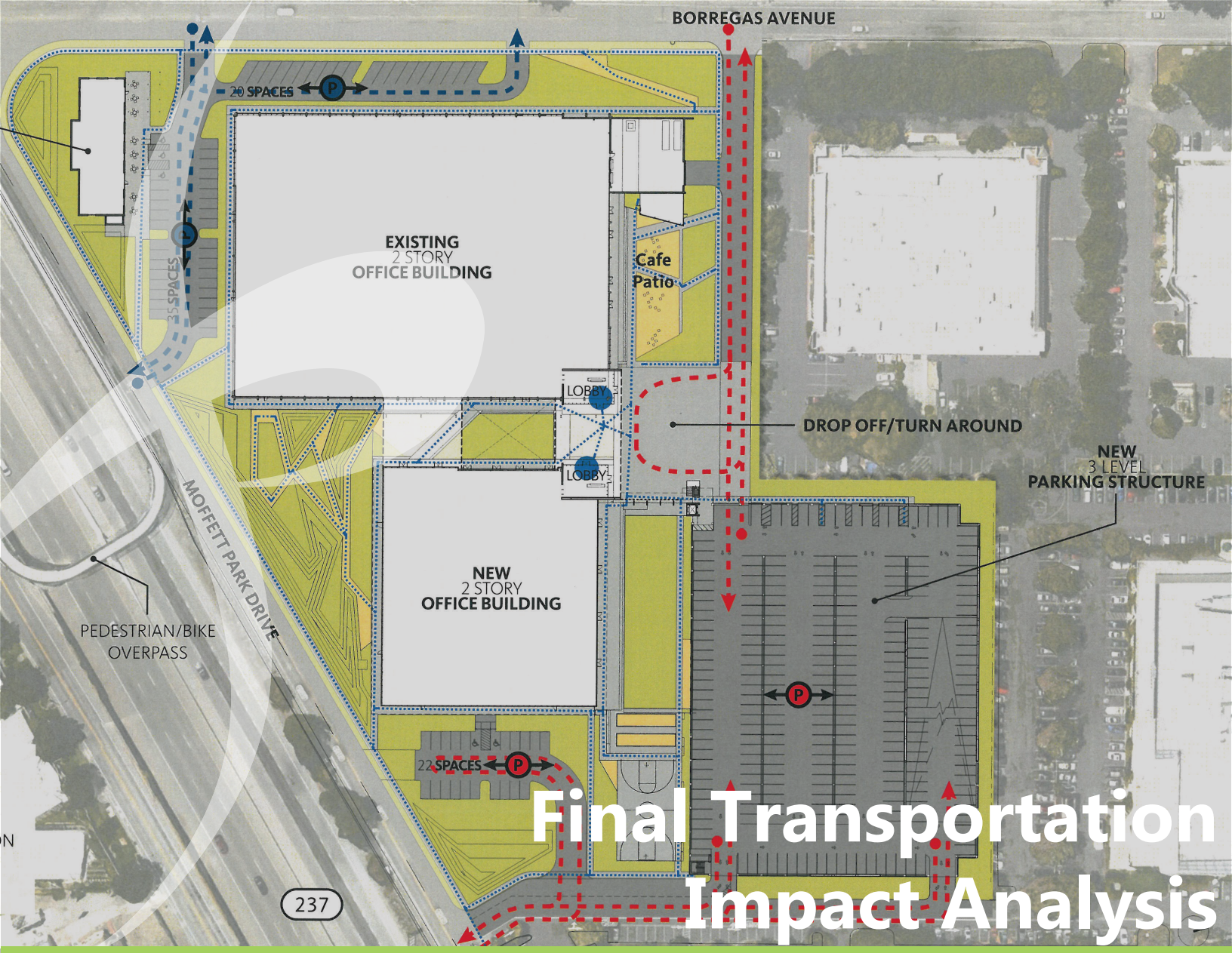

Final Transportation Impact Analysis

215 Moffett Park Drive

Prepared by
FEHR PEERS

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April 2015

215 Moffett Park Drive

Final Transportation Impact Analysis

Prepared for:
City of Sunnyvale

April 2015

SJ14-1540

FEHR PEERS

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AUTO TRIP REDUCTION STATEMENT

UPDATED: October 2014

SANTA CLARA Valley Transportation Authority

PROJECT INFORMATION	*Relevant TIA Section:*	1.1 Project Description
Project Name: 215 Moffett Park Drive Office Development		
Location: 215 Moffett Park Drive, Sunnyvale, CA		
Description: The project would renovate and reduce the existing 158,497-square foot (s.f.) office research and development (R&D) building to a 157,060-s.f. building and add an 86,403-s.f. office R&D building and a 5,000-s.f. restaurant to the 9.5 acre project site.		

Size (net new):	0	*D.U. Residential*	89,966	*Sq. Ft. Comm.*	9.5 *Acres (Gr.)*
Density:		*D.U. / Acre*	58		*Floor Area Ratio (FAR)*

Located within 2000 feet walking distance of an LRT, BRT, BART or Caltrain station or major bus stop? Yes

PROJECT AUTO TRIP GENERATION	*Relevant TIA Section:*	3.1: Project Trip Estimates		
Auto Trips Generated:	123 *AM Pk Hr*	114 *PM Pk Hr*	1,123 *Total Weekday*	
Methodology (check one)	☒ **ITE**	☐ **Other** *(Please describe below)*		

AUTO TRIP REDUCTION APPROACH	*Relevant TIA Section:*	3.1: Project Trip Estimates	
☒ **Standard** *Complete Table A below*	☐ **Peer/Study-Based** *Complete Table B below*	☐ **Target-Based** *Complete Table C below*	☐ **None Taken**

TRIP REDUCTION REQUIREMENTS	*Relevant TIA Section:*	
Is the project required to meet any trip reduction requirements or targets? Yes	**If so, specify percent:** 22.5% daily	
Reference code or requirement: Moffett Park Specific Plan. Daily (22.5%)and peak hour (30.0%) requirements.		

TRIP REDUCTION APPROACHES

A. STANDARD APPROACH	*Relevant TIA Section:*	3.1: Project Trip Estimates			
Type of Reduction *Specify reduction. See Table 2 in TIA Guidelines*		**% Reduction from ITE Rates**	**Total Trips Reduced (AM/PM/Daily)**	**TOTAL REDUCTION CLAIMED**	
				%	**Trips**
Transit	Employment Near LRT	6.0	17/16/126	11	31/30/231
Mixed-Use					
Financial Incentives	TDM program	5.0	14/14/105		
Shuttle					

B. PEER/STUDY-BASED APPROACH	*Relevant TIA Section:*		
Basis of Reduction		**TOTAL REDUCTION CLAIMED**	
		%	**Trips**

Last updated 11/4/2014

C. TARGET-BASED APPROACH			Relevant TIA Section:		
Type of Reduction (check all that apply)				TOTAL REDUCTION CLAIMED	
❒ % Trip Reduction	❒ % SOV mode share	❒ Trip Cap		%	Trips
Description					
Time period for reduction	Peak Hour	Peak Period	Full Day		
	❒ AM/PM	❒ AM/PM	❒		

OTHER TDM/REDUCTION MEASURES			
Bicycle/Pedestrian	Yes/No	Relevant TIA Section:	
Parking Management	Yes/No	Relevant TIA Section:	
Transit	Yes/No	Relevant TIA Section:	
Site Planning and Design	Yes/No	Relevant TIA Section:	
TDM Program	Yes/No	Relevant TIA Section:	

IMPLEMENTATION		Relevant TIA Section:	
Have the project sponsor and Lead Agency agreed to any of the following measures?			
❒Monitoring			
❒Enforcement			
❒Data Sharing			

EXECUTIVE SUMMARY

This report presents the results of the transportation impact analysis (TIA) for the proposed development at 215 Moffett Park Drive (proposed project) located in City of Sunnyvale, California. The project would renovate and reduce the existing 158,497-square foot (s.f.) office research and development (R&D) building to a 157,060-s.f. building and add an 86,403-s.f. office R&D building and a 5,000-s.f. restaurant to the 9.5 acre project site. The project is located within the Moffett Park Specific Plan (MPSP) area and is generally bounded by Borregas Avenue to the west, Moffett Park Drive to the south, and existing office development to the north and east. Part of the project description includes the construction of a new three-level parking structure on the east side of the project site.

PROJECT TRAFFIC ESTIMATES

The proposed project is estimated to generate 1,123 net new daily trips, 123 net new AM peak hour trips (87 inbound and 36 outbound), and 114 net new PM peak hour trips (38 inbound and 76 outbound).

INTERSECTION IMPACTS AND MITIGATION MEASURES

Intersection impacts are evaluated under No Project and plus Project scenarios for Existing, Background, and Cumulative Conditions.

Existing plus Project Conditions

Based on the City of Sunnyvale's impact criteria, the project is expected to have a **less-than-significant impact at all 16 study intersections** evaluated in this TIA.

Background plus Project Conditions

Based on the City of Sunnyvale's impact criteria, the project is expected to have a significant impact at the following locations. Mitigation measures required to mitigate the project impacts are also identified below.

Int. 3 Mathilda Avenue/Moffett Park Drive – Per the Moffett Place TIA (Fehr & Peers, 2013), the reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impact to a less-than-significant level**. Payment of the City's traffic impact fee (TIF) would constitute the project's fair share contribution.

Int. 7 Bordeaux Drive/Moffett Park Drive – Based on City standards, the project's impact would be **mitigated to less-than-significant levels** with the installation of a traffic signal. Per the Moffett Place

TIA, the proposed realignment of the SR 237 Westbound Ramp/Moffett Park Drive off-ramp would require the closure of Moffett Park Drive between Mathilda Avenue and Bordeaux Drive. This would eliminate the eastbound approach of the intersection of Bordeaux Drive and Moffett Park Drive, thus removing all conflict points and eliminating the entire intersection. Therefore, if the proposed off-ramp realignment is implemented, no additional improvements would be required at this intersection.

Cumulative plus Project Conditions

Based on the City of Sunnyvale's impact criteria, the project is expected to have a significant impact at the following locations. Mitigation measures required to mitigate the project impacts are also identified below.

Int. 3 Mathilda Avenue/Moffett Park Drive – Similar to Background plus Project Conditions, the reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impact to a less-than-significant level**. Payment of the City's traffic impact fee (TIF) would constitute the project's fair share contribution.

Int. 7 Bordeaux Drive/Moffett Park Drive – Similar to Background plus Project Conditions, the project's impact would be **mitigated to less-than-significant levels** with the installation of a traffic signal. The proposed realignment of the SR 237 Westbound Ramp/Moffett Park Drive off-ramp would require the closure of Moffett Park Drive between Mathilda Avenue and Bordeaux Drive, which would remove all conflict points and eliminate the entire intersection. Therefore, if the proposed off-ramp realignment is implemented, no additional improvements would be required at this intersection.

Int. 9 Borregas Avenue/Moffett Park Drive – The project's impact would be **mitigated to less-than-significant levels** by removing the stop signs along Moffett Park Drive along the eastbound and westbound approaches and adding an enhanced crosswalk across Moffett Park Drive. This mitigation would not be implemented until vehicular volumes warrant the mitigation and the applicant would be responsible for the full cost of this mitigation.

MATHILDA AVENUE CORRIDOR ANALYSIS

To supplement the TRAFFIX analysis results, the results and findings from the Moffett Place TIA, which used Synchro/SimTraffic software to evaluate the Mathilda Avenue corridor, were used to determine the project's relative effect to the corridor operations.

The Moffett Place TIA identified some intersections to operate unacceptably (level of service (LOS) F) during the AM and PM peak hours. The addition of project trips to these intersections would exacerbate unacceptable operations. The Moffett Place TIA also identified some intersections to operate acceptably

(LOS E or better) during the AM and PM peak hours. Since the proposed project is expected to add 90 or less trips (mostly through and right-turn movements) to a given intersection along the Mathilda corridor, it would be unlikely for the project to degrade operations to unacceptable levels. Therefore, the addition of project trips from the proposed project would not change the Mathilda Avenue corridor operations conclusions presented in the Moffett Place TIA.

FREEWAY SEGMENT IMPACTS AND MITIGATION MEASURES

Freeway impacts are evaluated under the Existing plus Project Conditions only. Under this scenario, the proposed would not degrade acceptably operating segments to unacceptable levels and would not add trips greater than one percent of the freeway segment capacity to the freeway study segments during the AM and PM peak hours. Therefore, the project would have a **less-than-significant freeway impacts** at the identified freeway study segments under Existing plus Project conditions.

BICYCLE AND PEDESTRIAN FACILITIES

Sidewalks will be provided along the perimeter of the project site along the north side of Moffett Park Drive and on the east side of Borregas Avenue. Pedestrian connections will be provided between the office buildings, proposed restaurant, parking lots, and parking garage. While a continuous sidewalk is not present from the project site to the nearest light rail transit (LRT) stop at the Java Drive/Borregas Avenue, the Moffett Place TIA does recommend that sidewalks be constructed on the east side of Borregas Avenue between Gibraltar Drive and Moffett Park Drive. This would complete pedestrian access between the LRT station and the project site.

Bicycle lanes are provided on both sides of Borregas Avenue. However, the bicycle lanes on Moffett Park Drive terminate midway along the project frontage due to insufficient roadway width where a pedestrian/bicycle overcrossing of SR 237 has been constructed. We recommend that the project applicant modify the site plan and include a dedicated bike lane along the entire project frontage to provide continuous westbound bicycle access between Borregas Avenue and Innsbruck Drive. Sharrow lane markings should be added to the roadway in the eastbound direction to indicate that cyclists have full use of the lane and aid cyclists with moving into mixed-flow traffic.

TRANSIT SERVICE

Minimal delays to transit are expected as a result of the proposed project, and no significant impacts were identified for transit.

VEHICLE AND BICYCLE PARKING

Based on the requirements of the Moffett Park Specific Plan (MPSP) and the City of Sunnyvale, the project is required to provide 857 vehicle parking spaces. With the proposed parking supply of 860 spaces, the project would meet and exceeds the minimum parking requirement by three spaces.

For office developments, the MPSP requires a bicycle parking supply ratio of 1 space per 6000 s.f. of gross floor area with 75% being Class I and 25% being Class II. For restaurant uses, the MPSP requires a bicycle parking supply of 1 Class I space per 30 employees and 1 Class II space per 6,000 s.f.

SITE ACCESS AND ON-SITE CIRCULATION

The site plan, dated September 2014, indicates the locations of the project driveways and the internal circulation system for auto, pedestrian, and bicycle traffic. Three driveways will be located along Borregas Avenue and two driveways will be located on Moffett Park Drive. Of the five driveways, two provide access to the three-level parking structure and the small surface lot on the eastern side of the project site. The other three driveways provide access to the parking lots on the southwest corner of the project site. All driveways provide inbound and outbound access except for the middle driveway on Borregas Avenue which provides outbound only access. There is adequate and safe spacing between the driveways.

1.0 INTRODUCTION

This report presents the results of the transportation impact analysis (TIA) for the proposed development at 215 Moffett Park Drive located in the City of Sunnyvale, California. The approximately 9.5 acre project site is located within the Moffett Park Specific Plan (MPSP) area and is generally bounded by Borregas Avenue to the west, Moffett Park Drive to the south, and existing office development to the north and east. Part of the project description includes the construction of a new three-level parking structure on the east side of the project site. The site location is shown on the map on **Figure 1** and the proposed site plan is shown on **Figure 2**.

The purpose of this analysis is to identify potentially significant adverse impacts of the proposed project on the surrounding transportation system and to recommend measures to mitigate significant impacts. The TIA was prepared following the guidelines of the City of Sunnyvale and Santa Clara Valley Transportation Authority (VTA), the congestion management agency for Santa Clara County.

1.1 PROJECT DESCRIPTION

As proposed, the project would renovate and reduce the existing 158,497-square foot (s.f.) office research and development (R&D) building to a 157,060-s.f. building and add an 86,403-s.f. office R&D building and a 5,000-s.f. restaurant to the 9.5 acre project site. A summary of the existing and proposed development on the project site is shown in **Table 1**.

TABLE 1
EXISTING AND PROPOSED DEVELOPMENT

Use	Existing (s.f.)	Proposed (s.f.)	Net New (s.f.)
Office R&D Building 1	158,497	157,060	-1,437
Office R&D Building 2	-	86,403	86,403
Restaurant	-	5,000	5,000
Total	**158,497**	**248,463**	**89,966**

Source: City of Sunnyvale, October 2014.

1.2 DEFINITIONS

- Existing – Conditions of roadways and intersections when data for the study area was collected. The data was collected over a two year period in November 2012, February 2013, October 2014, and November 2014.
- Project – Traffic associated with the proposed 215 Moffett Park Drive R&D and restaurant development.
- Background – Existing conditions plus growth associated with "approved and not built" and "not occupied" developments.
- Cumulative – Existing conditions plus background growth plus all planned and pending projects, in addition to a five-year growth factor (approximately from 2014-2019).
- Constrained Projects – Planned transportation improvement projects for which VTA anticipates full funding within the timeframe of the regional transportation plan ("*Valley Transportation Plan 2035*).

Figure 1

Project Location and Study Intersections

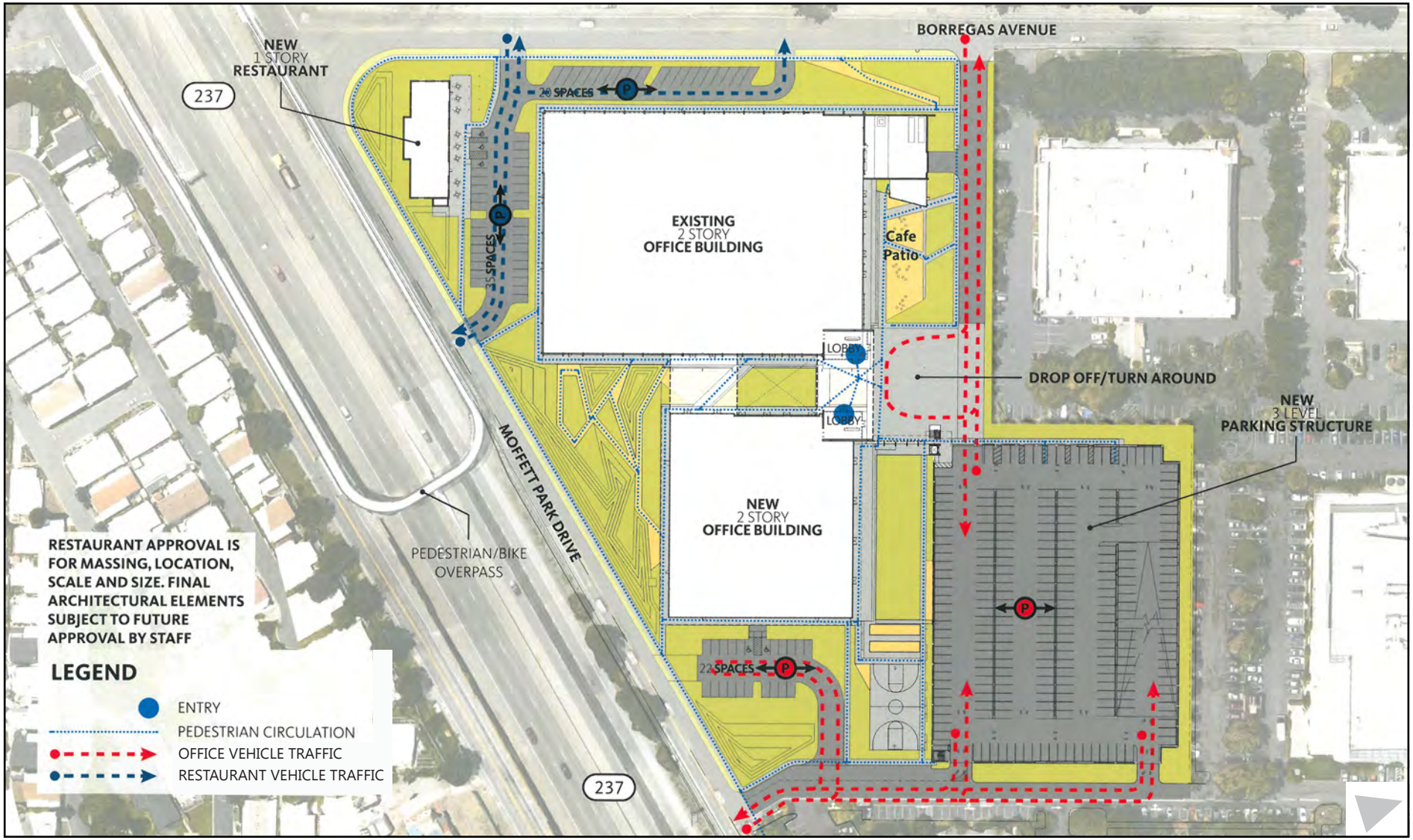


Figure 2

215 Moffett Park Site Plan

1.3 STUDY AREA

The roadway impacts of the proposed project were evaluated for the following intersections and freeway segments:

Study Intersections

1. Northbound US 101 Ramps/Moffett Park Drive
2. Innovation Way/Moffett Park Drive
3. Mathilda Avenue/Moffett Park Drive
4. Mathilda Avenue/Westbound SR 237 Ramps
5. Mathilda Avenue/Eastbound SR 237 Ramps
6. Mathilda Avenue/Ross Drive
7. Bordeaux Drive/Moffett Park Drive
8. Borregas Avenue/Java Drive
9. Borregas Avenue/Moffett Park Drive
10. Java Drive/Geneva Drive
11. Crossman Avenue/Java Drive
12. Crossman Avenue/Moffett Park Drive
13. Fair Oaks Avenue/Fair Oaks Way
14. Fair Oaks Avenue/Tasman Drive
15. Fair Oaks Avenue/Weddell Drive
16. Fair Oaks Avenue/Northbound US 101 Ramps

The listed intersections were selected in consultation with the City of Sunnyvale and generally determined based on VTA's ten trip per lane guideline, which indicates that intersections should be included if the proposed project adds 10 or more peak hour vehicles per lane to any intersection movement.

Freeway Segments

Freeway segments were selected in consultation with the City of Sunnyvale following VTA guidelines. The following segments were selected for analysis because a) the project site is adjacent to SR 237, and b) project access is provided with the Mathilda Avenue and Lawrence Expressway interchanges at US 101 and SR 237 in addition to the Fair Oaks Avenue interchange at US 101.

US 101 (Northbound and Southbound)

- Between SR 237 and Mathilda Street
- Between Mathilda Street and Fair Oaks Avenue
- Fair Oaks Avenue and Lawrence Expressway

SR 237 (Eastbound and Westbound)

- Between US 101 and Mathilda Avenue
- Between Mathilda Avenue and Fair Oaks Avenue
- Between Fair Oaks Avenue and Lawrence Expressway

Pedestrian, Bicycle, and Transit Facilities

Project impacts to pedestrian facilities, bicycle facilities, and transit service and facilities are also addressed.

1.4 ANALYSIS SCENARIOS

The operations of the study intersections were evaluated during the weekday morning (AM) and weekday evening (PM) peak hours for the following scenarios:

Scenario 1: *Existing Conditions* – Existing volumes obtained from counts.

Scenario 2: *Existing plus Project Conditions* – Scenario 1 volumes plus traffic generated by the proposed project.

Scenario 3: B*ackground No Project Conditions* – Existing volumes plus traffic from "approved but not yet built" and "not occupied" developments in the area.

Scenario 4: *Background plus Project Conditions* – Scenario 3 volumes plus traffic generated by the proposed project.

Scenario 5: *Cumulative No Project Conditions* – Background No Project volumes (Scenario 3) including pending developments in the area plus a five year ambient growth factor.

Scenario 6: *Cumulative plus Project Conditions* – Scenario 5 volumes plus traffic generated by the proposed project.

Four of the study intersections on the Mathilda Avenue corridor are closely spaced and the corridor experiences operational issues beyond isolated intersection LOS. A qualitative evaluation of the operational issues along the Mathilda corridor between Ross Drive and Moffett Park Drive is provided in **Chapter *6*** to supplement the TRAFFIX level of service analysis.

1.5 ANALYSIS METHODS

The operations of roadway facilities are described with the term *level of service*. Level of Service (LOS) is a qualitative description of traffic flow based on factors such as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, the best operating conditions, to LOS F, the worst operating conditions. LOS E represents "at-capacity" operations. When traffic volumes exceed the intersection capacity, stop-and-go conditions result, and operations are designated as LOS F.

1.5.1 SIGNALIZED INTERSECTIONS

The method described in Chapter 16 of the 2000 *Highway Capacity Manual* (HCM) (Special report 209, Transportation Research Board) was used to prepare the level of service calculation for the study intersections. This level of service method, which is approved by the City of Sunnyvale and VTA, analyzes a signalized intersection's operation based on average control delay per vehicle. Control delay includes the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The average control delay for signalized intersections is calculated using TRAFFIX analysis software and is correlated to a LOS designation as shown in **Table 2**.

TABLE 2
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS
USING AVERAGE CONTROL VEHICULAR DELAY

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	≤ 10.0
B+	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 to 12.0
B		12.1 to 18.0
B-		18.1 to 20.0
C+	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 to 23.0
C		23.1 to 32.0
C-		32.1 to 35.0
D+	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 to 39.0
D		39.1 to 51.0
D-		51.1 to 55.0
E+	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	55.1 to 60.0
E		60.1 to 75.0
E-		75.1 to 80.0
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80.0

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

1.5.2 UNSIGNALIZED INTERSECTIONS

The operations of the unsignalized intersections were evaluated using the method contained in Chapter 17 of the *2000 HCM*. LOS ratings for stop-sign-controlled intersections are based on the average control delay expressed in seconds per vehicle. At two-way or side-street-controlled intersections, the average

control delay is calculated for each stopped movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. **Table 3** summarizes the relationship between delay and LOS for unsignalized intersections. Additionally, the City of Sunnyvale applies the 2014 *California Manual on Uniform Traffic Control Devices* (MUTCD) peak-hour volume signal warrant to evaluate operations at unsignalized intersections.

TABLE 3
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS
USING AVERAGE CONTROL VEHICULAR DELAY

Level of Service	Description	Average Control Delay Per Vehicle (Seconds)
A	Little or no delay.	≤ 10.0
B	Short traffic delay.	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 with intersection capacity exceeded.	> 50.0

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

1.5.3 FREEWAY SEGMENTS

Freeway segments are evaluated using VTA's analysis procedure, which is based on the density of the traffic flow using methods described in the 2000 HCM. Density is expressed in passenger cars per mile per lane. The Congestion Management Program ranges of densities for each freeway segment level of service are shown in **Table 4**.

TABLE 4
FREEWAY SEGMENT LEVEL OF SERVICE DEFINITIONS

Level of Service	Density (passenger cars per mile per lane)
A	≤ 11
B	11.1 to 18.0
C	18.1 to 26.0
D	26.1 to 46.0
E	46.1 to 58.0
F	> 58.0

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

1.6 LEVEL OF STANDARDS AND IMPACT CRITERIA

1.6.1 INTERSECTION LEVEL OF SERVICE STANDARDS IMPACT CRITERIA

1.6.1.1 Signalized Intersections

The LOS standard for City of Sunnyvale intersections is LOS D except for City of Sunnyvale intersections that are designated regionally significant. Regionally significant roadways are generally CMP roadways and relevant to this TIA includes the Mathilda Avenue corridor. The threshold for regionally significant roadway intersections, consistent with Santa Clara County CMP intersections, is LOS E. Traffic impacts at City of Sunnyvale would occur when the addition of traffic associated with implementation of the Project causes:

1. Intersection operations to deteriorate from an acceptable level (LOS D or better for City of Sunnyvale intersections and LOS E or better for regionally significant roadways) under "No Project" Conditions to an unacceptable level (LOS E or LOS F for City of Sunnyvale intersections and LOF for regionally significant roadways) under the corresponding "plus Project" Condition; or,
2. Exacerbation of unacceptable "No Project" operations (LOS E or LOS F for City of Sunnyvale intersections and LOS F for regionally significant roadways) by increasing the average critical delay by more than 4 seconds and increasing the critical volume-to-capacity (V/C) ratio by 0.01 or more.

The exception to this threshold is when the addition of project traffic reduces the amount of average control delay for critical movements, i.e., the change in average control delay for critical movements are negative. In this case, the threshold is when the project increases the critical v/c value by 0.01 or more.

1.6.1.2 Unsignalized Intersections

Levels of service analysis at unsignalized intersections are generally used to determine the need for modification in type of intersection control (i.e., all-way stop or signalization). As part of this evaluation, traffic volumes, delays, and traffic signal warrants are evaluated to determine if the existing intersection control is appropriate.

The City of Sunnyvale does not have an officially adopted significance criteria for unsignalized intersections. Based on previous studies, significant impacts are defined to occur when the addition of project traffic causes the average intersection delay for all-way stop-controlled intersection or the worst movement/approach for side-street stop-controlled intersections to degrade to unacceptable levels (LOS E or LOS F for City of Sunnyvale intersections and LOS F for regionally significant roadways) and the intersection satisfies any traffic signal warrant from the MUTCD.

1.6.2 FREEWAY IMPACT CRITERIA

The LOS standard for CMP freeway segments is LOS E. Traffic impacts on a CMP freeway segment occurs when the addition of project traffic causes:

- Freeway segment operations to deteriorate from an acceptable level (LOS E or better) under Existing Conditions to an unacceptable level (LOS F); or
- An increase in traffic of more than one percent of the capacity of a segment that operates at LOS F under Existing Conditions.

1.6.3 PEDESTRIAN AND BICYCLE IMPACT CRITERIA

Pedestrian and bicycle impacts are considered significant if the Project would potentially disrupt existing pedestrian and bicycle facilities, interfere with planned pedestrian and bicycle facilities, or would conflict or create inconsistencies with adopted pedestrian and bicycle system plans, guidelines, policies, or standards. These impacts are discussed in **Chapter 7.**

1.6.4 TRANSIT IMPACT CRITERIA

Transit impacts are considered significant if the proposed Project conflicts with existing or planned transit facilities, generates potential transit trips in excess of available capacity, or does not provide adequate facilities for pedestrians and bicyclists to access transit routes and stops. These impacts are discussed in **Chapter 7.**

1.7 MOFFETT PARK SPECIFIC PLAN (MPSP)

The Moffett Park Specific Plan (MPSP) was adopted by the City of Sunnyvale on April 27, 2004. The MPSP defines goals and objectives for future development, community and design guidelines, infrastructure improvements, and development standards for the Moffett Park area. The Moffett Park area is located in the northern most portion of the City of Sunnyvale and is generally bounded by the Moffett Federal Airfield in the west, the San Francisco Bay to the north, SR 237 to the south and Sunnyvale Baylands Park to the east. In regards to transportation, the MPSP includes guidelines for mandatory transportation demand management programs, parking requirements for both vehicles and bicycles, planned roadway improvements to accommodate vehicles, transit, bicyclists, and pedestrians with the proposed buildout of Moffett Park.

1.8 CITY OF SUNNYVALE'S DEFICIENCY PLAN AND TRANSPORTATION IMPACT FEE PROGRAM

In compliance with VTA, the City of Sunnyvale maintains a *Citywide Deficiency Plan* (CDP, September 2005) to address existing and anticipated deficiencies in the level of service of Congestion Management Program (CMP) intersection within the City. The objective of the CDP is to set forth a comprehensive citywide solution of offsetting improvements to LOS deficiencies at CMP facilities for which no localized mitigation is feasible. The CDP includes a list of transportation improvements to mitigate identified deficiencies. Improvements include intersection and roadway improvements, as well as pedestrian, bicycle, and transit infrastructure improvements to facilitate multi-modal access throughout the City. In the vicinity of the proposed project is the Mary Avenue Extension project, which will extend Mary Avenue from its current terminus at Almanor Avenue north over SR 237 and US 101 connecting to 11th Avenue. The new roadway connection will change travel patterns on adjacent streets (particularly the parallel arterials) and will reduce congestion on key facilities such as Mathilda Avenue. The Mary Avenue Extension project is a large long-term project. The extension project is eligible for funding from the City's traffic impact fee (TIF), discussed in the following paragraph, though the TIF assumes that 50 percent of the cost for the extension project will be funded from outside sources. The City projects that the extension project will not move forward until closer to buildout of the General Plan (2035).

To facilitate implementation of the improvements identified in the CDP, the City of Sunnyvale has a two-tiered traffic impact fee (TIF), which identifies a separate fee structure for the Moffett Park Specific Plan area north of SR 237 and the remainder of the City south of SR 237. Fees are adopted pursuant to the Transportation Strategic Program to fund major transportation projects necessary to support land use

plan, including major transportation improvements identified in the CDP. The purpose of the fee is to help provide adequate transportation-related improvements to serve cumulative development within the City. One of the identified projects of the Transportation Strategic Program near the project site is the reconfiguration of the SR 237/Mathilda Avenue interchange. The SR 237 Mathilda Avenue project is a near-term project that is currently in the conceptual design/environmental/Caltrans approval process. Funding is available to complete this project. Since the SR 237/Mathilda Avenue reconfiguration will not be completed by 2019 (the cumulative year for the proposed project), the effects of the reconfiguration are not included in this analysis.

1.9 MOFFETT PLACE TRANSPORTATION IMPACT ANALYSIS (TIA)

The Moffett Place Office Development TIA (hereafter: Moffett Place TIA) was completed in August 2013 (Fehr & Peers, 2013). The Moffett Place project replaces 537,114 s.f. of existing office space and 60,000 s.f. of community college uses (Cogswell College) with a total of 1,799,554 s.f. of office R&D uses. This project is currently under construction and is located adjacent to the 215 Moffett Park project evaluated as part of this TIA at the northwest corner of the intersection of Moffett Park Drive and Borregas Avenue. Since the two projects are directly adjacent and have similar land use and transportation characteristics, technical information, such as mitigation measures and detailed simulation analysis of the Mathilda Avenue corridor, from the Moffett Place TIA are referenced in this analysis.

1.10 REPORT ORGANIZATION

The remained of this report is divided into the following chapters:

- ***Chapter 2*** describes the **existing transportation system** near the project site and the current operating conditions of the key intersections and freeway segments.
- ***Chapter 3*** describes **Existing plus Project Conditions**, including the method used to estimate the amount of traffic added to the surrounding roadways by the proposed project and its impacts on the transportation system.
- ***Chapter 4*** describes **Background Conditions**.
- ***Chapter 5*** describes **Cumulative Conditions**.
- ***Chapter 6*** provides a **qualitative evaluation** of the operational issues **along the Mathilda Avenue corridor**.

- ***Chapter 7*** provides an assessment of **site access, on-site circulation, multi-modal transportation, and parking**.

2.0 EXISTING CONDITIONS

This chapter describes the existing conditions of the roadway facilities, pedestrian and bicycle facilities, and transit service. It also presents existing traffic volumes and operations for the study intersections and freeway segments with the results of the level of service calculations.

2.1 EXISTING ROADWAY NETWORK

State Route 237 (SR 237), US 101, Lawrence Expressway, and Central Expressway provide regional access to the project site. The following streets provide local access: Mathilda Avenue, Moffett Park Drive, Borregas Avenue, Java Drive, Crossman Avenue, and Fair Oaks Avenue. Descriptions of these roadways are presented below. **Figure 1** shows the locations of these facilities in relation to the project site.

SR 237 is located immediately south of the project site and provides regional freeway access between the Cities of Mountain View and Milpitas. SR 237 is an east-west freeway with two mixed-flow lanes in each direction. Express lanes are provided in each direction of SR 237 east of Mathilda Avenue. During the morning (5:00 AM to 9:00 AM) and evening (3:00 PM to 7:00 PM) commute periods, express lanes provide solo drivers the option to use the lanes for a fee. However, vehicles with two or more persons (carpool, vanpool, and buses), motorcycles, and certain zero-emission vehicles (ZEVs) and plug-in hybrid electric vehicles (PHEVs) can use the lanes for free during the commute periods. Access from SR 237 is provided via its interchanges with US 101, Mathilda Avenue, Fair Oaks Avenue (limited access) and Lawrence Expressway.

US 101 extends north through San Francisco and south through San Jose but travels in an east-west direction near the project site. The freeway has three mixed-flow lanes and one HOV lane in each direction. Interchanges at Ellis Street, Mathilda Avenue, Fair Oaks Avenue, and Lawrence Expressway provide local access to the project site.

Mathilda Avenue is a major six-lane north-south arterial that also provides regional access to SR 237 and US 101. North of SR 237, Mathilda Avenue connects to Caribbean Drive, which is the extension of Lawrence Expressway. To the south, Mathilda Avenue passes through central Sunnyvale and becomes Sunnyvale-Saratoga Road, ultimately connecting to I-280 and SR 85. Mathilda Avenue is one of the City of Sunnyvale's designated truck routes for truck over three tons in weight. Approximately 45,000 daily vehicles travel on Mathilda Avenue south of SR 237 on an average weekday.

Moffett Park Drive is a two-lane east-west roadway that extends along the southern border of the MPSP. Moffett Park Drive/Manila Drive provides direct regional access to the project site at the SR 237 interchange and US 101 interchange and has an ADT of approximately 5,000 vehicles. Moffett Park Drive connects to Mathilda Avenue west of the project area and extends east to Caribbean Drive. No access is provided to Moffett Park Drive west of Mathilda Avenue from the SR 237 westbound off-ramp; vertical delineators currently prevent access to the northbound left-turn lanes.

Java Drive is a four-lane east-west roadway divided by light rail tracks in the City of Sunnyvale. Java Drive extends between SR 237 to the east and North Mathilda Avenue to the west. Java Drive continues as North Fair Oaks Avenue to the east and as Lockheed Martin Way to the west.

Fair Oaks Avenue is a four to five-lane north-south roadway extending from SR 237 in the north and continuing as West Remington Drive in the south.

Crossman Avenue is a four-lane north-south roadway extending between Caribbean Drive in the north and Moffett Park Drive in the south.

2.2 PEDESTRIAN FACILITIES

Pedestrian facilities consist of sidewalks, crosswalks, and pedestrian signals at signalized intersections. Sidewalks are not provided on Moffett Park Drive or Borregas Avenue along the project frontage. However, the MPSP identifies future sidewalk improvements on both sides of Borregas Avenue and to the north side of Moffett Park Drive.

At the Mathilda Avenue/SR 237 interchange, north-south pedestrian movements are limited to the east side of Mathilda Avenue and east-west crossing of Mathilda Avenue is prohibited within the interchange area. Pedestrians crossing Mathilda Avenue in the east-west direction must use the crosswalk on the north leg of the Mathilda Avenue/Moffett Park Drive intersection. Sidewalks continue on the east side of Mathilda Avenue from the SR 237 interchange to the south of the US 101 interchange, at which sidewalks continue on both sides of Mathilda Avenue. The City has identified providing sidewalks on both sides of Mathilda Avenue between Moffett Park Drive and US 101 as future pedestrian improvements, which are included in the TIF program.

A multi-use pedestrian/bicycle bridge crosses SR 237 and US 101 east of Mathilda Avenue providing a pedestrian/bicycle connection between Moffett Park on the north and the residential neighborhood to the south. There is currently a stop-controlled crosswalk located on the west leg of the Moffett Park

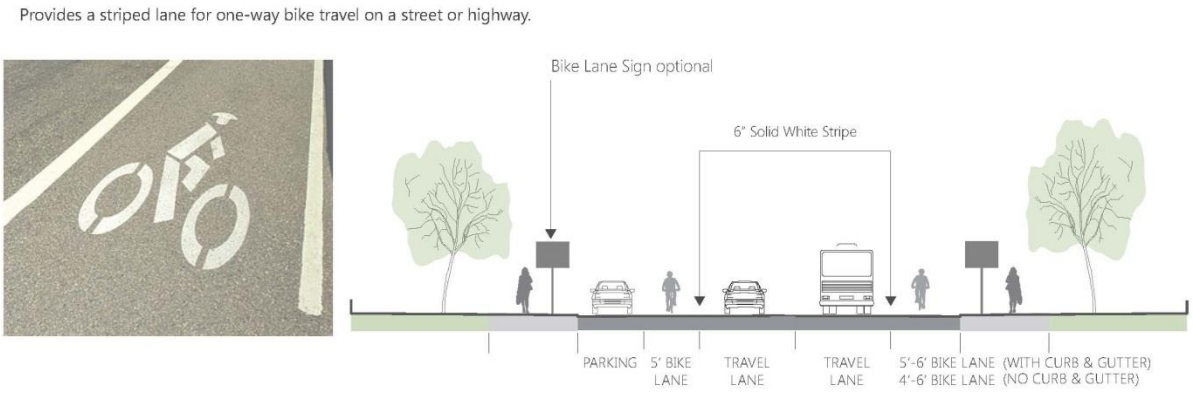
Drive/Borregas Avenue intersection providing a connection to the pedestrian bridge. However, there are currently no sidewalks connecting to the crosswalk at any point of the intersection.

2.3 BICYCLE FACILITIES

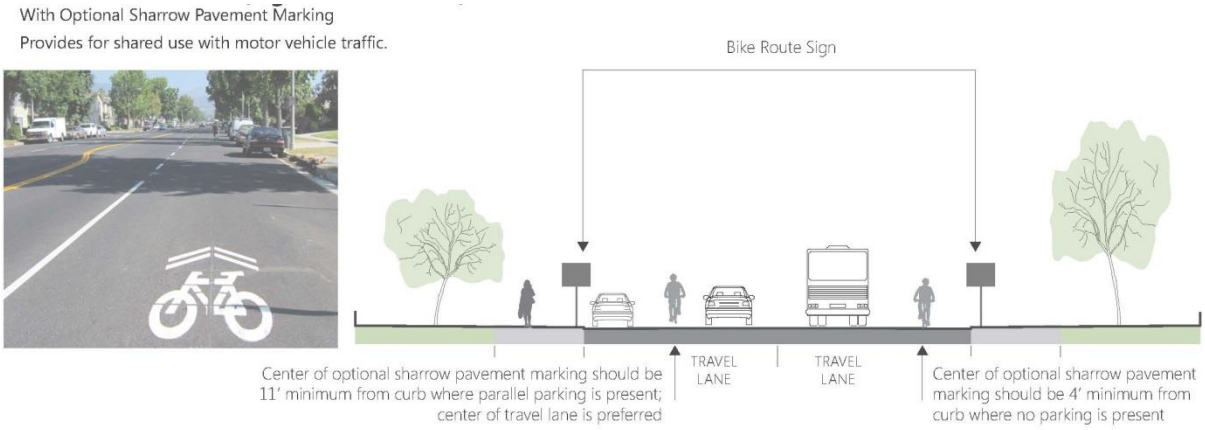
Bikeway planning and design in California typically relies on guidelines and design standards established by California Department of Transportation (Caltrans) in the *Highway Design Manual* (Chapter 1000: Bikeway Planning and Design). Caltrans provides for three distinct types of bikeway facilities, as described below and shown on the accompanying figures.

- *Class I Bikeway (Bike Path)* provides a completely separate right-of-way and is designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized. In general, bike paths serve corridors not served by streets and highways or where sufficient right-of-way exists to allow such facilities to be constructed away from the influence of parallel streets and vehicle conflicts.

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



- *Class III Bikeway (Bike Route)* are designated by signs or pavement markings for shared use with pedestrians or motor vehicles, but have no separated bike right-of-way or lane striping. Bike routes serve either to: a) provide continuity to other bicycle facilities, or b) designate preferred routes through high demand corridors.



The *VTA Bicycle Technical Guidelines* (December 2007) recommends that Caltrans standards regarding bicycle facility dimension be used as a minimum and provides supplemental information and guidance on when and how to better accommodate the many types of bicyclists. **Figure 3** shows the location of the existing bicycle facilities.

Class II bicycle lanes are provided along the following locations in the study area:

- Mathilda Avenue (north of the intersection of 1st Avenue and Bordeaux Drive)
- Borregas Avenue (between Moffett Park Drive and Caribbean Drive) in both directions
- Moffett Park Drive (east of Bordeaux Drive except for a small section along the project frontage)
- Crossman Avenue (between Java Drive and Caribbean Drive)
- Caribbean Drive (between Mathilda Avenue and 237 Ramps)

While there are no bike lanes or delineated right-of-way, a bicycle route (Class III) is designated on Mathilda Avenue at the intersection of 1st Avenue/Bordeaux Drive to Innovation Way.

Class I bicycle/pedestrian trails are provided along the following locations in the study area:

- San Francisco Bay Trail located towards the north of the MPSP area
- The Calabazas Creek located east of Lawrence Expressway
- The John W. Christian Greenbelt from Garner Drive to Morse Avenue, where it connects with existing Class II bike lanes along Weddell Drive

VTA has adopted the Santa Clara Countywide Bicycle Plan (CBP). The CBP guides the development of major bicycling facilities by identifying Cross County Bicycle Corridors and other projects of countywide or intercity significance. Several of these routes travel through the study area, including Route 9 on Borregas Avenue.

Pedestrian and bicycle volumes were collected at all study intersections. The pedestrian and bicycle volumes at the study intersections are shown in **Figure 4** and the count worksheets are provided in **Appendix A**. There is moderate bicycle use along Moffett Park drive during the peak hours; most other movements have only a few cyclists. Pedestrian volumes are low along Mathilda Avenue but relatively high along Java Drive due to proximity to the Borregas and Crossman light rail stations.

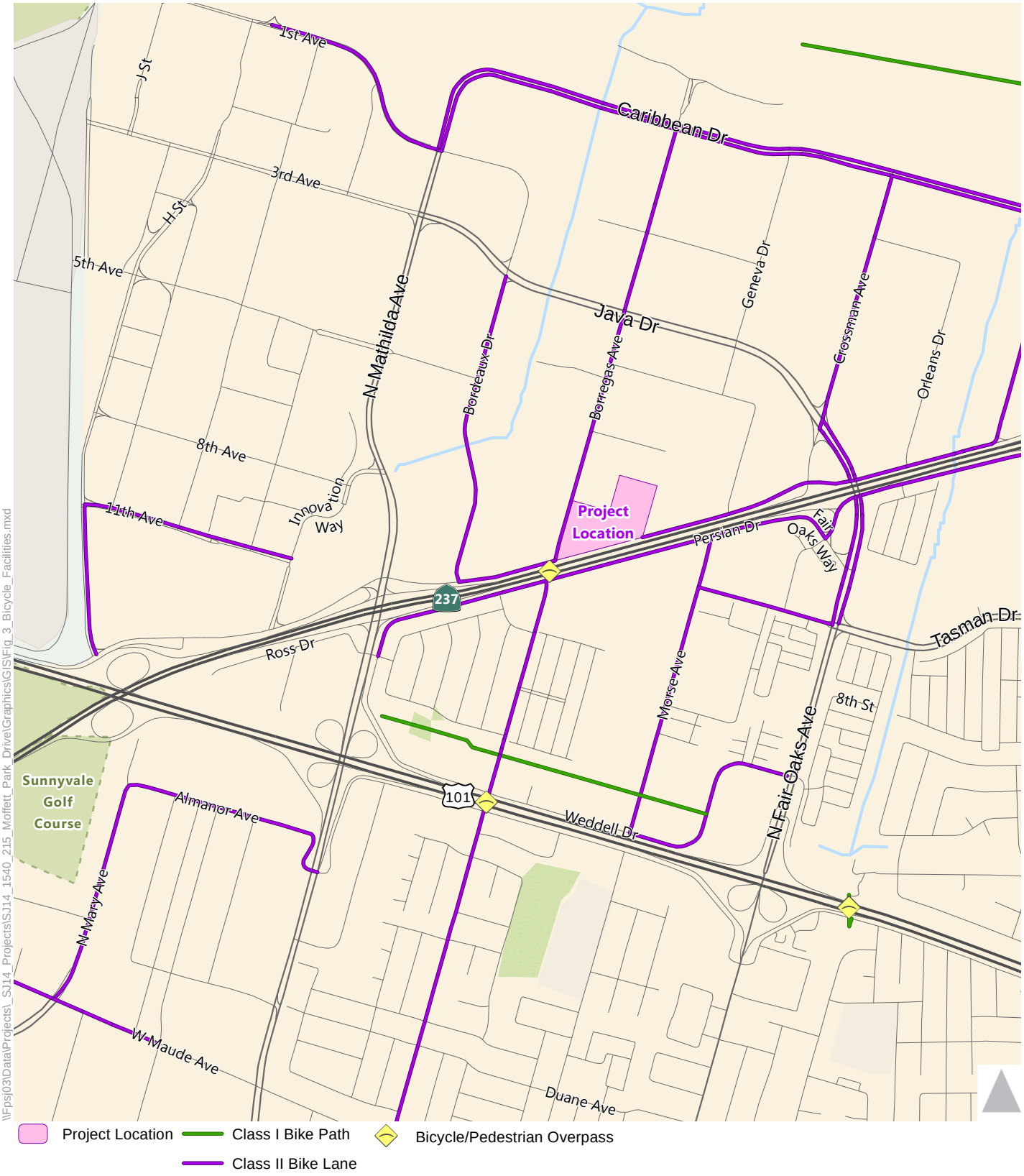


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Figure 3

Existing Bicycle Facilities

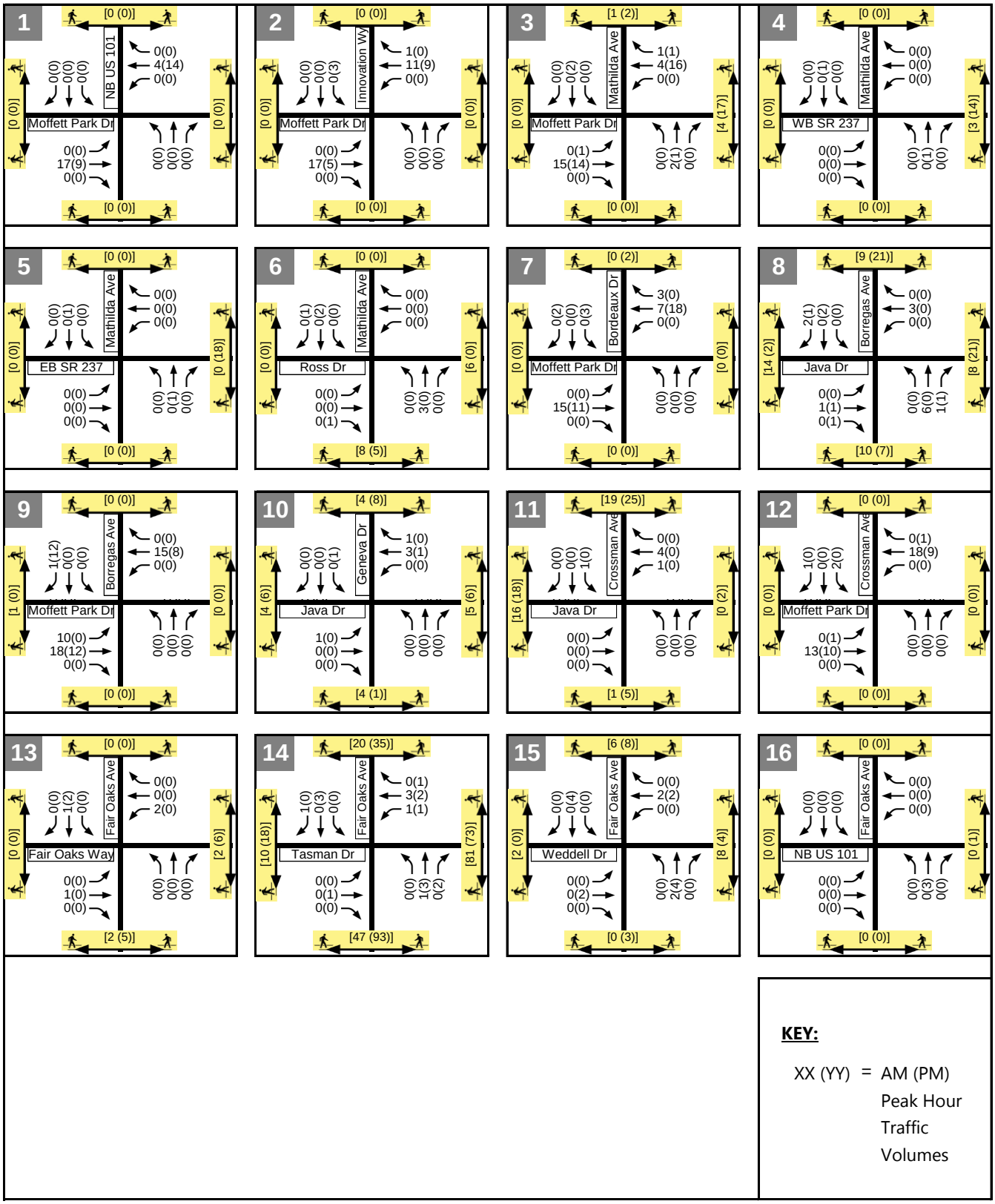

Figure 4
Existing Bicycle and Pedestrian Volumes

2.4 EXISTING TRANSIT SERVICE

The project site is located near VTA-operated transit routes and shuttles to passenger rail service as shown in **Figure 5** and summarized in **Table 5**. The table includes the origins and destinations, operating hours, and headways.

2.4.1 VTA TRANSIT SERVICE

The nearest VTA light rail transit (LRT) station is the Borregas Station, located on Java Drive between Borregas Avenue and Geneva Drive. The Borregas Station is part of the Mountain View – Winchester LRT (Route 902), which begins at the Winchester Station and terminates at the Downtown Mountain View Station. This line connects to the Alum-Rock Santa Teresa LRT (Route 901) and the Peak Commuter Express Service at the Convention Center Station in downtown San Jose and the Tasman Station in San Jose.

VTA also operates bus service in the area. Local buses include bus route 26 and 54. Bus route 26 provides service along Fair Oaks Avenue, Java Drive and Mathilda Avenue. Nearest bus stops are provided along Java Drive at Crossman Avenue, Geneva Drive and Borregas Avenue. Bus route 54 provides service primarily along Mathilda Avenue with the nearest stop provided just north of the intersection of Mathilda Avenue and Moffett Park Drive.

VTA provides express bus service via bus routes 120, 121, and 122. These three lines provide terminate at Lockheed Martin Transit Center and originate from Fremont BART, Gilroy transit Center, and South San Jose respectively. All three routes provide stops along Java Drive at Crossman Avenue, Geneva Drive, and Borregas Avenue.

Limited stop bus service is provided via VTA bus routes 321 and 328. Similar to the express bus service, bus stops are available along Java Drive at Crossman Avenue, Geneva Drive and Borregas Avenue. Bus route 321 operates between the Great Mall and the Lockheed Martin Transit Center while bus route 328 operates between south San Jose and the Lockheed Martin Transit Center.

2.4.2 CALTRAIN AND ACE SHUTTLES

Caltrain provides intercity passenger rail service between San Francisco and San Jose, with extended service to Morgan Hill and Gilroy during weekday commute hours. Both the Mountain View and Sunnyvale Caltrain stations are accessible via bus/shuttle from the MPSP area. The Mary Moffett Caltrain

Shuttle provides service between the Mountain View Caltrain Station and office buildings in the Mary Avenue and Moffett Park areas. During weekday AM and PM commute periods, the Caltrain shuttle operates every 50 to 60 minutes on Mathilda Avenue with a stop at Tech Corners (located off of the intersection of 11th Avenue and Innovation Way). The Mountain View and Sunnyvale stations are designated as express (bullet) train stations for Caltrain. Bus service between the Sunnyvale Caltrain Station and the Moffett Park area is provided by VTA Route 54. Additional private shuttles operated by local employers provide service between the Moffett Park area and the Sunnyvale Caltrain Station. These services are generally limited to the specific employer(s).

The *Altamont Commuter Express* (ACE) provides passenger rail service between Stockton and San Jose. The *ACE Red Line Shuttle (Route 826)* provides free shuttle service between buildings in the Moffett Park and the ACE Great America Station in Santa Clara. This shuttle operates on Mathilda Avenue north of the study area. Shuttle stops are provided at the intersection of Java Drive and Crossman Avenue. Four shuttle runs operate during the AM and PM commute periods with roughly 60-minute headways.

2.4.3 LOCAL SHUTTLES

There are a number of local shuttles specific to Moffett Park Area that provide service within Moffett Park and to surrounding neighborhoods and major transit facilities. The Moffett Park Business & Transportation Association provides information on the shuttle programs to the tenants in Moffett Park.

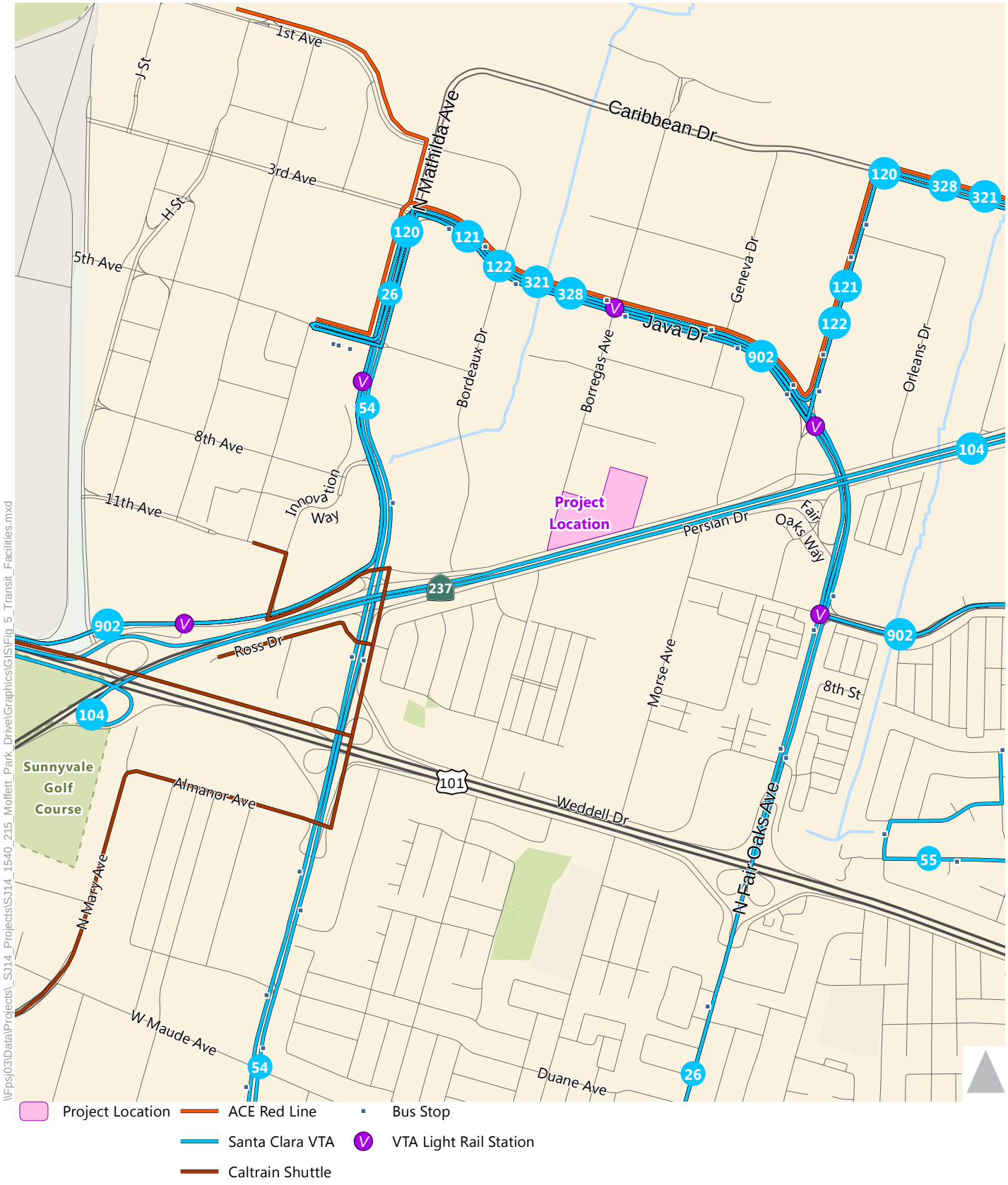

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Figure 5

Transit Facilities

TABLE 5
EXISTING TRANSIT SERVICE

Route	From	To	Weekdays		Weekends	
			Operating Hours[1]	Peak Headway[2] (minutes)	Operating Hours[1]	Headway (minutes)[2]
Bus Service VTA						
26	Eastridge Transit Center	Lockheed Martin Transit Center	5:20 AM – 11:50 PM	30	6:25 AM – 10:55 PM	30 – 60
54	De Anza College		6:00 AM – 9:30 PM	30	8:00 AM – 7:50 PM	45 – 60
120	Fremont BART Station		6:10 AM – 9:15 AM 4:05 PM – 7:10 PM	AM: 6 SB Trips PM: 6 NB Trips	No Service	
121	Gilroy Transit Center		4:30 AM – 9:15 AM 3:00 PM – 7:35 PM	AM: 9 NB Trips PM: 9 SB Trips	No Service	
122	Santa Teresa LRT Station		5:50 AM – 6:45 AM 4:50 PM – 6:00 PM	AM: 1 NB Trip PM: 1 SB Trip	No Service	
321	Great Mall/Main Transit Center		8:10 AM – 8:45 PM 5:50 PM – 6:30 PM	AM: 1 WB Trip PM: 1 EB Trip	No Service	
328	South San Jose		6:00 AM – 8:40 AM 4:55 PM – 7:15 PM	AM: 2 NB Trips PM: 2 SB Trips	No Service	
826 (ACE)	ACE Great America Station		6:15 AM – 9:40 AM 3:10 PM – 6:40 PM	AM: 4 WB Trips PM: 4 EB Trips	No Service	
Mary Moffett Area Caltrain Shuttle	Mountain View Caltrain Station	Tech Corners	7:05 AM – 10:20 AM 2:50 PM – 6:30 PM	AM: 4 NB Trips PM: 4 SB Trips	No Service	
Light Rail Service (VTA)						
902	Downtown Mountain View	Winchester	4:45 AM – 12:40 AM	15	6:00 AM – 12:40 AM	30

Notes:
1. Operating hours rounded to the nearest 5 minute interval.
2. Headways are defined as the time interval between two transit vehicles traveling in the same direction over the same route.

Source: VTA, Caltrain, February 2015.

2.5 EXISTING TRANSPORTATION DEMAND MANAGEMENT PROGRAMS

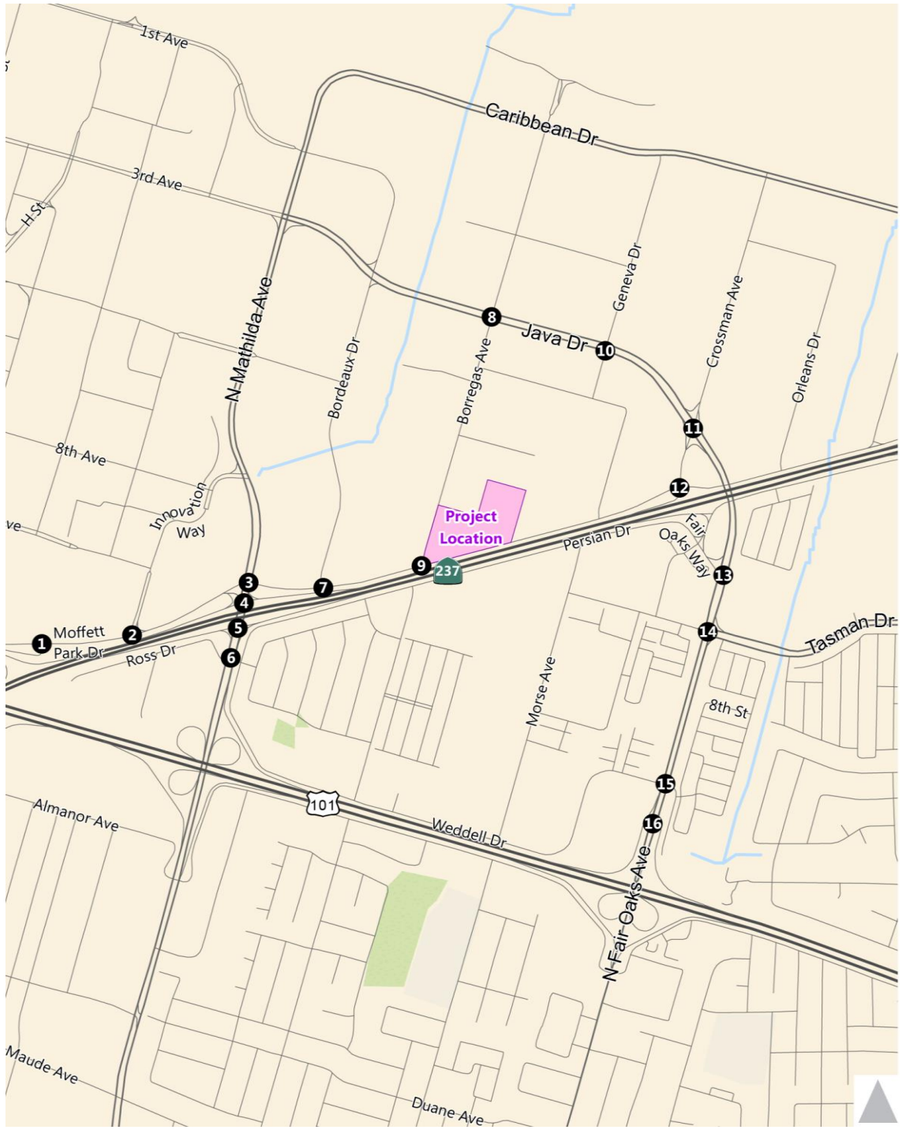
The MPSP requires all new projects with development density of 50-60% FAR in the Moffett Park area of Sunnyvale to have transportation demand management (TDM) programs that reduce daily vehicle trips by a minimum of 22.5 percent and peak hour trips by at least 30 percent from ITE trip generation estimates. Based on the MPSP, TDM programs need to provide detailed descriptions of the employed TDM strategies and should address penalties for noncompliance. TDM programs include an annual review of employee commuting patterns and need to be submitted to City staff for review. As per the MPSP, the Project Applicant will develop a TDM Plan and submit it to City staff for review at the appropriate time in the Project review timeline.

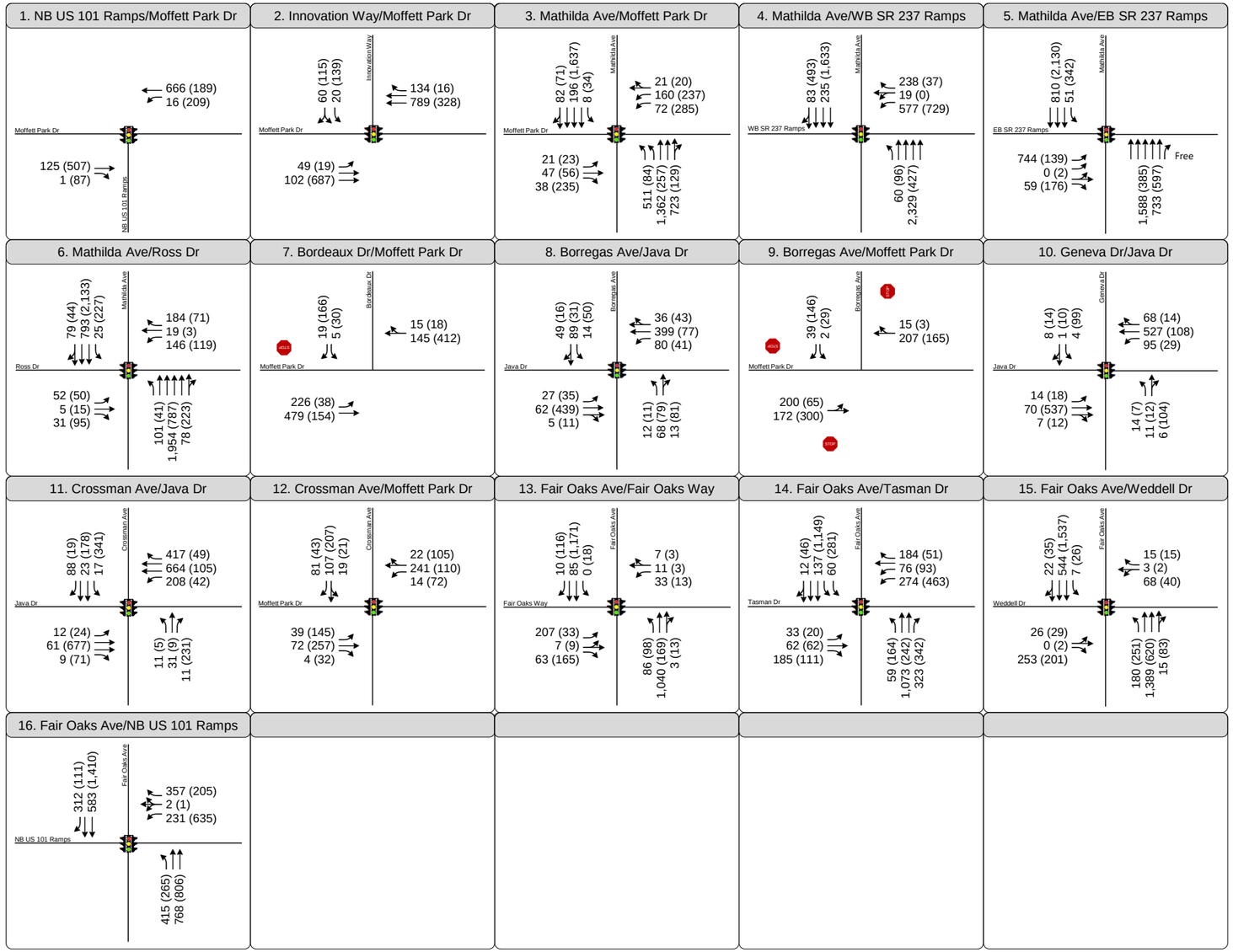
2.6 EXISTING INTERSECTION VOLUMES AND LANE CONFIGURATIONS

The existing operations of the study intersections were evaluated for the highest one-hour volume during the weekday morning and evening peak periods. AM and PM peak-hour intersection turning movement counts were conducted between November 2012 to November 2014 (counts prior to November 2014 were provided by the City of Sunnyvale). Copies of new traffic counts are included in **Appendix A**. **Figure 6** presents the existing AM and PM peak-hour turning movement volumes, lane configurations, and traffic control devices at the study intersections.

2.7 EXISTING INTERSECTION LEVELS OF SERVICE

Existing intersection lane configurations, signal timings, and peak-hour turning movement volumes were used to calculate the levels of service for the key intersections during each peak hour. The results of the LOS analysis using the TRAFFIX software program for Existing Conditions are presented in **Table 6**. **Appendix B** contains the corresponding calculation sheets. The results indicate that all study intersections operate at acceptable service levels (LOS D or better for City intersections and LOS E or better for regionally significant intersections during the AM and PM peak hours.





Peak Hour Traffic Volume AM (PM)
Turn Lane
Stop Sign
Traffic Signal

Figure 6
Existing Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices

TABLE 6
EXISTING INTERSECTION LEVELS OF SERVICE

	Intersection	Count Date	Intersection Control	Peak Hour[1]	Delay[2]	LOS[3]
1	Northbound US 101 Ramps/Moffett Park Drive	February 2013	Signal	AM PM	1.9 5.7	A A
2	Innovation Way/Moffett Park Drive	November 2014	Signal	AM PM	9.6 10.8	A B+
3	Mathilda Avenue/Moffett Park Drive*	February 2013	Signal	AM PM	18.5 22.0	B- C+
4	Mathilda Avenue/ Westbound SR 237 Ramps*	February 2013	Signal	AM PM	14.4 17.6	B B
5	Mathilda Avenue/Eastbound SR 237 Ramps*	February 2013	Signal	AM PM	20.9 12.3	C+ B
6	Mathilda Avenue/Ross Drive*	November 2014	Signal	AM PM	12.4 12.7	B B
7	Bordeaux Drive/Moffett Park Drive	February 2013	Side-Street Stop Controlled	AM PM	22.3 14.1	C B
8	Borregas Avenue/Java Drive	November 2014	Signal	AM PM	17.5 19.6	B B-
9	Borregas Avenue/Moffett Park Drive	November 2014	All-Way Stop Controlled	AM PM	9.9 10.3	A B
10	Java Drive/Geneva Drive	November 2014	Signal	AM PM	13.9 18.8	B B-
11	Crossman Avenue/Java Drive	November 2014	Signal	AM PM	13.7 24.2	B C
12	Crossman Avenue/Moffett Park Drive	November 2014	Signal	AM PM	11.8 12.4	B+ B
13	Fair Oaks Avenue/Fair Oaks Way	November 2014	Signal	AM PM	14.8 18.8	B B-
14	Fair Oaks Avenue/Tasman Drive	November 2012	Signal	AM PM	25.7 38.8	C D+
15	Fair Oaks Avenue/Weddell Drive	November 2012	Signal	AM PM	10.3 17.1	B+ B
16	Fair Oaks Avenue/ Northbound US 101 Ramps	October 2014	Signal	AM PM	22.4 25.0	C+ C

Notes:
1. AM = morning peak hour, PM = afternoon peak hour
2. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop-controlled intersections.
3. LOS = Level of Service calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the *2000 HCM*.

* Regionally significant intersection with LOS E threshold

Source: Fehr & Peers, February 2015.

2.8 FIELD OBSERVATIONS

Field observations of the study intersections were conducted during the morning and evening peak hours in November 2014. In most cases, the intersections were observed to operate at the calculated levels of service for each peak hour. However, in some locations, there were differences between the observed and calculated operations. During both AM and PM peak commute periods, operations at the intersections of Mathilda Avenue/Moffett Park Drive, Mathilda Avenue/SR 237 westbound ramps, and Mathilda Avenue/SR 237 eastbound ramps experienced high traffic volumes that caused long queues and congestion.

Mathilda Avenue/Moffett Park Drive – In the AM peak hour, at the Mathilda Avenue/Moffett Park Drive intersection, the heaviest movements are the northbound through and left-turn movements. Due to the short storage length (90 feet) between Moffett Park Drive and the westbound SR 237 ramps, northbound traffic frequently spill backed into the Mathilda Avenue/SR 237 westbound ramps intersection.

During the PM peak commute period, southbound Mathilda Avenue through traffic does not efficiently utilize the available green time due to queue spill back from the downstream intersection at Mathilda Avenue/SR 237 eastbound ramps intersection. This frequently leads to southbound through traffic blocking the intersection, which in turn hinders westbound traffic from making left-turns. It was observed that the westbound left-turn movement had a large queue and only about half of the queue was able to clear during each green phase (cycle). This standing queue resulted in two to three cars per cycle that entered the intersection under the red at the end of each phase serving westbound Moffett Park Drive.

Mathilda Avenue/SR 237 Westbound Ramps – Westbound SR 237 off-ramp traffic cannot access westbound Moffett Park Drive; vertical delineators prohibit the right-turn movement into those lanes. Vehicles would have to cross three lanes of through traffic on Mathilda Avenue in less than 100 feet to access the northbound left-turn lane.

Mathilda Avenue/SR 237 Eastbound Ramps – During the AM peak period, traffic was heavy at the intersection of Mathilda Avenue/SR 237 Eastbound ramps; however, there was little congestion and illegal movements were not observed. During the PM peak period, the southbound through and left-turn lanes have limited storage capacity, which causes vehicles to spill back into the upstream intersection at Moffett Park Drive.

Mathilda Avenue/Ross Drive - During the AM peak period, traffic is heaviest in the northbound direction (through movements). Specifically, lane utilization is the heaviest in the outer through lane, with vehicles lining up to access the SR 237 eastbound on-ramp at the next intersection. Queues occasionally backed

up near the northbound off-ramp, but cleared within two minutes. The queues did affect freeway or ramp operations. In the PM peak hour, no major queues or delays were observed. Southbound traffic is held at the signal for the SR 237 eastbound off-ramp and approaches the Mathilda Avenue/Ross Drive intersection in smaller platoons (groups), which minimizes potential delay and queuing problems.

2.9 EXISTING FREEWAY SEGMENT LEVELS OF SERVICE

According to VTA's *Transportation Impact Analysis Guidelines* (VTA, 2014) a freeway segment analysis should be included if the project meets one of the following requirements:

1. The proposed development project is expected to add traffic equal to at least one percent of a freeway segment's capacity.
2. The proposed development project is adjacent to one of the freeway segment's access or egress points
3. Based on engineering judgment, Lead Agency staff determines that the freeway segment should be included in the analysis.

The project meets all three criteria and a freeway segment analysis was conducted.

Table 7 contains the existing freeway segment levels of service for the mixed-flow and HOV lanes based on the segment densities reported in the VTA's *2012 CMP Monitoring and Conformance Report,* which is the most recent report available as of February 2015. For mixed-flow lanes, freeway segment capacities are defined as 2,200 vehicles per hour per lane (vphpl) for four-lane freeway segments and 2,300 vphpl for six-lane freeway segments. HOV lane capacities are defined between 1,800 to 1,900 vphpl.

TABLE 7
EXISTING FREEWAY SEGMENT LEVELS OF SERVICE

Freeway Segment	Direction	Peak Hour[1]	Lanes		Density[2]		LOS[3]	
			Mixed	HOV	Mixed	HOV	Mixed	HOV
US 101, SR 237 to Mathilda Avenue	NB	AM	3	1	50	34	E	D
		PM	3	1	27	20	D	C
	SB	AM	3	1	25	34	C	D
		PM	3	1	28	28	D	D
US 101, Mathilda Avenue and Fair Oaks Avenue	NB	AM	3	1	**59**	35	**F**	D
		PM	3	1	33	12	D	B
	SB	AM	3	1	33	20	D	C
		PM	3	1	42	21	D	C
US 101, Fair Oaks Avenue and Lawrence Expressway	NB	AM	3	1	**93**	35	**F**	D
		PM	3	1	31	11	D	A
	SB	AM	3	1	29	25	D	C
		PM	3	1	**78**	35	**F**	D
SR 237, US 101 and Mathilda Avenue	EB	AM	2	0	**83**	N/A	**F**	N/A
		PM	2	0	28	N/A	D	N/A
	WB	AM	2	0	41	N/A	D	N/A
		PM	2	0	**71**	N/A	**F**	N/A
SR 237, Mathilda Avenue and Fair Oaks Avenue	EB	AM	2	1	**60**	20	**F**	C
		PM	2	1	**72**	25	**F**	C
	WB	AM	3	0	**79**	N/A	**F**	N/A
		PM	3	0	**70**	N/A	**F**	N/A
SR 237, Fair Oaks Avenue and Lawrence Expressway	EB	AM	2	1	34	23	D	C
		PM	2	1	**93**	30	**F**	D
	WB	AM	2	1	**82**	56	**F**	E
		PM	2	1	**72**	31	**F**	D

Notes:
1. AM = morning peak hour, PM = afternoon peak hour
2. Measured in passenger cars per mile per lane
3. LOS = Level of Service

N/A = Not applicable. Freeway segment does not have HOV lanes.
Bold font indicates unacceptable operations based on VTA's LOS E Standard.
Source: *2012 Monitoring and Conformance Report*, VTA, May 2012.

3.0 EXISTING PLUS PROJECT CONDITIONS

The impacts of the proposed project on the transportation system are discussed in this chapter. First, the method used to estimate the amount of traffic generated by the project is described. Then, the results of the level of service calculations for Existing plus Project Conditions are presented. (Existing plus Project Conditions are defined as Existing Conditions plus traffic generated by the proposed project). A comparison of intersection operations under Existing plus Project Conditions and Existing Conditions is presented and the impacts of the project on the study intersections are discussed. Project impacts on freeways are also addressed.

3.1 PROJECT TRAFFIC ESTIMATES

The amount of traffic added to the roadway system by the proposed development is estimated using a three-step process: (1) trip generation, (2) trip distribution, and (3) trip assignment. The first step estimates the amount of traffic added to the roadway network. The second estimates the direction of travel to and from the project site. The new trips are assigned to specific street segments and intersection turning movements during the third step. The results of the process for the proposed project are described in the following sections.

3.1.1 TRIP GENERATION

The amount of traffic anticipated to be added to the surrounding roadway system by the proposed project was estimated based on data published in the Institute of Transportation Engineers' (ITE) *Trip Generation* 9th Edition (2012). The results are presented in **Table 8**.

The proposed project will add a new 86,403-s.f. office building and 5,000-s.f. restaurant to the project site. The existing 158,497 s.f. office space will be renovated and reduced to a 157,060 s.f. building. Trip generation equations for "Research and Development Center" (ITE Land Use 760) and average rates for "High-Turnover (Sit-Down) Restaurant" (ITE Land Use Code 932) were used to develop the trip generation estimates. Trip generation estimates for existing land uses, based on ITE rates, were credited to the new project land uses to determine the net new vehicle trips that would access the project site.

TABLE 8
215 MOFFETT PARK DRIVE TRIP GENERATION ESTIMATES

Land Use	ITE Code[1]	Size	Units[2]	Daily		AM Peak Hour				PM Peak Hour			
				Rate[3]	Trips	Rate[3]	In	Out	Total	Rate[3]	In	Out	Total
EXISTING LAND USES													
Office R&D Building[4]	760	158.497	ksf	9.29	1,472	1.22	161	33	194	1.22	29	164	193
6% Office Transit Reduction[6]					-88		-10	-2	-12		-2	-10	-12
Existing Land Use Vehicle Trips (A):					**1,384**		**151**	**31**	**182**		**27**	**154**	**181**
PROPOSED LAND USES													
Office R&D Buildings[4]	760	243.463	ksf	8.63	2,102	1.16	234	48	282	1.13	41	235	276
11% Office TDM Program Reduction[6,7]					-231		-26	-5	-31		-5	-25	-30
Net Proposed Office Trips					1,871		208	43	251		36	210	246
Restaurant[5]	932	5.0	ksf	127.2	636	10.8	30	24	54	9.8	29	20	49
Proposed Land Uses Vehicle Trips (B):					**2,507**		**238**	**67**	**305**		**65**	**230**	**295**
NET NEW VEHICLE TRIPS (B-A):					**1,123**		**87**	**36**	**123**		**38**	**76**	**114**

Notes:
1. ITE Code 760 – Research and Development Center (Peak Hour, AM, and PM); ITE Code 932 – High-Turnover Restaurant (Adjacent Street 7-9AM, 4-6PM)
2. ksf = 1,000 square feet
3. Rates per unit (ksf)
4. Following ITE trip generation equations used (ITE Code 760)
   Daily: LN(T) = 0.83*LN(X)+3.09; AM: LN(T) = 0.87*LN(X)+0.86 (83% in, 17% out); PM: LN(T) = 0.83*LN(X)+1.06 (15% in, 85% out)
5. Following ITE trip generation rates used (ITE Code 932)
   Daily: T = 127.15*(X); AM: T = 10.81*(X) (55% in, 45% out); PM: T = 9.85*(X) (60% in, 40% out)
6. Trip reduction for "Employment near LRT, BRT, or Caltrain Station" per VTA *Transportation Impact Analysis Guidelines* (August 2014).
7. Trip reduction for "Financial Incentives" and "Employment near LRT, BRT, or Caltrain Station" per VTA *Transportation Impact Analysis Guidelines* (August 2014).

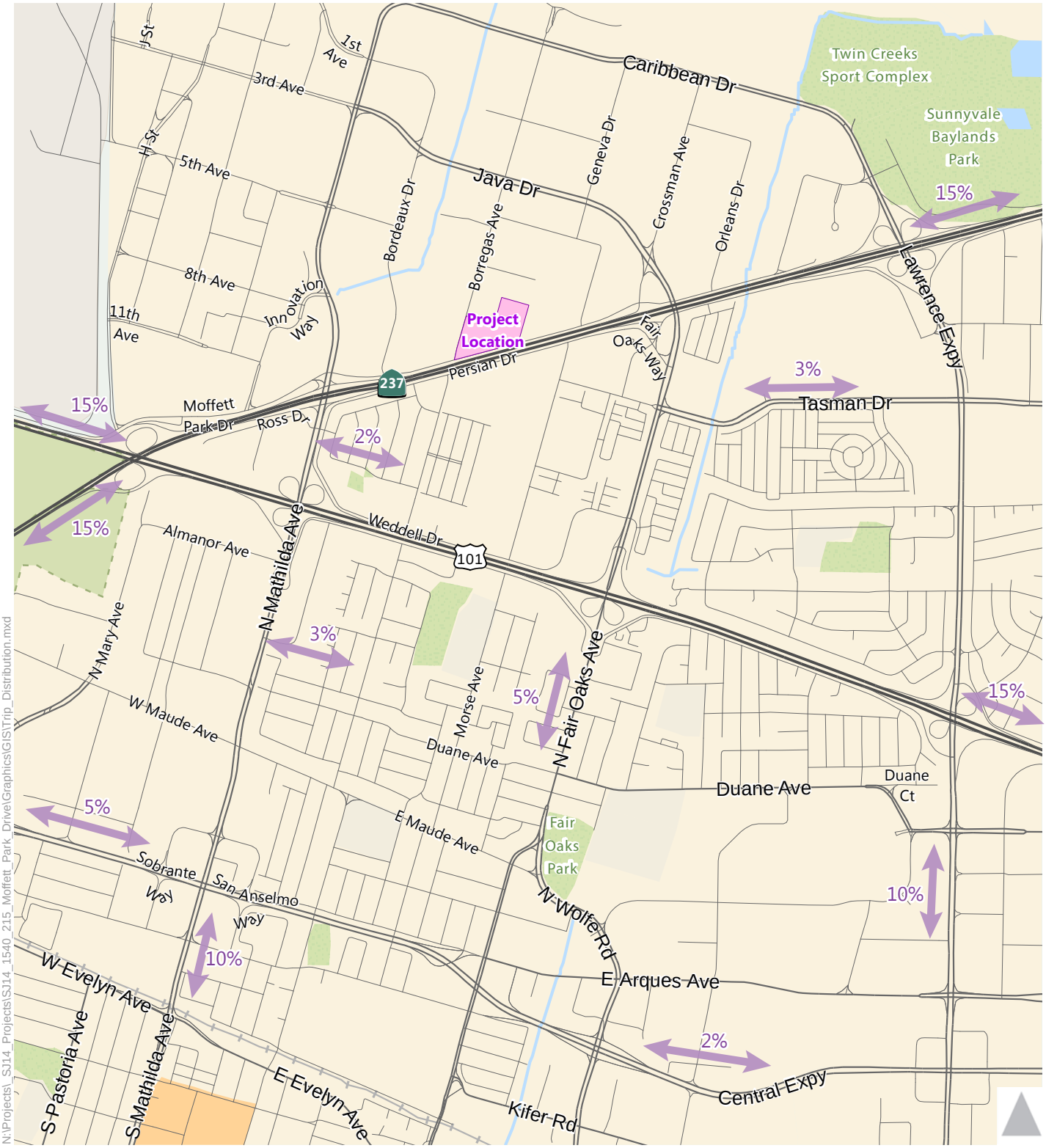
Sources: *ITE Trip Generation Manual*, 9th edition (2012); *Transportation Impact Analysis Guidelines*, VTA Congestion Management Program, August 2014

As discussed under Existing Conditions, the MPSP requires all new projects in the Moffett Park area of Sunnyvale to have TDM programs that reduce daily and peak hour vehicle trips. The existing office building on the project site does not have a TDM program but the proposed project will have a TDM program developed by the Project Applicant. Based on the guidelines from the MPSP, the Moffett Park TDM program is required to reduce daily trips by 22.5 percent and peak hour trips by 30 percent. However, VTA guidelines only allow for a maximum 11 percent reduction on vehicle trips for projects near a light rail station that have an effective TDM program based on the standard trip reduction approach applied in this study. Therefore, the more conservative 11 percent was applied to the proposed project office trips. As shown in **Table 8**, the proposed project is estimated to generate 1,123 net new daily trips, 123 net new AM peak-hour trips (87 inbound and 36 outbound), and 114 net new PM peak hour trips (38 inbound and 76 outbound).

3.1.2 TRIP DISTRIBUTION AND ASSIGNMENT

The distribution of the traffic generated by the project onto the roadway system was based on the locations of complementary land uses, prevailing travel patterns, surrounding population densities, and recent TIAs completed in the area. Input from the City of Sunnyvale staff was used to refine the trip distribution patterns. The trip distribution pattern is shown in **Figure 7**.

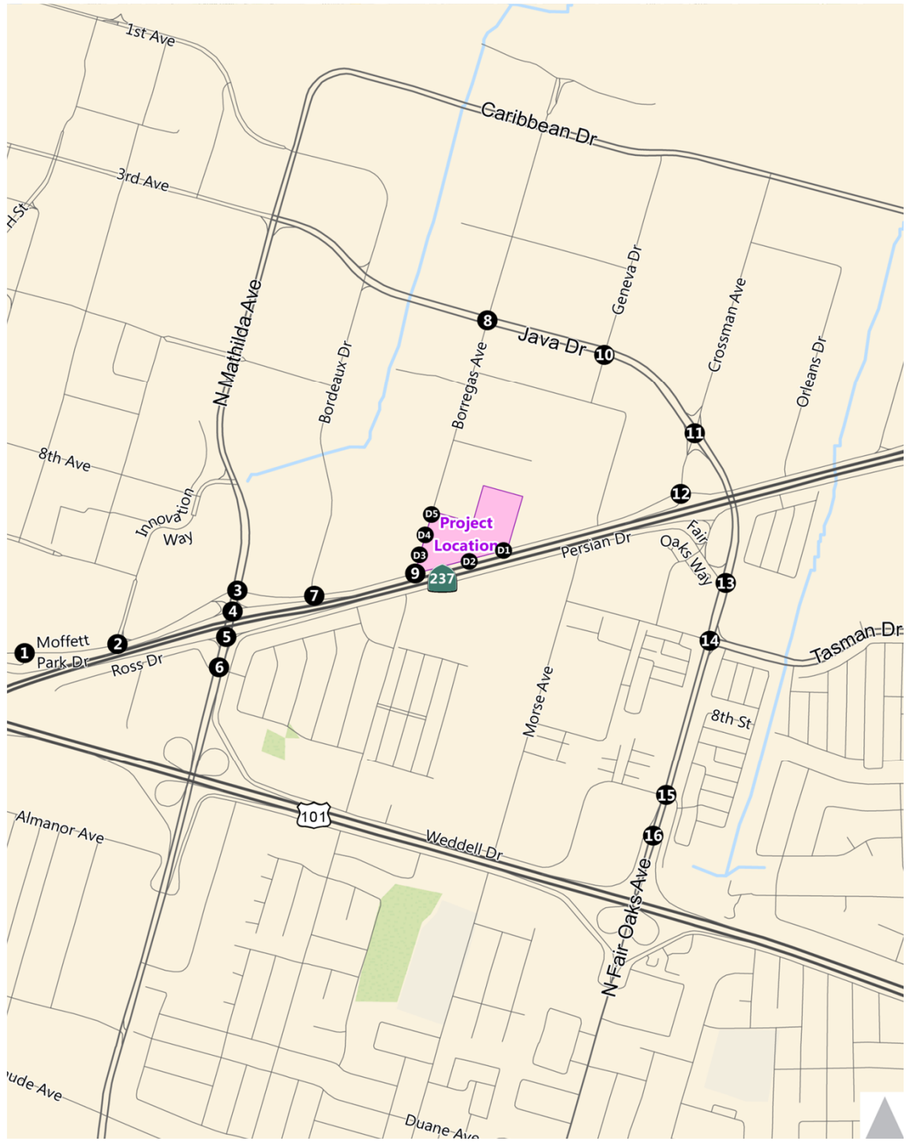
Project trips were assigned to the roadway network based on the trip distribution patterns discussed above. **Figure 8** shows the AM and PM peak hour project trips assigned to each turning movement at the study intersections. The trip assignment was added to the existing volumes to establish volumes under Existing plus Project Conditions, as shown on **Figure 9**.

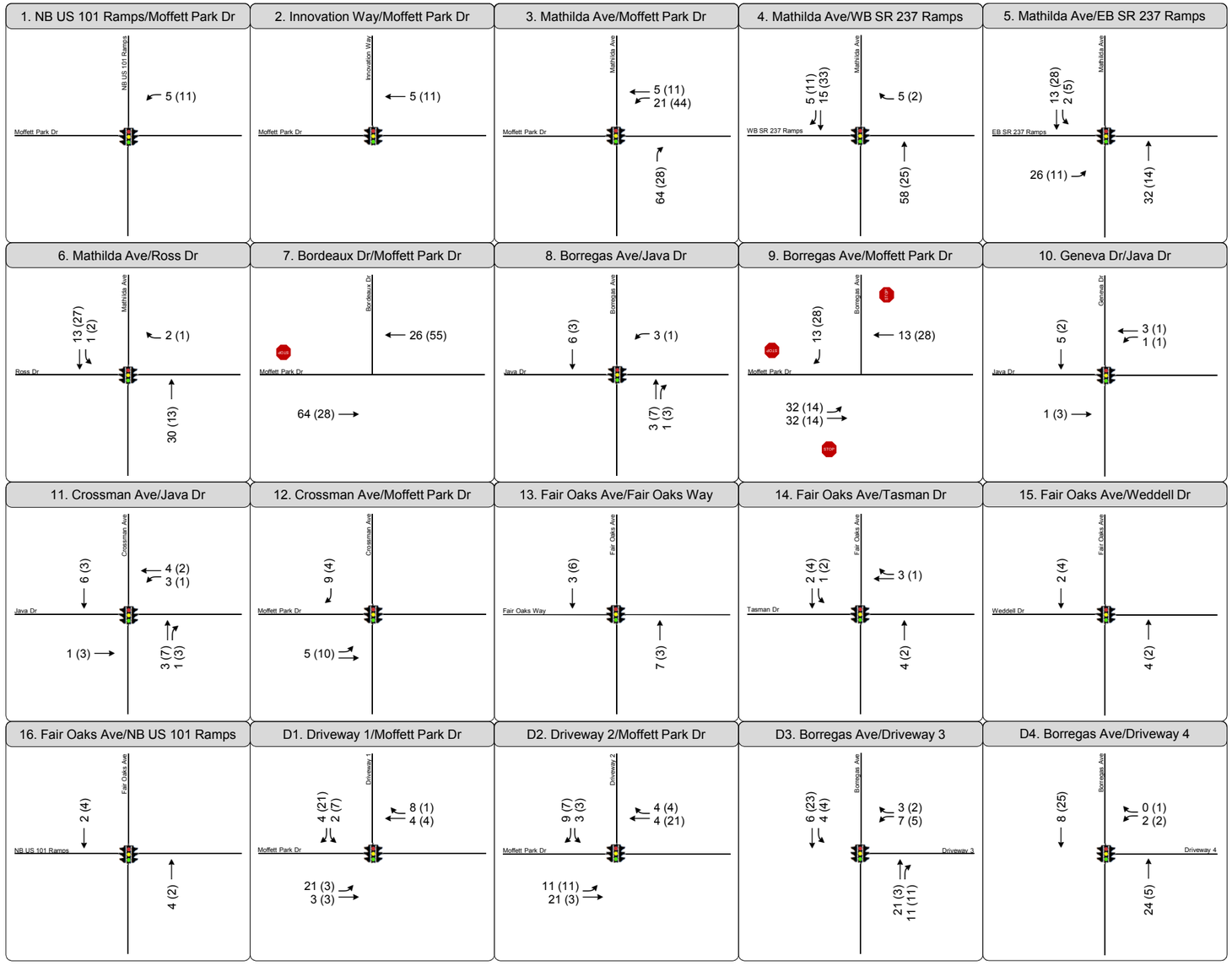


Project Location

Figure 7

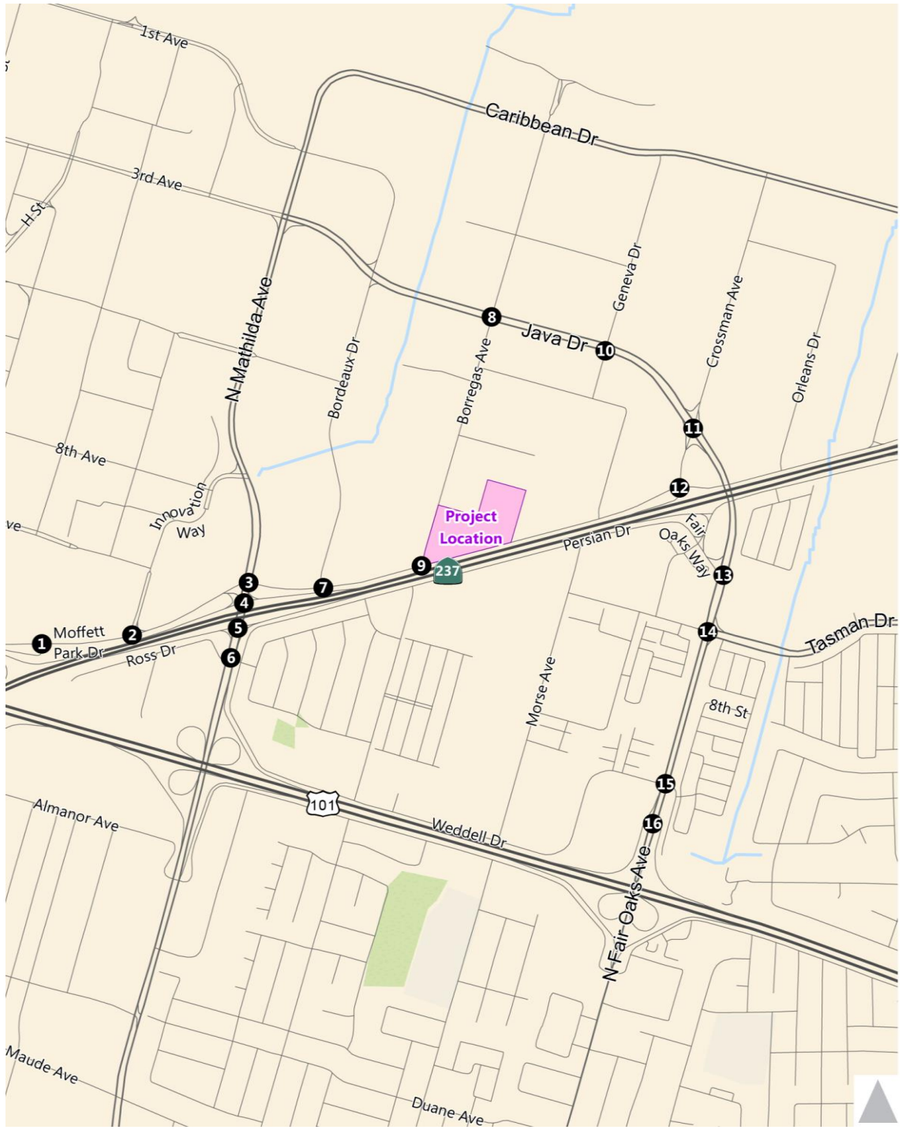
Project Trip Distribution

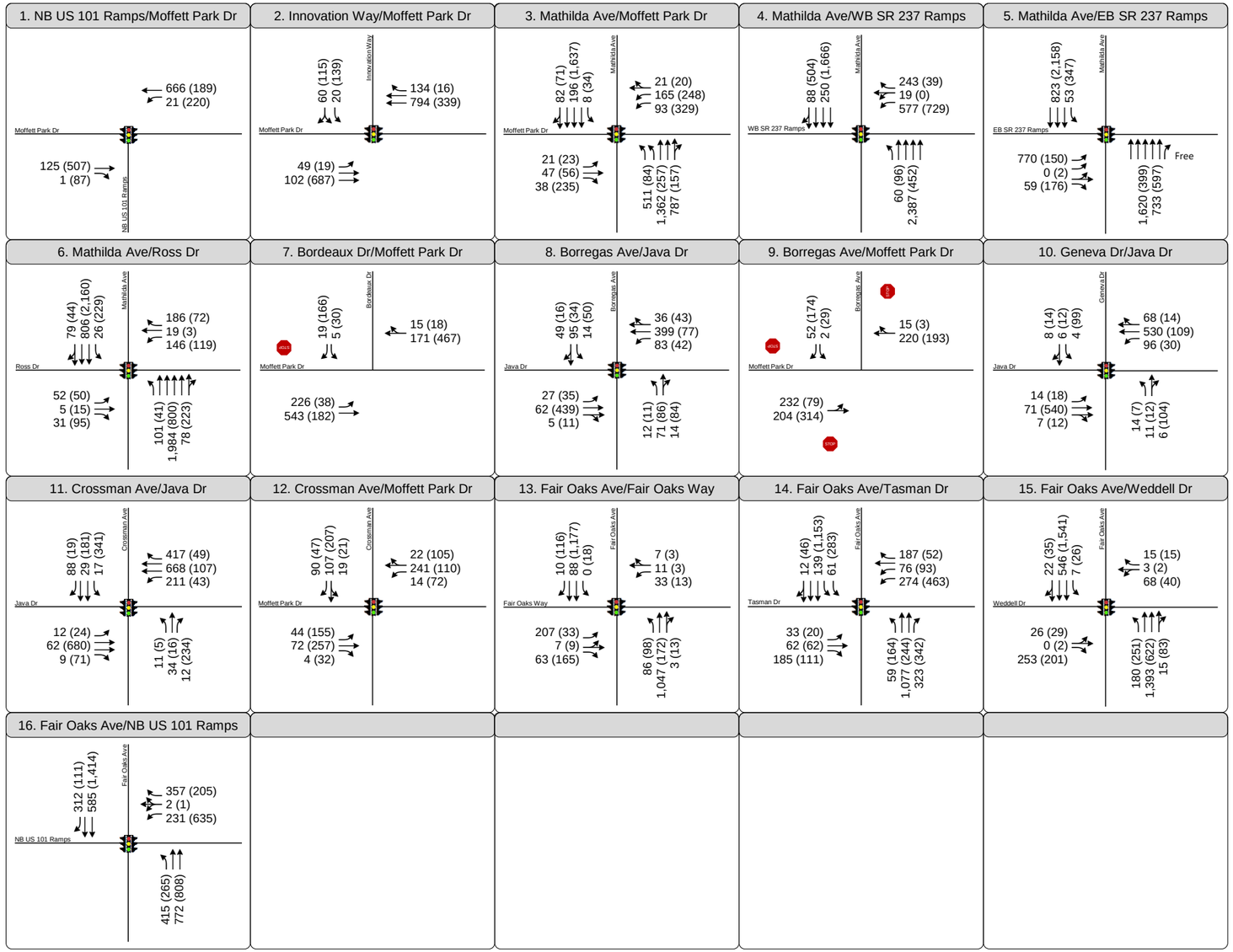




Peak Hour Traffic Volume — AM (PM)
Turn Lane
Stop Sign
Traffic Signal

Figure 8
Project Trip Assignment





Peak Hour Traffic Volume — AM (PM)
Turn Lane
Stop Sign
Traffic Signal

Figure 9
Existing plus Project Peak Hour Traffic Volumes and Lane Configurations

3.2 EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

Intersection levels of service were calculated with the new traffic added by the proposed project to evaluate the operating conditions of the intersections and identify potential impacts to the roadway system. The results of the intersection level of service calculations for Existing plus Project Conditions are presented in **Table 9**. **Appendix B** contains the corresponding calculation sheets. The results for Existing Conditions are included for comparison purpose, along with the projected increases in critical delay and critical volume-to-capacity (V/C) ratios. Critical delay represents the delay associated with the critical movements of the intersection, or the movements that require the most "green time" and have the greatest effect on overall intersection operations. The changes in critical delay and critical V/C ratio between Existing and Existing plus Project Conditions are used to identify significant impacts.

The results of the LOS calculations indicate that all study intersection operate at acceptable service levels (LOS D or better for signalized City intersection and LOS E or better for regionally significant and unsignalized intersections) during the AM and PM peak hours under Existing plus Project conditions.

3.2.1 PEAK HOUR SIGNAL WARRANT ANALYSIS

The 2014 California *Manual of Uniform Traffic Control Devices* (MUTCD) contains a number of guidelines, called warrants, to determine whether the installation of a traffic signal at a particular location is appropriate. The peak hour volume signal warrant, one of eight warrants, was evaluated for the unsignalized intersections of Bordeaux Drive/Moffett Park Drive and Borregas Avenue/Moffett Park Drive under Existing and Existing plus Project Conditions.[1] The results indicate that neither intersection satisfies the peak hour volume signal warrant under Existing plus Project Conditions during the AM and PM peak hours. **Appendix C** contains the peak hour signal warrants.

[1] The peak hour signal warrant analysis should not serve as the only basis for deciding whether and when to install a traffic signal. To reach such a decision, the full set of warrants should be investigated based on a thorough study of traffic and roadway conditions by an experienced engineer. The decision to install a signal should not be based solely upon the warrants, since the installation of signals can lead to certain types of collisions. The responsible state or local agency should undertake regular monitoring of actual traffic conditions and accident data and timely re-evaluation of the full set of warrants in order to prioritize and program intersections for signalization.

TABLE 9
EXISTING AND EXISTING PLUS PROJECT INTERSECTION LEVELS OF SERVICE

	Intersection	Intersection Control[1]	Peak Hour[2]	Existing Conditions		Existing plus Project Conditions				
				Delay[3]	LOS[4]	Delay[3]	LOS[4]	Δ in Crit. V/C[5]	Δ in Crit. Delay[6]	Signal Warrant Met?[7]
1	NB US 101 Ramps/ Moffett Park Drive	Signal	AM	1.9	A	1.9	A	0.000	0.0	N/A
			PM	5.7	A	5.9	A	0.007	0.2	N/A
2	Innovation Way/ Moffett Park Drive	Signal	AM	9.6	A	9.5	A	0.001	0.0	N/A
			PM	10.8	B+	10.7	B+	0.004	0.0	N/A
3	Mathilda Avenue/ Moffett Park Drive*	Signal	AM	18.5	B-	19.1	B-	0.046	1.9	N/A
			PM	22.0	C+	22.5	C+	0.007	0.4	N/A
4	Mathilda Avenue/ WB SR 237 Ramps*	Signal	AM	14.4	B	14.4	B	0.009	-0.1	N/A
			PM	17.6	B	17.5	B	0.007	0.0	N/A
5	Mathilda Avenue/ EB SR 237 Ramps*	Signal	AM	20.9	C+	21.0	C+	0.012	0.2	N/A
			PM	12.3	B	12.3	B	0.008	0.0	N/A
6	Mathilda Avenue/ Ross Drive*	Signal	AM	12.4	B	12.3	B	0.004	0.0	N/A
			PM	12.7	B	12.7	B	0.005	0.0	N/A
7	Bordeaux Drive/ Moffett Park Drive	SSSC	AM	22.3	C	24.7	C	N/A	N/A	No
			PM	14.1	B	15.3	C	N/A	N/A	No
8	Borregas Avenue/ Java Drive	Signal	AM	17.5	B	17.6	B	0.004	0.2	N/A
			PM	19.6	B-	19.8	B-	0.007	0.3	N/A
9	Borregas Avenue/ Moffett Park Drive	AWSC	AM	9.9	A	11.0	B	0.1	0.536	No
			PM	10.3	B	11.0	B	0.1	0.525	No
10	Java Drive/Geneva Drive	Signal	AM	13.9	B	14.0	B	0.004	0.1	N/A
			PM	18.8	B-	18.8	B-	0.002	0.0	N/A
11	Crossman Avenue/ Java Drive	Signal	AM	13.7	B	13.8	B	0.003	0.1	N/A
			PM	24.2	C	24.3	C	0.006	0.1	N/A
12	Crossman Avenue/ Moffett Park Drive	Signal	AM	11.8	B+	11.9	B+	0.003	0.1	N/A
			PM	12.4	B	12.4	B	0.007	0.1	N/A
13	Fair Oaks Avenue/ Fair Oaks Way	Signal	AM	14.8	B	14.8	B	0.002	0.0	N/A
			PM	18.8	B-	18.8	B-	0.002	0.0	N/A
14	Fair Oaks Avenue/ Tasman Drive	Signal	AM	25.7	C	25.7	C	0.002	0.0	N/A
			PM	38.8	D+	38.8	D+	0.001	0.0	N/A
15	Fair Oaks Avenue/ Weddell Drive	Signal	AM	10.3	B+	10.3	B+	0.001	0.0	N/A
			PM	17.1	B	17.1	B	0.001	0.0	N/A
16	Fair Oaks Avenue/ NB US 101 Ramps	Signal	AM	22.4	C+	22.4	C+	0.000	0.0	N/A
			PM	25.0	C	25.0	C	0.001	0.1	N/A

Notes:
1. Signal = Signalized Intersection; SSSC = Side-Street Stop Controlled Intersection; AWSC = All-Way Stop Controlled Intersection AM = morning peak hour, PM = afternoon peak hour
2. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop-controlled intersections.
3. LOS = Level of Service calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the *2000 HCM*.
4. Change in critical volume-to-capacity ratio (V/C) between Existing and Project Conditions.

5. Change in critical movement delay between Existing and Project Conditions.
6. Signal warrant based on CA MUTCD Warrant 3, Peak Hour Volume (Urban Area).

* Regionally significant intersection with LOS E threshold

Bold font indicates unacceptable operations based on City of Sunnyvale LOS standards. **Bold and highlighted** indicates significant impacts.

Source: Fehr & Peers, February 2015.

Some of the study intersections, such as Innovation Way/Moffett Park Drive (Int. 2), show a reduction in average delay with the addition of project traffic, which is counterintuitive. The average delay values in the table are weighted averages. Weighted average delays will be reduced when traffic is added to a movement with a low delay, such as the through movements in the non-peak direction. Conversely, relatively small volume increase to movements with high delays can substantially increase the weighted average delay.

3.3 EXISTING PLUS PROJECT INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 9** against the City of Sunnyvale's criteria for significant intersection impacts and presents mitigation measures for identified impacts.

Based on the City of Sunnyvale's criteria, the project has a **less-than-significant impact at all study intersections under the Existing plus Project scenario** and no mitigation measures are identified.

3.4 EXISTING PLUS PROJECT FREEWAY SEGMENT LEVELS OF SERVICE

Freeway segments of US 101 and SR 237 were analyzed during the AM and PM peak hours by calculating the amount of project traffic projected to be added to these freeway segments. To be conservative, no project trips were assigned to HOV lanes.

Table 10 presents the estimate number of trips added to the freeway segments under Existing plus Project Conditions and the estimated densities and service levels.

TABLE 10
EXISTING PLUS PROJECT FREEWAY SEGMENT LEVELS OF SERVICE

Freeway Segment	Direction	Peak Hour[1]	Capacity (vph)[2]	Existing Conditions		Existing plus Project Conditions			
				Density[3]	LOS[4]	Trips[5]	Density	LOS	% Impact[6]
US 101, SR 237 to Mathilda Avenue	NB	AM	6900	50	E	0	50	E	0.00%
		PM		27	D	0	27	D	0.00%
	SB	AM	6900	25	C	0	25	C	0.00%
		PM		28	D	0	28	D	0.00%
US 101, Mathilda Avenue and Fair Oaks Avenue	NB	AM	6900	**59**	**F**	13	**59**	**F**	0.19%
		PM		33	D	6	33	D	0.09%
	SB	AM	6900	33	D	5	33	D	0.07%
		PM		42	D	11	42	D	0.16%
US 101, Fair Oaks Avenue and Lawrence Expressway	NB	AM	6900	**93**	**F**	13	**93**	**F**	0.19%
		PM		31	D	6	31	D	0.09%
	SB	AM	6900	29	D	5	29	D	0.07%
		PM		**78**	**F**	11	**78**	**F**	0.16%
SR 237, US 101 and Mathilda Avenue	EB	AM	4400	**83**	**F**	26	**84**	**F**	0.59%
		PM		28	D	11	28	D	0.25%
	WB	AM	4400	41	D	5	41	D	0.11%
		PM		**71**	**F**	2	**71**	**F**	0.05%
SR 237, Mathilda Avenue and Fair Oaks Avenue	EB	AM	4600	**60**	**F**	2	**60**	**F**	0.04%
		PM		**72**	**F**	5	**72**	**F**	0.11%
	WB	AM	6900	**79**	**F**	5	**79**	**F**	0.07%
		PM		**70**	**F**	2	**70**	**F**	0.03%
SR 237, Fair Oaks Avenue and Lawrence Expressway	EB	AM	4600	34	D	2	34	D	0.04%
		PM		**93**	**F**	5	93	F	0.11%
	WB	AM	4600	**82**	**F**	5	**82**	**F**	0.11%
		PM		**72**	**F**	2	**72**	**F**	0.04%

Notes:
1. AM = morning peak hour, PM = afternoon peak hour
2. vph = vehicles per hour per lane
3. Measured in passenger cars per mile per lane
4. LOS = Level of Service
5. Project trips added to individual freeway segments
6. Percent impact on mixed flow lanes determined by dividing the number of project trips by the freeway segment's capacity.

N/A = Not applicable. Freeway segment does not have HOV lanes.
Bold font indicates unacceptable operations based on VTA's LOS E Standard. **Bold and highlighted** indicates significant impacts.
Source: *2012 Monitoring and Conformance Report*, VTA, February 2015.

3.5 EXISTING PLUS PROJECT FREEWAY IMPACTS AND MITIGATION MEASURES

As shown in **Table 10**, the proposed project would not add trips greater than one percent of the freeway segment capacity to the freeway study segments during the AM and PM peak hours. Therefore, the project would have a **less-than-significant freeway impacts at the identified freeway study segments under Existing plus Project conditions** and no mitigation measures are proposed.

4.0 BACKGROUND CONDITIONS

This chapter presents the results of the level of service calculations under Background Conditions with and without the project. Traffic volumes for Background No Project Conditions comprise of existing volumes plus traffic generated by "approved but not yet built" and "not occupied" development in the area to account for local growth in the study area. Background plus Project Conditions are defined as Background No Project Conditions plus traffic generated by the proposed project.

4.1 BACKGROUND NO PROJECT TRAFFIC VOLUMES

Vehicle trips from "approved but not yet built" and "not occupied" development projects in the study area were added. Staff from the City of Sunnyvale provided a list of "approved but not yet built" and "not occupied" development projects. Trip generation estimates from approved and not occupied projects that would add traffic to the study intersections were obtained from their respective traffic reports or estimated based on trip generation rates published in the Institute of Transportation Engineers *Trip generation* (9th Edition). The trips for each of the background projects were then assigned to the roadway network based on the relative locations of complementary land uses, as well as existing and estimated future travel patterns.

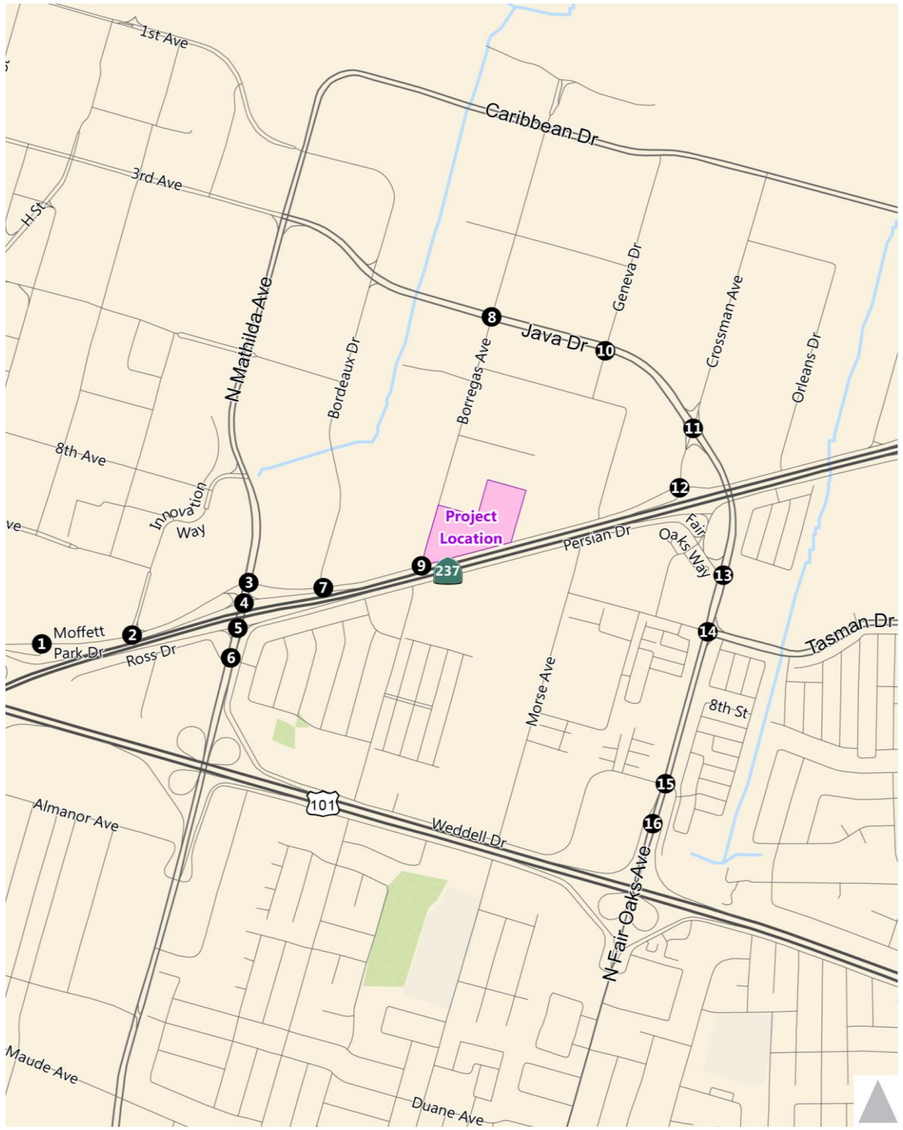
Appendix E contains a list of approved and not occupied projects. The trips for each of the background projects were added to the existing volumes discussed above to represent Background Conditions, as shown in **Figure 10**.

4.2 BACKGROUND NO PROJECT IMPROVEMENTS

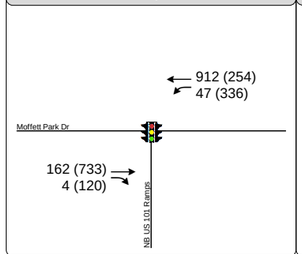
No new roadway improvements were identified for the background scenario; therefore, the existing roadway network was used for the background analysis.

4.3 BACKGROUND PLUS PROJECT TRAFFIC VOLUMES

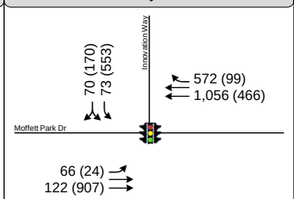
Trips generated from the proposed project (**Figure 8**) were added to the Background traffic projections to develop traffic volumes for Background plus Project Conditions. The resulting volumes are shown on **Figure 11**.



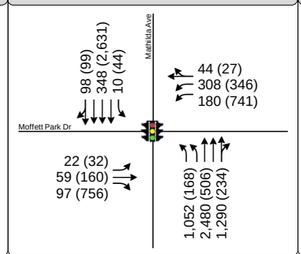
1. NB US 101 Ramps/Moffett Park Dr



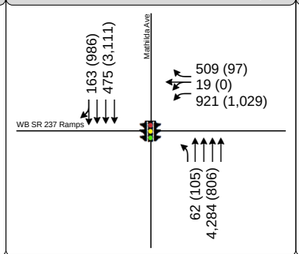
2. Innovation Way/Moffett Park Dr



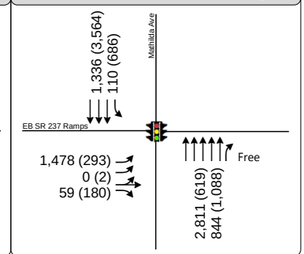
3. Mathilda Ave/Moffett Park Dr



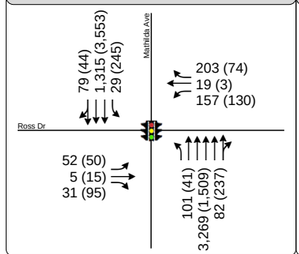
4. Mathilda Ave/WB SR 237 Ramps



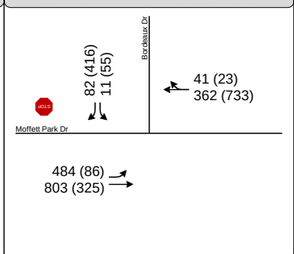
5. Mathilda Ave/EB SR 237 Ramps



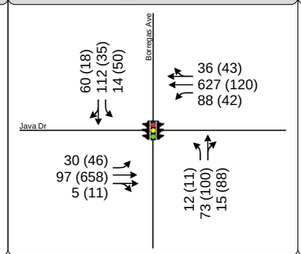
6. Mathilda Ave/Ross Dr



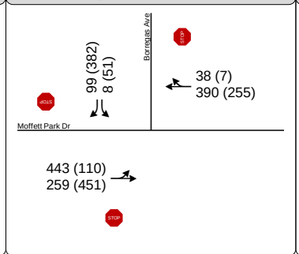
7. Bordeaux Dr/Moffett Park Dr



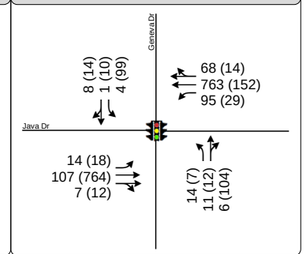
8. Borregas Ave/Java Dr



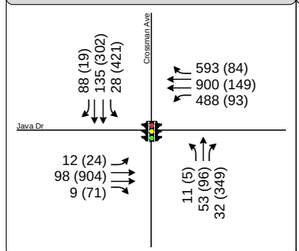
9. Borregas Ave/Moffett Park Dr



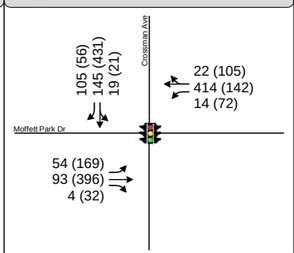
10. Geneva Dr/Java Dr



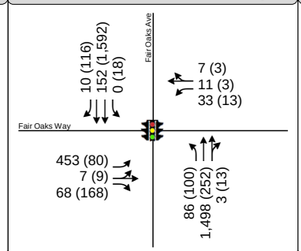
11. Crossman Ave/Java Dr



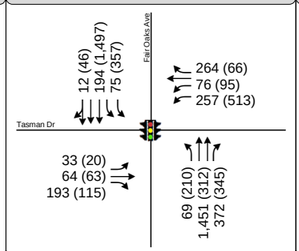
12. Crossman Ave/Moffett Park Dr



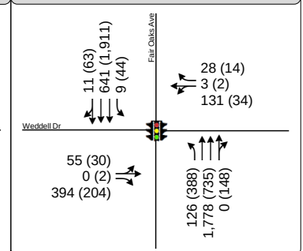
13. Fair Oaks Ave/Fair Oaks Way



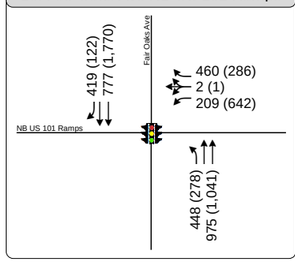
14. Fair Oaks Ave/Tasman Dr



15. Fair Oaks Ave/Weddell Dr

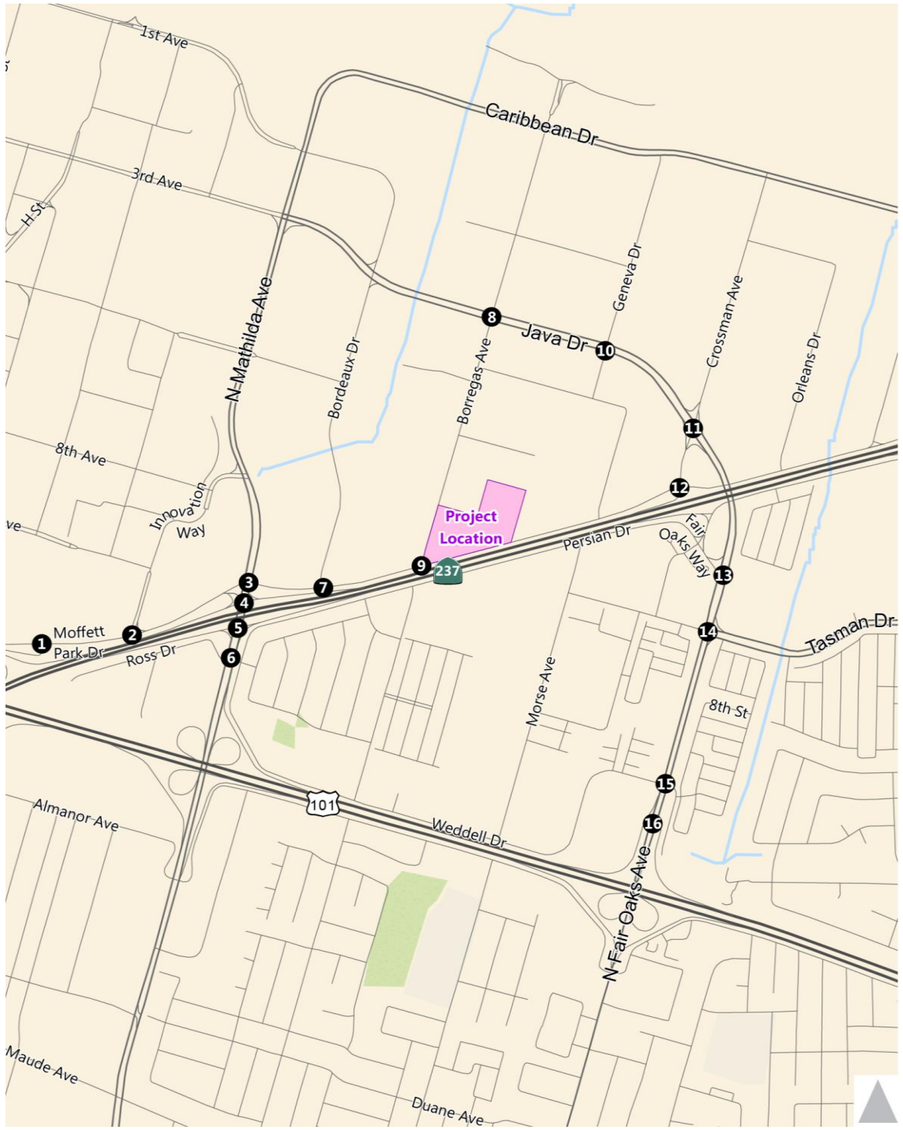


16. Fair Oaks Ave/NB US 101 Ramps

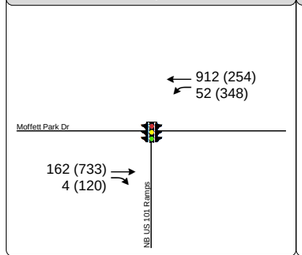


Peak Hour Traffic Volume AM (PM)
Turn Lane
Stop Sign
Traffic Signal

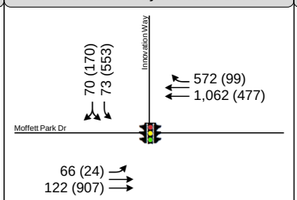
Figure 10
Background No Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices



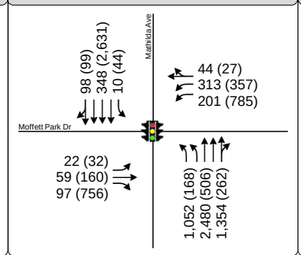
1. NB US 101 Ramps/Moffett Park Dr



2. Innovation Way/Moffett Park Dr



3. Mathilda Ave/Moffett Park Dr



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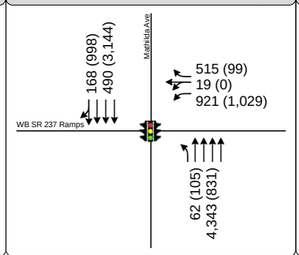

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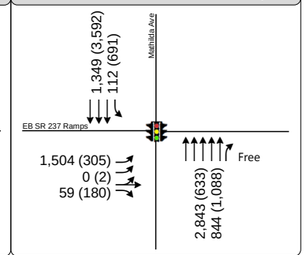
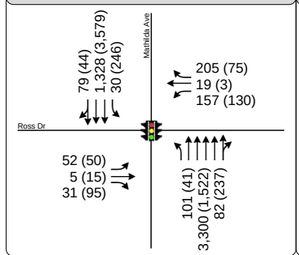


6. Mathilda Ave/Ross Dr



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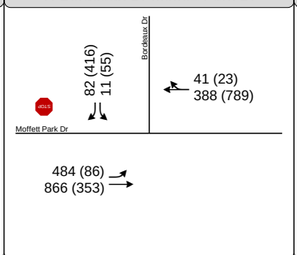

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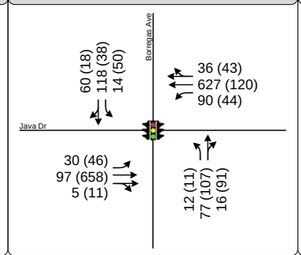

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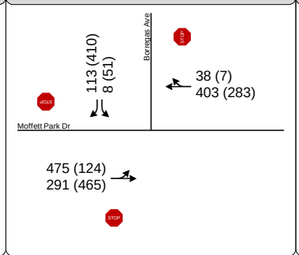
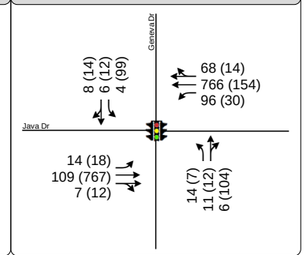
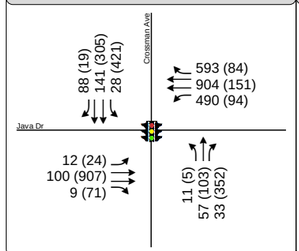


10. Geneva Dr/Java Dr



11. Crossman Ave/Java Dr



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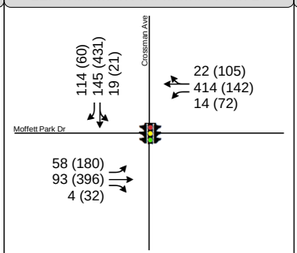
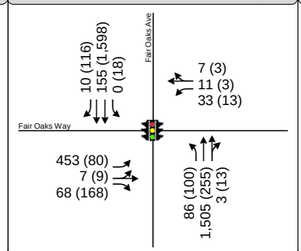
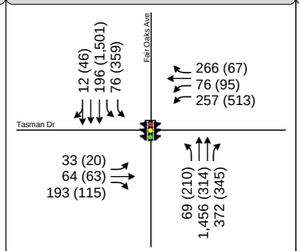


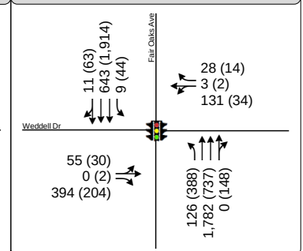
13. Fair Oaks Ave/Fair Oaks Way



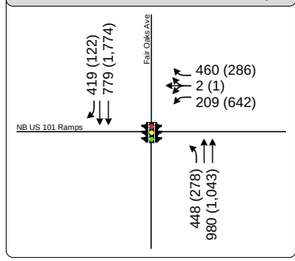
14. Fair Oaks Ave/Tasman Dr



15. Fair Oaks Ave/Weddell Dr



16. Fair Oaks Ave/NB US 101 Ramps



Peak Hour Traffic Volume AM (PM)
Turn Lane
Stop Sign
Traffic Signal

Figure 11
Background plus Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices

4.4 BACKGROUND INTERSECTION LEVELS OF SERVICE

Table 11 presents the delay and level of service calculation results for the study intersection under Background No Project and Background plus Project Conditions. **Appendix B** contains the corresponding calculation sheets.

TABLE 11
BACKGROUND AND BACKGROUND PLUS PROJECT INTERSECTION LEVELS OF SERVICE

	Intersection	Intersection Control[1]	Peak Hour[2]	Background Conditions		Background plus Project Conditions				
				Delay[3]	LOS[4]	Delay[3]	LOS[4]	Δ in Crit. V/C[5]	Δ in Crit. Delay[6]	Signal Warrant Met?[7]
1	NB US 101 Ramps/ Moffett Park Drive	Signal	AM	2.3	A	2.4	A	0.000	0.0	N/A
			PM	8.3	A	8.5	A	0.008	0.3	N/A
2	Innovation Way/ Moffett Park Drive	Signal	AM	9.6	A	9.5	A	0.002	0.0	N/A
			PM	13.2	B	13.2	B	0.004	0.1	N/A
3	Mathilda Avenue/ Moffett Park Drive*	Signal	AM	**113.1**	**F**	**119.5**	**F**	**0.046**	**25.7**	N/A
			PM	**108.0**	**F**	**114.7**	**F**	**0.021**	**9.3**	N/A
4	Mathilda Avenue/ WB SR 237 Ramps*	Signal	AM	26.9	C	28.4	C	0.013	2.1	N/A
			PM	47.1	D	47.5	D	-0.018	-7.3	N/A
5	Mathilda Avenue/ EB SR 237 Ramps*	Signal	AM	28.7	C	29.7	C	0.012	1.6	N/A
			PM	13.8	B	14.0	B	0.005	0.2	N/A
6	Mathilda Avenue/ Ross Drive*	Signal	AM	10.9	B+	10.9	B+	0.004	0.0	N/A
			PM	17.5	B	19.0	B-	0.017	2.5	N/A
7	Bordeaux Drive/ Moffett Park Drive	SSSC	AM	**143.6**	**F**	**172.2**	**F**	N/A	N/A	No
			PM	**74.9**	**F**	**99.5**	**F**	N/A	N/A	**Yes**
8	Borregas Avenue/ Java Drive	Signal	AM	17.4	B	17.5	B	0.004	0.2	N/A
			PM	19.1	B-	19.4	B-	0.015	0.3	N/A
9	Borregas Avenue/ Moffett Park Drive	AWSC	AM	30.7	D	**46.5**	**E**	0.102	15.8	No
			PM	24.2	C	31.0	D	0.068	6.9	Yes
10	Java Drive/ Geneva Drive	Signal	AM	14.1	B	14.2	B	0.004	0.1	N/A
			PM	17.2	B	17.2	B	0.006	-0.1	N/A
11	Crossman Avenue/ Java Drive	Signal	AM	16.1	B	16.2	B	0.004	0.1	N/A
			PM	31.5	C	31.8	C	0.006	0.1	N/A
12	Crossman Avenue/ Moffett Park Drive	Signal	AM	12.2	B	12.3	B	0.003	0.1	N/A
			PM	16.1	B	16.9	B	0.016	1.0	N/A
13	Fair Oaks Avenue/ Fair Oaks Way	Signal	AM	20.2	C+	20.2	C+	0.002	0.0	N/A
			PM	20.0	B-	20.0	B-	0.002	0.0	N/A
14	Fair Oaks Avenue/ Tasman Drive	Signal	AM	25.5	C	25.6	C	0.002	0.0	N/A
			PM	40.3	D	40.3	D	0.005	0.0	N/A
15	Fair Oaks Avenue/ Weddell Drive	Signal	AM	11.0	B+	11.0	B+	0.001	0.0	N/A
			PM	20.4	C+	20.6	C+	0.006	0.2	N/A

TABLE 11
BACKGROUND AND BACKGROUND PLUS PROJECT INTERSECTION LEVELS OF SERVICE

	Intersection	Intersection Control[1]	Peak Hour[2]	Background Conditions		Background plus Project Conditions				
				Delay[3]	LOS[4]	Delay[3]	LOS[4]	Δ in Crit. V/C[5]	Δ in Crit. Delay[6]	Signal Warrant Met?[7]
16	Fair Oaks Avenue/ NB US 101 Ramps	Signal	AM	22.6	C+	22.6	C+	0.001	0	N/A
			PM	34.5	C-	34.2	C-	-0.002	-0.5	N/A

Notes:
1. Signal = Signalized Intersection; SSSC = Side-Street Stop Controlled Intersection; AWSC = All-Way Stop Controlled Intersection.
2. AM = morning peak hour, PM = afternoon peak hour
3. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop-controlled intersections.
4. LOS = Level of Service calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the *2000 HCM*.
5. Change in critical volume-to-capacity ratio (V/C) between Background and Project Conditions.
6. Change in critical movement delay between Background and Project Conditions.
7. Signal warrant based on CA MUTCD Warrant 3, Peak Hour Volume (Urban Area).

* Regionally significant intersection with LOS E threshold

Bold font indicates unacceptable operations based on City of Sunnyvale LOS standards. **Bold and highlighted** indicates significant impacts.

Source: Fehr & Peers, February 2015.

As mentioned under Existing Conditions, some of the study intersections show a reduction in average delay with the addition of project traffic, which is counterintuitive. The average delay values in the table are weighted averages. Weighted average delays will be reduced when traffic is added to a movement with a low delay, such as the through movements in the non-peak direction. Conversely, relatively small volume increase to movements with high delays can substantially increase the weighted average delay.

4.4.1 SIGNALIZED INTERSECTIONS

Under Background plus Project Conditions, the following signalized intersection is projected to operate at unacceptable service levels (LOS E/F for City intersections and LOS F for regionally significant intersections) during the identified peak hours:

Int. 3 Mathilda Avenue/Moffett Park Drive: The addition of project traffic exacerbates unacceptable LOS F operations during the AM and PM peak hours.

4.4.2 UNSIGNALIZED INTERSECTIONS

Under Background plus Project Conditions, the following unsignalized intersections are projected to operate at unacceptable service levels (LOS E or F) during the identified peak hours:

Int. 7 Bordeaux Drive/Moffett Park Drive: The addition of project traffic exacerbates unacceptable LOS F operations during the AM and PM peak hours. The 2014 CA MUTCD peak hour warrant is not met during the AM peak hour but is met during the PM peak hour.

Int. 9 Borregas Avenue/Moffett Park Drive: The addition of project traffic degrades to unacceptable LOS E operations during the AM peak hour. The 2014 CA MUTCD peak hour warrant is not met during the AM peak hour but is met during the PM peak hour.

Appendix C contains the peak hour signal warrants.

4.5 BACKGROUND INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 11** against the City of Sunnyvale's criteria for significant impacts and presents mitigation measures for identified impacts. Peak hour LOS calculation worksheets including the recommended mitigation measure are provided in **Appendix D**.

Int. 3 Mathilda Avenue/Moffett Park Drive

During the AM and PM peak hours, the addition of project traffic is projected to exacerbate unacceptable LOS F operations at the intersection. The critical delays are projected to increase by more than four seconds and the critical V/C ratios are projected to increase by more than 0.01 between the Background No Project and Background plus Project scenarios. Therefore, the project is considered to have a **significant impact** at the Mathilda Avenue/Moffett Park Drive intersection based on Sunnyvale's impact criteria.

However, per the Moffett Place TIA, reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impact to a less-than-significant level**. Payment of the City's TIF would constitute the project's fair share contribution. These improvements include:

- Shifting the SR 237 Westbound Off-Ramp to align with the intersection of Moffett Park/Mathilda Avenue;
- Removal of SR 237 Westbound On-Ramp; and,
- Construction of a direct southbound right-turn on-ramp from Mathilda Avenue to US 101 north

These improvements are in both the City's TIF and the VTA's *VTP 2035* list of constrained projects.

Although VTA guidelines only allow for a maximum 11 percent reduction of vehicle trips due to a TDM program and location near a rail station based on the standard trip reduction approach applied in this study, the MPSP TDM program is required to reduce peak hour trips by 30 percent. With a 30 percent reduction in vehicle trips, the intersection would continue to operate at LOS F, increase the critical delay by more than four seconds, and increase the critical V/C ratio by more than 0.01 during the AM and PM peak hours. Therefore, the intersection would **continue to have a significant impact with an increased 30 percent TDM reduction**.

Int. 7 Bordeaux Drive/Moffett Park Drive

Under Background plus Project Conditions, the intersection is projected to operate at unacceptable LOS F during the AM and PM peak hours. However, the intersection is projected to meet the MUTCD peak hour signal warrant volume threshold only during the PM peak hour. Therefore, based on the City of Sunnyvale's intersection threshold, the Bordeaux Drive and Moffett Park Drive intersection would have a **significant impact** during the PM peak hour.

Per the Moffett Place TIA, the proposed realignment of the SR 237 Westbound Ramp/Moffett Park Drive off-ramp would require the closure of Moffett Park Drive between Mathilda Avenue and Bordeaux Drive. This closure would eliminate the eastbound approach of the intersection of Bordeaux Drive and Moffett Park Drive, thus removing all conflict points and eliminating the entire intersection. Therefore, when the project is implemented, no additional improvements would be required at this intersection. Payment of the City's TIF would constitute the project's fair share contribution.

With a 30 percent reduction in vehicle trips (as required by the MPSP TDM program), the intersection would continue to operate at LOS F during the AM and PM peak hours and meet the MUTCD peak hour signal warrant during the PM peak hour. Therefore, the intersection would **continue to have a significant impact with an increased 30 percent TDM reduction**.

Int. 9 Borregas Avenue/Moffett Park Drive

Under Background plus Project Conditions, the intersection is projected to operate at unacceptable LOS E during the AM peak hour but is not projected to meet the MUTCD peak hour signal warrant volume threshold. During the PM peak hour, the intersection is projected to operate at acceptable LOS D and is projected to meet the MUTCD peak hour signal warrant volume thresholds. While the intersection operates at an unacceptable LOS during the AM peak hour and meets the peak hour signal warrant during the PM peak hour, the intersection does not meet both impact thresholds (LOS E or worse and

peak hour signal warrant) during the AM or PM peak hours. Therefore, based on the City of Sunnyvale's intersection threshold, the Borregas Avenue/Moffett Park Drive intersection would have a **less-than-significant impact**.

5.0 CUMULATIVE CONDITIONS

This chapter presents the results of the level of service calculations under Cumulative Conditions with and without the Project. Cumulative No Project Conditions are defined as conditions within the next five years (2019). Traffic volumes for Cumulative No Project Conditions comprise existing volumes plus background volumes as well as volumes from pending developments and a five year growth factor. Cumulative plus Project Conditions are defined as Cumulative No Project Conditions plus traffic generated by the proposed Project.

5.1 CUMULATIVE NO PROJECT TRAFFIC VOLUMES

Cumulative traffic volumes were developed by applying a five-year growth factor to existing volumes, adding trips from the Background No Project growth assumptions ("approved but not yet built" and "not occupied" development projects), and trips from pending development projects in the study area. The development of Cumulative No Project volumes is discussed in more detail below.

5.1.1 CUMULATIVE TRAFFIC GROWTH

Growth factors for local roads, collectors, and arterials were developed based on the City of Sunnyvale's travel demand forecasting model. The City of Sunnyvale uses the rates in **Table 12** to estimate annual regional traffic growth based on the roadway classification.

TABLE 12
ANNUAL GROWTH RATES

Roadway Classification	AM Peak Hour	PM Peak Hour
Arterial	2.00%	1.75%
Collector	2.28%	2.34%
Local	0.50%	0.50%

Source: City of Sunnyvale, 2014.

Using year 2014 as the base year for Existing Conditions, five-year growth factors (to year 2019) based on roadway classifications were applied to all movements at the 16 study intersections.

5.1.2 APPROVED, NOT OCCUPIED, AND PENDING PROJECTS

In addition to the vehicle trips from "approved but not yet built" and "not occupied" development projects discussed under Background Conditions, vehicle trips from pending development projects in the study area were added to the study intersection. Similar to the approved developments, trip generation estimates from the pending development projects that would add traffic to the study intersections were obtained from their respective traffic reports or estimated based on trip generation rates published in the Institute of Transportation Engineers *Trip Generation* (9th Edition). The trips for each of the projects were then assigned to the roadway network based on the relative locations of complementary land uses, as well as existing and estimated future travel patterns. **Appendix E** contains a list of pending projects from the City of Sunnyvale and their assumed trip generation estimates.

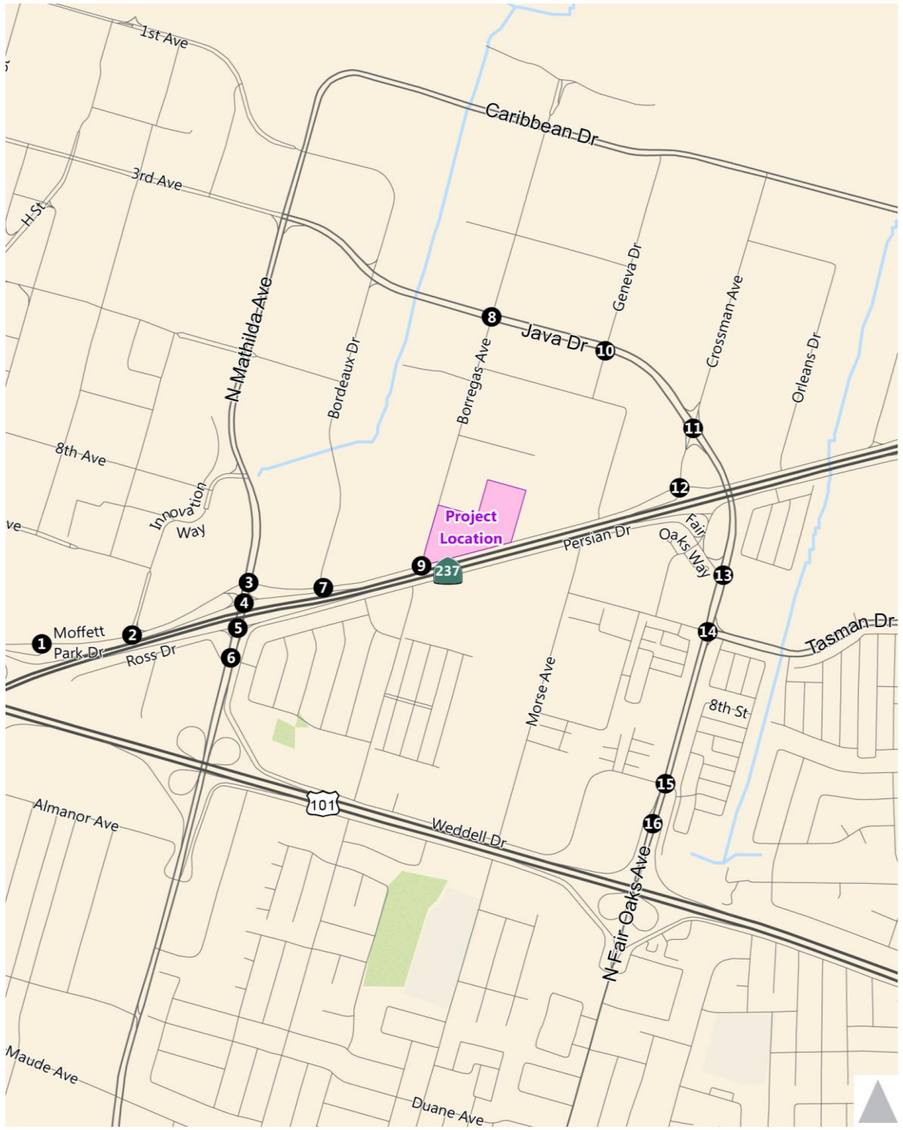
The trips for each of the approved, not occupied, and pending development projects were added to the existing volumes, which were multiplied by the annual growth rates discussed above to represent Cumulative No Project Conditions, as shown on **Figure 12.**

5.2 CUMULATIVE IMPROVEMENTS

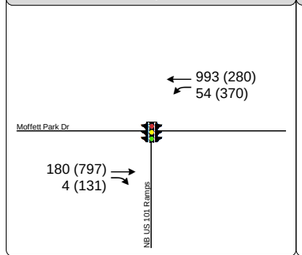
There are no approved and funded transportation network improvements that were assumed to be constructed prior to cumulative horizon year of 2019. Therefore, the existing roadway network was used for the cumulative analysis.

5.3 CUMULATIVE PLUS PROJECT TRAFFIC VOLUMES

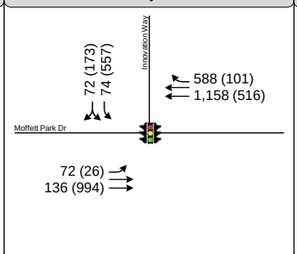
Trips generated from the proposed project (**Figure 8**) were added to the Cumulative No Project traffic projections to develop traffic volumes for Cumulative plus Project Conditions. The resulting volumes are shown on **Figure 13**.



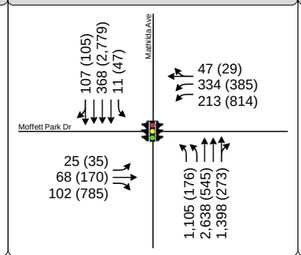
1. NB US 101 Ramps/Moffett Park Dr



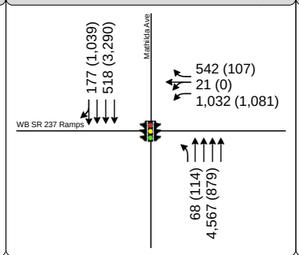
2. Innovation Way/Moffett Park Dr



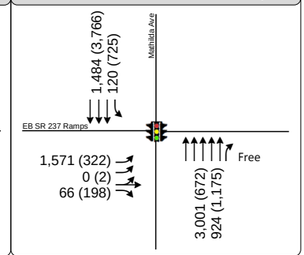
3. Mathilda Ave/Moffett Park Dr



4. Mathilda Ave/WB SR 237 Ramps



5. Mathilda Ave/EB SR 237 Ramps



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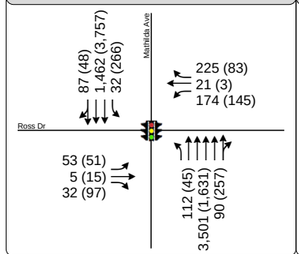

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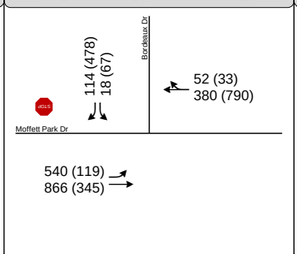

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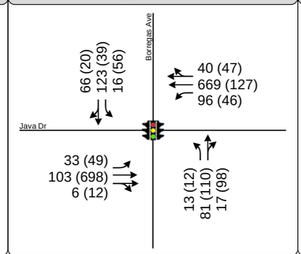

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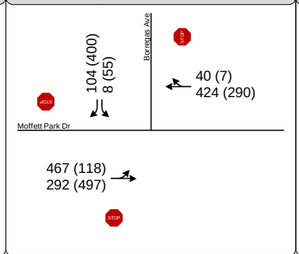

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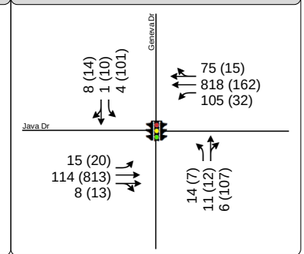

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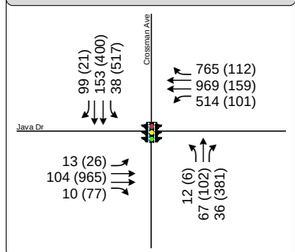

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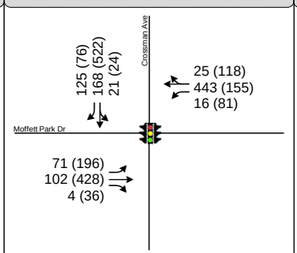
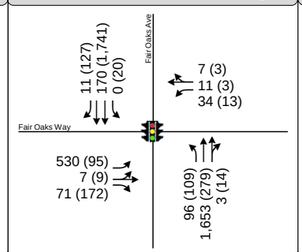
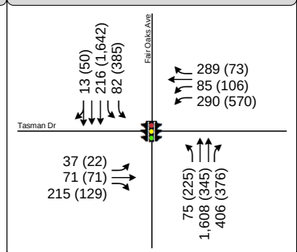


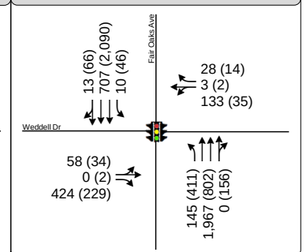
13. Fair Oaks Ave/Fair Oaks Way



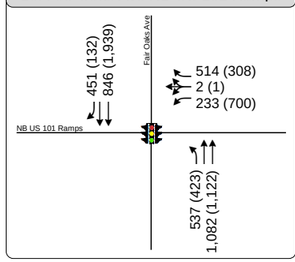
14. Fair Oaks Ave/Tasman Dr



15. Fair Oaks Ave/Weddell Dr

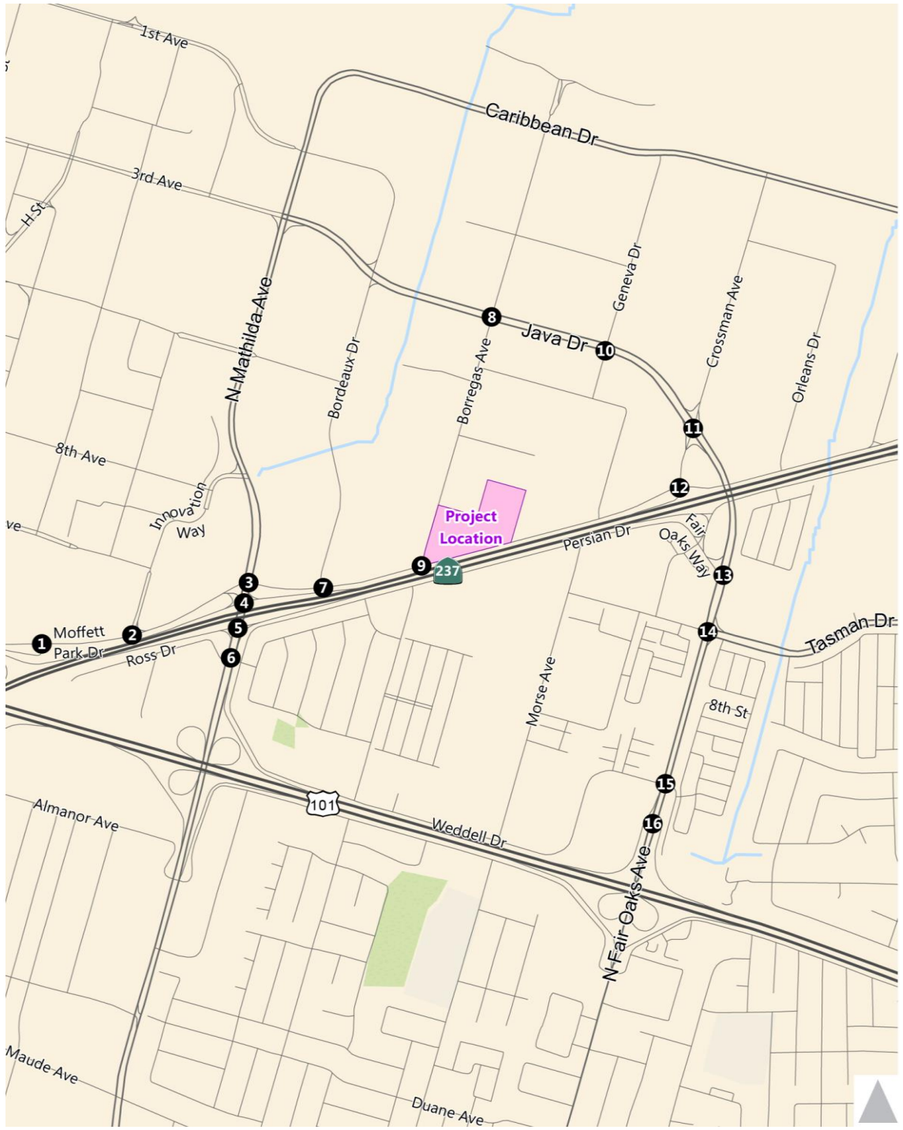


16. Fair Oaks Ave/NB US 101 Ramps

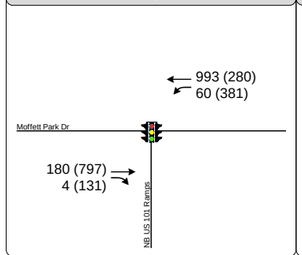


Peak Hour Traffic Volume — AM (PM)
Turn Lane
Stop Sign
Traffic Signal

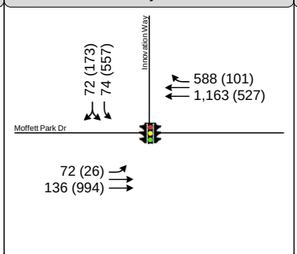
Figure 12
Cumulative No Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices



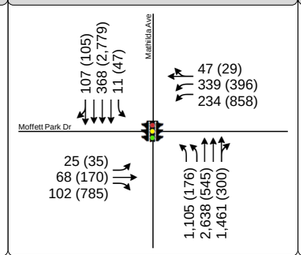
1. NB US 101 Ramps/Moffett Park Dr



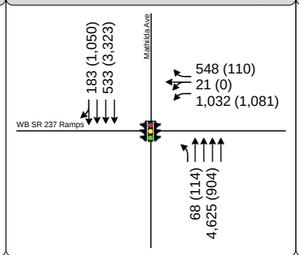
2. Innovation Way/Moffett Park Dr



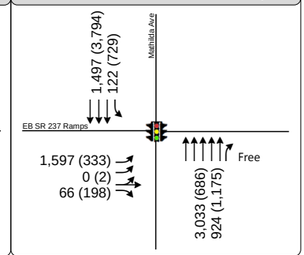
3. Mathilda Ave/Moffett Park Dr



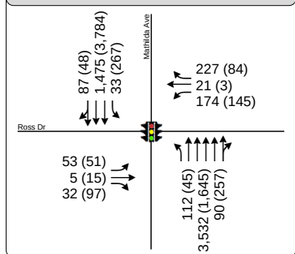
4. Mathilda Ave/WB SR 237 Ramps



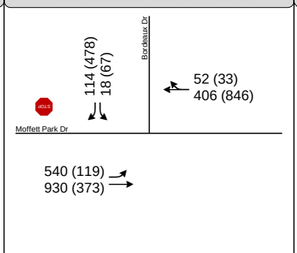
5. Mathilda Ave/EB SR 237 Ramps



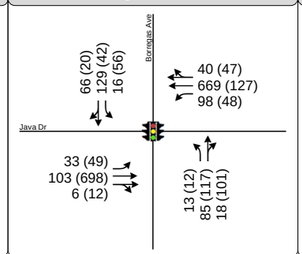
6. Mathilda Ave/Ross Dr



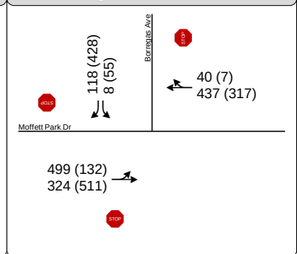
7. Bordeaux Dr/Moffett Park Dr



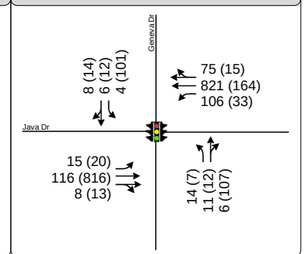
8. Borregas Ave/Java Dr



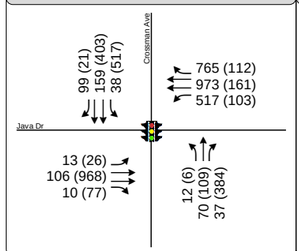
9. Borregas Ave/Moffett Park Dr



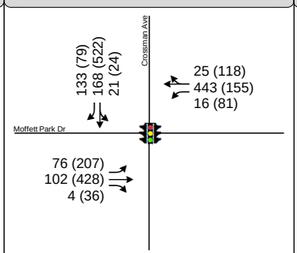
10. Geneva Dr/Java Dr



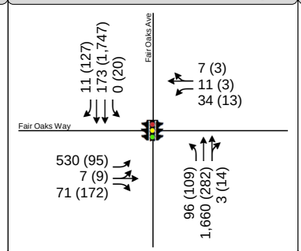
11. Crossman Ave/Java Dr



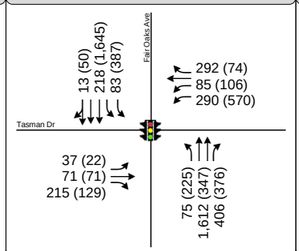
12. Crossman Ave/Moffett Park Dr



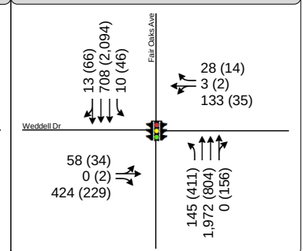
13. Fair Oaks Ave/Fair Oaks Way



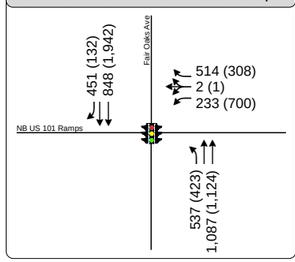
14. Fair Oaks Ave/Tasman Dr



15. Fair Oaks Ave/Weddell Dr



16. Fair Oaks Ave/NB US 101 Ramps



Peak Hour Traffic Volume AM (PM)
Turn Lane
Stop Sign
Traffic Signal

Figure 13
Cumulative plus Project Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control Devices

5.4 CUMULATIVE INTERSECTION LEVELS OF SERVICE

Table 13 presents the level of service calculations for the study intersection under Cumulative No Project and Cumulative plus Project Conditions. **Appendix B** contains the corresponding calculation sheets.

TABLE 13
CUMULATIVE AND CUMULATIVE PLUS PROJECT INTERSECTION LEVELS OF SERVICE

	Intersection	Intersection Control[1]	Peak Hour[2]	Cumulative Conditions		Cumulative plus Project Conditions				
				Delay[3]	LOS[4]	Delay[3]	LOS[4]	Δ in Crit. V/C[5]	Δ in Crit. Delay[6]	Signal Warrant Met?[7]
1	NB US 101 Ramps/Moffett Park Drive	Signal	AM	2.6	A	2.6	A	0.000	0.0	N/A
			PM	9.6	A	9.9	A	0.007	0.3	N/A
2	Innovation Way/ Moffett Park Drive	Signal	AM	9.6	A	9.5	A	0.001	0.0	N/A
			PM	13.6	B	13.5	B	0.004	0.1	N/A
3	Mathilda Avenue/Moffett Park Drive*	Signal	AM	**138.0**	**F**	**144.7**	**F**	**0.045**	**25.3**	N/A
			PM	**131.2**	**F**	**136.5**	**F**	**0.016**	**7.5**	N/A
4	Mathilda Avenue/ WB SR 237 Ramps*	Signal	AM	40.8	D	43.8	D	0.012	4.1	N/A
			PM	65.7	E	67.9	E	0.007	3.2	N/A
5	Mathilda Avenue/ EB SR 237 Ramps*	Signal	AM	38.2	D+	40.2	D	0.013	3.9	N/A
			PM	15.6	B	15.8	B	0.008	0.2	N/A
6	Mathilda Avenue/ Ross Drive*	Signal	AM	11.3	B+	11.3	B+	0.004	0.0	N/A
			PM	22.6	C+	23.6	C	0.005	1.6	N/A
7	Bordeaux Drive/ Moffett Park Drive	SSSC	AM	**309.1**	**F**	**384.4**	**F**	N/A	N/A	**Yes**
			PM	**159.4**	**F**	**199.8**	**F**	N/A	N/A	**Yes**
8	Borregas Avenue/ Java Drive	Signal	AM	17.7	B	17.8	B	0.004	0.2	N/A
			PM	19.5	B-	19.7	B-	0.008	0.3	N/A
9	Borregas Avenue/ Moffett Park Drive	AWSC	AM	**44.5**	**E**	**65.4**	**F**	**0.104**	**20.9**	**No**
			PM	**35.4**	**E**	**46.1**	**E**	**0.073**	**10.7**	**Yes**
10	Java Drive/ Geneva Drive	Signal	AM	14.3	B	14.3	B	0.004	0.1	N/A
			PM	17.2	B	17.2	B	0.002	0.0	N/A
11	Crossman Avenue/ Java Drive	Signal	AM	17.0	B	17.1	B	0.002	0.0	N/A
			PM	36.0	D+	36.3	D+	0.003	0.4	N/A
12	Crossman Avenue/ Moffett Park Drive	Signal	AM	12.6	B	12.6	B	0.003	0.1	N/A
			PM	21.0	C+	21.1	C+	0.000	0.0	N/A
13	Fair Oaks Avenue/ Fair Oaks Way	Signal	AM	22.7	C+	22.8	C+	0.002	0.1	N/A
			PM	21.2	C+	21.2	C+	0.002	0.0	N/A
14	Fair Oaks Avenue/ Tasman Drive	Signal	AM	26.8	C	26.9	C	0.002	0.0	N/A
			PM	41.7	D	41.7	D	0.001	0.0	N/A

TABLE 13
CUMULATIVE AND CUMULATIVE PLUS PROJECT INTERSECTION LEVELS OF SERVICE

	Intersection	Intersection Control[1]	Peak Hour[2]	Cumulative Conditions		Cumulative plus Project Conditions				
				Delay[3]	LOS[4]	Delay[3]	LOS[4]	Δ in Crit. V/C[5]	Δ in Crit. Delay[6]	Signal Warrant Met?[7]
15	Fair Oaks Avenue/ Weddell Drive	Signal	AM	11.4	B+	11.4	B+	0.001	0.0	N/A
			PM	21.9	C+	21.9	C+	0.001	0.0	N/A
16	Fair Oaks Avenue/ NB US 101 Ramps	Signal	AM	27.2	C	27.1	C	0.000	0.0	N/A
			PM	**67.0**	**E**	**67.2**	**E**	**0.001**	**0.3**	N/A

Notes:
1. Signal = Signalized Intersection; SSSC = Side-Street Stop Controlled Intersection; AWSC = All-Way Stop Controlled Intersection.
2. AM = morning peak hour, PM = afternoon peak hour
3. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections. Total control delay for the worst movement is presented for side-street stop-controlled intersections.
4. LOS = Level of Service calculations conducted using the TRAFFIX level of service analysis software package, which applies the methodology described in the *2000 HCM*.
5. Change in critical volume-to-capacity ratio (V/C) between Cumulative and Project Conditions.
6. Change in critical movement delay between Cumulative and Project Conditions.
7. Signal warrant based on CA MUTCD Warrant 3, Peak Hour Volume (Urban Area).

* Regionally significant intersection with LOS E threshold

Bold font indicates unacceptable operations based on City of Sunnyvale's LOS standards. **Bold and highlighted** indicates significant impacts.

Source: Fehr & Peers, February 2015.

Some of the study intersections show a reduction in average delay with the addition of project traffic, which is counterintuitive. The average delay values in the table are weighted averages. Weighted average delays will be reduced when traffic is added to a movement with a low delay, such as the through movements in the non-peak direction on Mathilda Avenue. Conversely, relatively small volume increase to movements with high delays can substantially increase the weighted average delay.

5.4.1 SIGNALIZED INTERSECTIONS

Under Cumulative plus Project Conditions, the following signalized intersection is projected to operate at unacceptable service levels (LOS E/F for City intersections and LOS F for regionally significant intersections) during the identified peak hours:

Int. 3 Mathilda Avenue/Moffett Park Drive: The addition of project traffic exacerbates unacceptable LOS F operations during the AM and PM peak hours.

5.4.2 UNSIGNALIZED INTERSECTIONS

Under Cumulative plus Project Conditions, the following unsignalized intersections are projected to operate at unacceptable service levels (LOS E or F) during the identified peak hours:

Int. 7 Bordeaux Drive/Moffett Park Drive: The addition of project traffic exacerbates unacceptable LOS F operations during the AM and PM peak hours. The 2014 CA MUTCD peak hour warrant is not met during the AM peak hour but is met during the PM peak hour.

Int. 9 Borregas Avenue/Moffett Park Drive: The addition of project traffic exacerbates unacceptable LOS E operations during the AM and PM peak hours. The 2014 CA MUTCD peak hour warrant is not met during the AM peak hour but is met during the PM peak hour.

Appendix C contains the peak hour signal warrants.

5.5 CUMULATIVE INTERSECTION IMPACTS AND MITIGATION MEASURES

This section of the report evaluates the intersection LOS results presented in **Table 13** against the City of Sunnyvale's criteria for significant impacts and presents mitigation measures for identified impacts. Peak hour LOS calculation worksheets including the recommended mitigation measure are provided in **Appendix D.**

Int. 3 Mathilda Avenue/Moffett Park Drive

During the AM and PM peak hours, the addition of project traffic is projected to exacerbate unacceptable LOS F operations at the intersection. The critical delays are projected to increase by more than four seconds and the critical V/C ratios are projected to increase by more than 0.01 between the Cumulative No Project and Cumulative plus Project scenarios. Therefore, the project is considered to have a **significant impact** at the Mathilda Avenue/Moffett Park Drive intersection based on Sunnyvale's impact criteria.

As discussed under Background Conditions, the Moffett Place TIA identified that reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impact to a less-than-significant level**. Payment of the City's TIF would constitute the project's fair share contribution. These improvements include:

- Shifting the SR 237 Westbound Off-Ramp to align with the intersection of Moffett Park/Mathilda Avenue;
- Removal of SR 237 Westbound On-Ramp; and,

- Construction of a direct southbound right-turn on-ramp from Mathilda Avenue to US 101 north

These improvements are in both the City's TIF and the VTA's *VTP 2035* list of constrained projects.

Although VTA guidelines only allow for a maximum 11 percent reduction of vehicle trips due to a TDM program and location near a rail station based on the standard trip reduction approach applied in this study, the MPSP TDM program is required to reduce peak hour trips by 30 percent. With a 30 percent reduction in vehicle trips, the intersection would operate at LOS F but would not increase the critical delay by more than four seconds or the critical V/C ratio by more than 0.01 during the PM peak hour. However, the intersection would operate at LOS F, increase the critical delay by more than four seconds, and increase the critical V/C ratio by more than 0.01 during the AM peak hour. Therefore, the intersection would **continue to have a significant impact with an increased 30 percent TDM reduction**.

Int. 7 Bordeaux Drive/Moffett Park Drive

Under Cumulative plus Project Conditions, the intersection is projected to operate at unacceptable LOS F during the AM and PM peak hours. However, the intersection is projected to meet the MUTCD peak hour signal warrant volume threshold only during the PM peak hour. Therefore, based on the City of Sunnyvale's intersection threshold, the Bordeaux Drive and Moffett Park Drive intersection would have a **significant impact** during the PM peak hour.

As discussed under Background Conditions, the Moffett Place TIA identified that the proposed realignment of the SR 237 Westbound Ramp/Moffett Park Drive off-ramp would require the closure of Moffett Park Drive between Mathilda Avenue and Bordeaux Drive. This closure would eliminate the eastbound approach of the intersection of Bordeaux Drive and Moffett Park Drive, thus removing all conflict points and eliminating the entire intersection. Therefore, when the project is implemented, no additional improvements would be required at this intersection. Payment of the City's TIF would constitute the project's fair share contribution.

With a 30 percent reduction in vehicle trips (as required by the MPSP TDM program), the intersection would continue to operate at LOS F during the AM and PM peak hours and meet the MUTCD peak hour signal warrant during both peak hours. Therefore, the intersection would **continue to have a significant impact with an increased 30 percent TDM reduction**.

Int. 9 Borregas Avenue/Moffett Park Drive

Under Cumulative plus Project Conditions, the intersection is projected to operate at unacceptable LOS F during the AM peak hour but is not projected to meet the MUTCD peak hour signal warrant volume threshold. During the PM peak hour, the intersection is projected to operate at acceptable LOS E and is

projected to meet the MUTCD peak hour signal warrant volume thresholds. Since the intersection operates at an unacceptable LOS during the PM peak hour and meets the peak hour signal warrant during the PM peak hour, the intersection meets both impact thresholds (LOS E or worse and peak hour signal warrant) during the PM peak hour. Therefore, based on the City of Sunnyvale's intersection threshold, the Borregas Avenue/Moffett Park Drive intersection would have a **significant impact**. **To mitigate the impact to less-than-significant levels**, the project applicant would be required to :

a) removal of the stop signs along the eastbound and westbound approaches of Moffett Park Drive, and
b) add pedestrian enhancements at the existing crosswalk on the west Moffett Park Drive, such a pedestrian activated rectangular rapid flashing beacon or raised crosswalk.

This mitigation would not be implemented until vehicular volumes warrant the mitigation and the applicant would responsible for cost of this mitigation measure.

With a 30 percent reduction in vehicle trips (as required by the MPSP TDM program), the intersection would continue to operate at LOS F during the AM peak hour, LOS E during the PM peak hour, and meet the MUTCD peak hour signal warrant during the PM peak hour. Therefore, the intersection would **continue to have a significant impact with an increased 30 percent TDM reduction**.

6.0 MATHILDA AVENUE CORRIDOR ANALYSIS

The study intersection on the Mathilda Avenue corridor between Moffett Park Drive and Ross Drive are closely spaced and the corridor experiences operational issues beyond simple intersection LOS primarily due to vehicle weaving. The TRAFFIX analysis software program does not accurately capture the operations of the Mathilda Avenue corridor, because it does not evaluate the intersections of closely spaced and coordinated intersections. To supplement the TRAFFIX analysis results presented in the previous chapters, the results and findings from the Moffett Place TIA, which used Synchro/SimTraffic software to evaluate the Mathilda Avenue corridor, are discussed to determine the 215 Moffett Park Drive project's relative effect to the corridor operations.

6.1 INTERSECTION LEVELS OF SERVICE USING MICRO SIMULATION

Though the Moffett Place TIA presents a different horizon year (2035 versus 2019) than the analysis presented in this report, the simulation analysis from the Moffett Place TIA analysis was used to qualitatively assess operations along the Mathilda Avenue corridor with development of the 215 Moffett Park Drive project. Based on the SimTraffic analysis presented in the Moffett Place TIA (results are shown in **Table 14)**, the following intersections are projected to operate at unacceptable LOS F:

Existing plus Project Conditions:

- Mathilda Avenue/Moffett Park Drive (PM peak hour)

Background plus Project Conditions:

- Mathilda Avenue/Moffett Park Drive (PM peak hour)
- Mathilda Avenue/Westbound SR 237 Ramps (PM peak hour)
- Mathilda Avenue/Eastbound SR 237 Ramps (AM peak hour)
- Mathilda Avenue/Ross Avenue (AM peak hour)

Cumulative plus Project Conditions:

- Mathilda Avenue/Moffett Park Drive (PM peak hour)
- Mathilda Avenue/Westbound SR 237 Ramps (PM peak hour)

- Mathilda Avenue/Eastbound SR 237 Ramps (AM and PM peak hours)
- Mathilda Avenue/Ross Avenue (AM and PM peak hours)

TABLE 14
INTERSECTION LEVELS OF SERVICE
BASED ON MICRO SIMULATION FROM MOFFETT PLACE TIA

	Signalized Intersection	Peak Hour[1]	Project Trips Added	Existing plus Moffett Place		Background plus Moffett Place		Cumulative plus Moffett Place	
				Delay[2]	LOS[3]	Delay[2]	LOS[3]	Delay[2]	LOS[3]
3	Mathilda Avenue/Moffett Park Drive	AM	90	22.0	C	34.8	C	68.3	E
		PM	83	**124.7**	**F**	**123.6**	**F**	**>180.0**	**F**
4	Mathilda Ave/Westbound SR 237 Ramps	AM	83	38.1	D	57.5	E	55.6	E
		PM	71	17.6	B	**>180.0**	**F**	**>180.0**	**F**
5	Mathilda Ave/Eastbound SR 237 Ramps	AM	73	62.3	E	**98.6**	**F**	**101.9**	**F**
		PM	58	14.6	B	21.8	C	**>180.0**	**F**
6	Mathilda Avenue/Ross Drive	AM	46	63.6	E	**152.6**	**F**	**>180.0**	**F**
		PM	43	40.7	D	55.4	E	**>180.0**	**F**

Notes:
1. AM = morning peak hour, PM = afternoon peak hour
2. Whole intersection weighted average control delay expressed in seconds per vehicle for signalized intersections.
3. LOS = Level of Service calculations conducted using the SimTraffic level of service analysis software package, which applies the methodology described in the *2000 HCM*.

Source: *Moffett Place TIA*, August 2013.

These results are different from the TRAFFIX service levels presented in earlier chapters. Under Existing plus Project Conditions, this report did not identify any impacts, while the SimTraffic analysis from the Moffett Place TIA identified an impact at Mathilda Avenue and Moffett Park Drive. Similarly, under Background plus Project and Cumulative plus Project, the SimTraffic analysis identifies additional impacts at the two SR 237 ramps intersections and Ross Drive.

The different level of service results can be attributed the differences between TRAFFIX and SimTraffic software programs. TRAFFIX is effective at analyzing intersection operations in isolation; however it does not accurately capture corridor operations. SimTraffic on the other hand, captures the random nature of driver behavior and models the interaction between vehicles in a study network. Traffic simulation better

accounts for delays under congested conditions including pedestrian crossings, queue blocking, and queue interactions between adjacent intersections when compared to traditional analysis methods.

During the AM peak hour, the corridor operations captured by SimTraffic account for the movements from the freeway ramps and side streets that are blocked by queued traffic along Mathilda Avenue that have spilled back from downstream intersections due to lack of vehicular storage. During the PM peak hour the closely spaced intersections and heavy weaving movements act as a choke point for the heavy southbound vehicular movements projected along Mathilda Avenue. The primary bottleneck is the signal tandem at SR 237 WB Ramps/Mathilda Avenue and at Moffett Park Drive/Mathilda Avenue.

6.2 QUALITATIVE EVALUATION OF THE MATHILDA AVENUE CORRIDOR OPERATIONS WITH THE PROPOSED PROJECT

This section of the report provides a summary of the qualitative operation of the Mathilda Avenue corridor intersection between Moffett Park Drive and Ross Avenue. The number of trips added to the corridor by the proposed project are compared to the intersection operations presented in **Table 14** to qualitatively asses the project's relative impact to the corridor.

6.2.1 EXISTING CONDITIONS PLUS PROJECT CONDITIONS

As noted in **Table 14**, the project would add up to 90 trips at a given intersection on the Mathilda Avenue corridor. Per the Moffett Place TIA, the Moffett Park Drive intersection would operate at LOS F during the PM peak hour. Addition of the 90 project trips would exacerbate unacceptable LOS F operations at this location and continue to result in a **significant impact**. However, reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impact to a less-than-significant levels**. Payment of the City's TIF would constitute the project's fair share contribution towards the SR237/Mathilda Avenue reconfiguration project.

Per the Moffett Place TIA, the Eastbound SR 237 intersection (AM peak hour) and Ross Drive intersection (AM peak hour) are projected to operate at LOS E, with approximately 62 to 64 seconds of delay. With the addition of the 46 to 73 project trips from mainly through movements or right-turn movements, these two intersections would likely continue to operate at LOS E, since the threshold for LOS F operations is 80 seconds of delay; thus the project would not likely result in unacceptable operations at these locations operating at LOS E and the project would likely have a **less-than significant impact** at the Eastbound SR 237/Mathilda Avenue intersection.

The remaining intersections along the Mathilda Avenue corridor operate at LOS D or better, and the project would unlikely degrade operations to unacceptable levels (LOS F).

Overall, under Existing plus Project Conditions, the addition of project trips from the 215 Moffett Park Drive project is unlikely to change the Mathilda Avenue corridor operations conclusions presented in the Moffett Place TIA.

6.2.2 BACKGROUND PLUS PROJECT CONDITIONS

Based on the SimTraffic results from the Moffett Place TIA, the following intersections are projected to operate at LOS F during the specified peak hour under Background Conditions:

- Mathilda Avenue/Moffett Park Drive (PM peak hour)
- Mathilda Avenue/Westbound SR 237 Ramps (PM peak hour)
- Mathilda Avenue/Eastbound SR 237 Ramps (AM peak hour)
- Mathilda Avenue/Ross Avenue (AM peak hour)

The addition of the 43 to 90 project trips from the 215 Moffett Park Drive development would exacerbate unacceptable LOS F operations at these locations and would continue to result in **significant impacts** at these four intersections. As discussed under Existing plus Project Conditions, reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impacts to less-than-significant levels**. Payment of the City's TIF would constitute the project's fair share contribution towards this improvement.

Per the Moffett Place TIA, the Westbound SR 237 intersection (AM peak hour) and Ross Drive intersection (PM peak hour) are projected to operate at LOS E, with approximately 55 to 58 seconds of delay. Since the threshold for LOS F operations is 80 seconds of delay, the addition of 43 to 83 project trips at these two intersections from mainly through movements or right-turn movements, would not likely result in unacceptable operations at these locations as the project would need to cause 20 seconds of additional delay. Therefore, the intersections would likely continue to operate at LOS E and the project would likely have a **less-than significant impact** at the Westbound SR 237/Mathilda Avenue intersection.

At the remaining intersections along the Mathilda Avenue corridor operate at LOS D or better, and the project would not likely degrade operates to unacceptable levels (LOS F).

Overall, under Background plus Project Conditions, the addition of project trips from the 215 Moffett Park Drive project is unlikely to change the Mathilda Avenue corridor operations conclusions presented in the Moffett Place TIA.

6.2.3 CUMULATIVE PLUS PROJECT CONDITIONS

Using Synchro/SimTraffic analysis software, the following intersections are projected to operate at LOS F during the specified peak hour under Background Conditions:

- Mathilda Avenue/Moffett Park Drive (PM peak hour)
- Mathilda Avenue/Westbound SR 237 Ramps (PM peak hour)
- Mathilda Avenue/Eastbound SR 237 Ramps (AM and PM peak hours)
- Mathilda Avenue/Ross Avenue (AM and PM peak hours)

The addition of the 43 to 90 project trips from the 215 Moffett Park Drive development would exacerbate unacceptable LOS F operations at these locations and would continue to result in **significant impacts** at these four intersections. The reconfiguration of the SR 237/Mathilda Avenue ramp intersections would **reduce the impacts to less-than-significant levels**. As discussed under Existing and Background Conditions, payment of the City's TIF would constitute the project's fair share contribution towards this improvement.

The Moffett Park Drive intersection (AM peak hour) and Westbound SR 237 intersection (AM peak hour) are projected to operate at LOS E, with approximately 56 to 68 seconds of delay. Since the threshold for LOS F operations is 80 seconds of delay, the addition of 43 to 83 project trips from mainly through movements or right-turn movements at these two intersections would not likely result in unacceptable operations at these locations as the project would need to cause 10 to 20 seconds of additional delay. Therefore, the intersections would likely continue to operate at LOS E and the project would likely have a **less-than significant impact** at the Westbound SR 237/Mathilda Avenue intersection.

At the remaining intersections along the Mathilda Avenue corridor operate at LOS D or better, and the project would not likely degrade operations to unacceptable levels (LOS F).

Overall, under Cumulative plus Project Conditions, the addition of project trips from the 215 Moffett Park Drive project is unlikely to change the Mathilda Avenue corridor operations conclusions presented in the Moffett Place TIA.

7.0 SITE ACCESS, ON-SITE CIRCULATION, MULTI-MODAL TRANSPORTATION, AND PARKING ASSESSMENT

This chapter discusses transportation impacts related to accessing and navigating the Project Site. Topics discussed include: site-access, on-site circulation, pedestrian and bicycle access and circulation, and transit access.

7.1 ACCESS AND CIRCULATION REVIEW

Fehr & Peers was provided a site plan, dated September 2014, for the proposed project (**Figure 2**). The site plan indicates the location of the project driveways and the internal circulation system for auto, pedestrian, and bicycle traffic.

The proposed project access will be provided via driveways located on Moffett Park Drive and Borregas Avenue. There are three driveways on the west side of the project site along Borregas Avenue. The first driveway is spaced approximately 100 feet from the intersection with Moffett Park Drive. The next two driveways are approximately 380 feet and 560 feet from the intersection with Moffett Park Drive, respectively. The first and third driveways will provide both inbound and outbound access while the second (middle) driveway will provide outbound access only. There is adequate and safe spacing between the driveways. There are also two driveways on Moffett Park Drive, which are adequately spaced from the each other.

On the eastern boundary of the project, there is a private roadway connecting to Moffett Park Drive that leads to a small surface parking lot (visitor and delivery) and the three-level parking structure for employees. The roadway extends back to serve other parcels to the north and east of the proposed project. Along the western side of the roadway, there are three driveways leading to the surface parking and parking structure. The first driveway provides access to a small surface parking area (less than 25 parking stalls). The second and third parking driveways provide access to a three-level parking structure.

Based on our review of the site plan we have the following observations:

- The driveway along the eastern boundary of the project site is measured to be 30 feet wide. This is in conformance with the City of Sunnyvale guidelines[2] which state that two-way driveways must be at least 20 feet wide.

[2] *Multi-family and Nonresidential Parking Requirements*, City of Sunnyvale, May 2014.

- As cars exit the project site onto Moffett Park Drive, there are two lanes provided – a left-turn lane and a dedicated right-turn lane. The dedicated right-turn lane extends back to the first driveway serving the parking structure. The driveway width at this location is just under 40 feet, which should be able to accommodate the three lanes (1 inbound, 2 outbound).
- The private roadway also serves the property immediately adjacent to the project. This property has approximately 20 perpendicular parking stalls along the roadway. Potential conflicts may arise between cars parking in the stalls of the adjacent property and cars entering or exiting the project's parking lots as they will be sharing the same parking aisle and driveway onto Moffett Park Drive. Since there is a limited number of perpendicular parking stalls along the roadway, this may not be an issue. However, coordination with the adjacent property owners/managers may be necessary.

Additionally, a queueing analysis was conducted at each of the five driveways. The analysis shows that each of the driveways would have a maximum queue of two vehicles during the PM peak hour, when vehicular traffic exiting the site would be the greatest. Thus the proposed driveway throat depths are sufficient to accommodate the anticipated demand.

7.2 PEDESTRIAN AND BICYCLE ACCESS AND CIRCULATION

This section addresses both off-site and on-site pedestrian and bicycle access and circulation.

7.2.1 PEDESTRIAN EVALUATION

Sidewalks will be provided along the perimeter of the project site along the north side of Moffett Park Drive and on the east side of Borregas Avenue. Pedestrian connections will be provided between the office buildings, proposed restaurant, parking lots, and parking garage. Pedestrian circulation is shown on the site plan in **Figure 2**.

The nearest light rail transit (LRT) stop is at the Borregas LRT station on Java Drive. While the project will provide sidewalks along a portion of Borregas Avenue, no sidewalks would be present along Borregas Avenue between Gibraltar Drive and the project driveway. However, the Moffett Place TIA does recommend that sidewalks be constructed on the east side of Borregas Avenue between Gibraltar Drive and Moffett Park Drive. This would complete pedestrian access between the LRT station and the project site.

7.2.2 BICYCLE ACCESS EVALUATION

Along the project site, bicycle lanes are provided on both sides of Borregas Avenue. Bicycle lanes are also provided on the northern portion of Moffett Park Drive, but terminate midway along the project frontage due to insufficient roadway width where a pedestrian/bicycle overcrossing of SR 237 has been constructed. We recommend that the project applicant modify the site plan and include a dedicated bike lane along the entire project frontage to provide continuous westbound bicycle access between Borregas Avenue and Innsbruck Drive. Sharrow lane markings should be added to the roadway in the eastbound direction to indicate that cyclists have full use of the lane and aid cyclists with moving into mixed-flow traffic.

7.2.3 PEDESTRIAN AND BICYCLE IMPACTS

Based on a preliminary review of the draft project site plan, the proposed project would not provide any negative impacts to pedestrian and bicyclists. Rather, the project will provide additional sidewalks and cycling facilities improving the pedestrian and bicycling networks in the Moffett Park area of Sunnyvale.

7.3 TRANSIT EVALUATION

This section discusses transit vehicle delay and transit access within the study area.

7.3.1 TRANSIT VEHICLE DELAY (FOR INFORMATIONAL PURPOSES)

Transit vehicles operating on the same roadways used by individuals to access the project site could incur additional delay due to increased auto congestion. The three primary corridors around the project site are Mathilda Avenue, Java Drive, and Fair Oaks Avenue. The through movement delays along the primary corridors from the detailed calculation sheets presented in Appendix B to determine the potential added transit vehicle delay. The difference between the No Project and Plus Project values is the added transit vehicle delay. The results, as well as the transit routes along each corridor, are shown in **Table 15**.

TABLE 15
ADDITIONAL TRANSIT VEHICLE DELAY BY CORRIDOR

Corridor	Peak Hour	Projected Additional Delay (sec)						Affected Transit Routes
		Existing plus Project		Background plus Project		Cumulative plus Project		
		NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	
Mathilda Avenue[1]	AM	0.5	1.0	2.3	1.9	4.3	3.8	54 and Mary Moffett Caltrain Shuttle
	PM	0.4	0.6	0.5	18.8	0.2	22.7	
Java Drive[2]	AM	0.2	0.5	0.2	0.3	0.2	0.3	26, 120, 121, 122, 321, 328, and 826 (ACE)
	PM	0.5	0.3	0.4	0.2	0.4	0.2	
Fair Oaks Avenue[3]	AM	0.0	0.0	0.0	0.0	0.0	0.0	26
	PM	0.0	0.0	0.0	0.0	0.0	0.0	

Notes:
1. Mathilda Avenue corridor is defined as between Ross Drive and Moffett Park Drive.
2. Java Drive corridor is defined as between Borregas Avenue and SR 237.
3. Fair Oaks Avenue corridor is defined as between NB US 101 Ramps and SR 237.

Under Existing plus Project Conditions, transit vehicles are projected to incur minimal to no delay as a result of the project. However, under Background plus Project and Cumulative plus Project Conditions, the Mathilda Avenue is projected to experience an incremental amount of delay due to the project which affects bus route 54 and the Mary Moffett Caltrain shuttles. Minimal delays are projected along Java Drive and Fair Oaks Avenue.

No significance thresholds for an increase in transit delay are identified in the latest VTA TIA guidelines (dated October 2014).

7.3.2 TRANSIT ACCESS

Transit impacts are considered significant if the proposed project:

- conflicts with existing or planned transit facilities,
- generates potential transit trips in excess of available capacity, or
- does not provide adequate facilities for pedestrians and bicyclists to access transit routes and stops.

Based on these criteria, the project would not have a significant impact on transit service.

While the Moffett Park area has a shuttle system that would be able to accommodate individuals accessing the project site, it is recommended that the project either subsidize the existing shuttle or

provide a separate private shuttle to facilitate direct access between the site and regional transit hubs (such as downtown Sunnyvale Caltrain Station) or other potential activity centers. The developer, in cooperation with the City and other potentially benefiting parties, should provide such an analysis and other logistical requirements for evaluating and establishing shuttle service.

As previously mentioned, the project will provide sidewalks on Borregas Avenue along the project frontage and the Moffett Place TIA does recommend sidewalks on both sides of Borregas Avenue. The MPSP also identifies sidewalks on Borregas Avenue as part of future sidewalk improvements. This will provide safe, continuous access for pedestrians between the LRT station at Java Drive/Borregas Avenue and the project site.

7.4 LEFT-TURN POCKET QUEUEING ANALYSIS

The addition of project traffic along the roadway network has the potential to add vehicles to left-turn movement such that the left-turn queue would exceed the turn pocket storage length. Queues that exceed the turn pocket storage length have the potential to impede through traffic movement along an approach. Potentially affected intersections were selected for this evaluation based on where the project would add at least 10 vehicles to a study intersection with a left-turn pocket, which include the following three intersections:

Int. 1 Northbound US 101 Ramps/Moffett Park Drive – Westbound left-turn pocket.

Int. 3 Mathilda Avenue/Moffett Park Drive – Westbound left-turn pocket.

Int. 5 Mathilda Avenue/Eastbound SR 237 Ramps – Eastbound left-turn pocket.

The 95th percentile queues from the TRAFFIX LOS analysis was used to evaluate the projected queues at the identified left-turn movements. The results of the left-turn queue analysis are presented in **Table 16**.

Based on the queue analysis presented in **Table 16**, the westbound left-turn pocket at the Northbound US 101 Ramps/Moffett Park Drive intersection and the eastbound left-turn pocket at the Mathilda Avenue/Eastbound SR 237 Ramp intersection have sufficient capacity to accommodate the project queues under the plus Project scenarios for Existing, Background, and Cumulative Conditions.

The westbound left-turn pocket at the Mathilda Avenue/Moffett Park Drive intersection projected to have deficient capacity to accommodate the anticipated queues under Background plus Project and Cumulative plus Project conditions. The reconfiguration of the SR 237/Mathilda Avenue interchange, as identified in the City's TIF program, could potentially provide added storage capacity for this movement. The City is

currently evaluating the design alternatives for the SR 237/Mathilda Avenue interchange, which includes queue capacity evaluation at key intersection within and around the interchange.

TABLE 16
LEFT-TURN VEHICLE QUEUE EVALUATION

	Intersection	Pocket	Peak Hour	Number of Trips Added	Available Pocket Length (feet)	Projected Queue Length (feet)[1]			Improvement
						Existing (Existing plus Project)	Background (Background plus Project)	Cumulative (Cumulative plus Project)	
1	Northbound US 101 Ramps/ Moffett Park Drive	WBL	AM PM	5 11	310	0 (25) 125 (125)	25 (25) 200 (200)	25 (50) 225 (225)	No improvements needed
3	Mathilda Avenue/ Moffett Park Drive	WBL	AM PM	21 44	560	75 (75) 250 (275)	175 (225) 1,000 (1075)	225 (275) 1,175 (1250)	Reconfiguration of the SR 237/Mathilda Avenue ramp intersections would help alleviate the left turn queue.
5	Mathilda Avenue/ Eastbound SR 237 Ramps	EBL	AM PM	26 11	1425	300 (325) 50 (50)	800 (825) 175 (175)	1,000 (1025) 175 (200)	No improvements needed

Notes:
1. Each vehicle in queue is assumed to occupy 25 feet.
Source: Fehr & Peers, February 2015.

7.5 PARKING ASSESSMENT

Off-street parking and bicycle requirements for the Moffett Park area are identified in the MPSP, as well as in guidelines from the City of Sunnyvale and the VTA.

7.5.1 VEHICLE PARKING

The MPSP requires office land uses within the MPSP area to provide a minimum off-street parking supply at a rate of one space per 300 square feet of gross floor area (3.3 spaces per 1000 s.f.). The MPSP does not establish parking requirements for restaurant uses in the Moffett Park area but the City of Sunnyvale requires an off-street parking at of rate of 9 spaces per 1000 s.f. for restaurant uses. The projects parking requirements are summarized in **Table 17**.

TABLE 17
VEHICLE PARKING REQUIREMENTS

Project Site	Project Size	Required Minimum Parking Supply[1]	Proposed Parking Supply
Office Buildings	243,463 s.f.	812	-
Restaurant	5,000 s.f.	45	-
Total		**857**	**860**

Notes:
1. MPSP requires a minimum parking supply ratio of 1 space per 300 s.f. of gross floor area of office uses. The City of Sunnyvale requires 9 spaces per 1000 s.f. of gross floor area of restaurant uses.

Source: Fehr & Peers, February 2015.

Based on the requirements of the MPSP, the project would be required to provide a minimum of 812 parking spaces for the office development and 45 spaces for the restaurant, which would total 857 spaces for the proposed development. According to the site plan, the proposed parking supply is 860 spaces which would meet and exceeds the minimum parking requirement by three spaces.

It should be noted that the MSPS' parking rates are fairly standard for office parking requirements for jurisdiction within Santa Clara County. However, the MPSP requires TDM programs that reduce daily vehicle trips by a minimum of 22.5 percent and peak hour trips by at least 30 percent. Thus, while the project is required to provide parking at the MSPS' standard rates, with implementation of the project's required TDM plan, the site's demand could be reduced.

7.5.2 BICYCLE PARKING

The MPSP provides both Class I and Class II bicycle parking requirements. Class I facilities protect the entire bicycle from theft, vandalism, and inclement weather and are appropriate for long-term storage. Examples include bike lockers, rooms with key access, guarded parking areas, and valet/check-in parking. Class II parking facilities include bicycle racks to which the frame and at least one wheel can be secured with a user-provided lock. The MPSP bicycle requirements are the similar to the recommendations included in VTA's TIA Guidelines (updated October, 2014).

The MPSP requires office uses to provide one bicycle parking space per 6,000 s.f. of gross floor area. Of that requirement, 75 percent needs to be Class I parking facilities and 25 percent Class II facilities. The MPSP does not include a specific bicycle parking requirement for restaurants, but does include one for commercial uses, which would include restaurant. The requirement for commercial uses is one Class I bicycle parking space per 30 employees plus one Class II bicycle parking space per 6,000 s.f. of gross floor area. The project's bicycle requirements are summarized in **Table 18**.

TABLE 18
BICYCLE PARKING REQUIREMENTS

Project Site	Project Size	Total Required Parking Supply[1]	Class I Parking Supply[1]	Class II Parking Supply[1]
Office Buildings	243,463 s.f.	41	31	10
Restaurant	5,000 s.f.	2	1	1

Notes:
1. MPSP requires parking supply ratio of 1 space per 6000 s.f. of gross floor area of office use with 75% being Class I and 25% being Class II. MPSP requires parking supply ratio of 1 Class I bicycle parking space per 30 employees and one Class II bicycle parking space per 6,000 s.f. of gross floor area for restaurant (commercial) uses. The restaurant is assumed to have eight (8) employees.

Source: Fehr & Peers, February 2015.