	3	130	44	0	12	1	0	0	0	0	0	0	0	**190**
9:00 AM	0	162	50	0	16	0	0	0	0	0	0	0	0	**228**
10:00 AM	0	204	56	0	22	0	0	0	0	0	0	0	0	**282**
11:00 AM	1	249	75	0	22	1	0	0	0	0	0	0	0	**348**
12:00 PM	5	237	69	0	23	1	0	0	0	0	0	0	0	**335**
1:00 PM	4	233	57	0	24	0	0	0	0	0	0	0	0	**318**
2:00 PM	0	210	65	0	15	0	0	0	0	0	0	0	0	**290**
3:00 PM	0	280	74	0	14	0	0	0	0	0	0	0	0	**368**
4:00 PM	1	264	73	0	16	0	0	0	0	0	0	0	0	**354**
5:00 PM	1	262	63	0	11	0	0	1	0	0	0	0	0	**338**
6:00 PM	0	222	44	0	22	0	0	0	0	1	0	0	0	**289**
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:00 PM	0	103	23	0	6	0	0	0	0	0	0	0	0	**132**
9:00 PM	0	122	11	0	4	0	0	0	0	0	0	0	0	**137**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	73	8	0	1	0	0	0	0	0	0	0	0	**82**
Total	**15**	**3,026**	**812**	**0**	**240**	**3**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**4,098**
Percent	**0.4%**	**73.8%**	**19.8%**	**0.0%**	**5.9%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

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APPENDIX B

- Level of Service Worksheets

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	294	243	0	0	0
Future Volume (Veh/h)	0	294	243	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	0	368	279	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				647	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				647	279
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1284				436	760

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	368	279	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1284	1700	1700
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
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

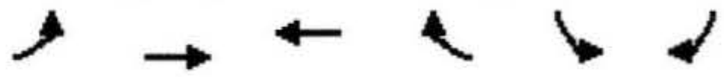
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	221	322	13	206	23	377	108	45	30	86	6
Future Volume (vph)	9	221	322	13	206	23	377	108	45	30	86	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3486		3433	3368		1770	3502	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3486		3433	3368		1770	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	9	233	339	16	261	29	401	115	48	41	118	8
RTOR Reduction (vph)	0	0	194	0	5	0	0	25	0	0	3	0
Lane Group Flow (vph)	9	233	145	16	285	0	401	138	0	41	123	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.7	13.5	26.0	0.8	13.6		12.5	25.7		2.5	15.0	
Effective Green, g (s)	0.7	13.5	26.0	0.8	13.6		12.5	25.7		2.5	15.0	
Actuated g/C Ratio	0.01	0.22	0.43	0.01	0.22		0.21	0.42		0.04	0.25	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	20	785	802	23	779		705	1423		72	863	
v/s Ratio Prot	0.01	0.07	0.04	c0.01	c0.08		c0.12	0.04		0.02	c0.04	
v/s Ratio Perm			0.06									
v/c Ratio	0.45	0.30	0.18	0.70	0.37		0.57	0.10		0.57	0.14	
Uniform Delay, d1	29.9	19.7	10.8	29.9	20.0		21.7	10.6		28.6	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.3	0.0	54.1	0.4		0.6	0.0		6.0	0.1	
Delay (s)	35.6	20.0	10.8	84.0	20.4		22.4	10.6		34.7	18.0	
Level of Service	D	B	B	F	C		C	B		C	B	
Approach Delay (s)		14.9			23.7			19.0			22.1	
Approach LOS	B		C	B			C			B		

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	19.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	233	339	16	290	401	163	41	126
v/c Ratio	0.05	0.27	0.37	0.09	0.34	0.52	0.10	0.19	0.17
Control Delay	33.1	20.8	2.7	32.6	20.6	24.3	9.3	31.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	20.8	2.7	32.6	20.6	24.3	9.3	31.2	19.4
Queue Length 50th (ft)	2	25	0	4	32	46	6	10	14
Queue Length 95th (ft)	22	98	45	27	101	171	44	47	41
Internal Link Dist (ft)		682			207		684		398
Turn Bay Length (ft)	120		120	95		265		180	
Base Capacity (vph)	1243	2628	1478	1243	2590	2982	3148	533	2621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.09	0.23	0.01	0.11	0.13	0.05	0.08	0.05

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	294	243	7	6	10
Future Volume (Veh/h)	10	294	243	7	6	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	13	368	279	8	24	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	287				677	283
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	287				677	283
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	95
cM capacity (veh/h)	1275				414	756

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	381	287	64
Volume Left	13	0	24
Volume Right	0	8	40
cSH	1275	1700	577
Volume to Capacity	0.01	0.17	0.11
Queue Length 95th (ft)	1	0	9
Control Delay (s)	0.4	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

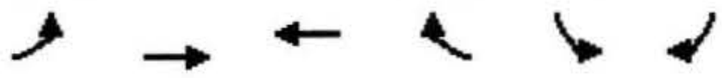
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	226	322	16	211	25	377	108	48	32	86	6
Future Volume (vph)	9	226	322	16	211	25	377	108	48	32	86	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3482		3433	3361		1770	3502	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3482		3433	3361		1770	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	9	238	339	20	267	32	401	115	51	44	118	8
RTOR Reduction (vph)	0	0	191	0	5	0	0	29	0	0	3	0
Lane Group Flow (vph)	9	238	148	20	294	0	401	137	0	44	123	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.7	13.5	26.3	0.8	13.6		12.8	23.4		4.1	14.0	
Effective Green, g (s)	0.7	13.5	26.3	0.8	13.6		12.8	23.4		4.1	14.0	
Actuated g/C Ratio	0.01	0.22	0.44	0.01	0.23		0.21	0.39		0.07	0.23	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	20	794	819	23	787		731	1308		120	815	
v/s Ratio Prot	0.01	0.07	0.04	c0.01	c0.08		c0.12	0.04		0.02	c0.04	
v/s Ratio Perm			0.06									
v/c Ratio	0.45	0.30	0.18	0.87	0.37		0.55	0.10		0.37	0.15	
Uniform Delay, d1	29.5	19.4	10.3	29.6	19.6		21.1	11.7		26.8	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.3	0.0	124.8	0.4		0.5	0.0		0.7	0.1	
Delay (s)	35.3	19.7	10.4	154.4	20.1		21.5	11.7		27.5	18.4	
Level of Service	D	B	B	F	C		C	B		C	B	
Approach Delay (s)		14.5			28.5			18.7			20.8	
Approach LOS	B		C	B			C					

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	19.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	238	339	20	299	401	166	44	126
v/c Ratio	0.05	0.28	0.37	0.10	0.35	0.51	0.12	0.20	0.17
Control Delay	33.2	21.0	2.7	32.6	20.8	24.2	10.1	31.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	21.0	2.7	32.6	20.8	24.2	10.1	31.3	19.6
Queue Length 50th (ft)	2	27	0	5	34	46	11	11	14
Queue Length 95th (ft)	22	100	45	32	103	171	44	50	41
Internal Link Dist (ft)		682			207		684		398
Turn Bay Length (ft)	120		120	95		265		180	
Base Capacity (vph)	1233	2606	1470	1233	2566	2958	3141	528	2599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.09	0.23	0.02	0.12	0.14	0.05	0.08	0.05

Intersection Summary



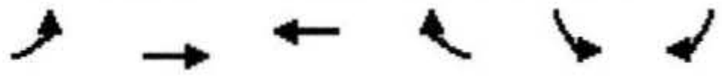
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	352	291	0	0	0
Future Volume (Veh/h)	0	352	291	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	0	440	334	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	334				774	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334				774	334
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1225				367	708

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	440	334	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1225	1700	1700
Volume to Capacity	0.00	0.20	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	21.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	264	385	16	246	28	451	129	54	36	103	7
Future Volume (vph)	11	264	385	16	246	28	451	129	54	36	103	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3486		3433	3368		1770	3501	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3486		3433	3368		1770	3501	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	12	278	405	20	311	35	480	137	57	49	141	10
RTOR Reduction (vph)	0	0	219	0	5	0	0	26	0	0	3	0
Lane Group Flow (vph)	12	278	186	20	341	0	480	168	0	49	148	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.8	15.2	30.4	2.0	16.4		15.2	26.5		4.3	14.9	
Effective Green, g (s)	0.8	15.2	30.4	2.0	16.4		15.2	26.5		4.3	14.9	
Actuated g/C Ratio	0.01	0.23	0.46	0.03	0.25		0.23	0.40		0.06	0.22	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	21	811	839	53	862		787	1346		114	786	
v/s Ratio Prot	0.01	0.08	0.05	c0.01	c0.10		c0.14	0.05		0.03	c0.04	
v/s Ratio Perm			0.07									
v/c Ratio	0.57	0.34	0.22	0.38	0.40		0.61	0.12		0.43	0.19	
Uniform Delay, d1	32.6	21.4	10.8	31.5	20.8		22.9	12.6		29.8	20.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.2	0.3	0.0	1.6	0.4		0.9	0.1		0.9	0.2	
Delay (s)	53.8	21.7	10.9	33.2	21.2		23.8	12.6		30.8	21.0	
Level of Service	D	C	B	C	C		C	B		C	C	
Approach Delay (s)		15.9			21.9			20.6			23.4	
Approach LOS	B		C			C			C			

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	19.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	352	291	7	6	10
Future Volume (Veh/h)	10	352	291	7	6	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	13	440	334	8	24	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	342				804	338
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342				804	338
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	94
cM capacity (veh/h)	1217				348	704

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	453	342	64
Volume Left	13	0	24
Volume Right	0	8	40
cSH	1217	1700	509
Volume to Capacity	0.01	0.20	0.13
Queue Length 95th (ft)	1	0	11
Control Delay (s)	0.3	0.0	13.1
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	13.1
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	269	385	19	251	30	451	129	57	38	103	7
Future Volume (vph)	11	269	385	19	251	30	451	129	57	38	103	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3483		3433	3360		1770	3501	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3483		3433	3360		1770	3501	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	12	283	405	24	318	38	480	137	61	52	141	10
RTOR Reduction (vph)	0	0	219	0	5	0	0	29	0	0	3	0
Lane Group Flow (vph)	12	283	186	24	351	0	480	169	0	52	148	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.8	15.3	30.6	2.1	16.6		15.3	26.6		4.4	15.0	
Effective Green, g (s)	0.8	15.3	30.6	2.1	16.6		15.3	26.6		4.4	15.0	
Actuated g/C Ratio	0.01	0.23	0.46	0.03	0.25		0.23	0.40		0.07	0.22	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	21	811	839	55	866		787	1339		116	787	
v/s Ratio Prot	0.01	0.08	0.05	c0.01	c0.10		c0.14	0.05		0.03	c0.04	
v/s Ratio Perm			0.07									
v/c Ratio	0.57	0.35	0.22	0.44	0.41		0.61	0.13		0.45	0.19	
Uniform Delay, d1	32.8	21.5	10.9	31.7	20.9		23.0	12.7		30.0	20.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.2	0.4	0.0	2.0	0.4		0.9	0.1		1.0	0.2	
Delay (s)	54.0	21.9	10.9	33.7	21.3		24.0	12.8		31.0	21.1	
Level of Service	D	C	B	C	C		C	B		C	C	
Approach Delay (s)		16.1			22.1			20.7			23.6	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

February 14, 2018

Steven E. Lederer
Director of Public Works
County of Napa Department of Public Works
1195 Third Street, Suite 101
Napa, California 94559

RE: Request for Road Exception - Left Turn Lane; New Life Church Project, 1451 American Canyon Road, Napa County, California, #P15-00384

Dear Mr. Lederer,

This letter is in reference to the site improvements for the proposed New Life Church, to be located at 1451 American Canyon Road. TJKM completed the attached draft technical memorandum to address any potential impacts as the result of the development of the religious facility on a vacant lot in Napa County.

Project Description and Background
The proposed project is located on a vacant parcel in unincorporated Napa County near the City of American Canyon. The area is mainly rural with American Canyon High School and residential developments located west of the project site. The proposed project consists of two buildings- a 3,115 square foot fellowship hall and a 7,911 square foot sanctuary. The existing New Life Community Church, which operates at a local elementary school off Silver Oak Trail in American Canyon, has a membership of 80 members, of those 30 are children. Services are on Saturdays in the morning, beginning with Sabbath School from 10:00 a.m. to 11:00 a.m., main service for worship from 11:00 am to 12:00 p.m., followed by lunch, and activity. The bulk of the membership arrive for the main service and lunch.

Initially, on the project site, the Sabbath school, main service, lunch, and afternoon activities would occur in the Fellowship Hall. As the membership grows, the Sanctuary would be built and activities would start in the fellowship Hall for classes, move on to worship for main services, then back to the Fellowship Hall for lunch and activities.

Per the Napa County Road and Street Standards, the project is required a left turn lane based on average daily traffic (ADT) travelling along American Canyon Road. Per the standard, ADT greater than 7,500 requires a left turn lane. It is noted that the Napa County warrants for left turn lanes are not based on the volume of left turners. The ADT for American Canyon Road is 9,034. Because of the unique nature of the use, an exception to the left turn lane is requested for the following reasons: 1) Comparatively Low Project Trip Generation, 2) Expensive Environmental Constraints, and 3) Alternative Site Access. These reasons are detailed below.

1. Comparatively Low Project Trip Generation

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the Institute of Transportation Engineer's (ITE) publication Trip Generation (9th Edition). TJKM used published trip rates for Church (ITE Land use Code 560). **Table 1** shows the trip generation for the proposed project. Since activities for adults would not occur in both buildings concurrently, trip generation is based on the Sanctuary building, which has the larger square footage. Though Saturday is the day for this project to worship, TJKM used the Sunday peak hour generator, as it represents the average trips generated during worship services.

Using ITE rates, the project is expected to generate approximately 95 weekend peak hour trips (48 inbound, 47 outbound) during the peak hour. New Life Community Church only operates one day a week; the peak hour should begin shortly before 11 a.m.

Table 1: Proposed Project Trip Generation

Land Use (ITE Code)	Size		Daily		Sunday Peak Hour Generator			
			Rate	Trips	Rate	In	Out	Total
Church-Fellowship Hall (560)	3.115	ksf	36.63	114	12.04	19	19	38
Church-Sanctuary (560)	7.911	ksf	10.37	290	12.04	48	47	95

Notes: Source- Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012.
ksf=thousand square feet

Project Trip Distribution and Assignment

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area. Assignment determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed project were developed based on the existing travel patterns and TJKM's knowledge of the study area. New Life Church is a regional church serving members in Fairfield, Vacaville, American Canyon and other areas. The distribution assumptions for the proposed development are as follows**:**

- 50 percent to/from west of American Canyon Road
- 50 percent to/from east of American Canyon Road

Using ITE information, during service, it is estimated that, at full occupancy, 24 trips will arrive from the west and 24 trips from the east on American Canyon Road, to enter the project site during the Saturday peak hour. However, the church does not anticipate full capacity and will be built in phases, using the Fellowship Hall for both worship and classes which would result in 19 trips total, with only 10 trips arriving from the east and 9 trips arriving from the west on American Canyon Road.

The project use is unique and will only operate service one day a week, and one hour for the main service. Because of the property site usage is one day a week and the number of actual left turns anticipated into the site is relatively low, it can be suggested a left-turn is not needed, even with the full occupancy of the proposed church.

2. Expensive Environmental Constraints

American Canyon Road is a major east-west, two to four-lane arterial roadway that traverses between Wetlands Edge Road, from within the City, to I-80, where it forms a grade separated interchange. At the project site, American Canyon Road acts as a rural connector east of the City limits. The two-lane roadway has approximately 12-foot travel lanes with minimal shoulders due to an embankment adjacent to the project site near the proposed driveway on the north side of the street, and a slope and vegetation with a large mature Eucalyptus tree across from it on the south side of the street.

A left hand turn lane exhibit was prepared by CMP Civil Engineering and Land Surveying (attached) that illustrates the need for significant right-of way and loss of the tree. The exhibit depicts 1,100 feet of improvement along American Canyon Road, roadway widening to accommodate an 11 foot left turn lane into the project driveway entrance in the eastbound direction. The removal of one 60 foot (or more) Eucalyptus tree would be required. The integrity of the tree is unknown and the impacts of tree removal, from the base and roots, may impact any utilities adjacent to the roadway and tree. A professional arborist would be required to perform a tree removal analysis.

Figure 1 American Canyon Road eastbound

There is also a fence and electrical posts that may require extensive coordination for relocation as well as a potential for a retaining wall east of the project driveway. The environmental constraints of the project would be an expensive improvement, and would be cost-prohibitive to continue with the development of the project.

Figure 2 American Canyon Road westbound

3. Alternative Site Access

As an alternative measure to eliminate left hand turns into the project site, the applicant is willing to modify the project to right in and right out only by providing a physical barrier at the entrance. The inclusion of the "pork chop" median island would require members and visitors to arrive to the church from the east from Interstate 80 (I-80) to enter the site, and upon exit, travel westbound towards via Flosden Road and the Napa Valley Highway (I-29). New Life Church has a regional following with many members travelling from the East Bay Area utilizing I-680 to I-80.

The "pork chop" island would preclude left turns into or out of the site. The design would be approved by the County and would be accompanied by NO LEFT TURN signs and markings in the eastbound lanes approaching the site. There would be similar signs and markings on the southbound lane of the driveway approaching American Canyon Road after leaving the church. Because of the availability of Flosden Road to the west, those desiring to travel to the east via SR 37 and I-80 would be only minimally inconvenienced. The church is willing to have a member near the driveway to remind motorists to not make left turns.

From a traffic perspective, the removal of the left-turn lane requirement is feasible based on the forecasted trip generation, minimal use on the project site to once a week, environmental constraints and elimination of left turns to and from the site. The New Life Church is willing to

provide these practical improvements and examine further opportunities with Napa County to move forward with the development of their project in the community.

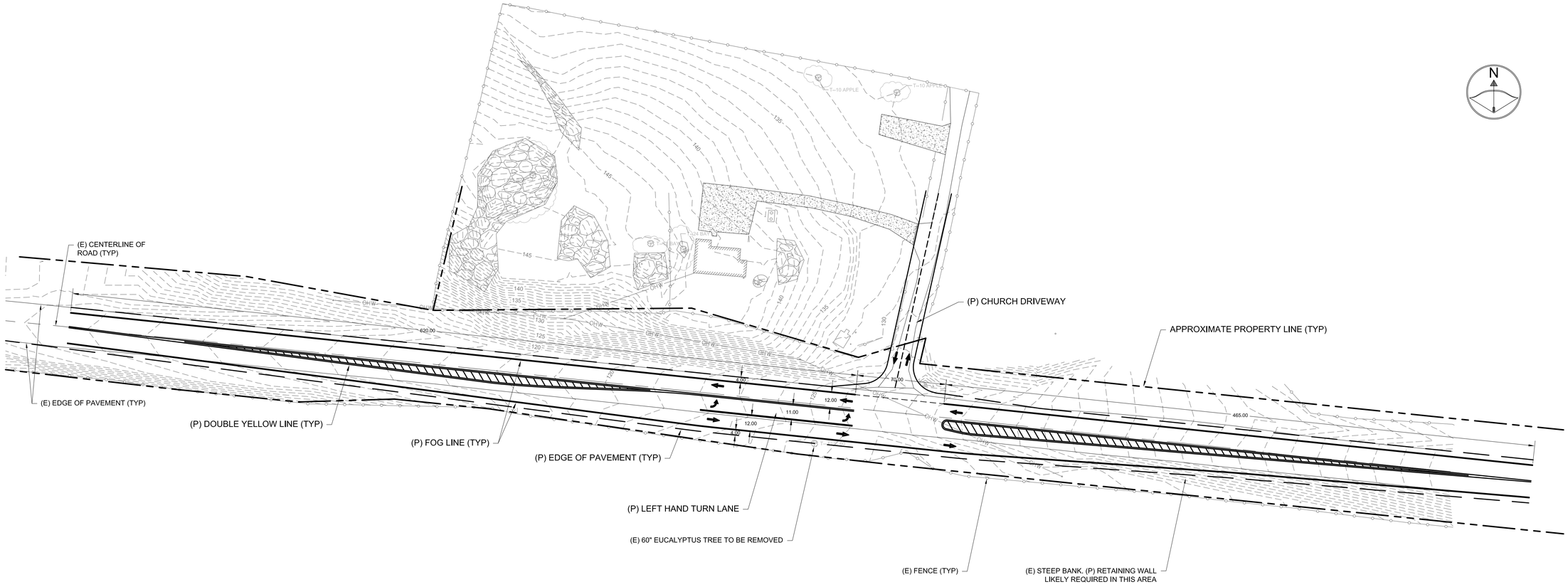
If you have additional questions, you may contact me at 925-264-5006 or email ckinzel@tjkm.com. Thank you.

Sincerely,

Chris D. Kinzel, PE, TE
Vice President

Attachments:

Technical Memorandum dated August 20, 2017
Left turn exhibit dated September 18, 2017



ABBREVIATIONS

AB	AGGREGATE BASE	ESMT	EASEMENT	R	RADIUS
AC	ASPHALT CONCRETE	ETW	EDGE OF TRAVELED WAY	RCP	REINFORCED CONCRETE PIPE
ACR	ACRES	EVC	END VERTICAL CURVE	RD	RELATIVE DENSITY
AD	AREA DRAIN	FC	FACE OF CURB	REQ	REQUIRED
AP	ANGLE POINT	FF	FINISHED FLOOR	RIM	RIM ELEVATION
APR	APPROVED	FG	FINISHED GRADE	RT	RIGHT
ARV	AIR RELIEF VALVE	FH	FIRE HYDRANT	ROW	RIGHT OF WAY
BC	BEGIN CURVE	FI	FIELD INLET	S	SLOPE
BCR	BEGIN CURB RETURN	FL	FLOW LINE	SD	STORM DRAIN
BM	BENCHMARK	GB	GRADE BREAK	SDE	STORM DRAIN EASEMENT
BO	BLOW-OFF VALVE	GR	GRATE ELEVATION	SDMH	STORM DRAIN MANHOLE
BP	BEGINNING POINT	HP	HIGH POINT	SE	SIDEWALK EASEMENT
BVC	BEGIN VERTICAL CURVE	INV	INVERT ELEVATION	SF	SQUARE FEET
BW	BOTTOM OF WALL	IRR	IRRIGATION	SPEC	SPECIFICATIONS
BOW	BACK OF WALK	JP	UTILITY JUNCTION POLE	SS	SANITARY SEWER
CL	CENTER LINE	JT	JOINT TRENCH	SSE	SANITARY SEWER EASEMENT
CLR	CLEAR	LAT	LATERAL	SSLAT	SANITARY SEWER LATERAL
CB	CATCH BASIN	LF	LINEAL FEET	SSMH	SANITARY SEWER MANHOLE
CMP	CORRUGATED METAL PIPE	LOP	LIP OF GUTTER	STA	STATION
CO	CLEAN OUT	LP	LOW POINT	STD	STANDARD
CONC	CONCRETE	LT	LEFT	STLT	STREET LIGHT
CP	CONTROL POINT	MAX	MAXIMUM	T	TANGENT
CR	CURB RETURN	MH	MANHOLE	(T)	TOTAL
DI	DRAIN INLET	MIN	MINIMUM	TB	TREE BOX
DIP	DUCTILE IRON PIPE	ORN	ORNAMENTAL TREE	TC	TOP OF CURB
DWY	DRIVEWAY	OHW	OVER HEAD UTILITY WIRE	TEMP	TEMPORARY
(E)	EXISTING	(P)	PROPOSED	TG	TOP OF GRATE
EA	EACH	PI	POINT OF INTERSECTION	TP	TEST PIT
EC	END CURVE	PL	PROPERTY LINE	TW	TOP OF WALL
ECR	END CURB RETURN	PSDE	PRIVATE STORM DRAIN ESMT	TYP	TYPICAL
EGR	EDGE OF GRAVEL	PUE	PUBLIC UTILITY EASEMENT	UE	UNDER GROUND ELECTRICAL
EL	ELEVATION	PVC	POLYVINYL CHLORIDE	VC	VERTICAL CURVE
EP	EDGE OF PAVEMENT	PVI	VERTICAL CURVE INTERSECTION	W	WATER
EQ	EQUAL	PAV	PAVEMENT	WLAT	WATER SERVICE LATERAL
				WM	WATER METER

UNAUTHORIZED CHANGES & USES:

THE SURVEYOR PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE DESIGNER OF THESE PLANS.

PROPERTY LINES:

THE PROPERTY LINES SHOWN HEREON ARE BASED ON PRELIMINARY SURVEY DATA, AND ARE FOR REFERENCE ONLY. THIS IS NOT A BOUNDARY SURVEY MAP AND SHOULD NOT BE USED AS SUCH.

HORIZONTAL & VERTICAL DATUM:

THIS MAP IS BASED ON FIELD SURVEY INFORMATION PERFORMED BY *CMP ENGINEERING AND LAND SURVEYING* IN OCTOBER OF 2015, HORZ & VERT DATUMS ARE ASSUMED, FIELD SURVEY CONTOURS ARE SHOWN AS FOLLOWS: MAJOR =5', MINOR =1'.

CMP CIVIL ENGINEERING & LAND SURVEYING

PREPARED BY:
CAMERON PRIDMORE PE, PLS
1607 CAPELL VALLEY ROAD
NAPA, CA 94558
(707) 815-0988
CAMERON@CMPENGINEERING.COM
CMPENGINEERING.COM

PROJECT #: 00177
DATE: 9/18/2017

REV. #	DESCRIPTION	DATE

PROJECT INFO:
NLCAC PROPERTY
1451 AMERICAN CANYON ROAD
AMERICAN CANYON, CA 94503
APN: 059-100-002

SHEET NAME:
LEFT HAND TURN LANE EXHIBIT

SHEET:
1
OF 2

Technical Memorandum

Date: August 20, 2017

To: John Wambaa
Email: wambaa.john@yahoo.com

Jurisdiction: Napa County

From: Chris Kinzel, P.E., T.E.
Vice President, TJKM

Subject: ***Focused Traffic Impact Analysis for the Proposed New Life Community Church Project at 1451 American Canyon Road, American Canyon, California.***

The purpose of this technical memorandum is to prepare a focused traffic impact analysis for the proposed New Life Community Church, which is located at 1451 American Canyon Road. The proposed project is to comply with the Napa County permit application requirements. Access to the project site would be provided via one full-access driveway on American Canyon Road. The project is located near to the Dwight Eisenhower Highway (I-80) as shown on **Figure 1**. The project site is currently a vacant lot, surrounded by agricultural land uses. **Figure 2** shows the project site plan.

TJKM evaluated traffic conditions at two study intersections during the Saturday peak of the project, 9:00 a.m. to 11:00 a.m. The highest single one-hour period recorded for the peak period was used in the analysis. The study intersections and associated traffic controls are as follows:

- American Canyon Road and the Project Driveway (One-Way Stop Control)
- American Canyon Road and Flosden Road/Newell Drive (Signalized)

This study addresses the following four traffic scenarios:

- *Existing Conditions* – This scenario evaluates the study intersection based on existing traffic volumes, lane geometry, and traffic controls. For the existing conditions scenario, the proposed site is analyzed as vacant.
- *Existing plus Project Conditions* – This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project.
- *Cumulative Conditions* – This scenario is similar to the Existing Conditions but with the projected growth rate of one percent per year for 18 years (Year 2035-forecasted traffic) which was applied to Existing Conditions Traffic Volumes.
- *Cumulative plus Project Conditions* – This scenario is identical to Cumulative Conditions, but with the addition of traffic from the proposed project.

Vicinity Map

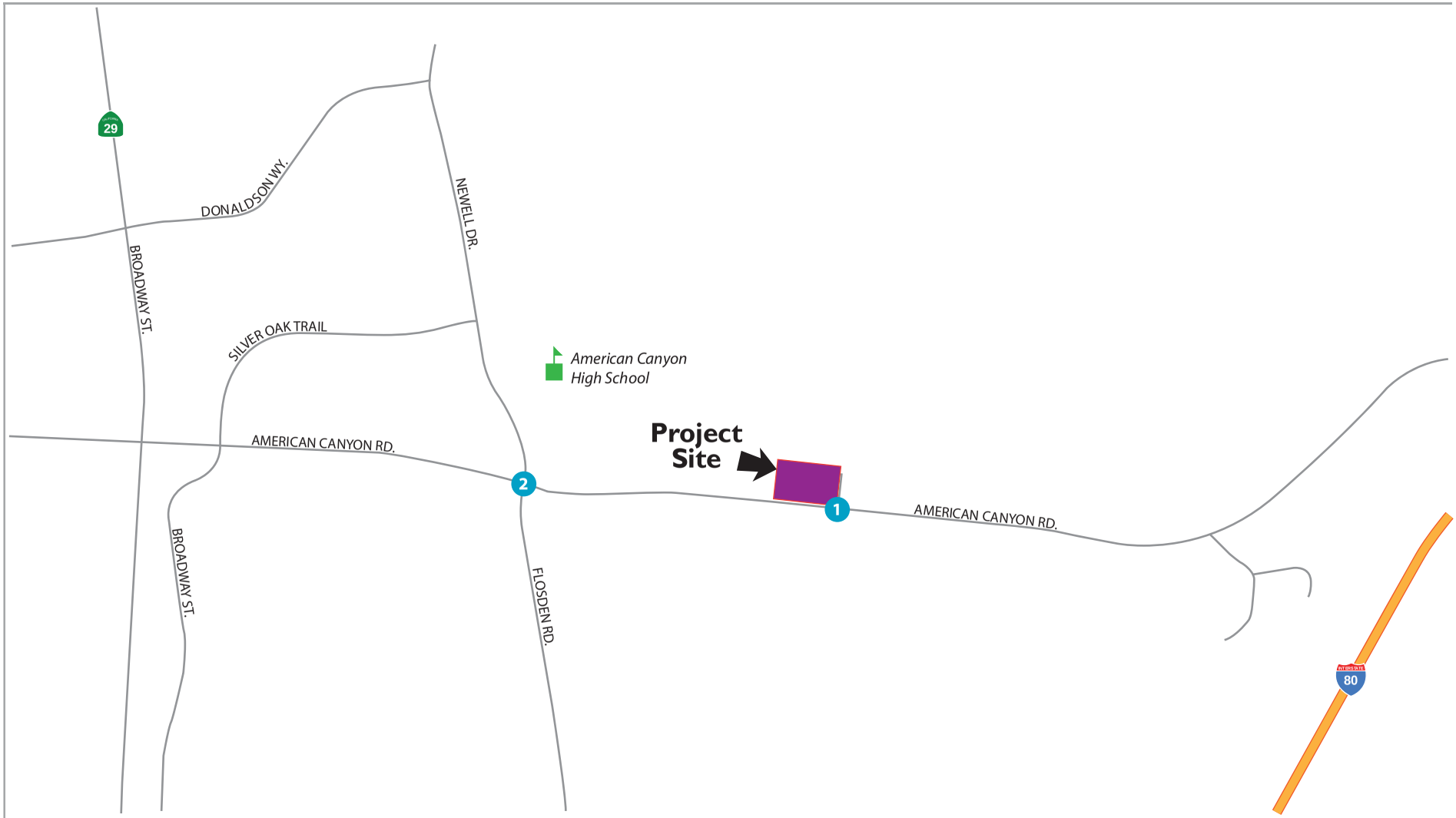


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Figure 1

Site Plan

Source: H. Adams, Architect

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Figure 2

EXISTING CONDITIONS

Important roadways adjacent to the project site are discussed below:

Interstate 80 (I-80) is an east-west divided freeway with four westbound lanes and four eastbound lanes. It is part of the Interstate Highway System, providing regional access to and from Sacramento, Solano, Contra Costa, Alameda, and San Francisco Counties. The posted speed limit along I-80 is 65 miles per hour (mph).

State Route 29 (SR-29) is a north-south, four-lane divided state highway that connects Interstate 80 (I-80) to the cities of Vallejo, American Canyon, and Napa to the north. Within the City of American Canyon, SR-29 bisects the City as a four-lane highway with signalized intersections at major cross streets. It serves as a primary route for commuter and industrial truck traffic traveling between Napa County and the San Francisco- Oakland Bay Area. The posted speed limit along SR-29 is 50 mph to 55 miles per hour (mph).

American Canyon Road is a major east-west, two to four-lane arterial roadway that traverses between Wetlands Edge Road, from within the City, to I-80, where it forms a grade separated interchange. American Canyon Road serves primarily residential and commuter traffic in the City, and acts as a rural connector east of the City limits. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential developments.

Newell Drive is a four-lane north-south roadway that connects Donaldson Way in the north and American Canyon Road in the south. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential, commercial and agricultural developments.

Flosden Road is a four-lane north-south roadway that connects American Canyon Road in the north and Corcoran Avenue in the south. The posted speed limit is 45 miles per hour (mph) within the project vicinity. It provides local access to residential and commercial developments.

EXISTING PEDESTRIAN, BICYCLE, AND TRANSIT FACILITIES

In the project vicinity, American Canyon Road and Flosden Road/Newell Drive intersection is signalized and equipped with countdown pedestrian signal heads. There are continuous sidewalks present on Flosden Road and Newell Drive along the both sides within the project vicinity. There are discontinuous sidewalks along the east side of American Canyon Road. There is adequate street lighting in the vicinity. There are no bus stops in the immediate vicinity of the project site.

There are no bicycle facilities on American Canyon Road, Newell Drive and Flosden Road. As per City of American Canyon Bicycle Plan (January 2012), prepared by the Napa Valley Transportation Authority (NVTA), Class II bicycle lanes are proposed on American Canyon Road between SR 29 to South Kelly Road.

There is no transit service within the project vicinity. The nature of the traffic generated by the proposed project would also not create any demand for new transit service, and is not expected to generate a need for transit in the area.

Level of Service Analysis Methodology and Significant Impact Criteria

Level of Service (LOS) is a qualitative index of the performance of an element of the transportation system. LOS is a rating scale running from A to F, with A indicating no congestion of any kind, and F indicating intolerable congestion and delays. The LOS analysis methods outlined in the Highway Capacity Manual (HCM, Transportation Research Board, 2000) were used in this study. Synchro 9.0 traffic analysis software was used for the analysis purposes. A signalized intersection's LOS is based on weighted average control delay measured in seconds per vehicle. At the side street, controlled intersections or two-way stop sign intersections, the control delay is calculated for each movement, not for the intersection as a whole. **Table 1 & Table 2** summarizes the relationship between control delay and LOS for signalized intersections and unsignalized intersections.

Table 1: Signalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay (seconds)
A	Operations with very low delay occurring with favorable traffic signal progression and/or short cycle lengths.	<10
B	Operations with low delay occurring with good progression and/or short cycle	>10 to 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20 to 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	>35 to 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	>55 to 80
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	>80

Source: Highway Capacity Manual, Transportation Research Board 2000

Table 2: Unsignalized Intersection Level of Service Criteria

Level of Service	Description	Average Control Delay (seconds)
A	Little or no delay	≤10.0
B	Short traffic delays	10.1 to15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	>50.0

Source: Highway Capacity Manual, Transportation Research Board 2000

The Circulation Element of the Napa County General Plan, dated June 3, 2008, includes General Plan Policy CIR-16 regarding significance criteria for traffic conditions based on level of service (LOS).The County shall seek to maintain an adequate level of service on roads and at intersections as follows. The desired level of service shall be measured at peak hours on weekdays.

- The County shall seek to maintain an arterial Level of Service D or better on all county roadways, except where maintaining this desired level of service would require the installation of more travel lanes than shown on the Circulation Map.
- The County shall seek to maintain a Level of Service D or better at all signalized 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.

Existing Peak Hour Volumes

Intersection turning movement counts of vehicles, bicycles, and pedestrians were collected during weekend a.m. peak period (9:00-11:00 a.m.) on Saturday, January 14, 2017. Peak hour factors used in the analysis were based on the counts.

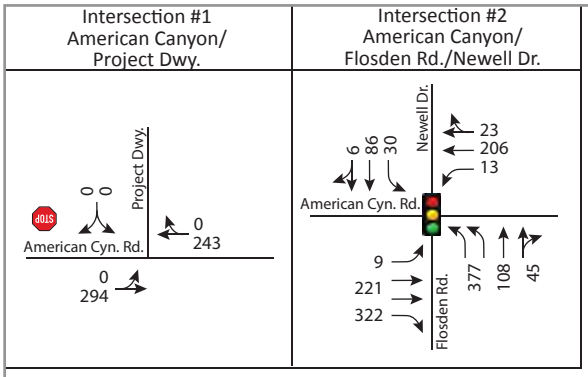
The study intersections and associated traffic controls are as follows:

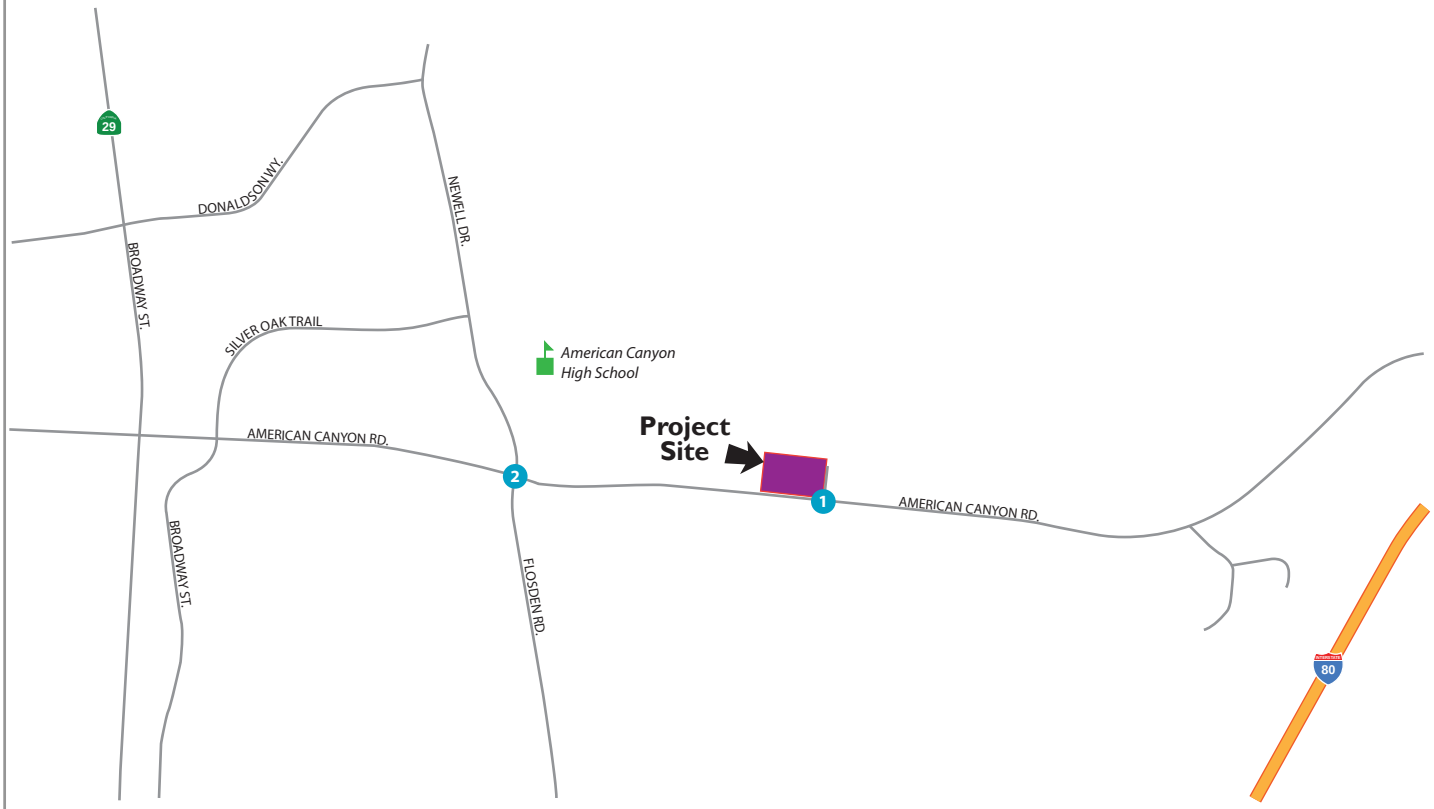
1. American Canyon Road and the Project Driveway (One-Way Stop Control)
2. American Canyon Road and Flosden Road/Newell Drive (Signalized)

In addition to the intersection turning movement counts, one-day 24 hour vehicle classification counts were conducted on American Canyon Road.

Appendix A includes all the data sheets for the collected 24 hour classification counts, vehicle, bicycle and pedestrian counts. **Figure 3** illustrates the existing conditions peak hour traffic volumes, lane geometry and traffic control at the study intersections.

Existing Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 3

Intersection Level of Service Analysis – Existing Conditions

The existing operations of the study intersection were evaluated for the highest one-hour volume during the weekend a.m. peak period. Turning movement counts for the study intersection were collected by TJKM. The City of American Canyon provided signal timings for the study intersections. The results of the Level of Service (LOS) analysis using the Synchro 9.0 software program for Existing Conditions are summarized in **Table 3**. **Appendix B** contains the corresponding calculation sheets. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour.

Table 3: Intersection Level of Service Analysis – Existing Conditions

ID	Intersections	Control	Peak Hour[1]	Existing Conditions	
				Average Delay[2]	LOS[3]
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	18.7	B

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.

Project Description and Trip Generation

The proposed project is located on a vacant parcel in unincorporated Napa County near the City of American Canyon. The area is mainly rural with American Canyon High School and residential developments located west of the project site. The proposed project consists of two buildings- a 3,115 square foot fellowship hall and a 7,911 square foot sanctuary. The existing New Life Community Church, which operates at a local elementary school off Silver Oak Trail in American Canyon, has a membership of 80 members, of those 30 are children. Services are on Saturdays in the morning, beginning with Sabbath School from 10:00 a.m. to 11:00 a.m., main service for worship from 11:00 am to 12:00 p.m., followed by lunch, and activity. The bulk of the membership arrive for the main service and lunch.

Initially, on the project site, the Sabbath school, main service, lunch, and afternoon activities would occur in the Fellowship Hall. As the membership grows, the Sanctuary would be built and activities would start in the fellowship Hall for classes, move on to worship for main services, then back to the Fellowship Hall for lunch and activities.

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the Institute of Transportation Engineer's (ITE) publication Trip Generation (9th Edition). TJKM used published trip rates for Church (ITE Land use Code 560). **Table 4** shows the trip generation for the proposed project. Since activities would not occur in both buildings concurrently, trip generation is based on the Sanctuary building, which has the

larger square footage. Though Saturday is the day for this project to worship, TJKM used the Sunday peak hour generator, as it represents the average trips generated during worship services.

Using ITE rates, the project is expected to generate approximately 95 weekend peak hour trips (48 inbound, 47 outbound) during the peak hour. New Life Community Church only operates one day a week, with the maximum use of one hour a week.

Table 4: Proposed Project Trip Generation

Land Use (ITE Code)	Size		Daily		Sunday Peak Hour Generator			
			Rate	Trips	Rate	In	Out	Total
Church-Fellowship Hall (560)	3.115	ksf	36.63	114	12.04	19	19	38
Church-Sanctuary (560)	7.911	ksf	10.37	290	12.04	48	47	95

Notes: Source- Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, 2012.
ksf=thousand square feet

Project Trip Distribution and Assignment

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area. Assignment determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed project were developed based on the existing travel patterns and TJKM's knowledge of the study area. The distribution assumptions for the proposed development are as follows**:**

- 10 percent to/from Newell Drive
- 20 percent to/from Flosden Road
- 50 percent to/from west of American Canyon Road
- 50 percent to/from east of American Canyon Road

Figure 4 illustrates the net project trip assignment at the study intersections expected from the proposed development.

Using ITE information, during Saturday service, it is estimated that, at full occupancy, 24 trips will arrive from the west and 24 trips from the east on American Canyon Road, to enter the project site during the Saturday peak hour. However, the church does not anticipate full capacity and will be built in phases, using the Fellowship Hall for both worship and classes which would result in 19 trips total, with only 10 trips arriving from the east and 9 trips arriving from the west on American Canyon Road.

Intersection Level of Service Analysis – Existing plus Project Conditions

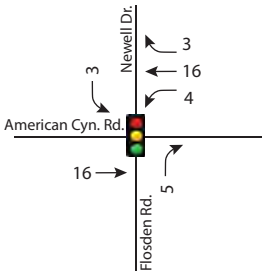
The results of the intersection level of service calculations for Existing plus Project Conditions are presented in **Table 5**. **Appendix B** contains the corresponding calculation sheets. The results for Existing Conditions are included for comparison purpose, along with the projected increases in delay. The changes in delay between Existing and Existing plus Project Conditions are used to identify significant impacts. **Figure 5** shows projected turning movement volumes at the study intersections for Existing plus Project Conditions. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour. Based on the County of Napa impact criteria, the project is expected to have a less-than-significant impact at the study intersections.

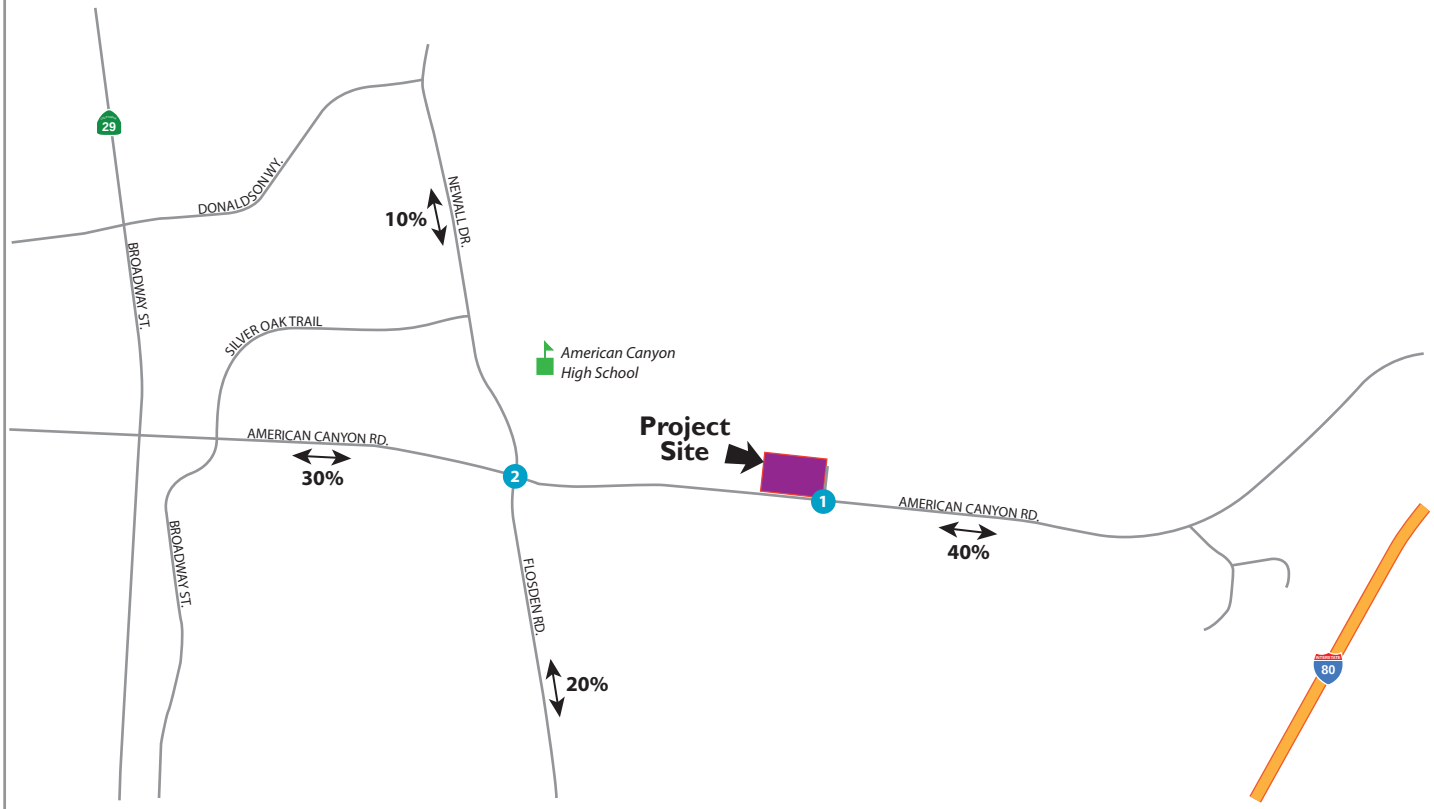
Table 5: Intersection Level of Service Analysis – Existing plus Project Conditions

ID	Intersections	Control	Peak Hour[1]	Existing Conditions		Existing plus Project Conditions		Change in Delay[4] (Sec)
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A	11.9	B	11.9
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	18.7	B	19.0	B	0.60

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.
[4] Change in delay between Existing and Existing plus Project Conditions.

Trip Distribution and Assignment

Intersection #1 American Canyon/ Project Dwy.	Intersection #2 American Canyon/ Flosden Rd./Newell Dr.
	



LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Trips
- **XX%** Trip Distribution

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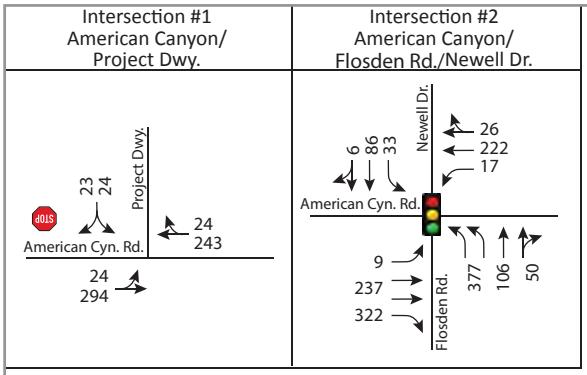
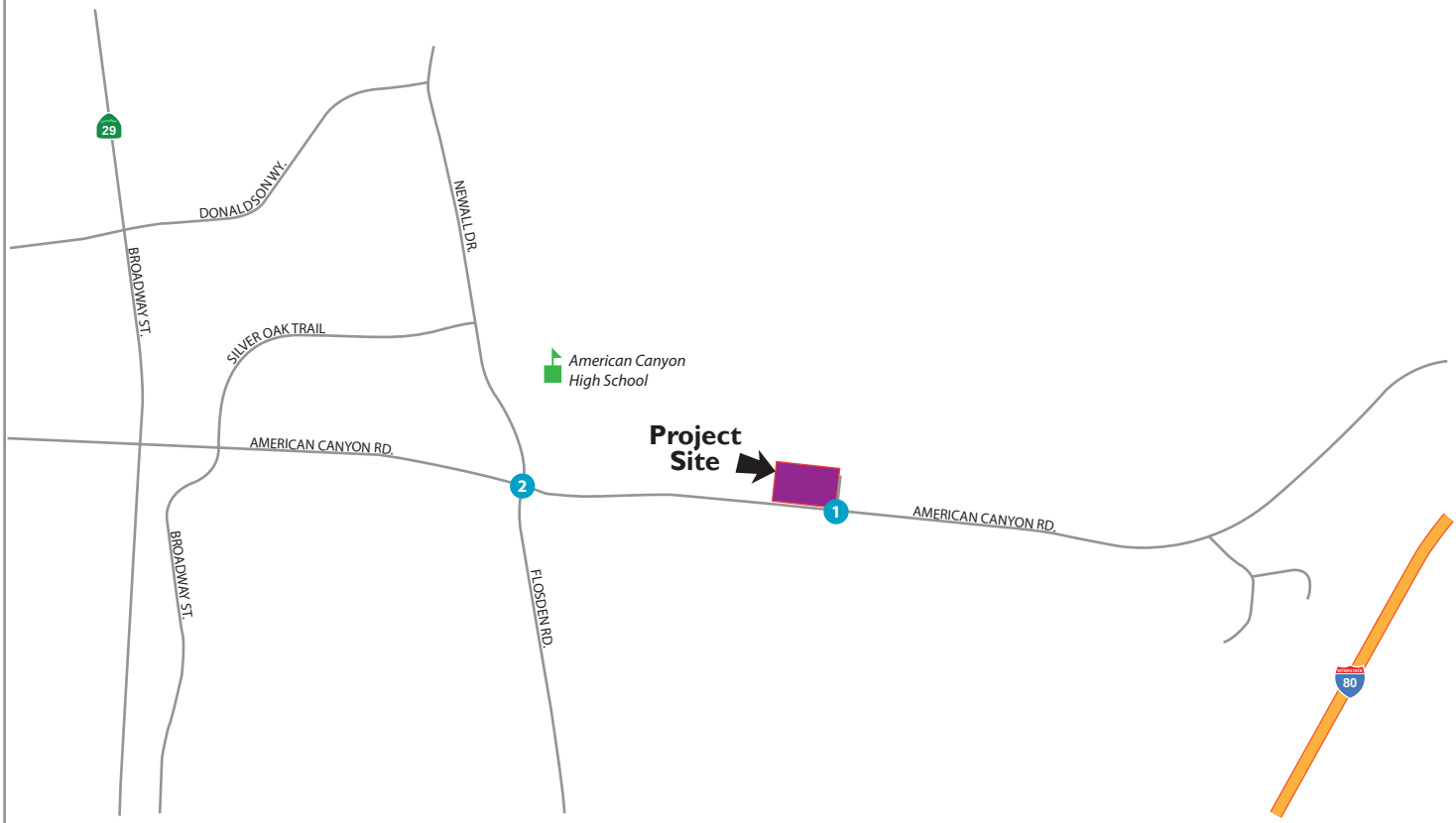
Figure 4

Existing plus Project Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 5

QUEUING ANALYSIS AT STUDY INTERSECTIONS

TJKM conducted a vehicle queuing and storage analysis for all exclusive left and right turn pockets at study intersections where project traffic is added under Existing plus Project Conditions. The 95th percentile (maximum) queues were analyzed using the HCM 2000 Queue methodology contained in Synchro software for the exclusive left turn/right turn pockets at the study intersections. Detailed calculations are included in the LOS appendices corresponding to each analysis scenario. **Table 6** summarizes the 95th percentile queue lengths at study intersections under Existing and Existing plus Project Conditions scenarios. The proposed project *does not create a significant queues* on the expected left-turn or right-turn queues at study intersections.

Table 6: 95th Percentile Queues at Turn Pockets Affected by Project Traffic

ID	Intersection	Lane Group	Storage Length per Lane	Existing		Existing plus Project	
				AM	PM	AM	PM
2	American Canyon Road and Flosden Road/Newell Drive	EBL	120	30	30	0	EBL
		EBR	120	50	50	0	EBR
		WBL	95	30	40	10	WBL
		NBL	265	180	180	0	NBL
		SBL	180	50	50	0	SBL

Notes: Storage length and 95th percentile queue is expressed in feet per lane
Queue length is rounded to nearest tenth value.

INTERSECTIONS LEVEL OF SERVICE ANALYSIS – CUMULATIVE (YEAR 2035) CONDITIONS

Cumulative No Project Conditions are defined as conditions that occurs within the next 18 years (Year 2035). Level of service analysis at the study intersections was conducted for this scenario to establish a base to evaluate the impacts due to the addition of traffic from the proposed project. This scenario is similar to the Existing Conditions, but with a projected growth rate of one percent per year applied over 18 years to project traffic demands for the Year 2035. **Figure 6** shows turning movement volumes at the study intersections for Cumulative Conditions. The intersection LOS analysis results for Cumulative Conditions are summarized in **Table 7**. Detailed calculation sheets for Cumulative Conditions are contained in **Appendix B**. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour.

Table 7: Intersection Level of Service Analysis – Cumulative (Year 2035) Conditions

ID	Intersections	Control	Peak Hour[1]	Cumulative Conditions	
				Average Delay[2]	LOS[3]
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	19.5	B

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.

Intersection Level of Service Analysis – Cumulative Plus Project Conditions

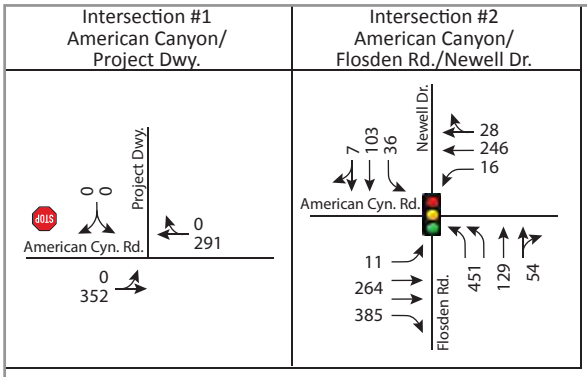
The intersection LOS analysis results for Cumulative (Year 2035) plus Project Conditions are summarized in **Table 8**. Detailed calculation sheets for Cumulative plus Project Conditions are contained in **Appendix B**. **Figure 7** shows turning movement volumes at the study intersections for Cumulative plus Project Conditions. Under this scenario, the study intersections operates within standards of the County of Napa (LOS D or better) during the weekend a.m. peak hour. Based on the County of Napa impact criteria, the project is expected to have a less-than-significant impact at the study intersections.

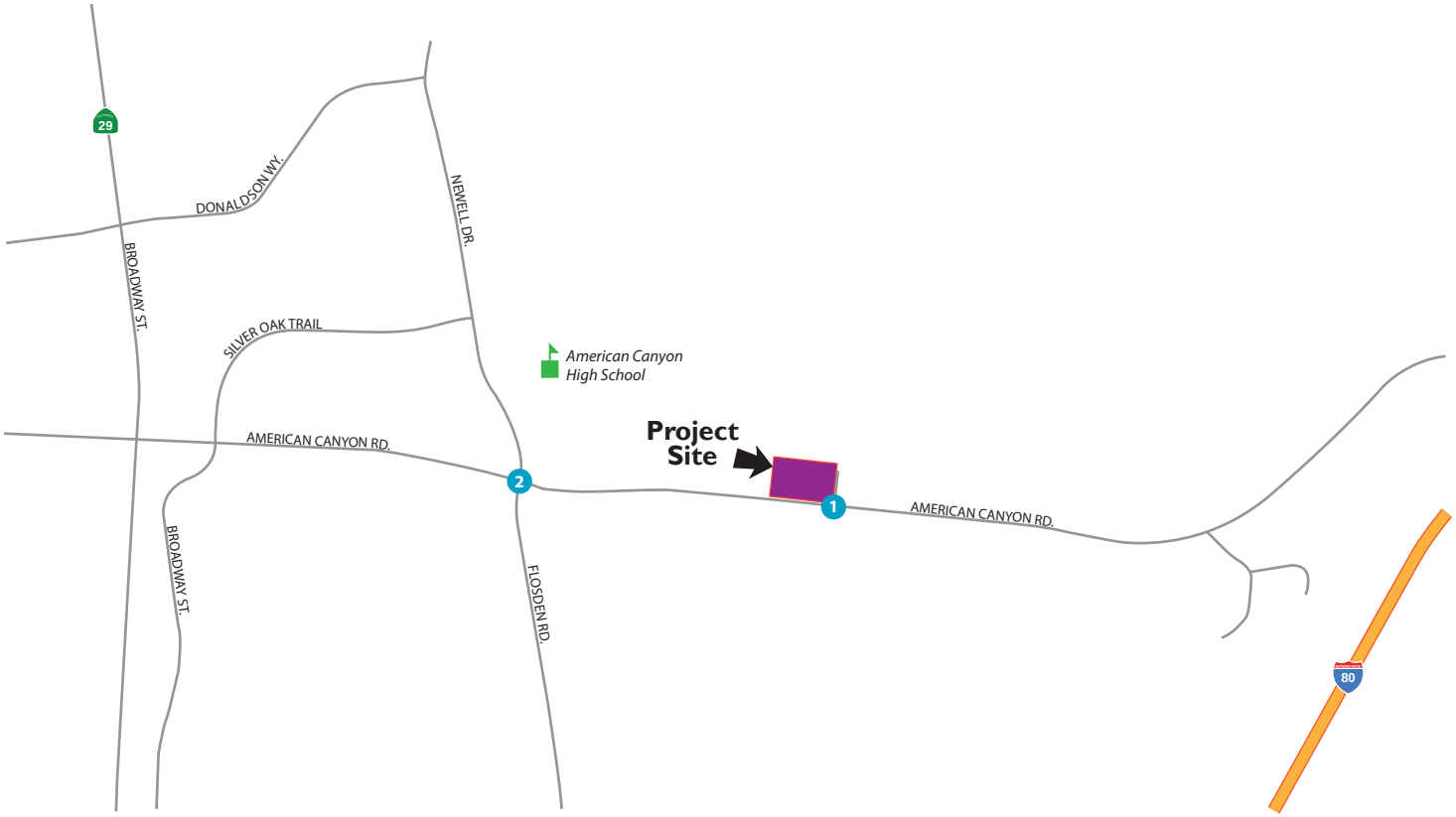
Table 8: Intersection Level of Service Analysis – Cumulative plus Project Conditions

No	Intersections	Control	Peak Hour1	Cumulative Conditions		Cumulative plus Project Conditions		Change in Delay[4] (Sec)
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	
1	American Canyon Road and Project Driveway	One-Way Stop	AM	0.0	A	13.2	B	13.2
2	American Canyon Road and Flosden Road/Newell Drive	Signalized	AM	19.5	B	19.6	B	0.10

Notes:
[1] AM – Weekend morning peak hour (between 9 and 11 a.m.)
[2] Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop – controlled intersections.
[3] LOS – Level of Service calculations conducted using the Synchro 9.0 level of service analysis software package, which applies the methodology described in the HCM 2000.
[4] Change in delay between Cumulative and Cumulative plus Project Conditions.

Cumulative (Year 2035) Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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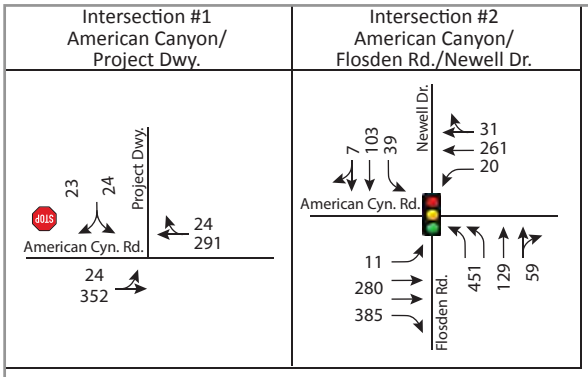
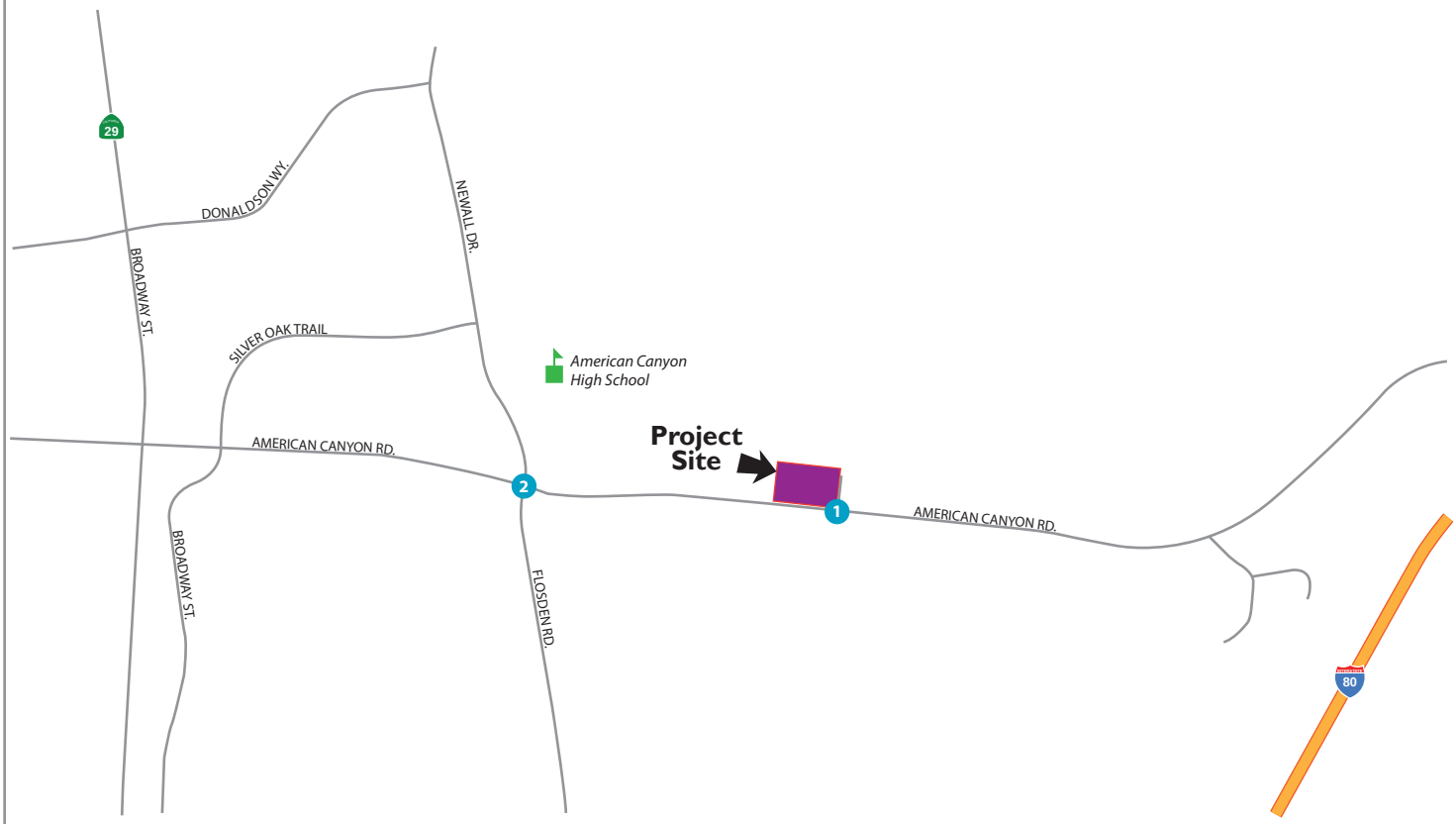
Figure 6

Cumulative plus Project Conditions Traffic Volumes, Lane Geometry and Traffic Controls





LEGEND

- X Study Intersection
- Traffic Signal
- STOP Stop Sign
- XX Weekend AM Peak Hour Volumes

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Figure 7

Alternative Analysis Discussion

The unique nature of the land use caused TJKM to perform an alternative analysis of an actual trip generation to determine realistic impacts of the development. The current membership is 80 members, approximately 50 adults and 30 children. Anticipating a near term situation of the church building in stages, the Fellowship Hall would be built first and will accommodate the current 80 members. As the church continues to grow in membership and funding for the ultimate buildout, which would include the sanctuary and classrooms, TJKM documented the increase of membership at full capacity of the main sanctuary, which is 150 seats. To document the actual number of vehicles driving eastbound, turning left, and vehicles driving eastbound to turn right into the project site from American Canyon Road, TJKM used the approved trip distribution rate as discussed in the Trip Generation and Distribution section of this report.

Alternative Trip Generation Analysis

Scenario	Number of members	Number of Members per Vehicle	Total number of vehicles entering during Saturday peak	EB direction rate	WB direction Rate	EB Direction# of left turning vehicles	WB direction # of right turning vehicles
Near Term	80	3	27	0.60	0.40	16	11
Future Buildout Capacity	150	3	50	0.60	0.40	30	20

*Left turn rate per approved trip distribution.

As with the ITE Trip generation analysis, the alternative trip generation analysis assumes that, based on the operation schedule of the church, the sanctuary and fellowship hall activities are not concurrent. The same members would begin in the fellowship hall for the Sabbath School; migrate to the Sanctuary for worship, then return to the fellowship hall for lunch.

Site Access And On-Site Circulation

TJKM reviewed site access and internal circulation for vehicles, pedestrians and bicycles based on the site plan. TJKM reviewed internal and external access for the project site for passenger vehicles, trucks, pedestrians, and bicycles.

TJKM reviewed the proposed project site plan to evaluate access to the project. The proposed project's access will be via one full access driveway on American Canyon Road as shown in the project site plan dated April 12, 2016. The internal circulation for the proposed project was reviewed for issues related to queuing, safety, dead-end aisles, and parking spaces that may be difficult to maneuver in and out of project site. The circulation aisles are about 30 feet wide and accommodate two-way travel. TJKM recommends the installation of Stop control at the project driveways with appropriate pavement delineation and signing to enhance traffic safety and operations at the driveways.

TJKM also examined the project site plan, in order to evaluate the adequacy of maneuvering by on-site vehicles and emergency vehicles circulation. The turning radii are adequate for the passenger vehicles. Emergency vehicles can access the project via American Canyon Road. Overall, the proposed on-site vehicle circulation is adequate and should not result in any traffic operations issues on-site that would provide significant impacts on City streets.

Left Turn Lane Warrants

The California Manual on Uniform Traffic Control Devices, the Caltrans Standard Specs and the Caltrans Highway Design manual shall be utilized to determine traffic warrants, design and construction procedures for all traffic control devices with the exception of left-turn lanes. Warrants for construction of a left-turn lane on County maintained roads as defined in Sections 18.112.040 through 18.112.080 of the County Code shall be as follows:

- Left-Turn Lane Warrant Graph based on road average daily trips (ADT) and the projected ADT of the proposed use. The chart is a representation of probable conflict between turning traffic and advancing traffic. Private Road or Driveway ADT is the total average daily traffic utilizing the facility. A left-turn lane will not be considered for uses generating an ADT of 20 or less.
- If the corner sight distance in advancing direction, measured from the driveway, is less than required per Caltrans design standards (usually the posted speed limit multiplied by 11, read in feet) a left-turn lane shall be installed.

TJKM notes that the County's standard for determining when left turn lanes are required does not appear to be based on actual left turning vehicles. Instead, the variable is side street ADT. Perhaps the standard is intending to indicate that an ADT of 20 LEFT TURNING vehicles might justify a left turn lane on streets with volumes that exist along American Canyon Road. In this situation, the actual opening-day number of arriving left turning vehicles would be a conservative estimate of 16 left turners during the busiest hour of the church week, which would be on a Saturday morning. Given the low demand for left turns at the site and difficult site conditions, which make the construction of a full left turn lane expensive, TJKM recommends that the County consider deferring the consideration of the need for a left turn lane upon completion of the full sanctuary and traffic evaluations are conducted.

The need for a left-turn lane on American Canyon Road at the project driveway was evaluated based on criteria contained in the Napa County Road and Street Standards, 2011. Based on the 24-hour classification counts, average daily traffic on American Canyon Road is 9,034 vehicles. The proposed project driveway average daily traffic is 82 trips. Based on these traffic levels, a left-turn lane would technically be warranted at the project driveway, with a 165 feet storage lane. However, the warrant only accounts for the number of trips on the roadway on a daily basis. At full occupancy, (150 seats and 7,911 square feet based on the site plan), the (ITE) trip generation anticipates eight left turns into the project site during the Saturday peak. However, the initial stage of development may only include the construction of the fellowship hall, which would only generate 32 average daily trips, and 11-peak hour trips, of those four would be left turns into the project site. With the alternative trip generation analysis, TJKM determined, based

on the number of members, that during an interim near-term scenario with just the fellowship hall built, and current members, there would be a total of 27 added vehicles to the roadway network, of those, 16 vehicles would turn left into the project driveway. At a future buildout membership of 150 members, the capacity of the Sanctuary, there would be a maximum of 50 vehicles added to the roadway network: 30 of which would be turning left into the project site.

The project use is unique and will only operate service one day a week, and one hour for the main service. Because of the property site usage is one day a week, the number of actual left turns anticipated into the site is relatively low, it can be suggested a left-turn is not needed at the time of initial construction. In the future, with 30 peak left turn movements associated with the development of the main sanctuary, TJKM is of the opinion that a left turn lane is only marginally required, but the potential need for the lane can be determined at that time.

The current roadway width would not allow for the restriping of a left turn lane without constructing additional pavement, which would be hindered by the presence of a very large tree on the south shoulder. Minor widening to allow vehicles behind the left turners to pass on the right is an alternate possibility.

Pedestrian Access

In the project vicinity, one study intersection was signalized. Sidewalks are provided on American Canyon Road and Newell Drive and Flosden Road. There are discontinuous sidewalks along the east side of American Canyon Road. There is adequate street lighting in the vicinity. Based on the pedestrian counts conducted there is little pedestrian activity within the vicinity of project. The proposed project will not result in any impacts to existing or planned pedestrian facilities in the immediate vicinity of the project. The proposed project does not conflict with existing and planned pedestrian facilities; therefore, the impact to pedestrian facilities is *less-than-significant***.**

Bicycle Access

In terms of bicycle access to the project site, there are no bicycle facilities within the project vicinity. As per City of American Canyon Bicycle Plan (January 2012), Class II bicycle lanes are proposed on American Canyon Road between SR 29 to South Kelly Road. The project does not conflict with existing and planned bicycle facilities; therefore, the impact to bicycle facilities is *less-than-significant*.

Transit

There is no transit service within the vicinity of study area so the project would not impose any impacts on existing transit service. The nature of the traffic generated by the proposed project would also not create any demand for new transit service and is not expected to generate a need for transit in the area. Therefore, impacts to transit service are expected to be *less-than-significant*.

Sight Distance Analysis

Sight distance is evaluated to determine if a driver will have adequate visibility to enter a roadway safely without resulting in a conflict with traffic already on the roadway. The distance between the intersection of American Canyon Road and Flosden Road/Newell Drive and the proposed site driveway on American Canyon Road is approximately half mile. According to the Caltrans Highway Design Manual (HDM), Chapter 200, 2014, the required minimum stopping sight distance for design speed of 15 mph (project driveway) should be 100 feet. The speed limit on American Canyon Road is 45 mph. According to HDM, Chapter 200, 2014, the required minimum stopping sight distance for design speed of 45 mph is 360 feet. Therefore, there is ample sight distance for vehicular speeds of 45 mph.

Parking

Based on the project site plan dated April 12, 2016, 65 standard parking spaces are provided for the New Life Community Church project, which includes auto parking and ADA parking. According to the Napa County Municipal Code (18.110.030), Churches requires one per employee plus one per each 3.5 seats in main sanctuary. Based on the proposed parking spaces to be provided on site, no parking impacts are projected on City Streets.

Conclusions

Operation of New Life Community Church facility, as proposed, would not result in a significant traffic impacts under Napa County guidelines, therefore no mitigation is needed to the study intersections. As an added safety measure, TJKM recommends the installation of a stop control at the project driveway with appropriate pavement delineation and signing.

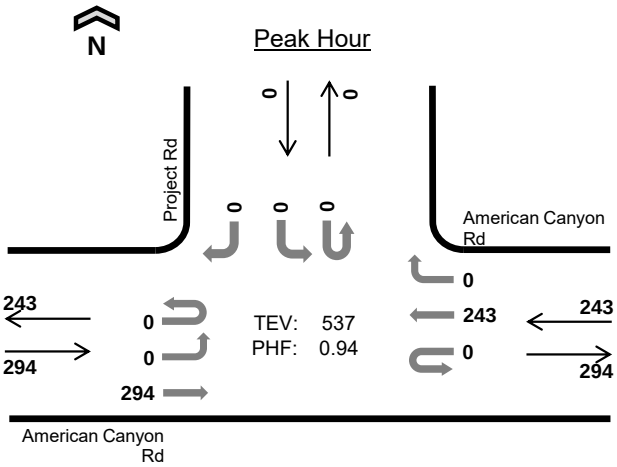
Per the Napa County Road and Street Standards, a left-turn lane may to be warranted on American Canyon Road at the project driveway. However, due to the unique circumstance, initial membership and building staging, a left turn lane does not appear to be necessary at the time of initial construction. The County can consider deferring the consideration of the need for a left turn lane upon completion of the full sanctuary and traffic evaluations are conducted. The County could consider minor widening on the south side of American Canyon Road, to permit eastbound through vehicles to slowly pass stopped church traffic that may be awaiting a gap in westbound traffic.

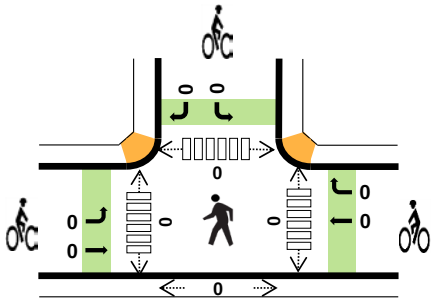
APPENDIX A

- Turning Movement Counts (TMC) for vehicles, Pedestrians and Bicycles & Classification Traffic Counts

Project Rd
American Canyon Rd

Date: 01/14/2017
Count Period: 9:00 AM to 11:00 AM
Peak Hour: 10:00 AM to 11:00 AM





	HV %:	PHF
EB	0.7%	0.80
WB	0.4%	0.87
NB	-	-
SB	-	-
TOTAL	0.6%	0.94

Two-Hour Count Summaries

Interval Start		American Canyon Rd Eastbound				American Canyon Rd Westbound				0 Northbound				Project Rd Southbound				15-min Total	Rolling One Hour
		UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM		0	0	63	0	0	0	46	0	0	0	0	0	0	0	0	0	109	0
9:15 AM		0	0	44	0	0	0	59	0	0	0	0	0	0	0	0	0	103	0
9:30 AM		0	0	53	0	0	0	52	0	0	0	0	0	0	0	0	0	105	0
9:45 AM		0	0	67	0	0	0	57	0	0	0	0	0	0	0	0	0	124	441
10:00 AM		**0**	**0**	**67**	**0**	**0**	**0**	**58**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**125**	457
10:15 AM		**0**	**0**	**62**	**0**	**0**	**0**	**67**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**129**	483
10:30 AM		**0**	**0**	**92**	**0**	**0**	**0**	**48**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**140**	518
10:45 AM		**0**	**0**	**73**	**0**	**0**	**0**	**70**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**143**	**537**
Count Total		0	0	521	0	0	0	457	0	0	0	0	0	0	0	0	0	978	0
Peak Hour	**All**	**0**	**0**	**294**	**0**	**0**	**0**	**243**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**537**	**0**
	HV	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**
	HV%	**-**	**-**	**1%**	**-**	**-**	**-**	**0%**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
9:00 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
9:15 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
9:30 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
9:45 AM	0	1	0	0	*1*	0	0	0	0	*0*	0	0	0	0	*0*
10:00 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
10:15 AM	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
10:30 AM	**0**	**1**	**0**	**0**	***1***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	*0*
10:45 AM	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***
Count Total	2	3	0	0	*5*	0	0	0	0	*0*	0	0	0	0	*0*
Peak Hr	**2**	**1**	**0**	**0**	***3***	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	***0***

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	American Canyon Rd				American Canyon Rd				0				Project Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	2
10:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
10:15 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	3
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	4
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**
Count Total	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	5	0
Peak Hour	**0**	**0**	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**

Two-Hour Count Summaries - Bikes

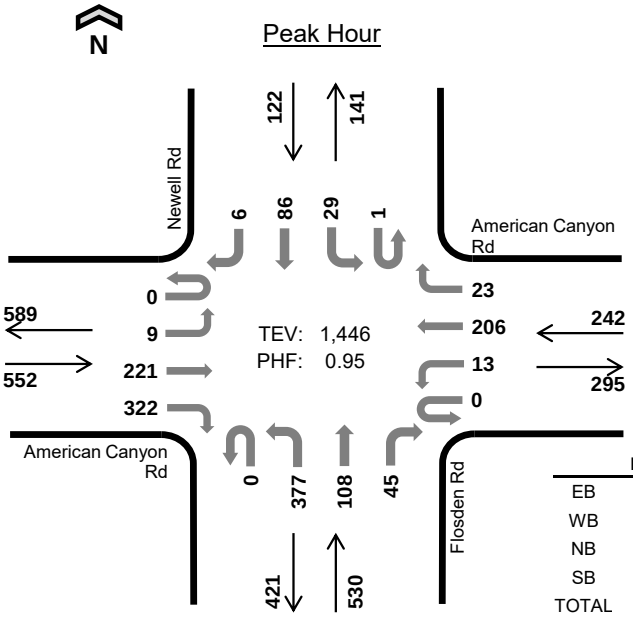
Interval Start	American Canyon Rd			American Canyon Rd			0			Project Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Count Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

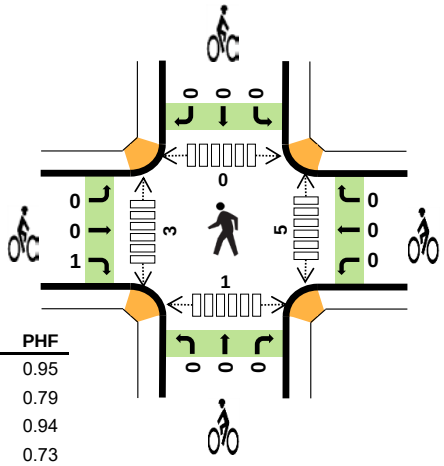
Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Newell Rd
American Canyon Rd

Date: 01/14/2017
Count Period: 9:00 AM to 11:00 AM
Peak Hour: 10:00 AM to 11:00 AM



	HV %:	PHF
EB	1.1%	0.95
WB	0.0%	0.79
NB	0.9%	0.94
SB	3.3%	0.73
TOTAL	1.0%	0.95



Two-Hour Count Summaries

Interval Start	American Canyon Rd Eastbound				American Canyon Rd Westbound				Flosden Rd Northbound				Newell Rd Southbound				15-min Total	Rolling One Hour
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	44	48	0	3	38	2	0	72	16	9	0	6	15	0	253	0
9:15 AM	0	4	27	79	0	5	47	4	0	79	17	9	0	6	21	0	298	0
9:30 AM	0	3	35	56	0	5	51	4	0	80	30	10	0	4	15	0	293	0
9:45 AM	0	3	51	67	0	3	55	16	0	100	21	14	0	7	25	0	362	1,206
10:00 AM	**0**	**1**	**50**	**82**	**0**	**2**	**52**	**7**	**0**	**86**	**37**	**18**	**0**	**4**	**20**	**0**	**359**	1,312
10:15 AM	**0**	**1**	**46**	**87**	**0**	**5**	**44**	**6**	**0**	**92**	**22**	**9**	**0**	**10**	**28**	**4**	**354**	1,368
10:30 AM	**0**	**6**	**66**	**74**	**0**	**1**	**47**	**1**	**0**	**92**	**25**	**12**	**1**	**9**	**19**	**1**	**354**	1,429
10:45 AM	**0**	**1**	**59**	**79**	**0**	**5**	**63**	**9**	**0**	**107**	**24**	**6**	**0**	**6**	**19**	**1**	**379**	**1,446**
Count Total	0	19	378	572	0	29	397	49	0	708	192	87	1	52	162	6	2,652	0
Peak Hour All	**0**	**9**	**221**	**322**	**0**	**13**	**206**	**23**	**0**	**377**	**108**	**45**	**1**	**29**	**86**	**6**	**1,446**	**0**
Peak Hour HV	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**4**	**0**	**15**	**0**
Peak Hour HV%	**-**	**0%**	**1%**	**1%**	**-**	**0%**	**0%**	**0%**	**-**	**1%**	**1%**	**2%**	**0%**	**0%**	**5%**	**0%**	**1%**	**0**

Note: Two-hour count summary volumes include heavy vehicles but exclude bicycles in overall count.

Interval Start	Heavy Vehicle Totals					Bicycles					Pedestrians (Crossing Leg)				
	EB	WB	NB	SB	Total	EB	WB	NB	SB	Total	East	West	North	South	Total
9:00 AM	1	0	2	0	*3*	0	0	0	0	*0*	0	1	0	1	*2*
9:15 AM	2	0	0	1	*3*	0	0	0	0	*0*	0	0	0	0	*0*
9:30 AM	1	1	0	0	*2*	0	0	0	0	*0*	0	1	0	0	*1*
9:45 AM	0	0	0	0	*0*	0	0	0	0	*0*	0	0	0	0	*0*
10:00 AM	**1**	**0**	**3**	**0**	***4***	**0**	**0**	**0**	**0**	***0***	**3**	**0**	**0**	**0**	*3*
10:15 AM	**0**	**0**	**1**	**1**	***2***	**0**	**0**	**0**	**0**	***0***	**2**	**1**	**0**	**0**	*3*
10:30 AM	**5**	**0**	**0**	**2**	***7***	**0**	**0**	**0**	**0**	***0***	**0**	**2**	**0**	**0**	*2*
10:45 AM	**0**	**0**	**1**	**1**	***2***	**1**	**0**	**0**	**0**	***1***	**0**	**0**	**0**	**1**	***1***
Count Total	10	1	7	5	*23*	1	0	0	0	*1*	5	5	0	2	*12*
Peak Hour	**6**	**0**	**5**	**4**	***15***	**1**	**0**	**0**	**0**	***1***	**5**	**3**	**0**	**1**	***9***

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Two-Hour Count Summaries - Heavy Vehicles

Interval Start	American Canyon Rd				American Canyon Rd				Flosden Rd				Newell Rd				15-min Total	Rolling One Hour
	Eastbound				Westbound				Northbound				Southbound					
	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT	UT	LT	TH	RT		
9:00 AM	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	3	0
9:15 AM	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	3	0
9:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
10:00 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**0**	**0**	**0**	**4**	9
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**2**	8
10:30 AM	**0**	**0**	**1**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**7**	13
10:45 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**	**0**	**2**	**15**
Count Total	0	0	3	7	0	1	0	0	0	5	1	1	0	0	5	0	23	0
Peak Hour	**0**	**0**	**2**	**4**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**1**	**0**	**0**	**4**	**0**	**15**	**0**

Two-Hour Count Summaries - Bikes

Interval Start	American Canyon Rd			American Canyon Rd			Flosden Rd			Newell Rd			15-min Total	Rolling One Hour
	Eastbound			Westbound			Northbound			Southbound				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:15 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:30 AM	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0
10:45 AM	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**
Count Total	0	0	1	0	0	0	0	0	0	0	0	0	1	0
Peak Hour	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Deon Fouche: 415 - 757 - 7714 deon.fouche@idaxdata.com

Vehicle Classification Report Summary

Location: American Canyon Rd

Count Direction: Eastbound / Westbound

Date Range: 1/14/2017 to 1/14/2017

Site Code: 01

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
Study Total														
Eastbound	15	3,252	867	0	253	3	0	1	0	1	0	0	0	4,392
Percent	0.3%	74.0%	19.7%	0.0%	5.8%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Westbound	17	3,685	773	0	165	0	0	2	0	0	0	0	0	4,642
Percent	0.4%	79.4%	16.7%	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	32	6,937	1,640	0	418	3	0	3	0	1	0	0	0	9,034
Percent	0.4%	76.8%	18.2%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

FHWA Vehicle Classification	
Class 1 - Motorcycles	Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 2 - Passenger Cars	Class 9 - Five-Axle Single-Trailer Trucks
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles	Class 10 - Six or More Axle Single-Trailer Trucks
Class 4 - Buses	Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks	Class 12 - Six-Axle Multi-Trailer Trucks
Class 6 - Three-Axle Single-Unit Trucks	Class 13 - Seven or More Axle Multi-Trailer Trucks
Class 7 - Four or More Axle Single-Unit Trucks	

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Location: American Canyon Rd
Date Range: 1/14/2017 to 1/14/2017
Site Code: 01

Saturday, January 14, 2017
Westbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	64	11	0	3	0	0	0	0	0	0	0	0	**78**
1:00 AM	0	30	6	0	1	0	0	0	0	0	0	0	0	**37**
2:00 AM	0	25	4	0	3	0	0	0	0	0	0	0	0	**32**
3:00 AM	0	18	1	0	4	0	0	0	0	0	0	0	0	**23**
4:00 AM	0	24	3	0	0	0	0	0	0	0	0	0	0	**27**
5:00 AM	0	28	6	0	1	0	0	0	0	0	0	0	0	**35**
6:00 AM	0	44	10	0	7	0	0	1	0	0	0	0	0	**62**
7:00 AM	0	98	18	0	3	0	0	0	0	0	0	0	0	**119**
8:00 AM	2	115	31	0	14	0	0	1	0	0	0	0	0	**163**
9:00 AM	0	154	43	0	15	0	0	0	0	0	0	0	0	**212**
10:00 AM	0	186	52	0	7	0	0	0	0	0	0	0	0	**245**
11:00 AM	2	237	51	0	17	0	0	0	0	0	0	0	0	**307**
12:00 PM	1	248	41	0	14	0	0	0	0	0	0	0	0	**304**
1:00 PM	0	224	38	0	10	0	0	0	0	0	0	0	0	**272**
2:00 PM	2	298	71	0	14	0	0	0	0	0	0	0	0	**385**
3:00 PM	1	301	61	0	14	0	0	0	0	0	0	0	0	**377**
4:00 PM	3	286	71	0	5	0	0	0	0	0	0	0	0	**365**
5:00 PM	0	285	65	0	14	0	0	0	0	0	0	0	0	**364**
6:00 PM	3	244	52	0	6	0	0	0	0	0	0	0	0	**305**
7:00 PM	0	191	45	0	3	0	0	0	0	0	0	0	0	**239**
8:00 PM	1	211	37	0	3	0	0	0	0	0	0	0	0	**252**
9:00 PM	0	161	25	0	5	0	0	0	0	0	0	0	0	**191**
10:00 PM	0	117	18	0	0	0	0	0	0	0	0	0	0	**135**
11:00 PM	2	96	13	0	2	0	0	0	0	0	0	0	0	**113**
Total	**17**	**3,685**	**773**	**0**	**165**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**4,642**
Percent	**0.4%**	**79.4%**	**16.7%**	**0.0%**	**3.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

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Location: American Canyon Rd
Date Range: 1/14/2017 to 1/14/2017
Site Code: 01

Total Study Average
Eastbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	33	5	0	0	0	0	0	0	0	0	0	0	**38**
1:00 AM	0	23	6	0	4	0	0	0	0	0	0	0	0	**33**
2:00 AM	0	21	5	0	4	0	0	0	0	0	0	0	0	**30**
3:00 AM	0	12	1	0	2	0	0	0	0	0	0	0	0	**15**
4:00 AM	0	16	7	0	0	0	0	0	0	0	0	0	0	**23**
5:00 AM	0	32	14	0	4	0	0	0	0	0	0	0	0	**50**
6:00 AM	0	61	19	0	8	0	0	0	0	0	0	0	0	**88**
7:00 AM	0	77	43	0	10	0	0	0	0	0	0	0	0	**130**
8:00 AM	3	130	44	0	12	1	0	0	0	0	0	0	0	**190**
9:00 AM	0	162	50	0	16	0	0	0	0	0	0	0	0	**228**
10:00 AM	0	204	56	0	22	0	0	0	0	0	0	0	0	**282**
11:00 AM	1	249	75	0	22	1	0	0	0	0	0	0	0	**348**
12:00 PM	5	237	69	0	23	1	0	0	0	0	0	0	0	**335**
1:00 PM	4	233	57	0	24	0	0	0	0	0	0	0	0	**318**
2:00 PM	0	210	65	0	15	0	0	0	0	0	0	0	0	**290**
3:00 PM	0	280	74	0	14	0	0	0	0	0	0	0	0	**368**
4:00 PM	1	264	73	0	16	0	0	0	0	0	0	0	0	**354**
5:00 PM	1	262	63	0	11	0	0	1	0	0	0	0	0	**338**
6:00 PM	0	222	44	0	22	0	0	0	0	1	0	0	0	**289**
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
8:00 PM	0	103	23	0	6	0	0	0	0	0	0	0	0	**132**
9:00 PM	0	122	11	0	4	0	0	0	0	0	0	0	0	**137**
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
11:00 PM	0	73	8	0	1	0	0	0	0	0	0	0	0	**82**
Total	**15**	**3,026**	**812**	**0**	**240**	**3**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**4,098**
Percent	**0.4%**	**73.8%**	**19.8%**	**0.0%**	**5.9%**	**0.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

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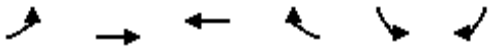
APPENDIX B

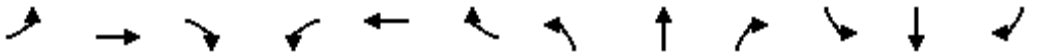
- Level of Service Worksheets



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	294	243	0	0	0
Future Volume (Veh/h)	0	294	243	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	0	368	279	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	279				647	279
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				647	279
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1284				436	760

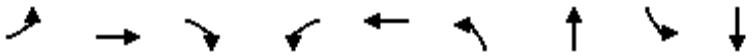
Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	368	279	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1284	1700	1700
Volume to Capacity	0.00	0.16	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	18.8%	ICU Level of Service	A
Analysis Period (min)	15		



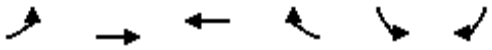
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	221	322	13	206	23	377	108	45	30	86	6
Future Volume (vph)	9	221	322	13	206	23	377	108	45	30	86	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3486		3433	3368		1770	3502	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3486		3433	3368		1770	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	9	233	339	16	261	29	401	115	48	41	118	8
RTOR Reduction (vph)	0	0	194	0	5	0	0	25	0	0	3	0
Lane Group Flow (vph)	9	233	145	16	285	0	401	138	0	41	123	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.7	13.5	26.0	0.8	13.6		12.5	25.7		2.5	15.0	
Effective Green, g (s)	0.7	13.5	26.0	0.8	13.6		12.5	25.7		2.5	15.0	
Actuated g/C Ratio	0.01	0.22	0.43	0.01	0.22		0.21	0.42		0.04	0.25	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	20	785	802	23	779		705	1423		72	863	
v/s Ratio Prot	0.01	0.07	0.04	c0.01	c0.08		c0.12	0.04		0.02	c0.04	
v/s Ratio Perm			0.06									
v/c Ratio	0.45	0.30	0.18	0.70	0.37		0.57	0.10		0.57	0.14	
Uniform Delay, d1	29.9	19.7	10.8	29.9	20.0		21.7	10.6		28.6	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.3	0.0	54.1	0.4		0.6	0.0		6.0	0.1	
Delay (s)	35.6	20.0	10.8	84.0	20.4		22.4	10.6		34.7	18.0	
Level of Service	D	B	B	F	C		C	B		C	B	
Approach Delay (s)		14.9			23.7			19.0			22.1	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	19.0
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	233	339	16	290	401	163	41	126
v/c Ratio	0.05	0.27	0.37	0.09	0.34	0.52	0.10	0.19	0.17
Control Delay	33.1	20.8	2.7	32.6	20.6	24.3	9.3	31.2	19.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	20.8	2.7	32.6	20.6	24.3	9.3	31.2	19.4
Queue Length 50th (ft)	2	25	0	4	32	46	6	10	14
Queue Length 95th (ft)	22	98	45	27	101	171	44	47	41
Internal Link Dist (ft)		682			207		684		398
Turn Bay Length (ft)	120		120	95		265		180	
Base Capacity (vph)	1243	2628	1478	1243	2590	2982	3148	533	2621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.09	0.23	0.01	0.11	0.13	0.05	0.08	0.05

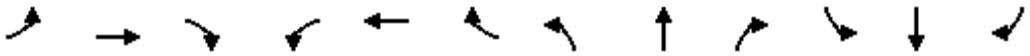
Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	294	243	7	6	10
Future Volume (Veh/h)	10	294	243	7	6	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	13	368	279	8	24	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	287				677	283
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	287				677	283
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	95
cM capacity (veh/h)	1275				414	756

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	381	287	64
Volume Left	13	0	24
Volume Right	0	8	40
cSH	1275	1700	577
Volume to Capacity	0.01	0.17	0.11
Queue Length 95th (ft)	1	0	9
Control Delay (s)	0.4	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.4	0.0	12.0
Approach LOS			B

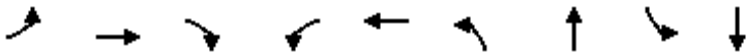
Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	226	322	16	211	25	377	108	48	32	86	6
Future Volume (vph)	9	226	322	16	211	25	377	108	48	32	86	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3482		3433	3361		1770	3502	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3482		3433	3361		1770	3502	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	9	238	339	20	267	32	401	115	51	44	118	8
RTOR Reduction (vph)	0	0	191	0	5	0	0	29	0	0	3	0
Lane Group Flow (vph)	9	238	148	20	294	0	401	137	0	44	123	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.7	13.5	26.3	0.8	13.6		12.8	23.4		4.1	14.0	
Effective Green, g (s)	0.7	13.5	26.3	0.8	13.6		12.8	23.4		4.1	14.0	
Actuated g/C Ratio	0.01	0.22	0.44	0.01	0.23		0.21	0.39		0.07	0.23	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	20	794	819	23	787		731	1308		120	815	
v/s Ratio Prot	0.01	0.07	0.04	c0.01	c0.08		c0.12	0.04		0.02	c0.04	
v/s Ratio Perm			0.06									
v/c Ratio	0.45	0.30	0.18	0.87	0.37		0.55	0.10		0.37	0.15	
Uniform Delay, d1	29.5	19.4	10.3	29.6	19.6		21.1	11.7		26.8	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.3	0.0	124.8	0.4		0.5	0.0		0.7	0.1	
Delay (s)	35.3	19.7	10.4	154.4	20.1		21.5	11.7		27.5	18.4	
Level of Service	D	B	B	F	C		C	B		C	B	
Approach Delay (s)		14.5			28.5			18.7			20.8	
Approach LOS		B			C			B			C	

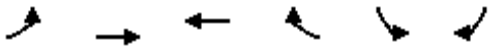
Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	19.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	9	238	339	20	299	401	166	44	126
v/c Ratio	0.05	0.28	0.37	0.10	0.35	0.51	0.12	0.20	0.17
Control Delay	33.2	21.0	2.7	32.6	20.8	24.2	10.1	31.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	21.0	2.7	32.6	20.8	24.2	10.1	31.3	19.6
Queue Length 50th (ft)	2	27	0	5	34	46	11	11	14
Queue Length 95th (ft)	22	100	45	32	103	171	44	50	41
Internal Link Dist (ft)		682			207		684		398
Turn Bay Length (ft)	120		120	95		265		180	
Base Capacity (vph)	1233	2606	1470	1233	2566	2958	3141	528	2599
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.09	0.23	0.02	0.12	0.14	0.05	0.08	0.05

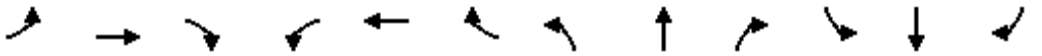
Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	352	291	0	0	0
Future Volume (Veh/h)	0	352	291	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	0	440	334	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	334				774	334
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	334				774	334
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1225				367	708

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	440	334	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1225	1700	1700
Volume to Capacity	0.00	0.20	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

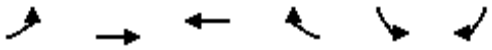
Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	21.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	264	385	16	246	28	451	129	54	36	103	7
Future Volume (vph)	11	264	385	16	246	28	451	129	54	36	103	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3486		3433	3368		1770	3501	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3486		3433	3368		1770	3501	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	12	278	405	20	311	35	480	137	57	49	141	10
RTOR Reduction (vph)	0	0	219	0	5	0	0	26	0	0	3	0
Lane Group Flow (vph)	12	278	186	20	341	0	480	168	0	49	148	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.8	15.2	30.4	2.0	16.4		15.2	26.5		4.3	14.9	
Effective Green, g (s)	0.8	15.2	30.4	2.0	16.4		15.2	26.5		4.3	14.9	
Actuated g/C Ratio	0.01	0.23	0.46	0.03	0.25		0.23	0.40		0.06	0.22	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	21	811	839	53	862		787	1346		114	786	
v/s Ratio Prot	0.01	0.08	0.05	c0.01	c0.10		c0.14	0.05		0.03	c0.04	
v/s Ratio Perm			0.07									
v/c Ratio	0.57	0.34	0.22	0.38	0.40		0.61	0.12		0.43	0.19	
Uniform Delay, d1	32.6	21.4	10.8	31.5	20.8		22.9	12.6		29.8	20.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.2	0.3	0.0	1.6	0.4		0.9	0.1		0.9	0.2	
Delay (s)	53.8	21.7	10.9	33.2	21.2		23.8	12.6		30.8	21.0	
Level of Service	D	C	B	C	C		C	B		C	C	
Approach Delay (s)		15.9			21.9			20.6			23.4	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	19.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

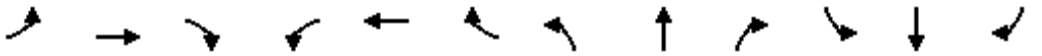
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	352	291	7	6	10
Future Volume (Veh/h)	10	352	291	7	6	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.80	0.80	0.87	0.87	0.25	0.25
Hourly flow rate (vph)	13	440	334	8	24	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	342				804	338
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	342				804	338
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	94
cM capacity (veh/h)	1217				348	704

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	453	342	64
Volume Left	13	0	24
Volume Right	0	8	40
cSH	1217	1700	509
Volume to Capacity	0.01	0.20	0.13
Queue Length 95th (ft)	1	0	11
Control Delay (s)	0.3	0.0	13.1
Lane LOS	A		B
Approach Delay (s)	0.3	0.0	13.1
Approach LOS			B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	269	385	19	251	30	451	129	57	38	103	7
Future Volume (vph)	11	269	385	19	251	30	451	129	57	38	103	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	1573	1770	3483		3433	3360		1770	3501	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3539	1573	1770	3483		3433	3360		1770	3501	
Peak-hour factor, PHF	0.95	0.95	0.95	0.79	0.79	0.79	0.94	0.94	0.94	0.73	0.73	0.73
Adj. Flow (vph)	12	283	405	24	318	38	480	137	61	52	141	10
RTOR Reduction (vph)	0	0	219	0	5	0	0	29	0	0	3	0
Lane Group Flow (vph)	12	283	186	24	351	0	480	169	0	52	148	0
Confl. Peds. (#/hr)			1						5			3
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	0.8	15.3	30.6	2.1	16.6		15.3	26.6		4.4	15.0	
Effective Green, g (s)	0.8	15.3	30.6	2.1	16.6		15.3	26.6		4.4	15.0	
Actuated g/C Ratio	0.01	0.23	0.46	0.03	0.25		0.23	0.40		0.07	0.22	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0		5.0	5.3		4.0	5.0	
Vehicle Extension (s)	2.0	4.0	2.0	2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	21	811	839	55	866		787	1339		116	787	
v/s Ratio Prot	0.01	0.08	0.05	c0.01	c0.10		c0.14	0.05		0.03	c0.04	
v/s Ratio Perm			0.07									
v/c Ratio	0.57	0.35	0.22	0.44	0.41		0.61	0.13		0.45	0.19	
Uniform Delay, d1	32.8	21.5	10.9	31.7	20.9		23.0	12.7		30.0	20.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.2	0.4	0.0	2.0	0.4		0.9	0.1		1.0	0.2	
Delay (s)	54.0	21.9	10.9	33.7	21.3		24.0	12.8		31.0	21.1	
Level of Service	D	C	B	C	C		C	B		C	C	
Approach Delay (s)		16.1			22.1			20.7			23.6	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	19.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	66.7	Sum of lost time (s)	19.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Trip Generation

CRANE TRANSPORTATION GROUP

Central Valley Office:
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Elk Grove, CA 95758
(916) 647-3406 *phone*
(916) 647-3408 *fax*

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(510) 236-9375 *phone*
(510) 236-1091 *fax*

MEMORANDUM

TO: John Wambaa (wambaa.john@yahoo.com)

FROM: Mark D. Crane, P.E.

DATE: April 19, 2016

RE: **PROPOSED NEWLIFE COMMUNITY ADVENTIST CHURCH – EXPECTED TRIP GENERATION**

John:

At the request of Napa County staff, Crane Transportation Group has developed a projection of the expected trip generation that would occur at your proposed facility at 1451 American Canyon Road. The facility would be 9,569 square feet in size and the weekly service would be on Saturday. It is our understanding that existing church attendance at the one weekend service is 60 to 80 people, and that ultimate attendance 10 years in the future would be up to 150 people. Occasional weekday meetings would occur on a Wednesday evening and have up to 30 people. Projections of maximum attendance trip generation on a Saturday have been developed by two separate methodologies: (1) extrapolating to the proposed maximum attendance based upon the auto occupancy from your existing congregation size; and (2) use of church trip generation rates from the traffic engineering profession's standard source of trip rate data: *Trip Generation Manual*, 9th Edition, by the Institute of Transportation Engineers (ITE), 2012.

1. ***Expected trip generation using existing church auto occupancy factor.*** Church staff determined that on Saturday April 16 (the most recent day of church services), there were 24 vehicles in the church parking lot and a 60-person attendance. This resulted in an auto occupancy of 2.5 people per vehicle. Using the same occupancy factor with 150 people in attendance would result in 60 vehicles. Therefore, on a Saturday with maximum attendance, church trip generation would be 120 two-way trips.

2. ***Expected trip generation using ITE trip rates.*** ITE trip rates for churches are based upon either the square footage of the church or the number of seats (or attendees). Sunday rates are higher than Saturday rates and were used for analysis purposes as surveyed sites were projected to have only Sunday services (which would be comparable to the Newlife Community Adventist Church's Saturday service). The table below shows the church's expected peak weekend day trip generation based upon size of church and

the number of attendees. It should be noted that the ITE surveyed sample sizes are small: only 7 churches for the square footage rates and only 4 churches for the attendee rates.

PEAK WEEKEND DAY TRIP GENERATION
BASED UPON SIZE OF CHURCH

SIZE	TRIP RATE (PER 1,000 SQ.FT.)	DAILY 2-WAY TRIPS
9,569 SQ.FT.	36.63	350

PEAK WEEKEND DAY TRIP GENERATION
BASED UPON NUMBER OF ATTENDEES

# ATTENDEES	TRIP RATES (PER ATTENDEE)	DAILY 2-WAY TRIPS
150	1.85	278

SUMMARY

There is a wide variation in projected trip generation for the Newlife Community Adventist Church's single weekend service based upon the choice of trip rate or factor source. The range of daily two-way (inbound+ outbound) trip generation with the church's maximum 150 attendees would be as follows:

120 trips	Based upon existing church trip generation and auto occupancy
350 trips	Based upon ITE square footage trip rates
278 trips	Based upon ITE attendee trip rates

It is projected that the actual trip generation will probably be at the lower end of the range and have a rate similar to the current church membership characteristics.

Thank you,

Mark Crane, P.E.

Traffic Report

CRANE TRANSPORTATION GROUP

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(510) 236-1091 *fax*

MEMORANDUM

TO: Rick Marshall
Napa County Public Works Department

FROM: Mark D. Crane, P.E.

DATE: November 17, 2015

RE: **SIGHT LINE ADEQUACY AT PROPOSED NEWLIFE COMMUNITY ADVENTIST CHURCH FUTURE DRIVEWAY CONNECTION TO AMERICAN CANYON ROAD**

I. INTRODUCTION

This report has been prepared for the Napa County Public Works Department to detail the adequacy of sight lines at the proposed Newlife Community Adventist Church's future driveway connection to American Canyon Road. The project site is at 1451 American Canyon Road just east of the City of American Canyon on the north side of the roadway. The proposed driveway location is shown on the site plan in **Figure 1**. Sight line evaluation was conducted by Mark Crane, a registered traffic engineer in the state of California.

II. ROADWAY DESCRIPTION

American Canyon Road in the vicinity of the project site is a two-lane road with a posted speed limit of 55 miles per hour. Travel lanes are 12 feet wide and there are two-foot-wide paved shoulders. The roadway is straight and there is a minor uphill grade west to east.

III. SIGHT LINES AT PROPOSED PROJECT DRIVEWAY CONNECTION

Sight lines to the east and west along American Canyon Road at the proposed project driveway connection are as follows.

SIGHT LINES AT PROPOSED CHURCH DRIVEWAY CONNECTION TO AMERICAN CANYON ROAD

TO THE WEST	TO THE EAST
550 feet	850 feet

Sight lines to the east are only limited by American Canyon Road cresting a hill. There are no restrictions due to topography or landscaping along the north side of the road. However, sight lines to the west are more limited due to a bush and hillside along the north side of the road just west of the driveway.

IV. MINIMUM REQUIRED SIGHT LINES

Based upon Caltrans criteria, corner sight line adequacy at a private driveway connection to a public road is based upon minimum stopping sight distance. The posted speed limit adjacent to the project site is 55 mph, while field measurements showed that vehicle speeds would occasionally reach 60 to 65 mph. The following chart presents minimum required stopping sight distances in relation to vehicle speeds at the project site.

SPEED	MINIMUM REQUIRED STOPPING SIGHT DISTANCE
55	500 feet
60	580 feet
65	660 feet

Source: Caltrans Highway Design Manual

V. ADEQUACY OF SIGHT LINES

Sight lines at the proposed Newlife Community Adventist Church's future driveway connection to American Canyon road should be acceptable to the east, but would be slightly less than adequate to the west based upon prevailing vehicle speeds. To the east the sight line would be 850 feet while the minimum required stopping sight distance would be 660 feet, while to the west the sight line would be 550 feet while the minimum required stopping sight distance would be 660 feet.

VI. REQUIRED MITIGATION

Remove vegetation and cut back the hillside on the north side of American Canyon Road just west of the project driveway connection to provide at least 660 feet of unobstructed sight line for drivers exiting the church driveway.