

4.9 TRAFFIC AND CIRCULATION

This section of the report identifies existing traffic and circulation conditions on the project site and in the project vicinity and evaluates the impacts to these conditions as result of the project. The following analysis is based on the Traffic Impact Analysis (TIA) completed in February 2014 and attached as **Appendix M** (Fehr & Peers, 2014).

4.9.1 EXISTING CONDITIONS

Roadways

The project is located on Fair Oaks Avenue and is generally bounded by Kifer Avenue to the north and East Evelyn Avenue to the south. Regional roadways that provide primary circulation in the vicinity of the project site include State Route 82 (El Camino Real) and County Route G2 (Lawrence Expressway) via US Highway 101 (US 101). **Figure 4-9.1** includes the locations of the following local roadways in close proximity to the project site.

Fair Oaks Avenue is a four to five lane, north-south roadway that extends through the City of Sunnyvale (City) from State Route 237 in the north and continuing as West Remington Drive in the south. Fair Oaks Avenue connects El Camino Real, Central Expressway, and US 101. Fair Oaks Avenue travels in a north-south direction. The project's main purpose is to rehabilitate the Fair Oaks Avenue Bridge (bridge) over Hendy Avenue and the Caltrain tracks.

California Avenue is a four-lane, east-west roadway that extends from North Mary Avenue to merge with the eastbound Central Expressway at Fair Oaks Avenue.

Evelyn Avenue is a four to five lane, east-west roadway that extends between Castro Street in the City of Mountain View and Reed Avenue in the City of Sunnyvale. Evelyn Avenue provides access to both the Sunnyvale and Mountain View Caltrain stations.

Kifer Avenue is a four to five-lane, east-west roadway that extends from Fair Oaks Avenue to Bowers Avenue. This roadway runs parallel to the Central Expressway and continues as Walsh Avenue to the west.

East Hendy Ave is a two-lane, east-west roadway that generally runs parallel to the Caltrain tracks. East Hendy begins where West Hendy ends; beginning from North Taffe Street and extending to Kifer Road.

Traffic Levels

Level of Service Methodology

The operations of roadway facilities are described with the term Level of Service (LOS). LOS is a qualitative description of traffic flow based on such factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined beginning with LOS A as the best operating conditions (least amount of traffic delay) to LOS F, or the worst operating conditions (greatest amount of traffic related delay). LOS E represents “at-capacity” operations. When traffic volumes exceed the intersection capacity, stop-and-go conditions result and operations are designated as LOS F. LOS calculations for the study intersections utilized the method described in Chapter 16 of the 2000 Highway Capacity Manual (HCM) (Special Report 209, Transportation Research Board)¹ as shown in **Table 4.9-1** below.

Table 4.9-1 Signalized Intersection Level Of Service (LOS) Definitions Using Average Control Vehicular Delay

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B+	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 12.0
B		12.1 to 18.0
B-		18.1 to 20.0
C+	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 23.0
C		23.1 to 32.0
C-		32.1 to 35.0
D+	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 39.0
D		39.1 to 51.0
D-		51.1 to 55.0

¹ This LOS method, which was approved by the City of Sunnyvale and Valley Transportation Authority (VTA), analyzes a signalized intersection’s operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using TRAFFIX analysis software and is correlated to a LOS designation.

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
E+	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 60.0
E		60.1 to 75.0
E-		75.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

Source: Traffic Level of Service Analysis Guidelines, VTA Congestion Management Program, June 2003; Highway Capacity Manual Transportation Research Board, 2000.

Study Intersections

Intersection turning movement counts were conducted in December 2012 to obtain existing information for the following two signalized intersections. These two intersections were chosen as they are the major signalized intersections to the immediate north and south of the extents of the bridge rehabilitation.

- Fair Oaks Avenue/Evelyn Avenue
- Fair Oaks Avenue/Kifer Road

Table 4.9-2 presents existing LOS at these intersections. Both study intersections are operating at LOS C or better during both the AM and PM peak hours. Sunnyvale’s minimum threshold for acceptable intersection signalized intersection operations is LOS D². Thus, both study intersections operate at acceptable service levels.

Field observations were also performed at the two study intersections and are generally consistent with the calculated LOS as shown in **Table 4.9-2** above. The following provides general field observations taken at each intersection:

Fair Oaks Avenue at Kifer Avenue – During the AM peak hour, the heaviest movement is northbound travel on Fair Oaks. During the PM peak hour, the heaviest movement is southbound travel.

Fair Oaks Avenue/Evelyn Avenue - During the AM peak period, traffic is heaviest in the northbound direction through movements on Fair Oaks. During the PM peak period traffic is heaviest in the southbound direction on Fair Oaks.

² Fair Oaks Bridge Rehabilitation Transportation Impact Analysis, Fehr & Peers, February 2014.

Table 4.9-2 Existing Intersection Levels of Service

Intersection	Peak Hour ¹	Intersection Control	Delay ²	LOS ³
1 Fair Oaks Avenue/Kifer Road	AM	Signalized	11.7	B+
	PM		14.1	B
2 Fair Oaks Avenue/Evelyn Avenue	AM	Signalized	29.4	C
	PM		28.2	C

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County Conditions per VTA guidelines.

3 LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the 2000 HCM.

Source: Fehr & Peers, 2014

Bicycle and Pedestrian Facilities

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. In the vicinity of the project site, sidewalks are currently provided on both sides of Kifer Road, the east side of North Fair Oaks Avenue, the east and west side of South Fair Oaks Avenue and the north and south side of Evelyn Avenue. There are no sidewalks on the existing bridge. A two to three-foot wide curb extends along the eastern side of the bridge. This curb is informally used as a sidewalk despite signage directing pedestrians to the pedestrian overhead crossing structure (POC) described below.

At the Kifer Road/Fair Oaks Avenue interchange, north-south pedestrian movements are limited to the east side of Fair Oaks Avenue and east-west crossing of Fair Oaks Avenue is limited to the north side of Fair Oaks Avenue. Raised pedestrian refuge islands are located at the slip lanes on westbound Kifer Road at North Fair Oaks Avenue, northbound north Fair Oaks Avenue at Kifer Road, northbound South Fair Oaks Avenue at Evelyn Avenue and westbound Evelyn Avenue at South Fair Oaks Avenue. Pedestrians crossing at these intersections must therefore cross in three stages. The POC structure is located just east of the bridge.

Bicycle lanes are provided on the existing bridge. Class II on-street bicycle lanes³ are provided in both directions on Kifer Road (between Fair Oaks Avenue and Lawrence Expressway), Evelyn Avenue, Sunnyvale Avenue (south of Evelyn Avenue) and North Wolfe Road (north of Reed Avenue). Pedestrian and bicycle volumes were collected at study intersections. **Figure 4.9-1** shows the location of existing bicycle facilities and **Tables 4.9-3** and **4.9-4** presents the existing bicycle and pedestrian counts.

Table 4.9-3 Existing Bicycle Counts

Intersection	Peak Hour ¹	Total Count
1 Fair Oaks Avenue/Kifer Road	AM	1
	PM	5
2 Fair Oaks Avenue/Evelyn Avenue	AM	7
	PM	8

¹ AM = morning peak hour, PM = afternoon peak hour.

Source: Fehr & Peers, 2014

Table 4.9-4 Existing Pedestrian Counts

Intersection	Peak Hour ¹	Total Count
1 Fair Oaks Avenue/Kifer Road	AM	8
	PM	12
2 Fair Oaks Avenue/Evelyn Avenue	AM	28
	PM	20

¹ AM = morning peak hour, PM = afternoon peak hour.

Source: Fehr & Peers, 2014

Transit Facilities

Figure 4.9-1 shows existing transit facilities near the project site. Within the vicinity of the project, VTA operates four bus routes. The bridge is also located 1 mile west of the Sunnyvale Caltrain station which provides intercity passenger rail service between San Francisco and San Jose, with extended service to Morgan Hill and Gilroy during the weekday commute hours.

³ Class II bike lanes are lanes for bicyclists generally adjacent to the outer vehicle travel lanes. These lanes have special lane markings, pavement legends and signage. Bicycle lanes are generally five (5) feet wide. Adjacent vehicle parking and vehicle/pedestrian cross-flow are permitted.

VTA AND LOCAL BUS ROUTES

Bus Route 304 operates on Evelyn Avenue and Fair Oaks Avenue and could be used as a connection to Bus Routes 32 and 26. Route 304 provides service between the Sunnyvale Transit Center and the VTA Santa Teresa Light Rail Train (LRT) station. Route 304 follows major arterials and travels through Sunnyvale, Santa Clara, and San Jose.

Similar to Bus Route 304, **Bus Route 32** operates on Evelyn Avenue and could be used as a connection to Bus Routes 55 and 26. Route 32 provides service between San Antonio Shopping Center and Santa Clara Transit Center. Bus stops for Route 32 are provided along Evelyn Avenue.

Bus Route 26 operates on Fair Oaks Avenue and could be used as a connection to Bus Routes 55, 304 and 32. Route 26 provides service between the Sunnyvale/Lockheed Martin Transit Center and the Eastridge transit center. Route 26 follows major arterials and travels through Sunnyvale, Cupertino, Saratoga, and San Jose.

Bus Route 55 operates on Sunnyvale Avenue and Evelyn Avenue and could be used as a connection to Bus Route 32. Route 55 provides service between De Anza College and Great America. Route 55 follows major arterials and travels through Cupertino, Sunnyvale and Santa Clara.

4.9.2 REGULATORY SETTING

Sunnyvale General Plan

The Sunnyvale General Plan (General Plan) Land and Use and Transportation Element identifies several goals and policies related to the provision of an effective, safe, pleasant, and convenient transportation system.

While there are neither quantitative transportation nor traffic standards related to construction activities, the following policies are applicable to replacement and enhancement of existing facilities and associated construction activities.

Policy LT-5.1 Achieve an operating level-of-service (LOS) of “D” or better on the City wide roadways and intersections, as defined by the functional classification of the street system.

Policy LT-5.1a Maintain and update a functional classification of the street system.

Policy LT-5.5d Maximize the provision of bicycle and pedestrian facilities.

- Policy LT-5.7 Pursue local, state and federal transportation funding sources to finance City transportation capital improvement projects consistent with City priorities.
- Policy LT-5.8 Provide a safe and comfortable system of pedestrian and bicycle pathways.

Project Consistency

As the project will be nearly identical to the existing bridge in terms of traffic operation except for the addition of enhanced pedestrian and bicycle facilities, the project would be consistent with the applicable goals and policies of the General Plan. The City has prepared a TIA to better understand, describe, and close potential construction-period and operational impacts of the project. The findings of the TIA are further described below in the discussion of impacts and mitigation measures.

4.9.3 IMPACTS AND MITIGATION MEASURES

Significance Criteria

Appendix G of the CEQA Guidelines identifies environmental issues to be considered when determining whether a project could have significant transportation related effects. The project would have a significant transportation related impact if it would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance of safety of such facilities.

Discussion of No Impacts

Analysis of project details and site characteristics in the context of the significance criteria stated above shows that for two of the above criteria, the project would result in no impact.

Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

The Santa Clara Valley Transportation Authority (VTA) serves as the Congestion Management Agency (CMA) for the County of Santa Clara and City of Sunnyvale. The CMP excludes construction traffic from conformance with CMP traffic LOS standards. According to the TIA prepared for the project, following construction, traffic conditions in the project vicinity would generally return to existing operational conditions. As any potential project transportation-related impacts as result of the project would be temporary in nature and limited to associated construction activities, the project would not conflict with the applicable congestion management program.

Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

The closest airport to the project site is Moffett Federal Airfield, located approximately 4 miles northwest of the project site. Moreover, no known private use airstrips are located in the vicinity of the project site. Based on the project site's significant distance from public airports and private airstrips, the proposed bridge rehabilitation project would not introduce any foreseeable hazards to aircraft or to people residing or working in the project vicinity.

Discussion of Less-than-Significant Impacts

Analysis of project details and site characteristics in the context of the significance criteria stated above shows that for two of the above criteria, the project would result in less-than-significant impacts.

Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

General Plan Policy LT -5.1 sets forth LOS “D” or better as acceptable operating levels for City intersections. The City has not adopted any level of service standard particular to roadway construction projects. Notwithstanding, the TIA prepared for the project used an LOS-based evaluation to help gauge the extent of construction-period effects to Fair Oaks Avenue and intersections in the immediate vicinity.

During Construction

During construction, traffic on the bridge will be limited to one vehicle lane and one bicycle lane in each direction. During early construction stages (expected to last up to 14 months), the City will close the portion of Hendy Avenue beneath the bridge.

In addition, the construction period will also see modifications to adjacent intersections. Specifically, Evelyn Avenue westbound traffic will be reduced from three to two lanes and Kifer Avenue at Fair Oaks Avenue will be reduced from two lanes to one lane.

Traffic patterns are expected to shift somewhat as some cars divert to other roadways in order to avoid the construction area. The TIA projects that approximately 15% of traffic will shift to an alternate route, likely to Wolfe Road and Sunnyvale Avenue via Evelyn Avenue and California Avenue.

Construction period level of service was calculated at the two study intersections assuming construction traffic volumes and construction period roadway configurations.

As shown in **Table 4.9-3** below, the study intersections will continue to operate at an acceptable LOS of D or better during early stages of construction. Operations at the Fair Oaks Avenue/Evelyn Avenue intersection will temporarily dip to LOS D-, but will rebound to current conditions upon completion of construction work. The temporary worsening of the level of service at this intersection would not be considered a significant impact because the effect would not be permanent and because the construction period level of service is still considered acceptable by City policy. Accordingly, the proposed project would not conflict with any applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system.

Table 4.9-5 Construction Intersection LOS

Intersection	Peak Hour ¹	Intersection Control	Existing		Construction	
			Delay ²	LOS ³	Delay ²	LOS ³
1 Fair Oaks Avenue/Kifer Road	AM	Signal	11.7	B+	29.2	C
	PM		14.1	B	23.3	C
2 Fair Oaks Avenue/Evelyn Avenue	AM	Signal	29.4	C	37.4	D+
	PM		28.1	C	53.5	D-

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County Conditions per VTA guidelines.

3 LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the 2000 HCM.

Source: Fehr & Peers, 2014.

Post Construction

All traffic that diverts away from the bridge during the construction period is expected to return to existing routes post final construction. The rehabilitated bridge would revert to providing four travel lanes.

Both the Kifer Road and Evelyn Avenue intersections at Fair Oaks Avenue are signalized and would remain so with project improvements. Project improvements include the following minor lane configuration changes:

- At Kifer Road, northbound Fair Oaks Avenue will have the existing free right turn lane removed and the sidewalk widened, so as to reduce the pedestrian crossing width of Kifer Road. Cars turning north on Kifer will turn from the right-hand lane. No changes are proposed for the southbound Kifer Road intersection.
- At Evelyn Avenue, the existing free right turn lane onto northbound Fair Oaks will be removed and the sidewalk widened, effectively reducing the pedestrian crossing width of both Evelyn and Fair Oaks Avenues.
- Also at the Evelyn Avenue intersection, the existing double-left turn lane from southbound Fair Oaks will be reduced to a single left-turn lane.

Post-construction LOS was also calculated assuming existing traffic volumes and the new lane configurations at the study intersections. The results of the intersection LOS calculations for Post-Construction Conditions are presented in **Table 4.9-4** and

include both existing and construction conditions for comparison purposes. As shown in **Table 4.9-4** the LOS for both study intersections will operate at acceptable service levels (LOS D or better) during the AM and PM peak hours' post-construction.

Six-foot wide bicycle lanes will be provided on the bridge post-construction. This is wider than the current bicycle lanes and will provide additional bicyclist comfort. The rehabilitated bridge will provide a 6-foot wide sidewalk on the east edge of the bridge which is an improvement from existing conditions. Currently there are no sidewalks on the bridge. The nearby Pedestrian Overcrossing Bridge (POC) will not be removed until the pedestrian facilities on the new bridge are installed. Transit routes will continue to maintain existing routes post construction.

It follows that the proposed project does not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, thus resulting in a less-than-significant impact. No mitigation is required.

Table 4.9-6 Post Construction Intersection LOS

Intersection	Peak Hour ¹	Intersection Control	Existing		Construction		Post Construction	
			Delay ²	LOS ³	Delay ²	LOS ³	Delay ²	LOS ³
1 Fair Oaks Avenue/Kifer Road	AM	Signal	11.7	B+	29.2	C-	15.3	B
	PM		14.1	B	23.3	C	18.7	B-
2 Fair Oaks Avenue/Evelyn Avenue	AM	Signal	29.4	C	37.4	D+	30.5	C
	PM		28.2	C	53.5	D-	28.6	C

1 AM = morning peak hour, PM = afternoon peak hour.

2 Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Signalized intersections include adjusted saturation flow rates to reflect Santa Clara County Conditions per VTA guidelines.

3 LOS = Level of Service. LOS calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the 2000 HCM.

Source: Fehr & Peers, 2014.

Discussion of Significant Impacts

Analysis of project details and site characteristics in the context of the significance criteria stated above shows that for two of the above criteria, the project would result in a significant impact requiring mitigation.

Result in inadequate emergency access and conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance of safety of such facilities?

Impact TRA-1: Construction activities could temporarily constrain transit, emergency access, as well as pedestrian and bicycle access through the work area. (LESS THAN SIGNIFICANT WITH MITIGATION)

During construction, the City will maintain at least one lane of traffic in each direction. This should allow for unfettered emergency access, but minor delays could result.

Pedestrian access will be maintained by the existing POC until the new sidewalk is opened on the bridge. Since the project will temporarily introduce construction-related activities and equipment to the area, pedestrian and bicycle access through the area could be temporarily delayed or rerouted within the project vicinity. Removal of the POC would be coordinated with

As a means to avoid or minimize any potential construction-period emergency vehicle or pedestrian/bicycle access issues, the following mitigation measure proposes preparation of and adherence to a construction Traffic control Plan (TCP).

Mitigation Measure TRA-1: Prior to the start of construction, the selected contractor shall prepare and submit for City review and approval a detailed (TCP). The objective of the TCP is to minimize traffic and circulation impacts that construction activities would have on the traveling public and emergency services. The TCP shall address and include, but not be limited to the following elements:

- Early consultation with the City's emergency service Departments and other interested City Staff shall occur and the TCP shall incorporate their respective Department comments and requirements.
- The TCP shall address traffic impacts from staged construction, detours, and specific traffic handling concerns during construction of the project, including both roadway and rail traffic.
- Traffic control strategies that require action by the construction contractor should be presented in the detailed construction plans and should be considered part of the project.

- The TCP shall include the designation of a traffic coordinator who would respond to neighborhood questions and complaints related to traffic and circulation matters. A sign shall be clearly posted on-site with allowed construction hours and with contact information to direct project related questions or complaints related to traffic and circulation.
- The TCP shall include measures addressing the production and dissemination of public outreach materials and other documents, as necessary, to adequately notify and inform motorists, business community groups, local entities, emergency services, and other interested parties of any upcoming road closures and detours during the different Phases of construction.

Significance after Mitigation: Less than significant. Adherence to the measures listed in **Mitigation Measure TRA-1** would help avoid or lessen any construction period interruptions to emergency vehicle and pedestrian/bicycle access to a less than significant level.

4.9.4 REFERENCES

City of Sunnyvale. 2011. Sunnyvale General Plan. Available:
<http://ecityhall.sunnyvale.ca.gov/cd/GeneralPlan.pdf>.

City of Sunnyvale. Sunnyvale Municipal Code. 2013. Available:
<http://qcode.us/codes/sunnyvale/>.

Fehr and Peers. 2014. Fair Oaks Bridge Rehabilitation Transportation Impact Analysis.

Figure 4.9-1 Existing Bicycle and Transit Facilities

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