HEXAGON TRANSPORTATION CONSULTANTS, INC.

Memorandum

Date: October 27, 2016

To: Ms. Shannon George, David J. Powers and Associates

From: Brian Jackson

Subject: W. San Fernando Street Office Tower Traffic Operations Study

Hexagon Transportation Consultants, Inc. has completed a traffic operations study for a proposed office tower development in downtown San Jose, California. The project site is located along the north side of W. San Fernando Street between SR 87 and Almaden Boulevard at 333-355 W. San Fernando Street (see **Figure 1**). The project would demolish the existing 25,000 square foot (s.f.) building on the site and construct a 20-story office tower providing 718,080 s.f. of office space and 6,745 s.f. of ground floor retail space. The proposed building would include parking to serve the project.

Since the project is located in the Downtown Core, it is covered under the San Jose Downtown Strategy 2000 EIR. Accordingly, City staff has already concluded that the project is in conformance with the City of San Jose Transportation Level of Service Policy (Council Policy 5-3) and will not require preparation of a comprehensive Transportation Impact Analysis (TIA).

Based on the proposed project size, site-generated traffic was estimated. Vehicular site access, including truck access (e.g., trash pickup and loading activities), was evaluated. Parking and on-site vehicular circulation also were analyzed. Lastly, bicycle and pedestrian access and safety were evaluated.

Existing Conditions

This section describes the existing conditions for all the major transportation facilities within the vicinity of the site, including the roadway network, transit service, and bicycle and pedestrian facilities.

Existing Roadway Network

Regional access to the project site is provided by I-280 and SR 87. Local site access is provided by Almaden Boulevard, San Fernando Street, and Delmas Avenue. These facilities are described below.

I-280 extends from US 101 in San Jose to I-80 in San Francisco. It is generally an east-west oriented eight-lane freeway within the vicinity of downtown San Jose. The section of I-280 just north of the Bascom Avenue over-crossing has six mixed-flow lanes and two high-occupancy-vehicle (HOV) lanes. Access to the project site to and from I-280 is provided via Bird Avenue, Almaden Boulevard and First Street.

SR 87 is primarily a six-lane freeway (four mixed-flow lanes and two HOV lanes) that is aligned in a north-south orientation within the project vicinity. SR 87 begins at its interchange with SR 85 and extends northward, terminating at its junction with US 101. Access to the project site to and from SR 87 is provided via nearby ramps at Woz Way, Auzerais Avenue, and Park Avenue.

Almaden Boulevard is north-south four-lane arterial with buffered bike lanes that provides access to the project site via San Fernando Street. North of Santa Clara Street, it transitions into two one-way streets: Notre Dame Avenue and Almaden Boulevard. South of I-280, it again transitions into two one-way streets: Vine Street and Almaden Avenue.

San Fernando Street is an east-west two-lane street providing direct access to and from the project site. San Fernando Street has sidewalks on both sides and buffered bike lanes in both directions. San Fernando Street extends through the heart of downtown between Autumn Street to the west and N. 17th Street to the east.

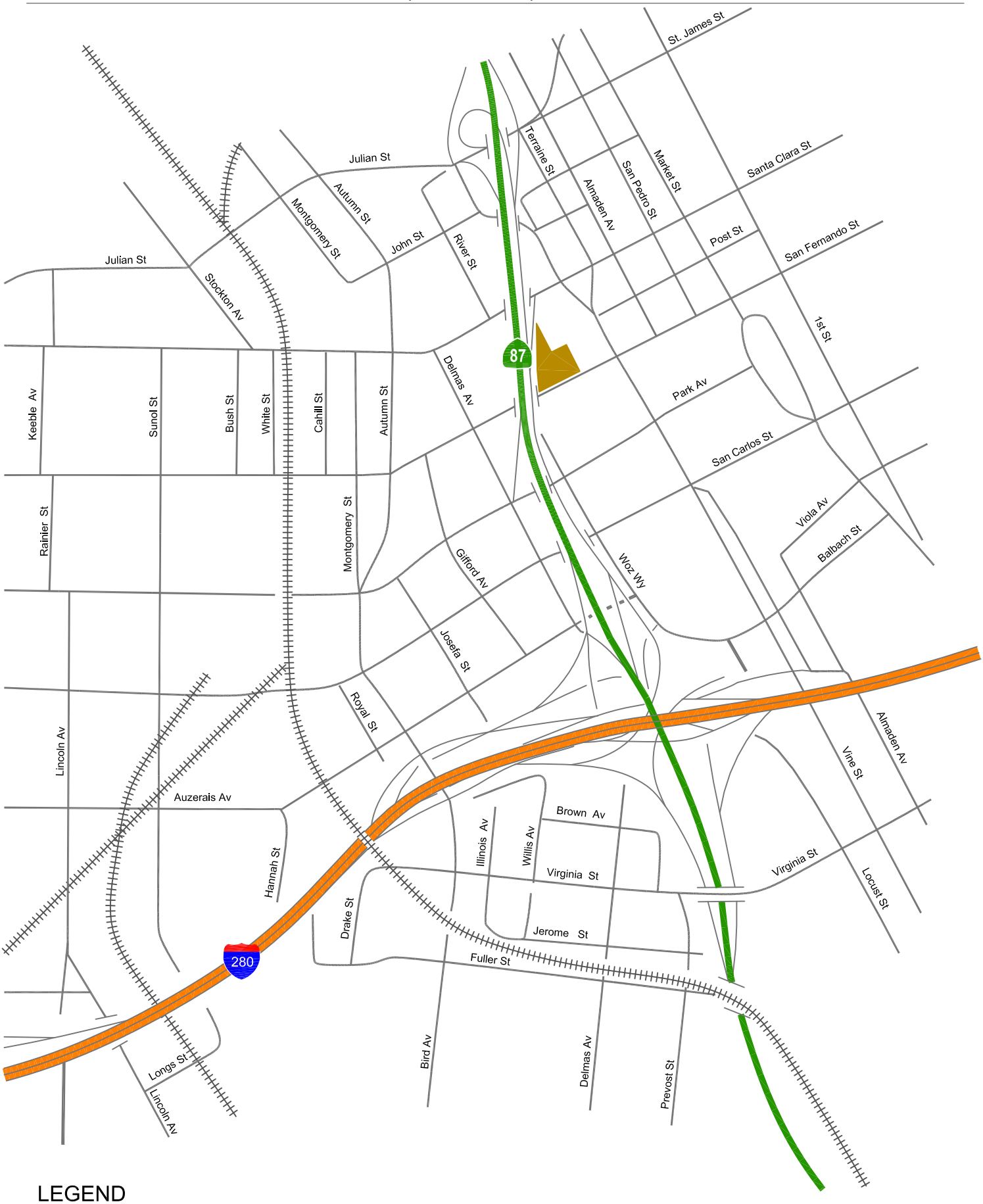


Figure 1
Project Location

Delmas Avenue is a north-south oriented, two-lane one-way street in the southbound direction. Delmas Avenue begins at Santa Clara Street and terminates at Auzerais Avenue and the SR 87 southbound on-ramp.

Existing Pedestrian and Bicycle Facilities

A complete network of sidewalks is present along the streets in the immediate vicinity of the project site, including W. San Fernando Street, Delmas Avenue and Almaden Boulevard. Crosswalks with pedestrian signal heads and push buttons are provided at the signalized intersections within the vicinity of the project site. A clearly marked mid-block pedestrian crosswalk with ADA compliant ramps and a median refuge island is currently provided on W. San Fernando Street near the southwest corner of the project site. Standard pavement markings with truncated domes and signage are provided at this unsignalized pedestrian crossing. Truncated domes are the standard design requirement for detectable warnings which enable people with visual disabilities to determine the boundary between the sidewalk and the street. This mid-block crossing provides direct access to the Guadalupe River trail. Overall, the existing network of sidewalks and crosswalks has good connectivity and provides pedestrians with safe routes to transit services and other points of interest in the downtown area.

The existing bicycle facilities in the immediate vicinity of the project site include the Guadalupe River multi-use trail (Class I bikeway) and buffered bike lanes (Class II bikeway) on San Fernando Street and Almaden Boulevard. Class II bike lanes on San Fernando Street, a City-designated bicycle route, provide safe bicycle travel through downtown in the east-west directions, and Almaden Boulevard offers safe bicycle travel in the north-south directions. The existing bicycle facilities in the area are shown graphically on **Figure 2**.

The Guadalupe River multi-use trail system runs through the City of San Jose along the Guadalupe River and is shared between pedestrians and bicyclists and separated from motor vehicle traffic. The Guadalupe River trail is an 11-mile continuous Class I bikeway from Curtner Avenue in the south to Alviso in the north. This trail system can be accessed via two locations: 1) the pedestrian path that runs under the SR 87 overpass just west of the project site, and 2) approximately 500 feet south of the project site via a pedestrian path that runs along the western border of the Adobe site.

Striped (Class II) bike lanes are present along the following street segements:

- Woz Way between San Carlos Street and Almaden Avenue.
- Park Avenue between Woz Way and Market Street, and west of Montgomery Street.
- San Fernando Street between the Diridon Station and 10th Street.
- Almaden Boulevard between Woz Way and Santa Clara Street.

The City of San Jose participates in the Bay Area Bike Share program, which allows users to rent and return bicycles at various locations around the downtown area. There are currently 16 Bike Share stations in downtown San Jose with two stations located within ¼ mile of the project site: one at Adobe on Almaden Boulevard and another on Santa Clara Street at Almaden Boulevard. The Diridon Station also has a bike share station and is located less than ½ mile from the project site.

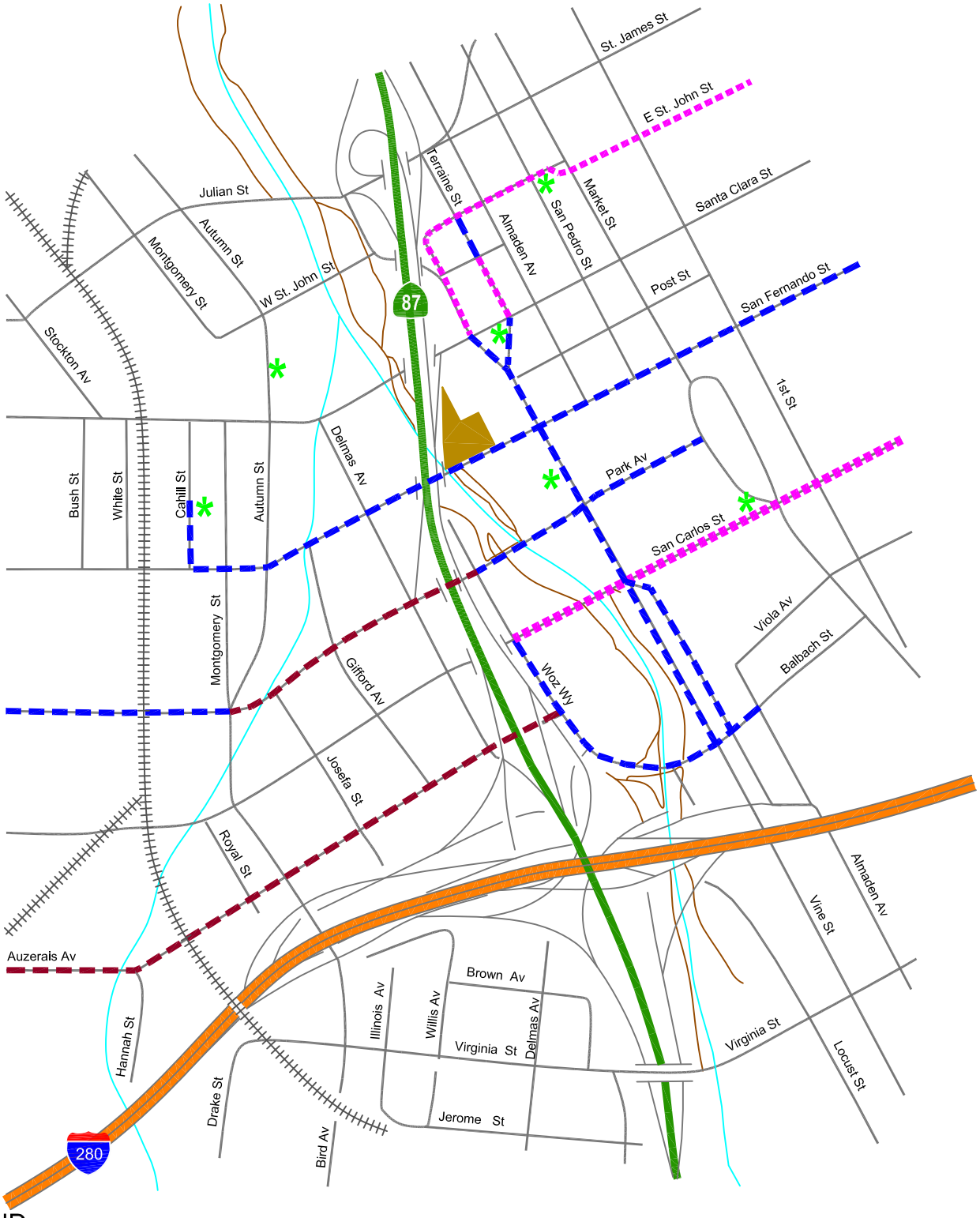
Pedestrian and Bicycle Counts on W. San Fernando Street

Pedestrian and bicycle crossings at the mid-block crosswalk and main project driveway on W. San Fernando Street were counted during the AM and PM peak hours. The counts showed that 121 pedestrians/bikes crossed W. San Fernando Street at the mid-block crosswalk during the AM peak hour, and 106 pedestrians/bikes crossed at this location during the PM peak hour.

The number of pedestrians and bikes that crossed W. San Fernando Street at the mid-block crosswalk and that crossed the east and west project driveways during the AM and PM peak hours are shown graphically on **Figures 3 and 4**.

Counts of bicyclists utilizing the buffered bike lanes along the project frontage on W. San Fernando Street were conducted during the AM and PM peak hours. The counts show that there were 24 eastbound bicycle trips and 21 westbound bicycle trips during the AM peak hour, and 21 eastbound bicycle trips and 22 westbound bicycle trips during the PM peak hour (see **Figure 4**).

The existing pedestrian and bicycle count data are contained in **Appendix A**.



LEGEND

- = Site Location
- = Existing Bicycle Lanes
- = Existing Bicycle Routes
- = Planned Bicycle Lanes (SJ Bike Master Plan)
- = Guadalupe River
- = Guadalupe River Trail
- = Bay Area Bike Share Stations

NORTH
Not to Scale

Figure 2
Existing and Planned Bicycle Facilities

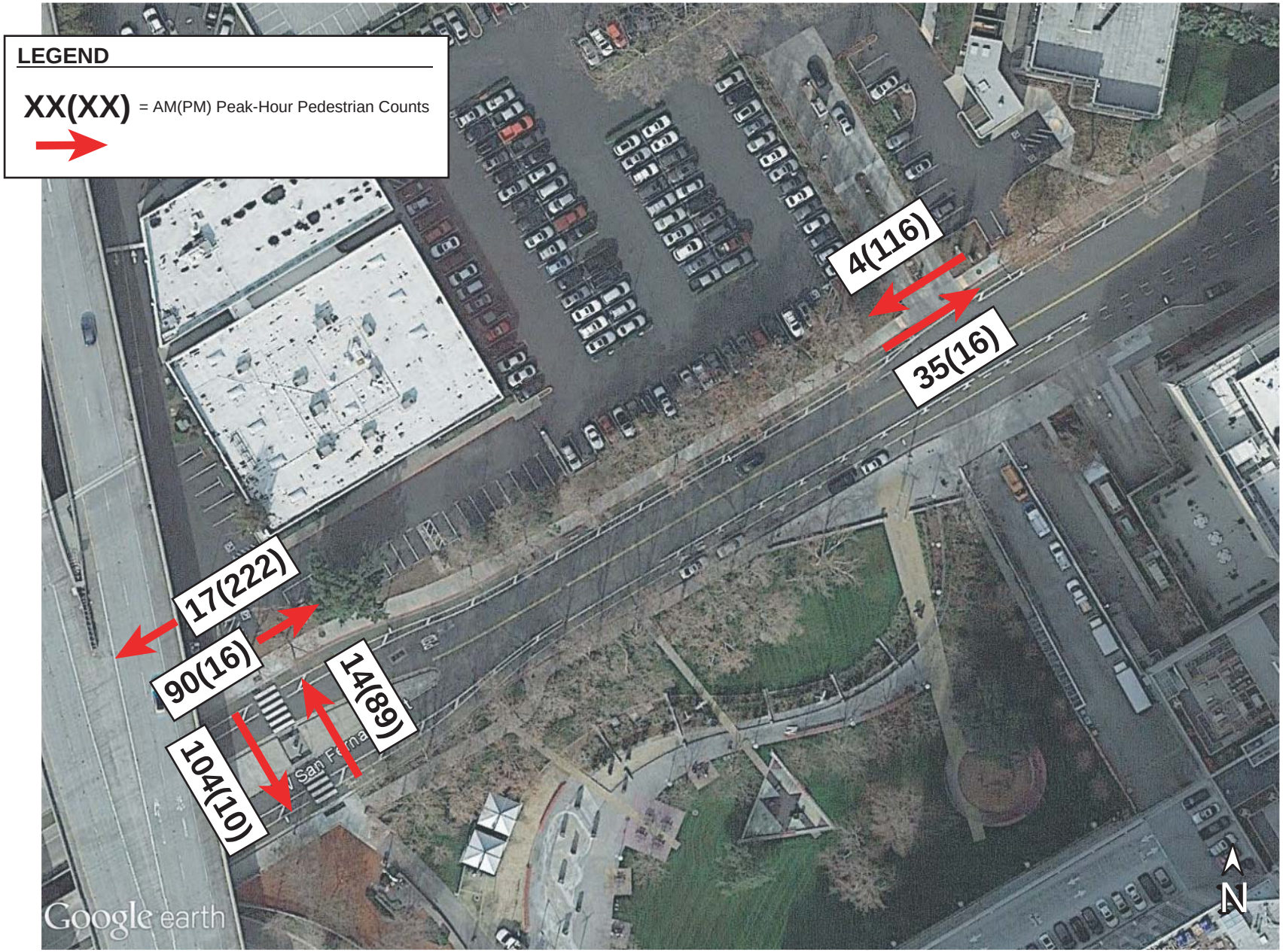


Figure 3
Existing Pedestrian Crossings*

* Count Date: March 29, 2016

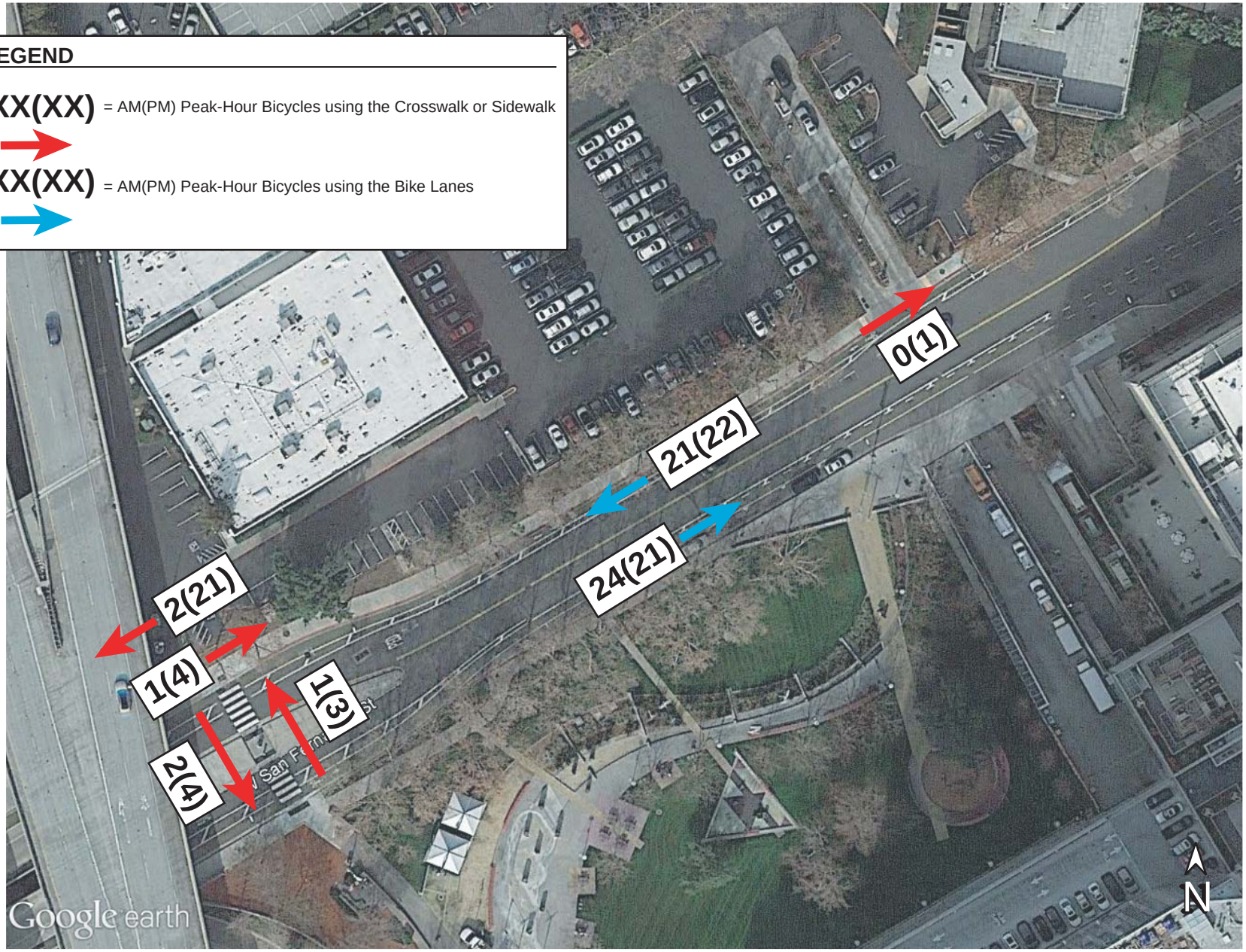


Figure 4
Existing Bicycle Counts*

* Count Date: March 29, 2016

Existing Transit Services

Existing transit services to the study area are provided by the Santa Clara Valley Transportation Authority (VTA), Caltrain, Altamont Commuter Express (ACE), and Amtrak. The transit stations and local VTA bus lines near the project site are shown on **Figure 5**.

VTA Service

The VTA operates local bus routes and two LRT lines within the project vicinity. The bus stop located on San Fernando Street adjacent to the project site, is served by local routes 63, 64, 65 and 201 (Downtown Area Shuttle, or DASH). The VTA bus routes with bus stops near the project site and the LRT lines are described in **Table 1** below, including their terminus points, closest scheduled stop, and commute hour headways.

Table 1
Existing Bus and LRT Service

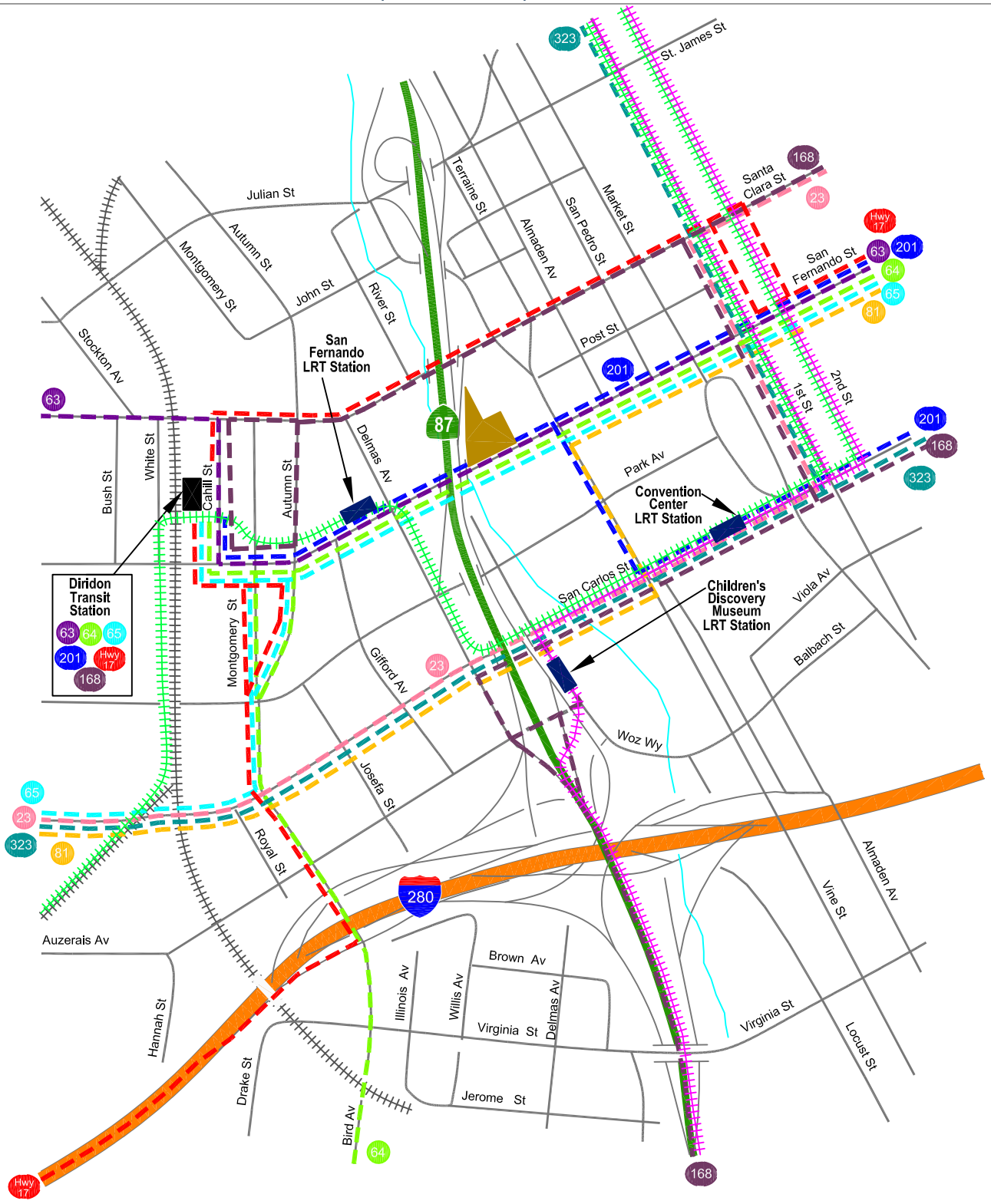
Bus Route	Route Description	Weekday Hours of Operation[1]	Headway[1]
Local Bus 23	DeAnza College to Alum Rock Transit Center via Stevens Creek	5:29am - 12:35am	11-13 min
Local Bus 63	Almaden Expwy/Camden, Diridon Transit Center, to SJSU	6:30am - 9:53pm	26-36 min
Local Route 64	Almaden LRT Station to McKee & White via Downtown	5:49am - 10:48pm	15 min
Community Bus 65	Kooser/Blossom Hill, Diridon Transit Center, to 13th/Hedding	6:38am - 7:05pm	45-50 min
Local Bus 81	San Jose State University to Vallco	6:39am - 7:32pm	25-35 min
DASH (Route 201)	Downtown Area Shuttle (DASH)	6:32am - 9:23pm	4-14 min
Express Bus 168	Gilroy Transit Center to San Jose Diridon Transit Center	6:26am - 8:41am 3:48pm - 5:52pm	30 min
Limited Stop Bus 323	Downtown San Jose to DeAnza College	6:28am - 10:42pm	15-20 min
Hwy 17 Express (Regional Service 970)	Downtown Santa Cruz/Scotts Valley to Downtown San Jose	5:37am - 10:52pm	10 - 30 min
Light Rail 901	Santa Teresa, Downtown San Jose, to Alum Rock	4:39am - 1:48am	10 - 15 min
Light Rail 902	Mountain View, Downtown San Jose, to Winchester in Campbell	5:04am - 12:25am	15 min

Notes:
1. Approximate weekday operation hours and headways during peak commute periods in the project area, as of January 2016.

The VTA operates the 42.2-mile LRT system extending from south San Jose through downtown to the northern areas of San Jose, Santa Clara, Milpitas, Mountain View and Sunnyvale. The service operates nearly 24-hours a day with 15-minute headways during much of the day. The Santa Teresa-Alum Rock and Mountain View-Winchester LRT lines operate within close proximity of the project site. The San Fernando LRT station is served by both LRT lines and is located approximately 1,000 feet west of the project site, or midway between the project site and the Diridon station.

San Jose Diridon Station

The San Jose Diridon Station, located approximately 2,000 feet west of the project site, is situated along the Mountain View-Winchester LRT line and is served by Caltrain, ACE and Amtrak. The Diridon Station provides bike racks and bike lockers.



LEGEND

- = Site Location
- = LRT Line 901 Alum Rock to Santa Teresa
- = LRT Line 902 Mt. View to Winchester
- = LRT Station
- = Local Bus Route 23
- = Local Bus Route 63
- = Local Bus Route 64
- = Local Bus Route 65
- = Local Bus Route 81
- = Dash Bus Route 201
- = Local Bus Route 168
- = Local Bus Route 323
- = Hwy 17 (970) Bus Route

Figure 5
Existing Transit Service

NORTH
Not to Scale

Caltrain Service

Caltrain is a regional, intercity commuter rail service between San Francisco and Gilroy. Caltrain provides service with approximately 20- to 30-minute headways during the weekday AM and PM commute hours. Trains stop frequently at the Diridon Station between 4:30 AM and 10:30 PM in the northbound direction, and between 6:28 AM and 1:34 AM in the southbound direction.

Altamont Commuter Express (ACE) Service

ACE provides commuter rail service between Stockton, Tracy, Pleasanton, and San Jose during commute hours. Service is limited to four westbound trips in the morning and four eastbound trips in the afternoon/ evening with headways averaging 60 minutes. ACE trains stop at the Diridon station between 6:32 AM and 9:17 AM in the westbound direction, and between 3:35 PM and 6:38 PM in the eastbound direction.

Amtrak Service

Amtrak provides daily commuter passenger train service along the 170-mile Capitol Corridor between the Sacramento region and the Bay Area. The Capitol Corridor trains stop at the Diridon station eight times during the weekdays between approximately 7:38 AM and 11:55 PM in the westbound direction. In the eastbound direction, Amtrak stops at the Diridon Station seven times during the week between 6:40 AM and 7:15 PM.

Existing Field Observations

Traffic conditions were observed in the field during the weekday AM (8:00 - 9:00 AM) and PM (5:00 - 6:00 PM) peak hours of the day in order to identify any existing operational deficiencies at and around the project site. The field observations did not reveal any significant traffic-related issues. Below is a discussion of the existing setting and traffic operations.

Almaden Boulevard and W. San Fernando Street

During the AM peak hour, the northbound and southbound left-turn pockets were observed to overflow several times. However, this did not impede the flow of traffic in either the northbound or southbound through lanes. There are high pedestrian volumes crossing the northbound and westbound legs of the intersection, and many bicycles and small motorized modes of transportation were also observed traveling through the intersection.

During the PM peak hour, the westbound left-turn pocket was observed to overflow almost every signal cycle. Vehicle queues of 10 to 15 vehicles in length consistently extended back into the eastbound left-turn pocket of the adjacent intersection. The lengthy queues often blocked westbound through traffic from reaching the intersection.

The eastbound right-turn volume at this intersection is very high during the PM peak hour. As a result, the right-turn movement often queued back to the main project driveway on W. San Fernando Street. This occurred between approximately 5:00 - 5:30 PM. The eastbound right-turn vehicle queues were noticeably shorter after 5:30 PM. Despite having the potential to block vehicles traveling eastbound on W. San Fernando Street, the right-turn vehicle queue did not impede the flow of eastbound through traffic.

East Project Driveway and W. San Fernando Street

The roadway is wide enough at this location that vehicles traveling westbound on W. San Fernando Street can easily maneuver around vehicles turning into the project driveway without crossing the centerline. This also holds true when vehicles turning into the driveway are waiting for a pedestrian or bicycle to pass by.

The security gate/control arm at the main project driveway responds quickly and inbound vehicles never queued onto the sidewalk or spilled onto W. San Fernando Street. During the AM peak hour, the longest observed inbound queue was 5 vehicles in length.

Between approximately 5:00 - 5:20 PM, the maximum outbound vehicle queue that was observed was 20 vehicles in length and extended back into the existing parking structure. The long outbound queues that developed during this short time period were caused by the high volume of cars exiting the driveway at once and the long eastbound right turn vehicle queue that developed at the Almaden Boulevard/W. San Fernando Street intersection. A majority of the exiting vehicles turned left onto eastbound W. San Fernando Street and then right onto southbound Almaden Boulevard. Whenever the eastbound right turn vehicle queue on W. San

Fernando Street would extend back to the east project driveway, it essentially prevented vehicles from exiting the driveway. The existing security gate on site did not contribute to the long outbound vehicle queues. By 5:30 PM, the outbound vehicle queues extended only 3 or 4 vehicles in length. Thus, the long outbound vehicle queues are short-lived.

Mid-Block Pedestrian Crossing on W. San Fernando Street

Large groups of pedestrians used this mid-block crossing after getting off an LRT train at the nearby San Fernando station or walking from Diridon station. Based on observations, most drivers seem well aware of the mid-block crossing and are quick to stop for pedestrians. Adobe has a hired security guard that stands near this crossing. During the observation periods, the guard was not observed stopping cars or assisting with crossings, but was wearing a reflective vest.

On occasion, the westbound vehicle queue at the Delmas Avenue/W. San Fernando Street intersection extended eastward and blocked the mid-block crosswalk. The long queues were the result of VTA light rail trains passing through the Delmas Avenue/W. San Fernando Street intersection. The queues did not result in any issues related to pedestrian crossings.

Delmas Avenue/W. San Fernando Street

Traffic volumes at this intersection were very low during both the AM and PM peak hours. As a result, the intersection operates well most of the time. The only issue observed during either peak hour was some queuing when trains pass through the intersection. During the PM observation period, a westbound train proceeded through the intersection, followed almost immediately by an eastbound train. When this occurs, vehicles are forced to wait for an extended period of time until they ultimately receive a green light and can pass through the intersection. This resulted in a westbound queue of 25 vehicles during the PM peak hour, which extended past the mid-block crossing.

Typical southbound queues at this intersection consist of 3 or 4 vehicles in length. When a train passes through the intersection the queue increases to up to 8 vehicles in length. Typical eastbound queues at this intersection consist of 5 or 6 vehicles in length. When a train goes through the intersection the queue can grow to 12 vehicles in length.

Project Trip Generation

Trips generated by any new development can be estimated based on counts of existing development of the same land use type. The City of San Jose has used count data of existing development that have been collected over the years to derive a list of trip generation rates for the most common land uses. The trip generation rates that have been developed can be applied to new development within the City to help predict future traffic increases that would result from new development. These recommended rates are detailed in the *San Jose Traffic Impact Analysis Handbook*, November 2009. Therefore, trip generation resulting from the proposed project was estimated by multiplying the City's established trip generation rates by the size of the development.

The project site is located within the Downtown Growth Area land use designation, which is characterized by mixed land uses and high rise buildings that create opportunities for multi-modal travel and strong transit demand. Development located within approximately a half-mile walk from a rail station that provides frequent and reliable transit services to a high percentage of regional destinations, such as the Diridon Station, can generally be considered a transit-oriented development. In addition, the availability of bicycle lanes and sidewalks throughout downtown San Jose provide for and encourage the use of multi-modal travel options and reduce the use of single-occupant automobile travel. The project location effectively renders it part of a large-scale mixed-use development in a pedestrian- and bike-friendly environment with a significant share of trips internal to the downtown area. For these reasons, the project qualifies for trip reductions as described below.

Trip Reductions

Due to the project's downtown location and proximity to transit and bicycle options, it is reasonable to assume that future tenants of the office building would utilize the available transit services and bicycle facilities in the area. Accordingly, a multi-modal trip reduction due to proximity to rail stations (e.g., Caltrain and LRT), major bus stops, and bicycle facilities can be applied to the gross project trip generation estimates. The project site

is located within a 2,000 foot walk of two existing rail stations – the Diridon Caltrain station and the San Fernando LRT station – and is served directly by four (4) local bus routes. In addition, the project site is situated along a City-designated bicycle route (San Fernando Street) with substantial bicycle and pedestrian usage, is located less than ¼ mile of two Bay Area Bike Share stations, and is situated adjacent to the Guadalupe River multi-use trail system. Furthermore, the site is located less than 2,000 feet from the future Diridon BART Station, and is located less than 2,000 feet from where a Bus Rapid Transit (BRT) stop will be located on Santa Clara Street adjacent to the SAP Center. For these reasons, a 20 percent multi-modal (i.e., transit/bike/walk) trip reduction was applied to the project. A 20 percent multi-modal trip reduction is consistent with the City's goals for downtown per the Envision San Jose 2040 General Plan, which identifies the transit commute mode split target as 20 percent or more for the year 2040, and the bicycle and walk commute mode split targets as 15 percent or more each for the year 2040.

A mixed-use development with complementary land uses such as office and retail will generate and attract trips internally between the uses. Thus, the number of vehicle trips generated for each use may be reduced, since a portion of the trips would not require entering or exiting the site. The VTA's *Congestion Management Program Transportation Impact Analysis Guidelines* (October 2014) indicates a trip reduction of up to 3 percent is allowed for employment and employee serving retail mixed-use developments. The reduction is applied to the employment component of the two complimentary land uses (in this instance the office use), and the same number of trips is then subtracted from the employee serving component (the retail use). Note that if the 3 percent office trip reduction resulted in a higher number of trips than the total number of employee-serving retail trips, then all the retail trips were assumed to be internal trips (net retail trips calculate to zero). This is consistent with VTA's TIA Guidelines, which states: "All trips made to retail services (employee-serving retail) within a proposed development may be considered internal trips." The project qualifies for this reduction because the employee-serving retail is integrated into the development and the retail would not have a dedicated parking area.

In October of 2016, the City of San Jose Public Works Department decided to implement reduced trip generation rates for most projects located in Downtown San Jose. The reduced rates are outlined in the Caltrans study entitled *Trip Generation Rates for Urban Infill Land Uses in California, Phase 2: Data Collection*. Based on the observed trip generation data contained in the Caltrans study, office building trip rates for urban infill sites are, on average, 50 percent lower than the standard City of San Jose rates and ITE rates. Therefore, the 20 percent multi-modal trip reduction plus the 3 percent internal trip reduction applied to the proposed office tower project can be considered a conservative estimate. The trip generation for the office tower will likely be lower than that calculated in this traffic operations study.

A retail pass-by trip reduction of 25 percent (typical for Santa Clara County) also can be applied to the net peak hour trip generation estimates for the retail space. Pass-by-trips are trips that would already be on the adjacent roadways (and so are already counted in the background traffic) but would turn into the site while passing by. Justification for applying the pass-by-trip reduction is founded on the observation that such retail traffic is not actually generated by the retail development, but is already part of the ambient traffic levels.

Existing Trip Credits

Trips that are generated by existing occupied uses can be subtracted from the gross project trip generation estimates. Although the existing 25,000 s.f. building on the project site is not currently occupied, trips attributable to the previous use were estimated to show the trip generation potential of the existing building. International Technological University (ITU) most recently occupied the existing building on the project site. The building has been vacant since ITU moved to a new San Jose location in mid-2015. The trip rates applied to the previous use (technical college) are based on "Junior/Community College" rates (Land Use 540) contained in ITE *Trip Generation*, 9th Edition (2012). This land use includes two-year junior, community, and technical colleges with evening programs.

Net Project Trips

After applying the appropriate trip generation rates and trip reductions/credits, the project would generate 3,994 new daily vehicle trips with 673 new trips occurring during the AM peak hour and 663 new trips occurring during the PM peak hour. Using the inbound/outbound splits recommended by the City of San Jose, the project would produce 604 new inbound and 69 new outbound trips during the AM peak, and 14 new inbound and 649 new outbound trips during the PM peak.

The trip generation estimates for the proposed project are shown in **Table 2**.

Table 2
Project Trip Generation Estimates

Land Use	% Reduction	Size	Daily Trip Rates	Daily Trips	AM Peak Hour Rate/ Factor	AM Peak Hour Splits In	AM Peak Hour Splits Out	AM Peak Hour Trips In	AM Peak Hour Trips Out	AM Peak Hour Trips Total	PM Peak Hour Rate/ Factor	PM Peak Hour Splits In	PM Peak Hour Splits Out	PM Peak Hour Trips In	PM Peak Hour Trips Out	PM Peak Hour Trips Total
Proposed Uses																
General Office Building [1]		718,080 s.f.	11.00	7,899	14.0%	88%	12%	973	133	1,106	14.0%	17%	83%	188	918	1,106
Trip reduction for employment and employee-serving retail [2]	3%			(237)				(2)	(4)	(6)				(6)	(12)	(18)
Trip reduction for transit/bike/walk due to downtown location [3]	20%			(1,580)				(195)	(27)	(222)				(38)	(184)	(222)
Specialty Retail/Strip Commercial [1]		6,745 s.f.	40.00	270	3.0%	70%	30%	6	2	8	9.0%	50%	50%	12	12	24
Trip reduction for employment and employee-serving retail [2]	3%			(237)				(4)	(2)	(6)				(12)	(6)	(18)
Trip reduction for retail pass-by [4]	25%			--				--	--	--				0	(2)	(2)
Proposed Uses Total:				***6,115***				***778***	***102***	***880***				***144***	***726***	***870***
Existing Trip Credits																
Technical College (Most Recent Previous Use) [5]		1,724 students	1.23	(2,121)	0.12	84%	16%	(174)	(33)	(207)	0.12	63%	37%	(130)	(77)	(207)
Net Project Trips:				**3,994**				**604**	**69**	**673**				**14**	**649**	**663**

Notes:

[1] Rates based on City of San Jose *Traffic Impact Analysis Handbook* , November 2009.

[2] As prescribed by the Transportation Impact Analysis Guidelines from VTA (October 2014), the maximum trip reduction for mixed-use development project with employment and employee-serving retail is equal to 3% off the employment component.

[3] The project site is located within a 2,000-foot walk of the existing Diridon Caltrain and San Fernando LRT Stations and future Diridon BART and BRT stations, is situated along a City-designated bicycle route with substantial bicycle and pedestrian usage, is located within 1/4 mile of two Bay Area Bike Share stations, is served directly by 4 local bus routes, and is situated adjacent to the Guadalupe River multi-use trail system. For these reasons, a 20 percent transit/bike/walk trip reduction was applied.

[4] A pass-by reduction of 25% is typically applied to retail development within Santa Clara County. The pass-by reduction is applied to the net retail trips after applying the mixed-use reduction.

[5] International Technological University (ITU) most recently occupied the existing building on the project site. The building has been vacant since ITU moved to a new location in mid-2015. The trip rates applied to the previous use (technical college) are based on "Junior/Community College" rates (Land Use 540) contained in ITE *Trip Generation,* 9th Edition (2012).

Project Trip Distribution and Trip Assignment

The project trip distribution patterns and net project trip assignment are shown on **Figure 6** and **Figure 7**, respectively. The project trips were assigned to the roadway network based on the project trip distribution pattern, which took into account existing travel patterns in the area, freeway access (i.e., ramp locations), and the relative locations of complementary land uses. The majority of project-generated trips would utilize the east project driveway. The west driveway, located adjacent to the mid-block crosswalk on W. San Fernando Street, is a limited access driveway (right-turn only) and would be utilized slightly less.

Intersection Queuing Analysis

The signalized intersections of Almaden Boulevard/W. San Fernando Street and Delmas Avenue/W. San Fernando Street were evaluated for vehicle queuing issues for the turning movements where the project would add a substantial amount of traffic. Intersection counts conducted in May and November of 2015 were used for the queuing analysis.

Vehicle queues were estimated using TRAFFIX, which is based on the Highway Capacity Manual (HCM) 2000 methodology. The basis of the analysis is as follows: the estimated maximum vehicle queue length (i.e., 95th percentile vehicle queue length) obtained from TRAFFIX is compared to the existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future storage requirements at intersections. The 95th percentile vehicle queue length value indicates that during the peak hour, a queue of this length or less would occur on 95 percent of the signal cycles. Or, a queue length larger than the 95th percentile queue would only occur on 5 percent of the signal cycles (about 3 cycles during the peak hour for a signal with a 60-second cycle length). Therefore, turn pocket storage designs based on the 95th percentile queue length would ensure that storage space would be exceeded only 5% of the time.

Queuing Analysis Results

The vehicle queue estimates and a tabulated summary of the findings are provided in **Table 3**.

Almaden Bl / W. San Fernando St Northbound Left-Turn Pocket

The queuing analysis indicates that the existing northbound left-turn pocket storage at the Almaden Boulevard/W. San Fernando Street intersection is adequate to accommodate the vehicle queues that currently occur during both the AM and PM peak hours. Existing field observations showed that during the AM peak hour the northbound left-turn pocket did overflow several times, but it does provide adequate vehicle storage most of the time. With the addition of trips generated by approved but not yet constructed development in the area, vehicle overflows are projected to occur during the AM peak hour within the northbound left-turn pocket. Vehicle overflows are also projected to occur with the addition of project-generated traffic.

Under background conditions, the northbound left-turn pocket is expected to overflow by three (3) vehicles during the AM peak hour. The northbound left-turn pocket is projected to overflow by six (6) vehicles under existing plus project conditions and nine (9) vehicles under background plus project conditions during the AM peak hour of traffic. Extending the northbound left-turn pocket is not possible due to the presence of back-to-back left-turn pockets. Adding a second northbound left-turn lane also is not feasible because W. San Fernando Street contains only one westbound receiving lane. Therefore, no physical improvements to increase the vehicle storage of the northbound left-turn pocket are possible.

Almaden Bl / W. San Fernando St Southbound Right-Turn Pocket

The queuing analysis indicates that the existing southbound right-turn pocket storage at the Almaden Boulevard/W. San Fernando Street intersection is adequate to accommodate the vehicle queues that currently occur during both the AM and PM peak hours, and would continue to provide adequate vehicle storage under background conditions. Vehicle overflows are projected to occur with the addition of project-generated traffic during the AM peak hour. The southbound right-turn pocket is expected to overflow by fifteen (15) vehicles under existing plus project conditions and seventeen (17) vehicles under background plus project conditions during the AM peak hour of traffic. The adjacent southbound through lane has capacity to accommodate the vehicle queues that would extend out of the southbound right-turn pocket.

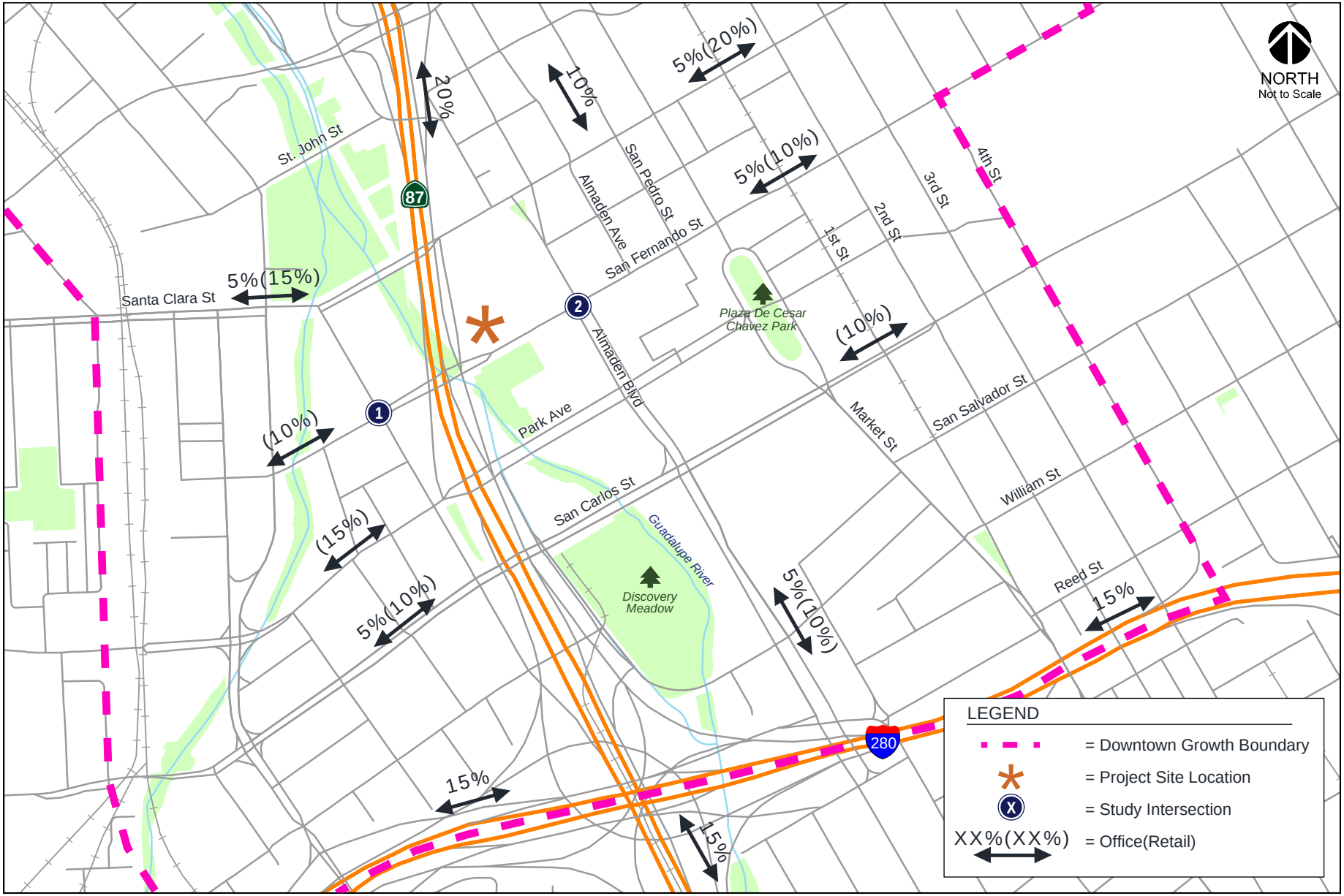


Figure 6
Project Trip Distribution Patterns

Figure 7
Net Project Trip Assignment

Almaden Bl / W. San Fernando St Eastbound Left-Turn Pocket

The queuing analysis indicates that the existing eastbound left-turn pocket storage at the Almaden Boulevard/ W. San Fernando Street intersection is adequate to accommodate the vehicle queues that currently occur during both the AM and PM peak hours. Existing field observations confirm this. Adequate storage also would be provided under background conditions. With the addition of project-generated trips, however, vehicle overflows are projected to occur during the PM peak hour. The eastbound left-turn pocket is expected to overflow by three (3) vehicles under existing plus project conditions and four (4) vehicles under background plus project conditions during the PM peak hour of traffic.

Extending the eastbound left-turn pocket to provide some additional vehicle storage is possible. However, since the main project driveway on W. San Fernando Street is situated only about 250 feet from Almaden Boulevard, the eastbound left-turn pocket could only be extended by about 100 feet. Thus, the eastbound left-turn vehicle queues estimated to occur with the project would still spill out of the turn pocket. Extending the left-turn pocket also could create operational issues associated with vehicles entering and exiting the Adobe parking garage, since Adobe employees would be forced to turn left across an additional lane of traffic when either entering or exiting the garage.

Almaden Bl / W. San Fernando St Eastbound Right-Turn Pocket

Based on existing field observations, the eastbound right-turn movement often queues back to the main project driveway on W. San Fernando Street during the PM peak hour, which is located approximately 250 feet from Almaden Boulevard. The queuing analysis results for existing conditions are, therefore, consistent with the field observations.

It is estimated that the addition of project-generated traffic would increase the length of the eastbound right-turn vehicle queue from 11 vehicles to 21 vehicles, or an increase of about 250 feet. Since the existing maximum vehicle queue extends back to the project driveway during the PM peak hour, any additional queuing would likely occur on-site along the project driveway and extend into the project parking garage.

Table 3
Vehicle Queuing and Left-Turn Pocket Storage Analysis

Scenario	Peak Hour	Projected Queue Length (Vehicles)					
		Almaden Blvd and W San Fernando St				Delmas Av and W San Fernando St	
		NBL	SBR	EBL	EBR	SBL-T-R	WBL-T-R
Existing	AM	6	4	1	3	1	1
	PM	2	1	2	**11**	5	6
Existing Plus Project	AM	**12**	**19**	2	4	2	1
	PM	2	1	**7**	**20**	7	8
Background	AM	**9**	4	1	3	5	1
	PM	3	1	2	**11**	13	13
Background Plus Project	AM	**15**	**21**	2	4	6	2
	PM	3	1	**8**	**21**	16	17
Strategy 2000	AM	**9**	5	2	4	1	1
	PM	3	1	3	**18**	8	9
Available Storage							
Existing & Background Storage (feet) [1]		150	100	100	200	600	900
Existing & Background Storage (Vehicle) [2]		6	4	4	8	24	36

Notes:
[1] Delmas St provides about 600 ft of SB vehicle storage between W San Fernando St and Santa Clara St, and W San Fernando St provides about 900 ft of WB vehicle storage between Delmas St and the east project driveway.
[2] Assumes 25 feet per vehicle.
Red numbers indicate movements for which projected queue lengths exceed available storage capacity.

Vehicular Site Access and Circulation

The site access and circulation analysis is based on the July 15, 2016 site plan prepared by Steinberg Architects. The ground level site plan is shown on **Figure 8**. Based on the site plan, access to the project site would be provided via two existing driveways on W. San Fernando Street: the east (main) project driveway and the west project driveway. The project driveways are described below.

Primary access to the project parking garage entrance would be provided via an existing unsignalized full access driveway on W. San Fernando Street. This east project driveway is situated approximately midway between Almaden Boulevard and the SR 87 overpass. This driveway currently provides access to the surface parking lot on the project site and the adjacent public parking garage. Additional access to the existing public parking garage is provided on the north side of the garage via Santa Clara Street. The majority of project-generated trips would utilize the east driveway to access the parking garage.

The west project driveway, situated between the SR 87 overpass and a mid-block crosswalk on W. San Fernando Street (southwest corner of the project site), is currently configured to be used only by key card holders who park in the existing surface parking lot located on the project site. The site plan shows the control arms/security gate would be removed as part of the project. The west driveway would provide secondary access to the project.

East Project Driveway (Primary Access)

The east project driveway is approximately 30 feet wide, measured at the throat, and has a raised median island that separates inbound and outbound traffic. The driveway is currently gated about midway along the driveway. The project-generated trips that are estimated to occur at the east project driveway are 452 inbound and 59 outbound during the AM peak hour, and 84 inbound and 417 outbound during the PM peak hour. **Figure 9** shows the east/west split at this project driveway.

Inbound Driveway Operations – AM Peak Hour

An evaluation of the main project driveway on W. San Fernando Street was performed to identify the effect of project-generated trips on the inbound vehicle queues during the AM peak hour of traffic. The existing maximum inbound vehicle queue at the east project driveway was measured in the field during the AM peak hour. A ratio between the existing inbound volumes and the volumes with the additional project trips was used to estimate the number of vehicles that would be added to the inbound queue under project conditions.

Due to the high number of project trips that would be added to this driveway, the current on-site configuration (security gate location) would not be adequate to serve the anticipated amount of inbound traffic with the project. Based on the total number of vehicles expected to enter the east project driveway during the AM peak hour of traffic, the maximum inbound vehicle queue that is estimated to occur with the addition of project trips is 18 vehicles long, or about 450 feet in length. An inbound vehicle queue of this length would spill out of the driveway and onto W. San Fernando Street. The east project driveway currently has room for 5 queued inbound vehicles. Thus, the remaining 13 inbound vehicles would queue about 225 feet to the east (westbound right-turn inbound movement) and about 100 feet to the west (eastbound left-turn inbound movement). A westbound right-turn vehicle queue of 225 feet would extend back to the Almaden Boulevard/W. San Fernando Street intersection, which would have a negative effect on traffic operations at the intersection.

The existing inbound security gate should be moved from its current location (midway between W. San Fernando Street and the existing parking garage to the north) to provide more on-site vehicle storage along the east driveway. The inbound control arm could be relocated 100 feet to the north, just south of the project parking garage entrance, which would provide twice the amount of on-site vehicle storage (200 feet) as is currently provided. Alternatively, the security gate could be removed and separate security gates for the project parking garage and existing parking garage could be added. In either case, substantial inbound queuing issues at the east driveway are still expected to occur as a result of the project. Adding one or two additional gates to the project parking garage entrance would help to improve driveway operations and reduce inbound vehicle queuing. However, due to the large number of vehicles entering the site at the east project driveway during the AM peak hour, significant queuing issues along W. San Fernando Street cannot be avoided.

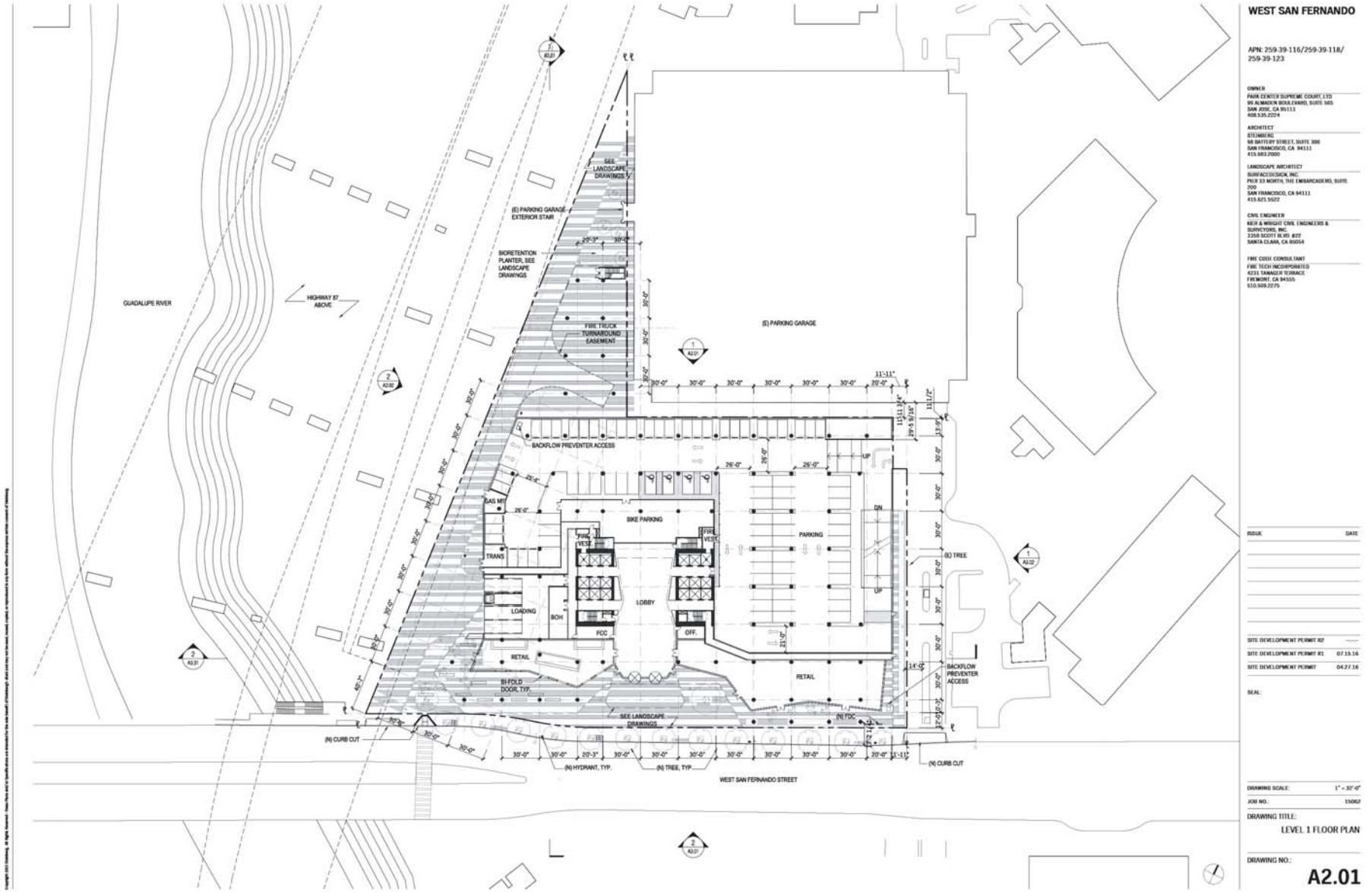
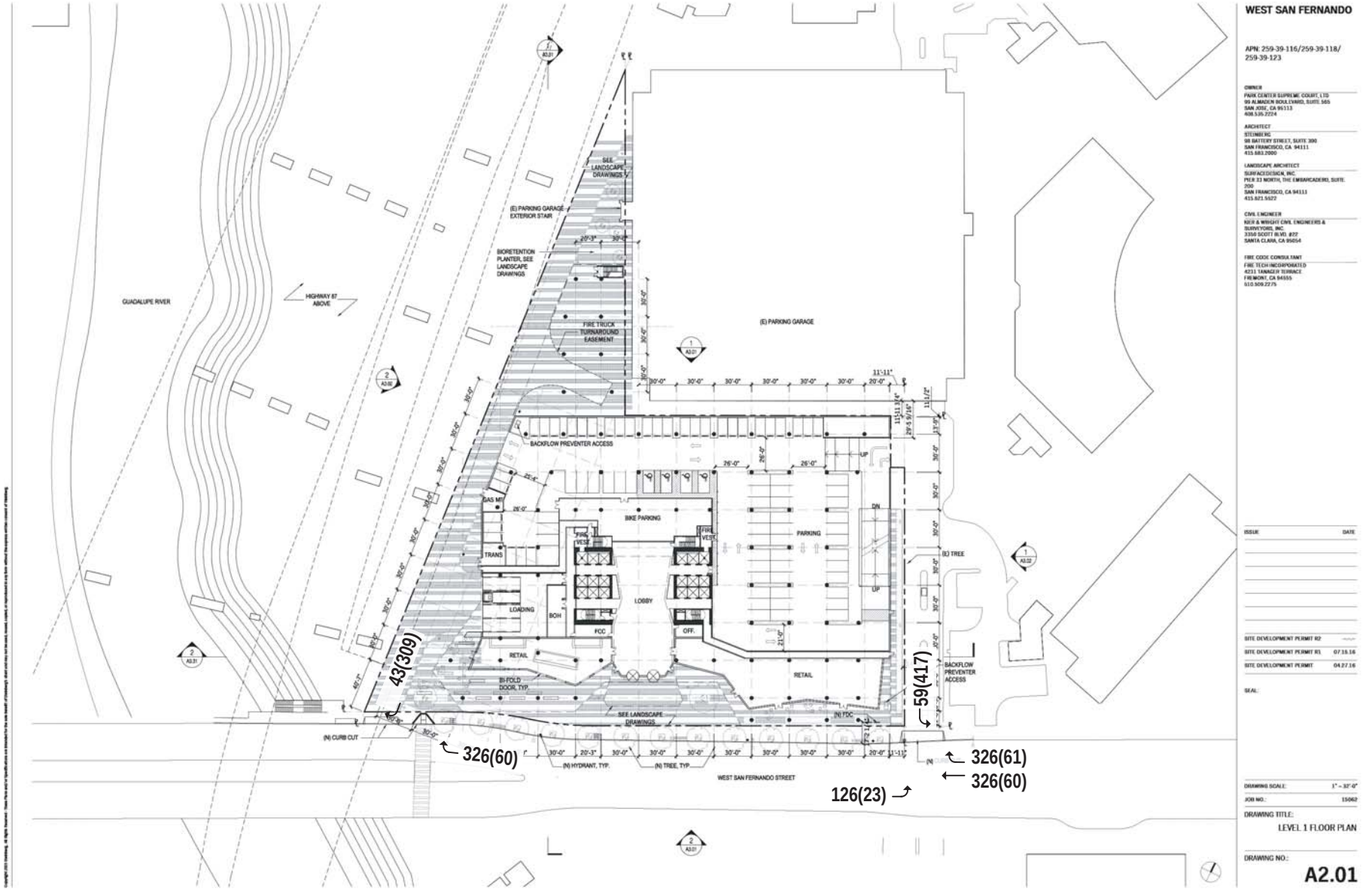


Figure 8
Ground Level Site Plan



Legend

XX(XX) = AM(PM) Peak-Hour Trips

Figure 9
Project Trips at the Driveways

Planned Roadway Improvements

The City of San Jose Department of Transportation (DOT) has developed preliminary design plans for improvements along W. San Fernando Street between the mid-block crosswalk and Almaden Boulevard (see **Figure 10**). The plan shows a new 10-foot wide eastbound left-turn lane at the main project driveway that would provide approximately 200 feet of inbound vehicle storage (including a portion of the taper) and would benefit the project considerably. This storage length would be adequate to accommodate the estimated maximum eastbound left-turn vehicle queues that would develop at the main project driveway during the peak period (i.e., AM peal hour) of inbound traffic.

Note that there is a pinch point along W. San Fernando Street just west of the main project driveway. DOT has indicated their desire for a 56-foot minimum curb-to-curb width at this location to accommodate the new eastbound left-turn lane while preserving the existing buffered bike lanes and street parking, as well as providing a 14-foot sidewalk along the project frontage (see cross section A-A on Figure 10). The improvement plan also shows a dedicated westbound right-turn lane to serve inbound trips. The addition of a westbound right-turn lane would require shifting the buffered bike lane away from the curb to the left side of the right-turn lane, removing a 125-foot section of buffer so that the buffered element of the bike lane begins just west of the main project driveway, and creating a 160-foot broken section of bike lane for merging purposes. Based on their preliminary evaluation, DOT estimates the project would need to widen the street by up to 6 feet at the 52-foot curb-to-curb section (pinch point). However, the exact amount of dedication needed for the roadway widening would need to be confirmed by field measurements. The improvements are shown conceptually on the plan and will be finalized at the implementation stage. It is our understanding that the City intends to require the project to implement these improvements as part of the project conditions of approval.

Outbound Driveway Operations – PM Peak Hour

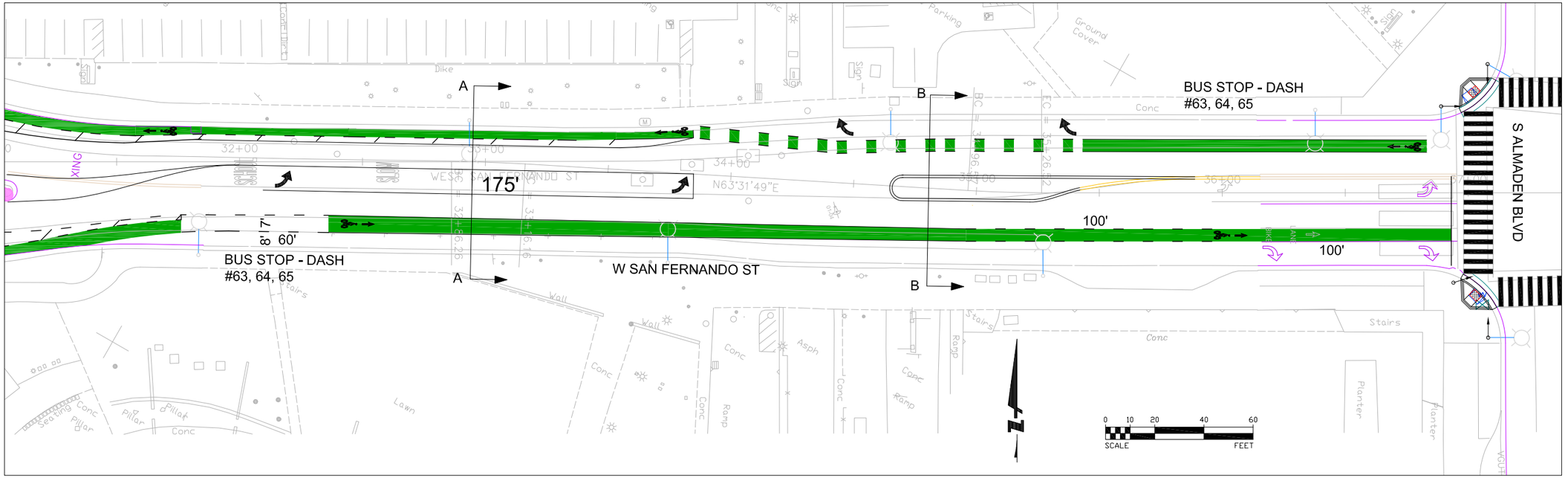
An evaluation of the main project driveway on W. San Fernando Street was performed to identify the effect of project-generated trips on the outbound vehicle queues during the PM peak hour of traffic. The existing maximum outbound vehicle queue at the east project driveway was measured in the field during the PM peak hour. A ratio between the existing outbound volumes and the volumes with the additional project trips was used to estimate the number of vehicles that would be added to the outbound queue under project conditions.

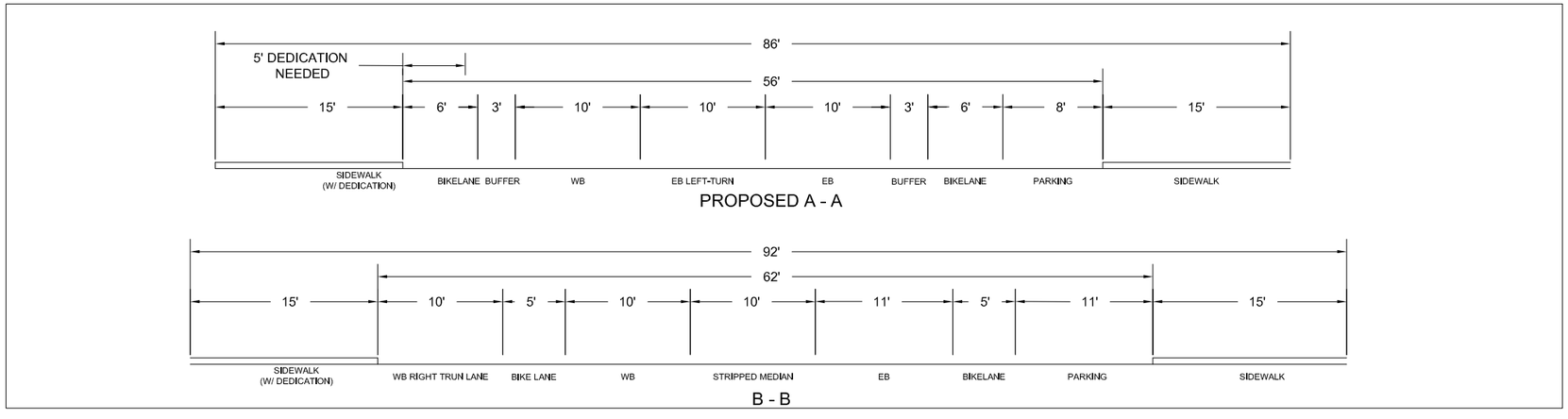
Excessive on-site vehicle queuing would occur during the PM peak hour of traffic due to the large number of vehicles exiting the project garage and adjacent on-site parking garage at the same time, and the random occurrence of gaps in both directions of travel on W. San Fernando Street. Based on the total number of vehicles expected to exit the east project driveway during the PM peak hour, the maximum outbound vehicle queue that is estimated to occur with the addition of project trips is 54 vehicles long, or 1,350 feet in length. As a comparison, the existing maximum outbound vehicle queue that was observed in the field was 20 vehicles in length, or about 500 feet, which extended into the existing parking structure. The PM peak hour outbound queuing issue currently lasts about 20 minutes. With the addition of project trips, on-site vehicle queuing at this driveway would increase, resulting in long delays to drivers for an extended period of time.

It is important to note that while the east driveway would be utilized by the project to access the project garage, the driveway is not located on the project property. The driveway lines up with the entrance to the existing parking garage to the north. For this reason, significant changes to the current driveway configuration aimed at providing additional vehicle capacity and improving the outbound operations may not be feasible.

Left turns from a driveway typically are more challenging than right turns because they most often require sufficient gaps in traffic in both directions of travel. If there are insufficient gaps for drivers, then long vehicle delays will occur. At some point, the delays become too great and drivers begin to seek alternate routes. Unfortunately, due to the restrictive nature of the project site, alternative routes are simply not available to drivers exiting the site. Based on the long delays that would occur at the east project driveway, it is highly likely that all drivers intending to head west on W. San Fernando Street would utilize the west project driveway. The project trip assignment (see Figure 9) reflects this assumption.

Since on-site vehicle queueing issues already occur at the east project driveway, it can be concluded that additional trips generated by the project would increase the delay for outbound vehicles during the peak travel periods. These operational issues are typical for a development in downtown where the streets frequently experience congestion, and is consistent with the vision of the Downtown Core per the City's General Plan and Downtown Strategy Plan which exempts the level of service standard within the Core.





PROPOSED CROSS SECTIONS

1. STATE DETAIL 9 (MODIFIED)	8. STATE DETAIL 32	15. CHATTER BARS	22. BICYCLE LOOP DETECTOR SYMBOL
2. STATE DETAIL 12 (MODIFIED)	9. STATE DETAIL 37B	16. TYPE "AY" MARKER	23. STATE DETAIL 39A (MODIFIED)
3. STATE DETAIL 22	10. STATE DETAIL 38	17. SOLID 12" WHITE	24. YIELD LINE
4. STATE DETAIL 23	11. STATE DETAIL 39	18. SOLID 12" YELLOW	25. GREEN PAVEMENT ENHANCEMENT
5. STATE DETAIL 25	12. STATE DETAIL 39A	19. SOLID 24" WHITE	26. STATE DETAIL 26
6. STATE DETAIL 27B	13. STATE DETAIL 40A	20. STATE DETAIL 26	27. SOLID 24" YELLOW
7. STATE DETAIL 29	14. ARROW / MESSAGES	21. STATE DETAIL 40	28. STATE DETAIL 41

	REVISIONS	DATE
6		
5		
4		
3		
2		
1		

333 West San Fernando St Towers

CITY OF SAN JOSE CAPITAL OF SILICON VALLEY

DEPARTMENT OF TRANSPORTATION
SAN JOSE, CALIFORNIA

DRAWN BY: X. GAO
CHECKED BY: F. LAPSTEA
PROJ COORD: Z. KHATTAB
DATE: SEPTEMBER 2016
SCALE: 1" = 20'
SHEET NO. 1 OF 1

JIM ORTBAL
DIRECTOR

FILE NO.

Figure 10
Planned Improvements to W. San Fernando Street

NORTH
Not to Scale

West Project Driveway (Secondary Access)

The west project driveway is approximately 30 feet wide, and serves only right turns in and right turns out. This driveway is currently gated and requires a key card to access the site. The security control arms are mounted on a small raised island that separates the inbound and outbound movements. The site plan shows the security gate control arms would be removed as part of the project. The project generated trips that are estimated to occur at the west project driveway are 326 inbound and 43 outbound during the AM peak hour, and 60 inbound and 309 outbound during the PM peak hour. The project trips at this driveway are shown previously on Figure 9.

Although not shown on the site plan, it is assumed that the west entrance to the project parking garage would be gated. The west project driveway would provide approximately 250 feet of on-site vehicle storage between the west garage entrance and W. San Fernando Street. This most likely would be adequate to accommodate the inbound vehicle queues that would develop during the AM peak hour at the west project driveway.

Significant on-site vehicle queuing issues are not expected at the west project driveway due to the relatively low opposing traffic volume on westbound W. San Fernando Street during the PM peak hour of traffic. Thus, delays for vehicles exiting the site at this driveway location are expected to be much lower than the east project driveway. For this reason, more drivers ultimately may choose to exit the site via the west project driveway than what is shown on Figure 9.

The west project driveway is located immediately adjacent to and on the west side of the mid-block crosswalk on W. San Fernando Street. Based on its location, vehicle trips exiting the site at this driveway would be turning away from the crosswalk. Also, due to the driveway's proximity to the mid-block crosswalk, westbound vehicles turning right into the driveway would be traveling very slowly at the moment they cross the crosswalk. For these reasons, and because the mid-block crosswalk has good visibility, the project is not expected to create any operational or safety issues at the west driveway. Note that existing field observations revealed no safety issues.

Allowing left turns out of the west project driveway would alleviate some of the on-site queuing and delay issues that would occur at the east project driveway during the PM peak hour. However, this would require removal of the raised median island on W. San Fernando Street, and would introduce the potential for conflicts between exiting vehicles and pedestrians crossing W. San Fernando Street via the mid-block crosswalk. In addition, the SR 87 overpass support structures located west of the project site would interfere with a driver's ability to locate gaps in traffic on eastbound W. San Fernando Street to safely turn left from this project driveway. Due to pedestrian safety and sight distance issues, adding an outbound left-turn movement to the west project driveway is not a recommended nor desirable modification.

Sight Distance at the East and West Project Driveways

The two driveways serving the project site are free and clear of obstructions, with the exception of an existing "For Lease" sign at the east project driveway location that appears to be only temporary. (It is assumed that there would be no sign at this location once the project is constructed and occupied.) There is no parking allowed along the project frontage on W. San Fernando Street, and all the street trees along W. San Fernando Street have a high canopy. For these reasons, sight distance is very good at both driveways in both directions. Thus, drivers exiting the project driveways would be able to clearly see pedestrians on the sidewalk and vehicles traveling on W. San Fernando Street. According to the site plan, the project does not propose to make any changes to these driveways.

On-Site Circulation

On-site vehicular circulation was reviewed for the project in accordance with generally accepted traffic engineering standards and City of San Jose design guidelines. The City's standard width for two-way drive aisles is 26 feet wide where 90-degree parking stalls are provided. This allows sufficient room for vehicles to back out of parking stalls. According to the site plan, the majority of drive aisles on all ten parking levels measure 26 feet wide where parking is provided. The north/south oriented dead-end drive aisle on each of the basement parking levels measures 25 feet wide. The garage ramps measure 21.5 feet wide. Since the ramps do not contain any parking, the proposed ramp width would be adequate for two-way traffic.

Access to all parking garage levels–five below-grade levels and five above-grade levels–would be provided via two garage entrances. The east and west garage entrances would be accessible via the east and west project driveways on W. San Fernando Street, respectively. The two garage entrances would be connected internally via a shared drive aisle.

The internal parking garage ramps, drive aisles, and parking stalls were evaluated for vehicle access by the method of turning-movement templates. Analysis using the appropriate turning templates shows that passenger vehicles could adequately access the garage ramps and drive aisles on all parking levels. However, there is a potential for operational issues to occur at the east garage entrance. The ramp to the lower levels of the parking garage is located immediately adjacent to the east parking garage entrance. While vehicles entering the garage could easily make the left turn and head down the ramp to the lower parking levels, vehicles traveling up the ramp from the lower parking levels would have difficulty negotiating the sharp right turn necessary to exit the parking garage. Vehicles making this right turn from the ramp would require most of the driveway width (i.e., would encroach upon the inbound lane) to complete the turn, resulting in conflicts between inbound and outbound vehicles. Thus, a larger radius is needed at this location to provide adequate space to allow vehicles to successfully negotiate the sharp right turn movement from the ramp.

Access to most of the parking stalls within the parking garage would be adequate. The five below-grade parking levels (Levels B1 - B5) each contain one parking stall that would be difficult to access. The stall is located adjacent to the wall at the end of the northern dead-end drive aisle on each of the five basement parking levels. Parking Levels 1 and 2 each contain five parking stalls located at the end of the dead-end drive aisle on each level that would be difficult to access. Multi-point maneuvers would be required to back out of these stalls. Parking Levels 3, 4 and 5 each contain one parking stall that would be difficult to access. The parking stall on each of these three parking levels is located adjacent to the wall at the end of the northern dead-end drive aisle.

No convex mirrors are shown on the site plan provided on any level. Convex mirrors should be placed on each parking level at appropriate locations to assist drivers with blind turns within the parking garage.

The standard full-size parking stalls and handicap parking stalls are shown to be 9 feet wide by 18 feet long on all levels of the parking garage. All compact parking stalls are shown to be 8 feet wide by 16 feet long. The below-grade parking levels B2 - B5 each contain two parallel parking spaces measuring 22 feet in length. All parking stall dimensions meet the City requirements.

Truck Access and Circulation

The site plan shows that large trucks would access the site via the west (secondary) project driveway only. The ground level site plan, shown previously on **Figure 8**, shows four proposed loading spaces on the west side of the building, near the office lobby and elevators. These four loading spaces would serve both the office and retail components of the project. Freight loading requirements and access to the loading spaces are described below.

Loading Zones

According to the City of San Jose Downtown Zoning Regulations (Chapter 20.70), the project is required to provide a total of seven (7) freight loading spaces to serve the proposed 718,080 s.f. office tower. No loading spaces are required to serve the small retail component of the project. Below are the City's requirements.

- Offices with 100,000 s.f. - 175,000 s.f. of total gross floor area (GFA) shall provide one (1) loading space. One (1) additional loading space shall be included for each 100,000 s.f. of total GFA in excess of 175,000 s.f. (Section 20.70.420 – Professional Offices)
- Retail and commercial stores and shops, restaurants, bars and drug stores with greater than 10,000 s.f. of total GFA and less than 30,001 s.f. of total GFA shall provide one (1) loading space.

The project is proposing to provide a total of four (4) freight loading spaces to serve the project, or three loading spaces less than what the City typically requires. Note that the Planning Director may authorize a reduction in the number of on-site loading spaces in connection with the issuance of a development permit if the Director finds that the amount of loading space would be sufficient to accommodate circulation and

manipulation of freight. The project applicant should coordinate with City staff to determine if four loading spaces would be adequate to serve the project.

Loading Space Dimensions

According to the City of San Jose Zoning Regulations (Chapters 20.70.460 and 20.90.420), each off-street loading space required by the project shall be no less than 10 feet wide by 30 feet long by 15 feet high, exclusive of driveways for ingress and egress and maneuvering areas. The site plan shows the length and width of the on-site freight loading spaces would be adequate to accommodate large delivery trucks (SU-30 truck types).

Truck Access and On-Site Circulation

All four of the on-site freight loading spaces would be accessible from the outside of the building. Analysis using the SU-30 turning template shows that these truck types could adequately access the west project driveway and all four loading spaces.

Garbage Collection

The site plan does not show the locations of the trash rooms. However, Steinberg Architects has indicated the Back of House (BOH) room, shown on the site plan adjacent to the freight loading spaces, would be a trash room. The project is in the process of developing a garbage management plan and will submit the plan for City approval.

Note that due to the presence of red curb and buffered bike lanes along the project frontage on W. San Fernando Street, garbage collection activities would need to occur on site. Garbage collection also would need to occur outside the building due to height limitations within the parking structure. Based on the truck turning template analysis, garbage trucks could adequately access the west project driveway and maneuver on site.

Emergency Vehicle Access

Fire code requires that driveways provide at least 32 feet for fire access. The existing driveways providing access to the project currently meet this requirement. The City of San Jose Fire Department additionally requires that all portions of buildings be within 150 feet of a fire department access road, and requires a minimum of 6 feet clearance from the property line along all sides of the building. The site plan shows a fire truck turnaround located near the northwest corner of the proposed office building. This would allow fire trucks and other large trucks to turn around on site and exit the west project driveway. Taking into consideration the fire truck turnaround easement, all portions of the office building would be within 150 feet of a fire access road. The project would also meet the 6-foot requirement for building clearance on all sides.

Pedestrian and Bicycle Access and Circulation

All new development projects in San Jose should encourage multi-modal travel, consistent with the goals of the City's General Plan. It is the goal of the General Plan that all development projects accommodate and encourage the use of non-automobile transportation modes to achieve San Jose's mobility goals and reduce vehicle trip generation and vehicle miles traveled. In addition, the adopted City Bike Master Plan establishes goals, policies and actions to make bicycling a daily part of life in San Jose. The Master Plan includes designated bike lanes along all City streets, as well as on designated bike corridors. In order to further the goals of the City, pedestrian and bicycle facilities should be encouraged with new development projects.

Pedestrian Facilities

The existing sidewalks in the area would provide pedestrian access to the ground floor retail uses and office lobby, including the elevators, stairwells, mail room, management office, and bicycle parking area. The sidewalk along the project frontage on W. San Fernando Street will be widened by approximately 4 feet as part of the project. In addition, the project will be required to construct a 14-foot wide attached sidewalk, which will provide an enhanced pedestrian experience. The network of sidewalks and crosswalks in the study area will have good connectivity and provide future tenants with safe routes to transit stops, the Guadalupe River multi-use trail, and other points of interest in downtown.

Mid-Block Crosswalk on W. San Fernando Street

A mid-block pedestrian crosswalk with ADA compliant ramps and a median refuge island is currently provided on W. San Fernando Street near the southwest corner of the project site. Standard pavement markings with truncated domes and signage are provided at this unsignalized pedestrian crossing. Truncated domes are the standard design requirement for detectable warnings which enable people with visual disabilities to determine the boundary between the sidewalk and the street.

Existing count data, field observations, and the Transportation Research Board (TRB) study entitled *Improving Pedestrian Safety at Unsignalized Crossings,* 2006, were all used to evaluate the adequacy of the existing mid-block crosswalk design. The TRB study includes guidelines for use in selecting pedestrian crossing treatments for unsignalized intersections and midblock locations, as described in Appendix A of the TRB study: Guidelines for Pedestrian Crossing Treatments.

The main purpose of pedestrian crossing treatments is to alert motorists to the presence of pedestrians and to direct pedestrians to a safe crossing location. The current crosswalk configuration accomplishes this goal. Based on field observations and the TRB guidelines, the appropriate treatment for the mid-block crossing on W. San Fernando Street is standard crosswalk markings with pedestrian crossing signs. A worksheet that shows the result of the pedestrian crossing treatment evaluation is contained in **Appendix B**.

While additional treatments such as flashing beacons are not indicated as needed in the TRB worksheet, the City of San Jose applies their own set of criteria when evaluating the need for enhanced pedestrian warning devices. City of San Jose staff anticipates that due to the connection to the Guadalupe River multi-use trail, lack of sight distance from the eastbound movement on W. San Fernando Street due to the SR 87 overpass support structure, and added trips from the proposed project and other nearby projects together will generate the need for flashing beacons at this location. Accordingly, the City plans to require the project to install Rapid Rectangular Flashing Beacons (RRFBs) at the pedestrian mid-block crossing adjacent to the project site.

Bicycle Facilities

Future tenants of the office tower would utilize the existing bicycle facilities in the immediate vicinity of the project site. Bike facilities include the Guadalupe River multi-use trail (Class I bikeway) and buffered bike lanes (Class II bikeway) on San Fernando Street and Almaden Boulevard. Additionally, there are four Bay Area Bike Share stations within walking distance of the project site. The identification of San Fernando Street as a City-designated bike route provides the project site with viable connections to surrounding bike and transit facilities and provides for a balanced transportation system as outlined in the Envision 2040 General Plan Goals and Policies.

The site plan shows a large bicycle parking area located between the ground level of the parking garage and the north end of the office lobby. It appears from the site plan that the bicycle parking area would be accessible via the parking garage only. Access via the office lobby does not appear possible. Thus, as proposed bicyclists would need to enter one of the parking garage entrances in order to access the centrally located bicycle parking area. Providing additional access to the bicycle parking area that is separated from motor vehicle parking and circulation, such as via the planned exterior entrance on the west side of the office building just north of the freight loading area, would be beneficial.

The existing sidewalks and bicycle facilities along the surrounding roadways have good connectivity and provide pedestrians and bicyclists with safe routes to complementary land uses and transit facilities in the area. Note that the City's General Plan identifies both walk and bicycle commute mode split targets as 15 percent or more for the year 2040. This level of pedestrian and bicycle mode share is a reasonable goal for the project, particularly if Caltrain, LRT and bus services are utilized in combination with bicycle commuting.

Transit Services

The San Fernando LRT station is located approximately 1,000 feet west of the project site, or midway between the project site and the Diridon station. In addition, four local bus routes serve the project site directly. The project's close proximity to major transit services will provide the opportunity for multi-modal travel to and from the project site. Thus, it is reasonable to assume that tenants of the proposed office tower would utilize the transit services in the area. The City's General Plan identifies the transit commute mode split target as 20 percent or more for the year 2040. This level of transit mode share is attainable for a downtown

high-rise office development project such as this, and is a reasonable goal for the project. It is estimated that the increased transit demand generated by the proposed project could be accommodated by the current available ridership capacities of the transit services in the study area.

Parking

Note that while this traffic study evaluated traffic operations based on a project size of 718,080 s.f. of office, the current project consists of 690,328 s.f. of office. The parking analysis presented below is based on the currently proposed reduced project size.

According to the City of San Jose Downtown Zoning Regulations (Chapter 20.70, Table 20-140), the project is required to provide 1.0 off-street parking stall per 400 square feet of office space. The project is not required to provide additional off-street parking for the retail component of the project. Based on this parking ratio, the project is required to provide 1,467 off-street parking spaces as follows:

Project Parking Requirement: (690,328 SF x 85% / 1,000 SF) x 2.5 = 1,467 parking stalls

The City of San Jose has indicated that the project has an obligation to provide the adjacent property at 99 Almaden Boulevard a minimum of 136 parking stalls. This is in addition to the required parking for the project. Therefore, the project is required to provide a total of 1,603 parking stalls.

The project would provide ten parking garage levels–five above-grade and five below-grade–containing a total of 1,603 parking stalls. Thus, the proposed parking supply would meet the City's parking requirement.

The parking would consist of 931 standard stalls, 632 compact stalls, and 40 handicapped stalls (including 5 van accessible stalls). The City of San Jose allows up to forty percent of the required off-street parking to be made up of compact parking stalls. The proposed parking ratio meets this requirement.

Bicycle Parking

According to the City's Bicycle Parking Standards (Chapter 20.90, Table 20-190), the project is required to provide one bicycle parking space for every 4,000 s.f. of office. This equates to 180 bicycle parking spaces. At least 80 percent of the bicycle parking should be short-term spaces and no more than 20 percent should be long-term spaces.

Since the site is located in the Downtown Core, the project is only required to provide two short-term bicycle parking spaces and one long-term space for the retail component of the project (per Section 20.70.485).

Definition of Long-Term and Short-Term Bicycle Parking

Long-term bicycle parking facilities are secure bicycle storage facilities for tenants of a building that fully enclose and protect bicycles and may include:

- A covered, access-controlled enclosure such as a fenced and gated area with short-term bicycle parking facilities,
- An access-controlled room with short-term bicycle parking facilities, and
- Individual bicycle lockers that securely enclose one bicycle per locker.

Short-term bicycle parking facilities are accessible and usable by visitors, guests or business patrons and may include:

- Permanently anchored bicycle racks,
- Covered, lockable enclosures with permanently anchored racks for bicycles,
- Lockable bicycle rooms with permanently anchored racks, and
- Lockable, permanently anchored bicycle lockers.

Bicycle Parking Provided

The bicycle parking area would be located on the ground level between the parking garage and the north end of the office lobby. This bicycle parking area is shown to be approximately 3,500 square feet in size. Typical space required for a single bicycle parking space is 15 square feet, which means the parking area has enough room for up to approximately 235 bicycles. Therefore, it can be concluded that adequate bicycle

parking would be provided for the project. Note that an exterior bike rack capable of accommodating two bicycles should be added to the site plan.

Motorcycle Parking

According to the City's Motorcycle Parking Standards (Chapter 20.90, Table 20-250), the project should provide one motorcycle parking space for every 50 code-required vehicle space. Since the site is located in the Downtown Core, the project is not required to provide motorcycle parking spaces for the retail component of the project. This equates to 31 required motorcycle parking spaces. The site plan shows 31 motorcycle parking spaces on basement level B1. Thus, an adequate amount of motorcycle parking would be provided.

Conclusions

The traffic operations study evaluated project trip generation, vehicular site access and on-site circulation, truck access and freight loading activities, pedestrian and bicycle access and circulation, intersection operations, and parking supply and layout. Based on the site access analysis, some operational issues would occur at the east (main) project driveway as described below.

On-site vehicle queueing issues currently occur at the east project driveway, and additional trips generated by the project would increase the delay for outbound vehicles during the peak travel periods. These operational issues are typical for a development in downtown, however, where the streets frequently experience congestion, and is consistent with the vision of the Downtown Core per the City's General Plan and Downtown Strategy Plan which exempts the level of service standard within the Core.

Due to the high number of AM peak hour project trips that would be added to the east (main) project driveway, the current on-site configuration (i.e., security gate location) would not be adequate to serve the anticipated amount of inbound traffic with the project. Based on the total number of vehicles expected to enter the east project driveway during the AM peak hour of traffic, the maximum inbound vehicle queue that is estimated to occur with the addition of project trips is 18 vehicles long, or about 450 feet in length. An inbound vehicle queue of this length would spill out of the driveway and onto W. San Fernando Street. The east project driveway currently has room for 5 queued inbound vehicles. Thus, the remaining 13 inbound vehicles would queue about 225 feet to the east (westbound right-turn inbound movement) and about 100 feet to the west (eastbound left-turn inbound movement). A westbound right-turn vehicle queue of 225 feet would extend back to the Almaden Boulevard/W. San Fernando Street intersection, which would have a negative effect on traffic operations at that intersection.

The existing sidewalks and bicycle facilities along the surrounding roadways have good connectivity and provide pedestrians and bicyclists with safe routes to complementary land uses and transit facilities in the area. Note that the City's General Plan identifies both walk and bicycle commute mode split targets as 15 percent or more for the year 2040. This level of pedestrian and bicycle mode share is a reasonable goal for the project, particularly if Caltrain, LRT and bus services are utilized in combination with bicycle commuting.

Below are recommendations resulting from the traffic study.

Recommendations

- Install an approximately 175-foot long and 10-foot wide eastbound dedicated left-turn lane at the main project driveway that would extend from the mid-block crosswalk to the project driveway. Re-stripe W. San Fernando Street heading west from Almaden Boulevard to create a dedicated right-turn lane, with the buffered bike lane along the left side of the new right-turn lane. This would include the narrowing of W. San Fernando Street to a minimum 56-foot wide curb-to-curb width, with a buffered bike lane and installation of a 14-foot wide attached sidewalk along the project frontage. Sidewalk easement dedication ranging from 0.5 feet to 6.0 feet, depending on location, would be necessary to achieve this cross section.
- Install Rapid Rectangular Flashing Beacons (RRFBs) at the existing mid-block pedestrian crossing adjacent to the west project driveway.
- Remove the existing inbound security gate from its current location (midway between W. San Fernando Street and the existing parking garage) and implement one of the following two gate

improvements to improve driveway operations and reduce inbound vehicle queuing at the main project driveway:

  - Move the security gate 100 feet to the north, just south of the project parking garage entrance (which would provide twice the amount of on-site vehicle storage); *or*
  - Remove the existing security gate and install separate security gates for the project parking garage and existing parking garage.

- Provide a larger turning radius at the interface between the garage ramp and the east garage entrance to allow exiting vehicles to successfully negotiate the sharp right-turn movement from the ramp.
- Install convex mirrors on each parking level at appropriate locations to assist drivers with blind turns within the parking garage.
- Coordinate with City staff to determine if four freight loading spaces would be adequate to serve the project.
- Add an exterior bike rack capable of accommodating two bicycles.

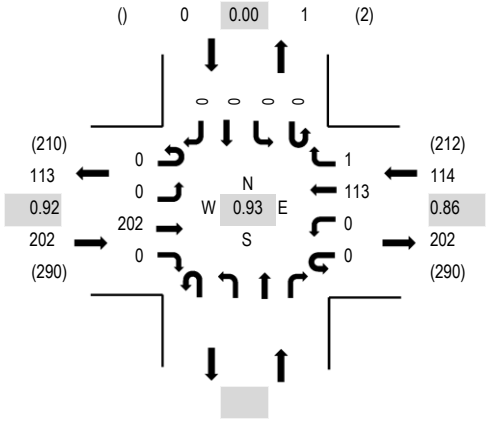
Appendix A

Pedestrian and Bicycle Counts

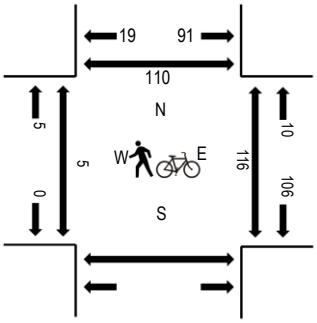
All Traffic Data Services Inc.
(303) 216-2439
www.alltrafficdata.net

Location: 1 MID BLOCK CROSSING/DWY & W SAN FERNANDO ST AM
Date and Start Time: Tuesday, March 29, 2016
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				MID BLOCK CROSSING/DWY Northbound				MID BLOCK CROSSING/DWY Southbound					Rolling Hour	Pedestrain Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South North
7:00:00 AM	0	0	11	0	0	0	8	0					0	0	0	0	19	186	0	2	5
7:15:00 AM	0	0	13	0	0	0	28	0					0	0	0	0	41	241	2	16	23
7:30:00 AM	0	0	29	0	0	0	32	1					0	0	0	0	62	285	6	30	32
7:45:00 AM	0	0	35	0	0	0	29	0					0	0	0	0	64	299	8	21	28
8:00:00 AM	0	0	41	0	0	0	33	0					0	0	0	0	74	316	0	51	55
8:15:00 AM	0	0	55	0	0	0	30	0					0	0	0	0	85		1	26	21
8:30:00 AM	0	0	53	0	0	0	23	0					0	0	0	0	76		2	22	12
8:45:00 AM	0	0	53	0	0	0	27	1					0	0	0	0	81		2	14	19

Peak Rolling Hour Flow Rates

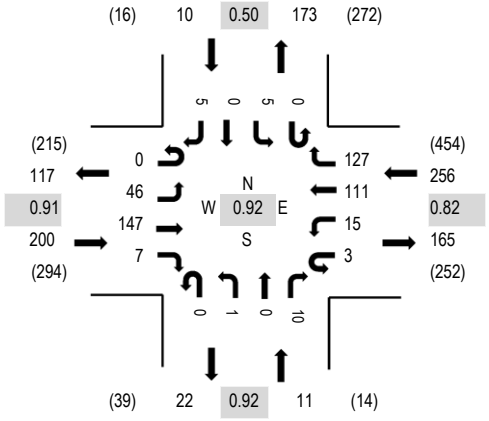
Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	0	0	0					0	0	0	0	1
Lights	0	0	174	0	0	0	96	1					0	0	0	0	271
Mediums	0	0	27	0	0	0	17	0					0	0	0	0	44
Total	0	0	202	0	0	0	113	1					0	0	0	0	316

All Traffic Data Services Inc.

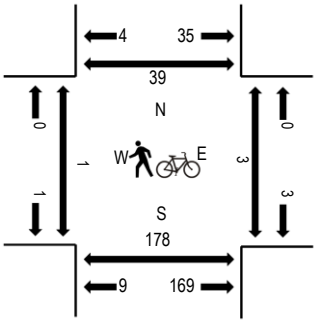
(303) 216-2439
www.alltrafficdata.net

Location: 2 PROJECT DWY & W SAN FERNANDO ST AM
Date and Start Time: Tuesday, March 29, 2016
Peak Hour: 08:00 AM - 09:00 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				PROJECT DWY Northbound				PROJECT DWY Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
7:00:00 AM	0	1	10	0	0	4	12	11	0	0	0	0	0	1	0	0	39	301	1	2	11	4
7:15:00 AM	0	3	13	0	2	3	27	18	0	0	0	0	0	0	0	1	67	391	3	2	29	7
7:30:00 AM	0	2	25	1	0	4	36	22	0	0	0	0	0	1	0	1	92	443	7	1	47	13
7:45:00 AM	0	8	30	1	1	4	20	34	0	1	0	2	0	2	0	0	103	466	5	0	37	13
8:00:00 AM	0	11	33	3	1	8	36	33	0	0	0	3	0	0	0	1	129	477	0	0	79	15
8:15:00 AM	0	16	38	1	1	1	23	34	0	1	0	2	0	1	0	1	119		0	2	42	5
8:30:00 AM	0	6	43	1	0	3	24	31	0	0	0	2	0	2	0	3	115		1	1	35	8
8:45:00 AM	0	13	33	2	1	3	28	29	0	0	0	3	0	2	0	0	114		0	0	21	11

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Lights	0	46	122	7	3	12	95	126	0	0	0	8	0	5	0	5	429
Mediums	0	0	24	0	0	3	16	1	0	1	0	2	0	0	0	0	47
Total	0	46	147	7	3	15	111	127	0	1	0	10	0	5	0	5	477

Start Date: 3/29/2016
Start Time: 7:00:00 AM
Site Code:

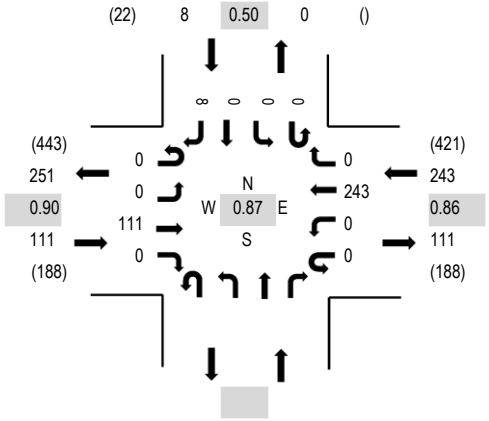
	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				MID BLOCK CROSSING Northbound				MID BLOCK CROSSING Southbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
07:00 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	2	0	0	0	6	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	2	0	0	0	9	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	6	0	0	0	9	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	8	0	0	0	6	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	7	0	0	0	2	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	3	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Peak Hour:		24				21										

All Traffic Data Services Inc.

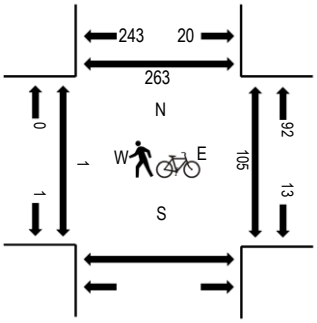
(303) 216-2439
www.alltrafficdata.net

Location: 1 MID BLOCK CROSSING/DWY & W SAN FERNANDO ST PM
Date and Start Time: Tuesday, March 29, 2016
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Peak Hour - Pedestrians/Bicycles in Crosswalk



Note: Total study counts contained in parentheses.

Traffic Counts

Interval Start Time	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				MID BLOCK CROSSING/DWY Northbound				MID BLOCK CROSSING/DWY Southbound					Rolling Hour	Pedestrain Crossings		
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00:00 PM	0	0	17	0	0	0	54	0					0	0	0	3	74	269	0	21		36
4:15:00 PM	0	0	23	0	0	0	39	0					0	0	0	3	65	299	1	16		37
4:30:00 PM	0	0	22	0	0	0	44	0					0	0	0	5	71	330	0	19		41
4:45:00 PM	0	0	15	0	0	0	41	0					0	0	0	3	59	340	0	11		33
5:00:00 PM	0	0	29	0	0	0	71	0					0	0	0	4	104	362	0	24		76
5:15:00 PM	0	0	31	0	0	0	63	0					0	0	0	2	96		0	28		76
5:30:00 PM	0	0	24	0	0	0	55	0					0	0	0	2	81		1	28		57
5:45:00 PM	0	0	27	0	0	0	54	0					0	0	0	0	81		0	18		29

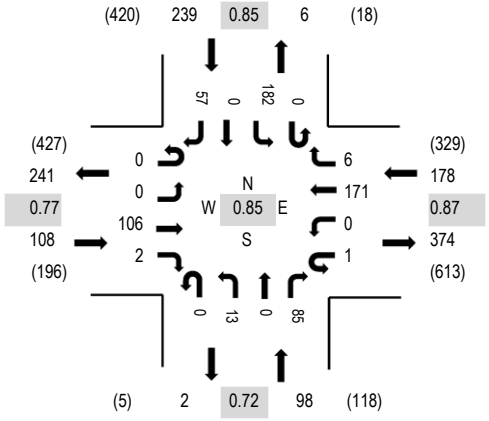
Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0					0	0	0	0	0
Lights	0	0	91	0	0	0	228	0					0	0	0	8	327
Mediums	0	0	20	0	0	0	15	0					0	0	0	0	35
Total	0	0	111	0	0	0	243	0					0	0	0	8	362

All Traffic Data
Services Inc.
(303) 216-2439
www.alltrafficdata.net

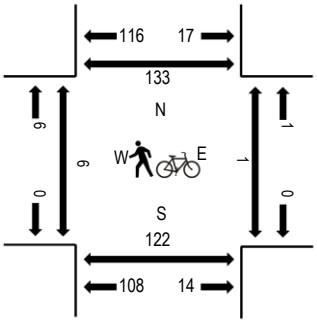
Location: 2 PROJECT DWY & W SAN FERNANDO ST PM
Date and Start Time: Tuesday, March 29, 2016
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles



Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles in Crosswalk



Traffic Counts

Interval Start Time	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				PROJECT DWY Northbound				PROJECT DWY Southbound					Rolling Hour	Pedestrain Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	Total		West	East	South	North
4:00:00 PM	0	0	18	0	3	3	34	2	0	1	0	3	0	29	0	16	109	440	0	2	20	7
4:15:00 PM	0	0	24	0	2	0	33	2	0	0	0	5	0	22	0	8	96	514	3	5	45	21
4:30:00 PM	0	0	29	0	0	0	32	7	0	0	0	4	0	36	0	16	124	593	2	0	25	10
4:45:00 PM	0	0	17	0	2	0	30	1	0	0	0	7	0	38	0	16	111	614	2	3	23	25
5:00:00 PM	0	0	34	1	0	0	48	2	0	5	0	28	0	51	0	14	183	623	3	1	29	50
5:15:00 PM	0	0	20	0	0	0	50	1	0	3	0	31	0	56	0	14	175		1	0	45	47
5:30:00 PM	0	0	27	0	1	0	33	1	0	5	0	24	0	38	0	16	145		1	0	22	26
5:45:00 PM	0	0	25	1	0	0	40	2	0	0	0	2	0	37	0	13	120		1	0	22	9

Peak Rolling Hour Flow Rates

Vehicle Type	Eastbound				Westbound				Northbound				Southbound				Total
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	
Articulated Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lights	0	0	89	2	0	0	158	5	0	13	0	85	0	181	0	57	590
Mediums	0	0	17	0	1	0	13	1	0	0	0	0	0	1	0	0	33
Total	0	0	106	2	1	0	171	6	0	13	0	85	0	182	0	57	623

Start Date: 3/29/2016
Start Time: 4:00:00 PM

	W SAN FERNANDO ST Eastbound				W SAN FERNANDO ST Westbound				MID BLOCK CROSSING Northbound				MID BLOCK CROSSING Southbound			
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds
04:00 PM	0	1	0	0	0	11	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	0	5	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	7	0	0	0	5	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	14	0	0	0	7	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
Peak Hour:		21				22										

Appendix B

Pedestrian Crosswalk Treatment Worksheet

WORKSHEET 1: PEAK-HOUR, 35 MPH (55 KM/H) OR LESS

Analyst and Site Information		
Analyst: Analysis Date: Data Collection Date: March 29, 2016	Major Street: W. San Fernando St. Minor Street or Location: Peak Hour: 8AM-9AM	
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street): a) Worksheet 1 – 35 mph (55 km/h) or less b) Worksheet 2 – exceeds 35 mph (55 km/h), communities with less than 10,000, or where major transit stop exists		
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?		Yes
Peak-hour pedestrian volume (ped/h), V_p	*2a*	121
If *2a* ≥ 20 ped/h, then go to Step 3.		
If *2a* < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.		
Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?		No
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$	*3a*	316
Minimum signal warrant volume for peak hour (use *3a* for $V_{maj\text{-}s}$), SC $SC = (0.00021\ V_{maj\text{-}s}^2 - 0.74072\ V_{maj\text{-}s} + 734.125)/0.75$ OR $[(0.00021\ 3a^2 - 0.74072\ 3a + 734.125)/0.75]$	*3b*	695
If *3b* < 133, then enter 133. If *3b* ≥ 133, then enter *3b*.	*3c*	695
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50 percent; otherwise enter *3c*.	*3d*	695
If *2a* ≥ *3d*, then the warrant has been met and a traffic signal should be considered if not within 300 ft (91 m) of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.		
Step 4: Estimate pedestrian delay.		
Pedestrian crossing distance, curb to curb (ft), L	*4a*	30
Pedestrian walking speed (ft/s), S_p	*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s	*4c*	3
Critical gap required for crossing pedestrian (s), $t_c = (L/S_p) + t_s$ OR $[(4a/4b) + 4c)]$	*4d*	11.57
Major road volume, total both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), $V_{maj\text{-}d}$	*4e*	202
Major road flow rate (veh/s), $v = V_{maj\text{-}d}/3600$ OR $[4e/3600]$	*4f*	0.056
Average pedestrian delay (s/person), $d_p = (e^{v\ tc} - v\ t_c - 1) / v$ OR $[\ (e^{4f\ x\ 4d} - 4f\ x\ 4d - 1) / 4f\ ]$	*4g*	4.71
Total pedestrian delay (h), $D_p = (d_p \times V_p)/3{,}600$ OR $[(4g \times 2a)/3600]$ (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment – assumes 0% compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.	*4h*	0.16
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.		
Expected motorist compliance at pedestrian crossings in region, Comp = high or low	*5a*	High

Total Pedestrian Delay, D_p (from *4h*) and Motorist Compliance, Comp (from *5a*)	**Treatment Category** (see Descriptions of Sample Treatments for examples)
$D_p \geq 21.3$ h (Comp = high or low) OR 5.3 h ≤ D_p < 21.3 h and Comp = low	RED
1.3 h ≤ D_p < 5.3 h (Comp = high or low) OR 5.3 h ≤ D_p < 21.3 h and Comp = high	ACTIVE OR ENHANCED
D_p < 1.3 h (Comp = high or low)	CROSSWALK

Figure A-2. Worksheet 1.

WORKSHEET 1: PEAK-HOUR, 35 MPH (55 KM/H) OR LESS

Analyst and Site Information			
Analyst: Analysis Date: Data Collection Date: March 29, 2016		Major Street: W. San Fernando St. Minor Street or Location: Peak Hour: 5 PM – 6 PM	
Step 1: Select worksheet (speed reflects posted or statutory speed limit or 85th percentile speed on the major street): a) Worksheet 1 – 35 mph (55 km/h) or less b) Worksheet 2 – exceeds 35 mph (55 km/h), communities with less than 10,000, or where major transit stop exists			
Step 2: Does the crossing meet minimum pedestrian volumes to be considered for a TCD type of treatment?			Yes
Peak-hour pedestrian volume (ped/h), V_p		*2a*	106
If *2a* ≥ 20 ped/h, then go to Step 3.			
If *2a* < 20 ped/h, then consider median refuge islands, curb extensions, traffic calming, etc. as feasible.			
Step 3: Does the crossing meet the pedestrian volume warrant for a traffic signal?			No
Major road volume, total of both approaches during peak hour (veh/h), $V_{maj\text{-}s}$		*3a*	354
Minimum signal warrant volume for peak hour (use *3a* for $V_{maj\text{-}s}$), SC $SC = (0.00021\ V_{maj\text{-}s}^2 - 0.74072\ V_{maj\text{-}s} + 734.125)/0.75$ OR $[(0.00021\ 3a^2 - 0.74072\ 3a + 734.125)/0.75]$		*3b*	980
If *3b* < 133, then enter 133. If *3b* ≥ 133, then enter *3b*.		*3c*	980
If 15th percentile crossing speed of pedestrians is less than 3.5 ft/s (1.1 m/s), then reduce *3c* by up to 50 percent; otherwise enter *3c*.		*3d*	980
If *2a* ≥ *3d*, then the warrant has been met and a traffic signal should be considered if not within 300 ft (91 m) of another traffic signal. Otherwise, the warrant has not been met. Go to Step 4.			
Step 4: Estimate pedestrian delay.			
Pedestrian crossing distance, curb to curb (ft), L		*4a*	30
Pedestrian walking speed (ft/s), S_p		*4b*	3.5
Pedestrian start-up time and end clearance time (s), t_s		*4c*	3
Critical gap required for crossing pedestrian (s), $t_c = (L/S_p) + t_s$ OR $[(4a/4b) + 4c)]$		*4d*	11.57
Major road volume, total both approaches or approach being crossed if median refuge island is present during peak hour (veh/h), $V_{maj\text{-}d}$		*4e*	243
Major road flow rate (veh/s), $v = V_{maj\text{-}d}/3600$ OR $[4e/3600]$		*4f*	0.0675
Average pedestrian delay (s/person), $d_p = (e^{v\ tc} - v\ t_c - 1) / v$ OR $[\ (e^{4f \times 4d} - 4f \times 4d - 1) / 4f\ ]$		*4g*	5.96
Total pedestrian delay (h), $D_p = (d_p \times V_p)/3{,}600$ OR $[(4g \times 2a)/3600]$ (this is estimated delay for all pedestrians crossing the major roadway without a crossing treatment – assumes 0% compliance). This calculated value can be replaced with the actual total pedestrian delay measured at the site.		*4h*	0.18
Step 5: Select treatment based upon total pedestrian delay and expected motorist compliance.			
Expected motorist compliance at pedestrian crossings in region, Comp = high or low		5a	High
Total Pedestrian Delay, D_p (from *4h*) and Motorist Compliance, Comp (from *5a*)	**Treatment Category** (see Descriptions of Sample Treatments for examples)		
$D_p \geq 21.3$ h (Comp = high or low) OR 5.3 h ≤ D_p < 21.3 h and Comp = low	RED		
1.3 h ≤ D_p < 5.3 h (Comp = high or low) OR 5.3 h ≤ D_p < 21.3 h and Comp = high	ACTIVE OR ENHANCED		
D_p < 1.3 h (Comp = high or low)	CROSSWALK		

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