WCCTAC
West Contra Costa Transportation Advisory Committee

West Contra Costa High-Capacity Transit Study

FINAL TECHNICAL MEMORANDUM #5
Existing and Planned Transportation Network

January 2016

WSP | PARSONS BRINCKERHOFF

With

RL Banks

Kimley-Horn

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Name	Date	Signature
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Acronyms and Abbreviations

AAR	Association of American Railroads
ABS	Automatic Block Signaling
AC Transit	Alameda-Contra Costa Transit District
BART	San Francisco Bay Area Rapid Transit
BNSF	Burlington Northern Santa Fe Railway
Caltrans	California Department of Transportation
CCJPA	Capitol Corridor Joint Powers Authority
CCTA	Contra Costa Transportation Authority
CSMP	Corridor Study Management Plan
CTC	Centralized Traffic Control
DMU	diesel multiple unit
FFY	Federal Fiscal Year
HOV	high-occupancy vehicle
I-580	Interstate 580
I-80	Interstate 80
I-880	Interstate 880
I-980	Interstate 980
ITS	Intelligent Transportation System
MP	milepost
mph	miles per hour
MTC	Metropolitan Transportation Commission
PTC	Positive Train Control
ROW	right-of-way
RTPC	Regional Transportation Planning Committee
SolTrans	Solano County Transit

SR-123	State Route 123
SR-4	State Route 4
STAA	Surface Transportation Assistance Act
TDM	Transportation Demand Management
TWC	Track Warrant Control
UPRR	Union Pacific Railroad
UPS	United Postal Service
WCCTA	Western Contra Costa Transit Authority
WCCTAC	West Contra Costa Transportation Advisory Committee
WestCAT	Western Contra Costa Transit Authority Transit Service
WETA	Water Emergency Transportation Authority

1 INTRODUCTION

1.1 Purpose of West County High-Capacity Transit Study

The purpose of the West County High-Capacity Transit Study is to evaluate the feasibility and effectiveness of improving high-capacity transit service in the West Contra Costa County travel corridor, which includes Interstate 80 (I-80), San Pablo Avenue, and Capitol Corridor service on the Union Pacific Railroad, extending from the Alameda County line to the vicinity of the Carquinez Bridge. This will require an understanding of travel markets and the demand for high-capacity transit in the corridor as part of the larger regional transit network, identifying the high-capacity transit options in West Contra Costa County, and understanding the costs and potential funding sources for these options.

For over 30 years, the region has been studying the opportunities for introducing high-capacity transit in West Contra Costa County owing to growing congestion on I-80. The potential for a Bay Area Rapid Transit (BART) extension has been studied every decade, and consideration has also been given to new commuter rail service, expansion of Capitol Corridor service, express bus, and new ferry service. Each of these studies has shown the potential for capturing additional transit ridership and, in response, Capitol Corridor service has been expanded, new express bus services have been introduced, and ferry service to Vallejo has been initiated. These investments have positively contributed to the growth in travel demand on I-80 by providing alternatives to automobile travel, but congestion in the corridor remains a concern. In addition, with the exception of a study conducted by the Metropolitan Transportation Commission (MTC) in the mid 1990s, focus has generally been on evaluation of singular modes rather than on the integration of transit services and how modal options can complement each other to improve transit ridership and maximize linkages throughout the county.

The purpose of this study is to look at these evaluations to gain an understanding of what has been considered in the past and to take a fresh look at multi-modal solutions to increase high-capacity transit in the West Contra Costa travel corridor.

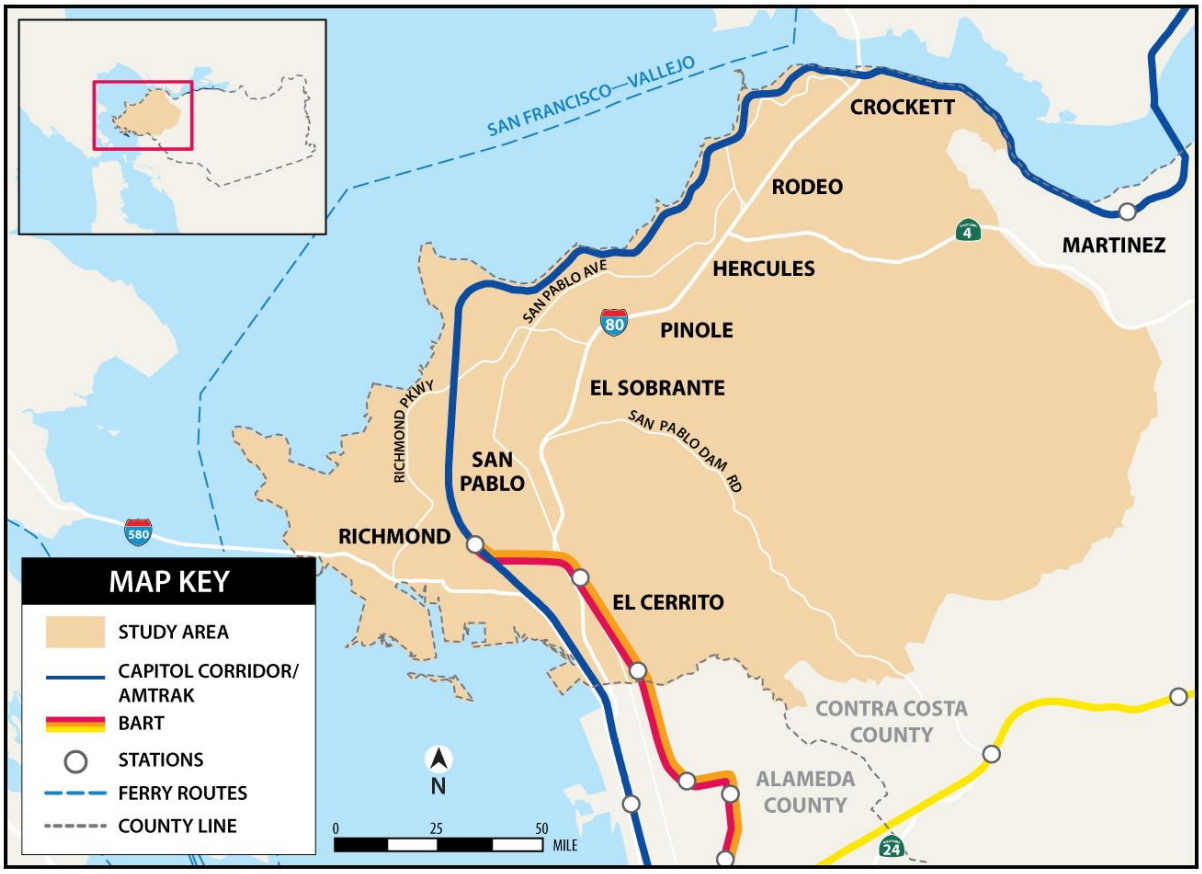
High-capacity transit is defined as a service or system that provides substantially higher levels of passenger capacity, speed, and service frequency as compared to community-based or local bus services. Transit options that will be evaluated as part of this study include freeway-based express bus, bus rapid transit, and/or light rail, extension of BART service, commuter rail improvements, and ferry service expansion.

1.2 Definition of Study Area

The Study Area extends along the I-80 corridor, encompassing West Contra Costa County from the southern boundary at the Alameda County line north to the Carquinez Bridge and the

Solano County line. It encompasses MTC's Superdistrict 20, which includes the Cities of El Cerrito, Hercules, Pinole, Richmond, and San Pablo, as well as the unincorporated communities of El Sobrante, Rodeo, and Crockett. **Figure 1-1** displays a map of the Study Area, which includes I-80 and Interstate 580 (I-580), as well as major surface streets, including San Pablo Avenue and Richmond Parkway.

Figure 1-1: Study Area



Source: WSP | Parsons Brinckerhoff, Kimley-Horn, 2015

This technical memorandum includes documentation of future travel and planned improvements extending to the horizon year of 2040. The information collected as part of this technical memorandum will be used to inform subsequent tasks.

1.3 Purpose of this Technical Memorandum

The purpose of this Existing and Planned Transportation Network Technical Memorandum is to document the existing and planned transportation network in the project corridor, including bus, rail (passenger and freight), and roadways. This memo summarizes existing transit services and facilities (such as major stations/stops) and describes planned improvements.

The memo characterizes existing and projected transit operations, such as peak-hour and off-peak services, ridership, fleet sizes, system capacities, properties and facilities, transit hubs, and park-and-ride locations. The memo also identifies the existing and planned road network for I-80 and major arterials, and the West Country rail facilities, including right-of-way (ROW) dimensions, track classifications, freight and passenger volumes, and estimated line capacities.

2 REGIONAL CONTEXT

Transportation planning in West Contra Costa County exists within a defined governance structure. The West Contra Costa Transportation Advisory Committee (WCCTAC) is one of four regional transportation planning committees (RTPC) in Contra Costa County. Together and in conjunction with the Contra Costa Transportation Authority (CCTA), the RTPCs participate in the cooperative transportation planning process called for in Measure J, which is the local transportation sales tax passed by voters in 1988 and renewed in 2004. CCTA manages the funds that come from the adopted sales tax and directs the state and federal transportation funds to investments in the county.[1] CCTA also works with the RTPCs to identify transportation projects that would be included in MTC's Regional Transportation Plan and Transportation Improvement Plan to compete for state and federal funds.

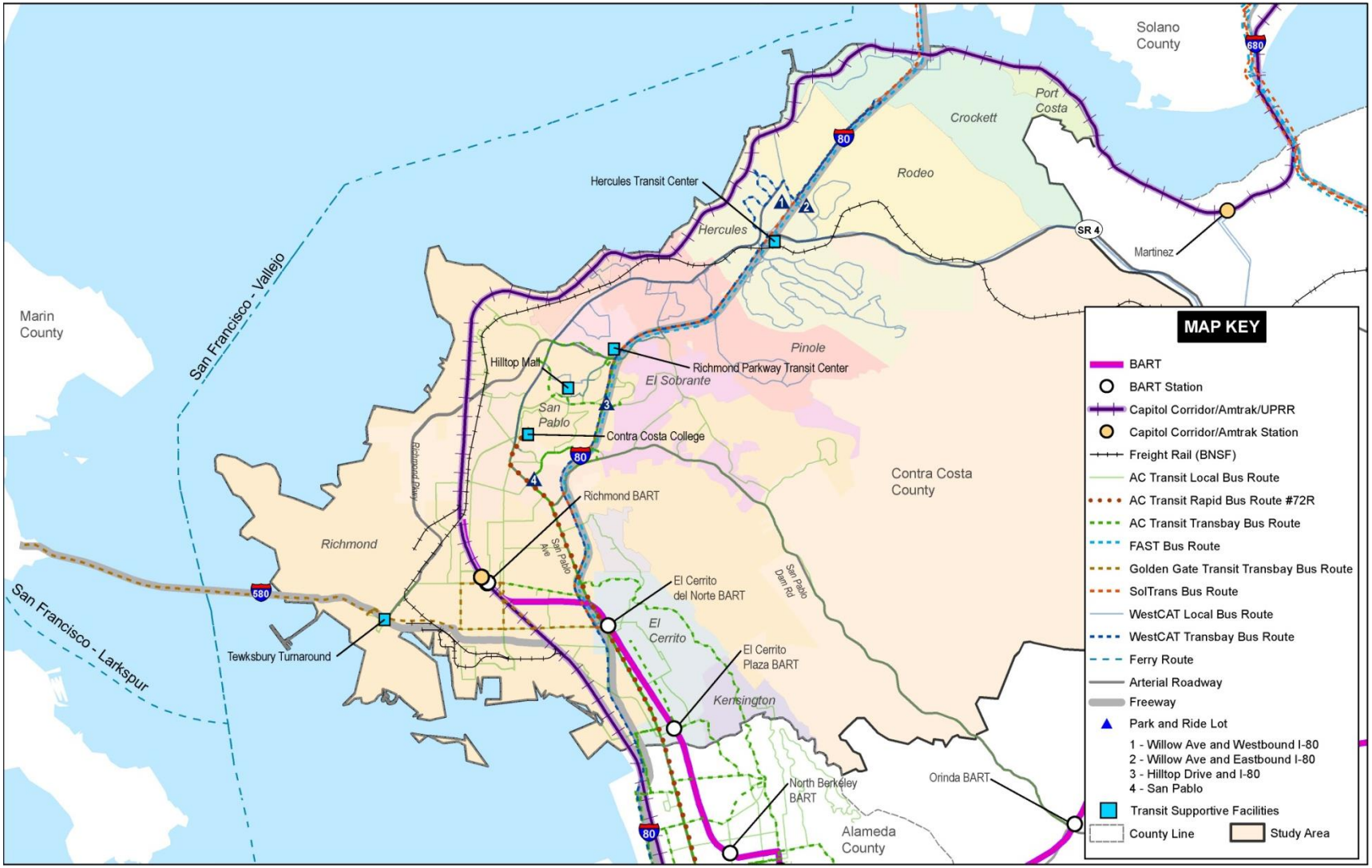
The summation of the study's analysis and findings begins the project development process at the "ground floor" of the transportation planning process, where a project or set of projects will be developed and analyzed to help WCCTAC staff, WCCTAC TAC, and the WCCTAC Board identify the most viable high-capacity transit alternatives for West County. A review of existing and future transportation conditions is important to assess available services and identify potential multimodal opportunities and gaps in a comprehensive manner.

3 EXISTING CONDITIONS

The following section briefly describes the existing transit services and facilities (such as major stations/stops) and planned improvements that are relevant to this high-capacity transit study. **Figure 3-1** shows the existing transportation networks in the Study Area. **Table A-1** in the appendix summarizes total ridership information.

[1] 2014 Countywide Comprehensive Transportation Plan Update: Volume 1 Draft for Public Review, Contra Costa Transportation Authority

Figure 3-1: Existing Transportation Network

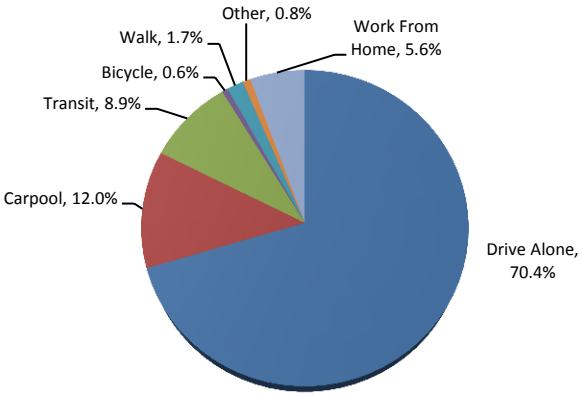


Source: WSP | Parsons Brinckerhoff, Kimley-Horn, 2015

CCTA's Countywide Comprehensive Transportation Plan Update (in progress) indicates that approximately nine percent of commuters in the county used transit to travel to and from work. This percentage has remained relatively constant since 1980, as has the share of travelers driving alone at 70 percent. The work-from-home share of commute trips has seen the greatest change; growing from 1.9 percent in 1980 to 5.6 percent in 2010 (see **Figure 3-2**).

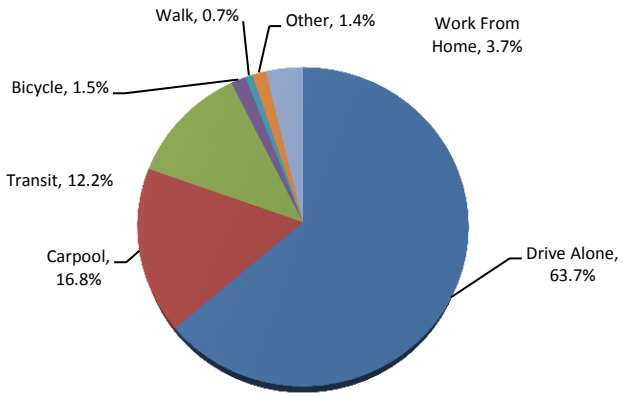
In West County, over 12 percent of commuters were traveling on transit in 2013, slightly higher than the county average in 2010. Approximately 64 percent of commuters drove alone and 17 percent carpooled. There are a greater proportion of West County commuters using alternative travel modes than county residents as a whole. The exceptions are walking and working from home mode shares, which are lower than the county average (see **Figure 3-3**).

Figure 3-2: Contra Costa County Travel Modes for Commute Trips, 2010



Source: CCTA, 2014 Countywide Comprehensive Transportation Plan Update: Volume 1 Draft for Public Review

Figure 3-3: West County Travel Modes for Commute Trips, 2013



Source: U.S. Census Bureau, American Community Survey, 5-Year Estimates, 2013

With continued growth in the Bay Area region, vehicle miles traveled are projected to increase by approximately 20 percent between 2010 and 2040 and the vehicle hours of delay are projected to increase by approximately 48 percent by 2040 (see **Table 3-1**). This is expected to translate to 10 to 58 percent growth in daily traffic volumes on selected regional routes in West County. The I-80 and I-580 bridges are expected to see an increase of 23 percent in PM peak hour traffic volumes by 2040 and I-80, just north of I-580, is expected to see an increase of nearly 22 percent in PM peak hour traffic volumes during that same time period.[2]

[2] 2014 Countywide Comprehensive Transportation Plan Update: Volume 1 Draft for Public Review, Contra Costa Transportation Authority

Table 3-1: Forecast Bay Area Regional Increases in Daily Vehicle Miles and Vehicle Hours Traveled, 2010 to 2040

	2010	2040	Increase
Vehicle Miles Traveled	149,046,000	179,397,000	+20%
Vehicle Hours of Delay	374,000	555,000	+48%
Vehicle Miles Traveled per Capita	20.8	19.6	-6%

Source: Contra Costa Transportation Authority, 2014 Countywide Comprehensive Transportation Plan Update: Volume 1 Draft for Public Review August 2014 from MTC, Plan Bay Area 2040 Final EIR, July 2013.

3.1 Bus Transit

3.1.1 Alameda-Contra Costa Transit District

The Alameda-Contra Costa Transit District (AC Transit) is the third largest public bus system in California. It serves 13 cities and adjacent unincorporated areas in Alameda and Contra Costa counties, including the West Contra Costa County area.[3]

The Study Area contains four major transfer centers used by AC Transit buses:

- **El Cerrito Plaza**. BART operates this station in El Cerrito with approximately 750 parking spaces, and 72 shared-use electronic bike lockers.[4,5] Five AC Transit lines access the El Cerrito Plaza station.
- **El Cerrito del Norte**. BART operates this station in El Cerrito with approximately 2,350 parking spaces and 24 shared-use electronic bike lockers. [6,7] The station serves AC Transit, BART, Fairfield-Suisun Transit, Golden Gate Transit, Solano County Transit (SolTrans), and the Western Contra Costa Transit Authority (WestCAT). Nine AC Transit lines access the El Cerrito del Norte Station. The station offers parking in a four-level garage and two surface parking lots east of the BART station, and another surface parking lot west of the station.
- **Richmond BART/Amtrak**. BART operates this station in Richmond with approximately 630 parking spaces and 24 shared-use electronic and two keyed bike lockers. [8,9] AC Transit, BART, Amtrak (Capitol Corridor, San Joaquin, and California Zephyr lines), and Golden Gate Transit provide service at this station. Seven AC Transit lines access this station. The station offers parking in a six-level garage west of the BART and Amtrak Station and a surface parking lot east of the BART station.

[3] AC Transit, www.actransit.org/about-us/facts-and-figures/
[4] 511.org, http://traffic.511.org/parking/index
[5] BART, www.bart.gov/stations/plza
[6] 511.org, http://traffic.511.org/parking/index
[7] BART, www.bart.gov/stations/deln
[8] 511.org, http://traffic.511.org/parking/index
[9] BART, www.bart.gov/stations/rich

- **Richmond Parkway Transit Center.** Operated by AC Transit and located at the corner of Blume Drive and the Richmond Parkway in the City of Richmond, this transit center contains a park-and-ride lot and bus transfer station accessed by five AC Transit lines. The lot contains 182 parking spaces. [10, 11]

Additionally, four major transit hubs serve AC Transit as noted below:

- **Contra Costa College**. Six AC Transit lines access Contra Costa College via Castro Road in the City of San Pablo. Contra Costa College offers parking for students, staff, and visitors with official business on campus only.
- **Tewksbury Turnaround**. AC Transit Line 72M accesses this turnaround, operated by Golden Gate Transit, located at Tewksbury Avenue and Castro Street in Point Richmond. Golden Gate routes 40 and 42 also serve the turnaround. No public parking lot is available in the vicinity of the turnaround.
- **Hilltop Mall**. Four AC Transit lines access the parking lot on the south side of the Hilltop Mall via Shane Drive in the City of Richmond. No commuter parking is available in the mall parking lots. All parking for transit riders would be directed to the Park-and-Ride lot.
- **Hilltop Mall Park-and-Ride**. The California Department of Transportation (Caltrans) operates this 151-space park-and-ride facility.[12] Two AC Transit lines access the park-and-ride lot.

Table 3-2 identifies the average daily ridership, frequency, and major transit center for each of the AC Transit lines serving the West Contra Costa County area.

[10] WestCAT, www.westcat.org/schedules/transitcentres.html
[11] Caltrans, www.dot.ca.gov/dist4/highwayops/parkandride/
[12] 511.org, http://traffic.511.org/parking/index

Table 3-2: AC Transit Ridership in West Contra Costa County for 2014

Line	Average Daily Ridership	Frequency		Transfer Center/ Transit Connection Area	Areas Served[13]
		Peak	Off-Peak		
7	730	40	40	El Cerrito del Norte	Richmond, El Cerrito, Kensington
25	840	40	40	El Cerrito Plaza	Albany, Kensington
70	1,190	30	30	Richmond BART/Amtrak, Richmond Parkway	Albany, Kensington
71	1,750	30	30	El Cerrito Plaza, Richmond BART/Amtrak, Contra Costa College, Richmond Parkway	Richmond, San Pablo, El Cerrito
72	4,380	30	30	El Cerrito Plaza, El Cerrito del Norte, Contra Costa College, Hilltop Mall	San Pablo, Richmond, El Cerrito
72M	4,270	30	30	El Cerrito Plaza, El Cerrito del Norte, Richmond BART/Amtrak, Tewksbury Turnaround	Richmond, San Pablo, Point Richmond, El Cerrito
72R	6,140	12	12	El Cerrito del Norte, Contra Costa College	San Pablo, Richmond, El Cerrito
74	1,370	35	35	Richmond BART/Amtrak, Contra Costa College, Hilltop Mall	San Pablo, Richmond
76	2,610	30	30	El Cerrito del Norte, Richmond BART/Amtrak, Contra Costa College, Hilltop Mall	Richmond, San Pablo, North Richmond, El Cerrito
376	330	n/a	30	El Cerrito del Norte, Richmond BART/Amtrak, Contra Costa College, Hilltop Mall, Richmond Parkway	Pinole, Richmond, San Pablo, North Richmond, El Cerrito
800	350	n/a	30 – 60	El Cerrito del Norte, Richmond BART/Amtrak	Richmond
G	360	17 – 60	n/a	El Cerrito Plaza	El Cerrito
L	650	15 – 40	n/a	El Cerrito del Norte	San Pablo, Richmond, El Cerrito
LA	490	15 – 30	n/a	Richmond Parkway	El Sobrante, Richmond, El Cerrito
LC	60	30 – 60	n/a	El Cerrito del Norte, Richmond Parkway	El Sobrante, Richmond, San Pablo, El Cerrito

Source: AC Transit 2014, 2014 Annual Route Performance Report

The Transbay lines (G, L, LA, and LC) operate 57-seat "over-the-road" coaches with high back, padded seats, reading lights, and air conditioning. The 72R is one of AC Transit's two Rapid lines and uses low-floor buses with three doors, limited stops, and signal preemption to increase the route's operation speeds between Contra Costa College and Jack London Square in Oakland.[14]

[13] Cities within the Study Area

[14] WestCAT, 2013 – 2022 Short Range Transit Plan. This data was used as it is more recent than the AC Transit SRTP.

3.1.2 Fairfield-Suisun Transit

The Solano Transportation Authority manages and the City of Fairfield operates Route 90, a high-frequency peak service in the mornings and evenings between the Fairfield Transportation Center and El Cerrito del Norte BART. Average weekday ridership in calendar year 2014 for was approximately 955 with a maximum peak of eight vehicles in service.[15] Route 90 runs on weekdays arriving at the El Cerrito del Norte station from 4:50 AM until 7:30 PM and leaving the El Cerrito del Norte station from 5 AM until 7:32 PM.[16]

3.1.3 Golden Gate Transit

The Golden Gate Bridge, Highway, and Transportation District operates Golden Gate Transit in addition to operating the Golden Gate Bridge and Golden Gate Ferry service.[17] Golden Gate Transit offers service to Western Contra Costa County via Routes 40 and 42. Average weekday ridership in calendar year 2014 for Routes 40 and 42 was approximately 210 and 630, respectively. Routes 40 and 42 serve the El Cerrito del Norte BART station and the Tewksbury Turnaround (described under 3.1.1, above), and Route 42 also serves the Richmond BART station. Weekdays, Routes 40 and 42 depart the San Rafael Transit Center from 5:30 AM to 10 PM and depart the El Cerrito del Norte BART station from 5:44 AM to 11:13 PM. The weekday fleet is composed of four buses. Golden Gate Transit is not currently considering any new additional transit hubs.[18]

3.1.4 SolTrans

SolTrans is a Joint Powers Authority that merged Vallejo Transit and Benicia Breeze. It provides public transportation to the southern Solano County cities of Vallejo and Benicia, and also provides express bus service to West Contra Costa County with Route 80 to the El Cerrito del Norte BART station directly from stops in Vallejo Monday through Saturday. Weekdays, Route 80 arrives at El Cerrito del Norte BART from 4:52 AM to 10:54 PM and leaves El Cerrito del Norte BART from 5:15 AM to 10:54 PM every 15 (peak) to 55 (off-peak) minutes. On Saturdays, Route 80 arrives at El Cerrito del Norte from 6:29 AM to 10:52 PM and departs from 6:35 AM to 11:01 PM between every 15 to 55 minutes.[19]

[15] Email communication with Lori DaMassa, Transportation Planner, FAST, 2015

[16] Fairfield- Suisun Transit, www.fasttransit.org/schedules-maps/express-intercity-route-maps-and-schedules/route-90/

[17] Golden Gate Transit District, http://goldengate.org/organization/

[18] Email communication with David Davenport, Golden Gate Transit District, 2015

[19] SolTrans, System Map, www.soltransride.com/wp-content/uploads/2012/06/System-Map-6-27-14_FINAL1.pdf

Average daily ridership in West Contra Costa County on SolTrans was about 1,510 in 2014. SolTrans operates three regional routes in Solano County, East Contra Costa, and West Contra Costa. The SolTrans fleet size for these three routes is 24 MCI buses.[20]

3.1.5 VINE

VINE Transit operates Napa County's public transit system under the oversight of the Napa County Transportation and Planning Agency. Route 29 runs between Calistoga and El Cerrito del Norte BART with stops in St. Helena, Yountville, Napa, American Canyon, and Vallejo. Route 29 operates Monday through Friday, arriving at El Cerrito del Norte BART 11 times between 5:42 AM and 7:13 PM and leaving the stations between 5:55 AM and 7:23 PM In Fiscal Year 2013-2014, average daily ridership for Route 29 was approximately 160 passengers.[21]

3.1.6 WestCAT

WestCAT provides local bus service to the northern portion of West County: Crockett, Rodeo, Hercules, Pinole, and parts of El Sobrante. WestCAT operates eight local fixed routes, two regional routes, and four express routes. **Table 3-3** shows the average daily ridership, fleet size, and major transfer centers associated with WestCAT.

Table 3-3: WestCAT Ridership in West Contra Costa County for Fiscal Year 2014

Line	Average Daily Ridership	Fleet Sizes for Service	Transfer Centers in West Contra Costa County
LYNX	1,000	6 full-sized buses	Willow Avenue Park-and-Ride (Rodeo), Northshore Business Park (Hercules), Hercules Transit Center
Express Routes (J, JX, JPX)	2,400	20 full-sized buses	Hercules Transit Center and El Cerrito Del Norte BART Station Pinole Valley Road and Richmond Parkway Transit Center (J and JPX)
Local Fixed Routes (10, 11, 12, 15, 16, 17, 18, and 19) and Regional Routes (30Z and C3)	1,600	15 full-sized buses	Varies depending on route

Sources: Email communication with Charles Anderson, General Manager, WestCAT, May 2015
WestCAT website www.westcat.org/schedules/fixedroute.html#express

WestCAT operates express bus service (Route J) in the I-80 corridor between the Hercules Transit Center and the El Cerrito del Norte BART station 365 days a year, with modified service on Saturdays, Sundays, and some holidays. Routes JX and JPX are weekday, express buses with 15-minute frequencies. Route JX travels directly between the Hercules Transit Center and El Cerrito del Norte BART during commute hours, and Route JPX travels between the Hercules

[20] Email communication with Mandi Renshaw, SolTrans, May 27, 2015

[21] Email communication with Tom Roberts, Manager of Public Transit, Napa County Transportation and Planning Agency. June 9, 2015

Transit Center and El Cerrito del Norte BART, with stops on Pinole Valley Road and at the Richmond Parkway Transit Center during commute hours and hourly during non-commute times.

WestCAT also operates the Martinez Link 30Z, a regional weekday service, between the Hercules Transit Center and the City of Martinez. The 30Z operates at a 30-minute frequency during commute times, and every hour during non-commute times with timed stops at the Hercules Transit Center, Veterans Administration Hospital, Contra Costa Regional Medical Center, and the Martinez Amtrak Station. WestCAT also operates Route C3, a regional weekday route, between the Hercules Transit Center and Contra Costa College from 7:30 AM to 8:44 PM

WestCAT Lynx is a weekday commuter service to the Transbay Terminal in San Francisco operating every 15 to 30 minutes between 5 AM and 9:10 AM, and 3:30 PM and 8:33 PM The Lynx has timed connections with Route 15 on Willow Avenue and with local routes at the Hercules Transit Center.[22]

WestCAT connects to other transit services at the following major transfer locations:

- **El Cerrito del Norte**. WestCAT express routes (J, JPX, and JR) access the El Cerrito del Norte Station in the City of El Cerrito. See discussion in Section 3.1.1 AC Transit for details about this station.
- **Richmond Parkway Transit Center**. WestCAT routes 17, 18, JPX, and JR access the Richmond Parkway Transit Center. See discussion in Section 3.1.1 AC Transit for details about this center.
- **Hercules Transit Center**. The center, located on Willow Avenue in Hercules, is owned by BART and managed by the City of Hercules. It includes a park-and-ride facility with 422 parking spaces[23] and 16 lockers and 8 rack spaces for bicycles.[24] WestCAT routes 10, 11, 12, 15, 19, 30Z, C3, J, JPX, and Lynx all use the Hercules Transit Center.

3.1.7 Transit-Supportive Facilities

The preceding sections identify and characterize some of the following transit centers or transit-supportive facilities (e.g., park-and-ride lots) in the West Contra Costa area:

- Contra Costa College (see Section 3.1.1, AC Transit)
- El Cerrito Plaza (see Section 3.1.1, AC Transit)
- El Cerrito del Norte (see Section 3.1.1, AC Transit, and Section 3.1.6, WestCAT)

[22] WestCAT, www.westcat.org/schedules/fixedroute.html#express
[23] WestCAT, www.westcat.org/schedules/transitcentres.html
[24] 511.org, www.511contracosta.org/wp-content/uploads/2011_Commuter_Handbook/11-Park-Ride-Locations.pdf

- Hercules Transit Center (Section 3.1.6, WestCAT)
- Hilltop Mall (see Section 3.1.1, AC Transit)
- Richmond BART/Amtrak (see Section 3.1.1, AC Transit)
- Richmond Parkway Transit Center (see Section 3.1.1, AC Transit, and Section 3.1.6, WestCAT)
- Tewksbury Turnaround (see Section 3.1.3, Golden Gate Transit)

Additional transit-supportive facilities in the Study Area include the following park-and-ride lots:

- **Willow Avenue and Eastbound I-80**: This park-and-ride lot in Hercules contains 27 parking spaces.
- **Willow Avenue and Westbound I-80**: This park-and-ride lot in Hercules contains 71 parking spaces.
- **Hilltop Drive and I-80**: This park-and-ride lot in Richmond contains 151 parking spaces.
- **San Pablo Avenue between Church Lane and Vale Road**: This park-and-ride lot in San Pablo contains 161 parking spaces, and 2 lockers and 10 rack spaces for bicycles.[25]

Caltrans operates all the park-and-ride lots above except for the San Pablo Park-and-Ride lot, which is operated by AC Transit.

3.2 Passenger Rail Transit

3.2.1 Bay Area Rapid Transit District (BART)

BART provides heavy-rail, rapid transit service in the San Francisco Bay Area. In the West Contra Costa County area, BART has three stations: Richmond, El Cerrito del Norte, and El Cerrito Plaza. Two lines run through the West Contra Costa County area: Fremont-Richmond and Richmond-Daly City/Millbrae. Average weekday ridership for the three stations is shown in **Table 3-4**.

Table 3-4: BART 2014 Average Weekday Ridership

	Richmond	El Cerrito del Norte	El Cerrito Plaza
Entry	4,293	8,253	4,787
Exit	4,240	8,859	4,831

Source: BART, 2015, www.bart.gov/about/reports/ridership

In 2014 on a typical weekday, the downtown Berkeley station was the most popular single point of exit for riders entering at Richmond, El Cerrito del Norte, and El Cerrito Plaza stations and represented approximately 13 percent of exits for riders originating from West Contra

[25] 511.org, http://traffic.511.org/parking/index

Costa County area stations. Exits in the downtown Oakland area (12th and 19th Street stations) and portions within and just outside of downtown Oakland (downtown stations and MacArthur, Lake Merritt, and Fruitvale stations) accounted for 12% and 21% of exits, respectively. In 2014 the San Francisco downtown area (Embarcadero, Montgomery, Powell, and Civic Center stations) and all San Francisco stations (downtown stations and 16th Street, 24th Street, Glen Park, and Balboa Park stations) accounted for approximately 38% and 45%, respectively, of exits during weekdays for riders originating at one of the three stations in the West Contra Costa County area.[26]

In 2014 on a typical weekday, the downtown Berkeley Station was the greatest single point of entry for riders exiting at the El Cerrito Plaza Station, and when considering riders exiting at all stations in the West Contra Costa County area, approximately 11% entered at the Downtown Berkeley Station. Approximately 11% of weekday riders exiting at one of the three stations in the West Contra Costa County area entered the BART system from the downtown Oakland area and 30% entered from the Oakland downtown stations and MacArthur, Lake Merritt, and Fruitvale stations. For riders exiting from the Richmond and El Cerrito del Norte stations, the greatest single points of entry were Powell and Montgomery stations, respectively. Approximately 36% of weekday riders exiting at one of the three stations in the West Contra Costa County area entered the BART system via the San Francisco downtown area and 41% via all San Francisco stations.[27]

BART trains leave Richmond from 4:12 to 12:17 AM on weekdays, from 5:55 to 12:17 AM on Saturdays, and 7:55 to 12:17 AM on Sundays. El Cerrito del Norte and El Cerrito Plaza trains, respectively, leave 4 and 7 minutes after departure from Richmond. Weekday trains for lines run every 15 minutes and every 20 minutes on Saturdays. The Richmond-Daily City/Millbrae line does not run after 6:42 PM on weekdays, 6:45 PM on Saturdays, or at all on Sundays. However, during BART operating hours, riders at Richmond, El Cerrito del Norte, and El Cerrito Plaza are able to board the Fremont-Richmond line and transfer to another line for connections to San Francisco and San Mateo County.[28]

3.2.2 Capitol Corridor (Amtrak)

Amtrak operates all intercity passenger rail service in California. The services are composed of Amtrak long-distance routes, which are funded by Amtrak and serve both California and interstate travel markets, and state-supported routes, which are funded by the state and serve only California travel markets.

[26] BART, 2014 Ridership, www.bart.gov/about/reports/ridership
[27] BART, 2014 Ridership, www.bart.gov/about/reports/ridership
[28] BART, www.bart.gov/schedules/byline

Amtrak Long-Distance Routes

Passenger trains operate on the Union Pacific Railroad (UPRR) ROW in West Contra Costa County. This section of track is called the Martinez Subdivision. Two daily Amtrak long-distance trains, the Coast Starlight and the California Zephyr, operate in the Study Area. No ridership information is available for these routes.

- **Coast Starlight (Los Angeles – Oakland – Sacramento - Portland and Seattle):** The Coast Starlight's daily round trip is the second-most popular long-distance train in the Amtrak system. The route provides daily round-trip service between Los Angeles and Seattle.
- **California Zephyr (Emeryville – Sacramento – Reno – Denver - Chicago):** The California Zephyr provides daily round-trip service between the Bay Area and Chicago, and often carries heavy passenger loads between the Bay Area and Reno.

Amtrak State-Supported Routes

Two California service routes operate in the Study Area: San Joaquin and Capitol Corridor.

San Joaquin Route: This route extends 316 rail miles between Oakland and Bakersfield. As of June 2015, the San Joaquin Joint Powers Authority (SJJPA) has assumed management of the route, although under an operating contract, Amtrak continues to operate four daily round trips between the San Francisco Bay Area through the San Joaquin Valley to Bakersfield with bus connections to Southern California. Over 1.1 million passengers traveled on the San Joaquin Route in Federal Fiscal Year (FFY) 2012, making it the fifth-highest intercity ridership in the country.[29] Amtrak operates the San Joaquin Route under provisions of its contracts with host railroads Burlington Northern Santa Fe Railway (BNSF) and UPRR. BNSF owns the majority of the ROW along this route (Port Chicago - Bakersfield), while UPRR owns 39 miles at the northern end of the route between Oakland and Port Chicago (this segment is within the Study Area) and 49 miles between Stockton and Sacramento.

Capitol Corridor Route: This route extends 169 rail miles between San Jose and Auburn. UPRR owns the entire route except for three miles between Santa Clara and San Jose, which is owned by the Peninsula Corridor Joint Powers Board. The Capitol Corridor Joint Powers Authority (CCJPA) contracts with Amtrak to operate 15 daily round trips. The CCJPA has the responsibility for oversight of the Capitol Corridor service through its operating contract with Amtrak, and the state funds the service. The CCJPA also has agreements with UPRR that allow for the operation of the existing 15 Capitol Corridor trains based on the necessary capacity improvements funded by the CCJPA to accommodate those trains without degradation of the freight rail service on the Capitol Corridor. In addition, in areas where passenger trains can

[29] Caltrans, 2013 California State Rail Plan

operate at higher speeds, the CCJPA pays an additional fee to maintain the track at Class IV (80 miles per hour [mph]) instead of Class III (60 mph). Operation of the Capitol Corridor service is based on multi-party agreements between CCJPA, Amtrak, and UPRR. CCJPA also funds a dedicated track maintenance crew and the provision of incentive payments to the host railroad to reduce the number of slow orders and improve the trains' on-time performance.[30]

The UPRR's Martinez Subdivision extends between milepost (MP)[31] 2.1 in Oakland and MP 106.6 in Roseville. For the purposes of this study, the focus will be on the segment between the Contra Costa-Alameda County line (MP 8.5) and the Martinez Bridge (MP 33.3), a distance of 24.8 rail miles (see **Figure 3-4**).

The UPRR's predecessor Southern Pacific Railroad negotiated a limit on the number of Capitol Corridor and San Joaquin passenger trains allowed to operate on the Martinez Subdivision. Passenger trains are limited to operating no more than twenty minutes in any one hour period. A maximum of twenty train pairs of state supported trains are allowed to operate on any portion of the Martinez Subdivision. With four pair of San Joaquin trains and fifteen pairs of Capitol Corridor trains currently operating, the operators are very close to the maximum number of passenger trains allowed on this corridor.

If the San Joaquin trains were rerouted over the Altamont Pass Line, then a corresponding increase in Capitol Corridor trains would be possible. Currently, the Altamont Commuter Express is limited to four pairs of trains operating in any 24 hour period. A new agreement with UPRR would have to be negotiated to allow the additional San Joaquin trains to operate on the Altamont Pass Line.[32]

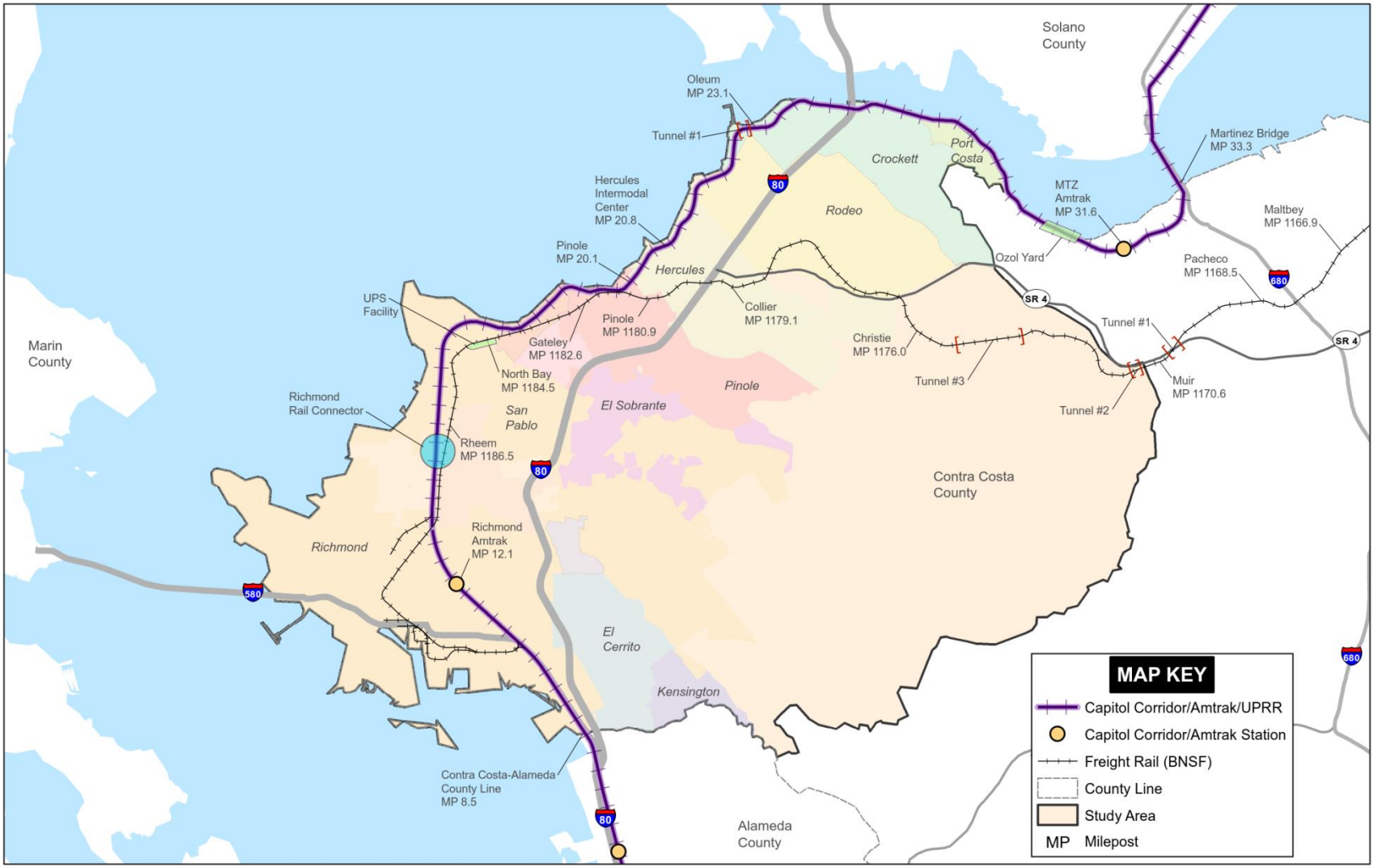
Two Amtrak stations, one at Richmond and the other at Martinez, are located in the Richmond–Martinez segment of the Martinez Subdivision. The Richmond Amtrak Station is in the Study Area and is located at MP 12.1, adjacent to the Richmond BART station. As discussed under Section 3.1.1 for AC Transit, the station is served by Amtrak's California Zephyr, Capitol Corridor and San Joaquin trains; BART; AC Transit; and Golden Gate Transit.

[30] Slow orders are a local speed restriction on a rail line that is set below the track's normal speed limit. They are usually imposed by railway dispatchers for sections that are in some way deficient or maintenance is being performed on that section of railway.

[31] Mileposts are used to designate specific locations on the railroad. Each milepost is given a number which indicates the distance a route travels from a designated origination point.

[32] Metropolitan Transportation Commission, 2007 Bay Area Regional Rail Plan.

Figure 3-4: Existing Rail Network



Source: WSP | Parsons Brinckerhoff, Kimley-Horn, RL Banks, 2015

Capitol Corridor connects with the Richmond station with trains running from 5 AM to 10 PM See the discussion under Section 3.1.1 for AC Transit regarding the facilities at the Richmond BART/Amtrak station. The total daily passenger train count on the Martinez subdivision is currently 42 passenger trains per day (2015).[33]

CCJPA reported a total ridership on Capitol Corridor of 1,679,220 for FFY 2014. Ridership in FY 2013-14 was up 1.1 percent from the prior year, continuing to make the Capitol Corridor Amtrak's third-busiest corridor.[34] The Richmond station contributed 53,877 annual boardings and 57,014 annual alightings.[35] On-time performance for the Capitol Corridor is 95 percent.

3.3 Shuttles

Various entities provide shuttle services in the Study Area. These include services provided by public and private operators as well as those involving a public-private partnership. Some shuttles in West County serve specific groups, such as employees or clients, and some are open to the general public. These services provide an important first-mile and/or last-mile connection to transit users, as many transit operators are not able to provide service that takes passengers to the front door of their destination.

3.3.1 City of Richmond

The City of Richmond runs a free "employment shuttle" funded by the Bay Area Air Quality Management District to connect employees to public and private employment centers within Richmond to El Cerrito Del Norte BART and Richmond BART. The shuttle runs during morning and afternoon commute hours.[36]

3.3.2 University of California, Berkeley

The University of California (UC) Berkeley offers various shuttles. One shuttle, the RFS Line, serves UC Berkeley's Richmond Field Station at 1301 South 46th Street in Richmond and the Regatta Art Collections Facility at 3300 Regatta Boulevard in Richmond. In the Study Area, the RFS Line has one stop at El Cerrito Plaza BART at 6:45 AM, and runs from the Regatta Facility 11 times between 7 AM and 6:05 PM, with two stops at the Richmond Field Station at 6:57 AM and 5 PM The shuttle connects the Richmond Field Station and Regatta facility to the UC Berkeley central campus. Fare for the shuttle is $1.50 and is open to the general public.[37]

[33] June 2015 Amtrak schedules.
[34] Capitol Corridor, "Capitol Corridor Intercity Passenger Rail Service Business Plan Update FY 2015-16 to FY 2016-17," April 2015.
[35] Monthly Station Ridership Activity FFY 2013 - 2013
[36] City of Richmond, www.ci.richmond.ca.us/index.aspx?NID=2881
[37] UC Berkeley, http://pt.berkeley.edu/around/beartransit/daytime

3.3.3 Kaiser Permanente/Richmond Medical Center Shuttle

Kaiser Permanente offers a free shuttle service to its Richmond Medical Center from the Richmond and El Cerrito del Norte BART stations. The Richmond BART shuttle runs every 15 minutes, Monday through Friday between 6:04 AM and 7:16 PM The Del Norte BART shuttle departs Del Norte BART at 7 AM, 7:30 AM, 8 AM, and 8:30 AM In the afternoon, the shuttle departs Richmond Medical Center at 3:05 PM, 3:35 PM, 4:05 PM, 4:35 PM, and 5:05 PM The shuttle is available for all employees, members, and visitors to the Richmond Medical Center.[38]

3.4 Freight Rail Services

The Study Area contains two rail corridors between Richmond and Martinez. As noted under Section 3.2.2, Amtrak trains, including the Capitol Corridor, currently operate on the UPRR Martinez Subdivision. The second route, the BNSF Stockton Subdivision, is currently only used for freight service. The following section documents, among other things, ROW dimensions, track classifications, passenger and freight train volumes, and a practical line capacity for both corridors. **Figure 3-4** shows the two rail lines noted below.

3.4.1 Union Pacific Railroad Martinez Subdivision

The UPRR's Martinez Subdivision extends between MP 2.1 in Oakland and MP 106.6 in Roseville. For the purposes of this study, the focus will be on the segment between the Contra Costa-Alameda County line (MP 8.5) and the Martinez Bridge (MP 33.3), a distance of 24.8 rail miles.

Trackway

The existing UPRR rail corridor generally has a 100-foot ROW and is a double track railroad with crossovers. In Richmond, there are three existing tracks (two mainline tracks and one running track on the west side of the main line). The running track connects Stege (MP 9.4) with San Pablo (MP 15.3) and allows local switching to take place without trains blocking the main line. This track configuration continues to just beyond the Richmond Parkway in San Pablo at MP 15.3. A double crossover track is located in San Pablo between MP 15.0 and 15.2 and in Pinole at MP 20.1.

In Point Pinole, the corridor consists of a double-track mainline with spur tracks on both sides to serve rail shippers. Between Richmond and the Point Pinole Regional Park access road, (MP 15.3) there are two main line tracks in the ROW with a maximum authorized speed of 79 mph (Class 4). From Point Pinole to Martinez, train speeds decrease to 40 mph due to the curvature of the track that follows the shoreline of San Francisco Bay and the Carquinez Strait. The rail corridor enters a tunnel at Oleum (Davis Point) from MP 23.6 to MP 23.8. A single crossover,

[38] Kaiser Permanente, www.eco-thrive.com/Richmond/transit.html

located at Selby (MP 24.6), enables switching locomotives to switch railcars from the western side of the mainline to an oil refinery on the eastern side of the mainline. The rail corridors includes a double crossover in at Costa (MP 27.3 to 27.5), followed by a single crossover at Howard (MP 30.1), which allows access to the Ozol Yard from either track. At MP 30.3, the West Ozol Yard lead provides access to a four-track switching yard. Beginning at East Ozol (MP 31.0) three main tracks serve the Martinez Amtrak Station (MP 31.6) as well as a freight bypass track on the west side of the mainline.

Signaling

Centralized Traffic Control (CTC)[39] governs UPRR's Martinez Subsection. Under CTC, a centralized train dispatcher controls railroad interlockings[40] and traffic flows for CTC-controlled assets using a control panel with a graphical depiction of the railroad. Using CTC, the dispatcher can visually monitor the movement of trains across the territory. This allows more than one train to operate in a segment, trains to pass each other in opposing directions, and advancement of a faster train (e.g., a passenger train can pass a slower freight train safely even if both are moving in the same direction). The train signals are spaced on average every 2.2 miles.

Train Operations

In addition to the 42 passenger trains on the Martinez Subdivision between Richmond and Martinez, UPRR operates an average of 20 freight trains per day.[41] The total number of trains, including both passenger and freight, using the Richmond–Martinez rail corridor is 62 per day.

3.4.2 Burlington Northern Santa Fe Stockton Subdivision

The BNSF Railway's Stockton Subdivision extends between Calwa (Fresno) at MP 994.9 and Richmond at MP 1189.0. For the purpose of this study, the focus is on the segment between Pacheco at MP 1168.5 and the Richmond Amtrak Station (MP 12.1 on the UPRR Martinez Subdivision). The Richmond Rail Connector branches off the BNSF Stockton Subdivision at MP 1186.4 near the Richmond Parkway and connects to the UPRR Martinez Subdivision at MP 14.4 near Parr Boulevard (see **Figure 3-4**).

[39] Centralized Traffic Control (CTC) is a series of interlocking signals controlled by a train dispatcher. From a computer screen, the train dispatch remotely controls signals and powered switches to efficiently and safely move trains across a designated territory. The signals are typically located at the ends of sidings and at crosssovers between main tracks. In addition, signals are also located about every two miles.

[40] Interlocking signals permit the movement of trains within the interlocking plant bounded by these signals. They can be controlled manually by a train dispatcher or automatically in depending on the interlockings specific purpose.

[41] Based on discussions with the UPRR

Construction of the Richmond Rail Connector, scheduled to be completed in the fall of 2015, would add approximately 0.75 miles of connection track between the BNSF Stockton Subdivision and the UPRR Martinez Subdivision north of downtown Richmond. The Richmond Rail Connector would improve the efficiency and competitiveness of goods movement along the corridor by rerouting freight trains destined for the Port of Oakland onto the UPRR Martinez Subdivision rather than following the old route through the center of the Downtown Richmond. This would substantially reduce the number of slow moving trains traveling through the center of Richmond and would also relieve traffic congestion at nine at-grade crossings.[42]

Trackway

The Stockton Subdivision rail corridor, a single-track railroad with sidings approximately every 4 miles in the study area, features a 100-foot ROW. Trains operate at a maximum authorized speed of 45 mph (Class 3) between Richmond MP 1189.0 and Pinole MP 1180.9. The Richmond Rail Connector connects the BNSF Stockton Subdivision at Rheem (MP 1186.5) with the UPRR Martinez Subdivision via a 0.75 mile connector track located near the Richmond Parkway.. BNSF trains serving the Port of Oakland will use this connector rather than the old alignment, which impedes transit along streets in downtown Richmond. In the vicinity of North Bay (MP 1184.5) a 2,230-foot-long siding is used exclusively to switch trains in and out of a United Parcel Service (UPS) transload facility. Gateley (MP 1182.6), in the City of Pinole, is a 5,310-foot-long siding used exclusively to store empty UPS intermodal railcars from the transload facility. Continuing to the east, the rail corridor includes the 5,184-foot Collier Siding (MP 1179.1) and the 4,936-foot-long Christie Siding (MP 1176.0). The Christie Siding is also used to store empty intermodal cars from the UPS transload facility. East of the Christie Siding, trains enter the west portal of Tunnel #3 (between MP 1174.6 (see **Figure 3-4**) and 1173.5), exit the tunnel to enter the short but scenic Franklin Canyon, and exit the canyon through Tunnel #2 (MP 1171.4 and 1171.0). Upon exiting Tunnel #2, trains cross Alhambra Boulevard on a 1,680-foot-long steel bridge and then enter Tunnel #1 (Muir Tunnel) between MP 1170.5 and 1170.3. In Pinole (MP 1180.9), train speeds decrease to 35 mph due to track curvature until the Muir Tunnel (MP 1170.5) where train speeds return to 45 mph until Maltby (MP 1166.9), the location of the 3,456-foot-long Maltby Siding, where train speeds increase to 55 mph.

Signaling

The signaling system in the BNSF Stockton Subdivision uses Track Warrant Control (TWC). Under the TWC system, the train dispatcher communicates with train crews via radio, giving train crews permission to occupy certain segments of track for a period of time. Train crews

[42] Caltrans 2012, Richmond Rail Connector Initial Study with Proposed Mitigated Negative Declaration. September. www.dot.ca.gov/dist4/documents/richmond_rail/initial_study.pdf

copy the information on a Track Warrant form and repeat the information back to the train dispatcher to verify the instructions. Train crews communicate with the train dispatcher via radio to get authorization to operate on track segments before they can proceed onto a new segment and must relinquish the segments they previously occupied so they can be available by the next train. This system allows only one train to operate on a segment at a time.

To increase flexibility and traffic capacity, an automatic block signaling system (ABS) is also used in this segment. ABS is a signaling system that operates without external control from a train dispatcher. The system is able to detect whether a segment is occupied or otherwise obstructed. Together, these two systems to allow more trains to operate over a single track railroad and is much less expensive than CTC.[43]

Train Operations

Typically, BNSF operates an average of 14 freight trains per day on the Stockton Subdivision.[44] Freight trains vary in length and can be up 100 cars long and they operate at slower speeds than passenger trains. They take more time to operate over segments and thereby reduce the effective capacity of the railroad when mixed with passenger trains. On the BNSF Stockton Subdivision, train movements at the UPS facility receive priority over other train movements and can tie up the mainline for long periods of time. UPS pays a premium price to BNSF to operate its high-priority trains and has penalties for delays when the railroad fails to meet its scheduled delivery time. In order to meet these high performance standards, BNSF has implemented operating rules along the Stockton Subdivision that allow UPS train movements to have a higher priority on their mainline than most other trains. This practice, however, creates delays to the normal flow of freight traffic. These delays are not directly related to track capacity, but rather how the railroad chooses to utilize their track. Constructing a by-pass track around this area would eliminate this bottle neck. There are no passenger stations located in the BNSF Stockton Subdivision.

3.5 Pedestrian and Bicycle Network

A central element of successful transit is that its users can access it easily and safely, underlining the importance of multimodal connections to and from transit. All transit users are pedestrians at some point in their trip – whether walking from their point of trip origin or

[43] Automatic Block Signaling (ABS) is a railroad communications system that consists of a series of signals that divides a railroad into sections or "blocks." This system controls the movement of trains between blocks using an automatic signaling system. The automatic operation comes from the system's ability to detect if blocks are occupied or otherwise obstructed. This system operates without any outside intervention and contrast with more modern traffic control systems that require external control.

[44] RL Banks, 2015. BNSF did not return telephone requests and emails to obtain information on the Stockton Subdivision. However, for purposes of this evaluation, it was estimated that BNSF operates an average of 14 freight trains per day on the Stockton Subdivision.

walking from their car or transferring from a bus or train. Bicycle access is becoming increasingly important as more people choose this mode of travel to connect to transit services.[45] Additionally, Caltrans, MTC, and CCTA have adopted "routine accommodation" policies, which are based on Complete Streets principles. These policies generally require that new transportation projects consider the needs of pedestrians and bicyclists, which are discussed further below.[46] Complete Streets practices are guided by the principles that street design should accommodate safe access and functionality for all users. Given this context, it is important for any type of alternative involving high-capacity transit to consider pedestrian and bicycle access.

3.5.1 Caltrans Bicycle Policy

In October 2008, Caltrans issued a Deputy Directive related to Complete Streets, which included policy support for multimodal transportation and safety. The directive states: "The Department (Caltrans) views all transportation improvements as opportunities to improve safety, access, and mobility for all travelers in California and recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system. This directive was accompanied by a Complete Streets Implementation Plan, handbook, and training course to help municipalities learn about Complete Streets principles and implementation. [47, 48]

3.5.2 MTC Regional Bicycle Plan

In 2001 MTC published the Regional Bicycle Plan to document the region's bikeway network (primarily focusing on an inventory of bicycle and transit facilities) and funding sources. In 2009 MTC updated the plan. The plan states its principal goal is to "ensure that bicycling is a safe, convenient, and practical means of transportation and healthy recreation throughout the Bay Area, including in Priority Development Areas (PDAs); to reduce traffic congestion and risk of climate change; and to increase opportunities for physical activity to improve public health."

The plan noted that in addition to onboard access and bicycle parking, another aspect of bicycle-related transit planning considers the route a cyclist may take to reach transit stops and stations. Unlike the transit facilities and vehicles, local roads and pathways are largely controlled by cities and counties, not by transit operators. Therefore, safer and more convenient bicycle access to public transit facilities often requires the cooperation and coordination of multiple agencies.

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[45] CCTA, Contra Costa Countywide Bicycle and Pedestrian Plan, 2009, www.ccta.net/about/download/5297adc44d334.pdf

[46] Caltrans Deputy Directive 64, CCTA Countywide Transportation Plan Update March 2014,and MTC Resolution 3765

[47] Caltrans, Deputy Directive 64-R1, http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets_files/dd_64_r1_signed.pdf

[48] Caltrans, Complete Streets Program http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets.html

Figure 3-5 shows the network identified in the 2009 plan. The primary trail systems in West County are the regional Bay and Ridge Trails, both of which have substantial portions completed. It was estimated in 2009 that approximately 57 percent of the regional bikeway network in Contra Costa County was complete. This was the highest percentage completion rate, and was shared with Santa Clara and San Mateo counties.

Figure 3-5: MTC Regional Bicycle Plan Bikeway Network in West Contra Costa County

Source MTC 2009

At the time the plan was published, Contra Costa County had the lowest share of bicycle ridership of all counties in the Bay Area, comprising only 0.7 percent of all trips. The regional average was 1.5 percent of trips occurring by bicycle, with both San Francisco and Alameda County showing the highest share of bicycle trips at 2.1 percent. [49]

3.5.3 Countywide Bicycle and Pedestrian Plan

In 2009, CCTA updated its Countywide Bicycle and Pedestrian Plan. The update to the 2003 plan addressed the following:

- 2004 passage of Measure J, which funds transportation improvements, including bicycle and pedestrian facilities
- Changes to funding sources

[49] MTC Regional Bicycle Plan for the San Francisco Bay Area 2009 Update www.mtc.ca.gov/planning/bicyclespedestrians/MTC_Regional_Bicycle_Plan_Update_FINAL.pdf

- MTC's adoption of a "routine accommodation" policy stating the that new transportation project need to consider bicyclists and pedestrians with consideration for Complete Street principles[50]
- Increase in public support for non-motorized transportation

The plan found that large parts of the cities of El Cerrito, Richmond, and San Pablo contain transit-oriented suburbs with comfortable, pedestrian-sized scales, of which walking and transit access can be complementary.

The plan noted that population growth in the county doubled between 1940 and 1950, and again between 1950 and 1990. This resulted in suburbanization with greater segregation of land uses and necessitating the use of cars. The plan found that these development patterns make adapting streets and neighborhoods to accommodate bicyclists and pedestrians challenging.

The plan noted that, consistent with the Bay Area and the rest of the country, pedestrians and bicyclists represent a disproportionate number of the transportation-related fatalities in the county and that when adjusted for population, two of the four cities (El Cerrito and San Pablo) with the highest annual number of bicycle injuries and the city with the lowest injury rates (Hercules) are in the West County. The three jurisdictions with the highest annual number of pedestrian injuries are all in the West County (El Cerrito, San Pablo, and Richmond). However, the plan noted that these numbers were not adjusted for the total number of bicycle or pedestrian trips in each jurisdiction to account for exposure and that the information remains unavailable.

The plan identified the following policy-type statements developed by or for the county related to the West County area:

- Increase bicycle and pedestrian mode splits to 3 percent for commute trips by 2012
- Continue planning and funding of bicycle and pedestrian routes
- Promote ridesharing, transit, bicycling, walking, staggered work hours, and telecommuting with local employers
- Develop a bicycle and/or pedestrian plan for West County
- Work with CCTA and MTC to seek funding for bicycle and pedestrian improvements
- Continue compliance with the Americans with Disabilities Act for pedestrians (e.g., improvements for the visually impaired)
- Prepare a needs assessment of the sidewalk and bicycle facilities along school routes

[50] MTC, Resolution No. 3765, June 9, 2006

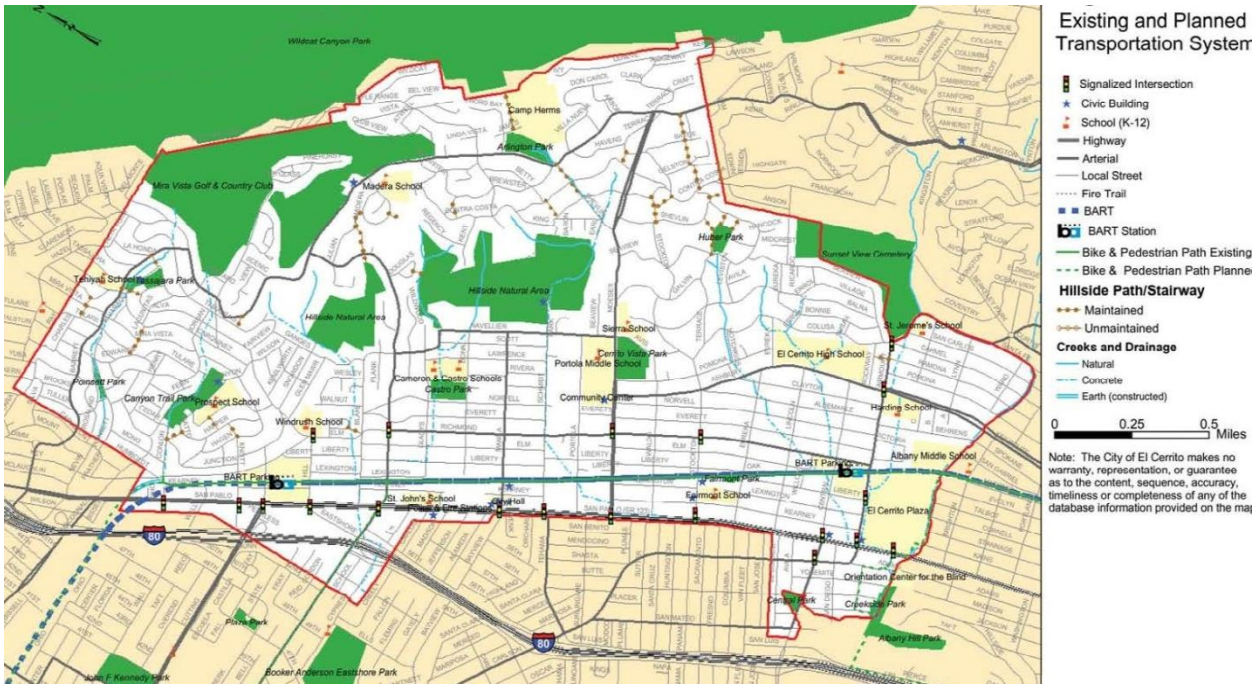
- Work with schools, districts, and Caltrans to seek Safe Routes to School grant funding
- Support Street Smarts, Safe Routes to School, and Safe Routes to Transit programs

3.5.4 El Cerrito Circulation Plan for Bicyclists and Pedestrians

The City of El Cerrito is the only city in the Study Area with its own circulation plan for bicyclists and pedestrians, which is shown in **Figure 3-6**. In 2007, the El Cerrito City Council adopted the Circulation Plan for Bicyclists and Pedestrians. The plan sought to:

- Identify and address the transportation needs of El Cerrito residents and visitors while taking into account the diverse population and other social, economic, and environmental factors
- Outline a comprehensive Circulation Plan that reflects local and regional policies, projects, and priorities
- Establish short- and long-term priorities that will guide future investments and improvements for bicyclists, pedestrians, and the disabled

Figure 3-6: El Cerrito Existing and Planned Transportation System



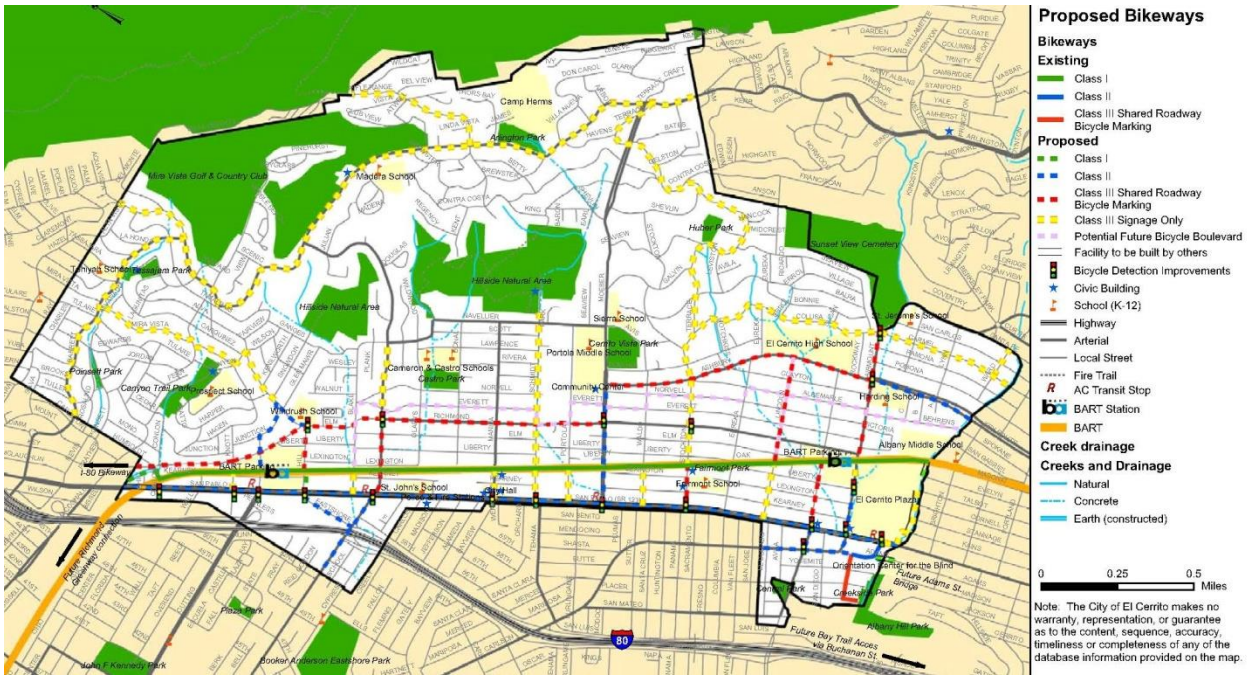
Source: El Cerrito Circulation Plan (2007)

The plan found that due to the close proximity to both I-80 and I-580, regional traffic congestion has a spillover effect on El Cerrito's major and minor arterials, such as San Pablo Avenue, Arlington Boulevard, Central Avenue, Potrero Avenue, and Cutting Boulevard.

Additionally, the plan noted that speeding and cut-through traffic are a problem within the city.

The plan identified the Ohlone Greenway, located beneath the elevated BART tracks, as the only existing designated bicycle and pedestrian facility in El Cerrito. An extension of the Ohlone Greenway, known as the Baxter Creek Gateway Restoration, was completed in 2006. This project, located in northern El Cerrito, extended the mixed-use path from its current terminus at Conlon Avenue north to San Pablo Avenue. The City of Richmond's Richmond Greenway project will connect the Ohlone Greenway to the Bay Trail. At the time the plan was adopted, Phases I and II of the Richmond Greenway were in the final planning phases. Phase III, identified as a trail alignment through the I-80 underpass and a yet-to-be-determined path across private land to a mid-block crossing on San Pablo Avenue, was being developed to connect to the Baxter Creek Gateway extension. **Figure 3-7** identifies existing and proposed bikeways in El Cerrito.

Figure 3-7: El Cerrito Existing and Proposed Bikeways



Source: El Cerrito Circulation Plan (2007)

Pedestrian paths and fire trails cross El Cerrito park areas, including the Hillside Natural Areas, Canyon Trail Park, and Huber Park. Additionally, El Cerrito owns ROW for more than 25 hillside paths or stairways but maintains only seven of the paths.[51]

[51] El Cerrito 2007 Circulation Plan for Bicyclists and Pedestrians http://el-cerrito.org/DocumentCenter/Home/View/801

3.6 Highways and Major Roads

Four highways run through West Contra Costa County. They include I-80, I-580, and State Routes (SR) 4 and 123. The first three are controlled-access highways. The fourth, SR-123 or San Pablo Avenue, has a state highway designation in El Cerrito and Richmond, but continues north through Hercules to Crockett. San Pablo Avenue functions more like a boulevard, running north/south over 12 miles through the Study Area and is the one continuous roadway that serves as an alternative to I-80. All of these roadways are further described below.

3.6.1 Interstate 80

I-80 is a major east-west freeway connecting San Francisco and Sacramento, which crosses over the San Francisco-Oakland Bay and Carquinez bridges. Within the study segment, I-80 carries three mixed-flow lanes in each direction and one high-occupancy vehicle (HOV) lane in each direction between the Alameda County – Contra Costa County line and the Carquinez Bridge.[52] The existing HOV lanes operate from Monday through Friday during the most congested peak periods (5 AM to 10 AM and 3 PM to 7 PM). Use of the HOV lanes is limited to vehicles with three or more people. I-80 is designated as a Surface Transportation Assistance Act (STAA) National Network Route and a High Emphasis Route.[53] There are direct HOV ramps at Cutting Boulevard and Richmond Parkway on I-80, which facilitate access to the El Cerrito del Norte BART station and the Richmond Parkway Transit Center, respectively.

The West Contra Costa County segment of I-80 has 18 interchanges and three additional street crossings.[54] Auxiliary lanes are provided at selected interchanges between on-ramps and off-ramps. The interchanges (street undercrossings and overcrossings) are listed below:

- Central Avenue Undercrossing
- Carlson Boulevard Undercrossing
- Potrero Avenue Undercrossing
- Cutting Boulevard Undercrossing
- MacDonald Avenue Undercrossing
- Barrett Avenue Undercrossing
- San Pablo Avenue (SR-123) Undercrossing

[52] 2013 Bay Area Managed Lane Report, Caltrans District 4 Office Of Highway Operations, 2013

[53] The 1982 STAA allows certain longer trucks called “STAA” trucks to operate on the National Network. After the STAA was enacted, Caltrans evaluated State Routes for STAA truck access and created Terminal Access and Service Access routes which, together with the National Network, are called the STAA National Network. A “High Emphasis Inter-regional Route System Route” represents a route that has high inter-regional importance from a statewide perspective. National Highway System Interstates included in this category are critically important to interregional travel and provide access to seaports, airports, rail yards, and national/international markets.

[54] 2002 California State Highway Log, District 4, Caltrans, 2002; California Log of Bridges on State Highways, Caltrans, January 2013.

- Solano Avenue Overcrossing
- McBryde Avenue Overcrossing
- San Pablo Dam Road Overcrossing
- El Portal Drive Undercrossing
- Hilltop Drive Overcrossing
- Richmond Parkway/Fitzgerald Drive Overcrossing
- Appian Way Overcrossing
- Pinole Valley Undercrossing
- SR-4 Interchange
- Willow Avenue Undercrossing
- Cummings Skyway Overcrossing

The road overcrossings and undercrossings, which are in the vicinity of the Union Oil Company at Rodeo, are listed below. These roads do not provide access to the freeway.

- California Street Overcrossing
- Union Oil Company Q Street Undercrossing
- Union Oil Company Road No. 8 Overcrossing

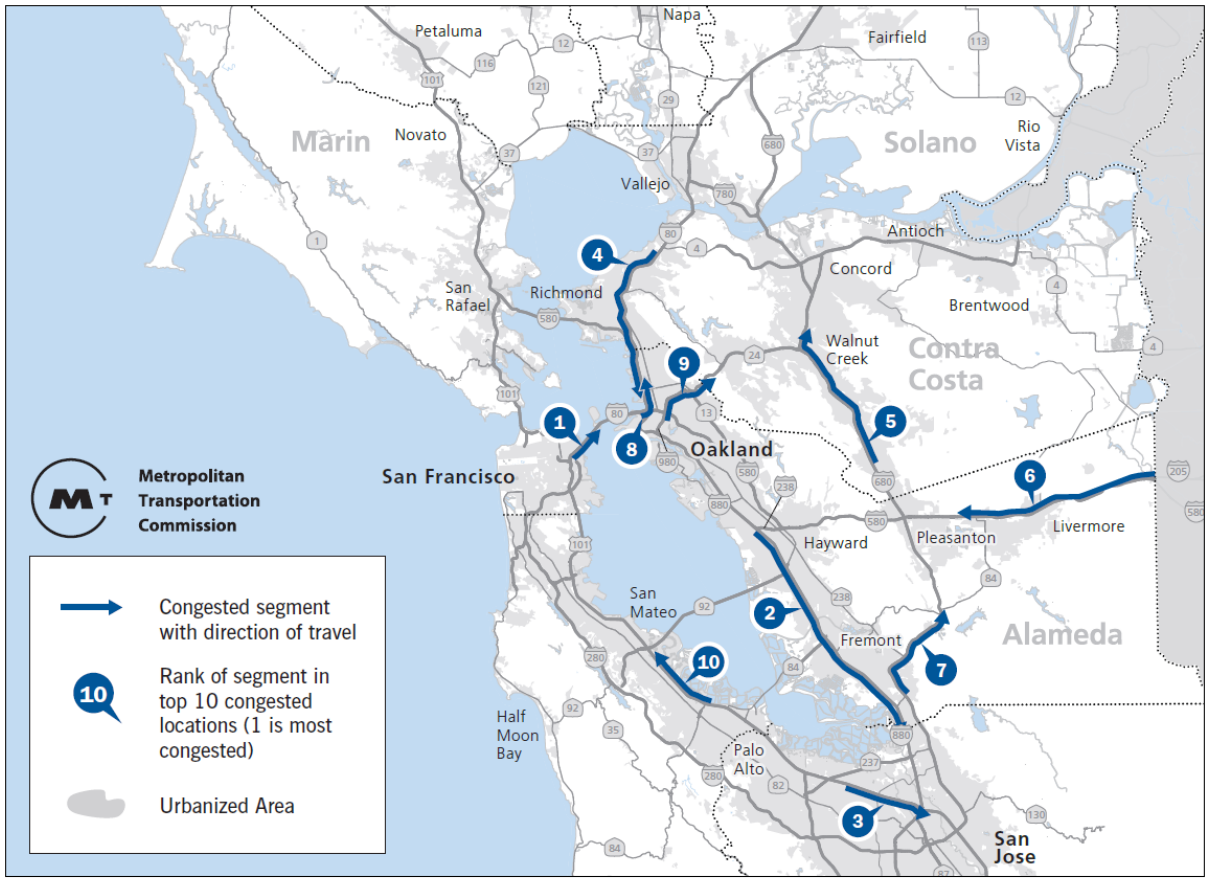
I-80 operates at capacity during peak commute hours and, according to the MTC, this section of I-80 ranked as the fourth-most congested section of freeway within the Bay Area in 2013. As shown in **Figure 3-8**, the length of freeway segment from SR-4 to the Alameda–Contra Costa county line experiences congestion, with approximately 5,000 vehicle hours of delay on an average weekday. **Table 3-5** summarizes 2013 traffic volumes on this segment of I-80. The Caltrans 2012 Mobility Report also identified major bottlenecks on I-80 in the vicinity of San Pablo and just north of the Alameda–Contra Costa County line in Richmond and El Cerrito.[55]

In 2014, the Contra Costa Transportation Authority projected that the PM peak hour traffic volumes on I-80 (in Richmond, just north of I-580) would increase by approximately 22 percent between 2010 and 2040. The increase in freeway demand is largely due to household and employment growth within Contra Costa County. The population in West County is expected to grow by approximately 29 percent and employment by approximately 36 percent during the same period. This is compared to 28 percent population growth and 37 percent employment growth countywide.[56]

[55] Caltrans Mobility Performance Statistics, Caltrans, 2012

[56] Countywide Comprehensive Transportation Plan Update Volume 1, Draft for Public Review, Contra Costa Transportation Authority, 2014

Figure 3-8: San Francisco Bay Area Freeway Locations with Most Delay during Commute Hours in 2013



2013 Rank	Location	2013 Daily (Weekday) Vehicle Hours of Delay	2008 Rank
1	**Interstate 80, eastbound, p.m.** — San Francisco County *US-101 to east of Treasure Island Tunnel*	6,900	8
2	**Interstate 880, southbound, a.m.** — Alameda County *I-238 to Dixon Landing Road*	5,600	22
3	**U.S. 101, southbound p.m.** — Santa Clara County *Fair Oaks Avenue to 13th Street/Oakland Road*	5,500	7
4	**Interstate 80, westbound, a.m.** — Alameda and Contra Costa Counties *West of CA-4 to Powell Street*	5,000	1
5	**Interstate 680, northbound, p.m.** — Contra Costa County *Bollinger Canyon Road to Treat Boulevard*	4,200	13
6	**Interstate 580, westbound, a.m.** — Alameda County *San Joaquin County line to Fallon Road*	4,000	6
7	**Interstate 680, northbound, p.m.** — Alameda County *CA-262/Mission Boulevard to CA-84*	3,800	31
8	**Interstate 80, eastbound, p.m.** — Alameda County *W Grand Avenue to Gilman Street*	3,100	8
9	**Highway 24, eastbound, p.m.** — Alameda and Contra Costa counties *27th Street to Wilder Road*	2,900	15
10	**U.S. 101, northbound, p.m.** — San Mateo County *Woodside Road to Hillsdale Boulevard*	2,800	16

Source: Metropolitan Transportation Commission

Rankings are for routes in which continuous stop-and-go conditions occur with few, if any, breaks in the queue. Thus, corridors that have equally severe delays but where congestion is broken into several segments may rank lower in this type of congestion listing. Similarly, the length of congested corridors in 2013 may be longer or shorter than those identified in the 2008 report.

Table 3-5: 2013 Traffic Volumes

Post Mile	Location	Average Daily Traffic
0	Alameda/Contra Costa County Line	
0.216	Central Avenue (Richmond)	172,000
1	Carlson Boulevard (Richmond)	175,000
1.671	Potrero Avenue (El Cerrito)	183,000
2.04	Jct. SR-123 South (Richmond)	169,000
2.619	Macdonald Avenue (Richmond)	195,000
2.961	San Pablo Avenue (Richmond)	192,000
3.411	Solano Avenue (Richmond)	198,000
3.795	McBryde Avenue (Richmond)	188,000
4.341	San Pablo Dam Road (San Pablo)	195,000
5.246	El Portal Drive (Richmond)	186,000
5.983	Hilltop Drive (Richmond)	188,000
6.6	Richmond Parkway (Richmond)	173,000
7.597	Appian Way (Pinole)	181,000
8.508	Pinole Valley Road (Pinole)	185,000
10.059	Jct. SR-4 East (Hercules)	170,000
10.685	Willow Avenue (Hercules)	118,000
12.753	Cummings Skyway (Crockett)	110,000
13.489	Crockett	112,000
14.139	Carquinez Bridge, CC/SOL County Line	109,000

Source: 2013 All Traffic Volumes on California State Highway System, Traffic Data Branch, Caltrans

As a result of the projected traffic growth, average vehicle travel speed will be reduced while average vehicle delay will increase. Table 3-6 and **Table 3-7** summarize the existing and projected average vehicle travel speed and vehicle delay, respectively, as analyzed in the 2010 I-80 Corridor System Management Plan (CSMP). Vehicle delay is reported as vehicle-hours of delay by all travelers over the peak AM and PM period.[57] According to I-80 CSMP, peak hours of delay occur during the morning period between 6:00 AM and 10:00 AM, and in the afternoon between 2:00 PM and 7:00 PM.

[57] Vehicle delay is defined as the difference between the observed travel time and the expected travel time under a specified traffic condition such as 35 mph, which Caltrans uses to define congested conditions for freeways. The delay relative to 35 mph is used and is reported as vehicle-hours of delays in the I-80 CSMP study.

Table 3-6: Existing and Projected Average Vehicle Travel Speed

	2005				2035			
	Average Vehicle Speed (mph)				Average Vehicle Speed (mph)			
	Eastbound		Westbound		Eastbound		Westbound	
Location	AM	PM	AM	PM	AM	PM	AM	PM
I-80 between Bay Bridge and Central Avenue	44	30	34	43	31	18	20	30
I-80 between Central Avenue and SR-4	60	32	33	51	45	21	18	43
I-80 between SR-4 and Carquinez Bridge	62	24	28	64	29	18	16	59

Source: I-80 CSMP, Alameda County Congestion Management Agency, November 2010

Table 3-7: Existing and Projected Vehicle Hours of Delay

	2005				2035			
	Average Delay (Hours)				Average Delay (Hours)			
	Eastbound		Westbound		Eastbound		Westbound	
Location	AM	PM	AM	PM	AM	PM	AM	PM
I-80 between Bay Bridge and Central Avenue	201	690	560	227	596	1,793	1,698	678
I-80 between Central Avenue and SR-4	23	995	978	168	319	2,504	3,221	399
I-80 between SR-4 and Carquinez Bridge	1	673	598	3	380	1,298	1,756	32

Source: I-80 Corridor System Management Plan, Alameda County Congestion Management Agency, November 2010

3.6.2 Interstate 580

I-580, designated as a STAA National Network Route and a High Emphasis Route connecting the Bay Area and Central Valley. I-580 runs in an east-west direction from the Interstate 205 (I-205) interchange near the San Joaquin–Alameda county lines to the Interstate 238 (I-238) junction in Castro Valley. At the I-580/I-238 split, I-580 travels northwesterly and merges with I-80 for approximately 4.4 miles from Emeryville to Albany. It then continues across the Bay as the Richmond-San Rafael Bridge and terminates in San Rafael at the junction of Highway 101, Marin County. It has three travel lanes in each direction through most of West Contra Costa County. There are 10 interchanges on I-580 in the Study Area as listed below. In addition, there are three grade-separated road crossings as noted.

- Stenmark Drive Undercrossing
- Castro Street Undercrossing
- Canal Boulevard Overcrossing
- Cutting Boulevard Overcrossing

- Harbour Way South Overcrossing
- Marina Way South Overcrossing
- South 23rd Street Overcrossing
- Regatta Boulevard Overcrossing
- Bayview Avenue Overcrossing
- Central Avenue Overcrossing

The following additional grade-separated crossings do not have access to the freeway:

- Marine Street Undercrossing
- South Garrard Boulevard
- South Second Street

I-580 also crosses over railroad tracks in multiple locations, including the southern end of the rail yard in Richmond, just to the west of South Garrard Boulevard.

Currently, I-580 does not contain HOV lanes in the Study Area. Westbound traffic during evening commute hours on I-580 between I-80 and the Richmond-San Rafael Bridge typically does not exhibit much congestion. However, the westbound direction near the Richmond-San Rafael Bridge during the morning peak period and eastbound traffic coming from the bridge in the evening to the Richmond Parkway exit exhibit localized traffic congestion. [58] Caltrans District 4's Corridor Study Management Plan (CSMP) does not require congestion monitoring on the segment of I-580 corridor west of I-80 in Contra Costa County.

3.6.3 State Route 4

The SR-4 corridor, functionally classified as an Urban Principal Arterial from San Pablo Avenue to Cummings Skyway and as an Expressway-Freeway east of Cummings Skyway, provides interregional connections between the Bay Area and Central Valley. The route begins west of I-80 at the intersection of San Pablo Avenue and John Muir Parkway where it becomes a limited access route to the east. It runs easterly to the Central Valley through Interstate 680 (I-680) in Vine Hill and SR 160 in Antioch. The segment of SR-4 between the I-80 junction in the west and Alhambra Avenue in the east is generally a four-lane facility with two lanes in each direction separated by a wide landscaped median, and characterized by rolling terrain surrounded by open fields. There are no HOV lanes located within the Study Area. Between San Pablo Avenue and Alhambra Avenue, SR-4 connects to the arterial network at the following eight interchanges:

- I-80 Interchange
- Willow Avenue Overcrossing
- Claeys Lane/Sycamore Avenue Overcrossing

[58] Caltrans Mobility Performance Statistics, Caltrans, 2012.

- Franklin Canyon Road Undercrossing
- Christie Road
- Cummings Skyway/Barry Hill Road Overcrossing
- McEwen Road Undercrossing
- Alhambra Avenue Undercrossing

There is also an underpass of the BNSF railroad between the Willow Avenue and Sycamore Avenue interchanges, and there are grade-separated recreational crossings with no freeway access at the following locations

- West Fire Trail Undercrossing
- East Fire Trail Undercrossing
- Franklin Equip Undercrossing
- John Muir Equestrian Trail Undercrossing

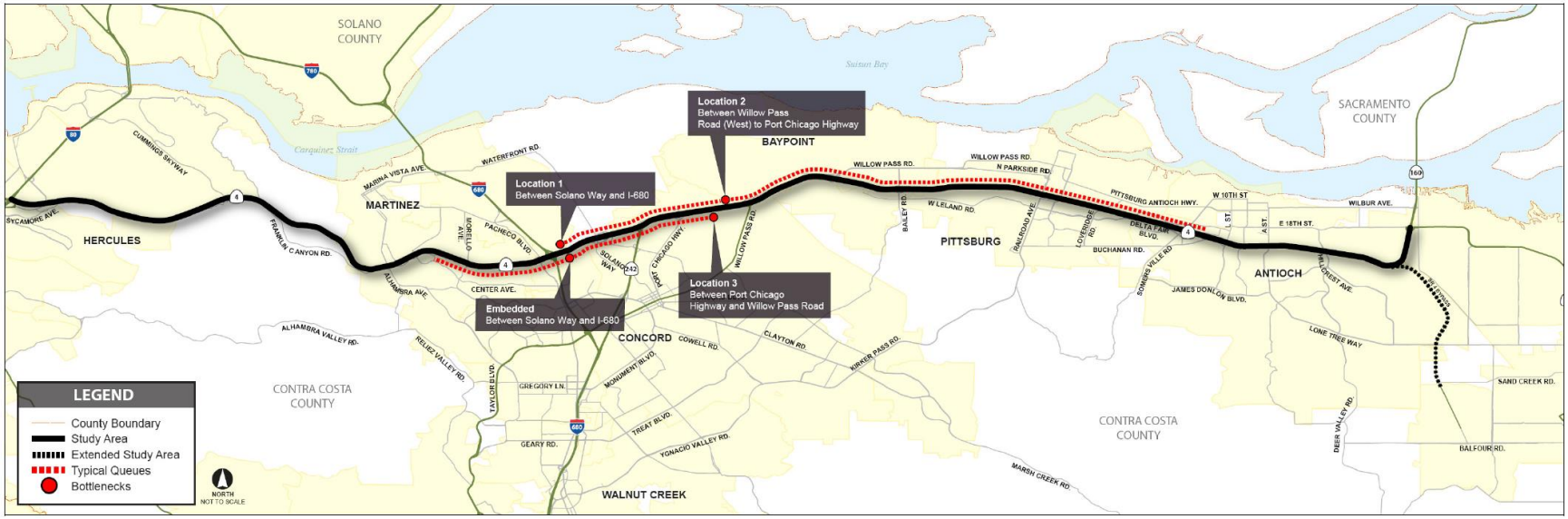
Caltrans conducted a comprehensive Corridor Performance Assessment to evaluate the existing and future freeway performance as part of the SR-4 CSMP in 2010.[59] The results of the assessment indicate that insufficient roadway capacity and merging traffic cause existing traffic congestion and bottlenecks at the following locations:[60]

- Eastbound and westbound SR-4 from Somerville Road to Loveridge Road
- Westbound SR-4 from Willow Pass Road to Port Chicago Highway
- Eastbound SR-4 from SR-242 to Port Chicago Highway
- Eastbound SR-4 from I-680 to Solano Way

Although the current congestion is outside the project study limits, the eastbound traffic queue is projected to extend from Willow Pass Road to I-80 for future 2030 conditions. To the east of I-80, eastbound traffic is expected to increase by about 59 percent in the PM peak and by about 43 percent westbound in the AM peak. The CSMP recommends the implementation of transportation management and capacity enhancement strategies on eastbound SR-4 between I-80 and SR 160 in Antioch to address long-term (2030) traffic needs. **Figure 3-9** and **Figure 3-10** depict the locations of recurrent congestion projected on SR-4 in 2015 and 2030, respectively. **Figure 3-11** shows existing and projected traffic volumes for various SR-4 segments.

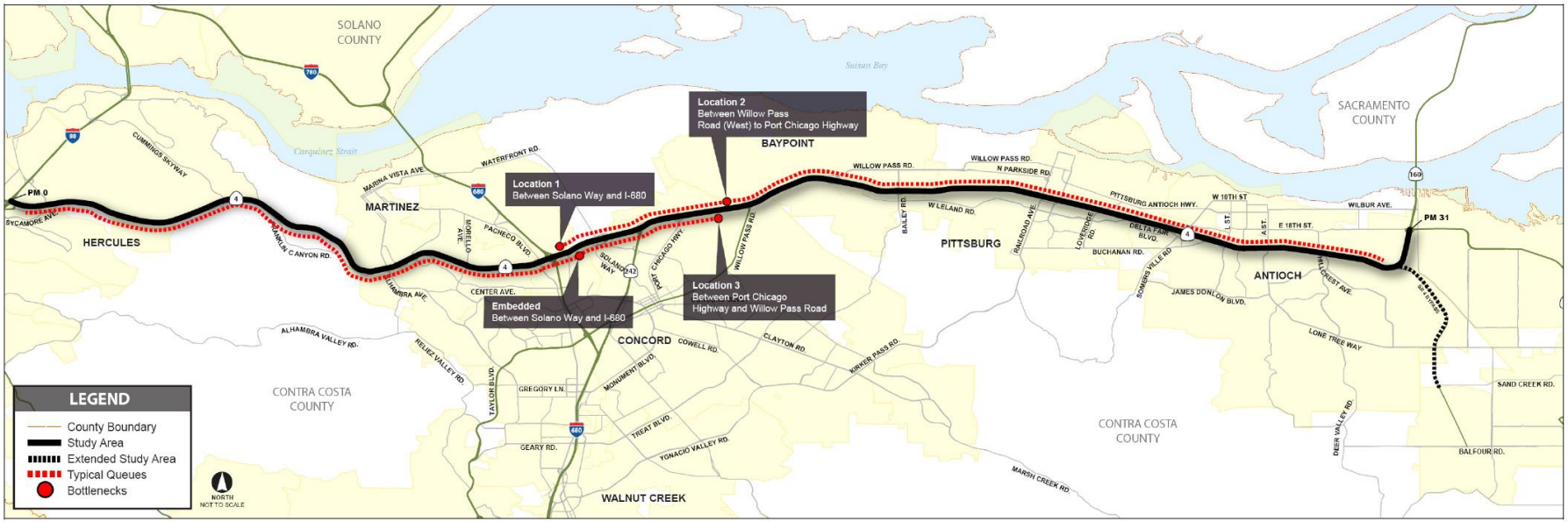
[59] Source State Route 4 Corridor System Management Plan October 2010, District 4, Caltrans
[60] The traffic study for existing condition is based on 2008 data

Figure 3-9: Location of Recurrent Congestion on SR-4 in 2015



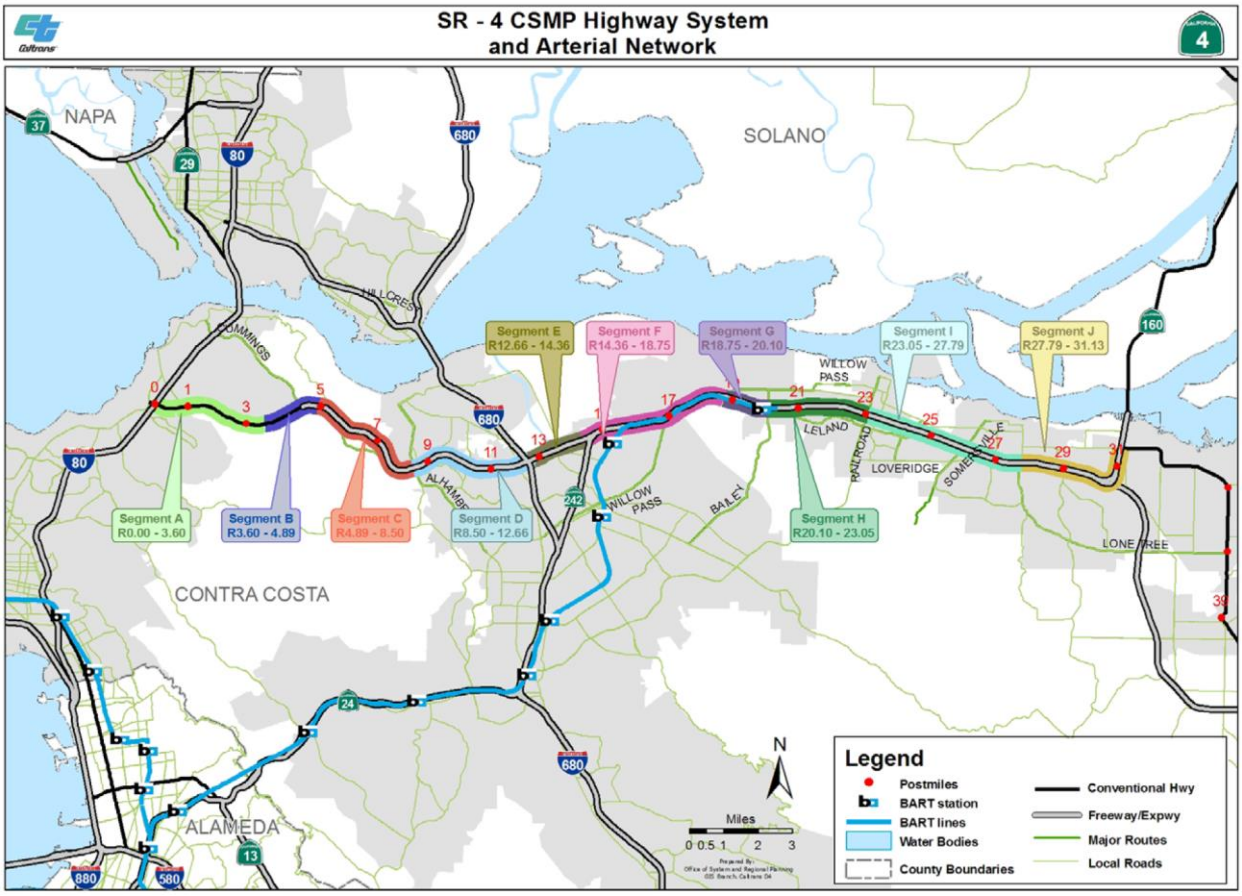
Source: Caltrans, SR-4 CSMP, October 2010

Figure 3-10. Location of Recurrent Congestion on SR-4 in 2030



Source: Caltrans, SR-4 CSMP, October 2010

Figure 3-11: Existing and Projected SR-4 Traffic Volumes by Segment



CSMP Segment	CO/RTE/PM	Vehicle Hours of Delay (VHD) (AM/PM)		EB PM Peak-Volumes		WB AM Peak Volumes		AADT (2007)	2008 Truck %	Accident Rate (Actual/ Statewide Average)		HOV	Aux	Bottleneck Location (AM/PM)	
		AM	PM	2007	2030	2007	2030			Actual	Avg			EB	WB
A	CC-4 0.00 -3.60			2,128	3,402	1,574	2,253	38,000	6.23	0.26	0.46				
B	CC-4 3.60-4.89			2,128	3,402	1,574	2,253	44,000	6.23	0.19	0.22				
C	CC-4-4.89-8.50			2,309	3,071	1,761	2,364	49,000	6.23	0.17	0.19				
D	CC-4-8.50-12.66			3,797	5,049	3,547	5,935	65,000	5.09	0.28	0.25		X		
E	CC-4-12.66-14.36			4,110	5,495	4,877	8,410	86,000	6.76	0.30	0.28	X	X		
F	CC-4-14.36-18.75	1,566 (WB)	318 (EB)	7,828	9,475	8,327	11,359	90,000	5.17	0.25	0.29	X		PM	AM
G	CC-4-18.75-20.10			6,424	8,253	6,637	9,750	142,000	5.52	0.25	0.31	X	X		
H	CC-4-20.10-23.05			5,474	7,471	5,578	9,201	131,000	4.60	0.34	0.37	X	X		
I	CC-4-23.05-27.79	2,470 (WB)	2,064 (EB)	4,311	7,674	4,976	8,946	114,000	4.60	0.46	0.46			PM	AM
J	CC-4-27.79-31.13			4,208	7,674	2,715	5,652	82,000	5.37	0.29	0.29				

Source: Caltrans, SR-4 CSMP, October 2010

3.6.4 San Pablo Avenue (SR-123)

San Pablo Avenue (also designated as SR-123 south of Cutting Boulevard) is a north–south principal arterial running from I-580 in Oakland to the I-80 freeway in Crockett. The section south of Cutting Boulevard designated as SR-123 is part of the Federal Aid Urban System.

Within the Study Area, San Pablo Avenue includes approximately 16 miles of predominantly four-lane roadway with median and turn lanes at select locations. It runs through West County from the Alameda-Contra Costa county line to Willow Road in San Pablo where it follows Parker Avenue for a short distance before once again becoming San Pablo Avenue. It continues as San Pablo Avenue all the way to I-80 in Crockett, just south of the Carquinez Bridge.

San Pablo Avenue serves all of the communities along the West County/I-80 corridor, but the design treatment varies along the route. In El Cerrito and Richmond, San Pablo Avenue functions as a major business corridor, providing sidewalks and local access to businesses and residences. At Robert Miller Drive in Richmond, it transitions to more of a limited access roadway and continues as such until approximately Richmond Parkway. In Pinole, San Pablo Avenue serves as a major arterial providing access to local businesses and residential areas. At Hercules Avenue in Hercules, San Pablo Avenue again transitions to a more limited access roadway until Parker Avenue in Rodeo, where it functions as the main street through the core of the city. As San Pablo Avenue continues through Rodeo and Crockett, it narrows to a four-lane undivided roadway with no shoulders or sidewalks. It primarily serves the oil refineries industrial area until it reaches Crockett and terminates at the San Pablo Street/Merchant Street/Pomona Street intersection where it transitions to Pomona Street in Crockett.

4 ANTICIPATED FUTURE CONDITIONS

The proposed transit improvements are summarized below and depicted on **Figure 4-1**.

4.1 Future High-Capacity Transit Improvement Projects

An array of high-capacity transit improvements are being considered for West Contra Costa County. These improvements range from enhancements to existing service to the provision of new modes of transportation, such as ferry service or diesel multiple unit (DMU) rail lines. While the ideas are diverse, many of them are still in the early planning phases, and much needs to be accomplished to get any one of them further along in the project development process, including securing funding. The projects described below are the most recently discussed high-capacity transit initiatives that could be implemented in West County.

4.1.1 Bus Service Enhancements and Bus Rapid Transit on San Pablo and Macdonald Avenues

AC Transit is currently preparing a Major Corridors Study that is looking at capital improvements for its highest-ridership corridors for the short-term (2020) and long-term (2040) horizon. One of these corridors is the San Pablo Avenue/Macdonald Avenue corridor, which extends north from Jack London Square to West County, with one branch serving Richmond (Line 72M) and another branch serving San Pablo (Lines 72, 72R) (see **Figure 4-2**). Currently, AC Transit is considering extending Lines 72 and/or 72R farther north to improve connectivity with WestCAT buses. The District is also considering Rapid Bus upgrades to this corridor to be implemented by 2020 and bus rapid transit implementation for 2040.[61]

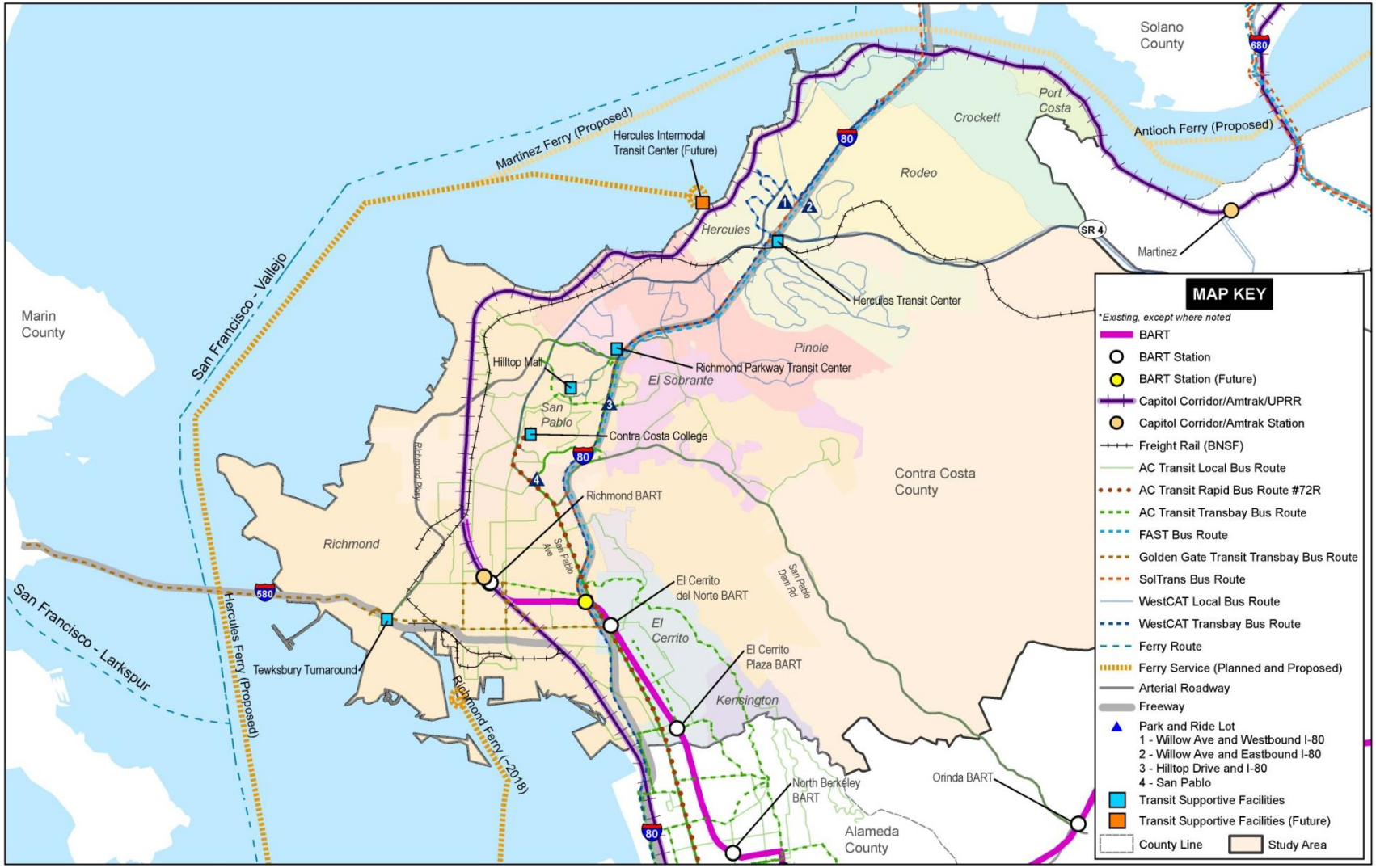
AC Transit is also in the process of developing the Service Expansion Plan (formerly called Comprehensive Operations Analysis) to identify core strengths and new opportunities to improve routes and schedules. Initial recommendations were presented at a public hearing before AC Transit's Board of Directors in November 2015 and an initial vote on the service plan recommendations will take place in January 2016.

4.1.2 BART Service Enhancements or Expansions

Currently under development, BART's Vision Plan is intended to be a comprehensive look at the next round of BART investments, weighing improvements to the existing core system, state of good repair, and potential new service extensions. Three potential projects in the Study Area were identified in the draft Vision Plan, including an Eastshore/Capitol Corridor overlay of DMU rail service from the Lake Merritt BART station to the Richmond BART station along the East Bay shoreline and continuing north to Hercules (**Figure 4-3**); wBART expansion, which is a proposal to extend BART service along the I-80 corridor in West Contra Costa County to San Pablo, Hilltop, Pinole, and Hercules using alternative technology (e.g., DMU or EMU) (**Figure 4-4**); and an infill BART station on I-80 between the existing El Cerrito del Norte and Richmond BART stations (**Figure 4-5**).[62] These two identified potential extensions of the BART system are consistent with the 2003 Contra Costa-Solano Rail Feasibility Study conducted by BART. These two alignments were identified as the most logical alignments for a future extension of the BART system from the Richmond BART station using DMU technology. They extended to Hercules either along the existing UPRR or BNSF corridors, to a proposed Capitol Corridor station at Hercules or the Hercules Transit Center east of I-80, respectively. This recommendation does not include the extension to Vallejo as included in the previous study.[63]

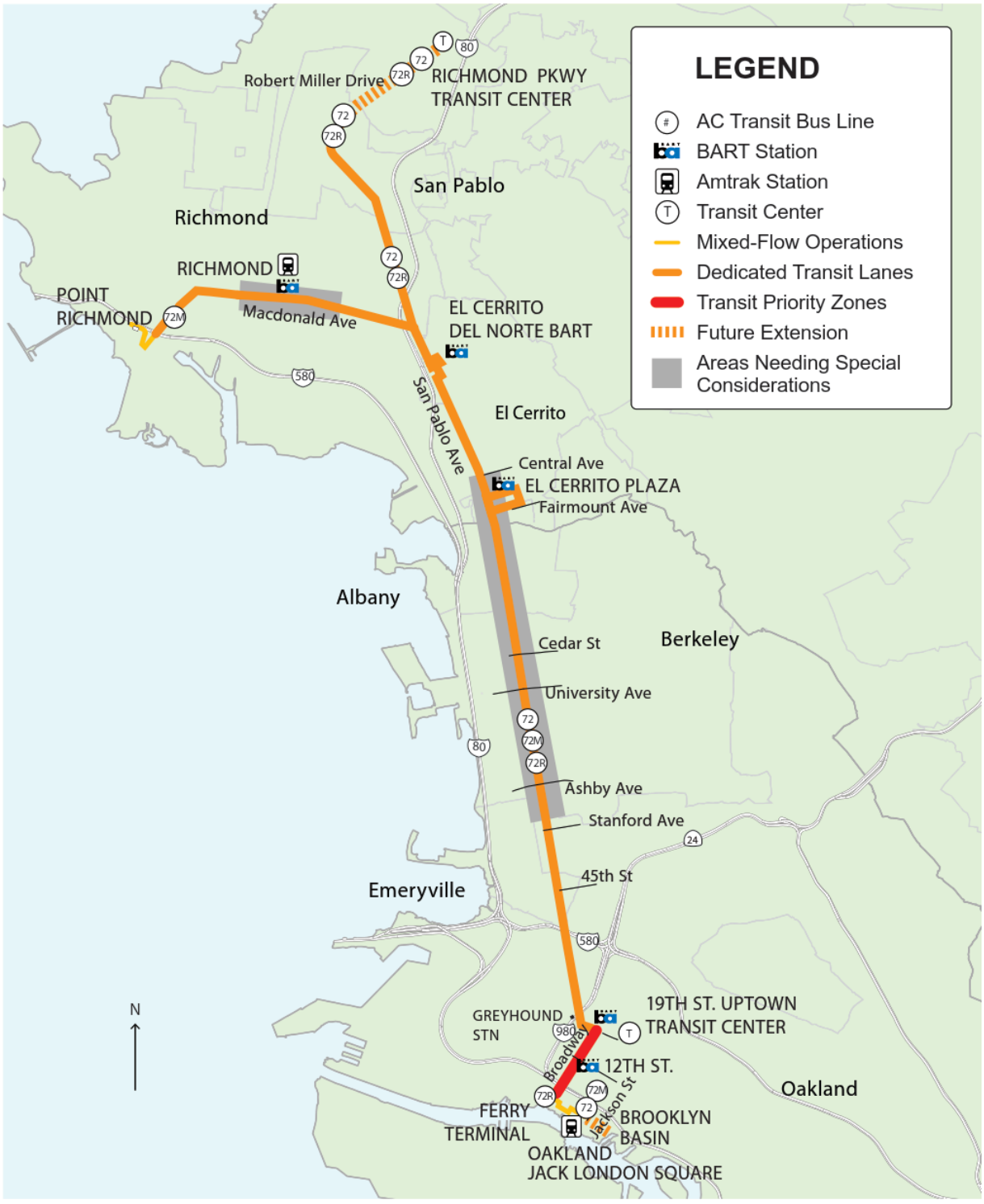
[61] AC Transit, Major Corridors Study, http://www.actransit.org/planact/major-corridors-study/
[62] BART 2014. BART Vision Update Presentation to the BART Board
[63] BART, Contra Costa-Solano Rail Feasibility Study, 2003

Figure 4-1: Future Transit Network



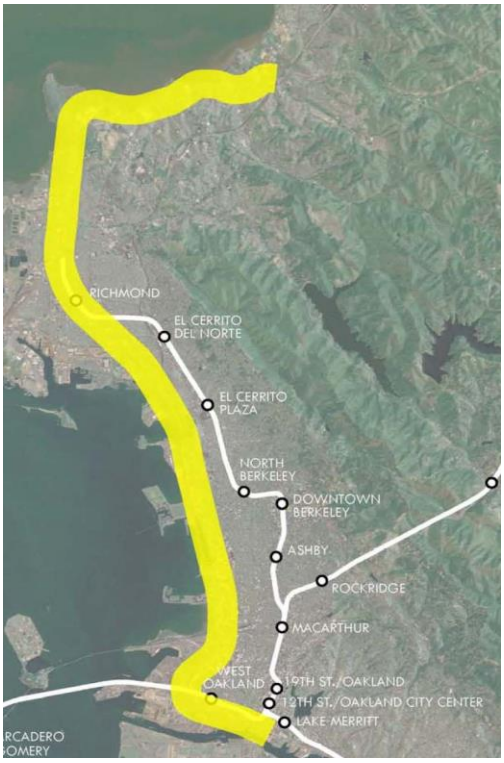
Source: WSP | Parsons Brinckerhoff and Kimley-Horn, 2015

Figure 4-2: AC Transit's Proposed Improvements on San Pablo Avenue Corridor



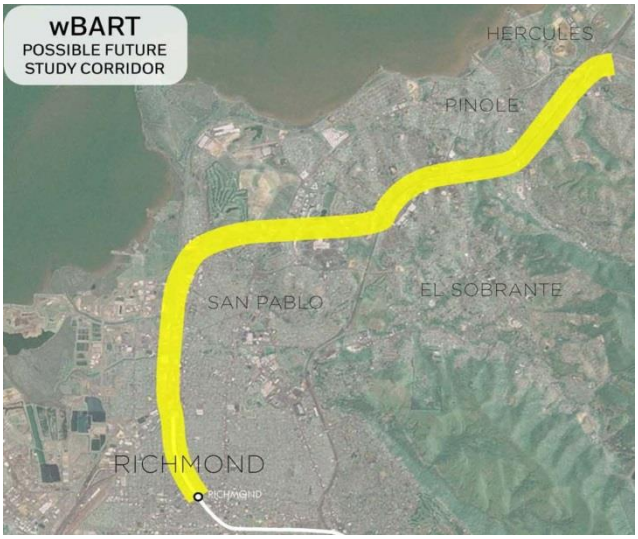
Source: AC Transit, Major Corridors Study, 2015

Figure 4-3: Possible Future Study Corridor for Eastshore DMU



Source: BART 2014. BART Vision Update Presentation to the BART Board

Figure 4-4: wBART Possible Future Study Corridor



Source: BART 2014. BART Vision Update Presentation to the BART Board

Figure 4-5: Possible Infill Future BART Station

Source: BART 2014. BART Vision Update Presentation to the BART Board

The BART Vision is a concept-level document that is meant to weigh core capacity improvements with service expansion. While BART has no definitive plans to move forward with these projects at this time, they are included to illustrate BART's long-term vision.

4.1.3 Capitol Corridor/Amtrak Service Enhancements or Expansions

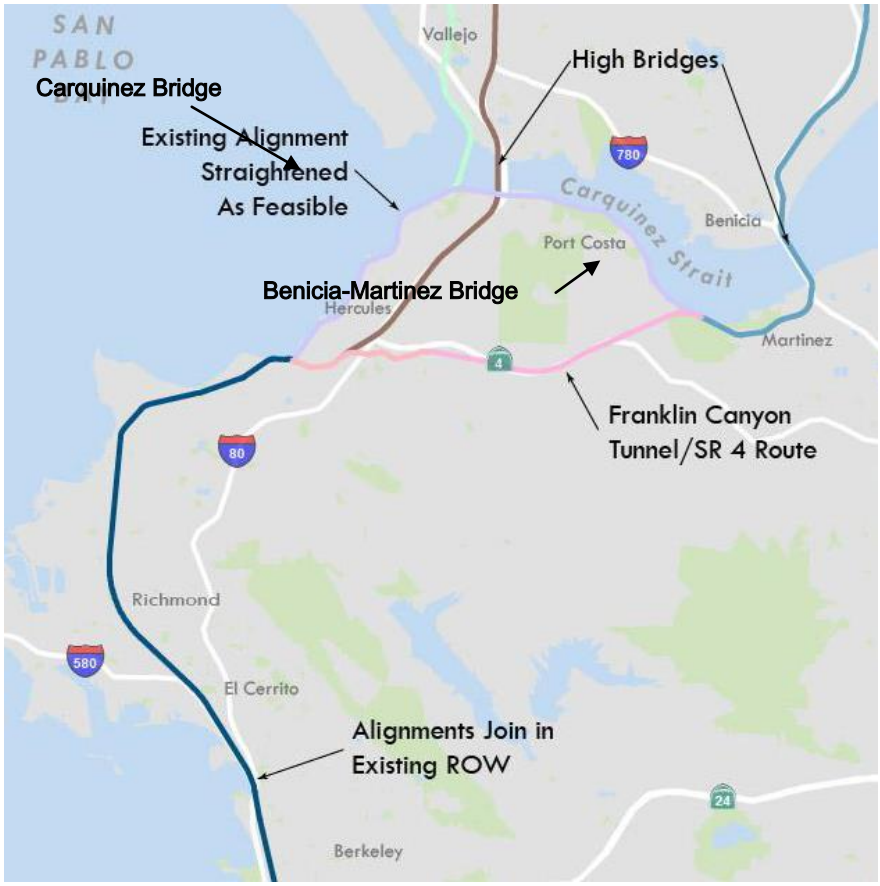
Long-term investments in the Study Area identified in CCJPA's Capitol Corridor Vision Plan primarily involve service expansion, including speeding up transit times and protecting the system from sea-level rise. These long-term alternatives include improving the existing alignment in West County by flattening the curves or providing new service at the Hercules Transit Center via the BNSF alignment and continuing north along the I-80 alignment and crossing over the Carquinez Strait near the Carquinez Bridge or following SR-4 through Franklin Canyon and crossing over the Carquinez Strait on a new high-level rail bridge (**Figure 4-6**). The most promising alignment for a new, more reliable high-level crossing of the Strait appears to be a new bridge that is parallel to the existing crossing between the twin spans of the Benicia-Martinez (I-680) auto bridge. The southern end of this new bridge could connect to the existing alignment rather than along a new I-80 alignment through Vallejo.[64]

Although this new potential alignment that connects to the existing BNSF ROW is the most feasible of all the alternatives, it would not serve the proposed City of Hercules Intermodal Transit Center (train, ferry, and bus) along Bayfront Boulevard near Refugio Creek. The city envisions a future Capitol Corridor station in Hercules at this location, but there is a potential conflict between the Hercules Plan and the Amtrak/Capitol Corridor Plan which could leave the planned Hercules Intermodal Transit Center without train service.[65] Existing facilities, such as

[64] Capitol Corridor Joint Powers Authority 2014 Capitol Corridor Vision Plan Update Final Version
[65] City of Hercules, www.ci.hercules.ca.us/index.aspx?page=226

the UPRR tracks, and potential developments in this area, such as the proposed Hercules Transit Center, would need to consider potential sea-level rise impacts.

Figure 4-6: Alternatives for Improvement along the Capitol Corridor in West Contra Costa County



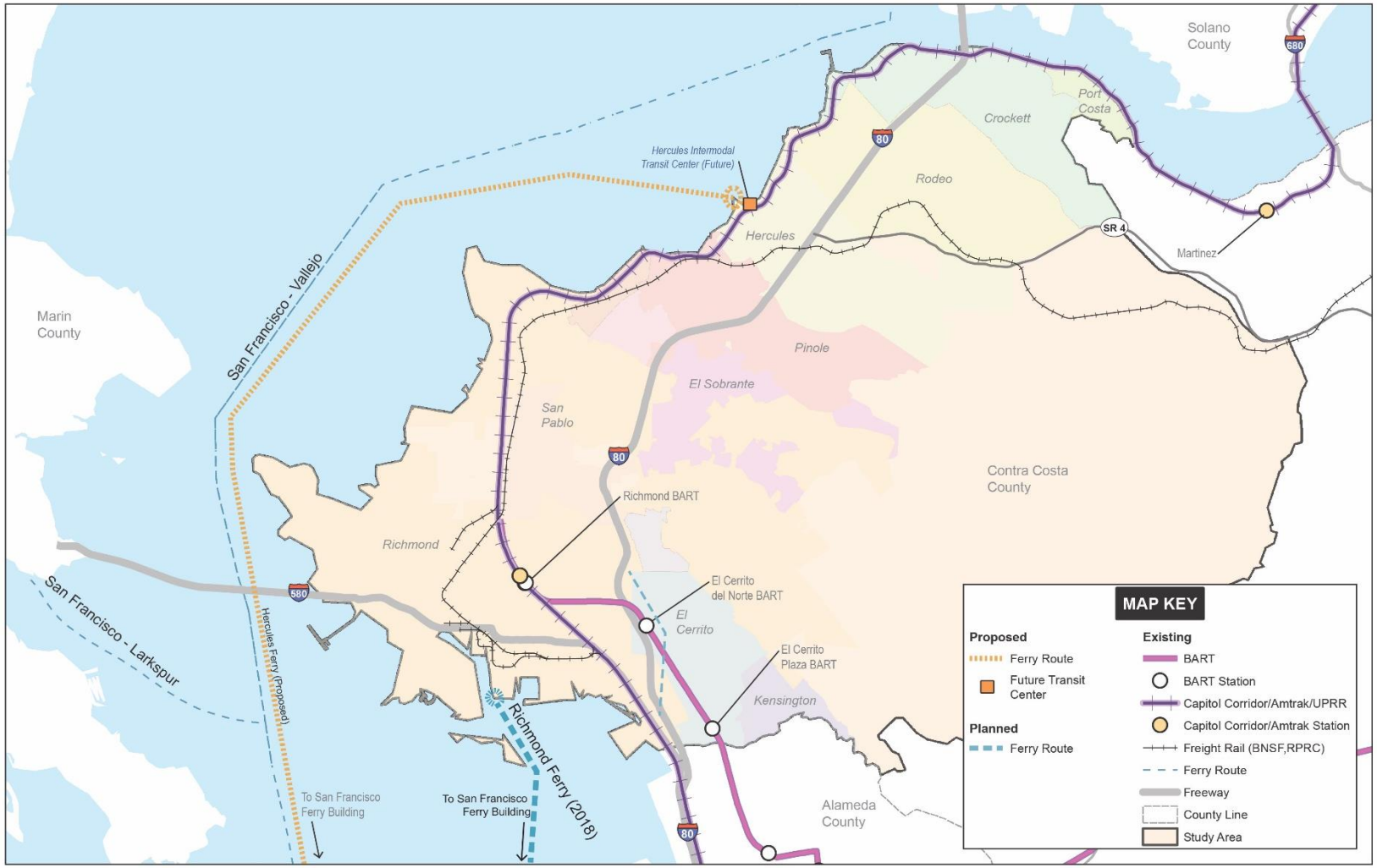
Source: Capitol Corridor Joint Powers Authority, 2014 Vision Plan, Update Final Version

4.1.4 Ferry Service

Ferry transportation is a viable transit mode in the San Francisco Bay Area, with passenger ferries having operated in the region for over 150 years. West County's shoreline location facilitates the exploration of potential ferry service to serve the study area and provide another transportation choice for travelers. The Water Emergency Transportation Authority's (WETA) Implementation and Operations Plan (2003), which proposed how the agency would achieve its legislative mandate, included both Richmond and Hercules as potential ferry terminal locations. Moreover, Measure J, Contra Costa County's half-cent transportation sales tax passed in 2004, provided partial funding for potential ferries in both Richmond and Hercules.

WETA considers Richmond ferry service to be a near-term expansion project and Hercules ferry service to be a longer-term, "horizon" expansion project. Ferry service at both locations is discussed below and depicted in **Figure 4-7**. Both services were evaluated in CCTA's Financial Feasibility Study for Contra Costa Ferry Service (2014). The study looked at financial feasibility

Figure 4-7: Planned and Proposed Ferry Service



Source: Kimley-Horn, 2015

by estimating capital and operating costs, as well as the potential ridership. Of the four ferry services examined in Contra Costa County, the study determined that service from Richmond would likely have the highest ridership and lowest cost This Financial Feasibility Study is further discussed in Tech Memo 4: Prior Studies. With funding from a variety of sources, including Measure J, WETA is now actively moving forward with the implementation of Richmond ferry service.

Planned Ferry Service to Richmond

WETA will operate ferry service between the existing San Francisco Ferry Terminal and a new ferry terminal on the Ford Peninsula in the City of Richmond starting in 2018. (See **Figure 4-7** and **Figure 4-8**) The agency is currently designing the ferry terminal in Richmond and anticipates beginning construction in 2016.

In March 2015, WETA entered into a 10-year cooperative agreement with the Contra Costa Transportation Authority (CCTA), which includes allocating operating funds for ferry service from Contra Costa County's Measure J transportation sales tax funds. Under this agreement, CCTA would provide an estimated $1.25 million or more annually towards operation of the service.[66] Initial service would include 11 trips per weekday as follows: the morning commute (6 a.m. to 9 a.m.) would consist of three weekday ferry trips from Richmond to San Francisco, with two reverse commute trips back to Richmond. The evening commute (3 p.m. to 7 p.m.) would consist of four weekday ferry trips from San Francisco to Richmond, with three reverse commutes back to San Francisco.[67] The 2035 projected daily ridership for the Richmond service is 1,715 passenger trips (or about 858 riders).[68] The aforementioned Ferry Financial Feasibility Study found that the Richmond ferry service could operate under WETA's existing ferry service funding guidelines, i.e., farebox recovery rates are projected to be 45 percent, exceeding WETA's farebox recovery goal of 40 percent.

Proposed Ferry Service to Hercules

Ferry service between Hercules and downtown San Francisco has also been proposed with a terminal located adjacent to the Hercules' planned Intermodal Transit Center (see **Figure 4-7**) and is discussed in Section 4.1.5 below. WETA's recent ridership model forecasted daily

[66] WETA website, Near-Term Expansion Projects: Richmond Ferry Service, https://sanfranciscobayferry.com/node/331

[67] WETA website, "WETA Approves Richmond Ferry Funding," Available https://sanfranciscobayferry.com/weta-approves-richmond-ferry-funding

[68] WETA website, Near-Term Expansion Projects: Richmond Ferry Service, https://sanfranciscobayferry.com/node/331

Figure 4-8: Location of Richmond Ferry Terminal

Sources: WETA, Richmond Ferry Terminal Project: Initial Study/Mitigated Negative Declaration, May 2014; WETA, 2015, Richmond Ferry Terminal Design Project, Design Review Submittal

ridership of 565 passenger trips (or 283 passengers) by 2035[69] for this service, which would require the purchase of new vessels as well as the construction of terminal facilities.

A draft EIS/EIR was prepared for the Intermodal Transit Center in 2010. While FTA issued a Record of Decision for the Intermodal Transit Center's Final EIS/EIR in 2012, the ferry terminal was not a part of this environmental process. WETA and the City of Hercules agreed to complete the environmental review of the ferry terminal when implementation of the ferry component is more certain based on funding availability and progress with other Intermodal Transit Center components.[70]

Figure 4-9 shows the proposed site plan for the proposed locations for the ferry terminal. Passengers would access the proposed ferry terminal location via a bridge to be constructed over the railroad tracks. Given the existence of shallow mudflats adjacent to the shore, the proposed ferry terminal location would require the construction of a pier at least 500 feet long and extensive dredging in this area. The dredging required at this location would involve significant capital costs as well as periodic preventive dredging maintenance costs. The total estimated cost of a terminal is $20 to $35 million, with $17 to $20 million of that cost being linked to the initial costs of dredging, according to the Ferry Feasibility report.

The City of Hercules has proposed an alternate terminal location on Point Hercules, which is located approximately a half-mile west of the proposed train station building. This alternate location may be situated in deeper water, which would likely reduce the amount of dredging work to be done (both initially as part of construction and also as part of periodic preventive maintenance). Confirmation of this fact and an assessment of the differential cost of dredging would require additional environmental and technical studies that are beyond the scope of this study. According to CCTA's Financial Feasibility of Contra Costa Ferry Service Final Report (2015), the City of Hercules "recently acquired Point Hercules" so the City could now plan for ferry service when developing any future plans (e.g., park, open space, development, etc.) for this area.

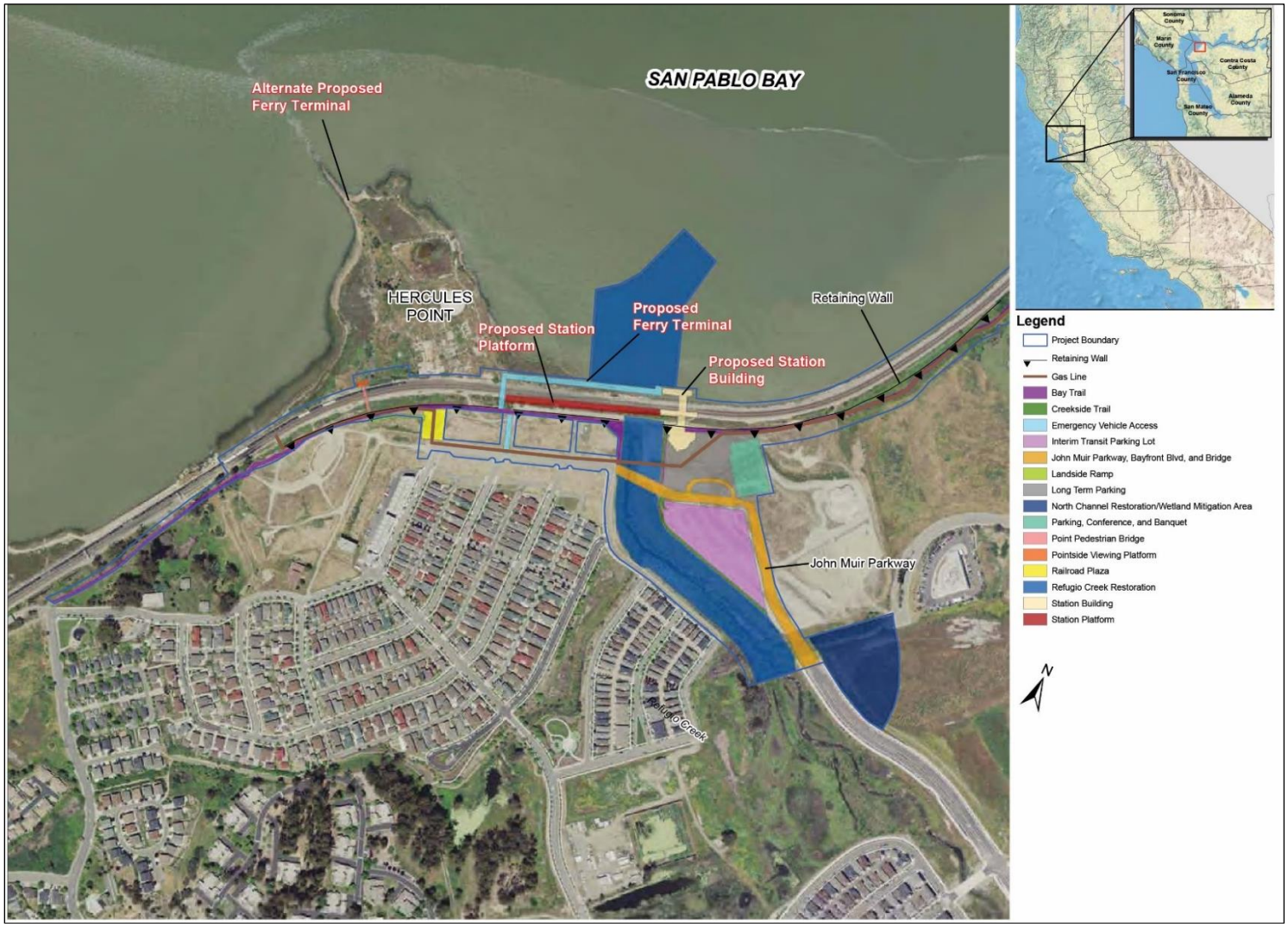
While site plans have not been prepared for this alternate location, a pedestrian bridge over the existing railroad tracks would be constructed to provide access to and from the ferry boat, just as with the with the other terminal location. However, in the case of the Hercules Point location, a longer path of travel would be required, which would increase passengers' walking distance and time to and from the boat. This could negatively impact ridership.[71]

[69] WETA website, Horizon Projects: Hercules Ferry Service, https://sanfranciscobayferry.com/node/331

[70] WETA website, Horizon Projects: Hercules Ferry Service, https://sanfranciscobayferry.com/node/331; CCTA, 2014, Financial Feasibility of Contra Costa County Ferry Service, 2015-2024

[71] CCTA, 2014, Financial Feasibility of Contra Costa County Ferry Service, 2015-2024

Figure 4-9: Site Plan for Hercules Intermodal Transit Center



Source: City of Hercules, Hercules Intermodal Transit Center Environmental Impact Report/ Environmental Impact Statement, April 2012, http://www.ci.hercules.ca.us/index.aspx?page=604

As mentioned previously, the primary cost differentiator between the two sites would most likely be the dredging costs with other factors (e.g., construction of terminal and auxiliary facilities, operating hours and frequency, etc.) remaining constant. The largest capital cost, according to the study, is not the terminal itself but the three ferry vessels required for this service, which have a total estimated price of $51,000,000 in 2014 dollars.

In addition to the capital costs of the ferry terminal and vessels, a potentially larger financial consideration is the ongoing annual operating cost of $5.6 million for which no funding source has currently been identified. Compared to Richmond ferry service ($3.46 million), Hercules ferry service would have higher annual operating costs due to the greater distance traveled (approximately double the length) and the associated additional fuel and labor costs. This cost does not include the ongoing expense of periodic dredging, the extent of which has yet to be determined.

The resulting 20-year capital and operating costs would be approximately $183-$197 million, which includes terminal construction with initial dredging, acquisition of ferries and ongoing operating costs, but not including possible periodic dredging for maintenance (although some of the operating expenses could be offset by fare revenue). Moving the terminal to Hercules Point could save up to $20 million if all dredging costs are avoided. However, this would only offset a portion (about 10 to 11 percent of the estimated 20-year expenses. In addition, as mentioned previously, the new location could also make ferry access less convenient, resulting in a potential loss of both ridership and fare revenue over time.

4.1.5 Hercules Intermodal Transit Center

The Hercules Intermodal Transit Center, which is under construction, is located adjacent to the mixed-use Hercules Waterfront Development on the eastern shore of the San Pablo Bay along Bayfront Boulevard near Refugio Creek. The transit center will include a new train station located west of Refugio Creek, as well as connections to potential new ferry service and local express bus service. [72]

The intermodal center would serve the City's planned transit-oriented development, which would include 1,300 housing units as well as commercial, office, and live-work units to be built in phases. The first phase, the $7 million Bay Trail East, is substantially complete and includes over a half-mile of new Bay Trail and the lateral clearance for the third rail track that will serve the future rail station. Construction on the $12 million Path To Transit phase began this fall and will extend John Muir Parkway and Bayfront Boulevard over Refugio Creek to provide direct access to the new rail station from I-80 and State Route 4. The scheduled completion date for this phase is fall 2016. The City of Hercules continues to seek funding for the three remaining

[72] CCTA, Project Fact Sheet, http://www.ccta.net/projects/project/35

phases, which are needed to allow the train to stop. These future phases include Fuel Line Relocation, Track/Signal Work, and the Rail Station.

The Intermodal Transit Center is environmentally cleared, except for the ferry portion of the project. The majority of the center's design has been completed, and future phases can proceed as soon as funding is secured. As noted in Section 0, if the Capitol Corridor alignment is moved to the BNSF corridor, the opportunity for a Capitol Corridor station at this location would be lost.

4.1.6 Transit-Oriented Development and Access Improvements at West Contra Costa BART Stations

This project, which is sponsored by BART, proposes to construct station and access improvements to enhance and support the development of transit-oriented development at the El Cerrito Plaza, El Cerrito del Norte, and Richmond BART stations. Planning studies are underway, and improvements being examined include pathways, plazas and sidewalks, upgraded lighting, restroom renovations, bicycle facilities, signage, additional vertical circulation, security features, landscaping, and other improvements in conjunction with development around the stations. While implementation of improvements will be phased by station, design is anticipated to take place from spring 2016 through spring 2018.[73]

4.2 Future Freight Improvement Projects

The UPRR and the BNSF, as private freight operators, do not make their plans for expansion available to the public. For this reason, an estimate of line capacity and the constraints that it poses to joint operation of freight and passenger service have been estimated for planning purposes for this study.[74]

4.2.1 Line Capacity

The competition between freight and passenger demands continues to be a capacity issue for lines where the rail ROW is shared. With the freight operators owning the lines and the passenger services gaining access rights through operating agreements, there are constraints on the ability to grow passenger services. Rail-line capacity is influenced by several factors, including the amount of traffic (e.g., trains per day), train speed, track curvature, gradient, and type of signaling systems used. Other factors affecting train capacity include grade crossings, industry tracks, siding spacing on single track lines, and the types of freight and passenger trains operating on the line.

Line capacity is measured using the following three metrics:

[73] CCTA, Project Fact Sheet, http://www.ccta.net/projects/project/138
[74] Estimates developed by RL Banks, 2015.

- *Theoretical capacity*, which is derived by a set of calculations involving train speed, segment length, segment occupancy time, and signal system characteristics
- *Practical capacity*, which is derived by reducing computed theoretical capacity by the application of judgment based on experience
- *Segment-specific capacity*, which is based on hands-on experience with operating individual track segments

Theoretical capacity has been studied extensively in the railroad industry and in academia. The results are typically expressed in the form of a formula that calculates the capacity of individual line segments using line-specific data and conclusions are drawn based on typical capacity. Theoretical capacity may differ from practical capacity because of different locomotive and train-handling characteristics that cause varying train speeds, mechanical problems, track maintenance, and adverse weather that can impact the railroad's ability to operate at optimal train speeds. There are two different types of signaling systems used by the railroads in this study. UPRR uses a Centralized Traffic Control System. Centralized Traffic Control (CTC) – which is a series of interlocking signals controlled by a train dispatcher, as discussed previously. BNSF uses a combination Automatic Block Signal System (ABS) with a Track Warrant Control system (TWC), which were also defined previously.

Table 4-1 shows the Association of American Railroads' (AAR) identified practical rail system capacity.[75]

Table 4-1: Rail System Capacity

Number of Tracks	Automatic Block Signal System (Trains Per Day)	Centralized Traffic Control System (Trains Per Day)
1	18-25	30-48
2	53-80	75-100

Note: For each range of trains per day, the lower figure represents the practical maximum if multiple train types use the corridor; the higher figure would be practical only if all trains on the line were of a single type with uniform characteristics.
Source: Cambridge Systematics, 2007

The most accurate method to determine line capacity is to use computer simulations. Due to budget constraints for this study, the line capacity has been estimated using the methodology in the National Rail Freight Infrastructure Capacity Study developed for the AAR.

[75] Cambridge Systematics, Inc. 2007. National Rail Fright Infrastructure Capacity and Investment Study. September

4.2.2 Improvements to Enhance Capacity

To enhance the capacity of a given line or a segment of the line, railroads use various improvements such as crossovers, sidings, and running tracks. These improvements allow a railroad to host more trains by facilitating train bypasses.

Crossovers

A crossover is a pair of switches connecting two parallel tracks. Crossovers in different directions overlap to form an "X." Crossovers allow trains traveling at different speeds to pass or meet one another without having to stop. On double-track rail lines, installation of crossovers facilitates the movement of fast passenger trains and slower moving freight trains by permitting movement from one track to another track to allow the faster moving train to overtake the slower train. Crossovers also provide railroads with increased capacity because they allow more flexibility in train operations.

Sidings

A siding is a parallel track connecting with the mainline, typically with switches at each end. A siding allows higher priority trains on a single track railroad to pass lower priority trains. Siding also allows trains traveling in opposite directions to pass each other.

Running Track

Running track is track paralleling the mainline track with switches on each end. The running track allows switching locomotives to access various shippers along the segment without blocking the mainline.

4.2.3 Union Pacific Railroad Martinez Subdivision

The UPRR line between Richmond and Martinez is predominantly two main tracks with a CTC signal system. Traffic on the line is mixed, consisting of faster passenger trains and freight trains, which are likely to operate at varying speeds. Applying the capacity guidelines previously cited from the 2007 AAR Report would indicate that a practical capacity of 75 trains per day could be expected, given multiple train types. The AAR methodology is not specific to train speed but it can be inferred that its capacity figures would represent "normal" conditions. The maximum train speeds (79 mph passenger and 70 mph freight) on the subject line are, if anything, at the upper end of normal, suggesting that the 75 train figure may be attainable under optimal operating conditions. However, between MP 18.6 and the Martinez station at MP 31.6, train speeds are significantly lower (40 mph passenger[76] and 30 mph freight). A 50-

[76] Capitol Corridor trains are allowed to operate at 79 mph between Oakland and Richmond and between Benicia and Sacramento.

percent reduction in speed would cause a 50-percent reduction in theoretical capacity. The lower train speeds would be expected to cause a lesser reduction in practical capacity over the specific segment and hence on the subject line overall.

Comparing the total daily train count of approximately 62 trains with a suggested practical capacity of somewhat under 75 daily trains indicates that the line is approaching capacity at times of peak passenger train operations.

Line Capacity Enhancements

The Hercules Intermodal Transportation Center would require construction of an 8,000-foot station track and construction of a three-mile section of third main track in the vicinity of Hercules. Based on track charts and satellite imagery, it would be possible to construct a three-mile section of third main track between Pinole MP 20.1 and Oleum MP 23.1.

Train Operations

Commuter Rail Service is a passenger service that primarily operates between city center and the outer suburbs up to 100 miles. They typically operate between the hours of six and nine AM and between four and seven PM five days per week, but can also offer off-peak midday service. Station distances vary, but are much shorter than intercity passenger rail stations.

Intercity Passenger Rail is express service that covers longer distances than commuter rail trains. These trains operate between major metropolitan areas with less frequent stops than commuter trains and with more comfortable coaches for the longer distance journeys. They typically attract more business and vacation travelers.

The Martinez Subdivision could support four additional commuter rail round trips with the construction of additional triple track segments. To achieve this, the new commuter trains would need to be scheduled so as not to conflict with the existing intercity passenger rail schedules (e.g., operating four commuter trains during morning [6 to 9 AM] and four in the afternoon [4 to 7 PM]).

Signaling

New signals will be required at both ends of the Hercules Station track as well as both ends of the third main track sections. Installation of a positive train control system[77] would allow trains to operate closer together, thereby providing additional capacity.

[77] Positive Train Control is a system that monitors and controls train movements to provide increased safety, train separation, collision avoidance, speed enforcement and rail worker safety. Equipment on board the train then enforces this, preventing unsafe movement. PTC systems may work in either unsignalized territory or signaled territory, and may use GPS navigation to track train movements. PTC also provides additional capacity by allowing trains the ability to operate closer together than conventional signaling systems.

Stations

The Hercules Intermodal Transportation Center (MP 20.8), described in Section 3.2.2 is a planned intermodal rail station and ferry terminal in the City of Hercules and would offer the first direct rail-to-ferry transit hub in the San Francisco Bay Area. The station site, located at Hercules Point and adjacent to Bayfront Boulevard, would also host a Water Transit Authority ferry terminal providing passengers with a 42-minute ferry ride to/from the San Francisco Ferry Building. A Capitol Corridor station site would be considered at this location if the Capitol Corridor plans to straighten the existing corridor were pursued.

Commuter trains could also serve the existing stations at Berkeley with connections to AC Transit and Emeryville, where there could be bus connections available to San Francisco through an agreement with the Capitol Corridor Joint Powers Authority.

4.2.4 BNSF Railway Stockton Subdivision

The BNSF line between the Richmond Connector and Muir near Martinez is single track with passing sidings. It is equipped with an automatic block signal system and dispatched by Track Warrant Control. Traffic on the line consists solely of freight trains but includes trains of varying types, such as intermodal, vehicle, and mixed freight trains. Although freight train types vary, train performance likely is of somewhat more uniform characteristics in terms of speed than on the UPRR line which hosts both passenger and freight. Applying the capacity guidelines previously cited from the 2007 AAR Report would indicate that the practical capacity probably lies between the 18 trains indicated under “Multiple Train Types” and the 25 indicated under “Single Train Type.” The AAR methodology is not specific to train speed, but it can be inferred that its capacity figures would represent “normal” conditions. The maximum speeds on the segment (35 to 45 mph, with over half the distance limited to 35 mph) are, if anything, a bit lower than normal, suggesting that the 25-train figure may be problematic.

Sidings on the segment are short by modern standards with only Collier and Gateley (often dedicated to UPS cars) exceeding 5,000 feet in an era where many freight trains and most unit trains exceed 6,000 feet. Operating a train longer than the longest available siding reduces dispatching flexibility, complicates operations, and reduces capacity. Dedicating the main line at times to crews serving or shuttling equipment to/from the UPS facility reduces line capacity as no trains may pass over the segment when crews supporting the intermodal facility occupy the main line.

Given the infrastructure characteristics of the line and the priority given to intermodal switching and support movements, line-specific capacity probably lies between the 14 daily trains currently believed to be operating and the 18 daily trains indicated by application of the AAR study methodology.

Line Capacity Enhancements

Congestion occurs on the BNSF Stockton Subdivision related to the UPS transload facility at North Bay. UPS's contract with BNSF requires certain performance measures that result in UPS mainline and switching trains taking priority over all other train movement along this segment of the subdivision. Construction of a dedicated, one-mile running track between North Bay MP (1184.1) and Gateley (MP 1183.1) would help to ensure commuter trains do not experience delays associated with the switching of this facility. This will allow local switching jobs to operate to and from the North Bay facility without tying up the mainline.

Train Operations

This section assumes that the new commuter rail operations could add four trains in the morning and four trains during the afternoon peak periods, for a total of 22 trains per day (14 freight trains and 8 passenger trains). Applying the capacity guidelines from the previously cited 2007 AAR report indicates a practical capacity lies within the 18 to 25 train range, as indicated under the "Multiple Train Types" heading. With the addition of a new siding at Pacheco or Muir and the construction of a dedicated running track between Gateley and North Bay, the BNSF Stockton Subdivision could contain sufficient capacity to operate 22 trains per day on this line.

Signaling

With the introduction of passenger service, new signals may be required at the following locations to protect a stopped passenger train:

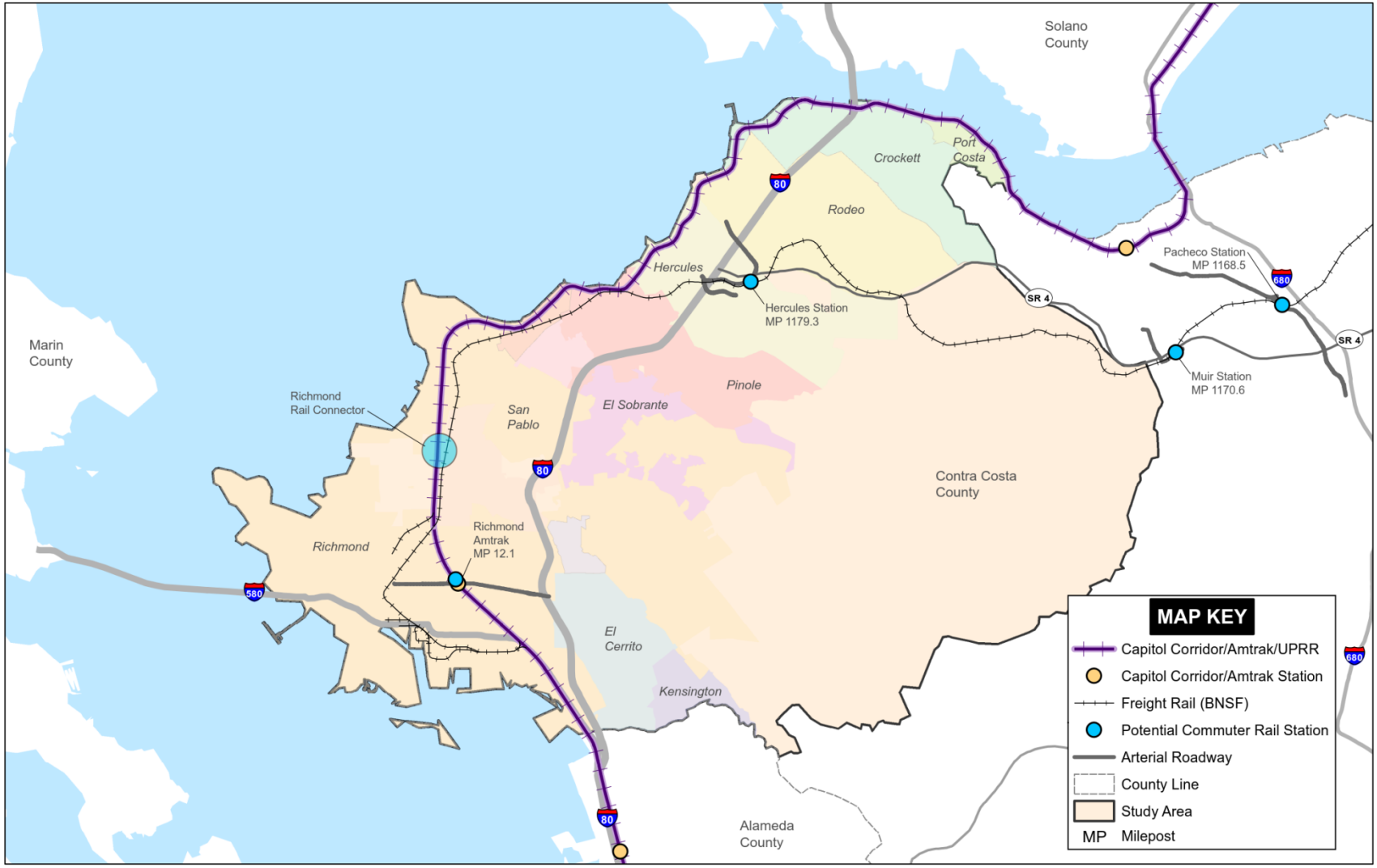
- Each end of the new Pacheco Siding (MP 1168.5)
- Each end of the new Muir Siding (MP 1170.6)
- Each end of the new Richmond Running Track (UPRR MP 14.2 and 12.1)

Stations

Based on a very preliminary analysis for this phase of the study, the BNSF Line contains the following potential commuter rail station sites (see **Figure 4-10**). The routing of connecting service to the south, will be examined during the alternatives development phase.

- Existing Richmond Amtrak Station MP 12.1. – Commuter rail access to the station would be provided by a dedicated running track between the BNSF connection at UPRR MP 14.4 and the Richmond Amtrak Station at MP 12.1. This would require the construction of a 2.3-mile-long running track along the east side of the UPRR mainline. Depending on the outcome of negotiations with the UPRR, it also may require the construction of a separate new station platform if access via the existing platform cannot be negotiated.

Figure 4-10: Potential Commuter Rail Station Sites on BNSF ROW



Source: WSP | Parsons Brinckerhoff, Kimley-Horn, RL Banks, 2015

- Hercules Station MP 1179.3 – Located near the intersection of Palm and Willow avenues, across the street from the Valley Bible Church, this location offers direct access to or from SR-4 via Willow and Sycamore avenues. The potential station location is within the Study Area and would use the existing Collier Siding as a station platform. Muir Station (MP 1170.6) – Located along Muir Station Road near the Grace Episcopal Church, just to the east of the Study Area, this site has direct access to SR-4 and downtown Martinez via Alhambra Way. This site would require construction of a siding to serve a station platform and overhead pedestrian walkway across Muir Station Road.
- Pacheco Station MP (1168.5) – Located west of the I-680 access ramps, Pacheco Boulevard provides access to downtown Martinez along a signalized four-lane road. This site, located east of the Study Area, would require the construction of a siding to serve a station platform off the mainline.

4.3 Future Roadway Improvement Projects

Proposed highway projects in the Study Area involve optimizing the existing facilities rather than roadway expansion.

4.3.1 Express Lanes

Express lanes are highway lanes designated specifically for travel by buses, carpools, vanpools, and other eligible vehicles at no cost. Solo drivers are allowed to use express lanes for a toll. Express lanes are a complimentary investment to high capacity transit investments—separating bus traffic from slower moving lanes enables buses to move through less congestion, providing faster and more reliable service. MTC plans to operate 270 miles of the 551 miles of the express lanes proposed in the Bay Area. This includes the conversion of 150 miles of existing carpool lanes to express lanes and the addition of 120 miles of new lanes to fill gaps in the Bay Area system of express lanes. Express lanes are planned on I-80 in West County between the Carquinez and Bay bridges and are expected to be operational by 2025 (see **Figure 4-11**).

Figure 4-11: Planned Express Lanes

Source: MTC, http://www.mtcexpresslanes.org/projects/express_lanes/projects/

4.3.2 CCTA I-80 Integrated Corridor Mobility Project

The Integrated Corridor Mobility project for I-80 and includes San Pablo Avenue is a multi-agency effort being led by Caltrans, CCTA, and the Alameda County Transportation Commission. It is part of the Smart Corridor project, which involves an Intelligent Transportation System (ITS) to improve travel time reliability and reduce accidents and associated congestion. ITS uses communication technologies to improve safety and mobility (e.g., providing drivers accurate, real- time information about traffic conditions). Construction of ITS improvements along San Pablo Avenue was completed in September 2014, with construction of ITS improvements along I-80 scheduled to be completed by the end of 2015.[78] ITS improvements will help relieve congestion on the I-80 corridor by optimizing circulation on the existing lanes without requiring increases in capacity. This will benefit existing bus and future bus service that travel on the corridor by allowing for faster bus operations.

4.3.3 CCTA Countywide Comprehensive Transportation Plan

The 2014 Countywide Comprehensive Transportation Plan Update, Draft for Public Review highlights specific actions for the 11 designated Routes of Regional Significance in West County:

I-80

- Implement and maintain the I-80 Integrated Corridor Mobility Project and the I-80 Corridor System Management Plan that aim to optimize traffic circulation on the I-80 corridor and will enable other modes to travel faster;
- Complete the Hercules Intermodal Station (also an action for SR-4 below) which will serve several modes of public transportation, including train, bus, and a possible ferry link the near future. This station is located along the I-80 corridor and would serve as a key transportation hub for future HCT investments.

I-580

- Implement the West County Subregional Transportation Mitigation Program, which is a fee required for health and safety fee reasons (i.e., traffic safety, improved commute and traffic conditions) to mitigate impacts as a direct result of the projects. The program will raise funds for eleven projects, several which are directly related to improvements that will help relieve congestion on the I-80 corridor (e.g., Hercules Passenger Rail Station, Ferry service from Richmond to San Francisco);
- Study extension of the Bay Trail

[78] CCTA, Project Fact Sheet, http://www.ccta.net/projects/project/37

SR-4

- Upgrade to a full freeway between I-80 and Cummings Skyway;
- Implement the recommendations of the SR-4 Integrated Corridor Analysis;
- Complete the Hercules Intermodal Station (also an action for I-80 above)

Appian Way

- Implement the recommendations of the Appian Way Alternatives Analysis and the Downtown El Sobrante Study

Carlson Boulevard, Central Avenue, and Richmond Parkway

- Implement the recommendations of the WCCTAC Transit Enhancements and Wayfinding Study (also an action for 23rd Street)

Cummings Skyway

- Study extension of the truck climbing lanes between Crockett Boulevard and Franklin Canyon Road

San Pablo Avenue

- Implement the San Pablo Avenue Complete Streets/Bay Trail projects;
- Increase transit service along the corridor

San Pablo Dam Road

- Complete the interchange with I-80;
- Implement the recommendations of the WCCTAC Transportation Demand Management (TDM) Program (also an action for 23rd Street)

23rd Street

- Implement the recommendations of specific plans along the street

5 SUMMARY

Currently transit carries about 12 percent of the commute trips in West Contra Costa County compared to 9 percent countywide. At the county level, the transit and the drive alone share of travel during commute periods has remained fairly constant over the past 30 years. As a result, as population and employment growth continues, the congestion on I-80, I-580, and SR-4, as well as alternative routes such as San Pablo Avenue, continues to increase.

While policies have been put in place to promote alternatives to single-occupant auto travel and to encourage transit-oriented development, Contra Costa County, as a whole, has not seen concrete results in terms of shifts in travel behavior or in land use patterns, with a few exceptions. This may be a result of limited funding for transit operations and increased competition for transit capital funds accompanied by land use policies that have not changed as rapidly as the growing demand for transit services. Given these conditions, the ability to keep pace with population growth and grow transit mode share is difficult. In West County, the limited investments in transit that have been made, including increased express bus service, new ferry service from Vallejo, and improvements in Capitol Corridor service, while well utilized, have not resulted in an increased transit mode share at a countywide level.

By documenting the existing transit ridership as well as the potential for expanding these services, the groundwork has been laid for better understanding how to address the critical challenge of providing transit services that can effectively serve the population in West County and begin to capture a greater share of the travel market. The success of this effort will be closely tied to understanding the land use patterns and the travel markets that exist in West County.

6 NEXT STEPS

The next step in the study involves preparing a summary of population and employment in the Study Area and linking that information with an assessment of the potential transit markets. As high transit usage often hinges on the achievement of a mix of land uses with increased density and limiting parking supply, the next phase of the study will complement the transportation information provided in this technical memorandum. The information will be further complemented by an assessment of trip origins and destinations within the Study Area and trips that travel through the Study Area and contribute to congestion on the major corridors.

ATTACHMENT A

Summary of Ridership in West Contra Costa County

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Appendix A

Table A-1: Summary of Ridership in West Contra Costa County

Operator	Route(s)	2014 Calendar Year Average Daily Riders (Except where noted)
AC Transit	7	726
AC Transit	25	841
AC Transit	70	1,187
AC Transit	71	1,749
AC Transit	72	4,384
AC Transit	72M	4,266
AC Transit	72R	6,139
AC Transit	74	1,368
AC Transit	76	2,610
AC Transit	376	327
AC Transit	800	352
AC Transit	G	363
AC Transit	L	648
AC Transit	LA	493
AC Transit	LC	55
AC Transit Total		***25,508***
BART Total	***Richmond, El Cerrito del Norte, El Cerrito Plaza***	***18,000***[79]
Fairfield-Suisun Transit	**90**	***955***
Golden Gate Transit	40	212
Golden Gate Transit	42	627
Golden Gate Transit Total		***839***
SolTrans	**80**	***1,510***
VINE	***Route 29***	***156***
WestCAT	LYNX	1,000
WestCAT	Express Routes (J, JX, JPX)	2,400
WestCAT	Local Fixed Routes (10, 11, 12, 15, 16, 17, 18, and 19) and Regional Routes (30Z and C3)	1,600
WestCAT Total		***5,000***
TOTAL Daily Intra-County/Regional Riders		***51,968***
Capitol Corridor (Amtrak)	**Richmond Station Boardings/Alightings**	**110,891 (FFY annual)**

FFY: Federal Fiscal Year

[79] BART, 2015, www.bart.gov/about/reports/ridership