Figure 2-16

Existing Study Area Regional Rail and Bus Network, Zone 1 (2013)

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Date: November 2013

FEHR PEERS

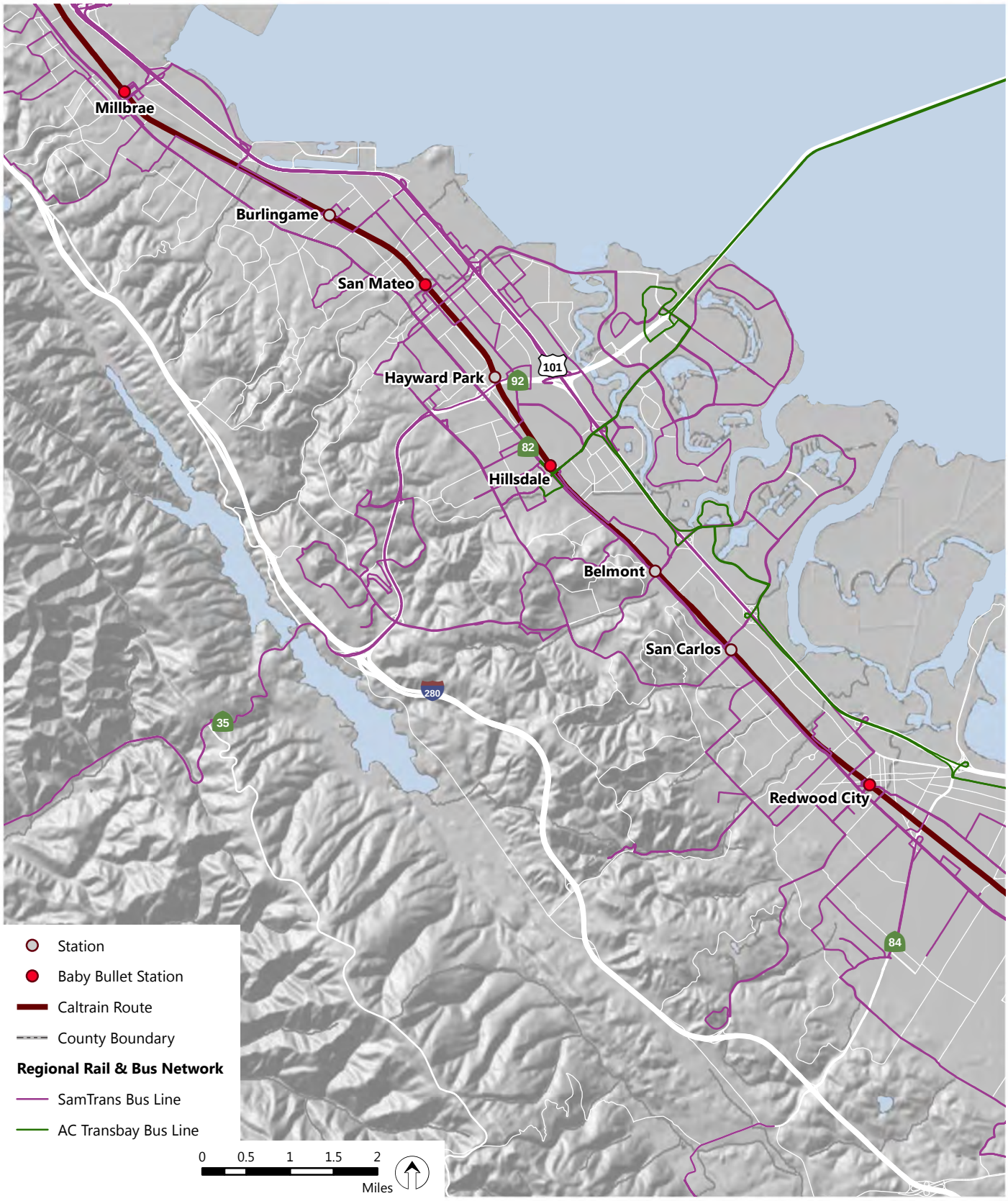

Figure 2-17

Existing Study Area Regional Rail and Bus Network, Zone 2 (2013)

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Date: November 2013

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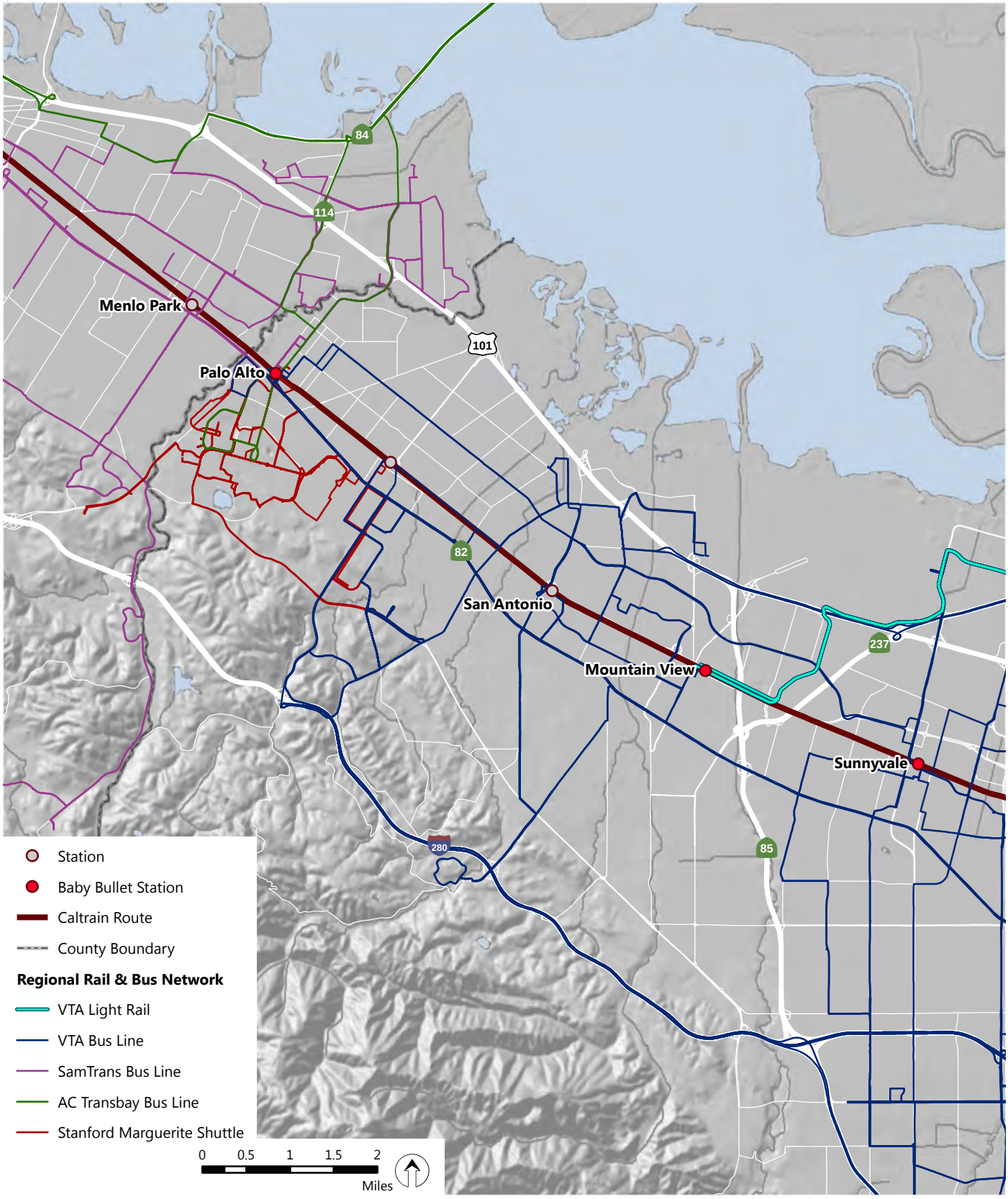

Figure 2-18

Existing Study Area Regional Rail and Bus Network, Zone 3 (2013)

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Date: November 2013

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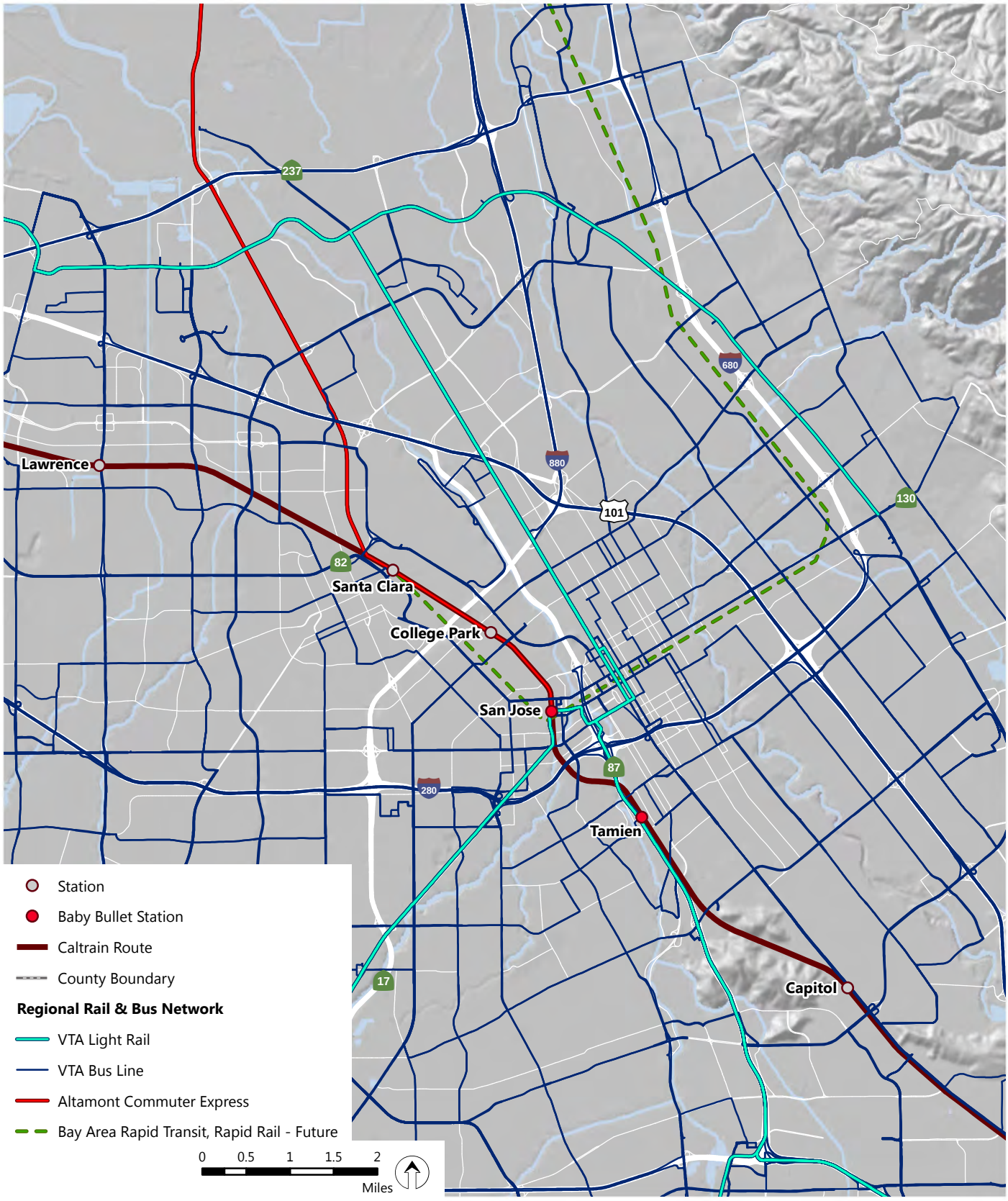

Figure 2-19

Existing Study Area Regional Rail and Bus Network, Zone 4 (2013)

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Date: November 2013

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2.3.5.1 Inter-Agency Transfers and Fares

The following connecting transit systems offer Clipper to passengers: BART, MUNI, VTA, AC Transit, and SamTrans. Clipper is not currently offered on ACE, Santa Cruz Metro Transit District, and Monterey-Salinas Transit (MST). Caltrain offers some discounted inter-agency transfers. Caltrain passengers who load a Caltrain Monthly Passes on their Clipper card can purchase a MUNI pass at a $5 discount, allowing unlimited rides on all MUNI vehicles excluding cable cars and special routes. VTA passengers with a two-zone or greater Caltrain Monthly Pass to receive a ~~L~~local fare credit on its bus and light rail services. SamTrans passengers with a two-zone or greater Caltrain Monthly Pass to receive a Local fare credit on all fixed-route bus routes. The Dumbarton Express bus route allows customers presenting a two-zone or greater Caltrain Monthly Pass to receive a transfer credit of a ~~L~~local fare on its buses if boarding within two hours of first boarding Caltrain.

2.3.5.2 San Francisco Bay Area Rapid Transit (BART)

BART provides rail transit service to the cities in the northern portion of the San Francisco peninsula, Oakland, Berkeley, Fremont, Walnut Creek, Dublin/Pleasanton, and other cities in the East Bay. BART is governed by a Board of Directors comprised of nine elected officials from the nine BART districts. Board members serve a four-year term. A total of 44 stations comprise the BART system. Of the five BART lines, Caltrain connects directly to two at the Millbrae Station: the Richmond Line and the Pittsburg/Bay Point. The Pittsburg/Bay Point includes a connection to San Francisco International Airport. The Richmond Line operates from Millbrae on weekdays before 8:00 PM, and the Pittsburg/Bay Point Line provides service after 8:00 PM and on weekends.

BART passengers can also connect to Caltrain's 4th and King Station via ~~MUNI Light Rail~~ MUNI Metro and bus (N-Judah, T-Third, Routes 30 or 45). BART operating hours on weekdays are 4:00 AM to midnight, with trains running every 15 to 20 minutes. On Saturdays, BART operates 6:00 AM to midnight; on Sundays between 9:00 AM and midnight. In the evening and on weekends, BART trains run approximately every 20 minutes (San Francisco Bay Area Rapid Transit District, 2013).

2.3.5.3 San Francisco Municipal Transportation Agency (SFMTA)

The San Francisco Municipal Transportation Agency (SFMTA) is governed by a seven-member Board of Directors appointed by the mayor. This agency oversees all light rail and bus service, bicycle and pedestrian program, taxis, parking and traffic control operations in the City and County of San Francisco. The~~y~~ system is commonly referred to as MUNI. ~~MUNI Light Rail~~ MUNI Metro system, a mixture of above- and below-ground service, is comprised of nine routes serving residential areas and the financial district. The MUNI bus system is comprised of approximately 65 Local and ~~expre3ss~~ express routes. In addition to light rail and buses, MUNI operates three cable car routes and one historic streetcar route (F-Market and Wharves). A number of ~~MUNI Light Rail~~ MUNI Metro and bus routes~~,~~ connect~~s~~ to the 4th and King, 22nd Street, and Bayshore Caltrain Stations (San Francisco Municipal Transportation Agency, 2013). MUNI operates 24 hours per day; actual hours and headways vary by route and type of service (e.g. OWL service only runs during evening hours and express routes run during peak hours only). Muni's hours of operation for light rail service are between approximately 4:00 AM to 2:00 AM~~,~~ daily with slight variations by route.

2.3.5.4 Santa Clara Valley Transportation Authority (VTA)

VTA provides light rail, bus and paratransit service to Santa Clara County, including the municipalities of Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga and Sunnyvale. In addition, VTA is the congestion management agency for Santa Clara County, responsible for countywide transportation planning and funding and for managing the county's congestion reduction and air quality improvement. VTA is governed by a 12-member Board of Directors. Of VTA's three light rail lines, two connect to Caltrain stations: Mountain View – Winchester at the Mountain View and San Jose Diridon Stations, and ~~Ohlone/Chynoweth-Almaden~~ Santa Teresa – Alum Rock at the Tamien Station. A number of VTA bus routes, including express routes, connect to Caltrain stations within Santa Clara County (San Mateo County Transit District, "Commute Fleets" 2013). Light rail trains operate at 15, 20, and 60 minute frequencies depending on the time of day. VTA bus routes generally operate between 5:00 AM and 1:00AM, with night service connections at most Caltrain stations between 1:00 to 5:00 AM provided by partnering agencies (AC Transit, MUNI, and SamTrans) (Metropolitan Transportation Commission, 2013).

2.3.5.5 Alameda-Contra Costa Transit (AC Transit)

AC Transit provides bus and paratransit services to 13 cities and adjacent unincorporated areas in Alameda and Contra Costa counties. Currently, AC transit operates 116 bus lines, including rapid services and "transbay" lines that traverse the San Francisco-Oakland Bay Bridge. AC Transit connects to Caltrain via the "M" bus line at the Hillsdale Station, the "U" line at the Palo Alto Station, and the Dumbarton Express at the Palo Alto and California Avenue Stations (AC Transit, "Ridership" 2013). AC Transit is governed by a nine-member Boarded of Directors. AC Transit bus routes operate at varied times of the day: routes 1-200 operate during peak hours (6:00 – 9:00 AM and 4:00 to 6:00 PM on weekdays); routes 300 to 399 operate during non-peak hours; routes 600 – 699 operate in conjunction with Local school district schedules; and routes 800-899 provide night service between 1:00 to 5:00 AM daily (AC Transit, "AC Transit Bus Line" 2013).

2.3.5.6 San Mateo County Transit District (SamTrans)

SamTrans operates 73 bus routes and paratransit service throughout San Mateo County and parts of San Francisco and Palo Alto. Caltrain and the San Mateo County Transportation Authority are contracted with SamTrans to serve as their managing agency, under the direction of the JPB and San Mateo County Transportation Authority Board of Directors, respectively. SamTrans buses, including the KX Express and Route ECR along El Camino Real between Palo Alto and Daly City, connect to a number of Caltrain stations throughout the Project Study Area (San Mateo County Transit District, "District Information" 2013). Buses generally operate between 5:00 AM and 12:00 AM daily, with several late-night service routes, including routes 297 and 397.

2.3.5.7 Altamont Commuter Express (ACE)

ACE provides passenger rail service across the Altamont corridor, spanning from San Jose to Stockton. ACE trains connect to Caltrain at the Santa Clara and San Jose Diridon Stations. The full ACE line is comprised of 10 stations. The San Joaquin Regional Rail Commission (SJRRC) is the owner and operator of ACE services. ~~AC Transit's~~ ACE's hours of operation for westbound trains are 4:20 AM to 9:17 AM. Eastbound trains operate between 3:35 PM and 8:50 PM. Trains depart approximately every hour during service hours (Altamont Corridor Express, 2013).

2.3.5.8 Capitol Corridor

The Capitol Corridor provides intercity passenger rail service to Sacramento, Oakland, and San Jose with Amtrak Thruway bus connections to nearby cities. Commuters traveling on Capitol Corridor trains from Sacramento and the East Bay can connect to Caltrain at the Santa Clara and San Jose Diridon Stations. Capitol Corridor trains operate between 4:30 AM and 11:30 PM. Trains depart about every hour to two hours during the weekdays. The Capitol Corridor is managed by the Capitol Corridor Joint Powers Authority (CCJPA), a partnership of six Local transit agencies in the eight-county service area. BART provides daily management support to the CCJPA, and trains are operated by Amtrak.

2.3.5.9 Amtrak

Amtrak provides rail and bus service to the continental United States. In the San Francisco Bay Area, one Amtrak route connects to Caltrain at San Jose Diridon, offering connections to approximately 200 Amtrak stations throughout California and many other stations in North America. The Coast Starlight connects the San Francisco Bay Area to Seattle in the North and Los Angeles to the South, with Amtrak Thruway bus connections to Vancouver, British Columbia in the North and connective train service to San Diego, California in the South. The Coast Starlight operates between about 5:00 AM to 1:00 AM, depending on the direction (Seattle-bound or Los Angeles-bound) (Amtrak, 2013). The Coast Starlight Train 11 departs San Jose in the southbound direction once daily at 9:55 AM. The northbound Coast Starlight Train 14 departs San Jose at 8:23 PM. In addition, Amtrak Thruway connecting bus service serves the 4th and King Caltrain Station at hourly frequencies. This shuttle connects Caltrain passengers to the closest Amtrak stations in Oakland and Emeryville (National Railroad Passenger Corporation, 2013).

2.3.5.10 Santa Cruz Metro Transit District

The Santa Cruz Metropolitan Transit District, commonly referred to as Santa Cruz METRO, provides bus service to Santa Cruz County. Santa Cruz METRO is governed by a Board of Directors. Santa Cruz METRO operates about 30 bus routes year-round and is governed by the Santa Cruz METRO Board of Directors. Caltrain passengers can travel to Santa Cruz via the Highway 17 Express route at the San Jose Diridon Station. The Highway 17 Express operates between the hours of 4:45 AM to 11:45 PM with buses leaving about every hour. Between the hours of 3:00 to 9:00 PM, buses depart every 20 to 30 minutes in both directions (Santa Cruz METRO, 2013). In addition to stopping in downtown Santa Cruz, the route also stops in Scotts Valley and Soquel.

2.3.5.11 Monterey-Salinas Transit (MST)

Monterey-Salinas Transit (MST) provides bus service in Monterey County and southern Santa Cruz. MST operates 59 bus routes and is managed by the board of directors with representatives from the cities of Carmel, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, Sand City, Seaside, Soledad and the County of Monterey. MST bus routes 55 and 79 connect to Caltrain at the San Jose Diridon Station. Route 55, Monterey-San Jose Express, operates between 5:00 AM and 8:00 PM, with three buses northbound and three buses southbound. Headways vary between one and five hours.

TABLE 2-6
STUDY AREA WEEKDAY TRANSIT CONNECTIONS, BY STATION (2013)

Station	Station Address	Transit Connections (Provider, Route)
San Francisco	700 4th Street, San Francisco, CA 94107	• MUNI bus: 10, 30, 45, 47, 80X, 81X, 83X, 91 owl, T owl, N owl • ~~MUNI Light Rail~~ MUNI Metro: N-Judah, T-Third • Public Shuttles: Amtrak Shuttle
22nd Street	1149 22nd Street, San Francisco, CA 94107	• MUNI Bus: 10, 22, 48 • ~~MUNI Light Rail~~ MUNI Metro: T-Third
Bayshore	400 Tunnel Avenue, San Francisco, CA 94134	• MUNI Bus: 8X, 8AX, 8BX, 9, 56 • ~~MUNI Light Rail~~ MUNI Metro: T-Third • SamTrans: 292 • Public Shuttles: Bayshore/Brisbane Senior shuttle, Bayshore/Brisbane Commuter Shuttle
South San Francisco	590 Dubuque Avenue, South San Francisco, CA 94080	• Public Shuttles: Oyster Point, Utah-Grand
San Bruno	297 Huntington Avenue, San Bruno, CA 94066	• Public Shuttles: Bayhill San Bruno Shuttle
Millbrae Transit Center	100 California Drive, Millbrae 94030	• SamTrans: 397 • BART: Richmond Line, Pittsburg/Bay Point (includes connection to San Francisco International Airport) • Public Shuttles: Broadway/Millbrae, Burlingame Bayside Area, North Burlingame, North Foster City, Sierra Point
Burlingame	290 California Drive, Burlingame, CA 94010	• SamTrans: 46, 292 • Public Shuttle: Burlingame Trolley
San Mateo	385 First Avenue, San Mateo, CA 94401	• SamTrans: 250, 292, 295, 59
Hayward Park	401 Concar Drive, San Mateo, CA 94402	• Public Shuttles: Norfolk
Hillsdale	3333 El Camino Real, San Mateo, CA 94403	• SamTrans ECR, KX, 57, 250, 251, 262, 292, 294, 295, 397, • AC Transit: M • Public Shuttles: Belmont - Hillsdale, Campus Drive, Lincoln Centre, Mariners Island/PCA, Oracle, Foster City Connections
Belmont	995 El Camino Real, Belmont, CA 94402	• SamTrans: ECR, KX, 67, 260, 261, 262, 397, 398 • Public Shuttles: Belmont - Hillsdale

TABLE 2-6
STUDY AREA WEEKDAY TRANSIT CONNECTIONS, BY STATION (2013)

Station	Station Address	Transit Connections (Provider, Route)
San Carlos	599 El Camino Real, San Carlos, CA 94070	• SamTrans: ECR, KX, FLXS, 260, 261, 295, 397, 398 • Public Shuttles: Electronic Arts, Oracle, Redwood Shores (Bridge Park), Redwood Shores (Clipper)
Redwood City	1 James Avenue, Redwood City, CA 94063	• SamTrans: ECR, KX, 270, 274, 275, 276, 278, 296, 297, 397, 398 • Public Shuttles: Pacific Shores
Menlo Park	1120 Merrill Street, Menlo Park, CA 94025	• SamTrans: ECR, 85, 286, 296 • Public Shuttles: Marsh Road, Willow Road
Palo Alto	95 University Avenue, Palo Alto, CA 94301	• SamTrans: ECR, 280, 281, 297, 397, • VTA Bus: 22, 35, 522 • AC Transit: U, Dumbarton Express • Public Shuttles: Deer Creek, Stanford Marguerite, Crosstown/Embarcadero, East Palo Alto Community
California Ave	780 Stockton Avenue, San Jose, CA 95126	• VTA Bus: 22, 89, 522 • AC Transit: Dumbarton Express • Public Shuttles: Deer Creek, Stanford Marguerite
San Antonio	190 Showers Drive, Mountain View, CA 94040	• VTA Bus: 32, 34, 35, 40 • Public Shuttles: Deer Creek, Stanford Marguerite
Mountain View	600 W. Evelyn Avenue, Mountain View, CA 94041	• VTA Bus: 34, 35, 51, 52, 902 • VTA Light Rail: Mountain View – Winchester • Public Shuttles: Duane Ave., Mary/Moffett, North Bayshore, Shoreline
Sunnyvale	121 W. Evelyn Avenue, Sunnyvale, CA 94086	• VTA Bus: 32, 53, 54, 55, 304
Lawrence	137 San Zeno Way, Sunnyvale, CA 94086	• Public Shuttles: Bowers-Walsh, Duane Ave., Mission
Santa Clara	1001 Railroad Avenue, Santa Clara, CA 95050	• VTA Bus: 10, Airport Flyer, 22, 32, 60, 81, 522 • ACE
College Park	780 Stockton Avenue, San Jose, CA 95126	• VTA Bus: 22, 61, 62, 522

TABLE 2-6
STUDY AREA WEEKDAY TRANSIT CONNECTIONS, BY STATION (2013)

Station	Station Address	Transit Connections (Provider, Route)
San Jose Diridon	65 Cahill Street, San Jose, CA 95110	• Altamont Commuter Express (ACE) • Amtrak: Coast Starlight • Capitol Corridor • VTA Bus: 22, 63, 64, 65, 68, 81, 180, 181, 522 • VTA Light Rail: Mountain View – Winchester • Santa Cruz Metropolitan Transit District: Highway 17 Express • MST: 55 • Public Shuttles: DASH (Downtown Area Shuttle)
Tamien	1355 Lick Avenue, San Jose, CA 95110	• VTA Bus: 25, 82 • VTA Light Rail: Ohlone/Chynoweth –Almaden, Alum Rock – Santa Theresa

Sources: caltrain.com, bart.gov, mtc.ca.gov, vta.org, acerail.com, dumbartonexpress.com
Note: Only stations with existing weekday service are listed (excludes Broadway and Atherton Stations)

2.3.6 PUBLIC AND ~~PRVIATE~~ PRIVATE SHUTTLE CONNECTIONS

Shuttles connecting to Caltrain include a broad ~~ranch~~ range of transportation services that are both publically and privately provided by transit agencies, community organizations, employers, and academic and cultural organizations. Shuttle vehicles range from mini-vans to full-sized motor coaches (San Francisco County Transportation Authority, 2011). Most public shuttles operate fixed routes between Caltrain stations and employment sites. The majority of shuttles listed in Table 2-6 are funded by the Bay Area Air Quality Management District Transportation Fund for Cleaner Air, JPB, San Mateo County Transportation Authority, and participating employers. Some shuttles charge a nominal fare of under $5.00; others are free (San Mateo County Transit District, 2013).

Recently, there has been substantial growth of shuttle operations in the San Francisco Bay Area, especially private employer-provided regional shuttles which provide direct service to employment sites either from residential neighborhood stops, or from major transit hubs, including Caltrain stations. Major employers offering such services include a number of technology industry companies based throughout the San Francisco Bay Area. Employers provide shuttles for a range of purposes, including: employee retention, filling transit service gaps, reducing commute times, environmental stewardship, ~~a~~ discouraging driving, and on-site parking.

Figure 2-20 illustrates the estimated frequency of public and private shuttles arriving between 7:00 and 9:00 AM on weekdays by station. Currently, the Palo Alto Station experiences the highest frequency of shuttles with about 75 shuttles each morning, followed by the Millbrae Station and Mountain View stations.

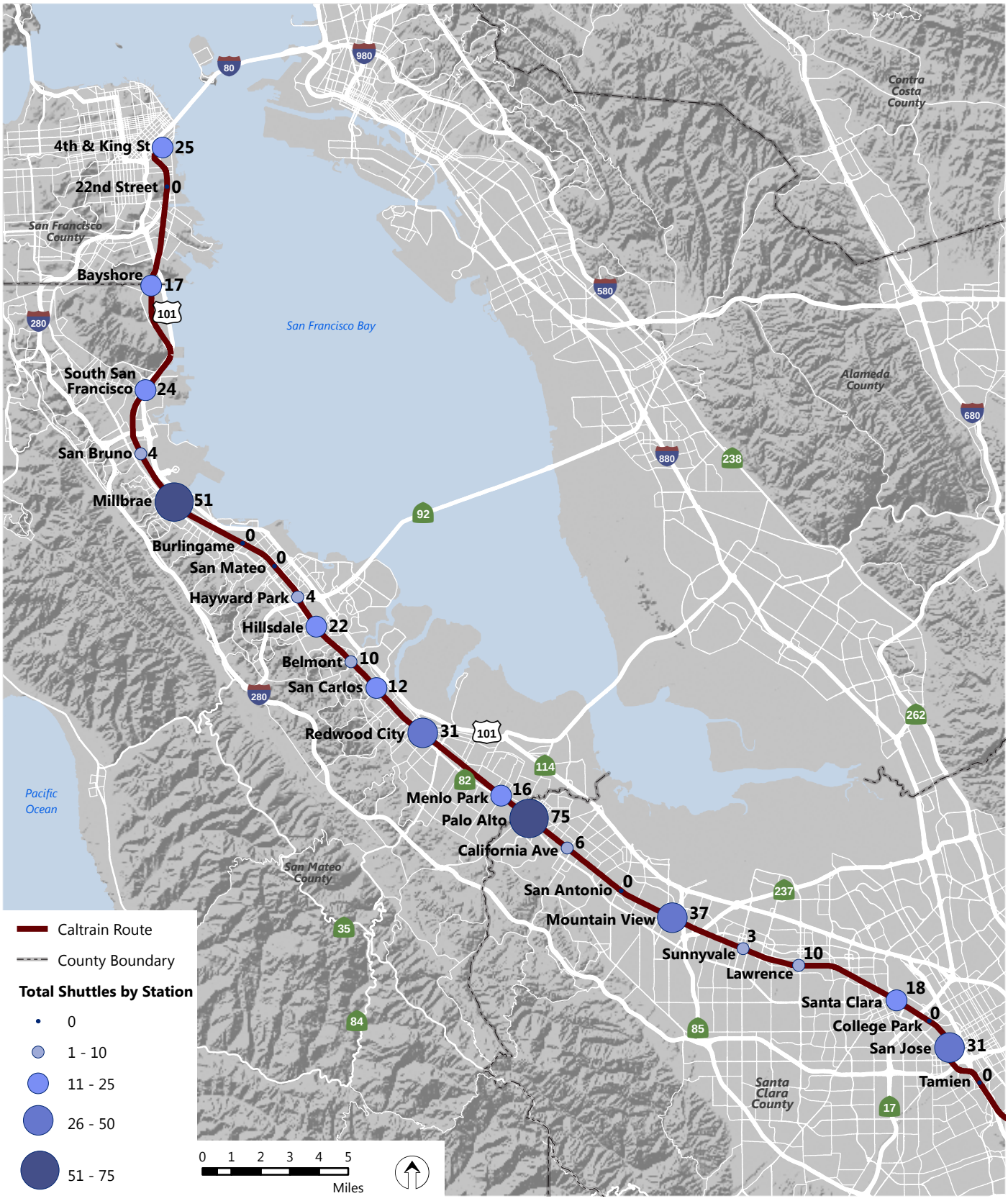

Figure 2-20

Frequency of AM Public and Private Shuttles at Caltrain Stations (2013)

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Date: December 2013

2.4 REGIONAL PLANNING CONTEXT: BACKGROUND PROJECTS AND PLANS

This section provides an overview of other regional and local projects and plans in the Study Area. Jurisdictions along the Caltrain corridor are currently engaged in a number of infrastructure projects, land use improvements, and planning studies of various scopes; these projects and plans present potential land use and transportation implications for this project.

Currently, a number of inter-regional and city-level infrastructure improvement projects are in-progress in the Study Area. On the state-level, the California High Speed Rail Authority (CHSRA) is bringing together numerous jurisdictions to plan high-speed rail in the state, in addition to implementing a Blended Operations Plan with Caltrain, discussed in Section 2.4.1. Bus rapid transit improvement projects are underway in Santa Clara and San Francisco counties. In addition, upcoming phases of the BART Silicon Valley extension ~~is~~ are planned to connect to Caltrain at the San Jose Diridon and Santa Clara Stations.

2.4.1 CALIFORNIA HIGH-SPEED RAIL AND BLENDED OPERATIONS WITH CALTRAIN

The California High-speed Rail Project proposes to provide intercity high-speed rail service along more than 800 miles of track, connecting ~~the~~ Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire (Riverside County), Orange County, and San Diego. CHSRA previously prepared a final program-level environmental analysis of a statewide HSR system (CHSRA 2005). The program-level analysis included an evaluation of various alignments for high-speed service. In 2008, CHSRA issued a final program-level environmental analysis of the Bay Area to Central Valley alignments. This analysis identified the Pacheco Pass and the Caltrain alignment as its preferred alternative. There were several legal challenges to the final program-level environmental analysis of the environmental analysis for the Bay Area to Central Valley alignments that resulted in court orders to make certain revisions to the Final Program EIR. Revisions to the Final Program EIR were completed in 2010 and 2012. Subsequent to certification of the 2012 revisions, CHSRA confirmed that the selected route for the California HSR system is the Pacheco Pass alignment from the Central Valley to the Bay Area and the Caltrain corridor for the Bay Area segment from San Jose to San Francisco.

In 2009, CHSRA began project-level analysis of a grade-separated, four-track system from San Jose to San Francisco, including an alternatives analysis and a supplemental alternatives analysis. The four-track proposals by CHSRA were controversial along the Peninsula corridor, with a diversity of opinions about the project. Taking into account these concerns, CHSRA decided in 2012 to change its approach for the Peninsula corridor and embrace a Blended Service concept in which Caltrain and CHSRA would share operations on the corridor and CHSRA would primarily be located within the Caltrain right of way.

Blended Service would consist of electrified Caltrain trains and HSR trains mostly using the same tracks from San Francisco to San Jose, with a section of passing tracks for scenarios with up to four HSR trains per peak hour per direction (pphpd).[4] There would be no Blended Service south of Santa Clara. Caltrain

[4] The Peninsula Corridor Electrification Project would replace approximately 75 percent of the revenue service fleet with EMUs for service from San Francisco to San Jose. Additional funding would need to be secured beyond that

and CHSRA have engaged in planning level studies of Blended Service to demonstrate its viability. The details of Blended Service are not available at this time. Additional planning and design will be done later and evaluated in a separate environmental evaluation of Blended Service by the CHSRA.

Since 2009, the JPB, the California High-Speed Rail Authority (CHSRA) the California Legislature, the Metropolitan Transportation Commission (MTC) and other parties have worked together to develop a vision of a "blended system" whereby both Caltrain and HSR would utilize the existing Caltrain Peninsula Corridor. This vision for implementing blended service was included in the *Revised 2012 Business Plan* that the CHSRA Board adopted in April 2012 for the California High-Speed Rail System.

The JPB and CHSRA are committed to advancing a blended system concept. This local vision was developed with stakeholders interested in the corridor. The blended system would remain substantially within the existing Caltrain ROW and accommodate future high-speed rail and modernized Caltrain service by primarily utilizing the existing track configuration. The blended system will be primarily a two-track system shared by Caltrain, high-speed rail, and existing tenant passenger and freight rail operators. As discussed below concerning the cumulative analysis, a blended system may require passing tracks at certain locations in the Peninsula corridor.

Based on the blended system vision, the Caltrain Peninsula Corridor has been designated to receive an initial investment of Proposition 1A bond funds that would benefit Caltrain and its modernization program in the short term and HSR in the long run. The JPB, CHSRA and seven other San Francisco Bay Area agencies (City and County of San Francisco, San Francisco County Transportation Authority, Transbay Joint Powers Authority, San Mateo County Transportation Authority, Santa Clara Valley Transportation Authority, City of San Jose, and MTC) have approved a Memorandum of Understanding (MOU) to pursue shared use of the corridor between San Jose and San Francisco to provide blended service of both Caltrain commuter rail service and HSR intercity service. Corridor improvements identified in the MOU include the following:

- **Advanced Signal System (CBOSS PTC or CBOSS):** CBOSS stands for Communications Based Overlay Signal System and PTC stands for Positive Train Control. Currently in construction, this project will increase the operating performance of the current signal system, improve the efficiency of grade crossing warning functions, and automatically stop a train when there is violation of speed or route occurs. This project, which includes implementation of safety improvements mandated by federal law, is scheduled to be operational by 2015 as mandated by the Federal Railroad Administration (FRA).
- **Corridor Electrification:** The JPB decided to prepare this new EIR for the corridor electrification due to the changes in existing conditions that have occurred along the corridor since the prior EIR analyses were conducted, to update the environmental analysis, and to update the cumulative analysis of blended service and other cumulative developments along the corridor. Completion of a new EIR will also allow public agencies, stakeholders, the public and decision-maker's the opportunity to review and comment on the project's environmental effects in light of current information and analyses. The Proposed Project includes 114 trains per day between San Jose and San Francisco.

available for the Proposed Project to provide sufficient rolling stock to have 100 percent electrified service from San Francisco to San Jose. Diesel service would continue from Gilroy to San Jose under all scenarios.

- **Blended Service:** The JPB, CHSRA, and the MOU partners have agreed on shared use of the Caltrain corridor for use of up to 6 Caltrain trains per peak hour per direction and up to 4 HSR trains per peak hour per direction. The operational feasibility of blended service has been studied, but this project is presently only at the conceptual planning phase. The potential addition of HSR service to this corridor will be subject of a separate environmental review process that will be undertaken subsequent to the environmental process for the Peninsula Corridor Electrification Project (Project). Based on the current CHSRA *Revised 2012 Business Plan*, blended service along the Corridor is scheduled to commence sometime between 2026 and 2029.

2.4.2 TRANSBAY TRANSIT CENTER AND DISTRICT PROJECTS

The new Transbay Transit Center, currently under construction in San Francisco, will serve as a regional transit hub for the region and state, connecting California High-speed Rail, Caltrain, AC Transit, BART, Golden Gate Transit, Greyhound, Muni, SamTrans, WestCAT Lynx, and Amtrak (Transbay Joint Powers Authority, 2013). The Transbay Transit Center will be located at the site of the former Transbay Terminal at First and Mission Streets. This section summarizes the interrelated projects in the Transbay Transit Center area, including the Transbay Transit Center, the Transbay Redevelopment Plan, the Caltrain Transbay Extension, and the 4th and King Street Railyards Study.

2.4.2.1 Transbay Transit Center and the Caltrain Downtown Extension

The Transbay Transit Center (TTC) will be located in downtown San Francisco in the area between Natoma and Minna Streets and Second and Main Streets ~~bounded by Main, Mission, 2nd, and Harrison Streets~~. The project is comprised of three interrelated infrastructure enhancement elements: 1) Replacing the former Transbay Terminal with an entirely new, five-story structure to accommodate multiple bus and rail services, as well as passenger amenities; 2) the Downtown Extension (DTX) will extend Caltrain and California High-speed Rail underground from Caltrain's current northern terminus at 4th and King Streets into the new Transit Center; and 3) Creating neighborhood housing, office, parks and retail in the area surrounding the Transit Center. Following the demolition of the former Transbay Terminal in 2011, the Transbay Temporary Terminal was constructed to provide temporary bus facilities during the reconstruction of the new terminal.

The construction of the Transbay Transit Center is divided into two phases. The first phase is the construction of the new Transit Center, including an above-grade bus terminal, and two below-grade rail levels serving Caltrain and California High-speed Rail. Bus ramps will be constructed connecting the Transit Center to the San Francisco-Oakland Bay Bridge and an off-site bus storage facility. Construction has commenced, and the project is scheduled to be completed by 2017. The second phase of the project will complete the two-mile extension of the Caltrain rail line from the 4th and King Station underground into the Transbay Transit Center. As part of this project, the 4th and King Station would be modified to accommodate platforms for both Caltrain and high-speed rail. ~~Phase 2 is currently in planning stages~~ Phase 2 has completed preliminary engineering and is partially funded, and the TJPA is carrying out a supplemental environmental review (San Francisco County Transportation Authority, 2013). Also related to the Caltrain Downtown Extension is the 4th and King Street Railyards Study completed in 2012. The purpose of the 4th and King Street Railyards Study was to examine existing facilities, capacity, and air-rights development at the Station in order to better understand how the Caltrain Downtown Extension, Caltrain Electrification, and High-speed Rail can be accommodated on the site (San Francisco Planning Department, 2012).

2.4.2.2 Transit Center District Plan

The Transit Center District Plan builds upon the City and County of San Francisco's Urban Design Element and the 1985 Downtown Plan to enhance the downtown core. The District area is defined by Market, Main, Tehama, and New Montgomery Streets. Visioning and planning for the District closely aligned with related projects co-located in the area.

2.4.3 TRANSIT SERVICE IMPROVEMENTS

This section describes currently planned or under-construction transit service improvements by county.

2.4.3.1 Santa Clara County

2.4.3.1.1 Bus Rapid Transit Projects

In Santa Clara County, three BRT projects are underway by VTA: the Santa Clara-Alum Rock BRT Project, The El Camino Real BRT Project, and the Stevens Creek BRT Project. The Santa Clara/Alum Rock Bus Rapid Transit Project will provide Limited-stop rapid transit service for 7.2 miles at 11 planned stations, from the Eastridge Transit Center to the Arena Station in downtown San Jose using Capitol Expressway, Alum Rock Avenue, and Santa Clara Street. Construction is set to begin in early 2014 with project completion by fall 2015 (Santa Clara Valley Transportation Authority, "Santa Clara Alum Rock" 2013).

The El Camino Real Bus Rapid Transit Project would upgrade the current VTA 522 bus route on El Camino Real to a bus rapid transit system. Transit improvements potentially include dedicated BRT lanes with either median or curb-running stations. About 26 stations would be served along the corridor between the Palo Alto Transit Center and the Eastridge Transit Center in San Jose. This project is currently in the planning stages and is targeted to be operational by fall 2018 (Santa Clara Valley Transportation Authority, "El Camino Real" 2013).

The Stevens Creek BRT Project will upgrade the current VTA Limited 323 bus route that travels along Stevens Creek Boulevard and San Carlos Street between De Anza College in Cupertino and the Downtown San Jose Transit Mall in San Jose. Once operational, the BRT vehicles will travel from De Anza College to downtown San Jose and then east to the Eastridge Transit Center along the Santa Clara-Alum Rock corridor. This project is in currently in the planning stages and is planned to be operational by fall 2017 (Santa Clara Valley Transportation Authority, "Stevens Creek" 2013).

2.4.3.1.2 BART Silicon Valley

BART is in the process of extending service from Fremont to San Jose, via the BART Silicon Valley Project. In partnership with VTA, the 15.4-mile corridor is being implemented in two extensions. Extension 1 connects the existing Fremont BART Station to the new Warm Springs BART Station about five miles south. This extension is slated to be completed in 2015. Extension 2, Phase 1, or the Berryessa Extension Project, will connect Warm Springs to new stations in Milpitas and Berryessa – a total of ten miles of track slated to be completed by 2017. Phase 2 of Extension 2, would directly intersect with the Caltrain Electrification Study Area. This phase would run from Berryessa through downtown San Jose with connections at the San Jose Diridon and Santa Clara Caltrain Stations. The environmental clearance process for Extension 2, Phase 2 began in late 2013.

2.4.3.2 San Mateo County

SamTrans is conducting a 16-month study of the potential for BRT service along El Camino Real corridor from Daly City to the Palo Alto Transit Center. The purpose of the study is to develop a phasing plan that will identify how existing bus operations in the corridor can be enhanced to incorporate rapid and BRT-type amenities over time, commensurate with population and employment densities and ridership demand. A major goal of the study is to identify enhancements in the short-term and long-term that could improve the passenger experience for existing riders and attract new riders.

2.4.3.3 San Francisco County

2.4.3.3.1 Bus Rapid Transit Projects

The SFCTA in partnership with SFMTA is currently implementing two BRT projects in San Francisco: Geary Corridor BRT and Van Ness Corridor BRT. The Geary BRT Project would bring BRT features, such as dedicated bus lanes and enhanced shelters along the Geary Boulevard corridor in North San Francisco. This project is currently in the Environmental Analysis phase, with a target completion timeframe of 2019-2020 (San Francisco County Transportation Authority, "Geary Corridor" 2013).

The Van Ness Bus Rapid Transit Project will implement a median-running dedicated BRT lane with ten stations between Mission Street and Union Street on Van Ness Blvd. Other project features include: pedestrian safety enhancements; all-door, level boarding; transit signal priority, and transit signal optimization. The target date for project completion is 2018 (San Francisco County Transportation Authority, "Van Ness Corridor" 2013). The SFCTA is also beginning a feasibility study looking at a potential BRT connection along Geneva Avenue and Harney Way, connecting the Balboa Park BART Station with new development in the Candlestick Point and Hunter's Point Shipyard areas of the City.

2.4.3.3.2 Rail Projects

The Central Subway Project in San Francisco entails the construction of a new 1.7-mile extension of MUNI's T Third light rail transit line. The project is the second phase of the SFMTA's Third Street Light Rail Transit Project, which originally opened in 2007. The Central Subway phase will extend the T Third line from the 4th and King Caltrain Station to Chinatown. In front of the 4th and King Station the tracks will be at-grade, though the majority of the extension will run underground. Four new stations will be built along the 1.7-mile alignment. Central Subway construction began in 2012, and the extension is expected to open by 2019.

2.4.4 STATION AREA AND DOWNTOWN PLANS

A number of downtown and station area plans near Caltrain stations in the Study Area have been adopted or implemented in the past decade, or are currently in-progress. In general, these plans are overseen by municipalities along the Study Area. Table details station area and downtown area plans in the Study Area completed since 2005 or currently in-progress. Some station area plans involve both public and private involvement and/or investment. In addition, some plans listed in Table 2-7 are part the Grand Boulevard ~~Imitative~~ Initiative, a multi-jurisdictional, regional planning effort focused on the El Camino Real Corridor from San Francisco to San Jose. The Grand Boulevard Initiative is currently in-progress.

TABLE 2-7
DOWNTOWN AND STATION AREA PLANS IN THE STUDY AREA (2000 – 2013)

Project/Study	Lead Jurisdiction/Agency	County	Status of Project/Study	Relevancy to PCEP
DOWNTOWN PLANS				
Burlingame Downtown Specific Plan	City of Burlingame	San Mateo	Adopted, 2010	Circulation Plan encourages increased ridership at Burlingame Station
Redwood City Downtown Precise Plan*	City of Redwood City	San Mateo	Completed, 2011; Amended 2013	Circulation plan identifies PCEP as a planned improvement per Caltrain's Short-Range Transit Plan (2008-2017), Includes policies addressing acceptable levels of traffic congestion in downtown area
El Camino Real/Downtown Specific Plan	City of Menlo Park	San Mateo	~~Currently in-progress~~ Adopted, 2012	Circulation Plan proposes pedestrian and parking enhancements dependent upon future configuration of Caltrain ROW
Palo Alto Downtown Cap Study	Palo Alto	Santa Clara	Currently in-progress	Ongoing downtown parking and land use study near Palo Alto Station
STATION AREA PLANS				
4th and King Street Railyards Study	City and County of San Francisco	San Francisco	Completed, 2012	Study evaluates potential TOD opportunities at railyard located at 4th & King Station
Bayshore Intermodal Station Access Study	SFCTA	San Francisco/San Mateo	Adopted, 2012	Study evaluates alternatives for station relocation and improved intermodal connections to Bayshore Station
South San Francisco Downtown Station Plan	City of South San Francisco	South San Francisco	~~Currently in-progress,~~ Draft in circulation, 2014	Plan encourages TOD and improved multi-modal connectivity to the South San Francisco Station
Millbrae Station Transit-Oriented Development	BART/City of Millbrae	Multi-county	Currently in-progress	Ongoing study of TOD near Millbrae Station
Rail Corridor Transit-Oriented Development Plan (Hayward Park and Hillsdale Stations)	City of San Mateo	San Mateo	FEIR certified, 2005	Plan encourages TOD and improved multi-modal connectivity to the Hayward Park and Hillsdale Stations
Station Park Green (Hayward Station)	City of San Mateo	San Mateo	Adopted, 2011	Plan encourages TOD/redevelopment of large site north of Hayward Station
Hillsdale Station Area Plan	City of San Mateo	San Mateo	Adopted, 2011	Plan encourages TOD/redevelopment between El Camino Real and JPB ROW and relocation of the Caltrain Station to north of 31st Ave.

TABLE 2-7
DOWNTOWN AND STATION AREA PLANS IN THE STUDY AREA (2000 – 2013)

Project/Study	Lead Jurisdiction/Agency	County	Status of Project/Study	Relevancy to PCEP
San Carlos Transit Village	City of San Carlos	San Mateo	Approved, 2013	Plan encourages TOD near San Carlos Station
California Avenue Concept Plan	City of Palo Alto	Santa Clara	Currently in-progress ~~Draft Plan in circulation, 2013.~~	Plan supports policies for increased shuttle connectivity to employment sites near California Avenue Station and improved bike/pedestrian connections in station area
The Crossings at San Antonio Caltrain Station	City of Mountain View	Santa Clara	Currently in-progress	Ongoing TOD study near San Antonio Station
Lawrence Station Area Plan	City of Sunnyvale	Santa Clara	Currently in-progress, expected Plan and EIR adoption in 2014	Ongoing study with focus on multi-modal connectivity near Lawrence Station
Santa Clara Station Area Plan	VTA, City of Santa Clara, City of San Jose	Santa Clara	Adopted, included in Santa Clara 2010-2035 General Plan	Plan encourages TOD and improved multi-modal connectivity at Santa Clara Station
Diridon Station Area Plan	City of San Jose	Santa Clara	~~DEIR released, 2013~~ Approved, 2014	Ongoing study of TOD and improved multi-modal connectivity to San Jose Diridon Station
Tamien Joint Development Plan	VTA	Santa Clara	~~Currently in-progress~~ Approved, 2013	Ongoing study to encourage TOD near Tamien Station

Source: Fehr & Peers, 2014

2.4.5 SPECIFIC PLANS, GENERAL PLAN UPDATES, AND OTHER RECENT PLANNING STUDIES

In addition to the downtown and station area plans in the Study Area, specific plan and general plan updates are also in-progress or have been recently adopted by jurisdictions along the corridor, listed in Table 2-8. Table 2-8 also includes short summaries of master plans, short-range transportation plans and long-range transportation plans in the Study Area.

2.4.6 CALTRAIN PLANS AND POLICIES

Caltrain has several plans relevant to this impact analysis which are described below

2.4.6.1 Caltrain Comprehensive Access Policy Program Statement

Caltrain adopted its Comprehensive Access Program Policy Statement in May 2010. The access guiding principles are as follows (Caltrain 2010):

- Increase access capacity to support ridership growth.
- Prioritize sustainable ("green") access.
- More effectively manage land and capital assets.
- Prioritize cost-effective access modes.
- Enhance customer satisfaction.
- Solidify partnerships to implement improvements.

Based on these guiding principles, the system-wide access mode of transportation priority is as follows: (1) Walk; (2) Transit; (3) Bike; and (4) Auto.

While the overall focus of capital investments at the system-wide level support walking, riding transit and bicycling, access mode prioritization at the station level will need to vary. Land uses and densities around the Caltrain stations vary from urban to suburban. Access strategies in an urban station area will differ from that of a suburban station area. Caltrain's access program prioritizes alternative modes of access at Transit Center stations (such as the 4th and King Station), Intermodal Connectivity stations (such as the Millbrae Station), and Neighborhood Circulator stations (such as the Menlo Park Station) and auto access at Auto-Oriented stations (such as the Tamien Station). Transportation investments need to be tied to land use decisions to result in context-sensitive solutions and maximize return on investment.

The Policy Statement requires the development of an Access Strategic Plan and a Capital Improvement Plan, as the next steps in developing a comprehensive access program.

The following are example access strategies by mode. They are the types of capital investments that can be made throughout the Caltrain system to shift ~~our~~ the access mode of transportation away from auto to walk, transit and bike. These strategies are considered in the development of Caltrain's Access Strategic Plan and the Capital Investment Plan, the next key steps in developing the Comprehensive Access Program.

- All Modes: real-time information; signage/ wayfinding; lighting; security; universal design (Americans with Disabilities Act (ADA) requirements); pedestrian/bicycle crossing signal priority; demand-based pricing strategies; and inviting public spaces;
- Walk: transit-oriented development (TOD); direct circulation; platform circulation management; traffic controls; traffic calming; timed transfers; transit; enhanced service frequency and capacity; platform proximity; and bike routes/lanes/paths.
- Bike: on-board accommodations; bike parking and stations; E-lockers; and bike sharing
- Auto: reserved parking; shared parking; car sharing; dedicated drop-off spaces (kiss-n-ride, taxis, ADA); and parking fees/permits.

2.4.6.2 Caltrain Bicycle Access and Parking Plan

The Caltrain Bicycle Access and Parking Plan complements Caltrain's bikes on board program. The Caltrain Bicycle Access and Parking Plan (Caltrain, 2008) proposes to increase the number of passengers who bicycle to Caltrain stations by making improvements to access bike parking throughout the system. The plan identifies specific improvements at the top 10 stations which account for 75 percent of the system's cyclist-passenger volumes: San Francisco, 22nd Street, Millbrae, Hillsdale, San Mateo, Redwood City, Palo Alto, Mountain View, Sunnyvale and San Jose Diridon. The plan also prescribes system-wide guidelines and best practices for improving bicycle facilities throughout the Caltrain system.

Caltrain's strategy is to provide a range of options to accommodate passengers' various needs for the bicycle portion of their Caltrain trip. Plan recommendations include:

- Cyclist-specific customer service and marketing
- Cyclist focused safety and security improvements
- Increasing overall bicycle parking supply
- Providing a mix of bike parking for different user needs
- Improving station access for passengers with bikes
- Working with cities to improve station bike access
- Studying innovative station-side concepts such as real-time bicycle capacity information, bike sharing, and subsidies for folding bikes.

The Caltrain Bicycle Access and Parking Plan contains Bicycle Parking and Access Guidelines to supplement existing Caltrain Design Criteria and Standards. Plan recommendations are implemented based on the timing of available funding.

TABLE 2-8
SPECIFIC PLANS, GENERAL PLAN UPDATES, AND OTHER RECENT PLANNING STUDIES IN THE STUDY AREA (2000 – 2013)

Project/Study	Lead Jurisdiction/Agency	County	Status of Project/Study	Relevancy to PCEP
SPECIFIC PLANS				
Rincon Hill Area Plan	City and County of San Francisco	San Francisco	Adopted, 2010	Plan encourages significant growth in housing near future Transbay Transit Center ~~Terminal~~
San Bruno Transit Corridors Specific Plan	City San Bruno	San Mateo	Approved, 2013	Plan encourages TOD and improved multi-modal connectivity to San Bruno Station
Palo Alto Arts and Innovation District	City of Palo Alto	Santa Clara	Currently in-progress	Ongoing study of TOD and economic development near Palo alto Station
Palo Alto Comprehensive Plan Update	City of Palo Alto	Santa Clara	Currently in-progress	Update in-progress on land use and development near Palo Alto Station
Downtown Sunnyvale Specific Plan	City of Sunnyvale	Santa Clara	Adopted, 2003	Plan encourages improving pedestrian and transit connections to Sunnyvale Station
Vision North San Jose	City of San Jose	Santa Clara	Adopted, 2012	Updated land use policy in North San Jose promoting long term viability, livability and economic activity.
GENERAL PLAN UPDATES				
San Francisco General Plan Transportation Element	City and County of San Francisco	San Francisco	Most recently amended and adopted 2010	Includes policies for integrating future rail transit lines with existing Caltrain stations and supporting the future Transbay Transit Center ~~Terminal~~ as a multi-modal facility
San Bruno General Plan	City of San Bruno	San Mateo	Adopted, 2009	Plan will encourage TOD and improved multi-modal connectivity to San Bruno Station
San Carlos 2030 General Plan and Climate Action Plan	City of San Carlos	San Mateo	Adopted, 2009	Plan supports pedestrian/bicycle connectivity across Caltrain ROW during future track reconstruction
Redwood City General Plan	City of Redwood City	San Mateo	Adopted, 2010	Plan prioritizes additional grade separations for improved traffic flow and encourage TOD around and improved transit connectivity at the Redwood City Station
Menlo Park General Plan Element Amendments	City of Menlo Park	San Mateo	Adopted, 2013; New process began in ~~expected to begin in~~ 2014	Circulation Plan encourages increased service and ridership at Menlo Park Station

TABLE 2-8
SPECIFIC PLANS, GENERAL PLAN UPDATES, AND OTHER RECENT PLANNING STUDIES IN THE STUDY AREA (2000 – 2013)

Project/Study	Lead Jurisdiction/Agency	County	Status of Project/Study	Relevancy to PCEP
Palo Alto Comprehensive Plan	City of Palo Alto	Santa Clara	Adopted, 2007	Plan supports PCEP and enhanced pedestrian circulation at the Palo Alto Station
Mountain View 2030 General Plan	City of Mountain View	Santa Clara	Adopted, 2012	Plan encourages coordination with Caltrain to improve service at Mountain View Station
Sunnyvale General Plan Land Use and Transportation Element	City of Sunnyvale	Santa Clara	~~Currently in progress,~~ Draft in circulation, 2014	Ongoing study of land use and transportation improvement near Sunnyvale Station
Santa Clara General Plan Update 2010-2035	City of Santa Clara	Santa Clara	Adopted, 2010	Plan encourages TOD and improved multi-modal connectivity near Santa Clara Station, as well as supports upgraded Caltrain facilities and services
Envision San Jose 2040	City of San Jose	Santa Clara	Adopted, 2011	Plan encourages new development around San Jose Diridon Station
MASTER PLANS, LONG-, AND SHORT-RANGE TRANSPORTATION PLANS				
SFMTA Strategic Plan FY 2013-2018	SFMTA	San Francisco	Adopted, 2012	Strategic Plan discusses SFMTA coordination with other regional transit providers, including Caltrain
San Francisco Transportation Plan 2040	SFCTA	San Francisco	Adopted, 2013	PCEP identified as a efficiency and enhancement project in the Strategic Plan
SamTrans Short Range Transit Plan FY 2008-2018	SamTrans	San Mateo	Adopted, 2009	Plan identifies SamTrans annual funding contribution to JPB for operation of Caltrain
Countywide Transportation Plan (2000)	City/County Association of Governments of San Mateo County (C/CAG)	San Mateo	Adopted, 2001; update underway	Update on county-wide multi-modal transportation policies, including Caltrain stations in San Mateo County
El Camino Corridor Study	City of Menlo Park	San Mateo	Currently in-progress	Transportation and safety improvements to El Camino Real
El Camino Real Master Planning Study	City of Palo Alto	Santa Clara	Currently in-progress	Ongoing study to improve multi-modal transportation on El Camino Real near California Avenue Station
Valley Transportation Plan ~~2035~~ 2040	VTA	Santa Clara	Draft in circulation, 2014	Update on VTA service and policies including VTA routes that connect to Caltrain Stations in Santa Clara County

Source: Fehr & Peers, 2014

2.4.7 STATE AND REGIONAL REGULATORY FRAMEWORK

This project also falls within the purview of some key state and regional long range transportation plans. This section describes the regulatory framework of these plans, including the status of implementation, as some of the plans are still in-progress and not yet fully adopted.

2.4.7.1 California Transportation Plan 2030

The California Transportation Plan (CTP) 2025 was adopted in 2006 and updated in 2007. The Plan, overseen by the California Department of Transportation (Caltrans), serves as a blueprint for California's transportation system defined by goals, policies, and strategies to meet the State's future mobility needs. The goals defined in the plan fall into three categories: social equity, prosperous economy, and quality environment. Each goal is tied to performance measures. In turn, members from regional and metropolitan planning agencies report to Caltrans these performance measures (State of California, 2007). The CTP 2030 Addendum updated the CTP 2025, to comply with the Safe, Accountable, Flexible, Efficient, Transportation Equity Act – A Legacy for Users (SAFETEA-LU). This federal law authorized transportation funding through 2009 and established new requirements for statewide and metropolitan transportation planning. Caltrans is presently working on an update of the CTP that would extend to 2040.

2.4.7.2 Plan Bay Area

Plan Bay Area is the San Francisco Bay Area's plan to meet the requirements of Senate Bill 375, Sustainable Communities, signed into law in 2008. Sustainable Communities requires each of the State' MPOs to develop a Sustainable Communities Strategy (SCS) aimed at reducing greenhouse gas emissions from passenger vehicles. The law also requires the California Air Resources Board (ARB) develops Regional greenhouse gas emissions targets for 2020 and 2035. ARB also reviews each final SSC to determine whether the plan would, if implemented, achieve the set greenhouse gas emission targets (MTC, 2013).

Plan Bay Area is overseen by the MTC and the Association of Bay Area Governments (ABAG). It serves as the region's SCS and the 2040 Regional Transportation Plan (preceded by *Transportation 2035*), integrating transportation and land-use strategy to manage greenhouse gas emissions and plan for future population growth. The Regional Transportation Plan and SCS includes policies that call for shifting more travel demand to transit and accommodating growth along transit corridors in "Priority Development Areas." In July of 2013, *Plan Bay Area* was adopted by ABAG and the MTC. The Proposed Project and the San Francisco Caltrain Downtown Extension Project/Transbay-Transit Center are ~~is one of~~ the major projects included in *Plan Bay Area*.

2.5 EXISTING BICYCLE AND PEDESTRIAN CONDITIONS

The existing pedestrian infrastructure surrounding Caltrain stations in the Study Area provides a good level of accessibility, considering the varied mix of land uses around stations. In general, bicycle facilities within the Study Area are characterized by a network of mostly continuous routes within about one-mile of stations. Demand for such facilities is relatively high due to the popularity of Caltrain's bicycle access program, described in more detail in Section 2.5.1.

2.5.1 BICYCLE FACILITIES AND PLANNED BICYCLE IMPROVEMENTS

The majority of Caltrain cyclists bring their bikes on-board the train rather than parking their bike at a Caltrain station. Of the 14 percent of Caltrain passengers who access stations via bicycle, about 13 percent bring their bicycles on-board, while about one percent of passengers park their bicycles at their origin station (Fehr & Peers, 2013). In 2013, a total of 4,900 bicycles board daily, almost equally split between northbound and southbound trains (50 percent of all daily bicycles trips head northbound, 49 percent head south) (JPB, 2013). As discussed in Section 2.1.3, walking is the most commonly used mode of access to Caltrain stations. About 36 percent of Caltrain passengers access Caltrain stations by walking.

2.5.1.1 Bikeway Facilities Connected to Caltrain Stations

Bicycle facilities are classified based on a standard typology, described in further detail below:

- Class I Bikeway (Bikeway Path): A completely separate right-of-way designated for the exclusive use of bicycles and pedestrians, with vehicle and pedestrian cross-flows minimized.
- Class II Bikeway (Bikeway Lane): A restricted right-of-way designated for the use of bicycles, with a striped lane on a street or highway. Bicycle lanes are generally five feet wide. Vehicle parking and vehicle and pedestrian cross-flows are permitted.
- Class III Bikeway (Bikeway Route): A right-of-way designated by signs or pavement markings for shared use with pedestrians or motor vehicles.

Most, but not all Caltrain stations are connected to the surrounding roadway network via some type of bicycle facility. Existing bicycle facilities connected to Caltrain stations in the Study Area are shown in Figure 2-21. Major Class I bikeways in the Study Area include the Guadalupe River Trail, Bay Trail, Los Gatos Creek Trail, and the Coyote Creek Trail. The Guadalupe Trail, Los Gatos Creek Trail, and Coyote Creek Trail are located in Santa Clara County. The San Francisco Bay Trail runs through nine counties, including all three counties within the Study Area.

The density of bicycle facilities around stations varies. Table 2-9 ranks stations in terms of the density of all bikeway facilities – Classes I, II, and III – within a one-mile radius immediately surrounding each station. The average miles of bikeway facilities surrounding Caltrain stations in the Study Area are about 13. The Sunnyvale Station is surrounded by the most bike facility miles, with 24.3 miles of bikeways within one-mile of the station. The Mountain View Station is almost equally matched with 24.1 miles of bike facilities surrounding the station. The majority of bike facility miles surrounding Sunnyvale are Class III routes (15.8 miles); around the Mountain View Station Class II lanes are most common (16.7 miles). The San Carlos, South San Francisco, Palo Alto, and 4th and King Stations are also surrounded by about 17 miles or more

of bikeway facility miles. Santa Clara, San Bruno, and College Park Station are surrounded by fewer than five miles of bikeway facility miles. Overall, Class III bikeway routes are the most common type of bike facility surrounding stations.

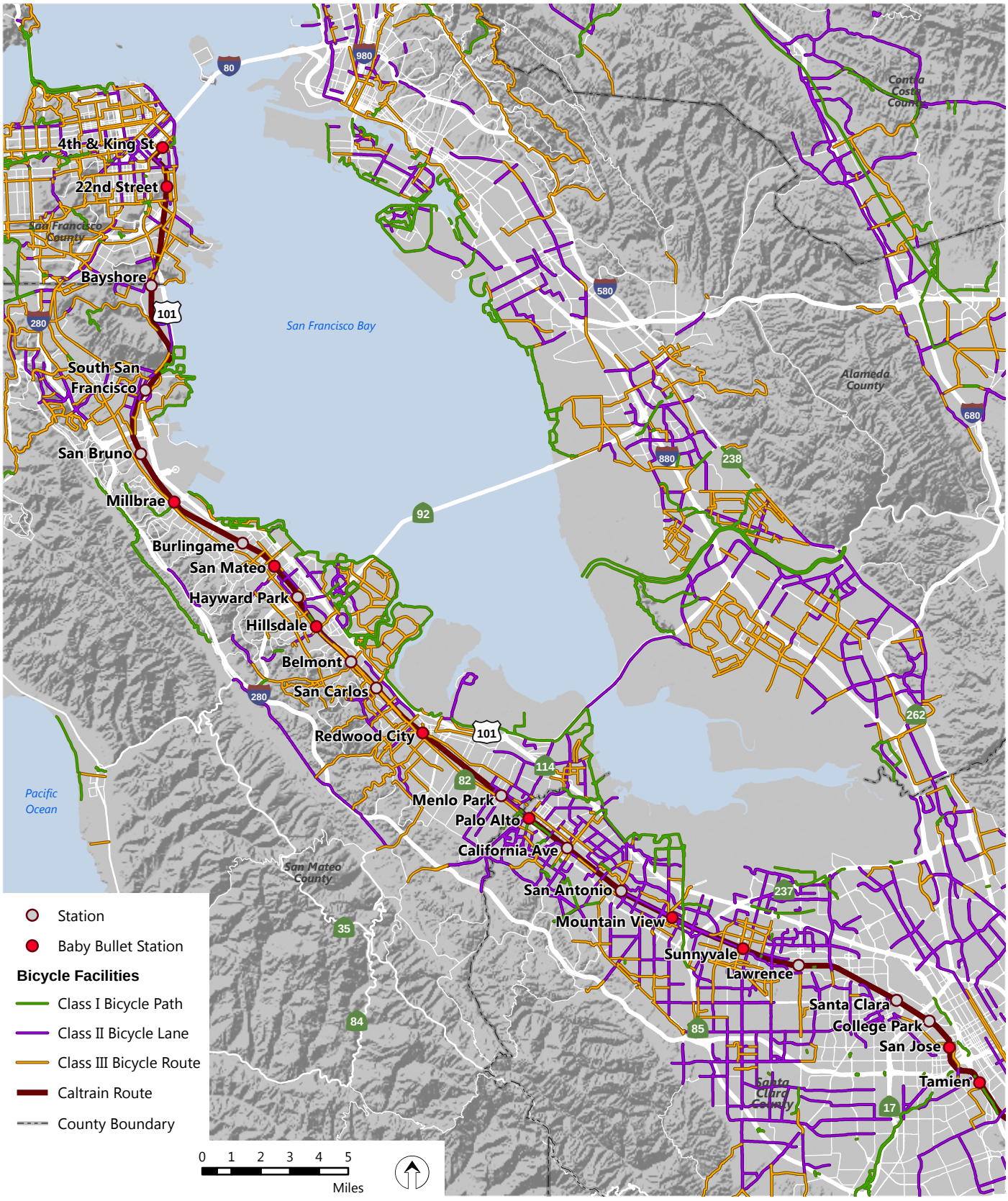

Figure 2-21

Bicycle Facilities Connected to Caltrain Stations (2013)

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Date: December 2013

FEHR PEERS

TABLE 2-9
TOTAL BICYCLE FACILITIES WITHIN ONE-MILE OF CALTRAIN STATIONS (2013)

Rank	Station	Total Bicycle Facility Miles
1	Sunnyvale Station	24.4
2	Mountain View Station	24.1
3	San Carlos Station	19.8
4	South San Francisco Station	18.4
5	Palo Alto Station	17.5
6	4th and King St Station	16.9
7	California Avenue Station	16.8
8	San Antonio Station	16.6
9	Stanford Stadium Station	16.6
10	Redwood City Station	15.4
11	Belmont Station	15.1
12	Hillsdale Station	14.2
13	22nd Street Station	12.7
14	Menlo Park Station	12.4
15	Burlingame Station	11.6
16	Hayward Park Station	11.6
17	Lawrence Station	11.1
18	Broadway Station	9.1
19	San Mateo Station	8.8
20	Atherton Station	7.4
21	Bayshore Station	7.3
22	Millbrae Station	6.8
23	Tamien Station	5.5
24	San Jose Diridon Station	5.3

2.5.1.2 Bicycle Parking at Stations

Caltrain offers a robust bicycle access program and regularly meets to discuss bike issues with the Bicycle Advisory Committee (BAC). The BAC is comprised of nine volunteer community members and Caltrain staff and meets monthly to discuss the interests and perspectives of bicyclists for integration into the Caltrain planning process (San Mateo County Transit District, "Bicycle Advisory" 2013).

Cyclists who ride Caltrain can either store their bicycles at Caltrain stations or bring their bicycles on board Both options are limited by capacity, either at the station or on-board. At the station, cyclists can store their bicycles on racks, lockers, or shared access bicycle parking facilities. The San Francisco Attended Bike Parking Facility and the Palo Alto Bike Station are two such facilities serving Caltrain stations; each bike station is attended by valets who check bicycles in and out for cyclists. Station lockers are managed by Caltrain and are available for a fee of $33 for six-month reservations, plus a nominal key deposit charge. Table 2-10 provides an inventory of dedicated bike parking, by station. The majority of bike parking facilities, including racks, lockers and shared facilities are owned and administered directly by Caltrain. At some stations, however, facilities may be owned and operated by a local jurisdiction or other transit property. The only Caltrain station without dedicated bicycle parking is College Park.

TABLE 2-10
BICYCLE PARKING CAPACITY AT CALTRAIN STATIONS (2013)

Station	Bicycle Rack Spaces	Bicycle Locker Spaces	Other Bicycle Amenities
San Francisco	6	180	Attended Bicycle Parking Facility; Bay Area Bike Share station
22nd Street	27	0	None
Bayshore	18	8	None
South SF	18	20	None
San Bruno	8	16	None
Millbrae	24	28	None
Broadway	18	12	None
Burlingame	13	18	None
San Mateo	11	12	None
Hayward Park	18	4	None
Hillsdale	18	12	None
Belmont	18	24	None
San Carlos	36	48	None
Redwood City	18	50	None; Bay Area Bike Share station
Atherton	0	26	None
Menlo Park	8	50	Shared access bicycle storage shed
Palo Alto	178	94	Shared access bicycle storage shed; Electronic lockers; Bay Area Bike Share station
California Avenue	33	42	None
San Antonio	18	38	Bay Area Bike Share station
Mountain View	23	116	Shared access bicycle storage shed; Bay Area Bike Share station
Sunnyvale	18	71	None
Lawrence	18	24	None
Santa Clara	18	54	Additional bicycle lockers across the street at VTA Transit Center (adjacent)
College Park	0	0	None
San Jose Diridon	16	48	None; Bay Area Bike Share station
Tamien	18	18	None

Source: "Bicycle Parking." (2013) San Mateo County Transit District

2.5.1.3 Bicycles On-Board Trains

Bicycles are allowed on Caltrain during all operating hours. Specific cars have been retrofitted to store bicycles safely during travel. As described in Section 2.3.2, Caltrain operates two types of train equipment: Bombardier and Gallery. While each train has two bicycle cars, the number of bicycle spaces on the two types of equipment differs. In 2011, trains were modified to be equipped with two bicycle~~s~~ cars, increasing overall bicycle carrying capacity by 30 percent. Bike boardings on Caltrain are on the rise. The average daily bike boardings increased by 16 percent between 2011 and 2012, outpacing total ridership growth. From 2012 to 2013, bicycle boarding increased by another 16 percent, compared to a total ridership increase of 11 percent (JPB, 2013). In 2013, a total of 4,900 bicycles boarded daily.

Bombardier trains can accommodate 48 bicycles, while Gallery sets carry a maximum of 80 bicycles. Some trains use lower bicycle capacity Bombardier equipment (San Mateo County Transit District, "Bicycle General" 2013).[5] Caltrain does not charge fees to bring bicycles on-board. The bicycle car is noted with a yellow bicycle decal on the outside (San Mateo County Transit District, "Bicycle General" 2013). Caltrain~~'s~~ regulates the type and positioning of bicycles brought on board. Only single-rider bicycles are allowed in bicycle cars; and folding bicycles are allowed on any train car, provided they are no wider than 32 inches at the widest point and are folded and stored properly ~~while the~~ until the passenger has fully left the train. Single-rider bicycles brought on board must not exceed 80 inches nor protrude into the aisle when stored on the train (San Mateo County Transit District, "Bicycle General" 2013). A maximum of four bicycles can be stored in each bicycle rack in the bicycle cars. Caltrain encourages cyclists to use destination tags, prominently displayed on their bicycles, to indicate where they are getting off the train. Bicycle tags are provided free of charge by conductors, or passengers can print and create their own on Caltrain's website.

In addition to total bicycle boardings, bicycle mode share of ridership has also been increasing. Table 2-11 displays the top ten stations for bicycles brought on-board by passengers. Stations are ranked according to the total number of bicycles that board trains that stop or originate at a specific station throughout a full entire day (cumulative and averaged over a sample period of five days). The 4th and King Station in San Francisco is a major bike boarding station, with almost double the number of bikes that board at Palo Alto. Redwood City and San Jose Diridon are closely ranked, with about 300 total bicycles boarding throughout the day.

[5] The following Northbound trains have lower bicycle capacity Bombardier equipment: 135; 193; 195; 199; 257; 273; 287; 305; 309; 313, 319, 323; 365; and 371. The following Southbound Trains have lower capacity Bombardier equipment: 102; 142; 146; 194; 196; 206; 218; 228; 282; 288; 314; 366; 370; 380 and ("Bicycles on Bombardiers 48-bicycle capacity." (2013) *San Mateo County Transit District)*

TABLE 2-11
TOP TEN STATIONS FOR BICYCLES ON-BOARD (2013)

Station	Average Weekday Bicycle Ridership	Total Average Weekday Ridership	Proportion of Total Ridership at Station
4th and King	1,166	10,789	11%
Palo Alto	644	5,469	12%
Mountain View	464	3,876	12%
Redwood City	307	2,619	12%
San Jose Diridon	305	3,489	9%
Sunnyvale	215	2,274	9%
California Avenue	199	1,294	15%
Hillsdale	191	2,317	8%
22nd Street	174	1,312	13%
Menlo Park	169	1,526	11%

Source: "February 2013 Caltrain Annual Passenger Counts Key Findings." JPB, 2013

Table 2-12 displays the top five trains for bicycle usage. Average Weekday Bicycle Ridership captures all passengers with bicycles that boarded and alighted throughout the entire train trip. The maximum load measures the numbers of bicycles on the train when the bicycle cars were the most full ~~fullest~~ and the station at which this maximum load was reached. All five of the fullest trains for bikes on-board occur in the morning or afternoon peak hours. The majority of fullest bicycle trains are northbound Limited trains. Of these four trains, three are in the evening reverse peak. However, the only northbound train in the top five is also the fullest – train 220 reached a load of 74 at Millbrae. In these conditions, more than or close to four bicycles are loaded onto a single on-board bicycle rack. Redwood City, a top bicycle boarding station, is the station at which two northbound trains first reach maximum load.

TABLE 2-12
TOP FIVE TRAINS FOR BICYCLE USAGE (2013)

Train Number	Direction	Departure Time	Average Weekday Bicycle Ridership	Maximum Load
220	Southbound	7:44 AM	110	74 (at Millbrae)
227	Northbound	7:55 AM	100	50 (at Hillsdale)
279	Northbound	5:39 PM	97	69 (at Redwood City)
269	Northbound	4:39 PM	95	69 (at San Carlos)
375	Northbound	5:23 PM	92	79 (at Redwood City)

Source: "February 2013 Caltrain Annual Passenger Counts Key Findings." *JPB*, 2013
Notes: Northbound departure times are from the San Jose Diridon Station. Southbound departure times are from the 4th and King Station in San Francisco. ~~Note:~~ Data shown are cumulative and averaged over a sample period of five days. Departure time identifies the departure time at the stations where the maximum bike load was reached on the train's journey.

Bringing bicycles on board is limited by safety and capacity. In some instances, at his or her discretion, the train conductor may refuse transportation or revise the handling of bicycles due to crowded trains, the

condition of the bicycle ~~bicycle condition~~, or unsafe conditions. The boarding of passengers with bicycles is on a first-come, first-serve basis. If a bicycle car is full, the cyclist will be asked to exit the train and wait for the next train, a situation commonly referred to as a "bicycle denial" or "bicycle bump." Bicycle denials can also be caused by additional circumstances, including swapped equipment and bicycle stacking that does not use the actual full capacity. In general, bicycle car capacity issues occur at the height of the morning and evening peak periods (Corey, Canapary and Galanis Research, 2010).

Because cyclists must wait until all passengers board the train before boarding or alighting with their bicycle, cyclists are encouraged to be ready to board or alight as soon as the train arrives at the station to avoid lengthened train dwell times, defined as the amount of time a train is stopped at a station (San Mateo County Transit District, "Bicycle Sharing" 2013). In 2010, Caltrain conducted on-board bicycle counts and dwell timing data to better understand bicycle boardings by station and train, number of bicycles denied boarding and dwell time for each train by station. Overall, the study found dwell times are influenced by total passenger boardings on platforms. The median dwell time at Caltrain stations was 48 seconds, with Baby Bullets ~~tended~~ tending to have ~~dwelt~~ dwell times of about one minute – higher in comparison to other types of service. In general, bicycle car capacity issues occur at the height of the morning and evening peak periods (Corey, Canapary and Galanis Research, 2010).

In February 2013, Caltrain conducted annual ridership counts. This effort included a tally of passengers with bicycles who were denied boarding because of bicycle capacity limitations. Data were collected over the course of ~~1~~ one week and were not averaged. A total of 59 cyclists on seven trains were denied boarding. The majority of boarding denials occurred on southbound trains. In general, fewer than five bicycles are denied boarding at a time, but on occasion bike denials can affect a larger number of bicycles. Bicycle denials tend to occur at the Redwood City, Millbrae, and 22nd Street Stations but have been observed and reported throughout the system. The new passenger information system at the station (visual electronic message signs at the platforms) is able to broadcast and redirect bicyclists away from trains that are full to those that still have capacity.

TABLE 2-13
PASSENGERS WITH BICYCLES DENIED BOARDING (2013)

Day	Train	Direction	Number of Bicycle Denials	Station Denial Occurred
Monday	279	Northbound	5	Redwood City
Monday	324	Southbound	1	22nd Street
Tuesday	375	Northbound	4 2	Menlo Park Redwood City
Wednesday	279	Northbound	1	San Carlos
Wednesday	220	Southbound	1 4 2	4th and King 22nd Street Millbrae
Wednesday	322	Southbound	22 3	22nd Street Millbrae
Wednesday	324	Southbound	5	22nd Street
Wednesday	332	Southbound	3 1	22nd Street Millbrae
Thursday	371	Northbound	5	Palo Alto

Source: "February 2013 Caltrain Annual Passenger Counts Key Findings." *JPB*, 2013

2.5.1.4 Bay Area Bike Share at Caltrain Stations

Because trains have limited on-board space, Caltrain encourages customers to park their bikes at Caltrain stations or make use of the newly-implemented regional bike share pilot program. In August 2013, a region-wide bike sharing pilot program launched. Bay Area Bicycle Share is a self-service service system that provides members with easy access to a network of bicycles. The pilot program, led by the Bay Area Air Quality Management District, is a partnership between SamTrans, The City of Redwood City, the County of San Mateo, SFMTA, San Francisco County Transportation Authority, Caltrain, and VTA (San Mateo County Transit District, "Bicycle Sharing" 2013).

There ~~will be~~ are 700 bikes at 70 kiosk stations along the Peninsula corridor in San Francisco, Redwood City, Palo Alto, Mountain View, and San Jose. Daily (24-hour) and three-day memberships can be purchased online or at any kiosk using a credit or debit card, currently priced at $22 and $9, respectively. Annual memberships are also available, currently priced at $88 to $99 annually. Members will be able to check out a bike close to home or work and return it to any of the kiosk stations in San Francisco, Redwood City, Palo Alto, and Mountain View. The following Caltrain stations have a bicycle share kiosk at or within one half-mile: 4th and King, Redwood City, Palo Alto, San Antonio, Mountain View, and San Jose Diridon (Bay Area Bike Share, 2013).

~~Because trains have limited on-board space, Caltrain encourages customers to park their bikes at Caltrain stations or make use of the newly-implemented regional bike share pilot program, Bay Area Bicycle Share. Bay Area Bicycle Share is a self-service service system that provides members with easy access to a network of bicycles. The pilot program, led by the Bay Area Air Quality Management District (BAAQMD), was launched in August 2013 and is intended to provide easy access to a network of bicycles. The program is a partnership between SamTrans, The City of Redwood City, the County of San Mateo, SFMTA, San Francisco County Transportation Authority, Caltrain, and VTA (San Mateo County Transit District, "Bicycle Sharing" 2013).~~

~~The program proposes 700 bikes at 70 kiosk stations along the Peninsula corridor in San Francisco, Redwood City, Palo Alto, Mountain View, and San Jose. Members are able to check out a bike close to home or work and return it to any of the kiosk stations. The San Francisco 4th & King, Redwood City, Palo Alto, San Antonio, Mountain View, and San Jose Diridon Stations have a bicycle share kiosk at or within one 0.5 mile of the station. three-day memberships can be purchased online or at any kiosk using a credit or debit card, currently priced at $22 and $9, respectively. Annual memberships are also available, currently priced at $88 to $99 annually.~~

2.5.2 PEDESTRIAN FACILITIES AND PLANNED PEDESTRIAN IMPROVEMENTS

This section summarizes the quality of the pedestrian environment, in terms of safety, accessibility, and urban design. Overall, walking to Caltrain stations is the most popular mode of access for passengers system-wide. However, as discussed in Section 2.1.3, mode of access varies by station. Although ~~all~~ stations offer mostly consistent pedestrian amenities on the platform, the quality of the pedestrian environment around the station area varies. Attachment C includes more detailed information on pedestrian conditions on station platforms and within a quarter mile of each station.

In analyzing design of the pedestrian environment within one-quarter mile of each station, the following components were reviewed: directions of pedestrian access to each station, sidewalk completeness, presence of sidewalks, density of street trees, proximity to freeway(s), maximum posted speed limit, and traffic calming measures. Some built-environment factors are correlated with the proportion of passengers walking to stations, including the density of street intersections around stations. These components/variables are described in detail in Attachment C.

2.5.2.1 Accessibility for Disabled Passengers

The majority of Caltrain stations are accessible to persons with disabilities, who can board via either a lift or accessible ramp. The following stations do not have wheelchair lifts: 22nd Street, South San Francisco, Broadway, Atherton, and College Park. Disabled Accessibility at stations is detailed in Attachment C. All stations include a blue boarding assistance area, indicated with blue paint on the ground. Passengers with disabilities who would like boarding assistance from the conductor sit or stand in the blue boarding assistance area. As per the Americans with Disabilities Act (1990), trains can accommodate wheelchairs of the following dimensions: no larger than 30 inches by 48 inches, and a total weight, including the occupant, of no more than 600 pounds (San Mateo County Transit District, "Accessibility" 2013).

Every train has at least one wheelchair accessible car that can accommodate up to three wheelchairs or mobility devices (e.g. two-wheeled Segways). The accessible car is usually the second car from the north and is marked with a blue accessibility symbol next to the doors. All accessible cars are equipped with an accessible restroom.

2.5.2.2 Pedestrians and Public Crossings on the Right-of-Way

A mix of grade-separated and non-grade separated pedestrian crossings exist at Caltrain stations within the Study Area. Because trains can operate at speeds up to 79 mph, pedestrians are advised by the JPB to take great care by looking both ways and listening for oncoming trains before traversing public crossings. Failure to practice safe crossing techniques at all times can degrade pedestrian safety. For example, at San Jose Diridon and Palo Alto, passengers can access the opposing directional platform via an underground

pedestrian walkway. This type of grade separated crossing does not require a passenger to cross over active railroad tracks. However, some stations, such as Mountain View and Sunnyvale allow passengers to cross tracks at non-grade separated public crossings. These designated crossings are marked by a sign and/or a gate. Caltrain distributes information to educate passengers on public crossing and platform safety on the Caltrain website, at Caltrain headquarters, in station areas, and on-board trains. In addition, Caltrain participates in three major public information campaigns to help reduce pedestrian trespassing and fatalities: Common Sense: Use It, Transit Watch and Operation Lifesaver (San Mateo County Transit District, "Safety and Security" 2013).

2.6 EXISTING TRAFFIC CONDITIONS

Existing automobile traffic along the Caltrain corridor is subject to a range of factors both directly and indirectly related to Caltrain operations. In a direct sense, existing traffic is partly comprised of automobile traffic from automobiles driving to and from stations. Indirectly, traffic is influenced by the effects of at-grade street crossings along the corridor. When gates are down due to a passing train, traffic at adjacent intersections is oftentimes affected.

In order to document existing traffic conditions and set a baseline for measuring future environmental impacts, a traffic microsimulation model was developed. A total of ~~82~~ 90 intersections within the Study Area were included in the microsimulation model and were analyzed due to their proximity to grade crossings and/or Caltrain stations.

Most of these intersections (~~64~~70) were modeled using the Synchro/SimTraffic software package. The remaining ~~18~~21 intersections were intersections with high congestion levels, unique intersection layouts, or other atypical conditions and were modeled using the VISSIM microsimulation software package. For more detailed information on the traffic model development and analysis process, see Attachment E. Existing traffic conditions described in this section are for the weekday AM peak hour typically between 8:00 AM and 9:00 AM and the weekday PM peak hour typically between 5:00 PM to 6:00 PM.

2.6.1 EXISTING ROADWAY CONDITIONS

This section summarizes existing roadway conditions along major freeways and arterial streets in the Study Area.

2.6.1.1 Freeways

The Caltrain corridor within the Study Area runs parallel to major north-south oriented freeways I-280 and US 101. Figure 1-1 displays the major freeways within the Study Area. In San Francisco County, I-280 begins as at the Embarcadero and terminates in the south at the US 101 and I-680 interchange in north San Jose. Within the Study Area, US 101 connects to I-80 in San Francisco County and continues south through Santa Clara County.

East-west oriented freeways in the Study Area include I-380 in San Mateo County and I-880 in Santa Clara County. I-380 runs east-west in north San Mateo County, connecting I-280 and US 101 crossing perpendicular to the Caltrain right-of-way. In San Jose north of the US 101/I-280 interchange, I-880

crosses perpendicular to the Caltrain right-of-way in a northeast to southwest orientation. Major Study Area freeways and arterials are displayed in Table 2-14.

TABLE 2-14
EXISTING MAJOR STUDY AREA FREEWAYS, EXPRESSWAYS, AND ARTERIAL STREETS ALONG CALTRAIN CORRIDOR

County	Orientation	Name	Classification	Extent within Study Area
San Francisco	North-South	US 101	Freeway	San Francisco County to Santa Clara County
San Francisco	North-South	I-280	Freeway	San Francisco County to Santa Clara County
San Mateo	East-West	I-380	Freeway	San Mateo County
Santa Clara	Northeast-Southwest	I-880	Freeway	Santa Clara County
San Francisco	East-West	Cesar Chavez Street	Arterial	San Francisco County
San Mateo	North-South	Route 82/El Camino Real	Arterial	San Mateo County to Santa Clara County
San Mateo	East-West	Route 92	Freeway	San Mateo County
San Mateo	East-West	Route 84	Arterial/Expressway	San Mateo County
Santa Clara	East-West	Route 85	Freeway	Santa Clara County
Santa Clara	East-West	Lawrence Expressway	Arterial/Expressway	Santa Clara County
Santa Clara	North-South	Route 87	Freeway	Santa Clara County
Santa Clara	North-South	Alma/Central Expressway	Arterial/Expressway	Santa Clara County

Source: Fehr & Peers, 2014

2.6.1.2 Major Arterial Streets

The Caltrain right-of-way runs parallel to or intersects with some major arterials in the Study Area. In San Francisco, Caltrain runs as a mix of both above- and below-grade, crossing east-west arterial Cesar Chavez Street above grade. The corridor runs parallel to California State Route 82 (El Camino Real). El Camino Real is a major north-south oriented roadway that extends from San Mateo County south to Santa Clara County within the Study Area.

In San Mateo County, Route 92 connects El Camino Real with US 101 and continues to become the San Mateo Bridge, crossing the San Francisco Bay. Also in San Mateo County, Caltrain crosses Route 84 at Woodside Road in Redwood City. Route 84 eventually joins US 101 and continues east across the San

Francisco Bay as the Dumbarton Bridge. In Santa Clara County, Caltrain travels parallel to Alma Road/Central Expressway which terminates at the San Jose International Airport located west of Guadalupe Parkway.

2.6.2 ROADWAY SYSTEM PERFORMANCE

Congestion during the weekday morning and afternoon peak period is common on US 101 in both directions through San Francisco, San Mateo and Santa Clara counties. During the morning peak period, southbound congestion on US 101 is common in San Francisco, from San Francisco International Airport to San Mateo, and in Palo Alto. Northbound US 101 is regularly congested from San Jose to north of Mountain View in Santa Clara County, as well as near the San Francisco International Airport and in San Francisco during the morning peak period. During the afternoon peak period, Southbound US 101 has notable congestion from South San Francisco to Burlingame, San Carlos to Palo Alto and Mountain View to San Jose. Northbound US 101 is congested in Mountain View, San Carlos, and San Francisco during afternoon peak periods.

I-280 also runs in a north-south orientation on the San Francisco Peninsula and is prone to backups during the peak period. During the morning peak period, southbound congestion is common from Daly City to San Bruno. Northbound morning congestion is common from San Jose to Cupertino and entering San Francisco. During the evening peak period southbound traffic congestion is common in southern San Francisco, Los Altos and from Cupertino to San Jose. Northbound evening congestion typically occurs from Portola Valley to Woodside in San Mateo County.

2.6.3 EXISTING GATE DOWN TIME CONDITIONS

Currently, there are 42 at-grade crossings along the Caltrain right-of-way within the Study Area. An at-grade crossing is an intersection of Caltrain tracks, roadways, walkways, or combination of these at the same level. All other crossings in the Study Area are grade-separated, meaning that roadways, walkways, and railroads cross at different, non-conflicting elevations. Gates on both sides of the tracks are in place at all crossing locations. When no train is crossing at this location, the gates are up or inactive. A gate down event occurs when these gates come down at the crossing, due to a train either passing or crossing or stopping at a nearby upstream station. It can also be due to simulations passing of two trains in opposite directions at a crossing. Gate down times is a key measurement for both the performance of the existing and future Caltrain operations in this Study. Gate down time is a summation of multiple actions that occur in sequence in order to ensure all modes can cross safely at a grade-crossing. These actions are listed and explained in chronological order below:

1. Gate flashers, located on gate arms to increase visibility, are triggered by a gate crossing event.
2. Gate arms descend, moving from vertical to horizontal position, indicating that all vehicular, bicycle, and pedestrian traffic must stop at the crossing to allow the train(s) to pass safely.
3. Train passes and fully clears the crossing.
4. Gate arms rise, moving from horizontal to vertical position gates coming down.

After this sequence is complete, pedestrian, bicycle, and vehicular traffic can resume regular operations through the crossing.

The following is a list of locations (near study intersections) and times[6] in the AM and PM peak hour during which gate restarts[7] occur under existing conditions:

- Bayswater Avenue (Burlingame Station)
    - 7:54 AM - Train 217 (AM peak hour)
    - No restarts in the PM peak period
- 1st Avenue (San Mateo Station):
    - 8:42 AM - Train 226 (AM peak hour)
    - 5:03 PM - Train 266 (PM peak hour)
    - 5:45 PM - Train 274 (PM peak hour)
    - 5:56 PM - Train 378 (PM peak hour)
- Brewster Avenue, Broadway (Redwood City Station)
    - 8:00 AM - Train 323 (AM peak hour)
    - 8:23 AM - Train 225 (AM peak hour)
    - 8:30 AM - Train 329 (AM peak hour)
    - 4:55 PM - Train 264 (PM peak hour)
    - 5:25 PM - Train 267 (PM peak hour)
    - 5:30 PM - Train 271 (PM peak hour)
- Maple Street (Redwood City Station)
    - 8:21 AM - Train 225 (AM peak hour)
    - No restarts in the PM peak period
- Main Street (Redwood City Station)
    - 8:13 AM - Train 218 (AM peak hour)
    - 5:07 PM - Train 368 (PM peak hour)
- Oak Grove Avenue (Menlo Park Station)
    - 7:46 AM - Train 221 (AM peak hour)
    - 7:50 AM - Train 314 (AM peak hour)
    - 8:40 AM - Train 227 (AM peak hour)
    - 4:46 PM - Train 365 (PM peak hour)
    - 5:19 PM - Train 267 (PM peak hour)

[6] The following non-study grade crossings in Zone 2 also experience restarts: Howard, Avenue, ~~Bayswater Avenue,~~ 2nd Avenue, 3rd Avenue, and Broadway (Redwood City). Broadway in Burlingame (Broadway Station) and Fair Oaks Lane and Watkins Avenue in Atherton (Atherton Station) also have gate restarts but these stations offer weekend-only service under existing conditions. North Lane also has gate restarts, but not during the AM or PM peak hour.

[7] Several grade crossing locations are in close proximity to stations and trigger gate restarts. Due to this close proximity, grade crossing events function slightly differently than at other grade crossings under current operations. When a train is making a station stop that has an at-grade crossing just upstream, in front of, or at the station stop, a gate crossing event occurs. Once the signaling system detects that a train has stopped and a rest time passes, the gates rise to allow traffic to flow across the railroad tracks. When the train leaves the station, the gates lower again. This sequence of events is referred to as "gate restarts" or "double gate action." (JPB, 2013).

- Ravenswood Avenue (Menlo Park Station)
    - 8:25 AM - Train 329 (AM peak hour)
    - No restarts in the PM peak period
- Rengstorff Avenue (San Antonio and Mountain View Station)
    - 8:10 AM - Train 216 (AM peak hour)
    - No restarts in the PM peak period
- Castro Street (Mountain View Station)
    - 8:06 AM - Train 225 (AM peak hour)
    - 8:38 AM- Train 220 (AM peak hour)
    - 9:00 AM - Train 233 (AM peak hour)
    - 5:01 PM - Train 369 (PM peak hour)
    - 5:06 PM - Train 267 (PM peak hour)
    - 5:36 - Train 266 (PM peak hour)
- Mary Avenue (Sunnyvale Station)
    - 8:02 AM - Train 314 (AM peak hour)
    - No restarts in the PM peak period

Caltrain is currently controlled by a wayside block signal system comprised of signals alongside the track that convey to the train engineer occupancy and/or routing status ahead. It controls train separation to match safe breaking needs for Caltrain's diesel-hauled trains. A key constraining factor in the existing Caltrain capacity is the current wayside signal system because it forces train separation based on the poorest performing train type (San Mateo County Transit District, "CBOSS" 2013).

Table 2-15 lists all ~~29~~ 31 grade crossings in the Study Area that are adjacent to study intersections (at-grade study crossings). The average gate down time at each crossing is also listed. Average gate down time is a measurement of average period gates are down per each gate down time event. There are ~~13~~ 11 additional grade crossings along the corridor not adjacent to study intersections.

Figure 2-22 displays all grade crossing locations in Zone 1. Figure 2-23 displays all grade crossing locations in Zone 2. Figure 2-24 displays all grade crossing locations in Zone 3. Figure 2-25 displays all grade crossing locations in Zone 4.

2.6.3.1 Grade Crossing Analysis Methodology (Existing Conditions)

Existing conditions gate down times were calculated empirically from gate down event records collected in the field (2013). These records included the train number, timestamp of when the gate down event sequence started, and a timestamp of when the gate down event ended (when the gate arms were fully raised and the flashing red lights were off). Data on whether two trains occupied the crossing during the same gate down event (a "2-for-1" scenario), or if the gate down sequence restarted was also used for this analysis. A similar set of data for 2020 and 2040 Plus Project scenarios was generated (LTK analysis, 2013). The results presented in this section are key inputs into the Intersection LOS Analysis presented in this section.

TABLE 2-15
EXISTING CALTRAIN GATE DOWN TIMES AT GRADE CROSSINGS ADJACENT TO STUDY INTERSECTIONS

Crossing	Jurisdiction	AM Average Gate Down Time (Minutes : Seconds)	PM Average Gate Down Time (Minutes : Seconds)
Mission Bay Drive	San Francisco	01:21	01:09
16th Street	San Francisco	01:10	00:54
Linden Avenue	South San Francisco	00:38	00:41
Scott Street	San Bruno	00:52	00:43
Broadway	Burlingame	00:41	00:50
Oak Grove Avenue	Burlingame	00:52	00:53
North Lane	Burlingame	01:03	01:06
Bayswater Avenue	Burlingame	00:51	00:53
Peninsula Avenue	Burlingame	00:56	00:53
Villa Terrace	San Mateo	00:54	00:45
First Avenue	San Mateo	01:23	01:21
Ninth Avenue	San Mateo	00:49	01:06
25th Avenue	San Mateo	01:00	00:55
Whipple Avenue	Redwood City	01:05	01:02
Brewster Avenue	Redwood City	01:21	01:18
Broadway	Redwood City	01:26	01:35
Maple Street	Redwood City	01:10	00:55
Main Street	Redwood City	01:19	01:05
Fair Oaks Lane	Atherton	00:39	00:39
Watkins Avenue	Atherton	00:54	00:56
Encinal Avenue	Menlo Park	00:48	00:48
Glenwood Avenue	Menlo Park	00:50	01:01
Oak Grove Avenue	Menlo Park	01:21	01:32
Ravenswood Avenue	Menlo Park	01:08	01:01
Palo Alto Avenue	Palo Alto	00:42	00:48
Churchill Avenue	Palo Alto	00:38	00:35
West Meadow Avenue	Palo Alto	00:40	00:39
West Charleston Avenue	Palo Alto	00:38	00:38
Rengstorff Avenue	Mountain View	00:50	00:43
Castro Street	Mountain View	01:09	01:30
Mary Avenue	Sunnyvale	00:38	00:40

Source: LTK, 2013
Note: This table reports average gate down times per event at grade crossings near study intersections. Several additional grade crossings are present along the Caltrain corridor that are not directly adjacent to designated study intersections.

Figure 2-22

Existing Grade Crossings Locations - Zone 1

Document Path: N:\Projects_SJ13_Projects\SJ13_1440_Caltrain_Electrification\Graphics\ADOBE\Fig_2-22_At_Grade_Crossing_Zone1.ai
Date: January 2014

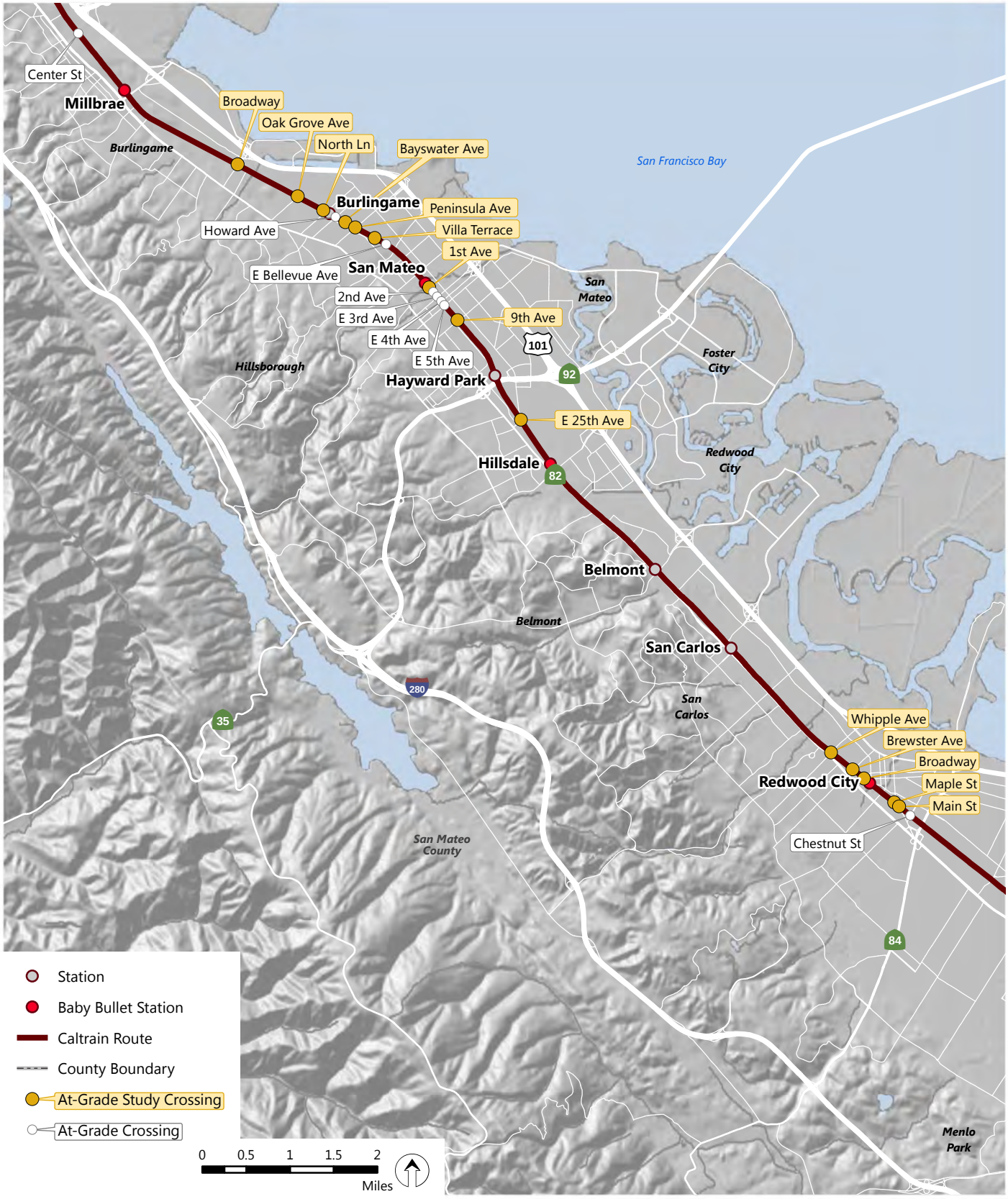

Figure 2-23

Existing Grade Crossings Locations - Zone 2

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Date: January 2014 (Revised September 2014)
*This figure replaces Figure 2-23 from the draft EIR (TIA)

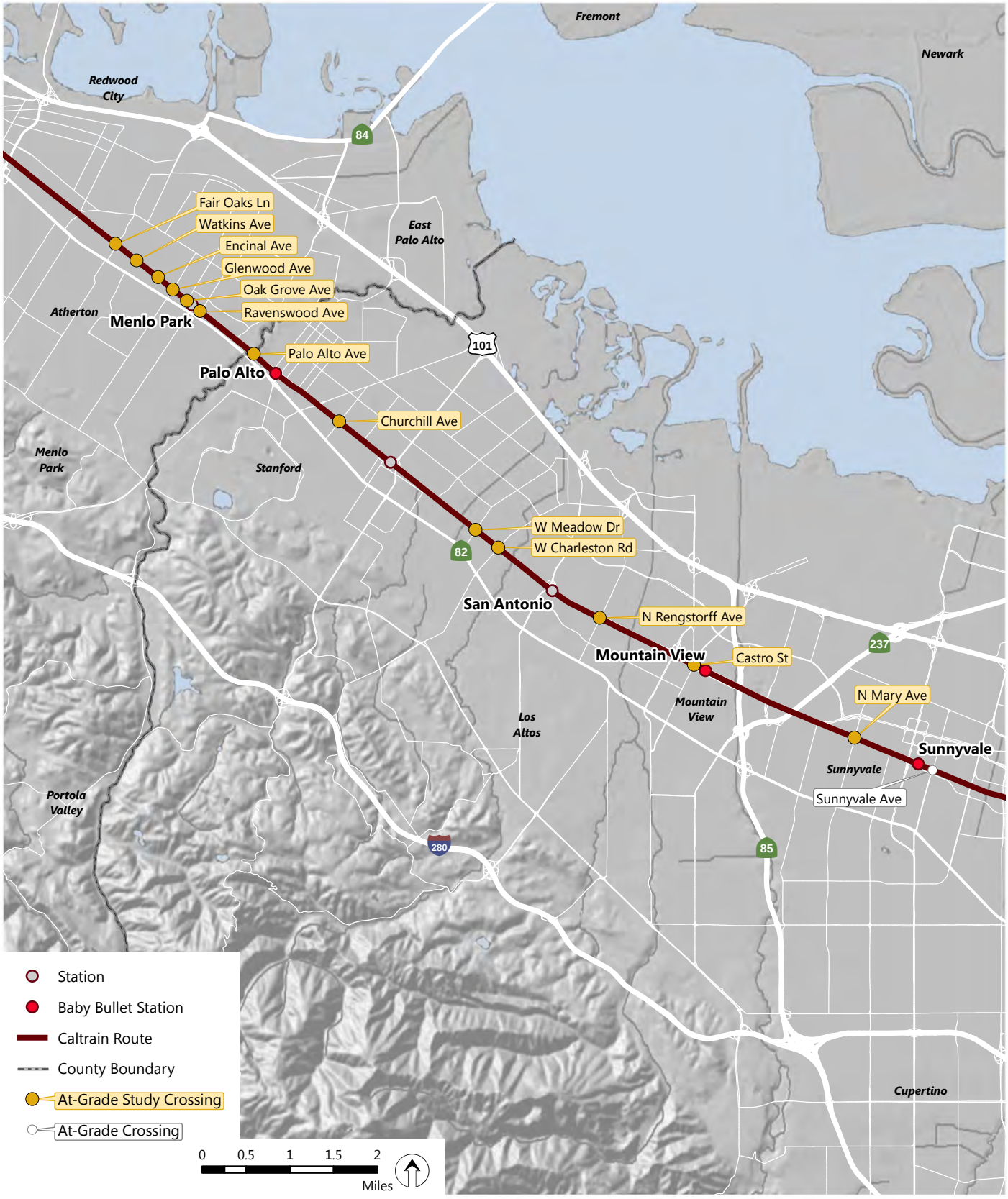

Figure 2-24

Existing Grade Crossings Locations - Zone 3

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Date: January 2014 (Revised September 2014)
*This figure replaces Figure 2-24 from the draft EIR (TIA)

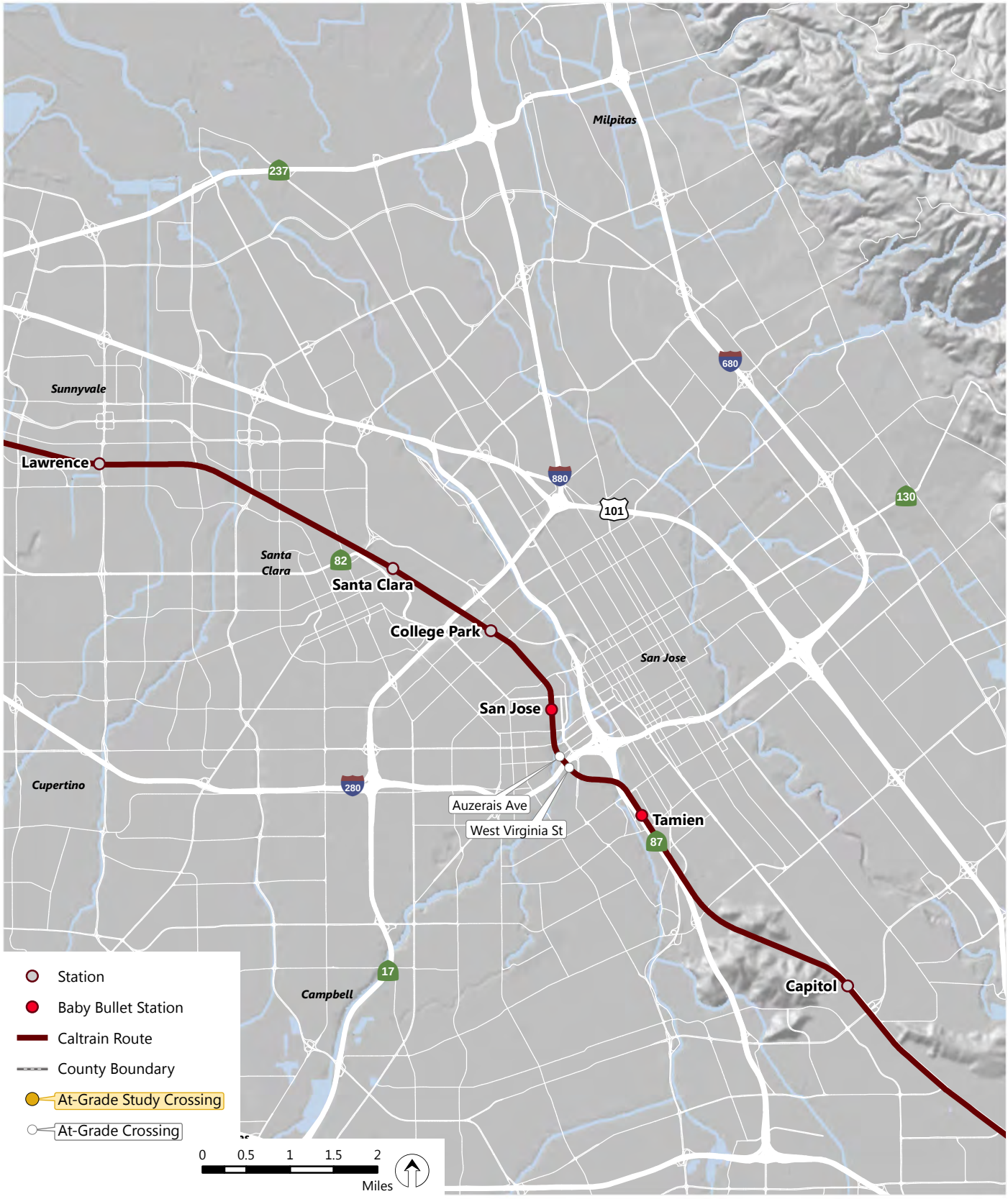

Figure 2-25

Existing Grade Crossings Locations - Zone 4

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Date: January 2014

2.6.4 EXISTING INTERSECTION LEVELS OF SERVICE

The Caltrain Project could affect traffic operations along the Caltrain corridor in several ways. First, the number of trains will increase, increasing the number of gate down occurrences. Second, the increased train service and added train capacity will change traffic patterns as auto trips are converted to train trips (resulting in potential increases in traffic near stations coupled with reduced traffic on parallel roads).

Traffic operations models allow for intersections to be evaluated based on how people and vehicles travel through them. The intersection analysis results include a descriptive term known as level of service (LOS). LOS is a measure of traffic operating conditions, which varies from LOS A, which represents free flow conditions, with little or no delay, to LOS F, which represents congested conditions, with extremely long delays. Table 2-16 displays the LOS designations for signalized intersections. Table 2-17 displays LOS thresholds for unsignalized intersections.

In order to evaluate how the project will affect corridor traffic patterns, 82 intersections[8] in the Study Area were analyzed initially. Additional analysis was conducted at eight intersections, resulting in 90 study intersections for existing levels of service:

- Intersection # 83 – Broadway / Rollins Road (Burlingame)
- Intersection # 84 – Rollins Road / Cadillac Way (Burlingame)
- Intersection # 85 – Bayswater Avenue/California Drive (Burlingame)
- Intersection # 86 – Encinal Avenue/El Camino Real (Menlo Park)
- Intersection # 87 – Encinal Avenue/Middlefield Road (Atherton)
- Intersection # 88 – Laurel Street /Oak Grove Avenue (Menlo Park)
- Intersection # 89 – Laurel Street/Glenwood Avenue (Menlo Park) - unsignalized
- Intersection # 90 – Laurel Street/Encinal Avenue (Menlo Park) - unsignalized

To obtain the LOS and the delay, the existing AM and PM peak hour VISSIM and SimTraffic models were updated to reflect future peak hour operating conditions. This included updates to forecasted traffic volumes, signal timings, gate down times, and frequencies of Caltrain at at-grade crossings.

These intersections were selected for evaluation using a tiered approach based on the criteria described below.

- Intersection Operations / Level of Service (LOS): Currently operating at LOS D, E, or F during peak hours
- Transit-Oriented Development (TOD): Adjacent to station where significant TOD is planned
- Gate down times: Adjacent to grade crossing where Project would result in substantial change in gate down times

[8] The intersection of Broadway and US 1010 Southbound Ramps (#84a) in Burlingame was added to the list of intersections as a result of the US 101/Broadway Interchange Reconstruction project, however this intersection does not exist under Existing Conditions, bringing the total number of intersections modeled for future conditions to 91. Intersection 84a was analyzed using the VISSIM software package.

- Intersection Geometry: Unusual geometry and/or signal operations

Intersections in the Study Area that meet one or more of the criteria outlined above were selected for study using traffic operations modeling tools.

As an additional step to provide additional discussion of potential traffic changes due to the project, other intersections in the Study Area that do not meet the above criteria were reviewed qualitatively. Over 130 intersections in the Study Area were originally reviewed as potential study intersection locations. Of these intersections, ~~50~~ 40 were ultimately not selected for detailed quantitative evaluation because they currently are operating at acceptable LOS with minimal to no delay, with no expectation of serious deterioration in the future. Although some of these non-study intersections are adjacent to or in close proximity to study intersections that are operating at LOS E or F under existing conditions or projected to under future scenarios, no impacts are expected due to queuing or other potential spillover effects. ~~For example, although Glenwood Avenue and Middlefield Road in Atherton operates at LOS E in the AM peak and LOS F in the PM peak under existing conditions, Middlefield Road and Encinal Avenue, a nearby intersection, was not included as a study intersection because it operates well and is unlikely to experience spillover operational effects.~~

Because no significant traffic effects are expected at these non-study intersections, they were not analyzed using quantitative traffic operations modeling tools. Some non-study intersections have also been analyzed as part of other planning efforts in the region, including the various downtown and station area plans and the Caltrain/HSR Blended Grade Crossing and Traffic Analysis (JPB, 2013).

Most of the ~~82~~ 90 study intersections (~~64~~ 70) were modeled using the Synchro/SimTraffic software package. The remaining ~~18~~ 20 intersections were modeled using the VISSIM software package, which is a more robust transportation microsimulation tool that has the ability to account for more complex intersection operations and multimodal interactions. VISSIM was used at intersections where there are high levels of congestion, frequent transit service, high automobile volumes, high pedestrian or bicycle volumes, or special traffic signal systems (such as transit signal priority). More detail on the model development and calibration process can be found in Attachment E. Synchro/SimTraffic output sheets can be found in Attachment G. VISSIM output sheets can be found in Attachment H. Traffic Volumes Count Sheets are in Attachment I.

TABLE 2-16
SIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

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
B	Operations with low delay occurring with good progression and/or short cycle lengths.	10.1 – 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.1 – 35.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	35.1 – 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 – 80
F	Operations with delays unacceptable to most drivers occurring due to over-saturation, poor progression, or very long cycle lengths.	> 80

Source: "2010 Highway Capacity Manual." (2010) Transportation Research Board

TABLE 2-17
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE DEFINITIONS

Level of Service	Description	Average Control Delay Per Vehicle on Worst Approach (seconds)
A	Little or no delays	≤ 10
B	Short traffic delays	10.1 – 15.0
C	Average traffic delays	15.1 – 25.0
D	Long traffic delays	25.1 – 35.0
E	Very long traffic delays	35.1 – 50
F	Extreme traffic delays with intersection capacity exceeded	> 50

Source: 2010 Highway Capacity Manual

Table 2-18 displays current level of service and calculated delay during the morning and evening peak at all study intersections. Figure 2-26 illustrates the geographic location of each study intersection and the associated AM and PM peak period LOS in Zone 1. Figure 2-27 illustrates the geographic location of each study intersection and the associated AM and PM peak period LOS in Zone 2. Figure 2-28 illustrates the geographic location of each study intersection and the associated AM and PM peak period LOS in Zone 3. Figure 2-29 illustrates the geographic location of each study intersection and the associated AM and PM peak period LOS in Zone 4.

In Zone 1, which includes San Francisco County and a portion of San Mateo County, the majority of study intersections operate at LOS C or better. However, 4th Street and King Street operates at LOS E in the AM

and F in the PM. Three other intersections operate at LOS D or worse: 7th Street and 16th Street (AM peak), Linden Avenue and Dollar Avenue (PM peak), and San Mateo Avenue and San Bruno Avenue (PM peak). In Zone 2, which includes northern and central San Mateo County, points of severe congestion (LOS E and LOS F) exist at major intersections, including along El Camino Real, Alma Street, and Middlefield Road. In Zone 3, which includes parts of San Mateo and Santa Clara Counties, congestion is also clustered along El Camino Real and Alma Street, in addition to Central Expressway. Overall, points of severe congestion are mostly clustered in Zone 3, in the cities of Atherton, Palo Alto, and Mountain View. In Zone 4, two intersections operate at LOS D or worse: Kifer Road and Lawrence Expressway and Reed Avenue and Lawrence Expressway (AM and PM peaks).

TABLE 2-18
EXISTING INTERSECTION DELAY AND LEVELS OF SERVICE (2013)

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	Delay	LOS
		ZONE 1				
1	4th Street and King Street	SF	AM PM	Signal	56.6 84.5	E F
2	4th Street and Townsend Street	SF	AM PM	Signal	28.9 28.8	C C
3	Mission Bay Drive and 7th Street	SF	AM PM	Signal	8.3 12.7	A B
4	Mission Bay Drive and Berry Street	SF	AM PM	Signal	2.3 8.4	A A
5	7th Street and 16th Street	SF	AM PM	Signal	67.3 49.5	E D
6	16th Street and Owens Street	SF	AM PM	Signal	10.6 10.7	B B
7	22nd Street and Pennsylvania Street	SF	AM PM	All-way Stop	7.6 7.3	A A
8	22nd Street and Indiana Street	SF	AM PM	All-way Stop	5.3 5.4	A A
9	Tunnel Avenue and Blanken Avenue	SF	AM PM	All-way Stop	7.9 7.2	A A
10	Linden Avenue and Dollar Avenue	SSF	AM PM	Signal	15.1 48.9	B D
11	East Grand Avenue and Dubuque Way	SSF	AM PM	Signal	7.5 7.5	A A
12	S Linden Avenue and San Mateo Avenue	SSF	AM PM	Signal	6.7 7.4	A A
13	Scott Street and Herman Street	SB	AM PM	Side-Street Stop	9.8 14.0	A B
14	Scott Street and Montgomery Avenue	SB	AM PM	Side-Street Stop	4.8 5.7	A A
15	San Mateo Avenue and San Bruno Avenue	SB	AM PM	Signal	10.9 >120	B F
		ZONE 2				
16	El Camino Real and Millbrae Avenue	MB	AM PM	Signal	43.4 42.7	D D
17	Millbrae Avenue and Rollins Road	MB	AM PM	Signal	33.0 38.8	C D
18	California Drive and Broadway	BG	AM PM	Signal	80.5 58.7	F E
19	Carolan Avenue and Broadway	BG	AM PM	Signal	26.5 39.2	C D
20	California Drive and Oak Grove Avenue	BG	AM PM	Signal	34.3 24.2	C C
21	Carolan Avenue and Oak Grove Avenue	BG	AM PM	Side-Street Stop	>120 92.1	F F

TABLE 2-18
EXISTING INTERSECTION DELAY AND LEVELS OF SERVICE (2013)

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	Delay	LOS
22	California Drive and North Lane	BG	AM PM	Side-Street Stop	14.7 11.4	B B
23	Carolan Avenue and North Lane	BG	AM PM	Side-Street Stop	23.0 17.8	C C
24	Anita Road and Peninsula Avenue	BG	AM PM	Side-Street Stop	15.6 >120	C F
25	Woodside Way and Villa Terrace	SM	AM PM	Side-Street Stop	5.1 4.7	A A
26	North San Mateo Drive and Villa Terrace	SM	AM PM	Side-Street Stop	11.7 12.8	B B
27	Railroad Avenue and 1st Avenue	SM	AM PM	Side-Street Stop	10.4 19.0	B C
28	S B Street and 1st Avenue	SM	AM PM	Signal	22.6 30.5	C C
29	9th Avenue and S Railroad Avenue	SM	AM PM	Side-Street Stop	34.7 21.4	D C
30	S B Street and 9th Avenue	SM	AM PM	Signal	15.0 14.4	B B
31	Transit Center Way and 1st Avenue	SM	AM PM	Uncontrolled	5.1 26.7	A D
32	Concar Drive and SR 92 Westbound Ramps	SM	AM PM	Signal	6.0 6.1	A A
33	S Delaware Street and E 25th Avenue	SM	AM PM	Signal	19.1 20.6	B C
34	E 25th Avenue and El Camino Real	SM	AM PM	Signal	32.0 80.6	C F
35	31st Avenue and El Camino Real	SM	AM PM	Signal	19.2 68.7	B E
36	E Hillsdale Boulevard and El Camino Real	SM	AM PM	Signal	43.7 67.1	D E
37	E Hillsdale Blvd. and Curtiss Street	SM	AM PM	Signal	12.0 14.7	B B
38	Peninsula Avenue and Arundel Road and Woodside Way	SM	AM PM	Side-Street Stop	14.3 >120	B F
39	El Camino Real and Ralston Avenue	BL	AM PM	Signal	>120 85.4	F F
40	El Camino Real and San Carlos Avenue	SC	AM PM	Signal	25.6 47.1	C D
41	Maple Street and Main Street	RC	AM PM	Side-Street Stop	10.9 14.3	B B
42	Main Street and Beech Street	RC	AM PM	Side-Street Stop	5.2 8.6	A A
43	Main Street and Middlefield Road	RC	AM PM	Signal	12.5 20.1	B C
44	Broadway Street and California Street	RC	AM PM	Signal	60.0 >120	F F

TABLE 2-18
EXISTING INTERSECTION DELAY AND LEVELS OF SERVICE (2013)

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	Delay	LOS
45	El Camino Real and Whipple Avenue	RC	AM PM	Signal	74.7 48.3	E D
46	Arguello Street and Brewster Avenue	RC	AM PM	Signal	14.7 39.4	B D
47	El Camino Real and Broadway Street	RC	AM PM	Signal	27.5 45.5	C D
48	Arguello Street and Marshall Street	RC	AM PM	Signal	15.1 48.7	B D
49	El Camino Real and James Avenue	RC	AM PM	Signal	26.2 33.7	C C
		ZONE 3				
50	El Camino Real and Fair Oaks Lane	AT	AM PM	Signal	33.6 27.6	C C
51	El Camino Real and Watkins Avenue	AT	AM PM	Side-street stop	34.5 48.1	D E
52	Fair Oaks Lane and Middlefield Road	AT	AM PM	Side-Street Stop	>120 41.3	F E
53	Watkins Avenue and Middlefield Road	AT	AM PM	Side-Street Stop	31.6 28.3	D D
54	Glenwood Avenue and Middlefield Road	AT	AM PM	Side-Street Stop	49.2 >120	E F
55	El Camino Real and Glenwood Avenue	MP	AM PM	Signal	34.1 29.6	C C
56	El Camino Real and Oak Grove Avenue	MP	AM PM	Signal	17.9 30.9	B C
57	El Camino Real and Santa Cruz Avenue	MP	AM PM	Signal	9.1 12.5	A B
58	Merrill St and Santa Cruz Avenue	MP	AM PM	All-way Stop	7.3 8.9	A A
59	Ravenswood Avenue and Alma Street	MP	AM PM	Side-Street Stop	24.4 17.1	C C
60	El Camino Real and Ravenswood Avenue	MP	AM PM	Signal	39.3 119.0	D F
61	Ravenswood Avenue and Laurel Street	MP	AM PM	Signal	31.0 26.3	C C
62	Alma Street and Palo Alto Avenue	PA	AM PM	Side-Street Stop	11.2 14.6	B B
63	Meadow Drive and Alma Street	PA	AM PM	Signal	72.6 62.0	E E
64	El Camino Real and Alma Street and Sand Hill Road	PA	AM PM	Signal	60.7 49.1	E D
65	High Street and University Avenue	PA	AM PM	Signal	12.6 14.1	B B
66	Alma Street and Churchill Avenue	PA	AM PM	Signal	66.0 64.0	E E

TABLE 2-18
EXISTING INTERSECTION DELAY AND LEVELS OF SERVICE (2013)

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	Delay	LOS
67	W Meadow Drive and Park Blvd.	PA	AM PM	Side-Street Stop	>120 29.3	F D
68	Alma Street and Charleston Road	PA	AM PM	Signal	63.5 80.5	E F
69	Showers Drive and Pacchetti Way	MV	AM PM	Signal	4.5 3.7	A A
70	Central Expressway and N Rengstorff Avenue	SCC	AM PM	Signal	75.5 90.9	E F
71	Central Expressway and Moffett Boulevard and Castro Street	SCC	AM PM	Signal	76.3 66.5	E E
72	W Evelyn Avenue and Hope Street	MV	AM PM	Signal	3.0 4.0	A A
73	Rengstorff Avenue and California Street	MV	AM PM	Signal	50.3 55.6	D E
74	Castro Street and Villa Street	MV	AM PM	Signal	11.8 21.2	B C
75	W Evelyn Avenue and S Mary Avenue	SV	AM PM	Signal	62.4 61.5	E E
76	W Evelyn Avenue and Frances Street	SV	AM PM	Signal	16.1 23.4	B C
		ZONE 4				
77	Kifer Road and Lawrence Expressway	SCC	AM PM	Signal	96.6 >120	F F
78	Reed Avenue and Lawrence Expressway	SCC	AM PM	Signal	97.3 93.7	F F
79	El Camino Real and Railroad Avenue	SCL	AM PM	Signal	26.6 21.3	C C
80	W Santa Clara Street and Cahill Street	SJ	AM PM	Signal	10.4 12.7	B B
81	S Montgomery Street and W San Fernando Street	SJ	AM PM	Signal	7.9 9.6	A A
82	Lick Avenue and W Alma Avenue	SJ	AM PM	Signal	15.8 20.8	B C
		Additional Intersections				
		ZONE 2				
83	Broadway and Rollins Road	BG	AM PM	Signal	46.2 95.6	D F
84	Rollins Road and Cadillac Way	BG	AM PM	Signal	89.1 48.3	F D
85	Bayswater Avenue and California Drive	BG	AM PM	Signal	9.1 8.7	A A
		ZONE 3				
86	Encinal Avenue and El Camino Real	MP	AM PM	Signal	25.5 30.9	C C

TABLE 2-18
EXISTING INTERSECTION DELAY AND LEVELS OF SERVICE (2013)

Int. ID	Intersection	Jurisdiction	Peak Hour	Intersection Control	Delay	LOS
87	Encinal Avenue and Middlefield Road	AT	AM PM	Signal	19.3 12.7	B B
88	Laurel Street and Oak Grove Avenue	MP	AM PM	Signal	9.7 8.6	A A
89	Laurel Street and Glenwood Avenue	MP	AM PM	All-way Stop	6.6 5.9	A A
90	Laurel Street and Encinal Avenue	MP	AM PM	All-way Stop	5.7 9.5	A A

Source: Fehr & Peers, 2014

This table replaces Table 2-18 from the Draft EIR (TIA)

Notes:

1. Jurisdictions:

SF	San Francisco
SSF	South San Francisco
SB	San Bruno
MB	Millbrae
BG	Burlingame
SM	San Mateo
BL	Belmont
SC	San Carlos
RC	Redwood City
AT	Atherton
MP	Menlo Park
PA	Palo Alto
MV	Mountain View
SV	Sunnyvale
SCL	Santa Clara
SCC	Santa Clara County
SJ	San Jose

AM = morning peak hour, PM = afternoon peak hour

LOS designation as per 2010 Highway Capacity Manual

Delay measured in seconds.