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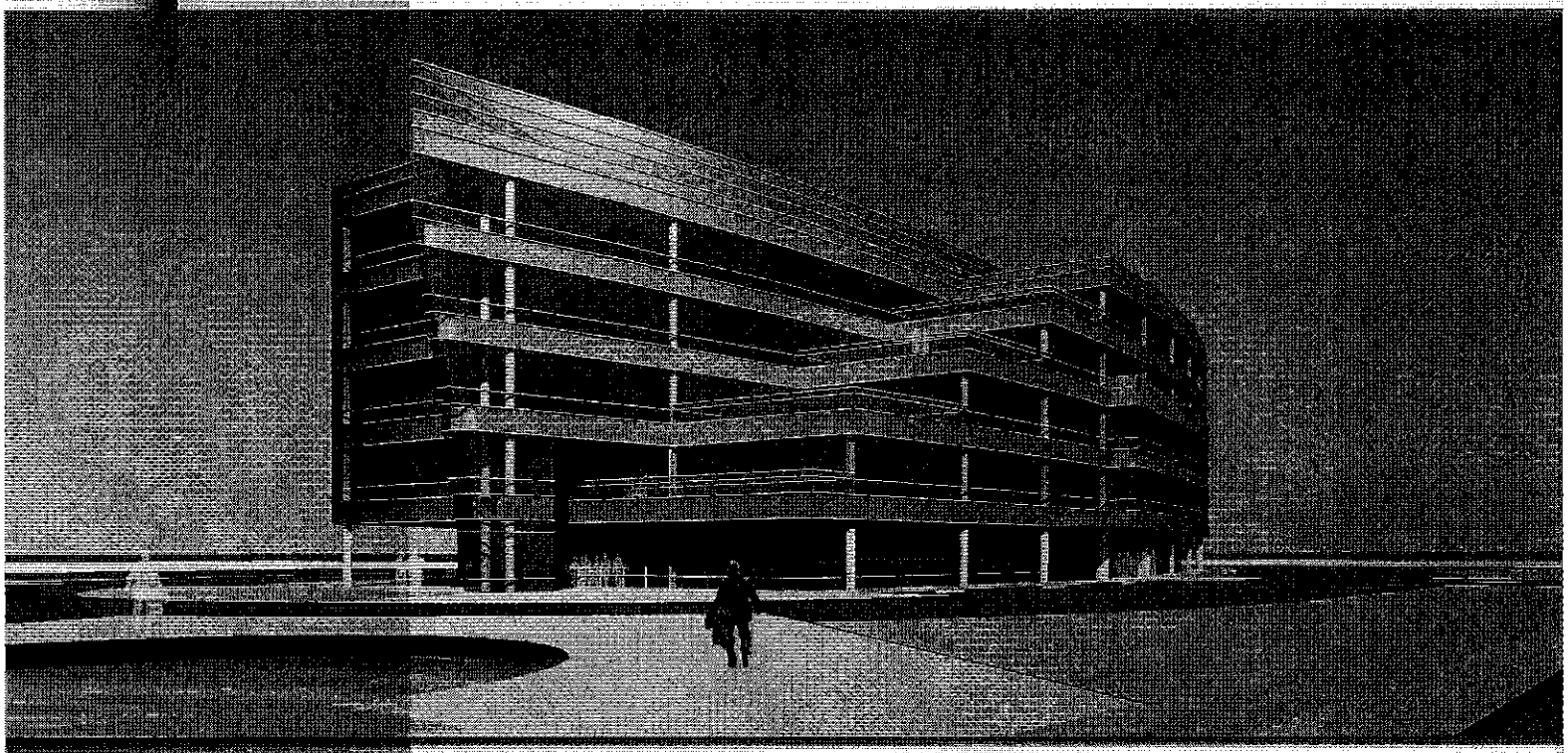
Transportation Demand Management (TDM) Plan
580 N. Mary Avenue
Sunnyvale, California



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CHAPTER 1. INTRODUCTION

This report presents the Transportation Demand Management (TDM) plan for the office development located at 580 N. Mary Avenue in Sunnyvale, CA. The proposed building size results in a Floor Area Ratio (FAR) for the site of 55 percent, where 35 percent is allowed. FAR represents the total floor area of the building compared to the size of the site (area). Certain developments in excess of 35 percent FAR require approval of a Use Permit. To achieve City Council approval for the density bonus, this project must demonstrate that it meets 26 review criteria, including providing a TDM plan.

PURPOSE OF THE TDM PLAN

The purpose of this TDM plan is to reduce the number of vehicle trips generated by the site. It contains a number of measures and strategies that encourage the use of alternative modes of travel such as transit, ridesharing (carpooling and vanpooling), bicycling, and walking. It may also contain measures that eliminate trips to the site such as telecommuting. The specific trip reduction goal of the plan is described in a subsequent section.

PROJECT DESCRIPTION

The project site is located at 580 N. Mary Avenue at the corner of W. Maude Avenue and contains 5.18 acres, or 225,640 square feet (sf). A site location map is shown on **Figure 1**. A US Post Office is currently operating at the project site. A previous study indicated that there would be no change in the number of trips generated during the AM peak hour and approximately half the number of trips generated during the PM peak hour with the proposed land use modifications. Therefore, the project will reduce PM peak hour demand on the surrounding transportation network.

The proposed project will include one building for general office use that will contain 124,000 sf representing a FAR of 55 percent. The site contains 424 parking spaces and 9 handicapped accessible spaces. It also contains 16 bike lockers and bike racks for 6 bicycles providing parking for 22 bicycles. The proposed site plan is shown on **Figure 2**.

TRIP GENERATION ESTIMATES

The purpose of the vehicular trip generation estimates is to determine the number of vehicle trips entering and exiting the site for a variety of purposes (employee trips, visitor trips, deliveries, etc.) during a selected time period. The amount of traffic was estimated using rates published in Institute of Transportation Engineers' (ITE), *Trip Generation,* 8th Edition (2008).

Trip estimates were prepared for the proposed building size (124,000 sf with an FAR of 55 percent) and for buildings sizes representing 35 percent FAR (79,000 sf) and 45 percent FAR (101,500 sf). The results are presented in **Table 1**. The proposed project is estimated to generate approximately 220 AM peak hour trips and 215 PM peak hour trips.

TRIP REDUCTION GOALS

The purpose of this TDM plan is to offer a reduction equivalent to the trip difference between 35 and 55 percent FAR with a minimum reduction goal equivalent to the trip difference between 35 and 45 percent FAR. The reduction goal of the program is a 27 percent reduction based on the average AM and PM peak hour trip estimates. The minimum reduction goal of the program is a 16 percent reduction based on the average for the AM and PM peak hour trip estimates.

TABLE 1
TRIP GENERATION – 580 N. MARY AVENUE

Land Use	ITE Code	Units[1]	Daily		AM Peak Hour				PM Peak Hour			
			Rate[2]	Trips	Rate[2]	In	Out	Total	Rate[2]	In	Out	Total
Proposed 55% FAR	710	124 ksf	12.69	1,574	1.8	196	27	223	1.76	37	181	218
2% Major Bus Stop Reduction				*31*		*4*	*0*	*4*		*1*	*3*	*4*
Vehicle Trips (A)				*1,543*		*192*	*27*	*219*		*36*	*178*	*214*
45% FAR	710	101.5 ksf	13.29	1,349	1.87	167	23	190	1.89	33	159	192
2% Major Bus Stop Reduction				*27*		*4*	*0*	*4*		*1*	*3*	*4*
Vehicle Trips (B)				*1,322*		*163*	*23*	*186*		*32*	*156*	*188*
35% FAR	710	79 ksf	14.09	1,113	1.96	136	19	155	2.11	28	139	167
2% Major Bus Stop Reduction				*22*		*3*	*0*	*3*		*1*	*2*	*3*
Vehicle Trips (C)				*1,091*		*133*	*19*	*152*		*27*	*137*	*164*
35% to 55% FAR Target TDM Reduction Goal (D) where D = A – C				**452**		**59**	**8**	**67**		**9**	**41**	**50**
35% to 45% FAR Target TDM Reduction Goal (E) where E = B – C				**231**		**30**	**4**	**34**		**5**	**19**	**24**

Notes:

1. ksf = 1,000 square feet
2. Rate per ksf
3. Following ITE trip generation equations used (ITE Code 710 - General Office Building, 8th Edition):

   AM: Ln (T) = 0.80 Ln (X) + 1.55; Enter = 88%, Exit = 12%

   PM: T = 1.12 * (X) + 78.81; Enter = 17%, Exit = 83%

   Where X = 1,000 square feet of floor area, T = number of vehicle trips, Ln = natural log

Sources: *Trip Generation Manual* (8th Edition), ITE, 2008

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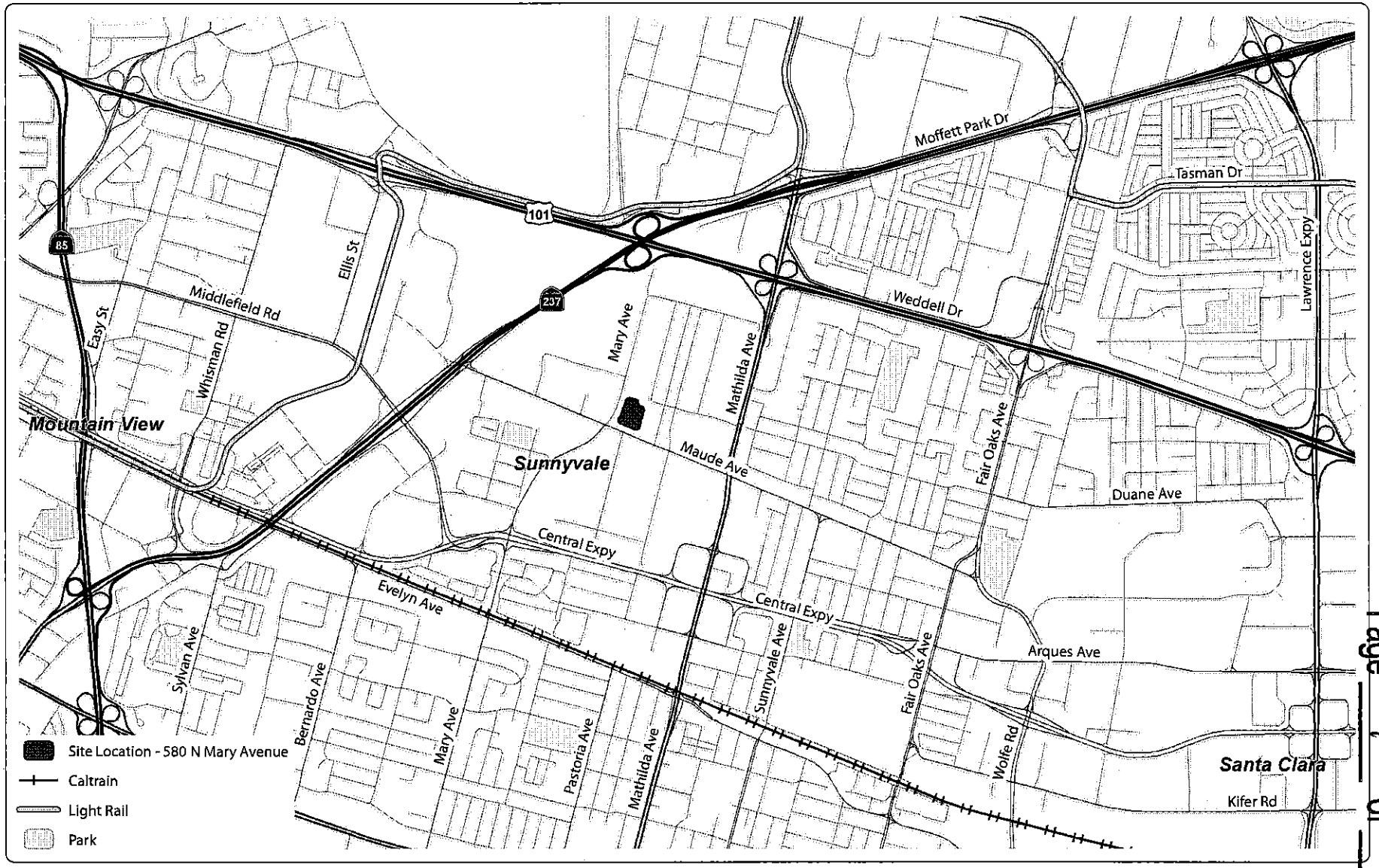

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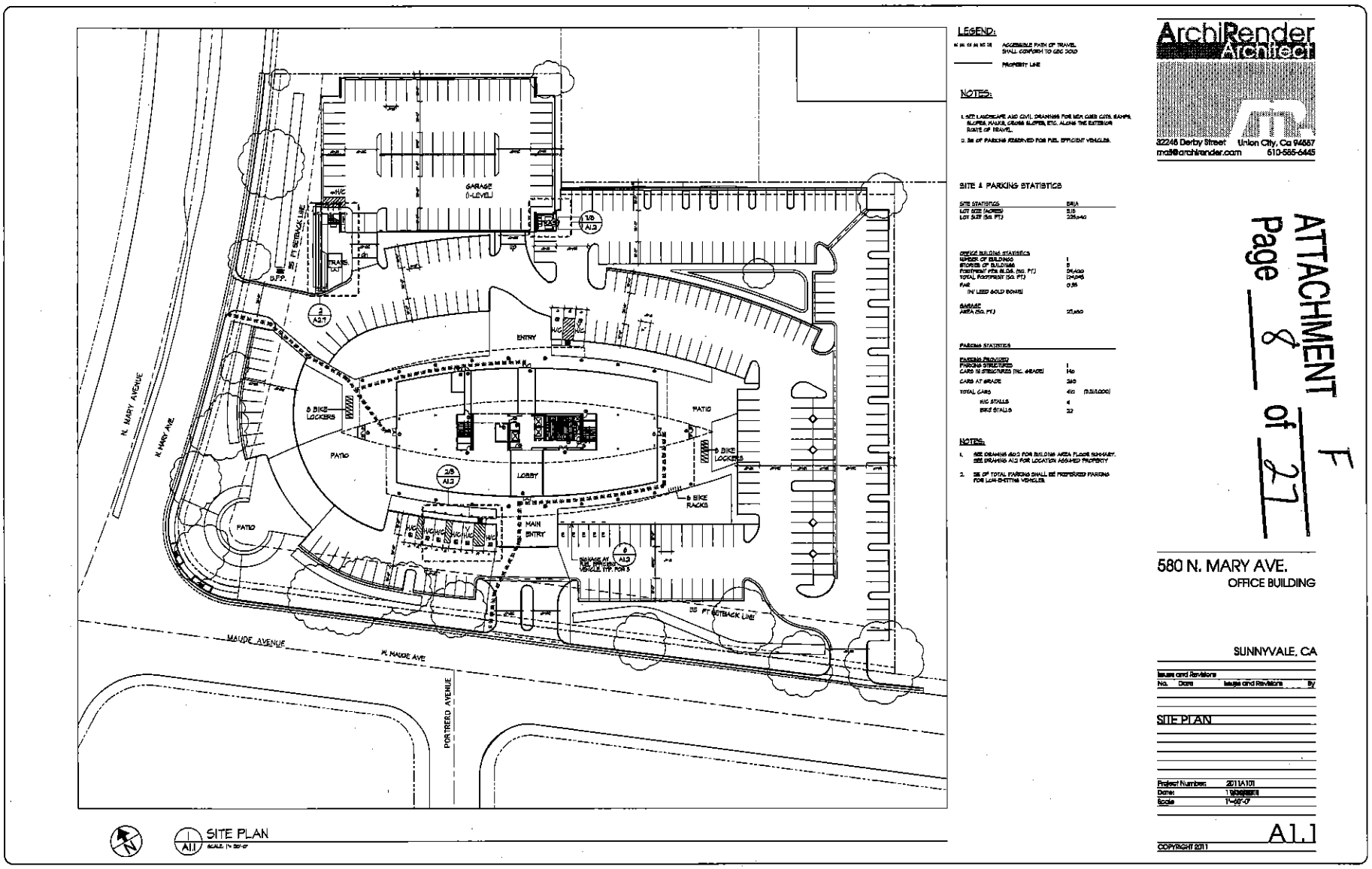
Site Location
Figure 1



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580 N. Mary Avenue Site Plan

Figure 2

CHAPTER 2. TRANSPORTATION FACILITIES AND SERVICES

The transportation facilities and services that support the use of modes of transportation other than the single-occupant vehicle (SOV) include commuter rail, light rail transit (LRT), buses and shuttle buses, bicycle facilities, and high-occupancy vehicle (HOV) lanes. Existing and planned support facilities and services near the 580 N. Mary Avenue site are discussed in this chapter. Rail and bus routes near the site are shown on **Figure 3**. **Figure 4** presents the bicycle facilities and HOV facilities are shown **on Figure 5**.

COMMUTER RAIL – CALTRAIN

Caltrain provides intercity passenger rail service between San Francisco and San Jose, with limited service to Gilroy during commute hours. Both the Sunnyvale and Mountain View Caltrain Stations are accessible to the project site and are described below in further detail. Rail service to these stations are summarized in the schedule tables to the right.

SUNNYVALE STATION SCHEDULE

Northbound Weekdays

4:44,5:19, 6:13, 6:18, 7:00, 7:13, 7:18, 8:00, 8:13, 8:18,8:54, 9:24, 10:24, 11:24, **12:24, 1:24, 2:24, 3:21, 3:58,4:58, 5:58, 7:04, 7:44, 8:44, 9:44, 10:44**

Southbound Weekdays

6:08, 6:38, 7:43, 8:43, 9:43, 10:20,11:20, **12:20, 1:20, 2:20, 3:20, 4:20, 4:42, 5:16, 5:21, 5:55, 6:17, 6:21, 6:55, 7:21, 7:55, 8:43, 9:53, 10:53, 11:53,** *1:14*

am - italics | **pm - bold**
yellow - limited-stop | red - baby bullet

MOUNTAIN VIEW STATION SCHEDULE

Northbound Weekdays

4:49,5:24, 5:57, 6:23, 6:37, 6:57, 7:05, 7:23, 7:37, 7:57,8:05, 8:23, 8:37, 8:59, 9:29, 10:29, 11:29, **12:29, 1:29, 2:29, 3:26, 4:03, 4:37, 5:03, 4:58, 5:37, 5:46, 6:03, 5:58, 6:37, 6:46, 7:00, 7:09, 7:49, 8:49, 9:49, 10:49**

Southbound Weekdays

6:03,6:33, 7:07, 7:38, 7:44, 7:58, 8:09, 8:38, 8:44, 8:58,9:09, 9:38, 9:44, 10:15, 11:15, **12:15, 1:15, 2:15, 3:15, 4:15, 4:37, 4:51, 5:11, 5:36, 5:50, 5:56, 6:12, 6:36, 6:50,6:56, 7:36, 7:50, 8:38, 9:48, 10:48, 11:48,** *1:09*

am - italics | **pm - bold**
yellow - limited-stop | red - baby bullet

The *Sunnyvale Caltrain Station* is the closest station to the project site. It is served by Local-Stop, Limited-Stop, and Baby Bullet (express) service. The station is serviced by three Baby Bullet and six Limited-stop northbound trains in the AM peak period with headways between five and forty-two minutes. In the PM peak period, the station is served by two Baby Bullet, five Limited-stop, and one Local-stop southbound trains with headways between five and thirty-four minutes. The distance between the station and the project site is 1.5 miles, or about a 30 minute walk. This distance is beyond what a typical commuter is willing to walk, generally up to a ¼ of a mile, to reach their final destination. 1.5 miles is a manageable distance for biking, however, as described below, there are limited bike facilities connecting Sunnyvale Station to the project site. The Station has 15 bike racks and 75 bike lockers available for reservation. There are no Caltrain shuttles that connect to the Sunnyvale Station. However, Caltrain riders can connect to the project site via *VTA Bus Route 54*, which has a transit stop at the intersection of Mathilda Avenue and Maude Avenue, a half mile from the project site.

The *Mountain View Station* is one stop north on the Caltrain route. Although the station is nearly three miles from the project site, it is made accessible via the Mary Moffett Shuttle connection. The shuttle, which is described in further detail in the *Caltrain Shuttle* section below, has a stop adjacent to the project site. The Mountain View Station is served by Local-stop, Limited-stop, and Baby Bullet (express) service, with a higher frequency of trains in the AM and PM peak periods compared to the Sunnyvale Station. The in AM peak period, the Station is served by nine Limited-stop and three Baby Bullet northbound trains, and two Local-stop, four Limited-stop, and four Baby Bullet southbound trains. In the PM peak period, the station is

served by six Limited-stop and five Baby Bullet northbound trains, and one Local-stop, seven Limited-stop, and three Baby Bullet southbound trains.

The Mountain View Station has 25 bike racks and 116 bike lockers available for reservation. The commute between the Station and the Project site is approximately three miles, or a 15-20 minute ride. Caltrain bicycle riders can commute nearly the entire way on bicycle facilities, including Central Expressway and E Evelyn Avenue.

Caltrain Shuttle

The *Mary Moffett Shuttle* operates between the Mountain View Caltrain Station and the Mary-Moffett area during commute hours. The shuttle operates four trips in the AM peak period and four in the PM peak period, coordinated with Local, Limited, and Baby Bullet service. The morning and afternoon schedules are included below. Funded by both public and private sources, the shuttle is free for all Caltrain passengers. The Mary Moffett Shuttle route provides direct service to the project site at the corner of Mary & Maude, in addition to two other stops within walking distance. The shuttle operates four AM trips and PM trips with approximately 1-hour headways. The shuttle schedule is summarized in Table 2 & 3.

TABLE 2
MARY MOFFETT SHUTTLE: MORNING SCHEDULE (AM)

Northbound Train # Mountain View	*207* 6:23	*217/221* 7:23/7:37	*227/231* 8:23/8:37	*135* 9:29
Southbound Train # Mountain View	*104* 6:33	*210/312* 7:38/7:44	*220/322* 8:38/8:44	*220/322* 9:38/9:44
Mountain View Caltrain	**6:35**	**7:46**	**8:45**	**9:45**
410 Mary	6:43	7:54	8:53	9:53
Mary & Maude	**6:44**	**7:55**	**8:54**	**9:54**
760 Mary	6:45	7:56	8:55	9:55
Mary & Almanor	6:46	7:57	8:56	9:56
Almanor & Palomar	6:47	7:58	8:57	9:57
Almanor & Vaqueros	6:48	7:59	8:58	9:58
755 Mathilda	6:49	8:00	8:59	9:59

Note: This table only shows the shuttle stops in the vicinity of the project site.
Source: Caltrain (2011)

TABLE 3
MARY MOFFETT SHUTTLE: AFTERNOON SCHEDULE (PM)

755 Mathilda	3:28	4:21	5:15	6:15
Almanor & Vaqueros	3:29	4:22	5:16	6:16

TABLE 3 MARY MOFFETT SHUTTLE: AFTERNOON SCHEDULE (PM)				
Almanor & Palomar	3:30	4:23	5:17	6:17
Mary & Almanor	3:31	4:24	5:18	6:18
760 Mary	3:32	4:25	5:19	6:19
Mary & Maude	**3:33**	**4:26**	**5:20**	**6:20**
410 Mary	3:34	4:27	5:21	6:21
Mountain View Caltrain	**3:42**	**4:35**	**5:30**	**6:30**
Northbound Train # Mountain View	*261* 4:03	*365* 4:37	*273/275* 5:37/5:46	*383/285* 6:37/6:46
Southbound Train # Mountain View	*158* 4:15	*260/362* 4:37/4:51	*266* 5:36	*276/280* 6:36/6:50
Note: This table only shows the shuttle stops in the vicinity of the project site. *Source: Caltrain (2011)*				

LIGHT RAIL TRANSIT

Santa Clara Valley Transportation Authority (VTA) operates light rail transit (LRT) and bus service in Santa Clara County. The VTA Mountain View to Winchester Avenue light rail line (Line 902) runs on tracks west and north of the project site. The line operates between 4:46 AM and 12:39 AM on 15- to 30-minute headways. On weekends, service is provided between 6:04 AM and 12:39 AM with 30-minute headways. The *Middlefield Station* is one mile west of the project site, though not an ideal walking distance (approximately 20 minutes), it is a manageable 7-minute bike ride.

The *Moffett Park Station,* also served by the Mountain View to Winchester Avenue light rail (line 902) is located less than a mile north of the project site. Although close to the project site, it is difficult to access; there are no direct pedestrian or bicycle connections across U.S. Route 101 and California State Route 237 to the station. Light Rail riders can take VTA Bus Route 54, which provides service on N. Mathilda Avenue. The travel time between the Moffett Park LRT Station and the Project Site would be approximately 31 minutes by bus.

Operating characteristics of Line 902 are summarized in Table 4.

VTA BUS ROUTES

There are two VTA bus routes that serve the site, Route 54 and Route 32.

Bus Route 54 operates along Mathilda Avenue and provides service between De Anza College and the Lockheed Martin Transit Center. During weekdays, Route 54 serves the stops near the project site between 6:03 AM and 9:29 PM with 30-minute headways. On weekends, Route 54 operates between 7:51 AM and 7:51 PM with 45 to 60-minute headways. Bus stops for Route 54 are provided along Mathilda Avenue near Maude Avenue and Del Ray Avenue.

Bus Route 32 operates on Mathilda Avenue and could be used as a connection to Bus Route 54. Route 32 provides service between the San Antonio and Santa Clara transit centers. Route 32 follows major

arterials and travels through Mountain View, Sunnyvale, and Santa Clara. These routes are summarized in Table 4.

TABLE 4
EXISTING TRANSIT SERVICE

Route	From	To	Weekdays		Weekends	
			Operating Hours	Peak Headway[1] (minutes)	Operating Hours	Headway[2] (minutes)
Bus Service (VTA)						
54	De Anza College	Lockheed Martin Transit Center	6:03 a – 9:29 p	30	7:51 a – 7:51p	45 – 60
32	San Antonio Transit Center	Santa Clara Transit Center	6:00 a – 7:59 p	30	9:00 a – 5:49 p	60
Light Rail Service (VTA)						
902	Downtown Mountain View	Winchester	4:46 a – 12:39 a	15	6:04 a – 12:39 a	30
Caltrain Service						
Sunnyvale Station	San Francisco (4th & King)	San Jose Diridon	4:30 a – 1:32 a	5 - 60	7:00 a – 1:37 a	60
Mountain View Station	San Francisco (4th & King)	San Jose Diridon	4:30 a – 1:32 a	8 - 30	7:00 a – 1:37 a	60
Mary/Moffett Area Caltrain Shuttle	Mountain View Caltrain Station	Alma Plaza	6:35 a – 10:23 a 3:00 p – 6:30 p	4 AM NB Runs 4 PM SB Runs	No Service	–

Notes:
1. Headways are defined as the time interval between two transit vehicles traveling in the same direction over the same route.
Sources: VTA, Caltrain, November 2011.

HOV LANES

High Occupancy Vehicles (HOV) lanes, also known as diamond or carpool lanes, restrict use to vehicles with two or more persons (carpool, vanpool, and buses) or motorcycles during the morning (5:00 AM to 9:00 AM) and evening (3:00 PM to 7:00 PM) commute periods. US 101 and State Route 237 (SR 237) provide regional access to the Project site. Both of these travel routes include HOV lanes.

US 101 extends north through San Francisco and south through San Jose. Near the project site, US 101 travels in an east-west direction with approximately 140,000 daily vehicles. The freeway has three mixed-flow lanes and one HOV lane in each direction.

SR 237 is an east-west freeway providing access between the Cities of Mountain View and Milpitas. SR 237 has two mixed-flow lanes and one HOV lane in each direction east of the Lawrence Expressway. Near the project site, SR 237 has an average daily traffic (ADT) volume of approximately 90,000 vehicles.

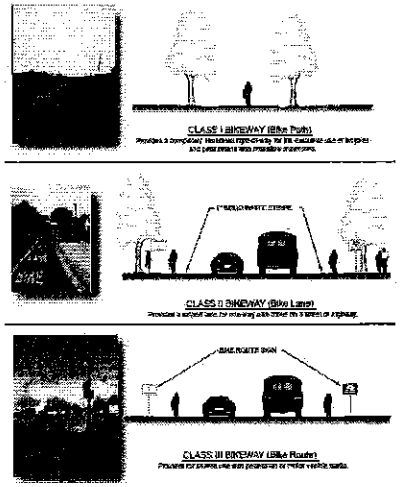
The Santa Clara Valley Transportation Authority (VTA) is implementing the Silicon Valley Express Lanes Program. The Express Lanes will give single-occupancy vehicles (SOV) the option of using an express lane by paying a toll. Tolls will vary throughout the day based on congestion levels to help maintain level of service and free-flow conditions. The current toll price will be displayed on electric signs above the lanes. Tolls and fees will be collected electronically using the FasTrak collection system. Carpools, motorcycles, and transit buses can continue to use the Express Lanes without paying the toll. Similar to HOV lanes, the Express Lanes will be separated from mixed-flow lanes by a painted buffer. The express lanes are expected to increase efficiency of the roadway and create a revenue stream that can be reinvested into facility maintenance and transit enhancement.

The Silicon Valley Express Lanes Program anticipates 34 miles of express lanes on US 101 by 2016, and, by 2012, express lanes on the SR 237/I-880 connectors.

BICYCLE FACILITIES

Bicycles are an important component of the City's transportation network. The City of Sunnyvale's bikeways are classified as Class I, Class II, or Class III facilities, as follows and shown to the right:

- Class I Bikeway – bike paths within exclusive right-of-way, sometimes shared with pedestrians
- Class II Bikeway – bike lanes for bicycle use only that are striped within the paved area of roadways
- Class III Bikeway – bike routes are shared with motor vehicles on the street. Class III bikeways may also be defined by a wide curb lane and/or use of a shared use arrow stencil marking on the pavement, known as a "sharrow"



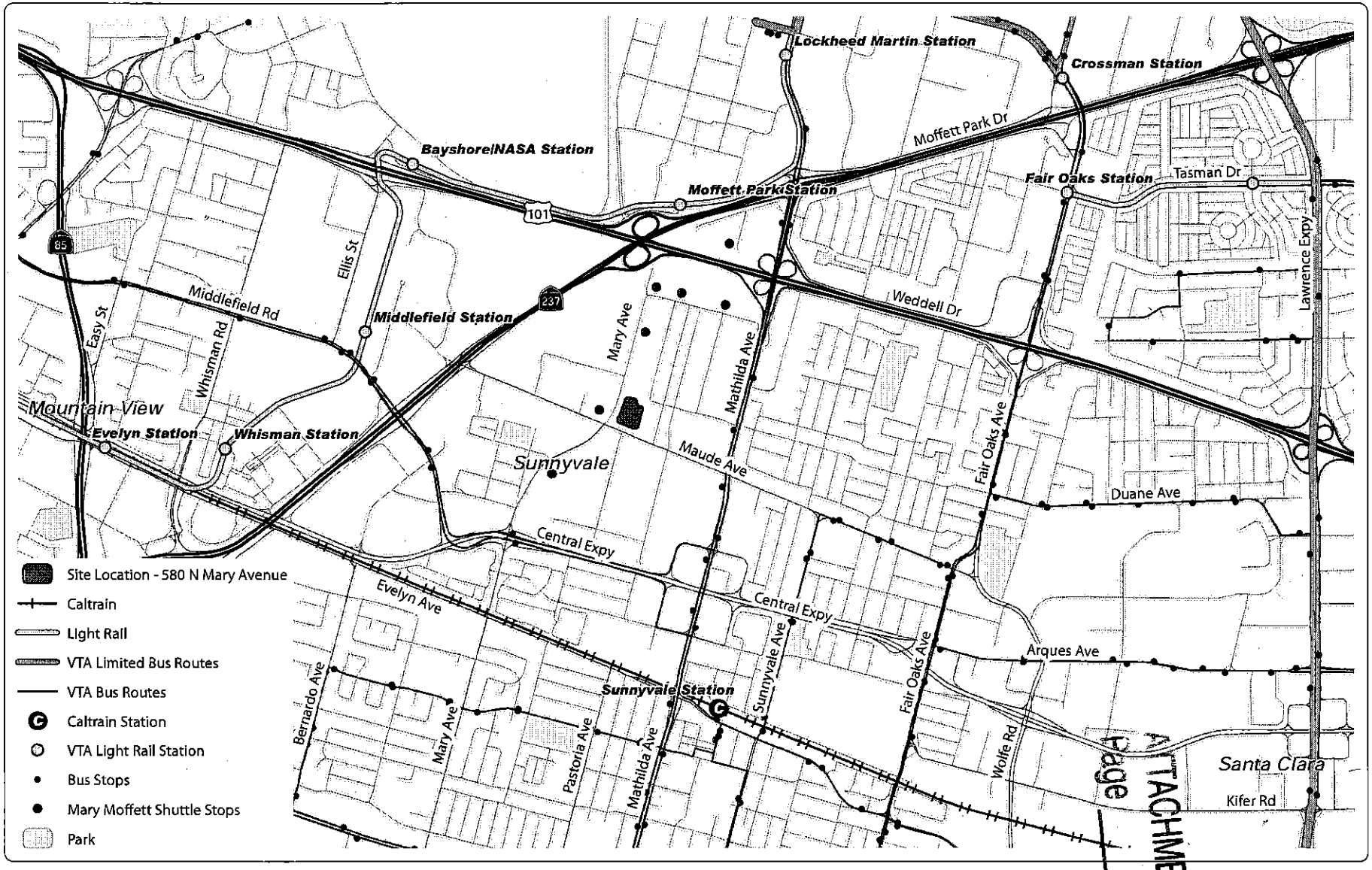
Existing bicycle facilities near the project site are shown on **Figure 4**. Class II Bike Lanes (in purple) are provided on N. Mary Avenue, W. Maude Avenue, E. Middlefield Road, and the Central Expressway. Class III Bikeways (in orange) are provided on Mary Avenue south of the Caltrain tracks, and a small network of streets east of Fair Oaks Avenue. A Class I Bike Path (in green) runs adjacent to SR 85.

The bicycle network provides a nearly complete route for bicyclists traveling from the Middlefield LRT Station, along Middliefeild Road and W. Maude Avenue, and the Mountain View Caltrain Station, along the Central Expressway and N. Mary Avenue. Gaps in the bicycle network, especially on N. Mary

Avenue, prevent a complete bicycle route between the Sunnyvale Caltrain Station and the project site. The City of Sunnyvale 2006 Bicycle Plan recommends future bikes lanes on N Mathilda Avenue and W Maude Avenue, which will help complete the route. In the meantime, however, although current facilities do not exist on these streets, N. Sunnyvale Avenue and. Maude Avenue would serve as the most direct and practical bicycle route between the Sunnyvale Caltrain Station and project site.

PEDESTRIAN FACILITIES

Pedestrian facilities include sidewalks, crosswalks, trails, and pedestrian signals or warning devices. Sidewalks are located on both sides of the streets adjacent to the project site: N. Mary Avenue and W. Maude Avenue. There is a continuous sidewalk from the *VTA Bus 54* stop at W. Maude Avenue and N. Mathilda Avenue, which provides a safe walking route for bus commuters to the project site. Sidewalks and crosswalks are also provided on the walking route from the Middlefield LRT Station, a mile west of the project site. The signalized N. Mary Avenue and W. Maude Avenue intersection adjacent to the project site includes both crosswalks and curb ramps. The next intersection north, N. Mary Avenue and Benecia Avenue, neither has crosswalks nor curb ramps. As mentioned earlier, SR 237 and US 101 create a barrier between the Moffett Park LRT Station a mile north of the project site. There is no direct pedestrian under or over crossing.



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Existing Rail & Bus Routes

Figure 3

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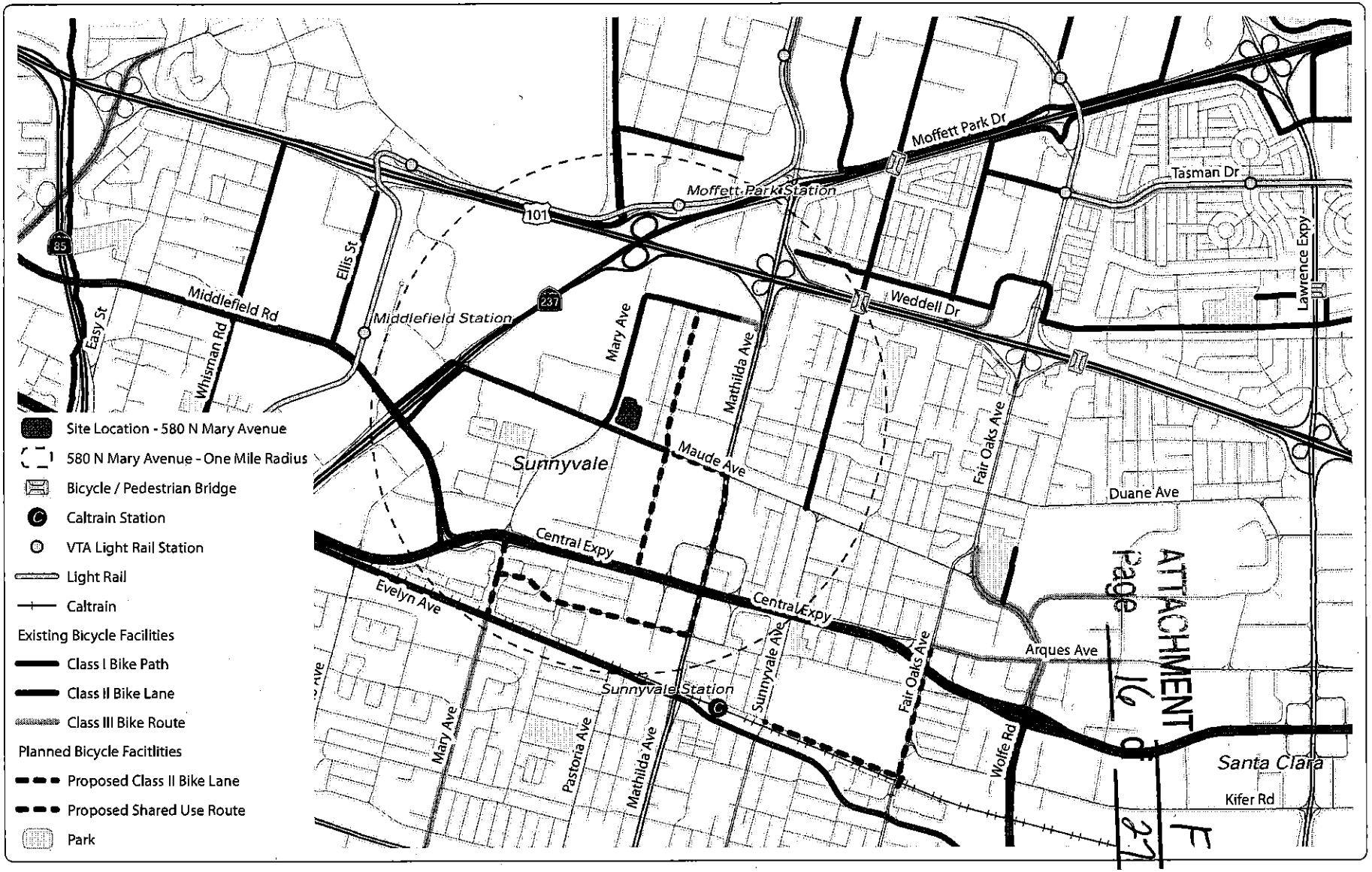

Source: City of Sunnyvale, 2006 Bicycle Plan

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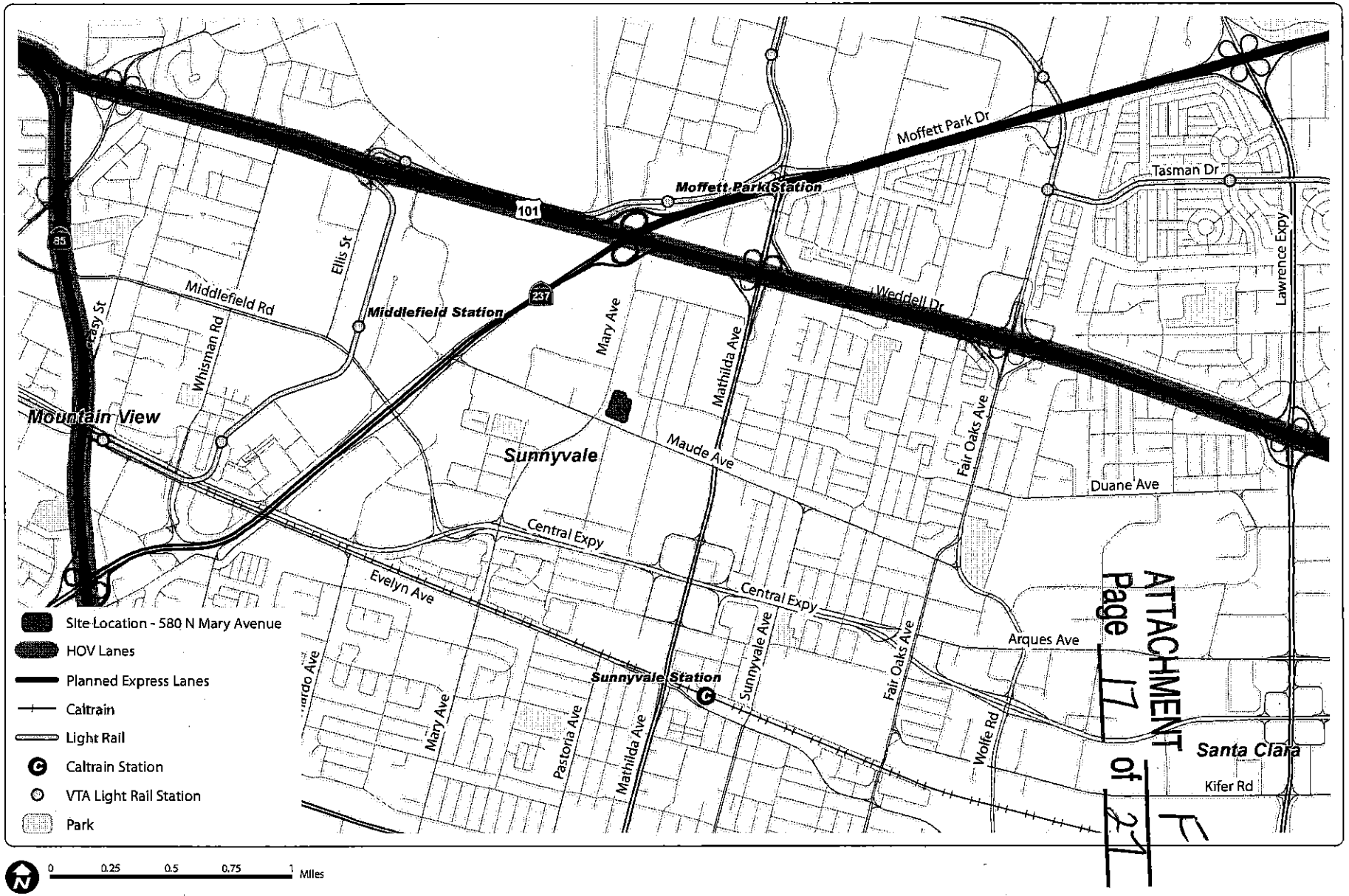
Existing Bicycle Facilities

Figure 4



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Existing & Planned HOV Facilities

Figure 5

CHAPTER 3. LIST OF POTENTIAL TDM MEASURES AND STRATEGIES

The City of Sunnyvale has a long list of TDM measures and strategies that are described in *Transportation Demand Management (TDM) Tool Kit,* prepared by The Hoyt Company in December 1999. Since that time new measures and strategies have been developed primarily based on the prevalence of web-based tools. The list of measures from the toolkit is summarized in Tables 5 and 6. Measures from this list plus more recent measures that are included in the TDM Plan for 580 N. Mary Avenue are described in the next chapter.

The Sunnyvale TDM Tool Kit Measures can be divided into two sets of strategies: Planning and Design, and Programs and Services. The Planning and Design strategies are part of the initial planning of the development to ensure that multiple modes of travels will be supported by a project's design, including sidewalks, bicycle parking, and urban design features. Further, these provisions help connect the project to its surrounding environment and transportation networks.

TABLE 5
SUNNYVALE TDM TOOL KIT MEASURES: PLANNING AND DESIGN

Planning and Design Measures		
	TDM Measure	**Description**
Building Design & Layout		
	Building entries	Building entries located towards pedestrian–oriented activities and transit stops.
	Building setbacks	Reduced setbacks provide closer access to sidewalks and transit stops.
	Passenger loading zones	Passenger loading zones near building entrances to provide accessible locations for drop-off and pick-up of carpool, vanpool, and transit/shuttle passengers.
	Building wiring	Wiring with fiber optics facilitates teleworking.
Transit Design Elements		
	Intersection geometrics	Streets and intersections designed to accommodate transit vehicle turning radii.
	Street design	Streets designed to structurally support the weight of transit vehicles.
	Land dedication for transit facilities	Land dedicated for construction of a future rail station or bus stop.
	Transit passenger shelter/bus stop	Transit passenger amenities provided for site on transit routes.
	Bus/rail station subsidy	Payment for the cost of constructing a bus stop or rail station.
Parking Design Measures		
	Off-street parking	Parking to be located on the side or rear of the building; not between building entrance and transit service.
	Parking configuration	Parking lot layout should be conducive to pedestrian access and circulation.
	Preferential parking	Designated parking spaces for carpools and vanpools near building entrances.

TABLE 5
SUNNYVALE TDM TOOL KIT MEASURES: PLANNING AND DESIGN

	TDM Measure	Description
Planning and Design Measures		
	Reduced parking	Reducing the number of parking spaces with a strong TDM program to shift people into alternative modes of transportation.
	Reduced parking fees	Free parking or reduced fees for preferential spaces (for sites that have paid parking).
Pedestrian Design Measures		
	Minimize walking distances	Design pedestrian access with minimum walking distance and/or the most direct route to transit stops.
	Pedestrian connections	Safe, convenient pedestrian connections between buildings and surrounding streets.
	Internal pedestrian access	Safe, convenient pedestrian connections between buildings on the site.
Bicycle Design Measures		
	Showers/clothes lockers	Shower facilities and clothes lockers for those who walk and bike to work.
	Bicycle parking (short + long term)	Secure bicycle parking including racks, lockers, and enclosed locked limited access areas.
On-Site Amenities		
	Cafeteria with hot food service, ATM, exercise facilities, convenience retail, childcare, valet service, post office/stamps, Onsite transit pass sales	On-site amenities provide services that would otherwise require a separate trip before, during, or after work hours.

Source: *Transportation Demand Management (TDM) Tool Kit,* prepared for the City of Sunnyvale by The Hoyt Company, December 1999.

Fehr & Peers, 2011.

The Program and Service TDM measures are typically employer-implemented strategies that support employee specific commuting options. These programmatic measures are often dependent on the design measures. For example, bicycle parking at the project site will be necessary for an effective employee bicycle program. The program and service measures are listed and described in Table 6.

TABLE 6
SUNNYVALE TDM TOOL KIT MEASURES: PROGRAMS AND SERVICES

Program and Service Measures		
	TDM Measure	**Description**
Information Board		
	Information board	Permanent locations for updated TDM information.
Transportation Coordinator		
	Transportation coordinator	Transportation coordinators are responsible for developing, marketing, implementing, and evaluating TDM programs.
Carpool Programs		
	Carpool programs	Carpool programs help carpools to form by matching drivers and passengers.
Vanpool Programs		
	Vanpool programs	Vanpool programs help vanpools to form by matching drivers and passengers and by providing or subsidizing vans.
Transit Programs		
	Transit subsidies	Employers subsidize transit passes through programs such as Commuter Check or by purchasing passes.
	Onsite pass outlet	Providing transit passes for sale onsite as a convenience for employees.
	Shuttle programs	Operation of a shuttle service to nearby rail and transit stations and possibly to midday destinations.
Parking Programs		
	Preferential parking	Designated parking spaces for carpools and vanpools near building entrances.
	Paid parking	Free parking or reduced fees for preferential spaces (for sites that have paid parking).
	Parking cashout	Employees receive the cash equivalent of employer-provided parking if they elect to forgo parking.
Pedestrian Programs		
	Pedestrian programs	Walking programs encourage employees to walk to work and may include mapping walking routes, creating walking groups or buddies, and providing incentives.
Bicycle Programs		
	Bicycle programs	Bicycle programs encourage employees to bike to work and may include mapping routes, creating biking groups or buddies, and providing incentives.
Promotional Programs		
	New employee orientation	Introduces new employees to the TDM program.
	Flyers, posters, emails	Ways to keep the TDM message in front of employees on a regular basis.
	Transportation fairs	Transportation fairs provide alternative mode information in a fun event.
	Newsletter articles	Articles about TDM in company newsletters.

TABLE 6
SUNNYVALE TDM TOOL KIT MEASURES: PROGRAMS AND SERVICES

	TDM Measure	Description
Program and Service Measures		
	Commuter information center	An on-site, one-stop shop for transit and commute alternatives information to assist building tenants with trip planning.
	Transit field trips	Orient new transit riders by showing them the local routes, fare collection method, transfer points, and other operational features.
	Free trial rides	Free transit tickets for employees interested in using transit.
	Transit riders guide	A guide with transit routes and schedules to the site.
	Bike-to-work day	A regional event to introduce bicycle commuting.
	Bicycle riders guide	A guide with bicycle routes, lanes, and paths to the site and bicycle parking facilities on the site.
	Guaranteed Ride Home Program	Employees who use transit, carpools, or vanpools are guaranteed a ride home in case of emergency or if they need to work late, typically with taxis, rental cars, or company cars.
Telecommuting		
	Telecommuting	Telecommuting allows employees to work from home or from neighborhood telecenters via telecommunications.
Alternative work schedule		
	Flextime	Employees set or modify their arrival and departure times.
	Staggered Work Hours	Work units or groups select or are assigned different starting and ending times for their work day.
	Compressed Work Week	Employees work more hours in a single day, but fewer days of the week.

Source: *Transportation Demand Management (TDM) Tool Kit,* prepared for the City of Sunnyvale by The Hoyt Company, December 1999.
Fehr & Peers, 2011.

CHAPTER 4. SELECTED TDM MEASURES AND STRATEGIES

The TDM measures and strategies for 580 N. Mary Avenue are based on the physical attributes of the site and the proposed building, plus the transportation facilities and services currently near the site. Additional measures would be needed to achieve the trip reduction goals. These measures include programs that would be created by the tenants. Therefore they would need to be included in lease agreements or some other instrument to ensure their implementation.

SITE AND DESIGN MEASURES

Building-Related Measures

1. Building Entries

The main building entrance is located on W. Maude Avenue, a roadway with pedestrian facilities. Locating the building entrance near pedestrian facilities supports an active pedestrian environment and encourages walking and transit use.

2. Building Setbacks

The building is located close to both N. Mary Avenue and W. Maude Avenue with only a circulation aisle and one or two rows of parking between the building and the street. Locating the building near pedestrian facilities encourages walking and transit use. Alternatively, having seas of parking between the roadway and the building encourages driving.

3. Passenger Loading Zones

The passenger loading zone is near the main entry. It is convenient for carpools and vanpools dropping off passengers. Passenger loading zones are also convenient if the project decides to implement a shuttle program in the future.

4. Building Wiring

The building will be wired with fiber optics to facilitate telecommuting.

Parking Design Measures

5. Parking Configuration

The parking lot layout is conducive for pedestrian access and circulation. The building entrances are a short distance from the street sidewalks with clearly defined pedestrian walkways and crossings.

6. Preferential Parking

There are several areas on the site plan near the building entrances that could be designated as carpool and vanpool spaces. These spaces would be located in premium and convenient locations to incentivize carpooling. If the spaces are underutilized, the carpool spaces may be made available to single occupancy vehicles after peak commute times.

Pedestrian Design Measures

8. Minimize Walking Distances

As described under Building Entries and Building Setbacks, the building design and placement on the site are such that pedestrian walking distances to the sidewalks on the adjacent streets are minimized.

9. Pedestrian Connections

The parking lot layout is conducive for pedestrian access and circulation. The building entrances are a short distance from the street sidewalks with clearly defined pedestrian walkways and crossings.

Bicycle Design Measures

10. Showers and Lockers

The building will have shower facilities and lockers and/or changing facilities to accommodate people bicycling to work. Shower and changing rooms will help promote bicycling as an alternative commute option for interested employees.

11. Bicycle Parking

The site plan depicts 16 bicycle lockers located adjacent to the building on the N. Mary Avenue frontage and bike racks accommodating 6 bicycles on the opposite end of the building. The number and placement of bicycle facilities is adequate according to the City of Sunnyvale municipal code.

PROGRAM AND SERVICE MEASURES

In addition to the Site and Design attributes that contribute to alternative mode use, the tenants of the building will need to provide additional measure to meet the TDM goals. These measures include a Commute Trip Reduction Program and subsidized transit passes.

12. Commute Trip Reduction Program

The Commute Trip Reduction Program includes a variety of measures to encourage ridesharing, bicycle use, and transit use such as:

a) Dissemination of TDM information

b) Carpooling encouragement

c) Ride-matching assistance

d) Preferential carpool parking

e) Flexible work schedules for carpools

f) Part-time transportation coordinator

This program incorporates many of the programs in the tool kit list including carpool, pedestrian, bicycle, and promotional programs. It would be managed by a part-time transportation coordinator who would be responsible for disseminating information, overseeing promotional activities, and conducting the annual monitoring and reporting. Information regarding transit service in the area plus connections to the site, maps of bicycle facilities, etc. and/or website links should be included in employee handbooks and discussed during new employee orientation. Carpooling should be encouraged by either providing a

carpool matching program on-site or via peer-to-peer matching program such as ZimRide. Bicycling should be encouraged by adopting a bicycle program that pairs riding buddies, promotes Bike to Work Day, and provides introductions to the basics of bicycle commuting and safety.

13. Subsidized Transit Passes

All employees who elect to use transit should be provided with subsidized transit passes through the Commuter Check or other similar program.

ADDITIONAL MEASURES

If the TDM monitoring shows that the trip reduction goals are not met, then measures would need to be added to the plan. Examples of measure that could be added are described in the following sections.

14. Guaranteed Ride Home

A common reason that employees do not use alternative modes (i.e., carpool, vanpool, or transit) is the inability to leave work unexpectedly for a family emergency or the fear of being stranded if they need to work late. One TDM element that allays these fears is a Guaranteed Ride Home program. With this program, employees can use a taxi service, rental car, or other means to get home, and the employer pays for the service. The lease agreement will state that the tenants must participate in a Guaranteed Ride Home program, which will be managed by the TDM Coordinator. Employees who wish to use the service would contact the transportation coordinator to make the travel arrangements.

15. Parking Cash-Out

With a parking cash-out program, employees are offered the option of a "free" parking space or a cash equivalent that can be used to offset the cost of commuting by an alternative mode. Employers would be required to offer employees a cash payment equivalent to the cost of the parking space to the employer based on their rent payments.

16. Shuttle Bus Program

The project employer's would establish a shuttle bus program that transports employees to residential locations, transit centers, or designated pick-up and drop-off stops.

TRIP REDUCTION EVALUATION

The project's TDM target is a 23 percent reduction in peak hour trips. This target stems from the project's increased FAR from the designated 35 percent FAR for the site to the project's planned 55 percent FAR.

Methods documented in *Quantifying Greenhouse Gas Mitigation Measures*[1], a report recently released by the California Air Pollution Control Officers Association (CAPCOA), were used to estimate the trip reduction effects of the proposed TDM strategies. The CAPCOA report provides methods for quantifying vehicle miles traveled (VMT) and vehicle trip (VT) reduction for a list of mitigation measures, primarily focused on project-level mitigation. The CAPCOA measures were screened on the basis of the feasibility of quantifying the reductions, the availability of robust and meaningful data upon which to base the quantification, and whether the measures would result in appreciable reductions. The report represents

[1] *Quantifying Greenhouse Gas Mitigation Measures -- A Resource for Local Government to Assess Emission Reductions from Greenhouse Gas Mitigation Measures,* California Air Pollution Control Officers Association. August, 2010.

the state of practice in quantifying effectiveness of TDM strategies. It has been adopted into CalEEMod, a statewide land use emissions model developed in collaboration with the air districts of California, and is recommended for use in California Environmental Quality Act (CEQA) documentation by the Bay Area Air Quality Management District.

The Site and Design measures and the Program and Service measures are projected to have a combined reduction of 16 percent based on the empirical data in the CAPCOA report. This meets the minimum goal of a 16 percent reduction. Adding the guaranteed ride home, parking cash-out, and shuttle bus program are anticipated to increase the total reduction to 19 percent. The actual reductions and resulting vehicle trip generation will be measured during the annual monitoring and reporting process discussed in the next chapter.

CHAPTER 5. MONITORING, EVALUATION, AND REPORTING

The intent of the TDM plan is to reduce vehicle trips and lessen the impact to traffic congestion anticipated to occur by the proposed development. Therefore, it is important to ensure strategies are implemented to monitor and evaluate how successful the programs are in performing their respective reductions and report the results to the City of Sunnyvale. The monitoring program will evaluate how effective the strategies are in meeting the reduction goals and identify areas the plan may be enhanced to assist the needs of the tenants on site.

The goal of the TDM program is a trip reduction of 27 percent, with a minimum allowable reduction of 16 percent. The program will be assessed annually to assess compliance with the target rate. The City will base TDM program compliance on the percentage of total employees who used transportation alternatives, not the percentage of survey respondents. Survey non-respondents will be assumed to be driving alone and will count against the compliance rate. It is important to conduct as thorough of a survey as possible. The following procedures will be used to monitor and evaluate how effective the strategies are in meeting the target rate.

Annual Commute Surveys – Surveys will be provided by the developer or building tenants (employers) to measure the number of employees commuting by alternative modes. The survey results should include mode splits and employee perceptions of the strategies available to them. Results will be used to monitor how effective current strategies are and enhance areas not meeting expectations.

The developer/building tenants (employers) must survey every year to collect data required for the TDM Annual Status report. The new data should be analyzed and compared to the previous survey results to determine progress and potential modifications needed to improve the program.

TDM Status Report to the City – A TDM report presenting a summary of the survey results will be provided to the City for review. It will provide the progress and effectiveness of current strategies and identify areas in need of improvement. For areas identified in need of improvement, the report should present what changes will occur in the TDM plan and how these enhancements are anticipated to meet the target rate.

Modifications to the TDM Program – The *Transportation Demand Management (TDM) Tool Kit,* CAPCOA report, and other TDM research documents should be consulted to identify modifications to the TDM program that will result in increases in alternative mode use and decreases in vehicle trips.

A successful TDM program will reduce the development's impact to traffic congestion and improve air quality in the community. When alternative mode commute trips are increased and drive alone commute trips are reduced the program is effective.

CHAPTER 6. SUMMARY AND CONCLUSIONS

This report presents the TDM plan for the office development at 580 N. Mary Avenue. The purpose of this plan is to reduce the number of vehicle trips generated by the site. It contains a number of measures and strategies that encourage the use of alternative modes of travel such as transit, ridesharing (carpooling and vanpooling), bicycling, and walking.

The proposed building size results in a FAR for the site of 55 percent, where 35 percent is allowed. The goal of this TDM plan is to offer a reduction equivalent to the trip difference between 35 and 55 percent FAR, or a 27 percent average AM and PM peak hour reduction. The minimum reduction goal of the TDM plan is to offer a reduction equivalent to the trip difference between 35 percent and 45 percent FAR, or a 16 percent average AM and PM peak hour reduction.

This comprehensive TDM Plan was designed to meet the specific needs for this project. **The planning, design, program, and service strategies will reduce project trips by 16 to 19%.** In addition to reducing single-occupancy vehicle trips, this TDM Plan will make use of existing regional and local transit systems, and provide flexible commuting solutions for future employees.

The TDM measures and strategies are based on the physical attributes of the site and the proposed building, plus the transportation facilities and services currently near the site. Additional measures would be needed to achieve the trip reduction goal of 27 percent. These measures include limiting parking supplies, implementing a car share program and improving transit system frequency and accessibility.