HEXAGON TRANSPORTATION CONSULTANTS, INC.

Hillsdale Terraces Mixed-Use Development

Draft Traffic Impact Analysis

Prepared for:

City of San Mateo

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Executive Summary

This report presents the results of the traffic study and parking management plan for the proposed Hillsdale Terrace mixed-use project at 2700 – 2790 El Camino Real in San Mateo, CA. The project would demolish the existing on-site structures and construct a five-story structure with 13,978 square feet of commercial space on the ground floor, 74 condominiums on the upper 4 levels, and a 3-level below grade parking garage. Garage access would be provided by driveways on 27th Avenue and 28th Avenue.

The traffic study was conducted for the purpose of identifying potential traffic impacts related to the proposed development. The impacts of the project were evaluated following the standards and methodologies set forth by the City of San Mateo and the City/County Association of Governments of San Mateo County (C/CAG). Project impacts on other transportation facilities, such as bicycle facilities and transit services, were determined on the basis of engineering judgment. The study determined traffic impacts of the proposed development on 10 study intersections during the weekday AM and PM peak periods of traffic. Since it is estimated that the project would add more than 100 peak hour vehicle trips to El Camino Real (SR 85), the project applicant is required to prepare a trip reduction plan in accordance with the C/CAG trip reduction checklist.

Project Trip Estimates

Project trips associated with the proposed residential and commercial uses and are estimated based on average trip generation rates obtained from ITE *Trip Generation Manual*, 9th Edition, for Residential Condominium/Townhouse (ITE land use code 230) and High-Turnover (Sit-Down) Restaurant (ITE category 445). Although the proposed commercial space could be used for retail or office, the commercial trips were estimated using trip generation rates for high-turnover restaurants because the restaurant use would generate the highest trips among various commercial uses. The proposed project is located within the San Mateo Rail Corridor Transit-Oriented Development (TOD) Plan area. According to the development policy requirement in the TOD Plan area, a 25% trip reduction was applied to the residential component of the project.

Because the project would replace the existing occupied uses, trips associated with the existing uses were subtracted from the project-generated traffic to derive the net site-generated trips. The peak hour trips generated by the existing uses were obtained from driveway counts at existing site driveways.

After applying the appropriate trip reductions and existing site trip credits, the project would generate 2,079 new daily vehicle trips, with 176 new trips occurring during the AM peak hour (88 inbound and 88 outbound) and 162 new trips during the PM peak hour (99 inbound and 63 outbound). Table ES 1 shows the project trip generation estimates.

Table ES 1
Project Trip Generation Estimates

Land Use	Size	Unit	Daily Rate	Daily Trips	AM Peak Hour Peak Rate	AM Peak Hour Trips In	AM Peak Hour Trips Out	AM Peak Hour Total Trips	PM Peak Hour Peak Rate	PM Peak Hour Trips In	PM Peak Hour Trips Out	PM Peak Hour Total Trips
Proposed Use												
Residential Condominium [1]	74	units	5.81	430	0.44	6	27	33	0.52	25	13	38
Restaurant [2]	13.98	ksf	127.2	1,777	10.81	83	68	151	9.82	82	55	137
Proposed Total				**2,207**		**89**	**95**	**184**		**107**	**68**	**175**
Trip Reduction												
TDM Trip Reduction [3]				(108)		(1)	(7)	(8)		(6)	(3)	(9)
Existing Uses												
Existing Site Trips [4]				(20)		0	0	0		(2)	(2)	(4)
Net New Project Trips				**2,079**		**88**	**88**	**176**		**99**	**63**	**162**

Notes:
All rates are from: Institute of Transportation Engineers, *Trip Generation Manual, 9th Edition*
1. Land Use Code 230: Residential Condominium/Townhouse (average rates, expressed in trips per dwelling unit)
2. Land Use Code 932: High-Turnover (Sit-Down) Restaurant (average rates, expressed in trips per 1,000 square feet gross floor area)
3. 25% trip reduction applied to residential trips based on the goal set in the San Mateo Rail Corridor Transit-Oriental Development Plan.
4. Existing AM and PM peak hour trip credits based on 9/9/2015 driveway counts. Existing daily trips were estimated.

Intersection Level of Service Impacts

Table ES-2 summarizes the results of the intersection PM peak hour level of service analysis under the following conditions: existing (Chapter 2), background (Chapter 3), existing plus project (Chapter 4), background plus project (Chapter 4), and cumulative with project (Chapter 5) conditions. The results of the level of service calculations show that all of the study intersections would operate at mid-level of service (LOS) D or better under all conditions, which is in accordance with San Mateo LOS standards.

However, the project would, as a result of its contribution to cumulative increases in traffic, be required to pay its fair share to the City of San Mateo Traffic Impact Fee.

Impact: The project will contribute to the growth in cumulative traffic demand. Intersection improvements identified in the City of San Mateo Traffic Mitigation Report will be required to maintain intersection levels of service within the adopted standards at some intersections.

Mitigation: The project will be required to pay Traffic Impact Fees based on the cumulative traffic increase.

Vehicle Miles Traveled

In accordance with SB 743, daily VMT for projects along El Camino Real near Hillsdale Boulevard in San Mateo versus the Bay area average are presented based on the Metropolitan Transportation Commission (MTC) travel demand forecast model. For workers (http://analytics.mtc.ca.gov/foswiki/Main/VmtPerWorker), the forecasted daily VMT is 28.1 miles per worker employed in this area of San Mateo, while the Bay Area average daily VMT is 23.8 miles per worker. For households (http://analytics.mtc.ca.gov/foswiki/Main/VmtPerCapita), the forecasted daily VMT is 13.4 miles per capita lived in this area in San Mateo, while the Bay Area average daily VMT is 15.5 miles per capita. Since no standard approach or guidelines have been finalized under SB 743, the VMT presented in the report is for

informational purposes only. It is not intended to provide any indication of the transportation impacts of the project under SB 743.

Turn Pocket Queuing Analysis

The analysis of intersection levels of service was supplemented with a vehicle queuing analysis for turn lanes at intersections where the project would add substantial number of trips to the turn movements. This analysis provides a basis for estimating future storage requirements at the intersections under existing and background conditions. The following turn movements were selected for evaluation:

- El Camino Real and 27th Avenue – northbound left turn
- El Camino Real and 28th Avenue – northbound left turn

At the intersection of El Camino Real and 27th Avenue, the queuing analysis results show that northbound left turn storage would be adequate for this intersection during both AM and PM peak hours under all conditions.

At the intersection of El Camino Real and 28th Avenue, the queuing analysis results show that under existing and background conditions, the 95th percentile vehicle queue for the northbound left turn lane is equal to the storage capacity during the AM peak hour and the northbound left-turn queue would exceed the available storage by one vehicle during the PM peak hour. The project is expected to increase this queue by one vehicle during the AM and PM peak hours. Under project conditions the 95th percentile vehicle queue for the northbound left turn lane is expected to exceed the available storage by one vehicle during the AM peak hour and by two vehicles during the PM peak hour. However, based on field observations, the northbound left-turn queue was not seen to overspill the left-turn pocket during the peak hours. El Camino Real has three through lanes so the occasional car spilling out of the turn pocket would not disrupt flow in any noticeable manner. It is anticipated that the project would not create a noticeable change in vehicle queuing and Hexagon does not recommend any changes to the left-turn lane.

Unsignalized Intersection Analysis

The unsignalized intersections of Edison Street/27th Avenue and Edison Street/28th Avenue are currently under one-way stop control. The intersections of Flores Street/27th Avenue and Flores Street/28th Avenue are currently under all-way stop control. The level of service analysis at these intersection showed that all of them would operate at acceptable levels of service under all conditions. Signal warrant analyses were performed based on the peak-hour turning-movement volumes projected at these intersections. The analysis concluded that the projected peak-hour traffic volumes would not warrant signalization at any of these four intersections.

Pedestrians, Bicycles, and Transit

Pedestrian facilities in the project vicinity consist of sidewalks along all of the surrounding streets and crosswalks with pedestrian signal heads at all of the signalized intersections. The intersections of El Camino Real/27th Avenue and El Camino Real/28th Avenue do not have crosswalks on the north legs on El Camino Real. The proposed site plan shows that the project would provide a new sidewalk on the north leg of the El Camino Real/27th Avenue intersection. Overall, the existing and proposed pedestrian facilities surrounding the site are sufficient to accommodate the pedestrian traffic generated by the proposed development.

Bicycle facilities in the immediate vicinity of the project site are provided on Hacienda Street and 25th Avenue. These existing bicycle facilities are not well-connected, and do not provide immediate access to the project site. For immediate access to the project site, bicycle riders would share the road with vehicles. Both 27th Avenue and 28th Avenue are fairly low-speed and low-volume roads, but they have narrow lane widths.

The *City of San Mateo Bicycle Master Plan* adopted on October 17, 2011 has identified the City's proposed bike network within the project area. According to the Bicycle Master Plan, 28th Avenue from El Camino Real to Mason Lane, Flores Street from 31st Avenue to 25th Avenue, and Edison Street from 31st Avenue to 41st

Avenue are all proposed for Class III signed bicycle routes. Under the Bicycle Master Plan build-out scenario, the project site would have improved bicycle access.

Bus stops are conveniently located on 27th Avenue, 28th Avenue, and El Camino Real adjacent to the project site. It is expected that new transit trips generated by the project would be well-served by the existing bus lines. The Hillsdale Caltrain Station is within a half mile of the project site and according to the *Hillsdale Station Area Plan*, adopted on April 18, 2011, the station would be relocated to between 28th Avenue and 31st Avenue, which would make it much closer to the project site.

Site Access and Circulation

Site access and on-site circulation were evaluated using commonly accepted transportation planning principles. This review was based on the project site plan dated April 14, 2016. Generally, the proposed site plan would provide adequate connectivity through the site and parking areas for vehicles, bicycles, and pedestrians.

Vehicular Site Access

Vehicular access to the project site would be provided via two driveways: one is located at the northern end of the project site on 27th Avenue and the other one is located at the southern end of the project site on 28th Avenue. Both driveways at 27th Avenue and 28th Avenue would connect to the ramps to the underground garage entrance, which is located at the center of the project building.

Both driveways would be close (about 75 feet) to the intersections of El Camino Real/27th Avenue and El Camino Real/28th Avenue; therefore, vehicle queues on 27th Avenue and 28th Avenue would occasionally extend beyond and block the project driveways during red lights. Because the vehicle queues would clear once the signals turn green, vehicles exiting the project driveways would not experience too much delay and would be able to find sufficient gaps to exit the driveways.

Vehicles entering the project driveway on 27th Avenue would occasionally disrupt westbound traffic flow when the eastbound vehicle queue blocks the project driveway, and the entering vehicles would have to wait on the street until the queue is clear. The project would generate 30 and 35 inbound trips during AM and PM peak hours at the 27th Avenue driveway, which is about one car every two minutes. Given the low traffic volume on 27th Avenue and the signal cycle length (less than two minutes) at the El Camino Real/27th Avenue intersection, the entering vehicles are not expected to cause a noticeable delay increase for traffic on 27th Avenue or cause queuing issues at the project driveway.

Vehicular Onsite Circulation

According to the site plan, the project proposes three levels of below ground parking with the first level for commercial parking and the second and third levels for residential use. Both driveways at 27th Avenue and 28th Avenue would connect to the ramps to the underground garage entrance, which is located at the center of the project building. The slope of the parking garage entrance ramp would be 13%, and the slope of the garage ramps between levels would be 6%. The parking aisles typically measure 24’-0’’, which would be adequate to allow vehicles to maneuver in and out of parking spaces. Generally, the site plan shows good circulation through the parking garage

The project proposes two loading zones adjacent to each driveway along 27th Avenue and 28th Avenue, which would meet the City's requirements for loading zones.

Parking Supply and Demand

Vehicle Parking

The City of San Mateo municipal code and the Hillsdale Station Area Plan each specify parking requirements for residential and commercial developments. However, the Hillsdale Station Area Plan establishes the precedent that for zones within the plan area, the regulatory framework of the Hillsdale Station Area Plan

supersedes the General Plan/Zoning Code. Therefore, the proposed project would need to satisfy the parking requirements listed for the Hillsdale Station Area Plan.

Although the commercial space could be used as restaurant, retail, or office space, the parking requirements for the proposed commercial space were based on a restaurant use because a restaurant would generate a higher parking demand than either a retail or office use.

The Hillsdale Station Area Plan parking requirements are:

- 1.0 resident parking spaces for every one-bedroom unit
- 1.3 resident parking spaces for every two-bedroom unit
- 1.6 resident parking spaces for every three-bedroom unit
- 0.2 visitor parking spaces for every residential unit
- 4.0 parking spaces per 1,000 square feet for restaurant uses

To meet the Hillsdale Station Area Plan requirements, the project would need to provide 107 parking spaces for residential use (92 for tenants and 15 for visitors) and 56 parking spaces for the commercial (restaurant) use for a combined total of 163 spaces. The project proposes 115 parking spaces for the residential use (100 for tenants and 15 for visitors) and 56 spaces for the commercial use for a combined total of 171 spaces. Therefore, the project would satisfy the vehicle parking requirements.

Bicycle Parking

According to the City Code, the project is required to provide 7 short-term and 1 long-term bicycle parking spaces for the commercial use and 6 short-term and 89 long-term bicycle parking spaces for the residential use. The project would provide 38 short-term bicycle spaces located at the main entrance on El Camino Real. The project would provide 90 long-term bicycle parking spaces in level 2 of the underground parking garage within an enclosed room in the gated area designated for residential vehicle parking. Long term bicycle parking for commercial tenants would be provided within the commercial floor area once the tenants have been identified.

Table ES 2
Intersection Level of Service Summary

Intersection	Peak Hour	Existing Avg Delay	Existing LOS	Existing + Project Avg Delay	Existing + Project LOS	Background Avg Delay	Background LOS	Background + Project Avg Delay	Background + Project LOS	Cumulative + Project Avg Delay	Cumulative + Project LOS
Signalized Intersections:											
El Camino Real and 25th Avenue	AM	28.0	C	28.0	C	31.8	C	32.0	C	21.8	C
	PM	30.9	C	31.1	C	36.9	D	37.3	D	22.2	C
El Camino Real and 27th Avenue	AM	18.4	B	19.9	B	19.3	B	20.7	C	20.0	B
	PM	14.7	B	15.5	B	14.9	B	16.0	B	15.0	B
El Camino Real and 28th Avenue	AM	22.8	C	24.9	C	23.6	C	25.7	C	23.0	C
	PM	22.1	C	23.9	C	22.8	C	24.6	C	23.3	C
El Camino Real and 31st Avenue	AM	22.0	C	21.4	C	21.7	C	21.1	C	32.5	C
	PM	26.8	C	26.6	C	27.4	C	27.2	C	32.4	C
El Camino Real and Hillsdale Boulevard (West)	AM	26.4	C	26.5	C	26.7	C	26.8	C	41.5	D
	PM	27.1	C	27.1	C	27.4	C	27.5	C	38.5	D
El Camino Real and Hillsdale Boulevard (East)	AM	24.4	C	24.9	B	26.1	C	26.7	C	41.5	D
	PM	24.7	C	24.8	C	25.7	C	25.8	C	38.5	D
Unsignalized Intersections											
Edison Street and 27th Avenue	AM	10.2	B	10.4	B	10.4	B	10.6	B	11.1	B
(Two-way stop)	PM	9.7	A	9.9	A	9.9	A	10.0	B	10.5	B
Edison Street and 28th Avenue	AM	12.2	B	12.5	B	12.5	B	12.9	B	15.8	C
(Two-way stop)	PM	10.9	B	11.1	B	11.1	B	11.3	B	13.0	B
Flores Street and 27th Avenue	AM	8.2	A	8.3	A	8.3	A	8.4	A	8.4	A
(All-way stop)	PM	8.0	A	8.0	A	8.1	A	8.1	A	8.4	A
Flores Street and 28th Avenue	AM	8.6	A	8.8	A	8.8	A	9.0	A	9.1	A
(All-way stop)	PM	8.2	A	8.3	A	8.3	A	8.4	A	8.9	A

Notes:
For all-way stop controlled unsignalized intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.

1. Introduction

This report presents the results of the traffic study and parking management plan for the proposed Hillsdale Terrace mixed-use project at 2700 – 2790 El Camino Real in San Mateo, CA. The project would demolish the existing on-site structures and construct a five-story structure with 13,978 square feet of commercial space on the ground floor, 74 condominiums on the upper 4 levels, and a 3-level below grade parking garage. Garage access would be provided by driveways on 27th Avenue and 28th Avenue.

The location of the project site and the surrounding study area are shown on Figure 1. The proposed site plan is shown on Figure 2.

Scope of Study

The purpose of the traffic study is to identify any potential traffic impacts due to the proposed project related to traffic, circulation and safety and to recommend appropriate measures to fully mitigate or lessen the impacts. The impacts of the project were evaluated following the standards and methodologies set forth by the City of San Mateo and the City/County Association of Governments of San Mateo County (C/CAG). The C/CAG administers the San Mateo County Congestion Management Program (CMP). The traffic study includes an analysis of AM and PM peak hour traffic conditions during weekdays on the following study intersections in the vicinity of the project site. None of the study intersections are part of the CMP roadway network.

- El Camino Real and 25th Avenue
- El Camino Real and 27th Avenue
- El Camino Real and 28th Avenue
- El Camino Real and 31st Avenue
- El Camino Real and Hillsdale Boulevard (west)
- El Camino Real and Hillsdale Boulevard (east)
- Edison Street and 27th Avenue (unsignalized)
- Edison Street and 28th Avenue (unsignalized)
- Flores Street and 27th Avenue (unsignalized)
- Flores Street and 28th Avenue (unsignalized)

The C/CAG requires new development projected to add 100 or more peak-hour trips to the Congestion Management Program (CMP) roadway network to implement trip reduction measures that would reduce project peak-hour trips. In the vicinity of the project site, El Camino Real (SR 82) is part of the CMP network. Since the project would add more than 100 peak-hour trips to El Camino Real, the project applicant is required to prepare a trip reduction plan in accordance with the C/CAG trip reduction checklist.

Traffic conditions were evaluated for the following scenarios:

Scenario 1: *Existing Conditions.* Existing intersection volumes were obtained from new manual turning-movement counts conducted in 2015 while schools were in session. New traffic count data are contained in Appendix A.

Scenario 2: *Background Conditions*. Background conditions traffic volumes were estimated by adding to existing peak hour volumes to the projected volumes from approved but not yet constructed developments in the study area.

Scenario 3: *Existing Plus Project Conditions.* Existing plus project traffic volumes were estimated by adding to existing traffic volumes the trips associated with the proposed project.

Scenario 4: *Background Plus Project Conditions.* Background plus project traffic volumes were estimated by adding to background traffic volumes the trips associated with the proposed project.

Scenario 5: *2030 Cumulative Conditions.* 2030 cumulative conditions represent future traffic volumes on the future transportation network in accordance with the San Mateo General Plan. The 2030 level of service results from the San Mateo General Plan, which includes the proposed project, were used to describe operating conditions at the study intersections under cumulative conditions. For study intersections not included in the General Plan report, the 2030 forecasted volumes from the San Mateo Travel Demand Model were used to calculate the levels of service.

LEGEND

= Project Site Location

= Study Intersection

Figure 1
Site Location and Study Intersections

HEXAGON

NORTH
Not to Scale

1 SITE PLAN
1" = 20'-0"

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HILLSDALE TERRACES
2700 SOUTH EL CAMINO REAL
SAN MATEO, CA 94403

Job Number: 13090

No.	Issue	Date
1	Planning Pre-Application	11/27/2013
2	Planning Study Session	01/16/2014
3	Planning Formal Application	04/02/2015
4	Response To Plan Check	12/17/2015
5	Response To Plan Check	04/14/2016

PRINT DATE: 4/28/2016 4:46:37 PM

REGISTERED ARCHITECT — No. C 25678 — REN. 5/31/17 — STATE OF CALIFORNIA

Date: 01/14/2016
Scale: 1" = 20'-0"
Description:
SITE PLAN

Sheet Number:
A-1.0

Figure 2
Proposed Site Plan

Methodology

This section describes the methods used to determine the traffic conditions for each scenario described above. It includes descriptions of the data requirements, the analysis methodologies, and the applicable level of service standards.

Data Requirements

The data required for the analysis were obtained from field observations, new traffic counts, previous traffic studies, the City of San Mateo, and the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition. The following data were collected from these sources:

- Existing intersection volumes
- Existing lane geometries
- Signal timing and phasing
- Approved but not yet completed projects
- Applicable trip generation rates

Analysis Methodologies

Intersection Level of Service Methodologies

Traffic conditions at the study intersections were evaluated using level of service (LOS). *Level of Service* is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. The various analysis methods are described below.

This study utilizes TRAFFIX software to determine intersection level of service. The TRAFFIX software is based on the 2000 Highway Capacity Manual (HCM) methodology for signalized intersections. This method evaluates intersection operations on the basis of average control delay time for all vehicles at the intersection. This average delay can then be correlated to a level of service. Table 1 presents the level of service definitions for signalized intersections. The level of service definitions for unsignalized intersections is shown in Table 2.

For unsignalized intersections, level of service depends on the average delay experienced by vehicles on the stop-controlled approaches. Thus, for all-way stop controlled intersections, level of service is determined by the average delay for all movements through the intersection. For two-way or T-intersections, operations are defined by the average control delay experienced by vehicles entering the intersection from the stop-controlled approaches on minor streets or from left-turn approaches on major streets. For two-way or T-intersections, the level of service is reported based on the average delay for the worst approach.

Traffic Signal Warrant

For the unsignalized intersections, the analysis of level of service was supplemented with a signal warrant check. The assessment of the need for signalization was conducted using the peak-hour volume signal warrant (Warrant #3) described in the 2014 California Manual on Uniform Traffic Control Devices (CA MUTCD). This method provides an indication of whether traffic conditions and peak-hour traffic levels are, or would be, sufficient to justify installation of a traffic signal. It should be noted that it is just one of the factors/warrants used to indicate whether installation of a traffic control signal is justified.

Table 1
Signalized Intersection Level of Service Based on Average Delay

Level of Service	Description	Average Control Delay Per Vehicle (sec.)
A	Signal progression is extremely favorable. Most vehicles arrive during the green phase and do not stop at all. Short cycle lengths may also contribute to the very low vehicle delay.	10.0 or less
B	Operations characterized by good signal progression and/or short cycle lengths. More vehicles stop than with LOS A, causing higher levels of average vehicle delay.	10.1 to 20.0
C	Higher delays may result from fair signal progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though may still pass through the intersection without stopping.	20.1 to 35.0
D	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable signal progression, long cycle lenghts, or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 55.0
E	This is considered to be the limit of acceptable delay. These high delay values generally indicate poor signal progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Individual cycle failures occur frequently.	55.1 to 80.0
F	This level of delay is considered unacceptable by most drivers. This condition often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes of such delay levels.	greater than 80.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000) p10-16.

Table 2
Unsignalized Intersection Level of Service Definitions Based on Delay

Level of Service	Description	Average Delay Per Vehicle (sec.)
A	Little or no traffic delay	10.0 or less
B	Short traffic delays	10.1 to 15.0
C	Average traffic delays	15.1 to 25.0
D	Long traffic delays	25.1 to 35.0
E	Very long traffic delays	35.1 to 50.0
F	Extreme traffic delays	greater than 50.0

Source: Transportation Research Board, *2000 Highway Capacity Manual* (Washington, D.C., 2000) p17-2.

Vehicle Queuing

The queuing analysis is used to determine the appropriate storage lengths for the high demand turn lanes where the project would add substantial number of trips to these movements. Vehicle queues were estimated using a Poisson probability distribution, which estimates the probability of "n" vehicles for a vehicle movement using the following formula:

$$\text{Probability } (X=n) = \frac{\lambda^n e^{-(\lambda)}}{n!}$$

Where:

Probability (X=n) = probability of "n" vehicles in queue per lane
n = number of vehicles in the queue per lane
λ = Average number of vehicles in queue per lane (vehicles per hour per lane/signal cycles per hour)

The basis of the analysis is as follows: (1) the Poisson probability distribution is used to estimate the 95th percentile maximum number of queued vehicles per signal cycle for a particular movement; (2) the estimated maximum number of vehicles in the queue is translated into a queue length, assuming 25 feet per vehicle; and (3) the estimated maximum queue length 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.

Level of Service Standards and Significant Impact Criteria

Signalized intersections

Significance criteria are used to establish what constitutes an impact. Impacts on signalized intersections are based on the significance criteria and level of standards of the jurisdiction in which the intersection is located. For this analysis, significance criteria for impacts on signalized intersections are based on the City of San Mateo level of service standard, which is mid-LOS D (delay of 45 seconds) or better for all of the signalized study intersections.

Per the City's General Plan Policy C 2.7, all projects are required, at a minimum, to pay a transportation mitigation fee. The transportation mitigation fee is used to fund planned transportation improvements that are identified in the City of San Mateo Traffic Mitigation Program.

In addition to paying the transportation impact fee, a development project may be required to fund off-site circulation improvements which are needed as a result of project generated traffic if:

1) The acceptable level of service at the intersection (mid-level LOS D, with an average delay of more than 45 seconds) is exceeded by 4 seconds or more when the project traffic is added, and

2) An intersection that operates below its level of service standard under the base year conditions experiences an increase in delay of 4 or more seconds, and

3) The needed improvements of the intersection(s) are not funded in the applicable five-year City Capital Improvement Program from the date of application approval.

The cost of the off-site improvements may be reimbursed by the City if a reimbursement program is established throughout the timeframe of the City of San Mateo's current Traffic Mitigation Program or at the time when the improvement was initially scheduled.

Unsignalized Intersections

The City of San Mateo does not have a level of service standard for unsignalized intersections. Traffic studies typically evaluate whether unsignalized intersections are functioning adequately and whether signalization is warranted using the peak-hour volume signal warrant described in the CA MUTCD.

Report Organization

The remainder of this report is divided into five chapters. Chapter 2 describes existing conditions on the roadway network and other transportation facilities. Chapter 3 presents the roadway operations under background conditions. Chapter 4 describes the methods used to estimate the project's impact on the transportation system. Chapter 5 describes the cumulative level of service results and Chapter 6 describes non-level of service issues associated with the proposed project.

2. Existing Conditions

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

Roadway Network

Regional access to the project study area is provided by US 101 and SR 92. These facilities are described below.

US 101 is an eight-lane north/south freeway in the vicinity of the site. US 101 extends northward through San Francisco and southward through San Jose. Access to and from the project study area is provided via its interchanges at Hillsdale Boulevard and SR 92.

SR 92 is a four- to six-lane east/west freeway extending from Half Moon Bay, in west San Mateo County, to Hayward in Alameda County. SR 92 has a full interchange at El Camino Real, which serves the study area.

Local access to the project site is provided via El Camino Real, 27th Avenue, 28th Avenue, and Edison Street. These roadways are described below.

El Camino Real (SR 82) is a six-lane north-south major arterial in the vicinity of the site. El Camino Real extends from Santa Clara County through San Mateo County. There are sidewalks along both sides of the street in the vicinity of the project site. El Camino Real serves as the eastern boundary of the project site.

Hillsdale Boulevard is a two- to six-lane roadway that provides direct access to the San Mateo Shopping Center southern block. The segment of Hillsdale Boulevard adjacent to the project site has four lanes of travel. Hillsdale Boulevard is a two-lane undivided street between SR 92 and Edison Street. East of Edison Street, Hillsdale Boulevard widens to four lanes, and then widens again to six lanes east of Saratoga Drive.

27th Avenue serves as the northern boundary for the project site and provides direct access to the project site via one full access driveway. 27th Avenue is a two-lane residential street with two discontinuous segments separated by Beresford Park. One segment extends from El Camino Real in the east to Alameda de Las Pulgas in the west, while the other segment extends from the west boundary of Beresford Park to Monterey Street.

28th Avenue is a two-lane residential street that runs from 31st Avenue, across Alameda de Las Pulgas, to El Camino Real. 28th Avenue serves the southern boundary of the project site and provides direct access via one full access driveway.

Edison Street is a two-lane residential street with two discontinuous segments separated by the Hillsdale Shopping Center. One segment extends from 43rd Avenue in the south to 31st Avenue in the north, while the other segment extends from 29th Avenue to 26th Place.

Flores Street is a two-lane residential street extends from 31st Avenue in the south to 22nd Avenue in the north.

Pedestrian and Bicycle Facilities

Pedestrian facilities near the project site consist of sidewalks along El Camino Real, 27th Avenue, 28th Avenue, and Edison Street and crosswalks at all of the signalized study intersections. The intersection of El Camino Real/25th Avenue has crosswalks on three of the four legs. The intersections of El Camino Real/27th Avenue and El Camino Real/28th Avenue have crosswalks on two of the three legs. The unsignalized intersections at Edison Street/27th Avenue and Edison Street/28th Avenue do not have crosswalks. The intersection of Flores Street/27th Avenue has crosswalks on all of the four legs and the intersection of Flores Street/28th Avenue has crosswalks on the two approaches along 28th Avenue.

According to the City of San Mateo's Bicycle Master Plan adopted on October 17, 2011, the following bicycle facilities exist within the vicinity of the project site. Existing bicycle facilities are shown on Figure 3.

Class I Bicycle Path:

- Parallel to Delaware Street between 28th Avenue and Pacific Boulevard

Class II Bicycle Lanes:

- Hillsdale Boulevard between Edison Street and Laurel Creek Drive
- Delaware Street between 25th Avenue and 19th Avenue
- Pacific Boulevard between Otay Avenue and Laurie Meadows Drive

Class III Signed Bicycle Routes:

- 25th Avenue between Delaware Street and Hacienda Street
- Hacienda Street between 25th Avenue and 37th Avenue
- Pacific Boulevard between Delaware Street and Otay Avenue
- Hillsdale Boulevard between Edison Street and Norfolk Street

Transit Service

Existing transit service to the study area is provided by the San Mateo County Transit District (SamTrans) and Caltrain. These services are described below.

SamTrans Bus Service

The project site is located along El Camino Real. SamTrans operates several bus lines along this arterial as well as the local streets of 27th Avenue and 28th Avenue. In addition, there are bus stops located at the Hillsdale Shopping Center and Caltrain Hillsdale Station that are within a quarter mile of the project site. The existing SamTrans service in the project vicinity is described below and shown on Figure 4.

The 57 bus line operates on school days only with one westbound service during the AM peak hour and one eastbound service during the PM peak hour. The bus runs along 31st Avenue and Hillsdale Boulevard in the project vicinity. There are two bus stops located in the project vicinity: one at El Camino Real/31st Avenue and one at Edison Street/Hillsdale Boulevard.

The 250 bus line provides service between downtown San Mateo, the Hillsdale Shopping Center, and the College of San Mateo, via Alameda de Las Pulgas, with 30-minute headways during the AM and PM peak hours. The closest buses tip is located at Edison Street/Hillsdale Boulevard.

The 251 bus line serves the Bridgepointe Shopping Center, Foster City, San Mateo, and the Hillsdale Shopping Center, with 60-minute headways. The closest bus stop is located at the southwest corner of the intersection of El Camino Real and 31st Avenue.

The 256 bus line provides service between the Hillsdale Shopping Center and the Foster City area, with 60-minute headways. In the vicinity of the project area, Route 256 runs surrounding the Hillsdale Shopping Center along 31st Avenue, Edison Street, El Camino Real, and Hillsdale Boulevard. The closest bus stop is located at the intersection of El Camino Real and 31st Avenue.

The 294 bus line serves the Coastside region and San Mateo via Alameda de Las Pulgas during commute hours, with 90-minute to 2-hour headways, Transfers are possible at the Hillsdale Caltrain Station. There are two bus stops located in front of the project site: one on 27th Avenue and the other on 28th Avenue.

The 295 bus line provides service between the Menlo Park Caltrain Station and the San Mateo Caltrain Station via Alameda de Las Pulgas, with 30 to 60-minute headways during the weekday AM and PM commute hours. There are two bus stops located in front of the project site: one on 27th Avenue and the other on 28th Avenue.

The 397 bus line provides service between the Palo Alto Caltrain Station and the San Francisco Downtown via El Camino Real, with 60-minute headways during the mid-day service hours. The closest bus stop is located in front of the project on El Camino Real.

Route ECR, which operates only on weekends, runs about every 20 minutes along El Camino Real from the Palo Alto Transit Center to the Daly City BART Station, with a bus stop in front of the project site on El Camino Real.

Route KX provides service between Redwood City and Downtown San Francisco during the AM and PM commute hours, and stops at the Hillsdale Caltrain Station with a 60-minute headway.

Caltrain Service

Commuter rail service between San Francisco and Gilroy is provided by Caltrain. The project is located about a 2,200 foot walk north of the Hillsdale Caltrain Station. Caltrain provides service with approximately 20- to 30-minute headways during the weekday AM and PM commute hours and 60 minute headways midday, at nights and on weekends. To get from the site to and from the Caltrain Station there are sidewalks along El Camino Real. There are crosswalks with pedestrian signals at the intersections of El Camino Real with 27th Avenue, 28th Avenue, and 31st Avenue to facilitate crossing to the station. According to the *Hillsdale Station Area Plan,* adopted on April 18, 2011, the station would be relocated to be between 28th Avenue and 31st Avenue, which would make it much closer to the project site.

Lane Configurations and Traffic Volumes

The existing lane configurations at the study intersections were obtained from field observations and previous traffic impact analyses in the study area (see Figure 5). Existing traffic volumes were obtained from new manual peak-hour turning-movement counts (see Figure 6). New traffic counts are included in Appendix A.

Intersection Level of Service Analysis

The results of the intersection level of service analysis under existing conditions show that all of the signalized study intersections currently operate at acceptable levels of service during the PM peak hours of traffic (see Table 3). The level of service analysis for the unsignalized intersections is provided for informational purposes only, as the City does not have a level of service standard for unsignalized intersections. The unsignalized study intersections currently operate at LOS B or better. The level of service calculation sheets are included in Appendix C.

Table 3
Existing Intersection Level of Service Analysis

Intersection	Peak Hour	Count Date	Avg Delay	LOS
Signalized Intersections:				
El Camino Real and 25th Avenue	AM	05/20/15	28.0	C
	PM	05/20/15	30.9	C
El Camino Real and 27th Avenue	AM	05/20/15	18.4	B
	PM	05/20/15	14.7	B
El Camino Real and 28th Avenue	AM	05/20/15	22.8	C
	PM	05/20/15	22.1	C
El Camino Real and 31st Avenue	AM	05/20/15	22.0	C
	PM	05/20/15	26.8	C
El Camino Real and Hillsdale Boulevard (West)	AM	05/20/15	26.4	C
	PM	05/20/15	27.1	C
El Camino Real and Hillsdale Boulevard (East)	AM	05/20/15	24.4	C
	PM	05/20/15	24.7	C
Unsignalized Intersections				
Edison Street and 27th Avenue	AM	05/28/15	10.2	B
(Two-way stop)	PM	05/28/15	9.7	A
Edison Street and 28th Avenue	AM	05/28/15	12.2	B
(Two-way stop)	PM	05/28/15	10.9	B
Flores Street and 27th Avenue	AM	05/28/15	8.2	A
(All-way stop)	PM	05/28/15	8.0	A
Flores Street and 28th Avenue	AM	05/28/15	8.6	A
(All-way stop)	PM	05/28/15	8.2	A

Notes:
For all-way stop controlled intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.

Figure 3
Existing Bicycle Facilities

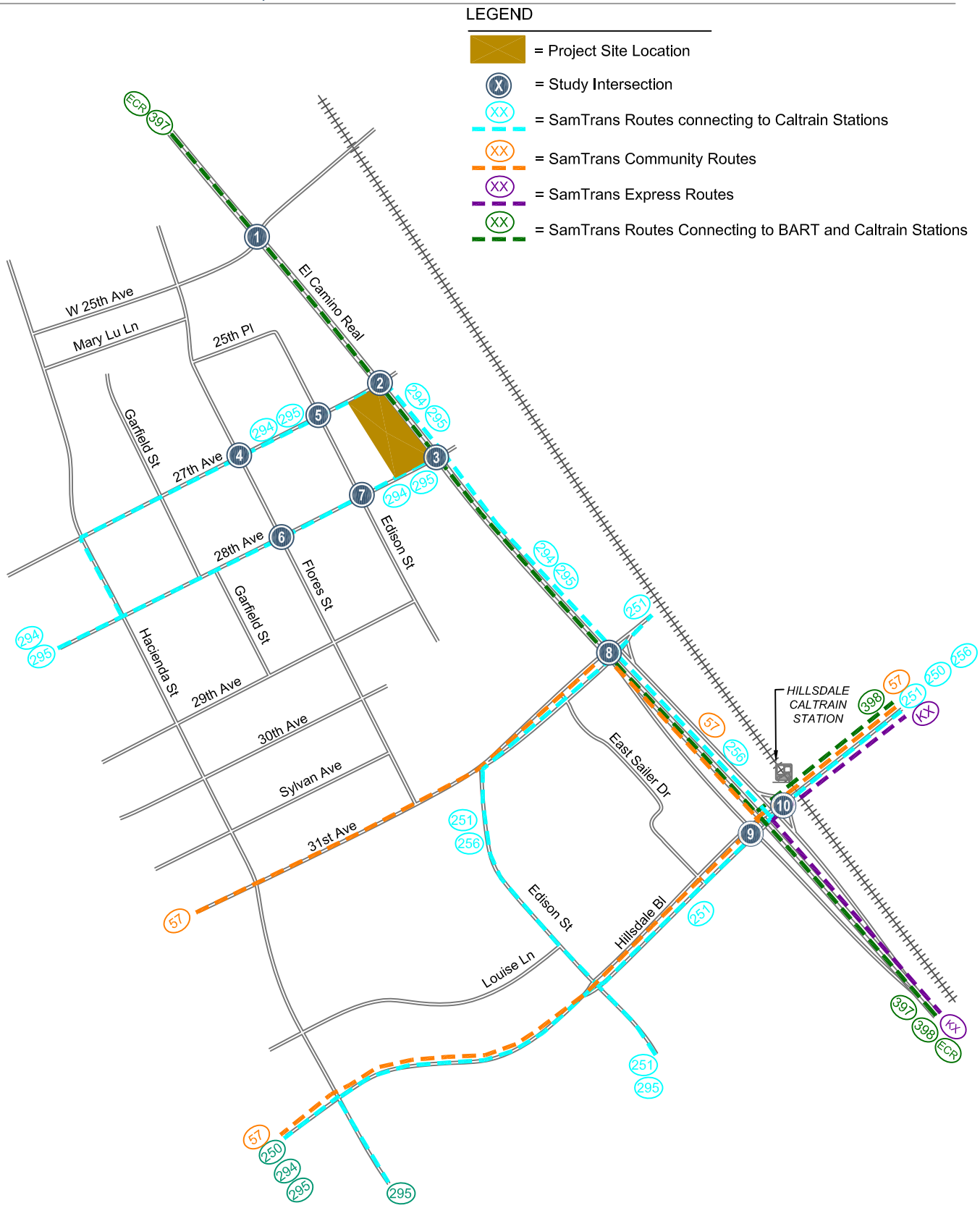


Figure 4
Existing Transit Service

NORTH
Not to Scale

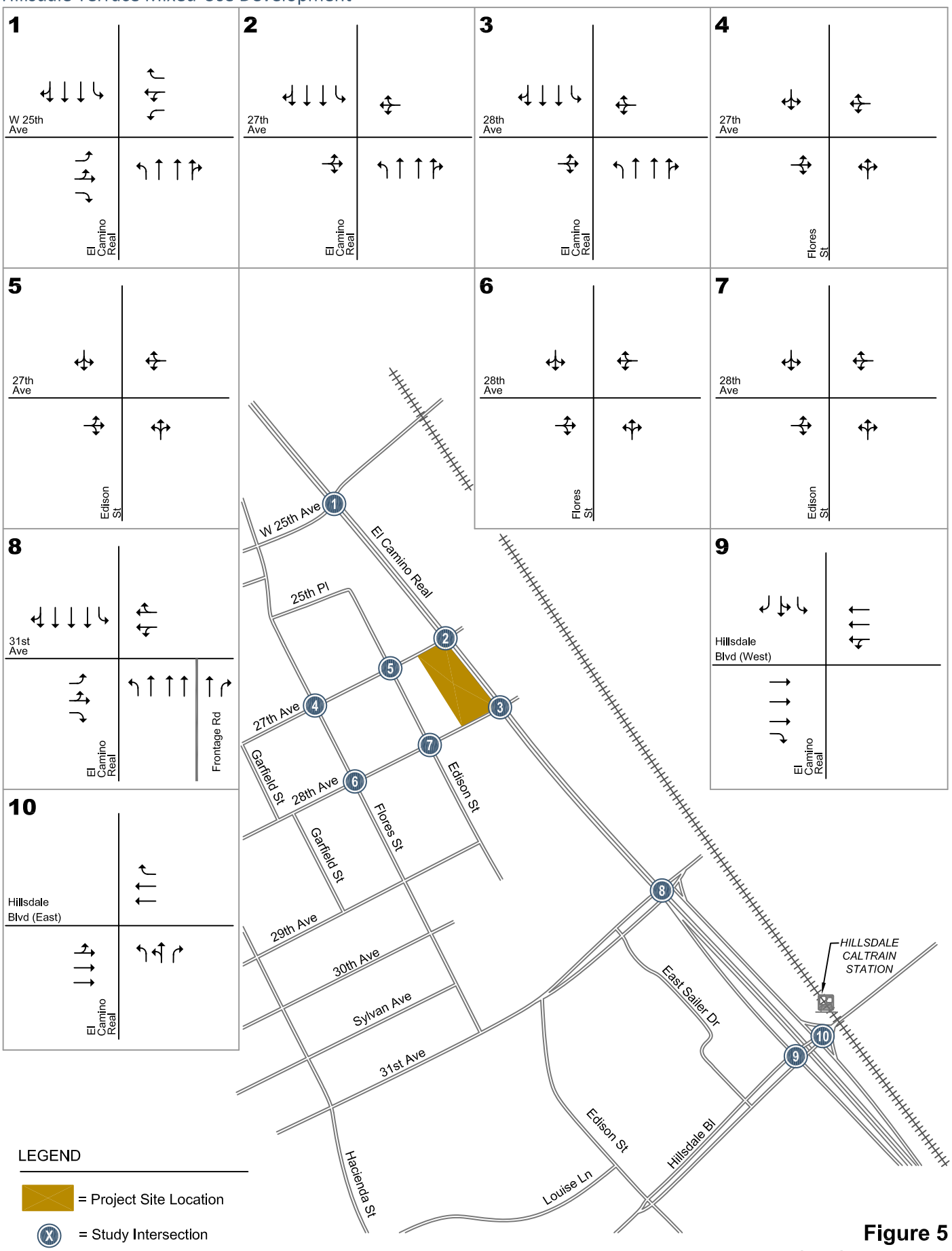


Figure 5
Existing Lane Configurations

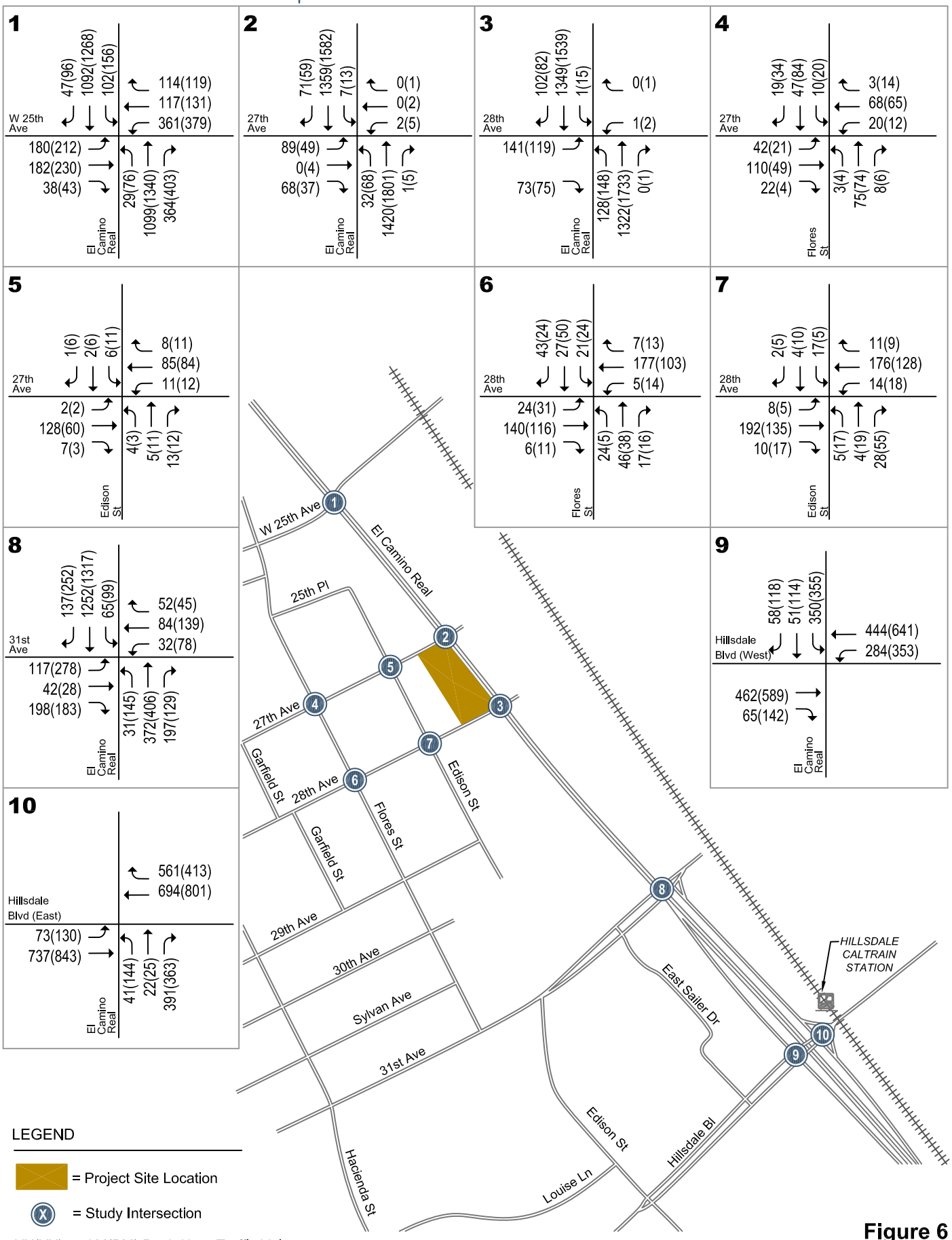


Figure 6
Existing Traffic Volumes

3. Background Conditions

This chapter describes background traffic conditions, which are defined as conditions with the addition of traffic from approved but not constructed projects in the area. Traffic volumes for background conditions comprise volumes from the existing traffic counts plus traffic generated by approved projects in the vicinity of the site. This chapter describes the procedure used to determine approved traffic volumes and the resulting traffic conditions.

Roadway Network

The roadway network under background conditions is assumed to be the same as the existing roadway network. The Railroad Corridor Plan includes the extension of 28th Avenue and 31st Avenue under the Caltrain railroad tracks to connect with Delaware Street; however, these extensions are not fully funded, so their construction cannot be assumed in the near term.

Traffic Volumes

Background traffic volumes were estimated for the project completion year by adding traffic from approved but not yet completed developments in the project area. Projects that have been approved by the City of San Mateo but that are not yet constructed or occupied could add traffic to one or more of the study intersections. The approved developments included in this study are listed below.

- Bay Meadows II Phase I: 1,250 dwelling units and 580,000 square feet of office development.
- 2000 S. Delaware Street Phase II: unoccupied 60 apartments
- Hillsdale Shopping Center North Block Redevelopment: 291,519 square feet of regional shopping center

Only Phase 1 of the Bay Meadows II development is included in the background because the remainder of the project cannot be built until the 28th Avenue and 31st Avenue extensions are built. Background conditions traffic volumes are shown on Figure 7. These approved trips are tabulated in the Volume Summary Tables in Appendix B.

Intersection Levels of Service

The results of the intersection level of service analysis under existing and background conditions are summarized in Table 4. The results show that all of the signalized study intersections would operate within the adopted level of service standard. The level of service calculation sheets are included in Appendix C.

The level of service analysis for the unsignalized intersections is provided for informational purposes only, as the City does not have a level of service standard for unsignalized intersections. The unsignalized study intersections would continue to operate at LOS B or better.

Table 4
Background Intersection Level of Service Analysis

Intersection	Peak Hour	Existing Avg Delay	Existing LOS	Background Avg Delay	Background LOS
Signalized Intersections:					
El Camino Real and 25th Avenue	AM	28.0	C	31.8	C
	PM	30.9	C	36.9	D
El Camino Real and 27th Avenue	AM	18.4	B	19.3	B
	PM	14.7	B	14.9	B
El Camino Real and 28th Avenue	AM	22.8	C	23.6	C
	PM	22.1	C	22.8	C
El Camino Real and 31st Avenue	AM	22.0	C	21.7	C
	PM	26.8	C	27.4	C
El Camino Real and Hillsdale Boulevard (West)	AM	26.4	C	26.7	C
	PM	27.1	C	27.4	C
El Camino Real and Hillsdale Boulevard (East)	AM	24.4	C	26.1	C
	PM	24.7	C	25.7	C
Unsignalized Intersections					
Edison Street and 27th Avenue	AM	10.2	B	10.4	B
(Two-way stop)	PM	9.7	A	9.9	A
Edison Street and 28th Avenue	AM	12.2	B	12.5	B
(Two-way stop)	PM	10.9	B	11.1	B
Flores Street and 27th Avenue	AM	8.2	A	8.3	A
(All-way stop)	PM	8.0	A	8.1	A
Flores Street and 28th Avenue	AM	8.6	A	8.8	A
(All-way stop)	PM	8.2	A	8.3	A

Notes:
For all-way stop controlled intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.

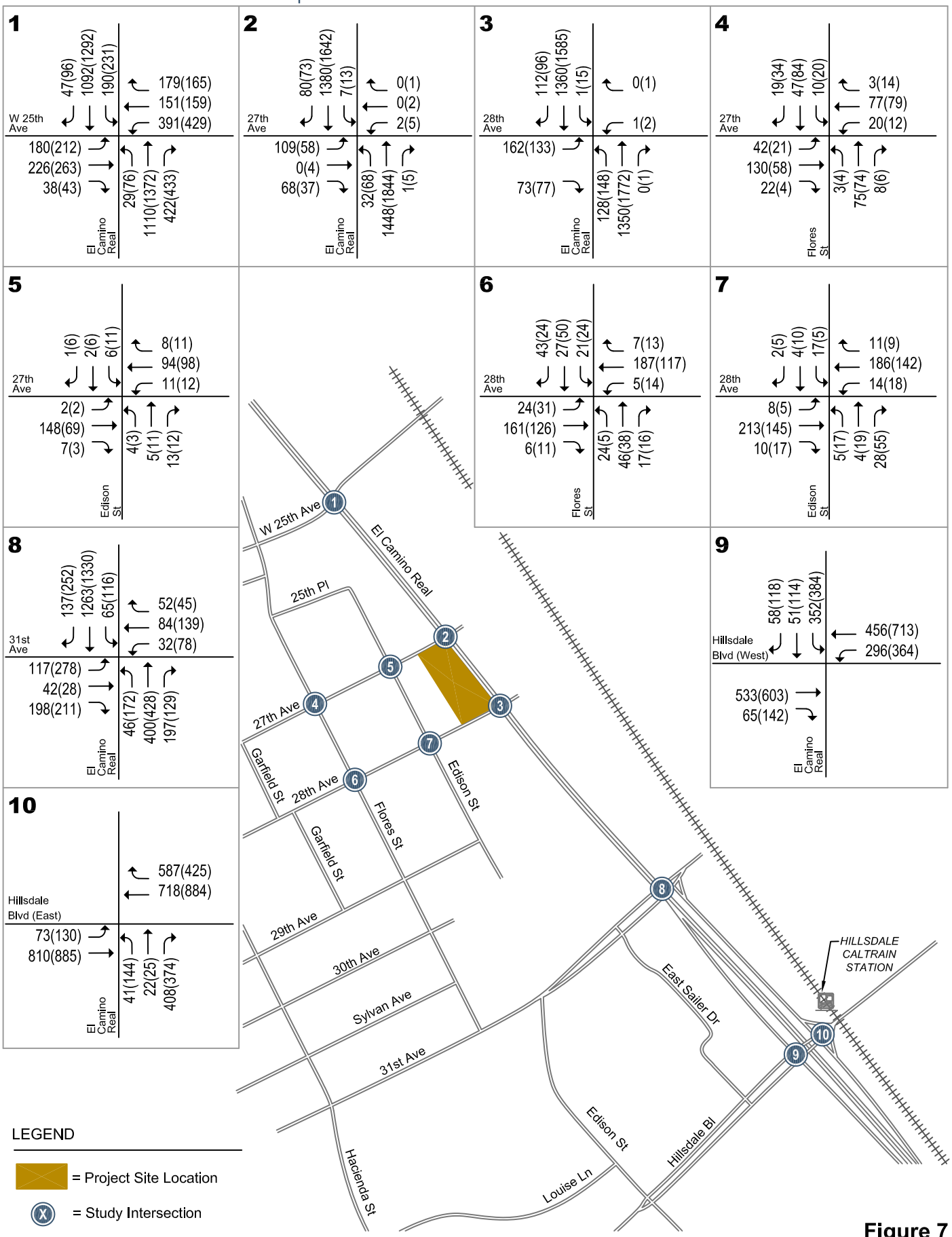


Figure 7
Background Traffic Volumes

4.
Project Traffic Conditions

This chapter describes the roadway traffic operations under existing plus project conditions and background plus project conditions, the method by which project traffic is estimated, and any impacts caused by the project. Existing plus project traffic conditions could potentially occur if the project were to be occupied prior to the other approved projects in the area. However, it is unlikely that this traffic condition would occur, since some of the other approved projects expected to add traffic to the study area would likely be built and occupied during the time the project is going through the development review process. Background plus project traffic conditions represent the more realistic traffic conditions, where the project would be occupied after the other approved projects in the area.

Roadway Network

It is assumed in this analysis that the roadway network under project conditions, including roadways and intersection lane configurations, would be the same as that described under existing conditions.

Project Trip Estimates

The magnitude of traffic produced by a new development and the locations where that traffic would appear are estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. In determining project trip generation, the magnitude of traffic entering and exiting the site is estimated for the AM and PM peak hours. As part of the project trip distribution, an estimate is made of the directions to and from which the project trips would travel. In the project trip assignment, the project trips are assigned to specific streets and intersections. These procedures are described below.

Trip Generation

Through empirical research, data have been collected that correlate trip making to building size for various land use types. For many types of land use there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The standard trip generation rates are published in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th Edition.

The project would demolish the existing on-site structures and construct a five-story structure with 13,978 square feet of commercial space and 74 condominium units. Although the proposed commercial space could be used for retail or office, the commercial trips were estimated using trip generation rates for high-turnover restaurants because the restaurant use would generate the highest trips among the various possible commercial uses.

The ITE land use types that are applicable to the proposed project are Residential Condominium/Townhouse (land use code 230) and High-Turnover (Sit-Down) Restaurant (land use code 932). Based on the ITE trip rates, it is estimated that the proposed mixed-use development would generate 2,207 daily vehicle trips, with 184 trips occurring during the AM peak hour and 175 trips during the PM peak hour (see Table 5).

Trip Reductions

The proposed project is located within the San Mateo Rail Corridor Transit-Oriented Development (TOD) Plan area. According to the development policy requirements in the TOD Plan area, a 25% trip reduction was applied to the residential component of the project. Because the project site is well served by transit options, the 25% trip reduction requirement is achievable.

Existing Uses

Because the project would replace the existing occupied uses, trips associated with the existing uses were subtracted from the project-generated traffic to derive the net site-generated trips. The AM and PM peak hour trips generated by the existing uses were obtained from driveway counts conducted on September 9, 2015 at existing site driveways.

Net Project Trips

After applying the appropriate trip reductions and existing site trip credits, the project would generate 2,079 new daily vehicle trips, with 176 new trips occurring during the AM peak hour (88 inbound and 88 outbound) and 162 new trips occurring during the PM peak hour (99 inbound and 63 outbound). Table 5 shows the project trip generation estimates.

Table 5
Project Trip Generation Estimates

					AM Peak Hour				PM Peak Hour			
Land Use	Size	Unit	Daily Rate	Daily Trips	Peak Rate	Trips In	Trips Out	Total Trips	Peak Rate	Trips In	Trips Out	Total Trips
Proposed Use												
Residential Condominium [1]	74	units	5.81	430	0.44	6	27	33	0.52	25	13	38
Restaurant [2]	13.98	ksf	127.2	1,777	10.81	83	68	151	9.82	82	55	137
Proposed Total				**2,207**		**89**	**95**	**184**		**107**	**68**	**175**
Trip Reduction												
TDM Trip Reduction [3]				(108)		(1)	(7)	(8)		(6)	(3)	(9)
Existing Uses												
Existing Site Trips [4]				(20)		0	0	0		(2)	(2)	(4)
Net New Project Trips				**2,079**		**88**	**88**	**176**		**99**	**63**	**162**

Notes:
All rates are from: Institute of Transportation Engineers, *Trip Generation Manual, 9th Edition*
1. Land Use Code 230: Residential Condominium/Townhouse (average rates, expressed in trips per dwelling unit)
2. Land Use Code 932: High-Turnover (Sit-Down) Restaurant (average rates, expressed in trips per 1,000 square feet gross floor area)
3. 25% trip reduction applied to residential trips based on the goal set in the San Mateo Rail Corridor Transit-Oriental Development Plan.
4. Existing AM and PM peak hour trip credits based on 9/9/2015 driveway counts. Existing daily trips were estimated.

Trip Distribution and Assignment

The trip distribution pattern for the project was developed based on existing travel patterns on the surrounding roadway system and the locations of complementary land uses. The peak hour vehicle trips generated by the project were assigned to the roadway network in accordance with the trip distribution pattern, with an emphasis on freeway access and project driveway locations.

Figure 8 shows the project trip distribution patterns for the residential use and Figure 9 shows net the project trip distribution patterns for the commercial use. Figure 10 shows the total net project trip assignment results.

Traffic Volumes

Project impacts were evaluated relative to both (1) existing traffic volumes and (2) background traffic volumes. For the existing plus project scenario, projected peak hour traffic volumes with the project were estimated by adding the net new trips generated by the proposed project to existing traffic volumes. For the background plus project scenario, projected peak hour traffic volumes with the project were estimated by adding the net new trips generated by the proposed project to background traffic volumes. The existing plus project and background plus project condition traffic volumes at the study intersections are shown in Figures 11 and 12, respectively.

LEGEND

= Project Site Location

= Study Intersection

Figure 8
Project Trip Distribution Patterns - Residential

NORTH
Not to Scale

LEGEND

= Project Site Location

= Study Intersection

Figure 9
Project Trip Distribution Patterns - Restaurant

NORTH
Not to Scale

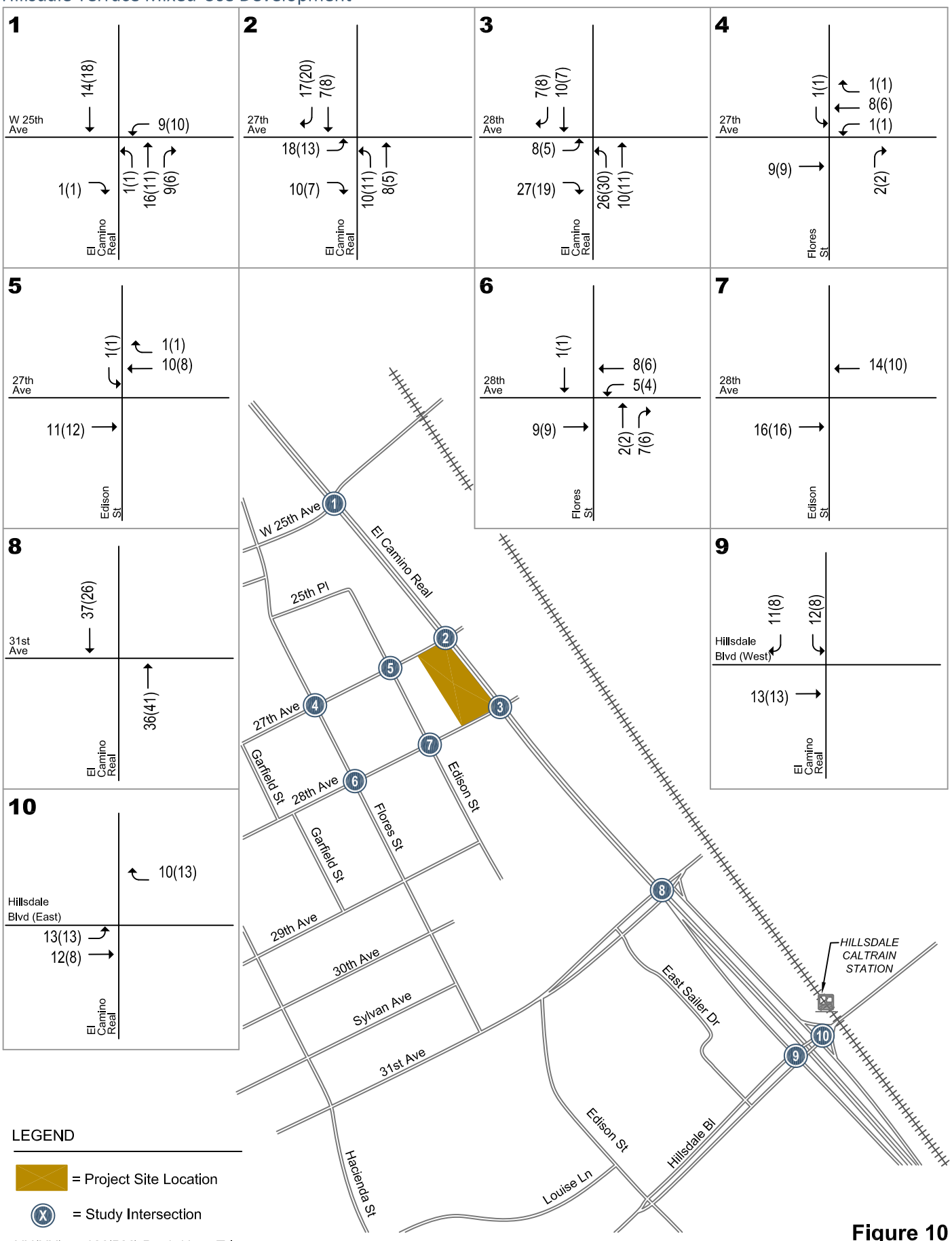


Figure 10
Project Trip Assignment

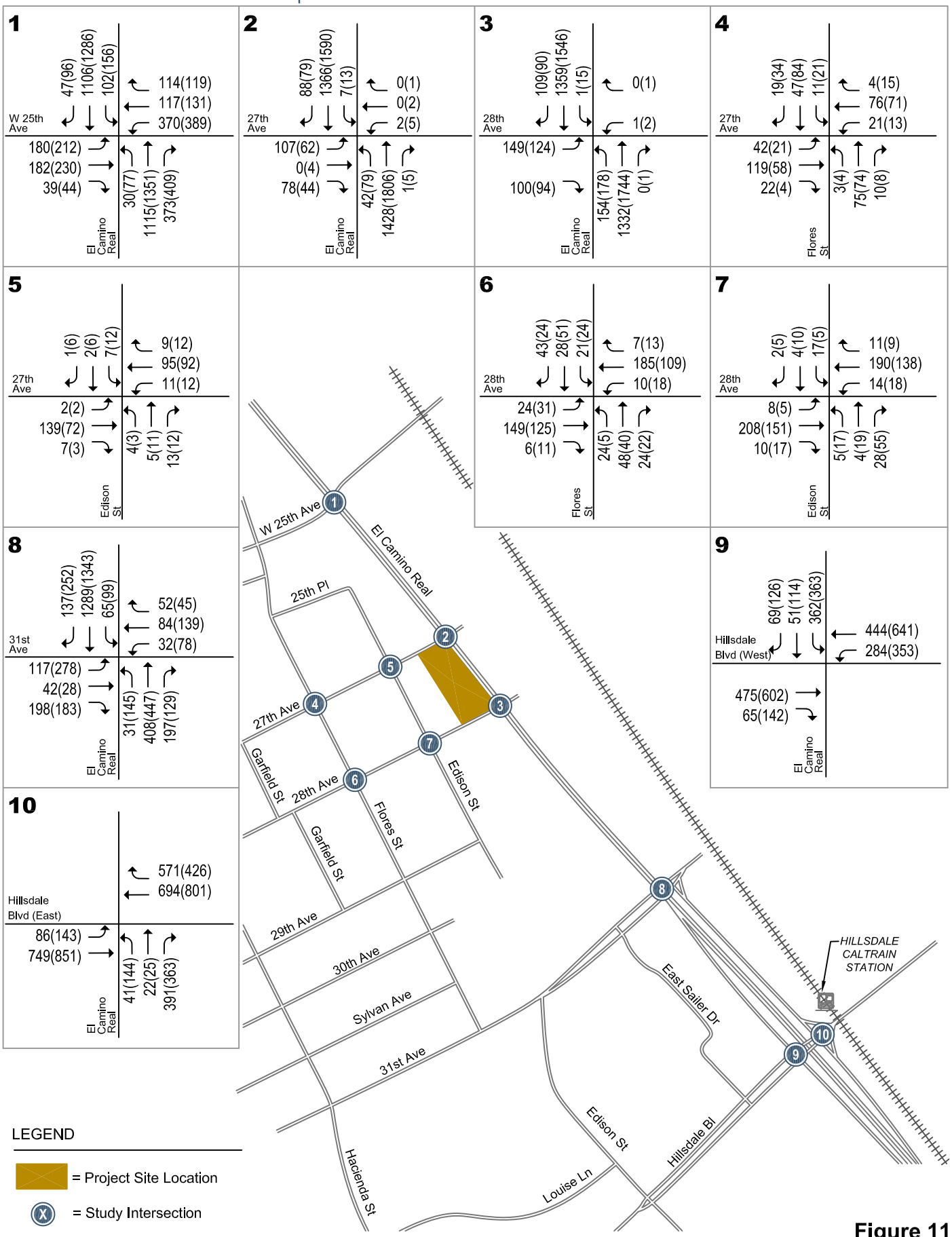


Figure 11
Existing Plus Project Traffic Volumes

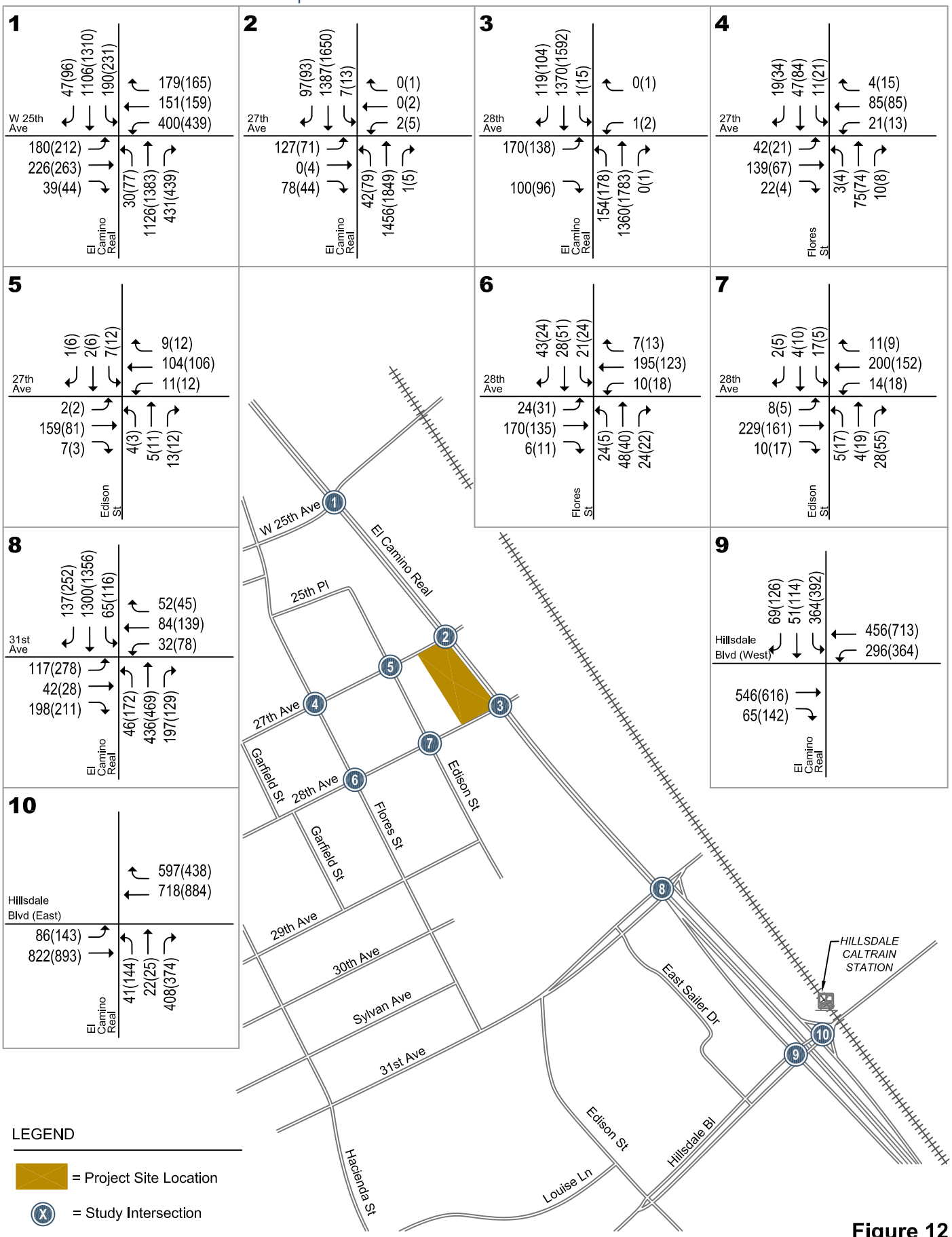


Figure 12
Background Plus Project Traffic Volumes

Intersection Level of Service Analysis

The results of the intersection level of service analysis for the (1) existing plus project and (2) background plus project scenarios are summarized in Tables 6 and 7. It should be noted that, at some study intersections, the average delay under project conditions is shown to be better than under no project conditions. This occurs because the intersection delay is a weighted average of all intersection movements. The addition of project traffic to movements with delays lower than the average intersection delay (such as right turns) can reduce the average delay for the entire intersection.

The results of the level of service analysis show that under project conditions, all of the study intersections would continue to operate at acceptable levels of service (see Chapter 1 for level of service standards and impact criteria). The level of service calculation sheets are included in Appendix C.

Table 6
Existing Plus Project Intersection Level of Service Analysis

Intersection	Peak Hour	Existing Avg Delay	Existing LOS	Existing + Project Avg Delay	Existing + Project LOS
Signalized Intersections:					
El Camino Real and 25th Avenue	AM	28.0	C	28.0	C
	PM	30.9	C	31.1	C
El Camino Real and 27th Avenue	AM	18.4	B	19.9	B
	PM	14.7	B	15.5	B
El Camino Real and 28th Avenue	AM	22.8	C	24.9	C
	PM	22.1	C	23.9	C
El Camino Real and 31st Avenue	AM	22.0	C	21.4	C
	PM	26.8	C	26.6	C
El Camino Real and Hillsdale Boulevard (West)	AM	26.4	C	26.5	C
	PM	27.1	C	27.1	C
El Camino Real and Hillsdale Boulevard (East)	AM	24.4	C	24.9	B
	PM	24.7	C	24.8	C
Unsignalized Intersections					
Edison Street and 27th Avenue	AM	10.2	B	10.4	B
(Two-way stop)	PM	9.7	A	9.9	A
Edison Street and 28th Avenue	AM	12.2	B	12.5	B
(Two-way stop)	PM	10.9	B	11.1	B
Flores Street and 27th Avenue	AM	8.2	A	8.3	A
(All-way stop)	PM	8.0	A	8.0	A
Flores Street and 28th Avenue	AM	8.6	A	8.8	A
(All-way stop)	PM	8.2	A	8.3	A

Notes:
For all-way stop controlled intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.

Table 7
Background Plus Project Intersection Level of Service Analysis

Intersection	Peak Hour	Background Avg Delay	Background LOS	Background + Project Avg Delay	Background + Project LOS
Signalized Intersections:					
El Camino Real and 25th Avenue	AM	31.8	C	32.0	C
	PM	36.9	D	37.3	D
El Camino Real and 27th Avenue	AM	19.3	B	20.7	C
	PM	14.9	B	16.0	B
El Camino Real and 28th Avenue	AM	23.6	C	25.7	C
	PM	22.8	C	24.6	C
El Camino Real and 31st Avenue	AM	21.7	C	21.1	C
	PM	27.4	C	27.2	C
El Camino Real and Hillsdale Boulevard (West)	AM	26.7	C	26.8	C
	PM	27.4	C	27.5	C
El Camino Real and Hillsdale Boulevard (East)	AM	26.1	C	26.7	C
	PM	25.7	C	25.8	C
Unsignalized Intersections					
Edison Street and 27th Avenue	AM	10.4	B	10.6	B
(Two-way stop)	PM	9.9	A	10.0	B
Edison Street and 28th Avenue	AM	12.5	B	12.9	B
(Two-way stop)	PM	11.1	B	11.3	B
Flores Street and 27th Avenue	AM	8.3	A	8.4	A
(All-way stop)	PM	8.1	A	8.1	A
Flores Street and 28th Avenue	AM	8.8	A	9.0	A
(All-way stop)	PM	8.3	A	8.4	A

Notes:
For all-way stop controlled intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.

5. Cumulative Conditions

Cumulative 2030 traffic conditions were evaluated for the AM and PM peak hours. The Hillsdale Terrace mixed-use development project is included in the 2030 General Plan forecasts.

The 2030 AM and PM peak hour level of service at the signalized study intersections, except for the intersection at 27th Avenue and El Camino Real, were obtained from the City of San Mateo General Plan 2030 model. The intersection at 27th Avenue and El Camino Real and the four unsignalized study intersections were not included in the General Plan 2030 model. The 2030 volumes for these intersections were estimated based on the 2030 forecast volumes at nearby intersections and are shown on Figure 13.

The 2030 roadway network includes the connections of 28th Avenue and 31st Avenue between El Camino Real and Delaware Street and grade separations at the Caltrain railroad tracks.

Intersection Level of Service Analysis

The intersection levels of service under 2030 Cumulative Conditions are summarized in Table 8. The level of service calculation sheets are included in Appendix C. The results show that all of the signalized study intersections would operate within the City's adopted level of service standard under 2030 conditions with the project. However, the project would, as a result of its contribution to cumulative increases in traffic, be required to pay its fair share to the City of San Mateo Traffic Impact Fee.

Impact: The project will contribute to the growth in cumulative traffic demand. Intersection improvements identified in the City of San Mateo Traffic Mitigation Report will be required to maintain intersection levels of service within the adopted standards at some intersections.

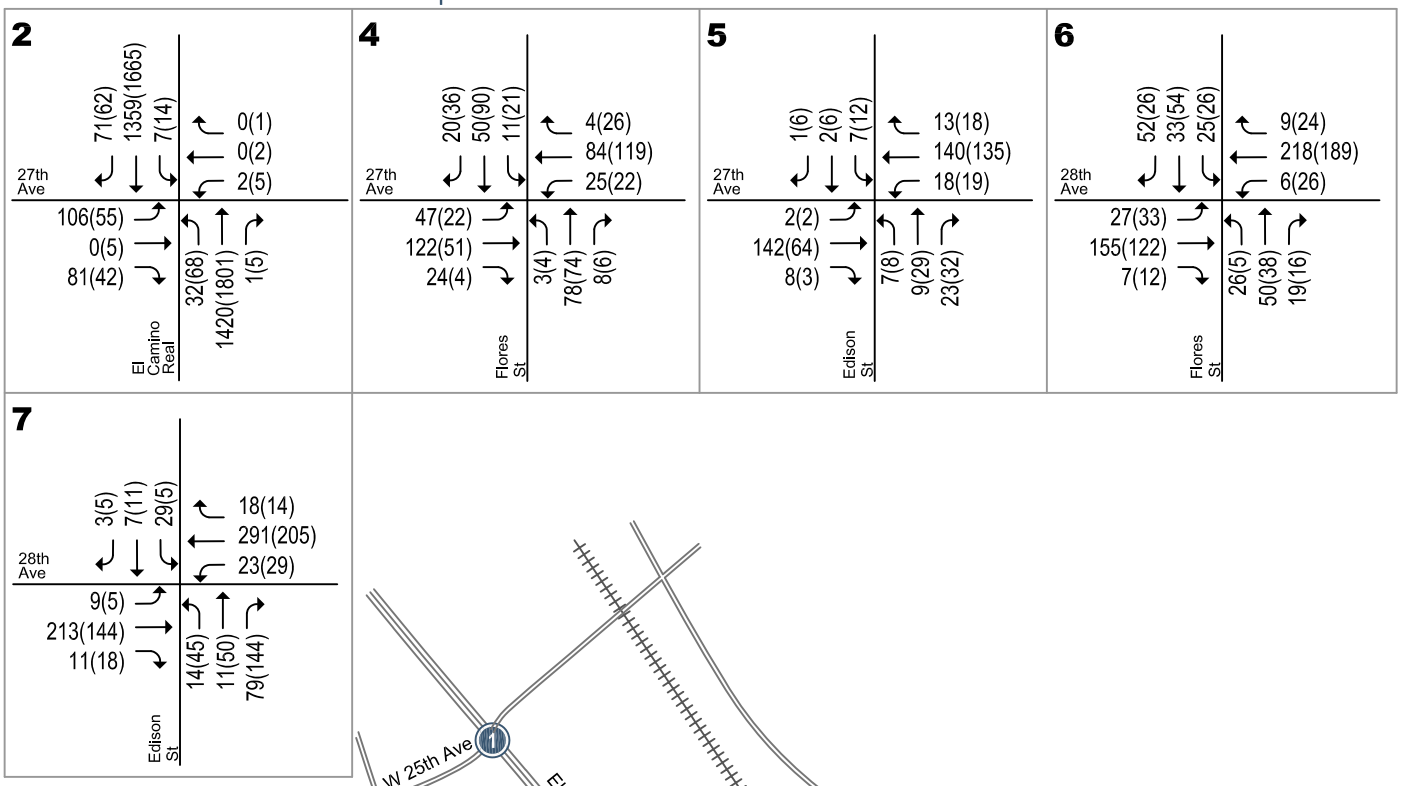
Mitigation: The project will be required to pay Traffic Impact Fees based on the cumulative traffic increase.

The level of service analysis for the unsignalized intersections is provided for informational purposes only, as the City does not have a level of service standard for unsignalized intersections. The level of service for the four-way stop-controlled intersections is the level of service based on the average delay for the intersection approaches, and for one-way stop controlled intersection, the average delay reflects the worst-case approach. The results show that the unsignalized intersections would operate at LOS C or better.

Table 8
Cumulative with Project Intersection Level of Service

Intersection	Peak Hour	Cumulative + Project Avg Delay	Cumulative + Project LOS
Signalized Intersections:			
El Camino Real and 25th Avenue	AM	21.8	C
	PM	22.2	C
El Camino Real and 27th Avenue	AM	20.0	B
	PM	15.0	B
El Camino Real and 28th Avenue	AM	23.0	C
	PM	23.3	C
El Camino Real and 31st Avenue	AM	32.5	C
	PM	32.4	C
El Camino Real and Hillsdale Boulevard (West)	AM	41.5	D
	PM	38.5	D
El Camino Real and Hillsdale Boulevard (East)	AM	41.5	D
	PM	38.5	D
Unsignalized Intersections			
Edison Street and 27th Avenue	AM	11.1	B
(Two-way stop)	PM	10.5	B
Edison Street and 28th Avenue	AM	15.8	C
(Two-way stop)	PM	13.0	B
Flores Street and 27th Avenue	AM	8.4	A
(All-way stop)	PM	8.4	A
Flores Street and 28th Avenue	AM	9.1	A
(All-way stop)	PM	8.9	A

Notes:
For all-way stop controlled intersections, LOS are based on average delay per vehicle for all movements.
For two-way stop controlled intersection, the average delay reflects the worst-case approach.



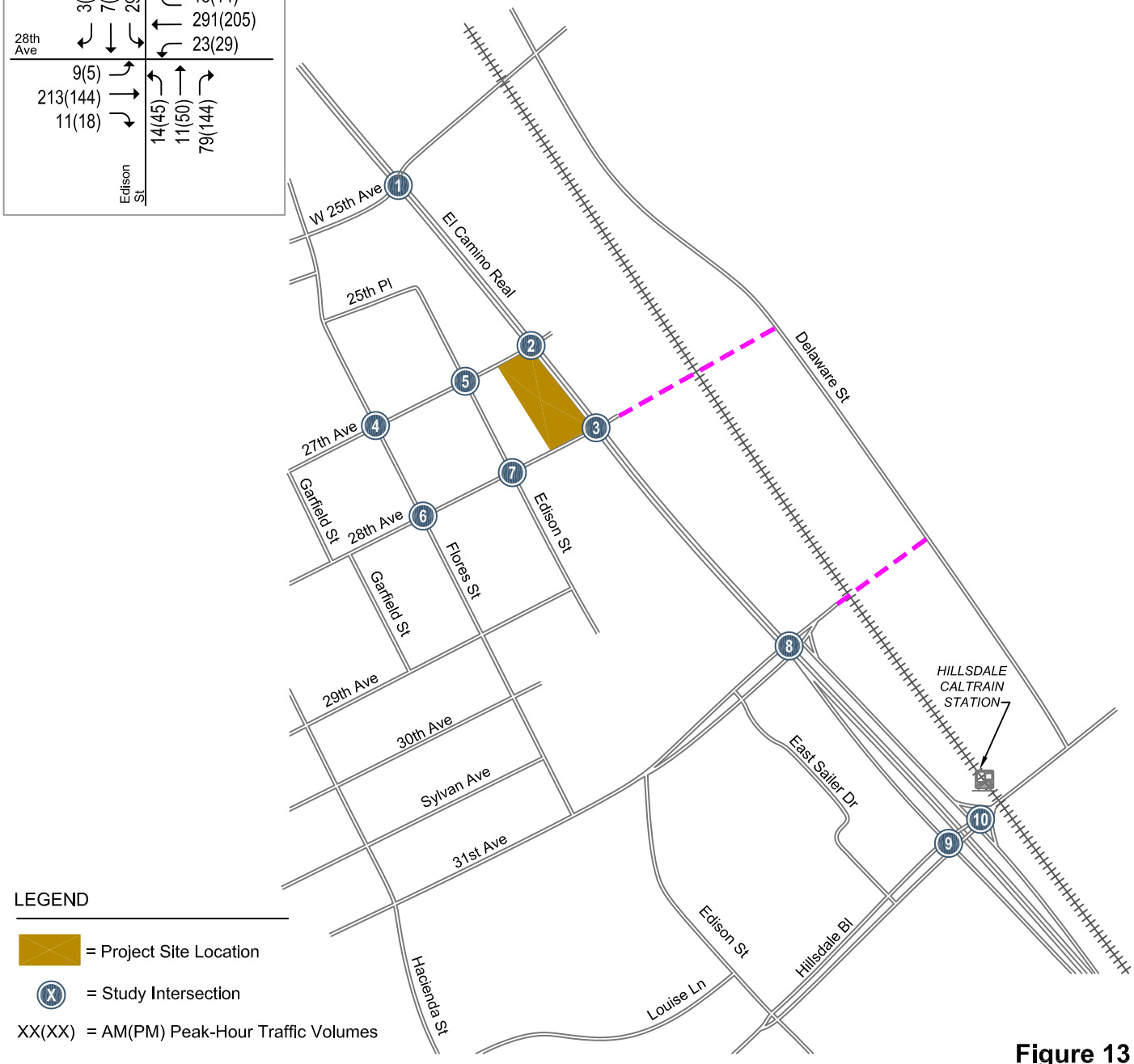


Figure 13
Cumulative Plus Project Traffic Volumes

6.
Other Transportation Issues

This chapter presents an analysis of other transportation issues associated with the proposed development including:

- Vehicle Miles Traveled
- Turn pocket queuing analysis,
- Signal warrant analysis,
- Bicycle, pedestrian and transit impact analysis,
- Site access and circulation review, and
- Parking Supply and Demand.

Unlike the level of service impact methodology, which is specified in the San Mateo General Plan, the analyses in this chapter are based on professional judgment in accordance with the standards and methods employed by the traffic engineering community.

Vehicle Miles Traveled

In accordance with SB 743, daily VMT for projects along El Camino Real near Hillsdale Boulevard in San Mateo versus the Bay area average are presented based on the Metropolitan Transportation Commission (MTC) travel demand forecast model. For workers (http://analytics.mtc.ca.gov/foswiki/Main/VmtPerWorker), the forecasted daily VMT is 28.1 miles per worker employed in this area of San Mateo, while the Bay Area average daily VMT is 23.8 miles per worker. For households (http://analytics.mtc.ca.gov/foswiki/Main/VmtPerCapita), the forecasted daily VMT is 13.4 miles per capita lived in this area in San Mateo, while the Bay Area average daily VMT is 15.5 miles per capita. Since no standard approach or guidelines have been finalized under SB 743, the VMT presented in the report is for informational purposes only. It is not intended to provide any indication of the transportation impacts of the project under SB 743.

Turn Pocket Queuing Analysis

The analysis of intersection levels of service was supplemented with a vehicle queuing analysis for turn lanes at intersections where the project would add substantial number of trips to the turn movements. This analysis provides a basis for estimating future storage requirements at the intersections under existing and background conditions. Vehicle queues were estimated using a Poisson probability distribution, described in Chapter 1. The following turn movements were selected for evaluation:

- El Camino Real and 27th Avenue – northbound left turn
- El Camino Real and 28th Avenue – northbound left turn

The results of the queuing analysis are described below, and shown in Table 9.

El Camino Real and 27th Avenue

The queuing analysis results show that northbound left turn storage would be adequate for this intersection during both AM and PM peak hours under all conditions.

El Camino Real and 28th Avenue

Under existing and background conditions, the northbound left-turn queue is equal to the storage capacity during the AM peak hour, and the 95th percentile vehicle queue for the northbound left turn lane would exceed the available storage by one vehicle during the PM peak hour. The project is expected to increase this queue by one vehicle during the AM and PM peak hours. Under project conditions the 95th percentile vehicle queue for the northbound left turn lane is expected to exceed the available storage by one vehicle during the AM peak hour and by two vehicles during the PM peak hour. However, based on field observations, the northbound left-turn queue was not seen to overspill the left-turn pocket during the peak hours. El Camino Real has three through lanes so the occasional car spilling out of the turn pocket would not disrupt flow in any noticeable manner. It is anticipated that the project would not create a noticeable change in vehicle queuing and Hexagon does not recommend any changes to the left-turn lane.

Table 9
Turn Pocket Queuing Analysis

	El Camino Real & 27th		El Camino Real & 28th	
Movement:	NBL	NBL	NBL	NBL
Peak Hour Period:	AM	PM	AM	PM
Existing				
Cycle/Delay[1] (sec)	100	100	100	100
Volume (vphpl)	32	68	128	148
Avg. Queue (veh/ln.)	0.9	1.9	3.6	4.1
Avg. Queue[2] (ft./ln)	22	47	89	103
95th %. Queue (veh/ln.)	3	4	7	8
95th %. Queue (ft./ln)	75	100	175	200
Storage (ft./ ln.)	175	175	175	175
Adequate (Y/N)	Y	Y	Y	**N**
Existing Plus Project				
Cycle/Delay[1] (sec)	100	100	100	100
Volume (vphpl)	42	79	154	178
Avg. Queue (veh/ln.)	1.2	2.2	4.3	4.9
Avg. Queue[2] (ft./ln)	29	55	107	124
95th %. Queue (veh/ln.)	3	5	8	9
95th %. Queue (ft./ln)	75	125	200	225
Storage (ft./ ln.)	175	175	175	175
Adequate (Y/N)	Y	Y	**N**	**N**
Background				
Cycle/Delay[1] (sec)	100	100	100	100
Volume (vphpl)	32	68	128	148
Avg. Queue (veh/ln.)	0.9	1.9	3.6	4.1
Avg. Queue[2] (ft./ln)	22	47	89	103
95th %. Queue (veh/ln.)	3	4	7	8
95th %. Queue (ft./ln)	75	100	175	200
Storage (ft./ ln.)	175	175	175	175
Adequate (Y/N)	Y	Y	Y	**N**
Background Plus Project				
Cycle/Delay[1] (sec)	100	100	100	100
Volume (vphpl)	42	79	154	178
Avg. Queue (veh/ln.)	1.2	2.2	4.3	4.9
Avg. Queue[2] (ft./ln)	29	55	107	124
95th %. Queue (veh/ln.)	3	5	8	9
95th %. Queue (ft./ln)	75	125	200	225
Storage (ft./ ln.)	175	175	175	175
Adequate (Y/N)	Y	Y	**N**	**N**

Notes:
[1] Vehicle queue calculations based on cycle length for signalized intersections and movement delay for unsignalized intersections.
[2] Assumes 25 feet per vehicle queued.

Signal Warrant Analysis

The unsignalized intersections of Edison Street/27th Avenue and Edison Street/28th Avenue are currently under two-way stop control. The intersections of Flores Street/27th Avenue and Flores Street/28th Avenue are currently under all-way stop control. The level of service analysis at these intersections showed that all of them would operate at acceptable levels of service under all conditions. Signal warrant analyses were performed based on the peak-hour turning-movement volumes projected at these intersections. The analysis concluded that the projected peak-hour traffic volumes would not warrant signalization at any of these four intersections.

Potential Impacts on Pedestrians, Bicycles, and Transit

Pedestrian facilities in the project vicinity consist of sidewalks along all of the surrounding streets and crosswalks with pedestrian signal heads at all of the signalized intersections. The intersections of El Camino Real/27th Avenue and El Camino Real/28th Avenue do not have crosswalks on the north legs on El Camino Real. The proposed site plan (Figure 2) shows that the project would provide a new sidewalk on the north leg of the El Camino Real/27th Avenue intersection. Overall, the existing and proposed pedestrian facilities surrounding the site are sufficient to accommodate the pedestrian traffic generated by the proposed development.

Bicycle facilities in the immediate vicinity of the project site are provided on Flores Street and 25th Avenue. These existing bicycle facilities are not well-connected, and do not provide immediate access to the project site. For immediate access to the project site, bicycle riders would share the road with vehicles. Both 27th Avenue and 28th Avenue are fairly low-speed and low-volume roads, but they have narrow lane widths.

The *City of San Mateo Bicycle Master Plan,* adopted on October 17, 2011, has identified the City's proposed bike network within the project area. According to the Bicycle Master Plan, 28th Avenue from El Camino Real to Mason Lane, Flores Street from 31st Avenue to 25th Avenue, and Edison Street from 31st Avenue to 41st Avenue are all proposed Class III signed bicycle routes. Under the Bicycle Master Plan build-out scenario, the project site would have improved bicycle access.

Bus stops are conveniently located on 27th Avenue, 28th Avenue, and El Camino Real adjacent to the project site. These bus stops serve Routes 57, 250, 251, 256, 294, 295, 397, El Camino Real, and KX. New transit trips generated by the project will be well-served by the existing bus lines.

The Hillsdale Caltrain Station is approximately a half mile from the project site. According to the *Hillsdale Station Area Plan*, adopted on April 18, 2011, the station would be relocated to between 28th Avenue and 31st Avenue. This location would be less than a quarter mile from the site, making it within walking distance for employees and residents of the project.

Site Access and Circulation

A review of the project site plan was performed to determine whether adequate site access and onsite circulation would be provided, using commonly accepted transportation planning principles and traffic engineering standards. This review was based on the site plan prepared by Costa Brown Architecture dated April 14, 2016 (shown on Figure 2 in Chapter 1). Generally, the proposed plan would provide adequate connectivity for pedestrians, bicycles, and vehicles throughout the site and parking areas.

Pedestrian and Bicycle Access and Onsite Circulation

The project would provide sidewalks along the project's frontages on El Camino Real, 27th Avenue, and 28th Avenue and curb ramps at the intersections of El Camino Real/27th Avenue and El Camino Real/28th Avenue. Within the project site, a pedestrian network would run through the center of project site between El Camino Real and the rear public space, and along the west side of the project building between 27th Avenue and 28th Avenue. The pedestrian network would provide pedestrian and bicycle access to commercial space, the residential lobby, an elevator and stairways to the parking garage, and public spaces within the site.

Vehicular Site Access

Vehicular access to the project site would be provided via two driveways: one is located at the northern end of the project site on 27th Avenue and the other one is located at the southern end of the project site on 28th Avenue. Both driveways would provide access to the underground garage.

Both driveways would be approximately 96 feet south of El Camino Real. Occasionally vehicle queues on 27th Avenue and 28th Avenue may block the project driveways during red lights. However, the vehicle queues would clear once the signals turn green, and vehicles exiting the project driveways would not experience too much delay and would be able to find sufficient gaps to exit the driveways.

Vehicles entering the project driveway on 27th Avenue would occasionally disrupt westbound traffic flow when the eastbound vehicle queue blocks the project driveway, and the entering vehicles would have to wait on the street until the queue is cleared. The project would generate 28 and 31 inbound trips during AM and PM peak hours, respectively, at the 27th Avenue driveway, which is about one car every two minutes. Given the low traffic volume on 27th Avenue and the signal cycle length (less than two minutes) at the El Camino Real/27th Avenue intersection, the entering vehicles are not expected to cause a noticeable delay increase for traffic on 27th Avenue or cause queuing issues at the project driveway.

Vehicular Onsite Circulation

According to the site plan, the project proposes three levels of below ground parking with the first level for commercial parking and the second and third levels for residential use. Both driveways at 27th Avenue and 28th Avenue would connect to the ramps to the underground garage entrance, which is located at the center of the project building. The slope of the parking garage entrance ramp would be 13%, and the slope of the garage ramps between levels would be 6%. The parking aisles typically measure 24'-0'', which would be adequate to allow vehicles to maneuver in and out of parking spaces. Generally, the site plan shows good circulation through the parking garage

The project proposes two loading zones adjacent to each driveway along 27th Avenue and 28th Avenue, which would meet the City's requirements for loading zones.

Parking Requirements and Supply

Proposed Project Parking

The proposed project would create a 3-level below grade parking garage that would contain the majority of the parking supply. The below grade garage would have 169 spaces, while the ground level would have two spaces. The garage parking supply would have 100 residential spaces, 54 commercial spaces, and 15 visitor spaces. The parking supply would include 17 fuel efficient vehicle spaces and 13 accessible spaces. The proposed parking by type and location is shown in Table 10.

Table 10
Proposed Project Parking Supply

	Residential			Commercial			Visitor		Total
Location [1]	Standard	Accessible	Fuel Efficent	Standard	Accessible	Fuel Efficent	Standard	Accessible	
Ground Level [2]	0	0	0	2	0	0	0	0	**2**
Parking Level A	0	0	0	44	4	6	8	1	**63**
Parking Level B	29	4	6	0	0	0	5	1	**45**
Parking Level C	53	3	5	0	0	0	0	0	**61**
Total	**82**	**7**	**11**	**46**	**4**	**6**	**13**	**2**	**171**

[1] Based on plans from Costa Brown Architecture dated for April 14, 2016, Level A is the top floor of the parking garage, Level B is the middle, and Level C is the bottom.

[2] Parking for Ground Level does not include the two loading zone areas.

Vehicle Parking Requirements

The City of San Mateo municipal code and the Hillsdale Station Area Plan each specify parking requirements for residential and commercial development. However, the Hillsdale Station Area Plan establishes the precedent that for zones within the plan area, the regulatory framework of the Hillsdale Station Area Plan supersedes the General Plan/Zoning Code. Therefore, the proposed project would need to satisfy the parking requirements listed for the Hillsdale Station Area Plan.

Although the commercial space could be used as restaurant, retail, or office space, the parking requirements for the proposed commercial space were based on a restaurant use because a restaurant would generate a higher parking demand than either a retail or office use.

The Hillsdale Station Area Plan parking requirements are:

- 1.0 resident parking spaces for every one-bedroom unit
- 1.3 resident parking spaces for every two-bedroom unit
- 1.6 resident parking spaces for every three-bedroom unit
- 0.2 visitor parking spaces for every residential unit
- 4.0 parking spaces per 1,000 square feet for restaurant uses

To meet the Hillsdale Station Area Plan requirements, the project would need to provide 107 parking spaces for residential use (92 for tenants and 15 for visitors) and 56 parking spaces for the commercial (restaurant) use for a combined total of 163 spaces. The project proposes 115 parking spaces for the residential use (100 for tenants and 15 for visitors) and 56 spaces for the commercial use for a combined total of 171 spaces. Therefore, the project would satisfy the vehicle parking requirements. The vehicle parking requirements are summarized in Table 11.

Table 11
Parking Requirements

			Parking Ratios[1]			Required Spaces		
Use	Size	Units	Commercial	Residential Visitor	Residential Gated	Commercial	Residential Visitor	Residential Gated
Commercial (assume restaurant)	13,978	s.f.	4 per 1,000 s.f.			55.9		
Residential - 1 Bedroom Units	22	units		1 per unit	0.2 per unit		14.8	22
Residential - 2 Bedroom Units	44	units		1.3 per unit	0.2 per unit			57.2
Residential - 3 Bedroom Units	8	units		1.6 per unit	0.2 per unit			12.8
Subtotal[2]						*56*	*15*	*92*
Grand Total							**163**	

[1] Parking ratios based on Hillsdale Station Area Plan requirements from Table 6-1.

[2] Required spaces values are rounded up to get subtotal parking, per San Mateo Municipal Code 27.64.110, when computation results in "a fractional space, an additional space is required."

Bicycle Parking

The Municipal Code Section 27.64.262 specifies the required short-term and long-term bicycle parking spaces for various land uses. Based on the code, each long-term bicycle parking space should consist of a locker or a rack located within a locked enclosure providing protection for each bicycle from theft, vandalism, and weather. Short-term bicycle parking must be along the project frontage and within 50 feet of the main entrance to the building or commercial use.

For commercial use, the City Code requires 1 short-term parking space per 2,000 s.f. and 1 long-term parking space per 12,000 s.f. for retail stores. This yields a minimum requirement of 7 short-term and 1 long-term parking spaces.

For residential use, the City Code requires 0.05 short-term and 1 long-term space per one-bedroom unit, 0.10 short-term and 1.25 long-term spaces per two-bedroom unit, and 0.15 short-term and 1.5 long-term spaces per three-bedroom unit. This yields a minimum requirement of 6 short-term and 90 long-term parking spaces.

The project would provide 38 short-term bicycle spaces located at the main entrance on El Camino Real. The project would provide 90 long-term bicycle parking spaces in Level B of the underground parking garage within an enclosed room in the gated area designated for residential vehicle parking. Long term bicycle parking for commercial tenants would be provided within the commercial floor area once the tenants have been identified.